FESSH 2024 CONGRESS

26-29 JUNE 2024 ROTTERDAM, THE NETHERLANDS

ABSTRACT BOOK

FESSH
Federation of European Societies for Surgery of the Hand

www.fessh2024.com

A-0001 PERILUNATE DISLOCATIONS AND FRACTURE-DISLOCATIONS: CLINICAL AND FUNCTIONAL LONG-TERM OUTCOMES

Irene Amigo Fernández, Rosa Villar Quintana, Nadia Mora Navarro, Guillem Salva Coll
University Hospital Son Espases, Majorca, Spain

Introduction: Perilunate dislocations and fracture-dislocations are severe injuries, usually result of high-energy trauma to the wrist. They often present in the setting of polytrauma patients with injuries to multiple organs and extremities. This fact could explain that the diagnosis may be initially missed in up to 25% of the cases, according to previous studies. Delay of treatment has an adverse effect on clinical results, whereas anatomical type tends to have less influence. We present a review of the clinical results obtained in the medium-long term of the cases treated in our center.
Objective: To evaluate the clinical results in the medium-long term and the influence of delayed treatment and anatomical type on the prognosis of these carpal injuries.
Materials and method: A retrospective study of 15 patients with perilunate dislocations and fracture-dislocations treated at our center from 2013 to 2022, with a mean follow-up of 4.05 ± 1.51 years, was conducted. A review of the medical records was performed and all patients were clinically evaluated. Functional assessment was based on the results of the QuickDASH scale, the PRWE scale, the Mayo Wrist Score scale, range of wrist mobility and fist clench strength. Data were analysed based on pattern of injury (dislocation or fracture-dislocation) and delay of treatment.
Results: The mean age was 47 ± 5 years, 93.30% male (14 cases). Perilunate fracture-dislocations (12 cases) were more frequent than perilunate dislocations (3 cases) in a ratio of 4:1. The dislocation of the head of the capitate from the distal surface of the lunate was dorsalward in all cases. In 53.30% of the cases, the carpal injury was result of high-energy polytrauma and the diagnosis was initially missed in 3 cases (20%). The mean score for the QuickDASH scale was 13.50 ± 6.09, PRWE scale 14.27 ± 10.63, Mayo Wrist Score scale 59.80 ± 6.22. Compared to the unaffected wrist, the mean loss of flexion was 37.60 ± 10.68%, extension 37.53 ± 8.81%, radial deviation 39.40 ± 8.24%, ulnar deviation 34.47 ± 7.55% and fist clench strength 29.93 ± 9.70%. No statistically significant differences were found between the delay of treatment and the results on the functional assessment scales, range of mobility and strength parameters. On the other hand, clinical results were found to be better in pure ligamentous injuries compared to fracture-dislocations ($p<.001$), proving a significantly lower loss in range of motion, fist clench strength and better results in the tests performed.
Conclusions: Perilunate dislocations and fracture-dislocations are severe and rare injuries. The results obtained in the functionality scales are globally good, however, a worse recovery is observed in terms of mobility and strength. Likewise, it is suggested that the prognosis of these injuries is directly related to the type of injury, being the prognosis better in patients with perilunate dislocations without associated fractures.

A-0002 A NOVEL PULSED ELECTROMAGNETIC FIELD DEVICE AS ADJUVANT THERAPY AFTER SURGICAL TREATMENT OF DISTAL RADIUS FRACTURES: A PROSPECTIVE, DOUBLE-BLIND, SHAM-CONTROLLED, RANDOMIZED PILOT STUDY

Shai Factor, Franck Atlan, Oren Rudik, Yishai Rosenblatt, Daniel Tordjman, Gilad Eisenberg, Tamir Pritsch
Hand Surgery Unit, Division of Orthopedic Surgery, Tel Aviv Medical Center, Israel

Background: This study aimed to determine whether the application of a novel pulsed electromagnetic fields (PEMF) generating device, the Fracture Healing Patch (FHP), immediately after open reduction and internal fixation (ORIF), results in faster healing of acute distal radius fractures (DRF) compared to a sham treatment.
Methods: Thirty-two patients with DRFs treated with ORIF were included. Patients were allocated to a PEMF group

(n =15) or a control (sham) group (n =17). All patients were assessed with regard to functional Patient-Rated Wrist Evaluation (PRWE) and SF12 and radiological outcomes (X-rays and computed-tomography (CT) scans) at 2,4, 6 and 12 weeks postoperatively.
Results: Patients treated with active PEMF demonstrated significantly higher extent of union at 4 weeks as assessed by CT (70% Vs 54%, p=.05). Mean grip strength in the active group was significantly higher as compared to control 16 ± 9 Kg vs 7 ± 3.5 Kg, respectively, p=. 02) A function subscale of the PRWE was significantly better in PEMF treated group at 6 weeks after surgery (27.2 VS 35.5, p=.04). No statistically significant differences were found in SF12.
Conclusion: PEMF application after ORIF of DRFs is safe, may accelerate bone healing which could lead to an earlier return to daily life activities and work.

A-0003 THE „SELFIE TEST": A NOVEL TEST FOR THE DIAGNOSIS OF LATERAL EPICONDYLITIS

Shai Factor, Ehud Rath, Eyal Amar, Oren Rudik, Daniel Tordjman, Gilad Eisenberg, Franck Atlan
Department of Orthopedic Surgery, Tel Aviv Medical Center, Israel

Background: Lateral epicondylitis (LE) is one of the most diagnosed elbow pathologies. The purpose of this study was to determine the diagnostic test accuracy of a new test (Selfie test) for the diagnosis of LE.
Methods: Medical data was collected from adult patients who presented with LE symptoms and ultrasound findings that supported the diagnosis. Patients underwent physical examination, including provocative tests for diagnosis as well as the Selfie test, and were asked to fill out the Patient Rated Tennis Elbow Evaluation (PRTEE) questionnaire and subjectively rate the activity of their affected elbow.
Results: Thirty patients were included in this study (17 females, 57%). Mean age was 50.1 years old (range, 35-68 years). The average duration of symptoms was 7±3.1 months (range, 2-14 months). The mean PRTEE score was 61.5±16.1 (range, 35-98), and the mean subjective elbow score was 63±14.2 (range, 30-80). The Mills, Maudsley, Cozen, and Selfie tests had sensitivities of 0.867, 0.833, 0.967, and 0.933, respectively, with corresponding positive predictive values of 0.867, 0.833, 0.967, and 0.933.
Conclusion: The Selfie test's active nature, which allows patients to perform the assessment themselves, could be a valuable addition to the diagnostic process, potentially improving the accuracy of diagnosis of LE.

A-0004 TREATMENT OF MULTIPLE FINGERTIP AMPUTATIONS BY ABDOMINAL POCKET METHOD

Takada Satoshi[1,2], Kitayama Toshihiro[1,2], Sakai Yuki[2], Hirai Kotaro[2], Nagamori Kei[2], Nishii Yoichi[2]
[1]Kyowa Hospital, Kyoto, Japan; [2]Uji-Tokushukai Medicalcenter, Kyoto, Japan

Introduction: The pocket principle, first reported by Brent in 1979, is an alternative method for the fingertip amputation when a microsurgical replantation is impossible. In recent years, the palmar pocket method has been recognized as an effective method for fingertip amputation. However, there are no reports of the pocket principle for multiple fingertip amputations. It is impossible to create a pocket on the palm to hold multiple fingers. The pocket must be created somewhere else other than the palm.
Purpose: The aim of this study is to present the effectiveness of abdominal pocket method for multiple fingertip amputations.
Methods: The surgical procedure for the amputated parts was performed according to the report by Arata in 2001. The

pocket was created in the contralateral lower abdominal quadrant instead of the palm. Detachment surgery was performed on day 17 after abdominal pocketing in all cases.
A total of 14 patients with multiple fingertip amputations underwent the abdominal pocket method in our hospital between 2013 and 2022 were retrospectively reviewed. Data collected includes age, sex, fingers, amputation level (Ishikawa's subzone classification), survival rate and postoperative range of motion (ROM). These data were compared with the data from 106 patients underwent the pocket principle for a single fingertip amputation in our hospital.
Results: All 14 patients were male and had two adjacent fingers amputated. Mean age was 38.8 years (range 22-62). 2 injured index finger and middle finger, 12 injured middle finger and ring finger. 22 fingers were subzone 2, 6 fingers were subzone 3. 26 fingers had complete survival and 2 fingers had partial dermal necrosis. All fingers conservatively epithelized. 2 partial necrosis fingers were subzone3. The average active PIP joint ROM was 10-78 and DIP joint ROM was 13-37. The shoulders, elbows and wrists had no loss of ROM, although rehabilitation was necessary.
Mean age of 106 single fingertip amputations was 35.5 (range 10-78). 67 fingers were subzone 2, 34 fingers were subzone 3 and 5 fingers were subzone 4. There were 90 males and 16 females. 2 fingers of 106 single fingertip amputations were completely necrotic. 33 fingers had partial necrosis and 71 fingers had complete survival. The average active PIP joint ROM was 23-73 and DIP joint ROM was 15-35. The shoulders, elbows and wrists had no loss of ROM, although rehabilitation was necessary.
Conclusion: The good results were obtained by using the abdominal pocket method for multiple fingertip amputation. There was no difference in engraftment rate or postoperative ROM between the single fingertip amputation group and the multiple fingertip amputation group. Abdominal pocket method is an effective treatment for multiple fingertip amputation.

A-0005 CATHETER IRRIGATION FOR FLEXOR TENOSYNOVITIS IN PATIENTS WITH SEVERE COMORBIDITIES: EARLY RESULTS AND CRITICAL REVIEW OF LITERATURE

Cheryl Pei Chyi Yong[1], Sze Ryn Chung[1], Zeus Yiwei Lim[2], Duncan Angus McGrouther[1,2]
[1]Department of Hand and Reconstructive Microsurgery, Singapore General Hospital, Singapore; [2]Biomechanics Laboratory, Singapore General Hospital, Singapore

Introduction: Flexor tenosynovitis is a common hand infection that occurs secondary to bacterial inoculation from an open wound or bacteraemia. Treatment involves surgical drainage and irrigation, with concomitant use of intravenous antibiotics. Our hypothesis is that flexor tenosynovitis can be treated effectively with catheter irrigation in patients with severe comorbidities. We illustrate our surgical technique and post-operative management with case examples, and our early results. A critical review of current literature is presented.
Methods: We describe a technique of treating pyogenic flexor tenosynovitis using a 2-incision catheter irrigation method, with the catheter placed within the flexor sheath. An incision is made just proximal to the MCPJ crease in the midline, and the flexor tendon sheath is incised. An infant feeding tube is inserted through the sheath and a separate exit incision is made over the distal aspect of the sheath and the midline pulp. The sheath is flushed intraoperatively till clear fluid is seen. This is followed by continuous irrigation of the flexor sheath post-operatively with 0.9% saline solution using a pump driver. Modifications of this technique for patients with narrower sheaths are also described. We retrospectively reviewed 16 patients with flexor tenosynovitis who underwent catheter irrigation with the described technique.
Results: Mean age of our patients was 61. 63% had a history of diabetes, and 13% had a history of renal impairment. 75% of patients had no obvious predisposing injuries. Patients received irrigation through a catheter for an average of 4 days (SD 1.2). Infection was controlled with a single catheter irrigation in 81% of patients. 25% of tissue cultures were

polymicrobial, and another 25% grew Staphylococcus aureus. 55% regained either good or excellent total active range of motion.

Summary:

• Continuous catheter irrigation through minimal incisions can be safely and effectively utilized to treat pyogenic flexor tenosynovitis in patients with severe comorbidities, with minimal morbidity

• We believe that the use of 0.9% normal saline causes the least damage to tissues, adequately dilutes proteolytic and lysosomal enzymes, and is effective as a mechanical lavage

• The use of a pump driver allows for reliable, continuous flow of irrigation fluid through the flexor sheath at a pre-determined infusion rate

• This technique also decreases nursing requirements, reducing the need for nurses to manually flush fluids through the catheter at intervals

A-0007 ATYPICAL LOCATION OF A GLOMIC TUMOR: REPORTS OF TWO CASES

Claudio Rodrigues de Lima, Carolina Braga dos Santos Azevedo, Diego Figueiredo Melara, Victor Augusto Ignácio de Souza
Hospital das Forças Armadas, Brasília, Brazil

The glomus tumor is a rare tumor and usually is located in the subungual region. In the last year, we performed two cases of glomus tumor in an atypical location and both patientes was male. In the first case the glomus tumor was located in volar face of the distal phalanx of the little finger and the second case was located in the first interdigital commisure. The histopathological exam confirmed the inicial hypothesis.

A-0008 TECHNIQUES TO REDUCE COMPLICATIONS IN TOTAL WRIST ARTHRODESIS - A CASES SERIES

Nathan Khabyeh-Hasbani[1], Sibat Noor[1], Sara Guerra[2], Yufan Yan[1], Steven M. Koehler[1]
[1]Montefiore Medical Center, Bronx, NY, USA; [2]Cedars Sinai Medical Center, Los Angeles, CA, USA

Introduction: Total wrist arthrodesis is reported to have a very high complication rate in the literature that ranges from 5-45% and can include nonunion and/or extensor tendon rupture for dorsal plate/screw constructs. It is often the "surgery of last resort" for wrist pathology. When employed, it can be a powerful tool to alleviate pain, correct deformity, and restore stability. Although complications are frequent, we have not encountered any complications in a consecutive series patients reported herein.

Methods: 24 consecutive patients from 2019-2023 were included. Retrospective chart review was employed for enrollment and determination of complications. Radiographs were reviewed for bony union.

Unique Surgical Methods to Avoid Complications:

•An "Eaton"-style capsular flap is raised to contain the bone graft. This technique helps to ensure graft containment and subsequently anchored for repair.

•A proximal row carpectomy is performed to reduce the number of fusion surfaces. This also supplies bone autograft in younger patients with healthy bone.

•The fusion surfaces are meticulously prepared by hand, avoiding burrs or power devices to prevent heat necrosis. Thorough debridement of articular cartilage creates an optimal surface for fusion.

•Autograft from the carpal bones is preferred, but iliac crest autograft (ICBG) serves as an alternative if the carpal bone

autograft is of poor quality. Allograft or synthetic bone graft materials/substitutes are strictly avoided.
• A plate with a long-slotted hole is used for stable fixation and a compression-distraction device is employed to apply significant compression across the fusion site, promoting bone fusion.
• Strict immobilization using a cast ensures stability and protects the surgical site. Regular monitoring and radiographic evaluations assess bony union progress.
• To minimize complications, drains are inserted to prevent hematomas and wound complications. Proper insertion and secure placement of drains contribute to optimal wound healing.
Results: A total of 25 patients, ranging in age from 15 to 88 years (mean 49), underwent wrist arthrodesis without any post-operative complications. 16 were males. ICBG was utilized in was 16 cases. Successful bony union was achieved in all cases.
Conclusion: In conclusion, wrist arthrodesis is a reliable surgical procedure for addressing severe wrist conditions. By following meticulous techniques, employing appropriate bone graft materials, utilizing compression-distraction devices, and providing postoperative immobilization and drainage, we have successfully performed wrist arthrodesis with favorable outcomes and without any complications in our patient population in a large consecutive series. This dispels the myth that total wrist arthrodesis comes with an assured risk of complications.

A-0010 GRANT CONVERSION TO PUBLICATIONS, PRESENTATIONS, AND NIH FUNDING IN HAND SURGERY

Nathan Khabyeh-Hasbani, Sibat Noor, Steven M. Koehler
Montefiore Medical Center, Bronx, NY, USA

Introduction: Funding is crucial for supporting academic careers and fostering innovation in hand surgery. Foundational grants play a key role in driving progress in medicine, especially at the pilot-level. However, the extent to which these grants effectively support research productivity remains uncertain. To address this, we conducted an analysis to evaluate the impact and success of foundational grants in hand surgery by assessing their conversion into manuscripts, presentations, and NIH funding. Our objective was to determine the "return on investment" provided by the American Association for Hand Surgery (AAHS), American Foundation for Surgery of the Hand (AFSH), Orthopedic Research and Education Foundation (OREF), and Plastic Surgery Foundation (PSF).
Methods: A retrospective review of grant awards from AAHS, AFSH, OREF, and PSF, specifically focusing on hand, upper extremity, and/or peripheral nerve studies was conducted between 2000 and 2020. Data were gathered through analysis of databases including Medline, PubMed and Google Scholars to identify published manuscripts. The NIH database was queried to track grants converted into NIH funding. And, specialty conference meeting records were combed to collect information on presentations during the same period.
Results: The results revealed that out of a combined 63 AAHS grant recipients, 32 successfully published a manuscript (50%), 27 presented their proposed topics in conferences (43%), and 9 secured NIH funding (14%). Among the 81 grant recipients of PSF, 53 published a manuscript (65%), 31 presented their topics in conferences (38%), and 12 received additional NIH funding (15%). From the total of 278 AFHS grant recipients, 146 published successful manuscripts (53%), 108 presented their topics at conferences (39%), and 23 received NIH funding (8%). Among the 54 OREF grant recipients, 20 published a manuscript (37%), 14 presented their topics at conferences (26%), and 4 secured further NIH funding (7%).
Conclusion: In conclusion, our analysis of foundational grants in hand surgery provided by the AAHS, AFSH, OREF, and PSF reveals that slightly more than half of the grant recipients successfully published a manuscript. However, the conversion rates for conference presentations and securing NIH funding were notably lower. These findings highlight the competitive nature of these grants and the challenges faced in advancing medical research. Further investigation is warranted to

identify factors contributing to the low conversion rates and explore strategies to enhance the impact and success of foundational grants in hand surgery.

A-0011 TREATMENT OF GLENOHUMERAL DYSPLASIA IN BRACHIAL PLEXUS BIRTH INJURY WITH AN END-TO-SIDE SPINAL ACCESSORY NERVE TO SUPRASCAPULAR NERVE TRANSFER

Nathan Khabyeh-Hasbani, Sibat Noor, Steven M Koehler
Montefiore Medical Center, Bronx, NY, USA

Introduction: Brachial plexus birth injury (BPBI) is a common birth injury that has a variable incidence rate worldwide. The spectrum of disease prognosis ranges from spontaneous recovery to lifelong debilitating disability, particularly of the shoulder joint. Surgery is the mainstay treatment for patients with BPBI to prevent shoulder deformity in the form of glenohumeral dysplasia (GHD), however, there is no clear-cut criteria for applying various surgical interventions. The surgical procedures can range from nerve grafting to nerve transfer or tendon transfer for restoring shoulder function. Herein, we report six cases of infants who underwent end-to-side spinal accessory nerve to suprascapular nerve transfers for treatment of GHD due to BPBI.

Methods: Six infants who underwent end-to-side nerve transfer of the spinal accessory nerve to the suprascapular nerve for the treatment of GHD due to BPBI were enrolled. Preoperative diagnosis, pre- and postoperative Active Motion Scale (AMS) scores, pre- and postoperative serial ultrasounds, surgical exploration findings, surgical techniques, postoperative complications, postoperative rehabilitation, and postoperative range of motion results were included.

Results: The age range for the six subjects was 4 months to 7 months. All patients presented with a history of BPBI and subsequent GHD. Each patient had participated in therapy since birth. Preoperative ultrasound of the shoulder joint demonstrated GHD in all cases. The patients underwent brachial plexus exploration, which revealed upper trunk neuromas. External rotation was not observed in any patient with 0.5mA or 2.0mA stimulation. Therefore, all patients were indicated for an end-to-side transfer of the spinal accessory nerve to the suprascapular nerve. No patients experienced complications. Postoperative therapy was continued, but no bracing was performed. Each patient was followed up for a minimum of 6 months post surgery or until patients demonstrated full shoulder range of motion, shoulder AMS improvement, and ultrasound revealed resolution of GHD.

Conclusions: We report six cases of patients with BPBI and concurrent GHD who were successfully treated with end-to-side spinal accessory to suprascapular nerve transfers. This is a novel procedure that addresses gray areas in which patients may not be indicated for a tendon transfer nor an end-to-end nerve transfer.

A-0016 SCAPHOID A WICKED SURGICAL DILLEMMA -COMPARISON OF FUNCTIONAL OUTCOME BETWEEN CONSERVATIVE VS SURGICAL INTERVENTION IN AN UNDISPLACED SCAPHOID FRACTURE - A CASE SERIES

Amey Sadar, Samir Dwidmuthe
All India Institute of Medical Sciences, Nagpur, India

Introduction: Scaphoid fractures frequently become susceptible to nonunion due to tenuous blood supply, proximal fracture location, fracture displacement, and absence of timely and appropriate treatment. Previous reviews have investigated outcomes following different approaches, bone grafts, and fracture patterns, but no updated treatment algorithm accounts for all of these findings.we compared functional outcome of conservative and surgical intervention.

inclusion criteria-1.undisplaced fracture,2.unilateral,3.age<70 years,4.patient willing to give consent.total number of patients-16 results-operative intervention was sought be far better as compared to conservative mx as it resulted in early functional mobility, less complications.

A-0017 IS NOTTAS NODULE, A NODULE OR NOT? AN ANATOMICAL STUDY OF PAEDIATRIC TRIGGER THUMBS

Sabrina Bhattacharya, Christina Lipede, Jane Kerby, Katarzyna Kostrzewa, Sahan Rannan-Eliya
Great North Childrens Hospital, Newcastle Upon Tyne, United Kingdom

Aim: Paediatric trigger thumb was traditionally described as Congenital, caused by a thickening of the flexor pollicis longus (FPL) tendon, classically named Notta's nodule.
However, it rarely presents at birth, Notta described this in adults and we demonstrate that it is more often not due to a nodule but a simple widening.
The senior author noted if the 'nodule' was not mobile with the tendon clinically, exploration revealed a widening in the radio-ulnar direction. If it was mobile, a firm spherical nodule within the tendon was present.
This difference, may explain the natural resolution in some children.
Methods: We reviewed our single operator series of paediatric trigger thumbs between 2012-2020.
Results: 40 thumbs underwent A1 pulley release in 36 children, at an average age of 3.4 years. Male:Female ratio was 1:1.4. Presentation was right sided in 15, left in 17, and 4 were bilateral.
Two presented congenitally, otherwise the average age of first symptom was 2.5 years. 56% presented with a painless fixed flexion deformity, Sugimoto IV, whilst 28%, were Sugimoto III.
At surgery, 43% had a definite firm spherical nodule, whilst in 57% the tendon was not thickened in the AP direction, but had a soft widening of 57% (Av = 5.7mm), compared to the normal tendon (Av = 3.6mm).
Perioperative complications were recorded in 3. At an average F/U of 3.8 months, all had full movement, and no other complications.
Conclusion: Paediatric trigger thumb is almost always a developmental not congenital anomaly, and more often 'Notta's nodule' is not a nodule at all, but a widening leading to a temporary mismatch between FPL and A1 pulley width. We recommend, that if painless, and no clinical mobility of the nodule – this may explain the success of conservative approaches, and could be considered more often.

A-0018 EFFECTIVENESS OF SUTURE ANCHOR AND TRANSOSSEOUS SUTURE TECHNIQUE IN ARTHROSCOPIC FOVEAL REPAIR OF THE TRIANGULAR FIBROCARTILAGE COMPLEX: A SYSTEMATIC REVIEW

Hsuan-Hsiao Ma[1,2,3], Jung-Pan Wang[1,2], Chen-Yuan Yang[4,5]
[1]Department of Orthopaedics and Traumatology, Taipei Veterans General Hospital, Taipei, Taiwan; [2]Department of Surgery, School of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan; [3]Division of Orthopaedics, Department of Surgery, Taipei Veterans General Hospital Taitung Branch, Taitung, Taiwan; [4]Department of Orthopedic Surgery, Kuang Tien General Hospital, Taichung, Taiwan; [5]Department of Nursing, Hungkuang University, Taichung, Taiwan

Background: Currently there were two major surgical methods for arthroscopic triangular fibrocartilage complex (TFCC) foveal repair: suture anchor (SA) and transosseous suture (TOS). The purpose of this systematic review is to examine the relevant outcome improvement and safety of SA and TOS technique.

Methods: Literature review of electronic databases for studies investigating the effects of SA and TOS in patients undergoing arthroscopic TFCC foveal repair was performed. We compared the pre-operative and post-operative functional outcomes, clinical outcomes (pain, range of motion (ROM) and grip strength), and complications of two methods. Minimal clinically important difference (MCID) was used to determine clinically meaningful improvement.
Results: There were 1263 distinct studies identified, with 26 (904 patients) meeting the inclusion criteria. The mean age of participants ranged from 21.4 to 41 years, and the mean follow-up time ranged from 6 to 106 months. Both SA and TOS groups reported significant improvement in the Modified Mayo Wrist Score, the Disabilities of the Arm, Shoulder, and Hand (DASH) score, quick DASH score, Patient-Reported Wrist Evaluation (PRWE) score, and the visual analog scale (VAS) score. According to MCID, all the studies from both groups reporting DASH, quick DASH, PRWE and VAS score achieved clinically meaningful improvement. (MCID: 10 for DASH, 14 for quick DASH, 14 for PRWE and 1.6-18 for VAS). The ROM changes in both groups varied from improvement to deterioration. Grip strength improved in both SA and TOS group. Most complications were self-limited. The reoperation rates in SA and TOS ranged from 0% to 20 % and 0% to 27.3%, respectively.
Conclusions: Both SA and TOS technique for arthroscopic TFCC foveal repair could achieve improvement in postoperative functional outcomes, pain, and grip strength with low reoperation rate. However, the ROM improvement was still inconclusive.

A-0019 VASCULARIZED FREE FIBULA AS SALVAGE WRIST ARTHRODESIS: A SOLUTION FOR FAILED WRIST ARTHRODESIS AFTER WRIST ARTHROPLASTY LOOSENING

Marcus Sagerfors, Mattias Hedspång, Daniel Reiser
Örebro University, Faculty of Medicine and Health, dep of Orthopedics and Hand Surgery, Sweden

Vascularized bone grafts like the free fibula transfer have become an integral part of bone reconstruction strategies. However, Radiocarpal arthrodesis (RCA) using a free fibula is mainly described for post-traumatic or post-infectious causes. Failed total wrist arthroplasty (TWA) can, in certain cases, be salvaged by component exchange, revision to a new TWA or conversion to a RCA. RCA after TWAs may come with technical difficulties, such as severe bone loss and synovitis secondary to wear particle from the articulation.
We present the case of an otherwise healthy male 58 year old worker who had an intraarticular distal radius fracture. He underwent surgery with volar locking plate and later developed radiocarpal osteoarthritis. About 2 years after the trauma, it was decided to provide him with a newly developed wrist hemiarthroplasty with an articulation of PEEK (polyether-ether-ketone). The patient still had wrist pain and limited motion despite additional surgeries and a decision was made to remove the hemiarthroplasty and to do a RCA with iliac crest bone graft and a locking plate. When removing the hemiarthroplasty PEEK articulation, a foreign-body reaction with synovitis was noted. The RCA did not heal. Another arthrodesis was undertaken, this time with iliac crest bone graft plus femoral head allograft. Perioperative cultures were negative for infection. Again, no bony union was observed. It was decided to do a third RCA with a free fibula transfer to provide well-vascularized bone to optimize healing conditions.
The fibula was removed with the vessels and pedicle under Doppler control. The radius was opened dorsally for a fenestration about 7 cm. The fibula was fitted to the floor of the third metacarpal and embedded in the radius recess. The fixation was performed with a wrist spanning plate. The pedicle and fibular vessels were sutured to the radial artery and cephalic vein. The wound edges were adapted and the remaining wound was covered with a meshed split skin graft was applied to keep the pressure on the pedicle as low as possible.

A CT-scan 4 months postoperatively showed union of the fibula into the radius and the third metacarpal. The patient was able to carry out his manual work without pain.
Failed wrist arthroplasty in combination with previous multiple surgeries may decrease bone vascularity of the wrist. Free fibula transfer can be an option to provide well-vascularized bone and increasing the likelihood of union.

A-0020 FUNCTIONAL OUTCOME IN A CASE OF POST TRAUMATIC BILATERAL DISTAL END RADIUS FRACTURE WITH BILATERAL SCAPHOID FRACTURE MANAGED WITH OPERATIVE AND CONSERVATIVE TRIAL - A RARE CASE REPORT

Amey Sadar, Samir Dwidmuthe
All India Institute of Medical Science - AIIMS, Nagpur, India

Introduction: Bilateral fractures of the distal radius and scaphoid are extremely rare injuries.Proper preoperative evaluation is must to know orientation of fracture.treatment must be based on displacement of the fracture.if the fracture is displaced,rigid internal fixation is must and if the fracture is stable with minimal or null displacement, we can conserve such fractures.
Case presentation: A patient with bilateral comminuted, displaced distal fracture of the radius on one side and bilateral fractures of the scaphoid was treated via internal fixation of the scaphoid fractures with Herbert screws and internal fixation of the distal radius fractures with locked volar plating on right side and below elbow cast in cup holding position on left side which was non dominant
Conclusion: management of the fracture depends upon the orientation of the fracture , patient profile and Compatibility of the surgeon. Rigid internal fixation of distal radius and scaphoid fractures provides early active rehabilitation of the wrist without the need for wrist immobilization with a plaster or external skeletal fixation. while conservative treatment with below elbow cast gives advantage nil blood loss and wound healing complication in undisplaced fractures specially in non dominant hand.
Keywords- bilateral,scaphoid , distal end radius, Herbert screw , volar plate,conservative

A-0021 SURVEY ON CURRENT NERVE MANAGEMENT DURING AMPUTATION SURGERY AMONG DUTCH PLASTIC SURGEONS

CPM van den Berg, EW DeVinney, EM van der Linde, EM Brakkee, JH Coert
Department of Plastic and Reconstructive Surgery, University Medical Center Utrecht, Utrecht University, The Netherlands

Background: There are several surgical options for the management of peripheral nerves during limb amputation surgery. By definition, a neuroma develops after a nerve transection. Some neuromas are painful and can be very disabling for patients. Diagnosis often proves to be challenging and treatment is rarely completely successful. In this study, we questioned Dutch (plastic) surgeons about their knowledge and preferred technique(s) in managing nerves during amputation surgery.
Method: For the Dutch situation, we approached (plastic) surgeons via email with the request to complete a digital questionnaire. The member registry of the Dutch Society for Plastic Surgery was used with permission. The questionnaire was developed and checked by an expert panel in the field of amputation surgery and user-friendly converted with LimeSurvey software. This consisted of questions about the background, preferences and knowledge of (plastic) surgeons with regard to nerve management during amputation surgery and also subsequent neuroma treatment. Data was processed anonymously and analyzed with descriptive statistics.

Results: 72 of the 390 surgeons shared their experience (response rate 18.5%, 91,7% plastic surgeons and 8.3% vascular or trauma surgeons). Hand and wrist surgery was the area of focus of the majority of participants(57%). 69% of the surgeons performed 1-10 amputations/year. Mean years of experience was 13.7(9.6). The group that preferred traction neurectomy as nerve management during amputation was less experienced than the group with other preferences (p=0.027). Of the available techniques, muscle burying (n=64) was the most well-known, followed by burial in bone (n=44), suturing end-to-side on another nerve (n=25), targeted muscle reinnervation (TMR) (n=14), regenerative peripheral nerve interfaces (RPNI) (n=10), relocation by nerve graft (n=9), nerve cap (n=7), buying into a vein (n=5). Differences with respect to amputation level were also examined. Nearly all respondents responded that they are checking for nerve pain (93%) or considering revision surgery (95%) during patient follow-up.
Conclusion: This study provides a national overview of the preferred nerve management during amputation surgery and the treatment of neuroma pain by (plastic) surgeons. It appears that all "modern" techniques are known to the participants who have completed the questionnaire. Training during plastic surgery training can contribute to knowledge about the various techniques.

A-0022 SUCCESS IN THE EUROPEAN BOARD OF HAND SURGERY DIPLOMA: CANDIDATES' VIEWS FROM VARIOUS COUNTRIES

Mahdi Siala[1], Johan van der Stok[2], Agatha Durdzinska[3], Kunal Kulkarni[4], Nina Fee Knie[5]
[1]Hand to Shoulder Riviera Center, Nice, France; [2]Limerick University Hospital, Limerick, Ireland; [3]Hôpital Cantonal de Fribourg, Fribourg, Switzerland; [4]University Hospitals of Leicester NHS Trust, Leicester, UK; [5]Centre for Hand Surgery, Microsurgery and Plastic Surgery, Schoen Clinic, Munich Harlaching, Germany

Hand surgery is evolving as a complete sub-specialty. The Federation of European Societies for Surgery of the Hand (FESSH) have therefore developed a common examination - the European Board of Hand Surgery (EBHS) diploma. We, as succesful candidates to the EBHS exam, aim to offer an insider's perspective of the EBHS diploma examination and tips to succeed in it. The differences between hand surgery training across several European nations, alongside statistics from the past three years of the EBHS. Raising the global standard and profile of hand surgery requires international collaboration. The EBHS is an excellent example of how this goal is being achieved through standardisation of educational attainment across borders, thereby helping to establish hand surgery as an important and independent specialist entity.

A-0023 RESTORATION OF TACTILE GNOSIS AFTER HAND LOSS - HOW TARGETED SENSORY REINNERVATION ENABLES SOMATOTOPY AND SPATIAL SENSORY CAPACITY OF SINGLE DIGITS AT THE RESIDUAL LIMB

Alexander Gardetto[1], Rainer Schultheis[2], Wolfgang Schaden[3], Gernot Müller-Putz[4], Kyriaki Kostoglou[4], Johannes Grillari[5], Jennifer Ernst[6]
[1]Centre for Plastic, Aesthetic and Reconstructive Surgery with Hand Surgery. Reference Centre for Bionic Prosthetics. Brixsana Private Clinic, Bressanone, Italy; [2]Saphenus Medical Technology, Vienna, Austria; [3]AUVA Medical Directorate, Vienna, Austria; [4]Institute of Neural Engineering, University of Technology Graz, Austria; [5]Ludwig Boltzmann Institute for Traumatology. The Research Center in Cooperation with AUVA, Vienna, Austria; [6]Department of Traumatology, University of Hannover, Germany

Introduction: The loss of the hand can lead to a considerable reduction in personal and professional quality of life for affected patients and often inevitably to psychological consequences. Currently, myoelectric prostheses can restore many of the normal activities of the hand, with the exception of tactile sensitivity. Based on our successful experience with TSR

(Targeted Sensory Reinnervation) surgery on the lower limb, we have extended and further developed the technique to the upper limb. The indications for TSR are primarily phantom pain and/or neuropathic pain that cannot be controlled by conservative therapy or, in the case of elective amputation, its prevention.
Methods: Between October 2020 and August 2023, we performed TSR in 6 patients. Three patients underwent TSR at the same time as elective hand amputation. In one patient, TSR was performed secondarily after a failed replantation attempt and in one patient we performed the TSR primarily due to a posttraumatic necessary amputation. In the last patient, all 4 limbs had to be amputated due to Waterhouse-Friderichsen syndrome. In this patient TSR was performed on both arms and lower legs with Targeted Muscle Reinnervation (TMR) and Agonist-Antagonist-Myoneural-Interface (AMI). The technique involves neurorrhaphy of the median and ulnar nerves with the lateral and medial cutaneous antebrachia nerves to reinnervate the skin of the amputation stump. In one patient, the coaptation sites were treated with shock wave immediately after surgery to check whether the reinnervation time could be shortened. Postoperatively, EEG and nerve conduction tests were performed. All patients underwent a rigorous rehabilitation program.
Results: There was no phantom limb pain in the electively and acute amputated patients, and in the patient who underwent secondary TSR, the pain decreased significantly or disappeared completely. In all patients, a phantom limp map of all five fingers at the level of the amputation stump could be regularly visualized. In addition, the patients can distinguish between hot and cold or dry and moist. Somatosensory evoked potentials (SEPs) in electroencephalography (EEG) and sensory nerve action potentials (SNAPs) in nerve conduction study (NCS) could be derived as a clear reinnervation sign.
Conclusions: The redirection of the median and ulnar nerve to the medial and lateral antebrachial cutaneous nerves creates the possibility with an associated interface to regain the feeling of the lost hand. Sensors on the fingers transmit a genuine feeling to the reinnervated area of the residual limb. This feedback is given via a sensitive glove (Feelix), which can be pulled over any prosthetic hand. The phantom pain is suppressed by this constant event-triggered feedback, or it does not occur after elective or traumatic amputation.

A-0024 NEW APPROACH FOR THE TREATMENT OF PATIENTS WITH IRREVERSIBLE BRACHIAL PLEXUS PALSIES

Alexander Gardetto[1], Juliane Ebner[2], Reinhold Perkmann[2]
[1]Centre for Plastic, Aesthetic and Reconstructive Surgery with Hand Surgery. Reference Centre for Bionic Prosthetics. Brixsana Private Clinic, Bressanone, Italy; [2]Department of Vascular and Thoracic Surgery, General Hospital of Bolzano, Italy

Introduction: In complete paralysis of the C5-T1 brachial plexus, extension and flexion of the elbow and fingers are not possible. The function of the shoulder is severely limited and spontaneous dislocation is common. In addition, there is a tilted position of the upper head. For these patients, the paralysed arm is perceived as an annoying appendage that restricts them in everyday life. The goal is always to achieve the best possible functional outcome for the hand, taking into account the initial injuries and intraoperative findings. Based on our experience with lower limb and hand amputations, a new approach for these patients is established.
Methods: Since December 2022, we have performed elective arm amputation in 6 patients with irreversible brachial plexus palsy in whom reconstruction attempts were unsuccessful. All patients suffered from medication-dependent neuropathic pain and phantom limb pain and underwent psychological evaluation prior to surgery. To facilitate postoperative fitting of a bionic prosthesis, the amputation is performed 7-8 cm proximal to the elbow joint. The tendon of the biceps brachii muscle is transosseous fixed dorsally to the humerus as a traction strap for the amputation stump. This fixes the humeral stump better to the shoulder joint and prevents dislocation. In addition, prophylaxis against neuroma formation (RPNI) is performed on all major nerves. All patients underwent a rigorous rehabilitation program.

Results: Neuropathic pain and phantom limb pain disappeared in all patients and drug dependence was continuously reduced to complete elimination. In all 5 patients, a phantom limb map was found, which was not so clearly perceived before the amputation. All patients were fitted with a bionic prosthesis after motor signals from the functioning adjacent muscles were detected. The patients are able to flex and extend the elbow and open and close the prosthetic hand. The quality of life has improved significantly in all of them.
Conclusions: After a frustrated brachial plexus reconstruction, patients have to live with a paralysed arm and very often perceive it as an unpleasant appendage. In addition, they very often suffer from severe neuropathic pain that can limit their quality of life in a big way. With this new approach and the new bionic prostheses, we can give these patients a new quality of life and new strength of their health literacy. They are able to use the arm and hand in their daily life as a proper tool. By demarking the phantom limp map, the future could bring an application of a feeling prosthesis with the appropriate feedback system.

A-0025 CURRENT TRENDS IN DUAL MOBILITY TRAPEZIOMETACARPAL JOINT ARTHROPLASTY: INTERNATIONAL VARIATIONS IN SURGICAL TECHNIQUES AND PATIENT MANAGEMENT

Agatha Durdzinska[1], Kunal Kulkarni[2], Nina Fee Knie[3], Mahdi Siala[4], Johan van der Stok[5]
[1]Hôpital Cantonal de Fribourg, Fribourg, Switzerland; [2]University Hospitals of Leicester NHS Trust, Leicester, UK; [3]Centre for Hand Surgery, Microsurgery and Plastic Surgery, Schoen Clinic, Munich Harlaching, Germany; [4]Hand to Shoulder Riviera Center, Nice, France; [5]Limerick University Hospital, Limerick, Ireland

Dual mobility total joint arthroplasty is gaining popularity for trapeziometacarpal joint (TMCJ) arthritis, albeit with global variation in surgical techniques and patient management as implants evolve. To understand the worldwide differences in patient selection, surgical technique, and post-operative rehabilitation, an anonymised online survey was developed and distributed to the international hand surgery community of surgeons performing TMCJ arthroplasty. Overall, 203 respondents were included, 59 of whom were considered 'highly experienced' and nearly 50% were French. results showed marked variation in patient selection, surgical technique, rehabilitation and complications, with highly experienced surgeons considering broader patient indications and showing greater flexibility in surgical technique.TMCJ arthroplasty has evolved over the last decades and has added an exciting management option for patients with TMCJ arthritis. Further long-term studies will be key to demonstrating their true advantages for patients.

A-0026 THE CLINICAL, FUNCTIONAL, AND RADIOLOGICAL COMPARISON OF THE CONSERVATIVE AND SURGICAL TREATMENT RESULTS OF PROXIMAL AND MIDPHALANGEAL NECK FRACTURES IN CHILDREN

Ersin Demirkaynak[1], Ayşe Şencan[2], Kahraman Öztürk[2]
[1]University of Health Sciences Turkey, M.S. Baltalimani Bone Diseases Teaching and Research Hospital, Department of Orthopaedics and Traumatology, Istanbul, Turkey; [2]University of Health Sciences Turkey, M.S. Baltalimani Bone Diseases Teaching and Research Hospital, Hand Surgery Clinic, Istanbul, Turkey

Introduction: Phalangeal neck fractures in children are rare fractures. While there is a consensus in the literature that Type 1 fractures according to the Al-Qattan classification should be treated conservatively, there is no consensus for the treatment of Type 2 and Type 3 fractures.
Aim: In our study, it was aimed to evaluate the results of patients treated with both treatment methods in terms of clinical, functional, and radiological aspects and to give clues about the treatment decision.

Materials and methods: In our study, the patients between the ages of 0-16 years, who had Type 2 and Type 3 phalangeal neck fractures and met the inclusion criteria 58 of whom were treated conservatively and 28 of whom were treated surgically between January 2013 and January 2020 were evaluated. At the last follow-up examination of the patients, joint range of motion, limitation of motion, early or late complications, functional outcomes according to Al-Qattan grading; parameters such as coronal and sagittal plane angulations were examined radiologically, and the data of the patients in the two groups were compared with each other.
Results: While the outcome of 63% of patients with Type 2 finger fractures who were followed up conservatively was excellent, this rate was 11.1% in the surgical group. There were no patients with poor results in the conservative group, however, 22.2% were found to be poor in the surgical group. While the excellent outcome rate of patients with Type 3 finger fractures who were followed up conservatively was 41.7%, there was no patient with an excellent outcome after surgery. In the comparison of distal interphalangeal joint motion of patients with proximal phalanx fractures who were treated conservatively and surgically; while the mean distal interphalangeal joint range of motion was 80,41 degrees in conservatively treated patients, it was 59,05 degrees in surgically treated patients ($p<0.001$). The initial and final angulation of the surgically treated midphalanx fractures in the sagittal plane is similar, although the conservatively followed midphalanx finger fractures approach the anatomical angulation in the sagittal plane, it is not statistically significant. Avascular necrosis was observed in 3 patients who underwent surgical treatment.
Conclusions: When both radiological and functional long-term results of pediatric finger neck fractures were compared, it was shown in our study that surgery requires expertise, surgical treatment has many complications, and remodeling is seen in these fractures, even though they are far from the physis. Therefore, we think that it would be good to keep these features in mind while planning the treatment of these fractures and to plan the conservative treatment of all Type 2 and Type 3c subgroups as much as possible. The limitation of our study is the low number of subgroups of Type 3 fractures other than Type 3c. If their number increases, a comparative study can be planned for these fractures in the future in terms of conservative and surgical treatment options among subgroups.

A-0027 ULTRASOUND-GUIDED HYDRODISTENSION INFILTRATIVE TREATMENT IN DE QUERVAIN'S DISEASE

Fabio Vita[1], Norman Della Rosa[2], Flavio Origlio[3], Davide Pederiva[1], Stefano Galletti[4], Federico Pilla[1], Cesare Faldini[1], Spinnato Paolo[7], Donati Danilo[5,6]

[1]Department of Orthopedic and Traumatological Surgery, IRCCS Istituto Ortopedico Rizzoli, University of Bologna, Bologna, Italy; [2]Department of Hand Surgery and Microsurgery, Policlinico di Modena, Modena, Italy; [3]Physical Therapy and Rehabilitation Unit, IRCCS Istituto Ortopedico Rizzoli, University of Bologna, Bologna, Italy; [4]Musculoskeletal Ultrasound School, Italian Society for Ultrasound in Medicine and Biology, Bologna, Italy; [5]Hand Rehabilitation Unit, Policlinico di Modena, Modena, Italy; [6]Clinical and Experimental Medicine PhD Program, University of Modena and Reggio Emilia, Modena, Italy; [7]Department of Radiology, IRCCS Istituto Ortopedico Rizzoli, University of Bologna, Bologna, Italy

Background and aims: De Quervain's disease is a wrist condition characterized by stenosing tenosynovitis of the first extensor compartment of the wrist. In about 2% of cases, there is a fibrous tendon septum that divides the first compartment into two compartments. The aim of this study was to evaluate the efficacy of ultrasound-guided hydrodistension treatment in patients diagnosed with De Quervain's stenosing tenosynovitis.
Methods: Ninety-five patients with ultrasound diagnosis of De Quervain's disease underwent infiltrative treatment of ultrasound-guided hydrodistension of the first extensor compartment. If a compartment was present within the tendon sheath, the needle was redirected into the sub compartment and half of the material was injected into each compartment

to effect hydrodistension of the two structures and break the dividing septum.
Results: Ninety patients achieved a significant clinical improvement in pain symptoms after the infiltration procedure. The VAS score before the infiltration treatment was 7.65 ± 1.31, and the mean VAS score at 2 months follow-up was 1.65 ± 2.32. Twelve patients needed a second infiltration after 1 month due to persistent symptoms (VAS 6.35 ± 1.22), which resolved after the second hydrodistension.
In five patients, who presented with a fibrous septum dividing the two compartments at the level of the first extensor compartment on ultrasound, ultrasound-guided infiltrative treatment was not conclusive and surgery was necessary.
Conclusions: In conclusion, about 95% of patients undergoing ultrasound-guided infiltrative treatment in De Quervain's disease achieved a marked improvement in pain symptoms already after the first infiltrative treatment, with consequent improvement in joint ROM.

A-0028 OSTEOID OSTEOMA OF THE HAND: SURGICAL TREATMENT VERSUS CT-GUIDED PERCUTANEOUS RADIOFREQUENCY THERMAL ABLATION

Fabio Vita[1], Gianmarco Tuzzato[1], Davide Pederiva[1], Giuseppe Bianchi[1], Augusto Marcuzzi[2], Roberto Adani[2], Paolo Spinnato[1], Marco Miceli[1], Danilo Donati[3,4], Marco Manzetti[1], Federico Pilla[1], Cesare Faldini[1]
[1]IRCCS-Rizzoli Orthopedic Institute, University of Bologna, Bologna, Italy; [2]Department of Hand Surgery and Microsurgery, University Hospital of Modena, Modena, Italy; [3]Hand Rehabilitation Unit, Hospital of Modena, Modena Italy; [4]Clinical and Experimental Medicine PhD Program, University of Modena and Reggio Emilia, Modena, Italy

Background and aims: Osteoid osteoma (OO) is one of the most common benign bone tumors. This type of osteogenic tumor is generally characterized by a well-defined lytic area with a vascularized central nidus surrounded by sclerosis and bone thickening. The wrist and hand bones are infrequent sites for osteoid osteoma: only 10% of the cases arise in these areas. Standard treatments are surgical excision and radio-frequency ablation (RFA), both with advantages and disadvantages. This study aimed to compare the two techniques to prove if RFA could be a potential alternative to surgery in the treatment of OO of the hand.
Methods: Patients treated for OO of the handbetween January 2011 and December 2020 were evaluated and data was collected regarding the lesions' characteristics and the treatment outcome. Each patient was followed up for 24 months and VAS pain (Visual Analogue Scale), DASH (Disability of the Arm, Shoulder and Hand), and PRWE (Patient-Related Wrist Evaluation) scores were collected.
Results: A total of 27 patients were included in the study: 19 surgical and 8 RFA. Both treatments showed a significant improvement in pain and functionality. Surgery was associated with a higher complication rate (stiffness and pain), while RFA was associated with a higher recurrence rate (2/8 patients). RFA allowed for a speedier return to work.
Conclusions: We believe that osteoid osteoma treatment with RFA in the hand should be an available alternative to surgery as it allows rapid pain relief and a swift return to work. Surgery should be reserved for cases of diagnostic uncertainty or periosteal localization.

A-0029 COMBINED REPAIR OF SCAPHOLUNATE LIGAMENT (SL) AND TRIANGULAR FIBROCARTILAGE COMPLEX (TFCC) LESIONS IN CHRONIC TRAUMA OF THE WRIST: SURGICAL TREATMENT OF 14 PATIENTS

Norman Della Rosa[2], Fabio Vita[1], Davide Pederiva[1], Federico Pilla[1], Danilo Donati[3,4], Cesare Faldini[1], Roberto Adani[2]
[1]Department of Orthopedic and Traumatological Surgery, IRCCS Istituto Ortopedico Rizzoli, University of Bologna, Bologna, Italy; [2]Department of Hand Surgery and Microsurgery, Policlinico di Modena, Modena, Italy; [3]Hand Rehabilitation Unit, Policlinico di Modena, Modena, Italy; [4]Clinical and Experimental Medicine PhD Program, University of Modena and Reggio Emilia, Modena, Italy

Background and aims: Injuries of the scapholunate ligament (SL) and of the triangular fibrocartilage complex (TFCC) represent the main ligament injuries of the traumatic wrist. A double injury of the SL and TFCC ligaments is quite common in the trauma setting, and clinical examination is fundamental. MRI allows to detection of a TFCC and SL ligament injury, but wrist arthroscopy is still the gold standard for diagnosis. We present the clinical results of the combined reconstruction of chronic scapholunate ligament and TFCC injury.
Methods: Fourteen patients were treated at our hospital with a combined scapholunate ligament and TFCC complex repair. All patients were surgically treated by the same senior author, after a diagnostic arthroscopy that revealed a lesion of both structures. A comparison between the pre-operative and post-operative pain and function was carried out using VAS, Disability of Arm, Shoulder and Hand score (DASH) and Patient-Related Wrist/Hand Evaluation score (PRWHE). Wrist range of motion and strength were also compared following surgery.
Results: All patients had a mean follow-up of 54 months. A statistically significant improvement was observed both with the reduction in pain (VAS from 8.9 to 5) and with the improvement of functionality scores (DASH from 63 to 40 and PRWHE from 70 to 57) and with the increase in ROM and strength. In only one patient (7%), because of pain and instability, a supplement operation was needed (Sauve–Kapandji procedure) 3 months after the initial surgery.
Conclusions: The simultaneous repair of the SL and TFCC complex has shown a good success rate in both decreasing pain and regaining functionality.

A-0030 TISSUE CONCENTRATIONS OF VANCOMYCIN ACHIEVED WITH BIER BLOCK ADMINISTRATION VERSUS INTRAVENOUS PROPHYLAXIS IN UPPER EXTREMITY SURGERY: A PROSEPCTIVE, RANDOMIZED CONTROLLED TRIAL

Kevin J. Renfree, Nathaniel B. Hinckley, Molly Klanderman
Mayo Clinic Arizona, Phoenix, USA

Background: Prior studies of intraosseous administration of vancomycin have demonstrated significantly higher tissue concentrations of antibiotic using lower doses compared to systemic intravenous (IV) administration. Our purpose was to quantify and compare vancomycin concentrations in bone and soft tissue of the hand and wrist: (1) after regional IV perfusion, and (2) after systemic IV administration, (3) and to determine if there is any difference in complication rates between the two modes of medication delivery.
Methods: Twenty patients undergoing an upper extremity reconstructive procedure requiring removal of bone were randomized to regional IV perfusion of vancomycin (125 mg in 50 ml normal saline) or systemic IV administration of vancomycin (1 g). Samples of subcutaneous fat and bone were collected 5-10 minutes after skin incision, 20-25 minutes after skin incision, and fat was collected at closure. These specimens were analyzed with mass spectrometry. The primary outcome was the difference in bone and fat tissue concentrations between groups. The secondary outcome was complications related to the method of delivery of vancomycin in each group.

Results: Mean tissue concentrations in fat for the regional IV perfusion group were 114.9 ug/g, 117.2 ug/g, and 150.1 ug/g at each timepoint compared to 3.9 ug/g, 5.2 ug/g, and 4.5 ug/g in the systemic IV group, respectively. In bone, mean concentrations were 107.0 ug/g and 117.4 ug/g in the regional IV perfusion group, and 13.0 ug/g and 14.9 ug/g in the intravenous systemic IV group, respectively. A fitted linear mixed model showed the average tissue concentration was 109 ug/g higher in the bier block group compared to intravenous administration ($p<0.001$). There were no systemic or immediate local complications in either group.

Conclusions: Regional IV perfusion of vancomycin in the upper extremity below a tourniquet achieves levels of antibiotic concentration up to 33 times greater than systemic IV administration of a much greater dose (eight times). Bier block delivery appears safe and may lower the required dose of vancomycin necessary to treat infections, augment systemic administration in severe infections, and may limit systemic toxicity. These preliminary results warrant further evaluation of this method for the prevention and treatment of infections in the upper extremity.

A-0031 SELECTIVE ENDOSCOPIC NEUROTOMY OF THE UPPER AND LOWER SUBSCAPULAR NERVES IN A PATIENT WITH DYSKINETIC CEREBRAL PALSY: A CASE REPORT

Mohammad Asif Aslam, Shwan Khoschnau
Akademiska Universitetssjukhuset, Uppsala, Sweden

Abstract

Dyskinetic cerebral palsy is challenging to manage and often causes the patient significant functional impairment as well as pain. Regardless of which subtype of dyskinetic cerebral palsy the patient has - dystonic, athetoid, or a combination of both – it is difficult to achieve a balance and synchrony in the highly complex interplay between agonist and antagonist musculature. Just like other parts of the locomotor system, the shoulder region with its intricate muscular apparatus is conventionally treated with botulinum toxin type a injections with the aim to suppress dyskinesia where it is especially prominent. Occasionally, this is not sufficient and surgical options need to be considered. However, surgical options such as humeroscapular joint arthrodesis, tenotomies, tendon transfers, or tendon elongations are often associated with great risk and further functional impairment. Here we report a 19-year-old female patient with a dyskinetic dystonic cerebral palsy. Initiation of voluntary movement in her right shoulder frequently generated a severe dystonic spasm engaging the whole arm, resulting in an internal rotation so strong that it caused a painful subluxation of the humeroscapular joint. Repeated botulinum toxin type a injections in the involved musculature brought only partial relief but helped in identifying the subscapularis muscle as the main generator of the painful dystonia. It was further confirmed using an isolated intramuscular local anaesthetic block administered into the subscapularis muscle under ultrasound guidance, whereupon the patient remained free from shoulder dystonia for the duration of the block. Based on the observation of this dramatic temporary elimination of shoulder dystonia, the patient was offered and chose to subsequently undergo selective neurotomy of the upper and lower subscapular nerves. Instead of an open approach, we employed standard shoulder arthroscopic equipment for endoscopic access. The upper and lower subscapular nerves were visualized and ablated using a radiofrequency ablation tool. The patient immediately experienced relief and has not had recurrent painful dystonic episodes post operatively. Part of the explanation is that the lower subscapular nerve also is a significant contributor of nociceptive articular branches to the glenohumeral joint, thus severing the nerve also denervated the anteroinferior portion of the joint capsule. This novel approach provides the surgeon with a new treatment option for managing especially severe and painful dystonia affecting the subscapularis muscle.

A-0032 A NETWORK META-ANALYSIS OF CONSERVATIVE MANAGEMENT OPTIONS FOR THUMB CARPOMETACARPAL OSTEOARTHRITIS

Jai Parkash Ramchandani[3], Arjuna Thakker[1], Melinda Hau[2], Nick Johnson[1], Joseph Dias[1]
[1]Academic Team of Musculoskeletal Surgery, Leicester General Hosptial, Leicester, UK; [2]Trauma and Orthopaedics, University Hospitals of Leicester NHS Trust, Leicester, UK; [3]Kings College London, GKT School of Medical Education, London, UK

Introduction: The aim of this network meta-analysis (NMA) was to determine the most effective conservative intervention in patients with thumb carpometacarpal osteoarthritis (CMC OA).
Methods: Data was obtained by searching Medline and Embase via OVID, CENTRAL and CINAHL via EBSCO. Reference lists of relevant literature reviews were also searched. Study inclusion criteria included symptomatic adults with thumb CMC OA. Outcomes were a reduction in pain and/or an improvement in hand function. Two reviewers independently selected studies, conducted a quality assessment and extracted results. Data was pooled using a Frequentist NMA, comparing outcomes at short (≤ 3 months) and medium-term (> 3-12 months) time points. Certainty of evidence was addressed through the GRADE (Grading of Recommendations, Assessment, Development and Evaluations) partially contextualized framework.
Results: Seventeen RCTs involving 1655 patients were included. We found moderate certainty of evidence that the rigid (thermoplastic) long carpometacarpal-metacarpophalangeal (cmc-mcp) splint was the most effective conservative intervention at the medium-term time point for alleviating pain (SMD -1.09 95% CI -2.06; -0.13). We found moderate certainty of evidence that the rigid short carpometacarpal (cmc) splint was the most effective conservative intervention at the short-term time point at improving function (SMD -0.60 95% CI -1.11; -0.10). No other interventions were deemed to have moderate or high certainty of evidence and league table analysis consistently ranked orthosis above intra-articular injections, therapeutic exercise and multiple treatment programs at both time points.
Conclusion: There is moderate certainty of evidence to support the use of the rigid cmc-mcp splint for initial pain management followed by a switch to a rigid cmc splint for functional gains once the patient's pain has subsided. Overall, whilst this is the first NMA to assess different conservative interventions for thumb CMC OA, there is a need for more methodologically robust research in this area to improve certainty of determining the best conservative options.

A-0033 PATIENT´S PERSPECTIVE AND EXPECTATIONS IN DUPUYTREN´S DISEASE TREATMENT

Sonja Pelzmann[1,2]
[1]Paracelsus Medical University, Doctoral Programme in Medical Science, Salzburg, Austria; [2]Wiener Gesundheitsverbund Klinik Ottakring - Institute for Physical Medicine & Rehabilitation, Vienna, Austria

Objective: Severity and duration of occurrence of the characteristic nodules and cords are important factors in the treatment of the neoplastic fibromatosis Dupuytren's disease (DD). Nevertheless, clinical practice shows and confirms that health-related aspects also significantly influence treatment and outcomes. It is necessary to include the patient's expectations and perspectives in the treatment process to achieve positive and realistic results. Although these aspects and their influence are always part of the treatment, they are rarely investigated in this progressive, non-curable disease, and there is no systematic overview on the available evidence. The aim of this study was to identify, classify and present the evidence base of patients' perspectives, expectations, and needs in DD treatment.
Method: Using a systematic search strategy multiple electronic databases (PubMed, Cinahl) and specific journals were searched for relevant and available information. The studies were classified using the Oxford Level of Evidence (LoE) and their findings were linked to the International Classification of Functioning, Disability and Health (ICF) and classified into four

categories ("expectations of treatment", "expectations of results", "need during treatment" and "knowledge for the future").
Results: Of the 1.417 publications found, five publications could be included in this review. The sample size of the five included studies ranged from seven to 24 patients and the LoE from IIIb to IV, respectively. The 34 findings were linked to the ICF-components "body function", "body structure", "activities" and "participation" as well as the ICF-domains "neuromusculoskeletal and movement-related functions", "structures related to movement", "sensory function and pain", "learning and applying knowledge", "communication", "self-care" and "interpersonal interactions and relationships". Involvement in decisions, communication of knowledge about the disease, treatment options including possible outcomes are essential for patients.
Conclusion: The results demonstrate the inadequate evidence base of health-related aspects in DD treatment. In addition to physiologically measurable parameter, health-related aspects are an issue and expected by patients with DD. Nevertheless, it is difficult to determine the individual contribution of these topics and to assess their value to subsequently use them adequately for the benefit of patients in DD treatment or developing and improving health services.

A-0036 ARTHROSCOPIC PARTIAL TRAPEZIECTOMY WITH FCR SUSPENSION AND INTERNAL BRACE WITH ANCHOR FOR BASAL JOINT ARTHRITIS OF THUMB

JuiTien Shih
Department of Orthopaedic Surgery, Armed Forces Taoyuan General Hospital, Taoyuan, Taiwan

Introduction: Thumb carpometacarpal (CMC) arthritis is one of the most common arthrosis of the upper limb. The most common surgical treatment currently used is trapezium partial or total excision combined with ligament reconstruction and tendon interposition (LRTI). In an effort to maintain the osseous foundation of the thumb, partial trapezium resection under arthroscopy with FCR suspension and internal brace with anchor have been described in this study. Moreover, arthroscopy is reliable for direct evaluation and treatment of the thumb CMC joint.
Aim: To evaluate the effect of arthroscopic partial trapezectomy with FCR suspension and internal brace with anchor for arthritis of basal joint.
Material & Methods: From August 2019 to April 2021, we treated 35 thumbs with symptomatic thumb basal joint arthritis (Eaton stage II-III) using arthroscopic partial trapezectomy and FCR weave with ABL for suspension. The sample included 25 women and 10 men with a mean age of 53.2 years (range, 19 to 68 years).
Results: All patients underwent regular clinical follow-up at a mean of 38 months (range, 26 to 78 months). Pain scores improved in all patients after the operation. The thumb pinch strength significantly improved in all thumbs after the operation ($P < .01$). All patients were satisfied with the results and improved their daily activities.
Conclusions: This arthroscopic procedure is very helpful for stage II-III arthritis of thumb basal joint.

A-0037 TRANSFORMING LANDSCAPE OF HAND TRAUMA: AN IN-DEPTH ANALYSIS OF TRENDS AND PATTERNS OF INJURIES IN A HAND TRAUMA CENTER OF A UNIVERSITY HOSPITAL OVER 16 YEARS

Martynas Tamulevicius, Florian Bucher, Nadjib Dastagir, Peter M. Vogt, Khaled Dastagir
Department of Plastic, Aesthetic, Hand and Reconstructive Surgery, Hannover Medical School, Hannover, Germany

Introduction: Acute hand injuries constitute up to 30% of all cases seen in the emergency department. Various factors influence the trends in hand injuries, including shifts in workplace safety regulations, changes in demographics or even individual lifestyle factors.

Aim: The aim of this study was to analyze those trends among patients admitted to a high-volume hand trauma center.
Material & Methods: In this retrospective, cross-sectional, descriptive epidemiological study, we investigated patients who presented on an emergency basis to our high-volume hand trauma center between 01/2007 and 12/2022. We analyzed trends in patients' demographics and the annual numbers of injuries. For the comparative analysis, patients were divided into two groups based on their presentation: Group 1 (2007-2014) and Group 2 (2015-2022). We utilized linear regression analysis to assess the significance of changes in injury trends annually.
Results: Over the study period, 14,414 patients (mean age 40.1 ± 19.6 years) presented to our emergency department with the aforementioned hand injuries. There was a significant positive trend in the age of patients ($R^2 = 0.254$, $p = 0.047$). The number of cases increased annually by an average of 2% ($p < 0.001$). The following hand injuries showed significant increases in rates: superficial lacerations (+53.99%, $p < 0.001$; $R^2 = 0.788$, $p < 0.001$), cuts (+37.16%, $p < 0.001$; $R^2 = 0.702$, $p = 0.003$), wrist fractures (+49.25%, $p = 0.003$; $R^2 = 0.364$, $p = 0.013$), metacarpal and finger fractures (+39.18%, $p < 0.001$; $R^2 = 0.784$, $p < 0.001$), joint dislocations (+51.28%, $p < 0.001$; $R^2 = 0.473$, $p < 0.001$), sprains and strains (+70.51%, $p = 0.004$; $R^2 = 0.586$, $p < 0.001$), and burns and corrosions (+29.45%, $p < 0.001$; $R^2 = 0.429$, $p = 0.006$). In the same analysis, rates of amputations showed a significant decrease (-22.09%, $p = 0.04$; $R^2 = 0.415$, $p = 0.007$).
Conclusions: In summary, our data demonstrate a significant annual increase in both the total number and the age of patients. Of particular concern is the rising number of patients due to minor injuries, which could often be treated in smaller clinics or private medical centers. The current structure and reimbursement for hand injury care require urgent optimization of healthcare resources to ensure effective care in emergency situations.

A-0038 INTEREST OF MODIFIED ISHIGURO'S TECHNIC IN SURGICAL MANAGEMENT OF MALLET FRACTURE

Aurélie Iniesta, André Gay, Caroline Curvale, Sebastien Viaud, Philippe Samson
SOS Mains Marseille Beauregard, Marseille, France

Introduction: There is not yet any consensus on the surgical indication for mallet finger with bony avulsion.
It is generally accepted, according to recent meta-analyses, that surgery is indicated when the surface of the bone fragment is larger or equal to 30% of the joint surface. The existence of a palmar subluxation of the distal phalanx is also considered as a surgical indication. Many surgical techniques have been described, by open or percutaneous way. The pinning technique described by Ishiguro in 1997 offers good results. However, it does not always allow to obtain a perfect reduction of the fracture neither completely satisfactory radiological result. Here we describe our experience using the Ishiguro technique modified by Chung et al. in 2012.
Aim: The modified surgical technique consists of placing a first intra-focal pin in the distal phalanx before positioning the console pin then the DIP arthrodesis pin. This often allows a better reduction and stabilization of the bone fragment.
Material & Methods: results In our series, 20 patients underwent surgery between 2017 and 2021. Of these 20 patients, 12 benefited from this modified technique based on intraoperative decisions. Two of these patients had fractures more than 5 weeks old.
The results were satisfactory with good radiographic reduction and consolidation. Clinically, the average post-operative extension deficit was less than 6°.
We deplored a single infectious complication as osteoarthritis which resolved under antibiotics without sequelae. There was no long term nail deformation or DIP stiffness.
Conclusions: Pinning treatment of Mallet finger fractures is commonly used. This is a relatively simple and reproducible technique showing good results.

However, in the event of delayed surgery, large inter-fragmentary space or rotation of the fragment, osteosynthesis may prove to be more complex.
We believe that the addition of this third pin can be a useful and effective trick to optimize the anatomical reduction.

A-0039 MODIFIED DUBERT'S TECHNIC WITHOUT ILIAC GRAFT HARVESTING IN 5TH CMC ARTHRITIS

Aurélie Iniesta, André Gay, Caroline Curvale, Benoit Poeuf, Jean-Luc Pellat
Institut de la main et du membre supérieur, Marseille, France

Introduction: The ideal treatment for fracture-dislocation of the 5th metacarpal is immediate reduction/fixation. Unfortunately, some of these lesions are only diagnosed at the CMC osteoarthritis stage. Among the available surgical treatment at this stage, Dubert procedure has been proven efficient. It consists of resecting the base of M5 and create an arthrodesis between M5 and M4, This intervention helps reduce pain, maintain strength and approximately 50% of the CMC mobility. In its initial description, this technique use an iliac graft to create the synostosis. We modified this technique by using the removed fragment of the 5th metacarpal base instead of an iliac graft.
Aim: Complete union was obtained in all 4 patients with a delay of 2.5 to 4.5 months. The pain was relieved. Postoperative wrist strength and mobility were identical to the contralateral side at last follow-up. In 2 cases the pins were removed because they caused discomfort.
Material & Methods: CMC osteoarthritis of the 5th ray is not that rare. The Dubert procedure is a satisfactory procedure for relieving pain, regaining strength and partial mobility. However, it requires the use of an iliac graft. The modification we brought to this technique avoids iliac harvesting. The solidity of the synostosis could be questioned due to the size of the graft, however no fracture of the arthrodesis was observed. In addition, following repeated trauma, a patient presented a fracture of the neck of the 5th metacarpal without affecting the arthrodesis, thus reassuring us about its reliability.
Results:Complete union was obtained in all 4 patients with a delay of 2.5 to 4.5 months. The pain was relieved. Postoperative wrist strength and mobility were identical to the contralateral side at last follow-up. In 2 cases the pins were removed because they caused discomfort.
Conclusions: CMC osteoarthritis of the 5th ray is not that rare. The Dubert procedure is a satisfactory procedure for relieving pain, regaining strength and partial mobility. However, it requires the use of an iliac graft. The modification we brought to this technique avoids iliac harvesting. The solidity of the synostosis could be questioned due to the size of the graft, however no fracture of the arthrodesis was observed. In addition, following repeated trauma, a patient presented a fracture of the neck of the 5th metacarpal without affecting the arthrodesis, thus reassuring us about its reliability.This technique seems reproducible, reliable and effective. The absence of iliac harvest reduces potential morbidity at the donor site as well as the duration of surgery which can thus be performed under locoregional anesthesia.

A-0040 THE USE OF CROSS FINGER FLAP FOR THE TREATMENT OF AMPUTATION OF THE FINGERTIP

Hideyuki Mizushima
Orthopedic Surgery, Hand Surgery and Microsurgery Center, Nagoya Tokushukai General Hospital, Japan

Introduction: We usually use cross finger flap especially for reconstructing oblique amputations with large volar defects. The aim of this study is to evaluate the outcomes of using cross finger flap for treating fingertip amputation.
Materials and Methods: Materials: We reviewed 18 cases (all men, average age, 51years) of fingertip amputation treated

by cross finger flap from July 2009 to April 2021 with at least 6 months observation. The injury sites were as follows: thumb (1), index finger (3), middle finger (11), ring finger (2), and little finger (1). All cases were injured in crush. The average follow-up period was 132 weeks (27-395). Ten cases are accompanied with distal phalanx bone defect, and remained 8 cases are without bone defect. Numbness, pain, sensory defects, and usefulness were examined at the final follow-up. Sensory defects were evaluated by using a 10-point subjective estimation, in which 10 was the highest score.
Methods: "U" shaped pedicled flap, raised from the plane between the paratenon of the extensor mechanism and the subcutaneous fat overlying the middle phalanx, was elevated from adjacent finger. And this flap was harvested to injured digit. A full-thickness skin graft from volar side of elbow used to cover the defect on the extensor surface of the donor finger with a tie over
Results: All flaps survived with an average score of sensory was 8.1 points (3-10). Slight numbness remained in 6 cases. Pain due to an attack remained in 3 case, which all cases were accompanied with bone defect of distal phalanx. And slight pain remained in 5 cases (3 cases with bone defect, 2 cases without bone defect). Affected finger were useful in all patients nevertheless of slight sensory disturbance.
Summary: Good outcomes were anticipated after reconstruction of the fingertip pulp defects with a cross finger flap.

A-0041 FACTORS INFLUENCING THE SUCCESSFUL TREATMENT OF RECURRENT TRIGGER FINGER WITH REPEATED CORTICOSTEROID INJECTIONS: A PROSPECTIVE COHORT STUDY

Pobe Luangjarmekorn, Adithep Charoenyothakun, Vanasiri Kuptniratsaikul, Pravit Kitidumrongsook
Department of Orthopaedics, Faculty of Medicine, Chulalongkorn University, King Chulalongkorn Memorial Hospital, Bangkok, Thailand

Introduction: The factors influencing the outcome of repeated corticosteroid injections in trigger finger as well as the pattern of symptom recurrence are not fully understood. Physicians are unable to precisely inform patients about the risk of symptom recurrence and the probability of long-term success following a repeated corticosteroid injection.
Aim: To determine the success rates, duration of disease control and predictive factors of the success of repeated corticosteroid injections for recurrent trigger finger.
Material & Methods: A prospective cohort study was conducted with patients who had recurrent trigger finger and a history of corticosteroid injections. All study subjects were treated with repeated corticosteroid injections and followed for 12 months. Data on demographic characteristics, comorbidities and possible predictive factors for successful treatment were collected from medical chart reviews and direct patient interviews for comparison. Patients were classified into success or failure groups at 1, 3, 6, and 12 months after the initial injection. The relationship between hypothesized predictors and success or failure after repeated corticosteroid injection was analyzed with multivariable logistic regression.
Results: The overall success rates of repeated cortisone injections after 1, 3, 6, and 12 months were 97.37%, 84.21%, 68.42% and 49.12%, respectively. No adverse effects were observed during the 1-year follow-up. Multivariable logistic regression modeling revealed that a high grade of disease (grade III or IV), a BMI $>$ 25 kg/m2 and a short symptom-free period ($<$ 6 months) after previous injection were strong predictors of symptom recurrence (odds ratio = 3.6, 95% CI 1.5-8.4, odds ratio = 2.5, 95% CI 1.1–5.9 and odds ratio = 1.8, 95% CI 1.1–3.0, respectively). A survival analysis compared the time to treatment failure in the patients who had no predictive factors and those who had 1, 2, or all 3 predictive factors. The results showed that at 1 year, patients who had received repeated steroid injections for the treatment of recurrent trigger finger showed success rates of 73.33%, 58.70%, 44.44% and 11.76% if they had 0, 1, 2 or 3 prognostic factors, respectively.
Conclusions: In conclusion, repeated corticosteroid injections for recurrent trigger finger should be considered in patients who prefer nonsurgical treatment, especially in those without prognostic factors.

A-0042 NEEDLE ARTHROSCOPY OF THE ELBOW THROUGH AN ANTERIOR TRANSBRACHIAL PORTAL

Jose M. Rapariz[1], Ana M. Far-Riera[1], Carlos Perez-Uribarri[2], Silvia Martin-Martin[3], Alfonso Rodriguez-Baeza[4]
[1]Hospital Son Llatzer, Palma de Mallorca; [2]Hospital Cruces, Bilbao; [3]Clínic Rotger, Palma de Mallorca; [4]Departament of Morphological Sciences (Human Anatomy and Embryology Unit) Faculty of Medicine, Universitat Auto23noma de Barcelona, Barcelona, Spain

Introduction: Current innovation in needle arthroscopy is improving the safety of anterior portals around the elbow. This study evaluated the proximity to the radial nerve, median nerve, and brachial artery on cadaveric specimens of an anterior portal used for elbow arthroscopy.
Aim: The purpose of this study was to evaluate the proximity to the radial nerve, median nerve, and brachial artery on cadaveric specimens of an anterior portal used for elbow arthroscopy.
We hypothesized that the anterior portal maintains safety margins (defined as 10 mm) comparable to classic portals.
Material & Methods: Ten fresh-frozen adult cadaveric extremities were used. After marking the cutaneous refer- ences, the NanoScope cannula was introduced just lateral to the biceps tendon, through the brachialis muscle and the anterior capsule. Elbow arthroscopy was performed. Dissection was then carefully per- formed on all specimens with the NanoScope cannula in place. The shortest distance from the cannula to the median nerve, radial nerve, and brachial artery was measured with a handheld sliding digital caliper.
Results: The cannula was an average of 12.92 mm away from the radial nerve, 22.27 mm from the median nerve, and 16.8 mm from the brachial artery. Needle arthroscopy performed through this portal allows complete visualization of the anterior compartment of the elbow, as well as direct visualization of the posterolateral compartment.
Conclusions: Needle arthroscopy of the elbow through an anterior transbrachialis portal is safe for the main neurovascular structures. In addition, this technique allows complete visualization of the anterior and posterolateral compartments of the elbow through the humerus-radius-ulna space.

A-0044 INTEROSSEOUS MEMBRANE RELEASE INCREASES FOREARM ROTATION IN MIDSHAFT RADIUS EXTENSION MALUNION. CADAVERIC STUDY AND CLINICAL RESULTS

Ferran Blasco-Casado[1], Diego González-Morgado[1], Unai Jambrina-Abasolo[2], Alfonso Rodríguez-Baeza[2], Francisco Soldado Carrera[1]
[1]Hospital Universitari Vall d'Hebron, Barcelona, Spain, Universitat, Autònoma de Barcelona, Barcelona, Spain; [2]Department of Morphological Sciences (Human Anatomy and, Embriology Unit) Faculty of Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain

Introduction: Malunion is a common complication of pediatric bone forearm fractures. Midshaft radius extension malunion has been associated with loss of pronosupination when the deformity is greater than 10º to 20º. To date, corrective osteotomy is the treatment of choice for this clinical situation. It has been suggested that interosseous membrane (IOM) might have a role in loss of forearm rotation. We hypothesized that IOM release improves rotation in forearm malunion.
Aim: The principal aim of this investigation is to elucidate the therapeutic efficacy of Interosseous Membrane Release in the management of midshaft radius extension malunion with rotational deficit. This study encompasses both a cadaveric biomechanical assessment and a clinical evaluation involving three pediatric patients.
Material & Methods: In the cadaveric study, we designed two experimental groups (each containing 10 upper limbs from fresh frozen cadaveric specimens): the 10º Midshaft Radius Extension malunion group and the 20º Midshaft Radius Extension malunion group. Forearm rotation was assessed using transversal K-wires in the distal radius and ulna as a

reference. The elbow was flexed at 90º, and the radius was rotated from full pronation to full supination, with frontal pictures taken in both positions. The angle between both K-wires was measured using Osirix Lite software. Data was presented as mean ±standard deviation. ANOVA test was used for comparison of more than two events. Confidence interval of 95%. 30º of rotation was considered clinically relevant. Clinical data were subsequently reviewed retrospectively, encompassing three pediatric patients who had undergone Interosseous Membrane Release as the treatment for rotational deficits arising from midshaft radius extension malunion. We reviewed: time since injury, age at surgery, preoperative pronosupination, if a corrective osteotomy was done and, if so, the intraoperative pronosupination immediately afterwards, intraoperative pronosupination after Interosseous Membrane Release, follow-up period, final pronosupination and postoperative complications.

Results: The two experimental groups revealed a statistically and clinically significant decrease in forearm rotation after malunion and a statistically and clinically increase in forearm rotation after Interosseous Membrane Release. In the 10º Midshaft Radius Extension malunion group rotation decreased from 163.66º±8.42 with Intact Forearm to 127.33º±17.88º after Malunion, and then increased to 149.22º±10.16º after Interosseous Membrane Release. In the 20º Midshaft Radius Extension malunion group rotation decreased from 158.11º±16 with Intact Forearm to 87.55º±23.29º after Malunion, and then increased to 127.66º±22.07º after Interosseous Membrane Release.

In all three clinical cases, the procedure resulted in a clinically significant increase in forearm rotation, and no complications were identified. On average, we observed an increase of 43.3º in pronation after a mean follow-up of 2 years and 7 months.

Conclusions: In conclusion, Interosseous Membrane Release would be an effective treatment for the rotational deficit in mid-diaphyseal radius fractures with extension deformity. This surgical technique should be considered, either in isolation or in addition to corrective osteotomies to improve forearm rotation in mid-diaphyseal radius fractures with extension deformity.

A-0045 HEMI HAMATE ARTHROPLASTY IS SAFE AND EFFECTIVE IN THE PEDIATRIC POPULATION

Danielle Thornburg[1,2], Erin Kelley[3], Alexandra Dominianni[4], Timothy Schaub[5], Shelley Noland[1,6]

[1]Mayo Clinic Department of Surgery, Division of Plastic Surgery, Phoenix, Arizona, USA; [2]New York University, Department of Plastic Surgery, New York, New York, USA; [3]University of Nevada School of Medicine, Reno, Nevada, USA; [4]University of Arizona School of Medicine, Phoenix, Arizona, USA; [5]Phoenix Childrens Hospital, Department of Surgery, Division of Plastic Surgery; [6]Mayo Clinic Department of Orthopedic Surgery, Division of Hand Surgery, Phoenix, Arizona, USA

Introduction: Intra-articular fracture dislocations of the proximal interphalangeal joint (PIPJ) are complex injuries that can be difficult to treat. These fractures commonly occur secondary to sports injuries with axial force and hyperextension of the digits. Surgical intervention depends on the extent of joint surface involvement; greater than 50% joint surface involvement requires surgical intervention. Treatment options include open reduction and internal fixation, volar plate arthroplasty, external traction pinning, and hemi-hamate arthroplasty (HHA). HHA aims to restore the buttressing effect of the palmar lip of the middle phalanx to prevent hyperextension and subluxation of the PIPJ. Many of the current reports of HHA outcomes do not include pediatric patients; the mean age of patients in these reports is around 30 years old. Further information is needed regarding the outcomes of HHA in pediatric patients especially due to the high incidence of sports injuries in this population. This case series describes three pediatric patients who underwent HHA for PIPJ fracture dislocations.

Aim: We aim to demonstrate the safety and feasibility of HHA in the pediatric patient population.

Methods and results A 15-year-old female presented two weeks after injuring her right index finger while catching a

softball with a non-gloved hand. She had distal interphalangeal joint (DIPJ) extensor lag and decreased range of motion (ROM) at both the DIPJ and PIPJ. Imaging revealed an unstable, comminuted volar lip fracture with dorsal dislocation of the PIPJ involving 40% of the base of the middle phalanx. Treatment included closed reduction percutaneous pinning of the distal phalanx and HHA of the middle phalanx one month after the initial injury. Ten weeks post-operatively, imaging confirmed incorporation of the hamate graft with improved congruence of the articular surface and improved ROM on exam.
A 14-year-old male presented for evaluation 3.5 months after sustaining an axial load injury to the right ring finger while playing football. On exam, he had a PIP flexion contracture with significantly limited ROM at the PIPJ. Imaging revealed a comminuted volar lip fracture of the middle phalanx volar base involving 50% of the joint surface. Eight weeks postoperatively he reported intermittent pain with activity however his ROM improved on exam.
A 13-year-old male presented for evaluation of pain and inability to flex the left index finger PIPJ one month following an injury playing basketball. Imaging confirmed an unstable volar lip fracture involving 50% of the joint surface of the middle phalanx with dorsal dislocation. One month after treatment with HHA, the patient had full ROM with no pain, swelling, or neurovascular deficits.
Conclusions: Each patient in this case series had successful incorporation of the hamate graft at the middle phalanx with improved ROM of the injured digits. None of the patients had evidence of adhesions, traumatic arthritis, or recurrent subluxation of the PIPJ postoperatively. This case series demonstrates HHA is a feasible surgical option for treatment of PIPJ fracture dislocations in the pediatric population. Further research is required to assess the incidence of long-term outcomes and complications unique to the pediatric population.

A-0046 NEUROPROTECTIVE EFFECTS OF METHYLCOBALAMIN-CONTAINING NANOFIBER SHEETS IN A RAT SCIATIC NERVE ADHESION MODEL - A COMPARATIVE STUDY WITH NEUROPROTECTIVE SHEETS DERIVED FROM SMALL INTESTINAL SUBMUCOSA

Yoshiaki Yoshimura, Toru Iwahashi, Taisuke Kasuya, Toshiki Shimada, Katsuyuki Konishi, Atsushi Kamata, Mai Konishi, Arisa Kazui, Ryoya Shiode, Satoshi Miyamura, Kunihiro Oka, Seiji Okada, Hiroyuki Tanaka
Osaka University Graduate School of Medicine, Osaka, Japan

Introduction: Methylcobalamin (MeCbl) is the active form of vitamin B12, which is reported to have both an anti-inflammatory effect as well as a neuroregenerative effect. We have engineered a nano-fiber sheet containing MeCbl, termed MeCbl sheet, allowing locally sustained release of MeCbl. In this study, we performed various experiments on the function of the MeCbl sheet.
Aim: To evaluate the neuroprotective effects of the MeCbl sheet against post-surgical adhesions and to compare the effect of MeCbl sheet with that of porcine small intestinal submucosa (SIS) sheet, which has already used in clinical practice.
Material & Methods: We used thirty male Wistar rats (6 weeks old, 200g). The left sciatic nerve was exposed and the perineural soft tissues were cauterized by using a bipolar cautery within an 8mm range from the bifurcation of the nerve, aiming to induce inflammation and scar formation, following dissection of the neural epineurium. The rats were then randomly allocated into four groups for the surgical interventions, as follows: the Sham group (n=4), in which only sciatic nerve exposure was performed; the Untreated group (n=10), in which no treatment was performed; the MeCbl sheet group (n=8), in which the sciatic nerve was wrapped with MeCbl sheet (10mm×7mm); and the SIS sheet group (n=8), in which the sciatic nerve was wrapped with SIS sheet (10mm×7mm). At the 2-week postoperative day, we performed the von Frey filament test and the Hargreaves test to assess the sensory function. For evaluation of motor function, we measured the muscle wet weight of the tibialis anterior muscle and performed the isometric tetanic force test of tibialis

anterior. Furthermore, electrophysiological examination was performed on the ipsilateral sciatic nerves. To evaluate postoperative scar formation, the infiltration of inflammatory cells, and their impact on nerve fibers, the left sciatic nerves were harvested and Masson's trichrome staining and immunohistochemistry staining were undertaken. Statistical analysis was performed using one-way ANOVA with Tukey – Kramer's multiple comparison test.
Results: The MeCbl sheet group demonstrated significantly favorable outcomes compared to the Untreated group in terms of the functional, sensory and electrophysiological examination. There was no significant difference observed between the MeCbl sheet and SIS sheet in any of these parameters. Masson's trichrome staining revealed that the MeCbl sheet group significantly mitigated collagen infiltration compared to the Untreated group. No significant difference was noted between the MeCbl sheet group and SIS sheet group. Immunohistochemistry staining demonstrated that the MeCbl sheet group had fewer infiltrating inflammatory cells within nerve bundles and a higher count of remaining axons and a greater degree of myelination compared to the Untreated group. Furthermore, MeCbl sheet group showed a propensity for the preservation of axons with larger diameters than those observed in the SIS sheet group.
Conclusions: This is the first study to investigate the neuroprotective effects of MeCbl sheet comparing with other neuroprotective materials within the rat sciatic nerve adhesion model. Our findings indicate that the MeCbl sheet may represent a novel approach to preventing the secondary nervous impairments following inflammation.

A-0047 METHYLCOBALAMIN PROMOTES ANGIOGENESIS AFTER PERIPHERAL NERVE INJURY

Yoshiaki Yoshimura, Toru Iwahashi, Taisuke Kasuya, Toshiki Shimada, Katsuyuki Konishi, Atsushi Kamata, Mai Konishi, Arisa Kazui, Ryoya Shiode, Satoshi Miyamura, Kunihiro Oka, Seiji Okada, Hiroyuki Tanaka
Osaka University Graduate School of Medicine, Osaka, Japan

Introduction: Angiogenesis in an early stage after peripheral nerve injury is known to be an important process for nerve regeneration and functional recovery. In addition to this, it is well known that methylcobalamin (MeCbl) promotes neural regeneration and functional recovery after peripheral nerve injury. However, its effect on angiogenesis remains unclear. We hypothesized that MeCbl has an positive effects on angiogenesis, and performed various experiments.
Aim: To investigate the effects of MeCbl on angiogenesis in vivo and in vitro.
Material & Methods: For in vivo experiments, we used 18 male Wistar rats (6 weeks old, 200g). The left sciatic nerve with 10mm length was excised, which was decellularized by frozen and thaw cycle for five times using liquid nitrogen. The nerve defect was bridged using the decellularized nerve tissue. Then, an osmotic pump adjusted to release MeCbl at a concentration of 1mg/kg/day was placed subcutaneously (MeCbl group), while the other group received an osmotic pump containing saline (control group). At postoperative 3, 5, and 7 days, nerves were harvested and evaluated for immunohistochemistry. For in vitro experiments, cell proliferation (BrdU assay), migration (scratch assay), and angiogenesis (tube formation assay) were evaluated in the presence or absence of MeCbl using Human Umbilical Vein Endothelial Cells (HUVECs). Additionally, we performed receptor tyrosine kinase (RTK) assay, RAS protein detective assay and Western Blotting to assess intracellular signaling pathways influenced by MeCbl. Statistical analysis was performed using unpaired Student's t-test or one-way ANOVA with Tukey – Kramer's multiple comparison test when experiments contained more than two groups. The Dunnet multiple comparison test was performed when appropriate.
Results: In the immunohistochemistry for sciatic nerves, the neovascular areas, labeling for nestin (red), significantly increased in the MeCbl group at postoperative day3, 5 and 7($p<0.05$) compared with the control group. From the perspective of the bridging by Schwann cells, MeCbl group showed a significant increase of Schwann cell positive area at postoperative day5 and 7 ($p<0.001$ and $p<0.05$). The scratch assay and the tube formation assay indicated the significant increase for

cell migration and angiogenesis in the MeCbl group ($p<0.01$), whereas there was no significant difference between each group in the BrdU assay. Furthermore, in the RTK assay, MeCbl was found to have no effects on the activation of receptor tyrosine kinases (RTKs) on the cell membrane surface. However, through the RAS protein assay, it was elucidated that MeCbl activates RAS proteins, downstream of the RTKs. Moreover, Western Blotting showed that MeCbl activated the PI3K – AKT – mTOR pathways, which is a downstream signaling cascade of RAS, more than control group. By inhibiting the effects of MeCbl, these activities significantly decreased, becoming equivalent to the Control group.
Conclusions: Our study revealed that MeCbl promotes angiogenesis following peripheral nerve injury in a rat model. Our results may lead to an application of MeCbl not only for nerve regeneration but also for the regeneration of other tissues.

A-0048 IS IT NECESSARY TO FIX BASAL FRACTURES OF THE ULNAR STYLOID AFTER ANTERIOR-PLATE FIXATION OF DISTAL RADIUS FRACTURES?

Ahmed Afifi, Ayman Mansour
Hand, Upper Limb, and Microsurgery Unit, Department of Orthopedic Surgery, Faculty of Medicine, Cairo University, Cairo, Egypt

Introduction: Ulnar styloid fractures may accompany distal radial fractures in 50% to 65% of cases These fractures may be located at the styloid base with a risk of TFCC detachment.
Aim: To investigate the necessity for surgical fixation of basal fractures of the ulnar styloid without distal radioulnar joint (DRUJ) instability, after stabilization of associated distal radial fractures using an anterior plate.
Material & Methods: This single-center, prospective, randomized controlled trial, conducted between 2015 to 2021. We included all skeletally mature patients with DRF that required surgical stabilization associated with basal ulnar styloid fractures. A basal fracture of the ulnar styloid was defined as an ulnar styloid fracture proximal to a transverse line drawn along the distal articular tip of the ulnar head perpendicular to long axis of ulna on a posteroanterior wrist radiograph. Forty-three patients were enrolled in each study arm who were randomized to either fixation (group A) or non-operative treatment (group B) of the ulnar styloid. At the final follow-up, patients were evaluated by the Disabilities of the Shoulder, Arm, and Hand (DASH) score, the Modified Mayo Wrist Score (MMWS), the visual analogue scale (VAS) for pain, the grip strength, and wrist range of motion.
Results: The mean follow-up period was 24 months (SD 5.2) in group A and 23.9 months (SD 5.5) in group B. The DASH score was 6 (SD 2.6) in group A and 6 (SD 2.4) in group B; the MMWS was 87 (SD 5.6) in group A and 87 (SD 5.6) in group B, and the grip strength was 88% (SD 9.4) in group A and 87% (SD 7.7) in group B.
Conclusions: Fixation of basal ulnar styloid fractures is not mandatory if the DRUJ is stable after rigid fixation of the associated fracture of the distal radius.

A-0049 ARTHROSCOPIC-ASSISTED FOVEAL REATTACHMENT OF TRIANGULAR FIBROCARTILAGE COMPLEX TEARS WITH DISTAL RADIOULNAR JOINT INSTABILITY: A COMPARISON OF SUTURE ANCHORS AND TRANSOSSEOUS SUTURES

Ahmed Afifi, Emad A. Abdel-Ati
Hand, Upper Limb, and Microsurgery Unit, Department of Orthopaedic Surgery, Faculty of Medicine, Cairo University, Cairo, Egypt

Introduction: The best treatment for foveal TFCC tears associated with DRUJ instability is still unclear. Different techniques have been described for these tears (open, arthroscopically-assisted, and all arthroscopic) with different methods of fixation, including transosseous sutures.

Aim: To compare the clinical outcomes of arthroscopically-assisted suture anchor repair and transosseous sutures for repair of foveal triangular fibrocartilage complex tears in patients with distal radioulnar joint (DRUJ) instability.
Material & Methods: This single-center, prospective, randomized controlled trial was conducted at an academic level 1 referral center between 2014 and 2020. Sixty patients with triangular fibrocartilage complex foveal detachment associated with DRUJ instability were prospectively recruited and randomized into 2 equal groups: the anchor repair group and the transosseous repair group. The primary outcome was DRUJ function after 2 years, which was assessed by the DRUJ evaluating system. The secondary outcomes were grip strength, visual analog scale for pain, Mayo Modified Wrist Score, Patient-Rated Wrist Evaluation score, and the Disabilities of the Arm, Shoulder, and Hand score.
Results: There were no significant differences between the groups for any of the outcome measures. Good-to-excellent outcomes (according to the DRUJ evaluation system) were achieved in 27 (90%) patients in the anchor repair group and 26 (86.7%) patients in the transosseous repair group. Fewer complications were observed in the anchor repair group.
Conclusions: Both techniques yielded good and comparable outcomes with a lesser incidence of early complications in the anchor repair group.

A-0050 THERAPEUTIC RESULTS OF DIRECT REPAIR FOR ISOLATED RUPTURE OF THE DORSORADIAL CAPSULE OF THE THUMB METACARPOPHALANGEAL JOINT; 7 CASES REPORT

Ikuo Nakai[1,2,3], Takanori Hatanaka[2], Hanako Tsuji[2], Jun Nishida[2]
[1]Nishi Omiya Hospital, Saitama, Japan; [2]Tokyo Medical University, Tokyo, Japan; [3]Dokkyo Medical School, Nikko Medical Center, Tochigi, Japan

Introduction: Isolated rupture of the dorsoradial capsule of the thumb metacarpophalangeal (MP) joint is a relatively rare injury characterized by dorsal pain and difficulty in extending the MP joint, and no distinctive imaging findings. According to previous reports, surgical intervention is supposed to be needed, and we examined whether direct repair of the capsule was beneficial.
Material & Methods: This study includes 7 cases of the injury who were treated surgically from in our hospital 2017 to 2023. There were five men and two women, averaging 49.0 years old. The mean period from onset to the first visit to our hospital was 57.0 days. The diagnostic criteria were tenderness or swelling on the dorsoradial surface and difficulty extending the MP joint without extensor pollicis brevis (EPB) tendon rupture and collateral ligament injury observed in the MRI examination. Surgical intervention was performed as soon as possible after making the diagnosis. Surgery was performed under local anesthesia to evaluate the improvement of thumb extension just after the repair of the capsule. The curved incision was made over the dorsal aspect of the thumb MP joint, and the condition of the dorsal aspect of the capsule, including thickness and color, was evaluated during surgery. The affected region was resected by a scalpel, followed by a suture with some stitches. During surgery, almost active full extension of the MP joint was obtained in all 7 cases. After immobilization of the MP joint in the extension position for 1-3 weeks, patients were allowed to use their thumbs freely. The range of motion, degree of pain, quick DASH score, and change of volar subluxation of the affected MP joint on the plain radiograph were evaluated before surgery and at the final follow-up time. In two cases, histopathological findings were evaluated.
Results: The mean follow-up period was 18.0 months. The pain disappeared in all cases, and the mean range of thumb MP joint extension angle was improved from -20.0 to 8.5 degrees. However, a 6-degree extension lag remained in one case. Volar subluxation on the plain radiograph was observed preoperatively in 6 cases, and all disappeared at the final follow-up. The mean quick DASH score improved from 38.9 preoperatively to 18.7 postoperatively. Intraoperative findings

showed redness and thinning of the lesion in all cases. Histopathologically, the lesion represented scar tissue without any inflammatory findings.
Conclusions: The pain and difficulty of the thumb extension were improved in all cases. Therefore, direct repair of the capsule was beneficial for isolated rupture of this injury, as in the previous reports. Previously, no objective findings distinctively suggested capsular rupture in the imaging examinations; scar findings on histopathological examination may provide evidence. Scar formation may represent the traumatic nature of this condition.

A-0051 A BIOMECHANICAL STUDY ON THE STRENGTH OF ARTHRODESIS TECHNIQUES FOR OSTEOARTHRITIS OF THE THUMB CARPOMETACARPAL JOINT

Kaoru Tada[1], Daiki Nishi[2], Akihiro Kurosawa[2], Mika Akahane[1], Soichiro Honda[1], Akari Mori[1], Masahiro Higuchi[2], Hiroshi Tachiya[2], Hiroyuki Tsuchiya[1]
[1]Department of Orthopedic Surgery, Graduate School of Medical Sciences, Kanazawa University, Kanazawa, Japan; [2]Institute of Science and Engineering, Faculty of Mechanical Engineering, Kanazawa University, Kanazawa, Japan

Introduction: Various types of arthrodesis have been performed to treat osteoarthritis of the carpometacarpal joint of the thumb, and in recent years, there has been an increasing number of reports on arthrodesis using locking plates. However, there have been few reports on the strength of arthrodesis techniques.
Aim: The purpose of this study was to investigate the strength of various arthrodesis techniques using finite element analysis.
Material & Methods: Based on computed tomography data of the first metacarpal and trapezius of a healthy adult male, a three-dimensional model of the thumb carpometacarpal joint with cortical bone and trabecular bone inside the cortical bone was created. Three-dimensional models were also created for locking plates and screws, and Young's modulus and Poisson's ratio were defined for each tissue. Four arthrodesis techniques were created for analysis: Technique 1 with two headless compression screws, Technique 2 with a spoon-shaped locking plate and locking screws, Technique 3 with a T-shaped locking plate and locking screws, and Technique 4 with one headless compression screw inserted obliquely from the trapezius to the first metacarpal bone in addition to Technique 3. The maximum equivalent stress generated in the implant was examined by applying 10 N compression, 10 N flexion, and 50 N-mm torsion to the metacarpal head of each model while the proximal surface of the trapezius was completely fixed.
Results: The maximum equivalent stresses for all loading were the greatest for Technique 3 (144.9 MPa in compression, 621.6 MPa in flexion, and 55.2 MPa in torsion) and the least for Technique 4 (10.3 MPa in compression, 72.0 MPa in flexion, and 14.9 MPa in torsion). The maximum equivalent stress in flexion was approximately 5–10 times higher than that in compression or torsion in each of the four arthrodesis techniques.
Conclusions: The results of this study suggest that using a locking plate and compression screw inserted obliquely from the trapezius to the first metacarpal is preferable for joint arthrodesis. Because flexion generates more stress than compression or torsion, appropriate restrictions should be placed on flexion of the thumb to avoid implant fracture until bone union is achieved.

A-0052 MACRODYSTROPHIA LIPOMATOSA WITH CARPAL TUNNEL SYNDROME; IS CARPAL TUNNEL RELEASE SUFFICIENT?

Zareze Abd Rahman, Lee Huang Shen, Nurul Asikin Zainal
Hospital Pakar Sultanah Fatimah, Muar

Introduction: Macrodystrophia lipomatosa occurs in individuals with lipofibromatous hamartoma associated with macrodactyly. Lipofibromatous hamartoma (LFH) commonly affects median nerve and progressive hypertrophy of median nerve subsequently results in carpal tunnel syndrome.
Aim: To report a case of Lipofibromatous hamartoma with macrodactyly affecting the median nerve which was treated with carpal tunnel release with satisfactory outcome.
Material & Methods: To report a case of carpal tunnel syndrome secondary to lipofibromatous hamartoma of median nerve
Results: Patient reported relief of carpal tunnel syndrome symptoms post carpal tunnel release without any debulking surgery done over the median nerve.
Conclusions: Carpal tunnel release alone is sufficient in alleviating symptoms of carpal tunnel syndrome in patient with lipofibromatous hamartoma of median nerve.

A-0053 INVESTIGATING THE ROLE OF METRNL IN THE INJURY RESPONSE FOLLOWING FINGERTIP AMPUTATION

Nadjib Dastagir, Vesna Bucan, Khaled Dastagir Peter Maria Vogt
Medical School of Hannover, Germany

Introduction: Replantation of the fingertip is a challenging microsurgery and requires extensive technical skills. To improve replantation success it is important to understand the mechanisms regulating healing and regenerative potential at the injury site. The protein METRNL has shown reparative proangiogenic functions in models of cardiac injury and skin wound healing, we hypothesized METRNL might be similarly involved in the healing response following amputation of the fingertip.
Aim: KIT positive cells contribute to fingertip regeneration
Material & Methods: We collected human digit tip samples from our clinic and used immunostaining to identify the presence of METRNL and its receptor KIT. To determine potential sources of METRNL we stained for immune cell presence using CD11b and to assess proangiogenic function we stained for the endothelial cell marker CD31.
Results: We found co-localization of METRNL and KIT along the nail bed, suggesting the protein may be involved in the post-amputation response. There appeared to be recruitment of immune cells to the injury site, and METRNL staining was near CD31+ cells suggesting it may contribute to the post-amputation angiogenesis response.
Conclusions: Our results suggest METRNL may be involved in the healing response following fingertip amputation. The colocalization of METRNL, KIT, and CD31+ endothelial cells along the nail bed suggests this ligand-receptor interaction may contribute to healing and regeneration via an angiogenic response. We plan to continue our characterization of METRNL in the fingertip to understand its roles in healing and assess its potential as a therapy to encourage the success of replantation microsurgeries.

A-0054 BLOOD VESSEL INJURIES OF THE FINGERS: A CLINICAL COMPARISON OF ONE- AND TWO-ARTERIAL BLOOD SUPPLY

Nadjib Dastagir, Doha Obed, Florian Bucher, Shiar Murad, Khaled Dastagir, Peter M Vogt
Medical School of Hannover, Germany

Introduction: Traumatic finger injuries are very common in emergency medicine. When patients present with finger injuries, there is often damage to the vascular nerve bundles, which requires subsequent reconstruction. It is unknown if repairing a unilaterally injured artery affects patients' recovery in a well-perfused finger.
Aim: Material & Methods: This retrospective cohort study compares the clinical outcomes of 11 patients with one-vessel supply (mean age 48.3 years; 7 males, 4 females) to 14 patients with two-vessel supply (mean age 44.5 years; 8 males, 6 females). The patient outcomes were assessed using patient questionnaires (Disabilities of Arm, Shoulder, and Hand (DASH), European Quality of Life 5 Dimensions 5 Level Version (EQ-5D-5L), and EuroQol visual analog scale (EQ-VAS)) and a clinical examination of hand function and imaging of circulatory efficiency.
Results: No significant changes were observed in the DASH, EQ-5D-5L, and EQ-VAS questionnaires. Clinical evaluation of hand function, measured by cold sensitivity, two-point discrimination, pain numerical analog scale, and grip strength also revealed no significant differences between cohorts. Blood flow measurements using thermal imaging revealed no effects on circulation in the affected digit.
Conclusions: Collectively, the study finds reconstruction is not absolutely necessary when there is one intact digital artery as it is sufficient for healing and functional outcomes. We recommend finger artery reconstruction when both digital arteries are injured or if an immediate tension-free suture is possible.

A-0055 AGE CONSIDERATIONS IN FOUR CORNER FUSION AND PROXIMAL ROW CARPECTOMY: A SYSTEMATIC REVIEW

John Heifner[1], Thomas Karadimas[2], Osmanny Gomez[3], Gregory Kolovich[4]
[1]Miami Orthopaedic Research Foundation; [2]USF Moroni College of Medicine; [3]Larkin Hospital Department of Orthopedic Surgery; [4]Optim Orthopedics

Introduction: Although indications for four-corner arthrodesis (4CA) and proximal row carpectomy (PRC) are not completely aligned, the surgeon is often tasked with deciding between these options which vary in surgical technique and complication profile. Patient age is often discussed as a determining factor for treatment; however, outcome data for these procedures are rarely stratified by patient age. Physiologic aspects of healing and recovery are not uniform across a large age distribution. Thus, treatment decisions should be evaluated within the confines of a more narrow age bracket to provide a template for informed clinical decision-making.
Aim: Our objective was to perform a systematic review on the age-specific outcomes for 4CA and PRC.
Material & Methods: A PubMed database search for 4CA and PRC was performed according to PRISMA guidelines. The inclusion criteria required individual case reporting of patient age, surgical intervention, and appropriate outcome measures. The data was stratified by procedure and by patients older and younger than 45 years.
Results: Within the 4CA group, the relative risk for a DASH score above 30 was 1.94 (95% CI, 1.1-3.67) in patients over 45 years compared to patients under 45 years. Within the PRC group, grip strength as a percentage of the contralateral side was higher in the over 45 age group (mean 75%) compared to the under 45 group (mean 61%) but did not reach the level of significance.
Conclusions: Despite satisfactory results for 4CA in aggregate, the distribution of scores indicates the need for setting

expectations when treating younger adult patients with 4CA. The current results demonstrate increased disability based on DASH score following 4CA in patients under 45 years compared to patients over 45 years. Although outcomes were comparable between younger and older adults following PRC, recovery of grip strength may occur less frequently in younger adults.

A-0056 THE AGE-SPECIFIC PERFORMANCE OF ELBOW HEMIARTHROPLASTY: A SYSTEMATIC REVIEW

John Heifner[1], Peter Falgiano[1], Thomas Yergler[2], Ty Davis[2], Nathan Hoekzema[3], Jorge Orbay[2]
[1]Miami Orthopaedic Research Foundation; [2]Larkin Hospital Department of Orthopedic Surgery; [3]UCSF Fresno

Introduction: There are notable gaps in the existent EHA literature. Patient age is often identified as an important determinant when deciding to treat with EHA however aggregate evidence on the age-specific performance of EHA is limited. Although data for EHA is often reported at a mean patient age around 60 years, there is a broad age distribution across the series from the 3rd to the 7th decade. Outcomes are variable across a wide age distribution, thus aggregate data should be reported within more narrow age confines
Aim: Our systematic review objectives were 1) to compare the performance of EHA between younger and older adults, and 2) to stratify outcomes for EHA by prosthesis.
Material & Methods: In compliance with PRISMA guidelines, databases were queried for EHA studies which met the inclusion criteria. The ages of 60 and 65 years were used to delineate younger and older adults. Cochrane ROBINS-I and the GRADE framework assessed bias and quality respectively.
Results: Patients older than 65 years (N=159) had a significantly higher elbow arc of motion compared to patients younger than 65 years (N=121) at a mean follow up of 51 months. There was a significantly increased risk for a MEPS below 75 in younger adults compared to older adults, at age delineations of 60 (RR 2.17) and 65 years (RR 2.19).
Conclusions: Our results demonstrate a two-fold increase in risk of a poor outcome as defined by MEPS in patients under 65 years compared to those over 65 years. Consistent with this finding, patients under 65 years had a significantly lower elbow arc of motion and elbow flexion compared to those over 65 years. However, the mean DASH scores were similar between the age groups. The current findings suggest that although elbow range of motion may be limited in younger adults following EHA, function is satisfactory and notably comparable to the function in older adults. Additionally, the risk of revision/removal surgery is similar between younger and older adults across short to mid-terms of follow up.

A-0057 THE IMPACT OF PHYSIOLOGIC ALIGNMENT ON RADIOCAPITELLAR PRESSURE FOLLOWING RADIAL HEAD ARTHROPLASTY

John Heifner[1], Gustavo Lacau[2], Stephen Forro[3], Ty Davis[3], Deana Mercer[4], Francisco Rubio[3]
[1]Miami Orthopaedic Research Foundation; [2]Miami Hand and Upper Extremity Institute; [3]Larkin Hospital Department of Orthopedic Surgery; [4]UNM Department of Orthopedic Surgery

Introduction: The incidence of radial head fractures is increasing, and radial head arthroplasty (RHA) is being more frequently utilized as treatment for irreparable fractures. Capitellar wear remains an unsolved problem following radial head arthroplasty. Aggregate data by Vannabouathong et al reported mean capitellar erosion of nearly 20% across monopolar RHA implants. The reported ranges of erosion were highly variable across the devices which suggests prosthetic design is a critical determinant. One of the most common RHA failure mechanisms across collective reporting is persistent

pain. Pain is potentially a multifactorial symptom but progressive onset following the acute postoperative phase may be indicative of capitellar erosion. It is currently unknown whether radiocapitellar contact characteristics may be optimized with an physiologically aligned RHA

Aim: Our objective was to compare radiocapitellar pressure between the native joint and two radial head prosthesis conditions - (1) a prosthetic head that was aligned to the forearm axis of rotation and (2) the same prosthesis with an axisymmetric nonaligned head.

Material & Methods: Ten cadaveric specimens received a pressfit radial head prosthesis (Align, Skeletal Dynamics, Miami, FL) for both prosthetic testing conditions. Physiologic alignment (AL) was defined as the prosthetic head aligned to the forearm axis of rotation. Axisymmetric alignment (NA) was defined as the prosthetic radial head aligned to the axis of the prosthetic stem. Axial load was applied with the elbow in extension and the forearm pronated. Data was collected using a Tekscan 4000 sensor.

Results: The mean pressure in the AL and AX groups were significantly higher than the mean pressure in the native joint. Compared to the native joint, the mean pressure was 19% higher in the AL group and 56% higher in the AX group. Peak pressure beyond 5 MPa occurred in zero specimens in the native joint group, in one specimen (10%) in the AL group, and in five specimens (50%) in the AX group.

Conclusions: The current findings indicate that physiologic alignment of the prosthetic radial head may yield capitellar pressures that are more similar to the native condition than a non-physiologically aligned prosthesis. This finding is pertinent as capitellar cartilage wear is one of the most common complications following RHA. The native radial head and capitellum have a congruent concave convex relationship. Precise replication of this relationship with RHA may still be detrimental to the capitellum due to the reduced surface compliance of a metallic head compared to native cartilage. However, non-physiologic alignment of the prosthetic radial head is likely to worsen and hasten the cartilage damage. These results suggest that physiologic alignment may improve the long-term durability of radial head arthroplasty.

A-0058 COMPARING INTERNAL AND EXTERNAL STABILIZATION FOR TRAUMATIC ELBOW INSTABILITY: A SYSTEMATIC REVIEW

John Heifner[1], Ty Davis[2], Robert Rowland[2], Osmanny Gomez[2], Robert Gray[3]

[1]Miami Orthopaedic Research Foundation; [2]Larkin Hospital Department of Orthopedic Surgery; [3]NorthShore Orthopedics

Introduction: Despite surgical reestablishment of the supporting structures, instability may often persist in traumatic elbow injury. In these cases, a temporary internal or external fixator may be indicated to unload the repaired structures and maintain joint concentricity. Aggregate data is needed to characterize the risk of complication between external fixation and the IJS when used for traumatic elbow instability.

Aim: Our objective was to review the literature to compare the complication profile between external fixation and the internal joint stabilizer.

Material & Methods: A database query was performed in accordance with the PRISMA guidelines. The Population, Intervention, Comparison and Outcome (PICO) characteristics for eligibility were the following: for patients over 18 years clinical outcomes were compared between an external fixator (ExFx) or the IJS for acute or chronic elbow instability. The Cochran ROBINS-I and GRADE framework were compiled for risk of bias and quality assessment.

Results: The rate of recurrent instability was 4.1% in the IJS group and 7.2% in the ExFx group, with an odds ratio of 1.93 (95% CI 0.88 to 4.23). The rate of device failure was 4.4% in the IJS group and 4.5% in the ExFx group. Pin-related complications occurred in 15.4% of ExFx cases.

Conclusions: Instability may persist despite fixation or repair of the disrupted structures. A hinged external fixator and the IJS provide the unique advantage of maintaining stability while allowing mobilization. These devices unload and protect the repaired structure(s) and mitigate the potential for stiffness. The literature demonstrates a distinct difference in complication profile between external fixation and the IJS. Although the rates of recurrent instability were not significantly different (p=0.09), the odds of recurrent instability with external fixation were nearly two times greater than the odds of recurrent instability with the IJS. This higher rate of recurrent instability following external fixation may be clinically important. Additionally, rates of device failure were comparable between the groups. However, the high rate of pin-related complications (14.3%) in external fixation cases is notable.

A-0059 SURGICAL TREATMENT OF COMMINUTED INTRA-ARTICULAR DISTAL RADIUS FRACTURE

Kyu Bum Seo, Hongje Kang
Jeju National Unviersity Hospital, South Korea

Introduction: Surgical treatments of severe comminuted intra-articular distal radius fracture are difficult to achieving anatomic alignment and articular congruity. Volar locking plate is widely used for distal radius fractures. However, Volar locking plate have limitations for severe comminuted intra-articular fractures. Some author reported volar and dorsal plating for intra-articular distal radius fracture. However, there are still some cases of two direction plates (volar and dorsal) are not enough for stable fixation. Also, Additional fixation with K-wire frequently caused complication.
We report results of Clinical and radiological results of three directional plating technique in intra-articular comminuted distal radius fracture.
Methods: Fourteen cases of severe comminuted distal radial fractures from January 2019 to April 2022 were included in this study. The mean age was 54.2 years. There were 8 males and 6 females. Inclusion criteria were severe comminuted distal radial fractures without achieved stable fixation with the volar and dorsal plates. So, three directional Patients using Volar, dorsal, and radial column plating were included. Postoperative clinical evaluation was performed with measurement of wrist range of motion, and visual analogue pain scale (VAS) at last follow-up. Bone union and radiological parameters were measured at radiological examination. Articular incongruence was measured with computer tomography at last follow-up.
Results: The wrist ROM was about 90% of the Contralateral side. The Mayo score at 1 year of POD showed a good clinical score. (Excellent 9, Good). The average VAS was 1.7. mean Bone union period was 10.2 weeks. Other radiological parameters are near normal ranges. Articular incongruency was less than 0.9 mm (0~1.4 mm). There was no complication such as delayed union or nonunion, wound problems, infection.
Conclusion: Three plane plating technique is good option for severe comminuted Intra-articular distal Radius Fracture. However, more experience and long term follow-up are required.

A-0060 SURGICAL TREATMENT OF COMMINUTED INTRA-ARTICULAR DISTAL RADIUS FRACTURE -TRIPLANE DIRECTIONAL PLATING TECHNIQUE

Kyu Bum Seo, Hongje Kang
Jeju National Unviersity Hospital, South Korea

Introduction: Surgical treatments of severe comminuted intra-articular distal radius fracture are difficult to achieving anatomic alignment and articular congruity. Volar locking plate is widely used for distal radius fractures. However, Volar

locking plate have limitations for severe comminuted intra-articular fractures. Some author reported volar and dorsal plating for intra-articular distal radius fracture. However, there are still some cases of two direction plates (volar and dorsal) are not enough for stable fixation. Also, Additional fixation with K-wire frequently caused complication.rnWe report results of Clinical and radiological results of three directional plating technique in intra-articular comminuted distal radius fracture.

Methods: Fourteen cases of severe comminuted distal radial fractures from January 2019 to April 2022 were included in this study. The mean age was 54.2 years. There were 8 males and 6 females. Inclusion criteria were severe comminuted distal radial fractures without achieved stable fixation with the volar and dorsal plates. So, three directional Patients using Volar, dorsal, and radial column plating were included. Postoperative clinical evaluation was performed with measurement of wrist range of motion, and visual analogue pain scale (VAS) at last follow-up. Bone union and radiological parameters were measured at radiological examination. Articular incongruence was measured with computer tomography at last follow-up.

Results: The wrist ROM was about 90% of the Contralateral side. The Mayo score at 1 year of POD showed a good clinical score. (Excellent 9, Good). The average VAS was 1.7. mean Bone union period was 10.2 weeks. Other radiological parameters are near normal ranges. Articular incongruency was less than 0.9 mm (0~1.4 mm). There was no complication such as delayed union or nonunion, wound problems, infection.

Conclusion: Three plane plating technique is good option for severe comminuted Intra-articular distal Radius Fracture. However, more experience and long term follow-up are required.

A-0061 IS THE CONSERVATIVE MANAGEMENT THE 1ST CHOICE OPTION IN THE ELDERLY PATIENTS WITH SIMPLE FRACTURE OF HUMERUS SUPRACONDYLE

Jae-min Lee, Jisu Park, Jin-Rok Oh
Department of Orthopaedic Surgery, Wonju Severance Christian Hospital, Wonju, South Korea

It has been controversial that there is no big difference in functional result between conservative treatment and surgery to distal humerus fractures for elderly patients. Most conservative treatment has been done by immobilization of splint or cast. However, many studies have identified that surgical management has no statistically significant difference and not a few elderly patients finished their fractrure of humerus by applying splint or immobilizing cast. In short, even though by radiologic outcome the elderly patients didn't get recovery, their quality of life was satisfied. However, our study showed that surgical treatments should not be ignored and if patients feel uncomfortable at their broken site such as sensation, structural deformity, malunion and neurological symptom, surgery to distal humerus fractures should be done definitively. We present 5 cases of elderly patients with simple distal humerus fractures who were at first treated with conservative management but came back to hospital to get surgical intervention for nonunion. Patients suffered from supracondyle humerus fracture that is classified in distal humerus fracture but they applied splint or cast to their injured site. After conservative treatment, patients made their decisions to have operation because of nonunion and pain to the fractured site. These cases insist that operative treatment should be considered and done to simple humerus supracondylar fracture. We believe that this experience will open new discussion points about treatment method for the elderly patients with simple humerus supracodylar fracture.

A-0062 OPPONENS POLLICIS FATTY INFILTRATION IN THUMB CARPOMETACARPAL OSTEOARTHRITIS: NEW FINDING

Hicham El Hor, Nicholas Rhodes, Naoya Iida, Nurisha Lachman, Peter Amadio
Mayo Clinic, Rochester, USA

Introduction: Thumb-Carpometacarpal (CMC) Osteoarthritis (OA) is a common and disabling condition with frequent poor outcomes after surgical treatment, including slow recovery, persistent instability, and weakness. In addition to rotating the thumb to face the fingers, the Opponens Pollicis (OPP) stabilizes the Thumb-CMC joint during pinch. while studying the detailed anatomy of the thenar muscles, we serendipitously discovered two cases of fatty infiltration (FI) of the deep head of the OPP in cadavers with Thumb-CMC OA.

Aim: In this study we aimed to answer to three questions: 1) what is the prevalence of OPP FI in populations with and without thumb-CMC OA; 2) what are the risk factors for developing FI; 3) to identify if FI affects other thenar eminence muscles.

Material & Methods: 790 consecutive 3T wrist and hand magnetic resonance imaging (MRI) studies performed in our institution over a 12 month period were analyzed for evidence of FI in the hand intrinsic muscles. This population was divided in two cohorts based on Xray analysis: a cohort with thumb CMC OA (n=330) and a second cohort without thumb CMC OA (n=460). We staged the thumb CMC OA using Eaton's classification. A statistical analysis using a logistic regression model was performed to investigate the factors of age, sex and OA severity for the presence of FI in these images.

Results: In the thumb CMC OA cohort, OPP FI was present in 153 patients (46%). FI, when present, was located only in the deep belly of the OPP. We found no OPP FI in the cohort without thumb CMC OA (460 patients). In the thumb CMC OA cohort 122 patients (80%) were older than 60y.o. No FI was found in patients with Eaton stage 1 and all patients with Eaton stage 4 (n=30) had FI. Twenty-one patients had had a trapeziectomy to treat their OA, so Eaton stage could not be determined, but 20 of these 21 had FI noted. As shown in Table 1, increasing age and, especially, advanced OA stage were significant predictors for the presence of OPP while CMC is more common in women, gender was not independently associated with the presence of FI.

Conclusions: OPP FI is found to be a frequent finding in Thumb CMC osteoarthritis that could help explain poor outcomes after surgery, due to the role of this muscle in stabilizing the joint. The insertion of the OPP deep belly on the thumb CMC joint capsule, where palmar osteophytes develop in advanced stage CMC OA, suggests a potential mechanism for the development of FI, with osteophyte impingement damaging the structure of the muscle leading to its fatty degeneration. In the future, we plan other studies to analyze clinical outcomes in CMC OA patients with and without FI, and more focused in vivo studies of OPP function.

OPP FI could potentially alter the function and the stability of the thumb CMC joint in patients with CMC OA

A-0063 WIDE AWAKE LOCAL ANESTHESIA NON TOURNIQUET TECHNIQUE VS BRACHIAL BLOCK IN PAIN CONTROL OF DISTAL RADIUS FIXATION ; A RANDOMIZED CONTROLLED TRIAL STUDY

Sunyarn Niempoog[1], Paworawat Kra-omkaew[1], Woraphon Jareonporn[2]
[1]Department of Orthopedics, Faculty of Medicine, Thammasat University, Thailand; [2]Department of Orthopedics, Police Hospital Thailand

Introduction: The Wide-Awake Local Anesthesia No Tourniquet (WALANT) technique is utilized for various orthopedic hand operations—a few reports of satisfactory outcomes when used for distal Radius fracture fixation. However, there is no literature that compares WALANT and Brachial Plexus Blocks (BPB) use for open reduction and internal fixation (ORIF) in a distal radius fracture.

Aim: To compare the pain, blood loss, preoperative preparation time, length of stay (LOS), costs, operative time, and patient satisfaction between WALANT and BPB with tourniquet for ORIF in distal Radius fractures during the preoperative, intraoperative, and postoperative period.
Material & Methods: This prospective Randomized Controlled Trial assembled 30 patients who presented with isolated unilateral distal Radius fractures between May 2019 and July 2022. Fifteen patients were allocated to undergo volar plating under WALANT and the other fifteen under BPB with the tourniquet.
Results: The WALANT group has a significant difference of VAS mean of 1.33 in WALANT and 0.28 in BPB ($p=0.037$) and blood loss mean of 56.11 and 19.21 ($p<0.001$) more than BPB. The WALANT group are superior in terms of preoperative preparation time mean of 17.33 minute and 24.35 minute ($p=0.022$), LOS mean of 30.88 hours and 67.5 hours ($p=0.179$), and cost mean of 49,905.44 bath and 62,144.71 bath ($p=0.003$). The operative time mean of 78.2 minutes and 76 minutes ($p=0.96$) and patient satisfaction mean of 4.33 and 4.35 ($p=0.99$) are not statistical differences.
Conclusions: The WALANT technique for ORIF in distal radius fractures produced more pain during the intraoperative and immediate postoperative periods and total blood loss compared to BPB whereas operative time and patient satisfaction are of no significant difference. However, we were able to complete every WALANT operation with the patients experiencing unruffled pain and blood loss. Moreover, the preoperative time before skin incision, LOS, and costs of stay were demonstrated to be less with the WALANT technique.

A-0064 EXPERIENCE OF LIVING WITH CHRONIC PAIN IN CONJUNCTION WITH SURGERY FOR ULNAR NERVE COMPRESSION AT THE ELBOW – A QUALITATIVE STUDY

Alice Giöstad[1], Ingela K Carlsson[2,3], Lars B. Dahlin[1,2,3], Erika Nyman[1,4]
[1]Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden; [2]Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden; [3]Department of Translational Medicine – Hand Surgery, Lund University, Malmö, Sweden; [4]Department of Hand Surgery, Plastic Surgery and Burns, Linköping University Hospital, Linköping, Sweden

Introduction: The outcome of surgery for ulnar nerve compression at the elbow (UNE) is often evaluated using patient-reported outcome measures (PROMS) or objective measures for strength and sensibility. Pain in conjunction with surgery for ulnar nerve compression at the elbow (UNE) is seldom highlighted in the literature.
Aim: Explore patients' experiences of living with chronic pain (≥3 months duration) in conjunction with surgery for UNE, the consequences and the coping strategies applied.
Material & Methods: In-depth interviews were conducted with 10 participants aged >18–<60 years. The narratives were analysed using an inductive approach and content-analysis.
Results: The analysis revealed seven main categories: "Physical symptoms/impairments" and "Mood and emotions" comprise symptoms caused by UNE and chronic pain; "Consequences in daily life" includes challenges and obstacles in every-day life, impact on leisure activities and social life; "Struggling with self-image" embraces experiences closely related to identity; "Coping strategies" covers adaptive resources; "Experience of relief " describes perceived improvements; "Key message for future care" comprises important aspects for healthcare providers to consider.
Conclusions: The results clarify the need for healthcare personnel to adopt a biopsychosocial approach when treating patients with UNE. Emotional symptoms and sleep disturbances should be identified and treated properly since they contribute to the heavy burden experienced by the individual.

A-0065 USING ARTIFICIAL INTELLIGENCE TO COMMUNICATE WITH NERVE CLINIC PATIENTS

Henry de Berker[1], Jamal Khudr[2], Elizabeth Jones[2], Conrad Cheesewright[3], Samuel Kitching[4], Anuj Mishra[1], Christopher Duff[1], James Bedford[1]

[1]Wythenshawe Hospital, UK; [2]Royal Preston Hospital, UK; [3]University of Exeter, UK; [4]University of Manchester, UK

Introduction: Surgeons should write to their patients in simple, accessible language to help them make decisions about their care. This is particularly true for those with complex nerve injuries, as they often face a long and uncertain recovery. However, many surgeons use clinic letters to record detailed clinical findings and communicate directly with other healthcare professionals in technical language. An obvious solution is writing two letters, but this is time consuming. Large language models, such as OpenAI's Chat-GPT4 can be used to rapidly generate coherent and detailed written information from simple prompts. This relatively new technology has a range of exciting potential applications in healthcare, including improving communication with our patients.

Aims: To assess whether large language models powered by artificial intelligence can be used to draft coherent, accurate clinic correspondence for patients with complex nerve injuries.

Materials & Methods: Fictional clinic letters for a range of upper limb nerve presentations were used as templates for OpenAI Chat-GPT3.5 (GPT3.5), Chat-GPT4 (GPT4) and Google Bard (Bard) to generate patient letters using two different prompts. 'Prompt 1' was more detailed than 'Prompt 2' (127 vs. 33 words). The Flesch Reading Ease Scale (FRES) was used to measure readability (100=easy, 0=difficult). Additionally, 5 blinded assessors marked the letters against criteria devised from the 'Please write to me' directive (Academy of Royal Colleges, 2018). Significance was calculated using a Student's T-test for mean values, and chi-squared test for binomial data ($p<0.05$ considered significant).

Results: Thirty-six letters were generated from 6 templates. Letters written by GPT3.5 and GPT4 were of higher quality than Bard (7/10 vs 6/10, $p<0.01$ for both). Assessors judged letters written by GPT4 were more likely to be understood by their friends and family (88%) than those written by GPT3.5 (80%, $p=0.04$) and Bard (77%, $p<0.01$). According to the FRES, letters written by Bard and GPT4 were significantly easier to read than the templates (68 vs 58, $p=0.02$ for both). Letters written with prompt 2 were easier to read than prompt 1 (72 vs 60 respectively, $p<0.01$). GPT4 was less likely to use unexplained medical jargon than Bard (25% vs 74% respectively, $p=0.03$). When assessed globally for quality, there was no difference between GPT3.5 and GPT4, which outperformed Bard ($p<0.01$ for both). Prompt 1 yielded higher quality letters than prompt 2 ($p<0.01$).

Conclusions: The quality and readability of letters written by large language models to patients using fictional input data is determined by prompt and model used. Of the models tested, GPT4 performed best.

A-0066 IMPLANTATION OF A CMC1ST PROSTHESIS UNDER WALANT. ABOUT MY FIRST 40 CASES

Stephane Barbary

Clinique Louis Pasteur, Nancy, France

Introduction: We report the method of implantation of a CMC1st prosthesis under WALANT (Wide Awake Local Anesthesia No Turniquet) based on feedback from our first 40 cases. The method of anesthesia is described in detail and more succinctly the surgical technique which is similar to the classic procedure under axillary block.rnMaterial & Methods: This study was performed from July 2021 to January 2023. The mixture used was: In 250ml of physiological serum, 40ml lidocaine 2%, 20 ml naropein 7.5%, 2 mg adrenaline. Between 30 ml and 45 ml of this mixture were needed depending on the hand's size. Anesthesia was performed by the same surgeon at least 30 minutes before the procedure. It took about 10-15 minutes, usually

in two 5 minutes stages, with a 5 minutes period rest to minimize the pain of the second injection, deeper into the joint and at the palmar aspect of the first metacarpal which is the most recalcitrant area to complete pain relief. 8 patients who were very stressed before the operation were relaxed by IV injection of 2 mg of Midazolam at the time of the incision. IV Antibiotic prophylaxis was systematic. The patients were monitored as for a classic procedure: oxygen saturation, ECG, blood pressure.
Results: This WALANT method provides effective anesthesia and allows the implantation of all 40 CMC1st prostheses without discomfort for the patient or the surgeon. The duration of the procedure was about 30 minutes, not longer than under axillary block. The differents surgical steps are the same as those with Axillary Block. The key step remains the placement of the cup in the trapezium but control of active movement is possible under WALANT. In addition, the choice of neck length and its tension seems more precise under WALANT due to the avoidance of over-stuffing and the more effective detection of an active cam effect. We do not report any complications regarding the anesthesia procedure or the implantation of the prosthesis. Patient satisfaction was excellent and all would like to have the same operation for the other hand except one. She was very stressed and did not appreciate the noise and vibrations nor the impactions.
Conclusions: The method of implantation of a CMC1st prosthesis under WALANT can be performed without pain and allows a comfortable procedure for the patient and the surgeon. The steps of the intervention are the same as under axillary block. Particular care must be taken when placing the cup in the trapezium (position and orientation), testing neck tension and mobility, and looking for the cam effect. The duration of the procedure is comparable. The absence of complication and positive patient satisfaction feedback underline the effectiveness and safety of this method. However, the selection of patients not too stressed is important.

A-0067 REPLACEMENT OF A DESTRUCTED SCAPHOID BY A 3D MODELLED PROSTHESIS

Marius Kemler
Martini Hospital, Groningen, the Netherlands

Introduction: In cases where scaphoid non-union advanced collapse occurs, the textbook advise is to perform a salvage procedure.
Aim: While replacement of destructed elements by prostheses is common practice in dentistry, it is new in wrist surgery. The option is in principle dismissed by fear of dislocation of the implant or periprosthetic arthritis. In this case, the affected scaphoid was replaced by the 3D modelled prosthesis
Material & Methods: A 29-year-old female patient presented with severe right wrist pain that had started spontaneously. Analysis revealed Preisser disease had caused avascular necrosis of the proximal pole of the right scaphoid. Initially, she was treated by a pedicled vascularized bone graft, but unsuccessfully. A CT scan two years postsurgery demonstrated progression of the avascular necrosis of the proximal pole of the right scaphoid. Wrist pain made it impossible to function both professionally and in her favourite pastime volleybal. Four years after the initial diagnosis, at the age of 33 years, the affected scaphoid was replaced by the 3D modelled prosthesis. The customized scaphoid replacements are modelled using computerized tomography
Results: At three years follow-up pain intensity had decreased from 8 to 1, PRWHE from 87 to 59, quickDASH from 77.5 to 43.2, grip strength from 14.7 to 19.3, wrist flexion from 10 to 25 and wrist extension from 60 to 63. Final X-rays demonstrated no signs of dislocation of the implant or signs of periprosthetic arthritis
Conclusions: Scaphoid non-union advanced collapse does not necessarily require a salvage procedure. Based on a CT scan of the unaffected wrist, it is possible to model the scaphoid that has to be replaced. Fear of dislocation of the implant or periprosthetic arthritis appears to be unfounded.

A-0068 FRACTURE GEOMETRY OF COMPLEX ARTICULAR PROXIMAL ULNA FRACTURES IN RELATION TO ITS ANATOMY

Charlotte L E Laane[1,2], Anup Arvind[1,3], Huub H de Klerk[1,4,5], Rohit Garg[1,6], Chaitanya S Mudgal[1,6*], Abhiram R Bhashyam[1,6*]
[1]Division of Hand Surgery, Dept of Orthopaedic Surgery, Massachusetts General Hospital; [2]Erasmus MC, University Medical Centre Rotterdam, Trauma Research Unit, Dept of Surgery; [3]Boston University Chobanian & Avedisian School of Medicine; [4]Amsterdam Shoulder and Elbow Center of Expertise (ASECE) OLVG, Amsterdam, the Netherlands; [5]Department of Orthopaedic Surgery, University Medical Center Groningen (UMCG) and Groningen University, Groningen, the Netherlands; [6]Harvard Medical School, Boston, MA

Introduction: The proximal ulna has a varus as well as a dorsal angulation. The ulna has a unique ligamentous anatomy, and due to Wolff's law the bone density is higher at the site of ligamentous and tendinous attachments.
Aim: The purpose of this study was to evaluate how intra-articular fractures of the proximal ulna relate to its bony anatomy and ligamentous attachments to ultimately aid in operative planning and restoring critical structures for elbow stability.
Material & Methods: This retrospective cohort study evaluated preoperative CT scans from 140 patients with intra-articular, comminuted fractures of the proximal ulna. Median age was 57 years (IQR 38-65), and 60% of the patients (84/140) were female. For evaluation, the articular space of the proximal ulna was divided into 5 zones – the olecranon process, the lateral and medial intermediate facets, the lesser sigmoid notch, and the coronoid process.
Results: Fractures affected each zone at differing rates: the olecranon process (94/140, 67%), the lateral (78/140, 56%) and medial intermediate facets (83/140, 59%), the lesser sigmoid notch (42/140, 30%), and the coronoid process (53/140, 38%). The most common fracture pattern was the comminution of the olecranon process, lateral, and medial intermediate facets (44/140, 31%). Dislocated elbows on average involved significantly more zones than the subluxation and normal alignment groups (4.22 compared to 3.82 and 3.14 zones, respectively). Fractures with concomitant radial head fracture on average involved significantly more zones than fractures without (4.29 compared to 3.22 zones, respectively). Proximal anterior to distal posterior fracture lines occurred in 75% of the fractures (105/140). Proximal ulnar to distal radial fracture lines occurred in 60% of the fractures (84/140).
Conclusions: This study suggests that fracture lines occur according to the bony anatomy and ligamentous attachments of the proximal ulna. The most common fracture patterns of the proximal ulna which occurred in approximately a third of the fractures involved the olecranon process, lateral, and medial intermediate facets. An elbow dislocation disrupted the ligamentous attachments to the proximal ulna to a higher degree, leading to association with further intra-articular comminution. Knowledge of this largely consistent and predictable fracture geometry can assist surgeons in planning fixation strategies to fix the fragments suitably so as to restore proximal ulnar anatomy, in an effort to optimize functional recovery of the elbow and forearm articulations.

A-0069 QUANTITATIVE THICKNESS MAPPING OF THE DISTAL RADIUS TO AID SCREW PLACEMENT DURING VOLAR PLATE FIXATION

Charlotte L. E. Laane[1,2*], Jayanth S. Pratap[1*], Rachel C. Cross[1], Mathieu M. E. Wijffels[2], Abhiram R. Bhashyam[1,3], Neal C. Chen[1,3]
[1]Division of Hand Surgery, Dept. of Orthopaedic Surgery, Massachusetts General Hospital; [2]Erasmus MC, University Medical Centre Rotterdam, Trauma Research Unit, Dept. of Surgery; [3]Harvard Medical School, Boston, MA

Introduction: Volar plate fixation is a common treatment for displaced distal radius fractures, but common complications include intra-articular or dorsal cortical screw penetration. Knowledge of distal radius thickness, and its variation across regions, can help guide optimal screw length and position.
Aim: The purpose of this study was to construct a quantitative thickness map of the distal radius, and to analyze how

thickness varies in relation to the screw length in the oval sliding hole.
Material & Methods: CT scans from 198 wrists with an intact distal radius were evaluated. Median age was 28 (IQR 23-43) years, and 28% of the patients (55/198) were female. An open-source software module was used to 1) decompose each CT into an ordered series of axial slices, 2) automatically segment the distal radius from each slice using a machine learning algorithm for in-context CT segmentation, and 3) aggregate across all axial cuts to assemble a 3-dimensional thickness map of the distal radius at the articular surface.
Results: The overall average thickness of the oval hole (21 mm from the distal end of the radius) was 9.96 (± 0.23) mm. The distal radius articular surface was divided into 4 segments and the average thickness of the quartiles starting at the radial side was 8.01 (± 0.42) mm for Q1, 15.39 (± 0.29) mm for Q2, 18.25 (± 0.18) mm for Q3, and 14.20 (± 0.37) mm for Q4. There was a statistically significant increase in thickness for all zones, comparing oval hole screw lengths of 8 versus 10mm ($p < 0.001$). The mean thickness at all screw positions was ~2 mm lower for females compared to males ($p < 0.001$), except for Q1 and Q4.
Conclusions: We provide information on distal radial thickness to help avoid unintentional intra-articular or dorsal screw penetration in distal radius fractures. Female patients and shorter oval hole screws were predictive of shorter distal locking screws.

A-0070 ANATOMY OF LISTER'S TUBERCLE: IMPLICATIONS FOR COMPLICATIONS FOLLOWING DISTAL RADIUS FRACTURE

Charlotte L.E. Laane[1,2*], Floris V. Raasveld[1,3*], Huub H. de Klerk[1,4,5], Daniel T. Weigel[1,6], Jayanth S. Pratap[1], Kyle R. Eberlin[1,7], Neal C. Chen[1,7]
[1]Division of Hand Surgery, Department of Orthopaedic Surgery, Massachusetts General Hospital; [2]Erasmus MC, University Medical Centre Rotterdam, Trauma Research Unit, Department of Surgery; [3]Erasmus MC, University Medical Centre Rotterdam, Department of Plastic, Reconstructive, and Hand Surgery; [4]Amsterdam Shoulder and Elbow Center of Expertise (ASECE) OLVG, Amsterdam, the Netherlands; [5]Department of Orthopaedic Surgery, University Medical Center Groningen (UMCG) and Groningen University, Groningen, the Netherlands; [6]Department of Plastic Surgery, Maastricht UMC, Maastricht University Medical Centre, the Netherlands; [7]Harvard Medical School, Boston, MA

Introduction: Dorsal protrusion of a screw tip is a substantial cause for EPL rupture after a surgically fixated distal radius fracture using a volar plate. This can be explained by the trajectory of the EPL in the EPL groove adjacent to Lister's tubercle and its proximity to the dorsal cortex. However, intraoperative assessment of optimal screw length and position can be challenging due to potential bony comminution and the disrupted anatomy of the distal radius following a fracture
Aim: The purpose of this study was to identify the location of Lister's tubercle in relation to the dorsal aspect of the radius.
Material & Methods: The length and width of Lister's tubercle and the location with respect to the radial and ulnar border, and the radial styloid were measured in 26 fresh frozen upper extremities. Of these, 27% were female (7/26), and the mean age was 73.6 years (±10.7 standard deviation (SD)). In addition, 198 CT scans were evaluated using a quantitative distal radius surface map. Median age was 28 (IQR 23 to 43) years, and 28% of the patients (55/198) were female.
Results: The mean Lister's tubercle proximal to distal length was 12.6 mm (±2.3, range 6-15) and width was 5.4 mm (±1.2, range 4-8). The distance from the radial styloid to the distal and proximal border of Lister's tubercle averaged 23.0 mm (±3.2, range 17-29) and 10.4 mm (±2.3, range 6-15), respectively. The ratios from the radial side to ulnar side comprised 43% from the radial border to Lister's tubercle, 15% of Lister's tubercle width, and 42% from Lister's tubercle to the ulnar border. On CT mapping, the distance between the peak of Lister's tubercle and the ulnar and radial border of

the radius was 46% (±6.3) and 54% (±6.3), respectively. Female sex was associated with a smaller distal radius width, but not with a smaller Lister's tubercle.
Conclusions: This data reporting Lister's tubercle topography may assist in more accurate volar plate placement in distal radius fractures.

A-0071 LONG-TERM RESULTS OF SCAPHOLUNATE ISTABILITY TREATMENT WITH DYNAMIC TRANSFER OF ECRB IN TWO HIGH-LEVEL ATHLETES

Francesco Brunelli, Sarah Farjallah
IMEJ Clinique Jouvenet Paris, France

Introduction: The correction of scapholunate instability with dynamic transfer of the Extensor Carpi Radialis Brevis has been used in the last twenty years after the publication of a caes report which gave a surprising excellent result.
Aim: To present this technique as a valid alternative to other static stabilization techniques.
Material & Methods: This technique involves the correction of scapholunate instability with the dynamic tranfer of the extensor carpi radialis brevis.
This tendon is detached from its insetion and rerouted via a double pulley, the first created at the level of the septum proximal to the Lister's tubercle, the second represented by the transfer of the tendon into the third canal in place of the extensor pollicis longus which is left free in the subcutaneous tissue.
The tendon, reproducing the direction of the scaphoid axis, is then reinserted into the distal pole of the scaphoid after having shortened it adequately (generally by one centimeter) with an anchor.
No other ligament repairs are performed and the wrist is immobilized for six weeks in extension.
The author presents the results of this technique in two patients practicing high-level sports with a long follow-up.
The first is a professional skipper who underwent surgery at the age of 22and 10 months after the injury.
The second is a 28 year old internationally renowned judoka who underwent surgery 4 months after the trauma.
Results: Both patients quickly restarted their sporting activities.
The clinical check-up was carried out 13 years later for the skipper and 7 years later for the judoka.
For both the clinical and radiological result was excellent in terms of strength, mobility and absence of pain.
Both described the operated wrist as normal.
Conclusions: This technique was used by the author in approximately 40 patients suffering from post traumatic instability of the scapholunate joint.
The results have varied, from excellent to bad.
Clinical experience seems to demonstrate that this technique, if used in patients with soft, easily reducible instability without initial arthritis, can represent a valid alternative to other static stabilisation techniques even in patients subjected to significant and long-lasting efforts.

A-0072 DELAYED DEBRIDEMENT AFFECTS PROGNOSIS IN PATIENTS WITH PURULENT FLEXOR TENOSYNOVITIS: A RETROSPECTIVE COHORT AND MULTIVARIATE ANALYSES

Yuki Fujihara, Ai Sakai, Satoshi Niwa, Hideyuki Ota, Hiroaki Kumagai
Department of Orthopaedic and Hand Surgery, Nagoya Ekisaikai Hospital, Nagoya, Japan

Introduction: Purulent flexor tenosynovitis (PFT) is a severe condition, and many patients report serious postoperative complications such as amputation, limited range of motion (ROM), or recurrence of symptoms. However, the ideal protocol for PFT treatment remains unknown owing to the limited number of studies. This retrospective cohort study aimed to identify prognostic factors for PFT treatment outcomes.

Methods: Sixty-six patients (46 men and 20 women) with PFT who underwent surgical debridement at our hospital between September 2005 and January 2023 were included in this study. An open debridement technique with Bruner's incision was used in our hospital, and we did not use continuous postoperative catheter irrigation. Additional inclusion criteria were as follows: age <18 years, availability of only insufficient data, and a follow-up period of <3 months. We conducted multivariate linear regression analysis with permanent deficit as the primary outcome. We defined the number of operations, laboratory data, interval from onset to debridement, previous conservative treatment, aetiology, Kanavel's signs, and medical history of diabetes mellitus as possible prognostic factors. We also defined the interval from onset to debridement as a secondary outcome and performed logistic regression analysis.

Results: This study included a total of 66 patients (46 men and 20 women), of which 25 (38%) showed unfavourable outcomes. The mean interval from onset to surgery was 8.3 ± 2.9 days (mean $\pm$ 95% CI), and longer interval from onset to surgery (odds ratio [OR]: 1.1, 95% confidence interval [CI]: 1.0–1.1) and polymicrobial infection (OR: 7.8, 95% CI: 1.56–38.8) were significant prognostic factors for unfavourable outcomes. Staphylococcus aureus was the most frequently detected, followed by Streptococcus, Pasteurella canis, and Neisseria (Table 4). The specific species did not affect clinical outcomes. Additional multivariate analysis showed that preoperative conservative treatment prolonged the interval to surgery (estimate, 16.4; standard error, 1.6; $p < 0.05$).

Conclusion: We identified the possible superiority of early debridement without preoperative or nonoperative treatment. Although previous studies have noted the importance of earlier debridement, this is the first study to clarify the prognostic factor for the prolonged time interval from onset to debridement. The results of this study suggest that the indications for nonoperative treatment of PFT are limited and earlier surgical debridement is recommended.

A-0074 CMC FIRST JOINT PROSTHESIS: RADIO-CLINICAL ADVICE ON CUP IMPLANTATION

Stephane Barbary[1], Louis Lajoinie[2], Antoine Dederichs[1], Romain Detamaecker[1], Gilles Dautel[1]
[1]Clinique Louis Pasteur, France; [2]Universitary Hospital of Nancy, France

Introduction: Coupled total prostheses are increasingly becoming the first-line surgical treatment of rhizarthrosis for many surgeons. As the number of implantations increases, so do the number of complications and revision surgeries. Despite a satisfactory 5-year survival rate of 80 to 95%, according to reports, most revision surgeries are the consequence of poor implantation, particularly due to poor positioning or/and orientation of the cup. Lack of radiographic control by the operator during the procedure is probably a major reason.

Aim: To define the optimal method of implantation of the CMC1st prosthesis, particularly the cup in the trapezium.

Material & Method : Radiographic analysis is fundamental to properly prepare and carry out the surgical procedure. We define 3 lines which must be visible around trapezium: The Distal Articular Surface of the Trapezium (DAST) ie the joint

space between the trapezium and the base of the first metacarpal. The Proximal Articular Surface of the Trapezium (PAST) ie, the joint space between the trapezium and the scaphoid. The TRAST ie the TRapezoidal Articular surface of the Trapezium. The operator have to learn how to reproduce the incidence during the surgery especially during the positionning of the guide pin before drilling the trapezium. Based on our experience of more than 1000 prosthesis during > 15 years and the experience of the others authors, we recommand 10 rules.
Results: 1/ Exclude severe trapezium dysplasia. 2/ Measure the depth and width of the trapezium after estimating the resection of the osteophytes to confirm the indication by simulation the positionning of the cup. If in doubt, perform a bone scan with 3D reconstruction. 3/ Cut the radial and ulnar bone horn as well as osteophytis which can induce a cam effect. 4/ Obtain a DAST almost parallel to the PAST. 5/ Be careful not to damage the subchondral bone of the DAST. 6/ Do a sufficient release of the 1st metacarpal base (soft tissues and volar bone beak). 7/ Use the special tool of the ancillary to push down the metacarpal and see correctly the DAST in front of you. 8/ Place a guide pin with multiple radiographics controls (on the AP and lateral radiographs) to confirm the centering and orientation in the trapezium : in the middle of the PAST and with an angle of 90° relative to the PAST in both incidence (AP & Lateral) and with TRAST visible to be sure of the trapezium's walls. 9/ Check X-Ray after impaction of the cup to confirm the correct centering and parallelism of the cup in relation to the PAST with sufficient spongious bone arround the cup especialy concerning the TRAST. 10/ Check the bone or intra-prosthetic cam-effect during movement especialy during thumb extension.
Conclusion: These 10 rules could avoid most early and medium-term failures of the 1st CMC prosthesis.

A-0075 EXTERNAL FIXATOR VERSATILITY IN THE TREATMENT OF DISTAL PHALANXES BONE LOSS

Daniele Tosi, Pietro Francesco Delle Femmine, Giovanni Ruocco, Matteo Ornelli, Lucio Cappelli, Nicola Felici
San Camillo Forlanini Hospital, Unit of Reconstructive Surgery of the Limbs, Rome, Italy

Introduction: Distal phalangeal (P2 and P3) bone loss associated with open finger trauma or with bone infections could complicate an already difficult reconstructive challenge in hand surgery. In very complex trauma primary amputation could be an option but usually patients ask for reconstructive options to avoid the mutilation of digital apex and the related psychological and relational problems. The first target for distal phalanxes bone loss reconstruction is to obtain a stable fixation restoring the length of the bone. Moreover, the bone fixation should be stable for enough time to allow soft tissue healing and to create a suitable location for free or vascularized bone grafting
Aim: We reported a single center preliminary experience using a static distal phalanxes external fixator. The external fixator was used to substain bone graft and vascularize bone flap.
Material & Methods: Seven patients, five with post-traumatic and two with post-infection bone loss defects at P2 and P3 level, underwent a multi-step reconstructive procedure to avoid distal phalanx amputation. A stable fixation between the proximal and distal phalanx was obtained and at the same time an adequate finger length and axial plain position were restored.
Results: The external fixator proved to be reliable in terms of stability and tolerability for the patient. In all cases it was on place between six to eight weeks; it allowed to obtain a suitable condition for free bone grafting and healing and, exploiting its structure, an "external" compression on bone grafting was achieved. In two cases the external fixator was associated with vascularized bone flap.
Conclusions: In all cases bone grafting or vascularized bone flap healed without sign of resorption; patients come back to previous work and manual activity without pain, impairment and acceptable finger ROM. Our preliminary results showed that static external fixator represents a valuable device for salvage of distal phalanxes after post-traumatic or

post-infective bone loss. It is a versatile and reliable device, easy to use in particular on distal phalanxes where others external fixator available on the market are bulkier and more difficult to put on site.

A-0076 DIFFERENCE OF TWO TYPES OF SILICONE IMPLANT FOR SYMPTOMATIC DISTAL INTERPHALANGEAL JOINT ARTHROPLASTY

Satoshi Usami[1], Yoshitaka Minamikawa[2], Yoshitaka Hamada[3], Yukiko Kinoshita[2], Kohei Inami[1]
[1]Department of Hand Surgery, Tokyo Hand Surgery & Sports Medicine Institute, Takatsuki Orthopaedic Hospital, Tokyo, Japan; [2]Department of Hand Surgery, Namba Hand Center, Osaka, Japan; [3]Department of Orthopaedics Surgery, Kansai Medical University Medical Center, Osaka, Japan

Aim: The aim of this study is to evaluate the outcomes of two types of silicone implant for distal interphalangeal (DIP) joint arthroplasty to treat symptoms and improve hand function.
Material & Methods: Total 77 digits of 48 patients was replaced using 50 SWANSON silicone implant and 27 SBi silicone implant (former AVANTA), including 30 index, 30 middle and 17 ring fingers. As clinical outcomes, active arc of DIP joint, extension loss of DIP joint, grip strength, VAS, quickDASH score and appearance satisfaction (0-10: 10 is worst) were statistically evaluated between pre- and postoperatively. Additionally, the involved factor for patient's total satisfaction among implant, finger and each postoperative outcomes was calculated using univariate analysis.
Results: Mean follow-up was 11.7 : 19.1 months (SWANSON : SBi, $p<0.001$). Regarding to other outcomes, arc of DIP joint, extension loss of DIP joint, grip strength, VAS, quickDASH score and appearance satisfaction were, 22.7 : 27.9 degrees ($p=0.037$), 14.8 : 10.0 degrees ($p=0.010$), 12.4 : 18.3 kg ($p<0.001$), 10.6 : 4.1 ($p=0.017$), 12.2 : 9.3 ($p=0.126$), and 3.5 : 1.5 ($p=0.002$), respectively. There was significant differences in arc of DIP joint, extension loss of DIP joint, grip strength, VAS, and appearance satisfaction. Regarding to the involved factor for patient's total satisfaction, implant and all postoperative outcome factors were significantly important ($p<0.05$).
Conclusions: SBi implant is better from the point of postoperative arc and extension loss of DIP joint, VAS, grip strength, appearance satisfaction and patient's total satisfaction. However, it has a tendency of postoperative lateral instability relative to SWANSON implant because it require more bone excision for implant setting. For getting postoperative joint stability, SWANSON is appropriate.

A-0077 HISTOLOGICAL STUDY OF DONOR/RECIPIENT FEASIBILITY IN DISTAL NERVE TRANSFER FOR THE UPPER LIMB NERVE INJURY

Akira Kodama, Atsushi Kunisaki, Teruyasu Tanaka, Shigeki Ishibashi, Kentarou Tsuji, Masaru Munemori, Goki Kamei, Nobuo Adachi
Hiroshima University, Hiroshima, Japan

Introduction: It is well-known that in proximal nerve injuries in the upper limb, adequate functional recovery cannot be expected even with nerve repair or transplantation. Until now, tendon transfer has been the only means to achieve functional recovery in proximal nerve injuries of the upper arm. Recently, nerve transfers have been proposed for the reconstruction for such injuries. However, the reports of its clinical results are limited, and there is no consistent view on functional prognosis and donor/recipient selection.
Aim: The purpose of this cadaveric study is to histologically investigate whether the compatibility of the donor and recipient nerves in distal nerve transfer for high radial nerve palsy and ulnar nerve palsy is suitable for restoring nerve function.

Material & Methods: Ten cadaveric upper limbs fixed by the Thiel technique were included. The nerve transfer techniques used were (1) partial median nerve transfer for radial nerve palsy; the flexor carpi radialis branch of the median nerve was transferred to the posterior interosseous nerve (FCR/PIN) and the flexor digitorum superficialis branch to the extensor carpi radialis brevis (FDS/ECRB). (2) Partial median nerve transfer for ulnar nerve palsy; transfer of the terminal branch of the anterior interosseous nerve to the deep branch of the ulnar nerve (AIN/DBUN), and the opponens pollicis branch of the median nerve to the adductor pollicis branch of the ulnar nerve (OP/TDDBUN). The number of axons at the suture site of the donor and recipient nerves in each procedure was compared histologically.
Results: All three techniques were able to suture donor and recipient nerve ends in all cadavers. The total number of nerve axons was FCR/PIN: 1605±746/5530±1572, FDS/ECRB: 793±210/703±286, AIN/DBUN: 953±229/4984±1931, OP/TDDBUN: 341±105/1449±489, with AIN/DBUN showing the largest difference.
Conclusions: The histology suggested an insufficient number of donor axons in the median-ulnar nerve transfer technique. And the use of OP/TDDBUN in combination with AIN/DBUN transfer may compensate for the insufficient number of donor axons.

A-0078 SUCESSFUL APLICATION OF TENODESIS IN A AN OUTSTANDINGLY RARE LESION IN THE BOXING ATHLETE - A CASE REPORT

João C. Pereira, André Moreira, Joana Azevedo, Elisabete Ribeiro, Juvenália Ribeiro, Pedro Varanda, Luis Rodrigues
Hospital de Braga, Portugal

Introduction: Spontaneous tendon ruptures of the wrist are rare patholoies, usually secondary to rheumatoid arthritis or distal radius fractures and most commonly evolving the Extensor Pollicis Longus.Sport-related etiology is a growing tendency of this pathology. As far as the authors know, this is the first sport-related, Extensor Carpi Radialis Brevis (ECRB) isolated spontaneous rupture described in the literature.
Aim: To describe the clincal presentation, surgical management and results of ECRB rupture.
Material & Methods: We describe a case of a 41 year-old female amateur kickboxer who developed acute dorsal radial pain in the right wrist during practice. After attempting conservative treatment for 4 months with rest and NSAIDs she recurred at our clinic. Local pain at dorsal wrist extension was observed. MRI demonstrated an isolated ECRB rupture with associated fibrous tissue proximal to the extensor retinaculum. Surgical management was proposed and consisted of fibrous tissue debridement and ECRB-ECRL tenodesis.
Results: At 3 months follow up the patient reported return-to-play with normal wrist range of motion and mild pain only at maximum wrist extension
Conclusions: Isolated tendon ruptures are a rare pathology, causing extreme pain and disability in the sport setting. Surgical management of this ECRB tendon rupture by tenodesis allowed for appropriate pain control and functional results and early return-to-play.

A-0079 SUCCESSFUL TREATMENT OF A 3 MONTH DELAYED PRESENTATION OF A P.I.P. JOINT FRACTURE - A CASE REPORT

João C. Pereira, Tiago Barbosa, Cesar Correia, Ana Vilela, Elisabete Ribeiro, Juvenália Ribeiro, Pedro Varanda, Luís Rodrigues
Hospital de Braga, Portugal

Introduction: Proximal interphalangeal (PIP) joint fractures of the hand present a difficult challenge to surgeons often resulting in unsatisfactory results with complications such as persisting pain, stiffness and arthritis, irrespective of treatment options. Delayed presentation of these cases further hinders good results due to malunion and tissue fibrosis.
Aim: To describe the treatment of a 3 delayed presentation of a P.I.P. joint fracture, chalanges and other surgical options
Material & Methods: We present the case of a 27 year-old male who presented fracture dislocation of the PIP joint of the 4th finger of the right hand in a football match. He was firstly treated with closed reduction and immobilization. He was referred to our hand surgery outpatient consult only after 3 months of unsuccessful treatment, presenting with pain and joint stiffness. Radiographic exams demonstrated a Pelissier type F3 fracture. Surgical treatment consisted of open reduction, ligamentotaxis with external fixation and reinsertion of the central band with 1.3 mm anchor in the intermediate phalanx.
Results: 6 weeks after the surgical intervention, the external fixator was removed and the patient initiated physical therapy. Upon 1 year of follow-up the patient was asymptomatic with a PIP joint range of motion of -10/90 (extension/flexion), having fully returned to work.
Conclusions: Several treatment options have been described for treating PIP joint fractures such as closed reduction and bracing, open reduction, percutaneous wire fixation, extension block fixation, external fixation and others. others. However, there is no preferred treatment amongst the current literature when considering the aforementioned options. All these options are also associated with a high prevalence of non-ideal clinical results. In this delayed presenting case, ligamentotaxis proved relevant to attain a positive final result, allowing for a functioning joint.
PIP joint fractures remain challenging cases for the hand surgeon. This case illustrates the fact that adequate surgical technique associated with proper rehabilitation can ensure good results even in challenging presentations.

A-0080 EXPLORING THE DIFFERENCES, RELATIONSHIPS, AND INTERACTIONS IN THENAR MUSCLE STIFFNESS, GRIP STRENGTH, AND LEFT/RIGHT JUDGMENT IN HEALTHY INDIVIDUALS: A PILOT STUDY

Tülay Çevik Saldıran[1], Abdurrahman Tanhan[1], Özgül Öztürk[2], İlke Kara[1,3], Robert Schelip[4,5]
[1]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Bitlis Eren University, Bitlis, Turkey; [2]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Acıbadem Mehmet Ali Aydınlar University, İstanbul, Turkey; [3]Department of Physiotherapy and Rehabilitation, Institute of Health Sciences, Dokuz Eylul University, İzmir, Turkey; [4]Conservative and Rehabilitative Orthopedics, Department of Sport and Health Sciences, Technical University of Munich, Munich, Germany; [5]Experimental Anaesthesiology, Ulm University, Ulm, Germany

Introduction: Examining the relationship and interactions between laterality judgment, hand grip strength, the stiffness of thenar muscles, and gender-based variations may offer valuable insights into the diversity of individual hand skills. This research has the potential to lead to practical applications, including specialized interventions and tools for hand assessment, particularly in the field of occupational therapy.
Aim: The primary objective of this study was to investigate gender-related differences in the stiffness of the abductor pollicis brevis (APB) and flexor pollicis brevis (FPB) muscles, grip strength, and performance in the Left/Right Judgment Task (LRJT) among healthy individuals. The secondary aim was to examine the relationships and interactions among these variables.

Material & Methods: A total of 40 healthy participants were selected for this study (mean age: 22.49 ± 1.07 years, 51.4% female, BMI: 20.68 ± 2.81 kg/m2). The stiffness of the thenar muscles was assessed using a myotonometer, and hand grip strength was measured with a hydraulic dynamometer. LRJT performance was evaluated using the Recognize® tablet application.

Results: The average LRJT recognition time for all participants was 1.60 ± 0.45 seconds. When stratified by gender, it was 1.71 ± 0.34 seconds for females and 1.48 ± 0.53 seconds for males. The mean grip strength was 30.63 ± 4.22 kg for females and 43.61 ± 7.44 kg for males. The mean differences in APB stiffness and FPB stiffness were -34.44 N/m and -11.71 N/m for females and males, respectively. Gender had no significant impact on the mechanical properties of the thenar muscles ($p > 0.05$) and LRJT performance ($p > 0.05$), but males exhibited significantly greater grip strength ($p < 0.05$). There was a positive correlation between APB muscle stiffness and grip strength, with a correlation coefficient of $r = 0.356$ and a p-value of $p = 0.031$. No significant correlations were observed among other parameters ($p > 0.05$). Furthermore, no significant interactions were found between any of the parameters in both linear and multiple linear regression analyses ($p > 0.05$).

Conclusions: The study findings demonstrate that laterality judgment does not vary by gender in healthy individuals. Additionally, this cognitive task is not influenced by or related to grip strength and mechanical properties. An increase in thenar muscle stiffness may only be associated with an increase in grip strength. Further research in pathological conditions, rather than in healthy individuals, may yield different results.

A-0081 EARLY OUTCOME AND SURGICAL TECHNIQUE OF 3D-PRINTED LUNATE REPLACEMENT FOR ADVANCED KIENBOCK'S DISEASE: A CASE STUDY

Wajiha Zahra[1], Gowthaman Arumugam[1], Simon Pickard[2], Akshay Malhotra[1]
[1]North Midlands Hand Centre, County Hospital, Stafford; [2]Robert Jones and Agnes Hunt Hospital, Oswestry

Introduction: Kienbock's Disease (KD), also known as avascular necrosis of the lunate, is a condition first described by Robert Kienböck in 1910. Despite various proposed surgical interventions over the years, no consensus on the optimal treatment has been reached.

Aim: This study presents a successful case of an 18-year-old patient with grade IV avascular necrosis of the lunate, treated with a 3D printed lunate replacement (pyro-carbon prosthesis Smith & Nephew Integra lunate) and lunotriquetral stabilization.

Surgical Technique –

The surgery was performed under general anaesthesia in a laminar flow theatre, with the patient in a supine position and the arm on the arm board. The lunate bone was exposed through a dorsal approach between the 3rd and 4th extensor compartments. After removal and debridement of the damaged bone, an ECRB graft was harvested and secured using patient-specific jigs for the scaphoid and triquetral bones to drill holes for graft suspension. The implant, achieving optimal articular congruity, was suspended with swivel lock 3.5 anchors to the proximal pole of the scaphoid, and the graft tail was passed over the capitate to suspend it to the dorsum of the scaphoid. The wrist's stability was assessed using II screening, showing length neutrality and stability in all planes.

Results: Following the procedure, the patient experienced significant improvements in pain, range of motion, and grip strength.

Conclusions: This case demonstrates successful utilization of a 3D-printed lunate replacement and lunotriquetral stabilization for advanced avascular necrosis of the lunate. The positive outcomes suggest this approach may be a

promising alternative for managing this condition. However, further research and larger studies are needed to establish the long-term efficacy and safety of this technique.

A-0083 MODIFIED WASSEL-FLATT TYPE III RADIAL POLYDACTYLY; SUBTYPES AND THEIR OUTCOMES

Wonsun Lee, Seung hyun Lee, Young Ho Shin, Joon O Yun, Jae Kwang Kim
Department of Orthopedic Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, South Korea

Introduction: Radial polydactyly is one of the most common congenital differences of the hand. The Wassel-Flatt classification is the most commonly used classification for radial polydactyly of the hand. Among types, type III radial polydactyly is rare and there are limited reports on the outcomes of type III radial polydactyly alone.
The Wassel-Flatt classification defines type III radial polydactyly as one in which the duplicated digit has a soft tissue or bony attachment at the level of the proximal phalanx.
In this study, we used the modified type III radial polydactyly definition recently suggested by Kim et al,14 including cases with only a bony attachment of the duplicated digit at the proximal phalanx level.
Aim: We aimed to subdivide modified type III radial polydactyly and evaluate the applied surgical procedures and outcomes according to the subtypes.
Material & Methods: This study included 32 thumbs of 32 patients treated for modified Wassel-Flatt type III radial polydactyly from March 2008 to December 2018. Each patient was subclassified into parallel, divergent, and convergent types according to the alignment of the duplicated digit. The parallel type was further divided according to the treatment method applied. The parallel A group comprised patients treated with reconstructing the radial collateral ligament of the interphalangeal (IP) joint after removing only the distal phalanx and preserving the proximal phalanx of the extra digit, and the parallel B group comprised patients treated with excision of the extra digit at the bifurcation site of the proximal phalanx. We evaluated the Japanese Society for Surgery of the Hand scores and radiographic angulation of the IP and metacarpophalangeal joints at a mean follow-up of 38 months.
Results: Fourteen cases were parallel type (6 and 8 in the parallel A and B groups, respectively), 14 were divergent type, and 4 were convergent type. Patients in the parallel A group had significantly better IP and metacarpophalangeal joint angulation and Japanese Society for Surgery of the Hand scores than those in the parallel B group. Patients in the parallel A group had significantly better Japanese Society for Surgery of the Hand scores than those in the divergent and convergent groups.
Conclusions: Reconstructing the radial collateral ligament of the IP joint after removing only the distal phalanx and preserving the proximal phalanx of the extra digit was associated with better outcomes than the excision of the extra digit at the bifurcation site in the parallel type cases. The parallel type treated with proximal phalanx preservation and ligament reconstruction had better clinical outcomes than other types of modified Wassel-Flatt type III radial polydactyly

A-0084 FLUOROSCOPIC SNIFF TEST AS A DIAGNOSTIC TOOL FOR PHRENIC NERVE INJURY IN TRAUMATIC BRACHIAL PLEXUS INJURY PATIENTS

Pasin Watanapokasin[1], Yuwarat Monteerarat[1], Torpon Vatthana[1], Roongsak Limthongthang[1], Mathee Ongsiriporn[2,3], Panai Laohaprasitiporn[1]

[1]Department of Orthopaedic Surgery and Rehabilitation, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand; [2]Department of Anatomy, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand; [3]Department of Radiology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction: Traumatic brachial plexus injury (BPI) is a high morbidity condition with an escalating incidence. One of the treatment options is neurotization by using the ipsilateral phrenic nerve. Therefore, diagnosis of the nerve dysfunction is a crucial step in preoperative planning.

Aim: This study aimed to assess the accuracy and reliability of fluoroscopic sniff test for diagnosis of phrenic nerve injury in traumatic BPI patients.

Material & Methods: The study was conducted during June 2019 and August 2023 at a tertiary care hospital. Pre-operative fluoroscopic sniff test was performed. During the brachial plexus surgery, direct phrenic nerve stimulation as a gold standard of phrenic nerve function was done. Two non-operating orthopedic surgeons interpreted the test for evaluation of accuracy and reliability of the test.

Results: Seventy-four traumatic BPI patients (66 males and 8 females) with median age of 26 years old were enrolled. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of the fluoroscopic sniff test were 90.9%, 100%, 100%, 93.2% and 95.9% respectively. Interobserver reliability showed excellent agreement (Kappa $= 1$; p-value < 0.001).

Conclusions: The fluoroscopic sniff test was proven to be an accurate, reliable, and simple tool to evaluate the phrenic nerve function in traumatic BPI patients. Preoperative test should be performed to reduce operative time to identify the phrenic nerve in case of no function detected from the fluoroscopic sniff test.

A-0085 EVALUATION OF FLEXOR TENDON GLIDING AFTER REPAIR USING PARTICLE IMAGE VELOCIMETRY

Issei Nagura[1], Takako Kanatani[2], Masaya Kusunose[3], Atsuyuki Inui[3]

[1]Shinsuma Hospital, Kobe, Japan; [2]Kobe Rosai Hospital, Kobe, Japan; [3]Kobe University Graduate School of Medicine, Kobe, Japan

Introduction: Motion analysis is a method of extracting specific information from videos by analyzing and processing the images using a computer. Previously this method was done manually and the main problem was time-consuming. However, the computers can automatically analyze videos quickly by using particle image velocimetry (PIV).

Aim: In this study, we utilized the PIV to evaluate the flexor tendon gliding after repair.

Material & Methods: Four patients were included in this study. The mean age was averaged 32.5 years-old (range 2-54 years-old), where the levels of the injuries were: Zone II; 2 patients, T2; 2 patients. Tendon repairs by direct sutures of 6 strands were performed in all patients. Postoperatively, ultrasonography was performed at 6 months and 12 months to evaluate of the gliding of repaired tendons in the long axis. The images were taken three times for each patient from each motion. Then, the particle movement along the long axis (µcomponent) by PIV were evaluated and statistically analyzed by Mann Whiteny's U test ($p<0.05$).

Results: The average of µcomponent was 0.000529(m/s) at 6 months and 0.000968(m/s) at 12 months postoperatively. Significantly increase was shown at 12 months after the surgery ($p=0.006$).

Conclusions: This model can be utilized to estimate the flexor tendon motion after the surgery. PIV could be an useful tool for evaluation of gliding after flexor tendon repairs.

A-0086 BIOMECHANICAL CHARACTERIZATION OF THE BRACHIAL PLEXUS AND HISTOMORPHOLOGIC CORRELATION

Anne Perruisseau-Carrier[1], Vadim Fleury[2], Hamdi Jmal[1], Philippe Liverneaux[3], Nadia Bahlouli[1], Yann Marco[2]
[1]Département de Mécanique, Laboratoire ICube, Strasbourg; [2]IRDL (Institut de Recherche Dupuy de Lôme) UMR CNRS 6027, ENSTA Bretagne, Brest; [3]Chirurgie de la Main et du Membre Supérieur, Hopitaux Universitaires de Strasbourg, Strasbourg, France

Introduction: The aim of this study is to bring standardized data on biomechanical characteristics of the different parts of the BP (roots, trunks, cords, terminal branches) and to correlate these with a histological analysis, to determine potential fragility zones within the BP.
Methods: A total of 8 BP were harvested on fresh frozen cadavers and, on each, the different regions of the PB (roots, trunks, cords, terminal branches) were individualized and specimen were cut according to each region of interest. A BOSE® Electroforce® 3330 (electromagnetic motor, 3.2kN cell)(BOSE®ElectroForce®3330 Series II, Minnetonka, MN) and an INSTRON® 5969 (electromechanical, 2kN cell)(INSTRON®, Norwood, MA) material testing machines were used to apply a tensile load on each of the brachial plexus segments. All experimental data were digitized and acquired with a personal computer at a sampling rate of 20Hz. Elasticity modulus, maximum stress and maximum strain values were reported.
Histomorphology: A total of 7 BP were harvested on fresh frozen cadavers and a sample from each region of interest (roots, trunks, cords, terminal branches) was fixed in formalin, paraffin included and stained using Gomori trichrome. Histomorphological images were segmented using a Matlab application. A ratio of connective tissue to axonal area (RCTAA) was computed for each BP region.
Results: Biomechanical characterization : Mean elastic moduli at the roots, trunks, cords, terminal branches respectively were 5.96MPa, 7.98MPa, 19.4MPa, 24.7MPa, and mean maximum stress were respectively 2.78MPa, 2.55MPa, 4.96MPa, et 6.67MPa. Segmentation: mean RCTAA at roots, trunks, cords, terminal branches levels respectively were 0.602, 0.915, 3.46 and 5.78.
Conclusion: This work shows a difference in biomechanical characteristics between proximal and distal parts of the BP, the proximal regions being weaker, and a histomorphological difference, the proximal regions showing a lower RCTAA.

A-0087 CADAVERIC STUDY OF FLEXOR DIGITORUM PROFUNDUS AND SUBLIMIS INNERVATION PATTERNS FOR SELECTIVE AND HYPERSELECTIVE NEURECTOMY, AND REPORT OF ONE CLINICAL CASE

Gautier Houziaux[1], Romuald Seizeur[1,2], Weiguo Hu[1,3], Alexandra Forli[4], Anne Perruisseau-Carrier[1,3]
[1]Université de Bretagne Occidentale, Brest, France; [2]Service de Neurochirurgie, CHRU de Brest, Hopital de la Cavale Blanche, Brest, France; [3]Service de Chirurgie Plastique, Reconstructrice et Esthétique, CHRU de Brest, Hopital de la Cavale Blanche, Brest, France; [4]Service de Chirurgie Plastique et Reconstructrice des Membres, Chirurgie de la Main et des Brûlés, CHU Grenoble Alpes, Grenoble, France

Introduction: Spasticity management in finger flexors, flexor digitorum profundus (FDP) and sublimis (FDS), and flexor pollicis longus, is a challenge, especially in functional spastic hand.
Recent studies have recently demonstrated the short- and long-term efficacy of selective and hyperselective neurectomies for spastic upper limb. However, hyperselective neurectomy was not applicable to FDP and FDS, given the lack of a safe surgical approach, without transmuscular dissection.

This cadaveric study describes a novel surgical approach, using the medial approach of the forearm, to reach all the motor branches to the FDS and FDP, and FPL.
Material and Methods: Fourteen cadaveric upper limbs, fresh frozen, were used for this study. The feasibility of the medial surgical approach was studied, as well as the number, length and point of emergence of the motor branches from the median and ulnar nerve to the FPL, FDP and FDS muscles. Clinical case: FDP, FDS and FPL selective neurectomies were performed using the medial approach in one patient (female, 56 years old, left side) presenting with a non functional spastic upper limb with strong spasticity of the FDS FDP and FPL.
Results: The medial approach to the forearm allowed to reach all the motor branches from the median and ulnar nerve to the FPL, FDS and FDP, in all cases. A Martin Gruber anastomosis was found in 7 cases out of 14. Clinical case: at one month follow up, the hand can be easily opened and spasticity of the finger and thumb flexors has disappeared.
Conclusion: The medial approach to the forearm allows to reach all the motor branches from the median and ulnar nerve to the FPL, FDS and FDP, without extensive transmuscular dissection of the pronator teres and FDS muscles. This approach opens the way to selective and hyperselective neurectomies of the FPL, FDP and FDS muscles, and can be used to effectively treat FDS, FDP and FPL spasticity in non functional spastic hands.

A-0088 FUNCTIONAL OUTCOME OF TENDON TRANSFER VS TENDON TRANSFER COMBINED WITH AXILLARY NERVE NEUROLYSIS IN ERB'S PALSY

Elhadi Abdelrahim, Mohammed Abdulal Mohammed, Samir Shaheen
Cheshire Home Khartoum Sudan; Soba University Hospital University of Khartoum Sudan

Introduction: Erb's palsy is the most common type of OBPI , although many cases can improve completely without intervention, but residual functional deficit can develop with incomplete recovery .
Combination of nerve and soft tissues surgery can result in a better outcome regarding the abduction and global range of motion of the shoulder.
Aim: To assess functional outcomes of two studies conducted before, to conclude whether tendon transfer with axillary nerve neurolysis has any additional benefit over tendon transfer alone .
Material & Methods: We compared the results of two study samples, 1st study was conducted on 25 patients between the period of January 2013 to March 2014 , who underwent tendon transfer alone and 2nd study conducted up on 35 patients in the period from March 2014 to April 2016 with their ages ranging from 2-11 years.This group of patients underwent transfer of the latissimus dorsi and teres major muscles with axillary nerve decompression and neurolysis.
Results: The abduction preoperative in 10 children was ranging from 30-60, and in 25 children ranging from 60-90, it significantly improved to > 140˚ in 14 (40%) children, and in 20 (57.1%) ranging from 110˚-140˚ and in 1 (2.9%) child was <110˚ (P- value 0.005).
Conclusions: both groups benefit dramatically in isolation, whether axillary nerve neurolysis add a benefit or not, it is a question that need to be further assessed with more future studies .
In our study we failed to find any additional benefit of axillary nerve neurolysis in improving both the global range of motion or abduction of the shoulder

A-0090 DORSO-ULNAR REVERSE FLOW PEDICLED OSSEOUS FLAP FOR BONE DEFECTS OF THE THUMB

Daniele Tosi, Pietro Francesco Delle Femmine, Lucrezia Arcari, Matteo Ornelli, Giovanni Ruocco, Nicola Felici
San Camillo Forlanini Hospital, Unit of Reconstructive Surgery of the Limbs, Rome, Italy

Introduction: Reconstruction of osseous defects of the distal phalanx of the thumb is usually addressed with free bone grafts or free vascularized bone flaps. Some reports demonstrated the possibility to harvest an osteo-cutaneous flap in the dorsoulnar side of the first metacarpal bone. In the same manner, no reports are present in the literature in which bone gaps were reconstructed with this flap elevated as an exclusively osseous flap.
Aim: We report our successful experience with three cases of distal phalanx reconstruction of the thumb by mean of the dorso-ulnar reverse flow pedicled osseous flap; the flap harvesting technique and review of literature.
Material & Methods: Three patients underwent bone resection at the thumb level, one case for tumor resection and two cases due to osteomyelitis of the thumb. Many different techniques were proposed to restore thumb functionality and aesthetic appearance. To overcome patient's apprehension on the donor site area and decrease the risk of resorption, we proposed a dorso-ulnar reverse flow pedicle osseous flap.
Results: No complications occurred and excellent functional result was evaluated at 12 months follow-up. The x-ray evaluation demonstrated complete bone consolidation and healing of the donor site area at the first metacarpal without recurrence of osteomyelitis or instability at the level of the reconstructed bone area. Patients returned to heavy manual work 12 weeks after surgery with a complete restoring of ROM, pinch grip and Kapandij score.
Conclusions: This flap may be considered as an alternative to free bone grafts in situations in which perilesional tissues may jeopardize the process of free graft taking and in cases in which free vascularized bone flaps are not feasible for patient or surgeon decision. As the anatomy of the flap is well established and documented in the literature, we believe that this flap is a valid option for distal phalanx bone reconstruction of the thumb.

A-0091 VOLAR FLAP IN SYNDACTILY OF THE ADULT

Adriana Martinez-Catasus[1], Francisco Soldado[2], Montserrat Castillo[1], Guillem Navarro[1], Jordi Faig-Marti[1]
[1]Hospital Sant Rafael, Barcelona, Spain; [2]Hospital Vall d'Hebrón, Barcelona, Spain

Introduction: Syndactyly is one of the most common congenital anomalies of the hand and is more frequent in males (2:1), presented bilaterally in 50% of affected patients and often is associated with other musculoskeletal malformations. This anomaly is more common between the third and fourth fingers (57%).
Surgical treatment consists in release of the merged components and is performed between the ages of six and 18 months. Multiple nuances exist depending on the complexity on the involved digits. Surgery in adults is not frequent and the bibliography is limited.
Aim: Material & Methods: We report a case of a 23-years-old man with family history of syndactyly, originally from another country, with bilateral syndactyly between third and fourth digits.
On physical examination of both hand there was a complete and complex syndactyly with osseous fusion of the third phalanx, confirmed in X-rays and MRI evaluation, with a common collateral neurovascular bundle. Due to the complexity of the right hand deformity, only the surgery of the left hand was performed.
Results: A volar rhomboid flap for commissure construction, a combination of dorsal and volar interdigitating zig-zag flaps and skin graft from the internal side of the arm was performed. The nail fold and the osseous fusion were separated with good cosmetic result and collateral neurovascular bundle was incorporated to the fourth digit where the cutaneous

coverage was in a better condition.
No postoperative complications occurred with no infection, contracture, devascularisation of the digit nor nerve injury and a good scar formation. Hand therapy was not necessary because of the patient's determination. A good aesthetic appearance and a correct function of the digits was achieved except a slight extension defect of both distal phalanges. The patient satisfaction was excellent.
Conclusions: A thorough history and physical exam should be performed on any patient presenting with syndactyly and it should be noted which digits are affected, whether they appear to be fused via soft tissue only or a combination of bony and soft tissue fusion to obtain a good preoperative planning.
Multiple techniques exist in the surgical release of syndactyly depending on complexity of the involved digits but there is not much bibliography in adults. In children, the most described technique to separate the digits is dorsal and volar based zig-zag incision described by Cronin.
We describe a surgical technique for syndactyly reconstruction with volar flap resulting good functional and cosmetic outcomes.
The surgery of syndactyly is an important challenge that requires careful planning and meticulous surgical techniques to minimize potential complications and allow satisfactory separation of the digits.

A-0092 OUTCOMES OF EXTRARTICULAR CORRECTIVE OSTEOTOMIES OF PHALANXS

Leonor Caixeiro, Miguel Morgado, Larissa Lanzaro, Ana Pinto, Horácio Costa
Serviço de Cirurgia Plástica, Reconstrutiva, Craniomaxilofacial, Mão e Unidade de Microcirurgia, Centro Hospitalar Vila Nova de Gaia/Espinho, Portugal

Introduction: Corrective osteotomies are often utilized to treat finger deformities that may occur due to a phalangeal malunion.
Aim: The purpose of this study is to evaluate osteotomies and fixation in the setting of extraarticular phalangeal malunion.
Material & Methods: All patients were treated with wedge or transverse osteotomy and adjunct capsulotomy and tenolysis. Satisfactory bone healing and correct anatomical alignment was achieved in all patients. The analysis showed a range of motion (ROM) improvement, but no recovery of normal ROM (comparing to contralateral hand).
Results: All patients were treated with wedge or transverse osteotomy and adjunct capsulotomy and tenolysis. Satisfactory bone healing and correct anatomical alignment was achieved in all patients. The analysis showed a range of motion (ROM) improvement, but no recovery of normal ROM (comparing to contralateral hand).
Conclusions: Corrections of finger deformities after extrarticular phalangeal fractures due to malunion can be successfully treated with corrective osteotomies, appropriate fixation and early mobilization with a predictable outcome.

A-0093 PYOGENIC EXTENSOR TENOSYNOVITIS CAUSED BY CAT BITE INJURY AND SUCCESSFUL TREATMENT WITH CLOSED CONTINUOUS CATHETER IRRIGATION – A CASE REPORT

Wang Qiao, Robert Yap Tze-Jin, Duncan Angus McGrouther
Department of Hand and Reconstructive Microsurgery, Singapore General Hospital

Introduction: Pyogenic extensor tenosynovitis of hand is an uncommon condition with only isolated case reports or small case series. Cases with atraumatic processes or as a result of penetration injuries were both seen in the existing literature.

Aim: To present a case of pyogenic extensor tenosynovitis as a result of cat bite injury, and to demonstrate our successful approach to treat the infection with minimal invasive technique by closed continuous catheter irrigation.
Case report: Patient was a twenty-year-old female. Her right hand was bitten by her own Maine coon cat. She developed severe dorsal hand swelling and pain within one day. On examination, she was found to have two bite marks. One is over radial aspect of the wrist, at the base of thumb. The other one is located at dorsum of wrist over 4th extensor compartment respectively. The dorsum of her hand and wrist were remarkably swollen, erythematous and tender. Both active and passive motion of her fingers and wrist were extremely limited.
She was then brought to emergency operating theatre and was treated with surgical debridement and catheter irrigation with minimal invasive technique. Intra-operatively, there was pus found both in subcutaneous plane and in the 4th extensor compartment. Totally three infant feeding catheters were inserted into both involved planes for irrigation.
Catheter irrigation was continuous post-operatively for four days in the ward. She returned to pain free full range of motion of wrist and all fingers with significantly improved pain and and swelling. The catheters were then removed subsequently. There was no secondary closure of the wounds needed. All wounds healed when she was reviewed in clinic on POD 13.
Conclusions: pyogenic extensor tenosynovitis of hand is a rare condition. For patient presented with signs and symptoms of hand or wrist dorsum infection with prior penetration injury, surgeons should be aware of the possibility of such uncommon differential. Closed continuous catheter irrigation is an effective way of treating such infection with minimal invasive techniques.

A-0094 LOCAL INFILTRATION OF KETOROLAC FOR POSTOPERATIVE PAIN CONTROL IN OPEN TRIGGER FINGER SURGERY: A RANDOMIZED CONTROLLED TRIAL

Thanat Auwattanamongkol, Torpon Vathana, Yuwarat Monteerarat, Roongsak Limthongthang, Panai Laohaprasitiporn
Department of Orthopeadic Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction and Aim: Effective postoperative pain control after open trigger finger surgery is crucial for achieving successful outcomes. Oral Non-steroidal anti-inflammatory drugs (NSAIDs) is commonly prescribed after the procedure; however, the adverse effect of its use should be concerned. The study objective was to determine whether local wound infiltration with Ketorolac could offer a safe and effective option for postoperative pain control, thus potentially improving patient satisfaction and facilitating better functional recovery after open trigger finger surgery.
Material & Methods: This study is a parallel design, randomized controlled trial conducted between December 2021 and October 2022. A total of 69 patients underwent open trigger finger surgery at a tertiary care hospital were randomized into one of three groups: Ibuprofen alone group (n=23), Ketorolac alone group (n=23) and Ketorolac and Ibuprofen group (n=23). The assessment included postoperative numeric rating scale (NRS) pain scores at 6, 24, 48 hours and 1, 2, 6, 12 weeks, DASH score, grip strength, range of motion of proximal interphalangeal (PIP) joint and complications.
Results: NRS scores with movement of affected finger movement after surgery were significantly lower at 6 hours in Ketorolac alone group [median (Q1, Q3) = 3 (1, 4)] and Ketorolac and Ibuprofen group [median (Q1, Q3) = 3 (1, 5)] compared to Ibuprofen alone group [median (Q1, Q3) = 5 (4, 6)] (P=0.001). However, there were no significant differences in postoperative DASH Score, grip strength, ROM of the PIP joint and complications between groups.
Conclusions: Local infiltration of NSAIDs, Ketorolac, has the benefit pain control during finger movement within 6 hours after trigger finger surgery compared to oral NSAIDs and safe to be an alternative use in those who have contraindication for systemic NSAIDs use.

A-0095 THE USEFULNESS OF DRY WRIST ARTHROSCOPY IN TREATMENT OF DISTAL RADIUS FRACTURE

Yountae Roh
H+ Yangji Jospital, Seoul, South Korea

Introduction: The development of wrist arthroscopy has made it possible to more accurately and less invasively restore articular congruency in the treatment of distal radius fracture. However, there is a risk of compartment syndrome due to fluid extravasaion, so a dry wrist arthroscopy technique been developed.

Aim: The purpose of this study was to investigate the treatment results and complications of patients treated with dry wrist arthroscopy in the treatment of distal radial fractures to confirm its usefulness.

Material & Methods: Among patients with distal radial fractures treated from January 2020 to July 2022, a total of 41 patients (27 females and 14 males) who underwent operative treatment using the dry wrist arthroscopy technique and retrospectively analyzed. Arthroscopy was performed when intra-articular stepping or gap greater than 2 mm, bony fragments in the joint, and accompanying ligament injury were confirmed on preoperative radiographs. Cannulated screw fixation was performed for B1 type fractures, and volar locking plate fixation was performed for all other fracture types. After reduction by intrafocal pinning or joystick method under image intensifier, temporary fixation was performed with K wire. In the case of using a volar plate, after applying the plate, the proximal screw was fixed with one or two screws, and the distal was fixed with K wire, and arthroscopy was performed to confirm the condition of the joint space. Arthroscopic findings, radiographic examinations, and patient charts were retrospectively analyzed. Operation time, fracture union, and complications were investigated. Pain visual analogue scale and the shortened disabilities of arm, shoulder and hand questionnaire (QuickDASH) were measured as clinical outcomes.

Results: The average age was 56.1 years, and the average follow-up period was 25.3 months (13~38 months).Fracture union was achieved in all cases, and the average pain visual analogue scale score was 0.7 points and the average QuickDASH score was 2.77 points, showing good results. The average operative time was 77 minutes. Although reduction was performed before arthroscopy, additional reduction was performed because articular surface gap or depression was found in 11 cases at the time of surgery. Accompanying triangular fibrocartilage complex injury was confirmed in 8 cases, and chondral injury of the lunatewas confirmed in 1 case. Acute scapholunate dissociation was confirmed in 2 cases. In 4 cases, bony or chondral loose bodies were identified and removed. Since there was no soft tissue swelling after arthroscopy, there was no difficulty in performing an additional open procedure to treat the accompanying metacarpal fracture or carpal fracture.There were no additional complications, and soft tissue problems such as compartment syndrome did not occur because water was not used.

Conclusions: In the treatment of distal radius fractures, dry wrist arthroscopy is a viable option for good treatment results. In distal radial fractures with intra-articular fractures, good results can be expected as intra-articular problems can be identified and resolved, and it is considered to be very useful because there is no possibility of soft tissue problems that can occur due to the use of water.

A-0096 CAUSE OF ULNAR SIDE WRIST PAIN IN PATIENTS WITH HEALED DISTAL RADIOULNAR FRACTURE : RUPTURE OF THE EXTENSOR CARPI ULNARIS TENDON

Yountae Roh
H+ Yangji Hospital, Seoul, South Korea

Introduction: If pain on the ulnar side of the wrist persists after the distal radius fracture has healed, it is known that the causes include malunion of the distal radius, triangular fibrocartilage complex (TFCC) injury, and ulnar styloid nonunion.
Aim: The author reports a case of a patient who continued to experience pain on the ulnar side of the wrist due to rupture of the extensor carpi ulnaris (ECU) tendon after healing of a distal radius fracture.
Material & Methods: 68-year-old woman visited the outpatient clinic complaining of left wrist pain after falling on her hands. In the radiological examination, an extra-articular fracture of the left distal radius with dorsal tilt and a fracture at tip of the ulnar styloid process were confirmed, and internal fixation was performed using a volar metal plate only for the radius. Seven months after the surgery, radiological examination showed that the distal radius fracture was completely unioned, but the patient complained of persistent pain on the ulnar side of the wrist. Physical examination showed tenderness in the styloid process of the ulna and a negative ballootment test, ECU synergy test was positive, tenderness along the ECU tendon, and pain on the ulnar side when the wrist was extended. Wrist MRI examination was performed, and nonunion of the ulnar styloid tip, high grade partial tear of ECU tendon, and T2 high Signal change of TFCC at ulnar styloid process attachment site were observed in the examination. Plate removal for a healed fracture of the distal radius, exploration for an ECU partial rupture, and wrist arthroscopy for a suspicious TFCC injury were planned, and surgery was performed. At wrist arthroscopy, TFCC was intact and the Hook test was negative. An approximately 4cm incision was made along the ECU tendon to open the ECU sheath, and a partial tear of the ECU tendon and a nonunited fragment of the ulnar styloid protruding inside the sheath were confirmed. Because the fragment was so small that osteosynthesis was not possible, excision was performed, and since the degree of rupture of the ECU tendon was not severe, debridement was performed only on the unstable portion. Wrist arthroscopy was performed again, and after confirming positive findings in the TFCC Hook test, so a bone tunnel was created and TFCC fovea repair was performed. Afterwards, rehabilitation treatment was performed after 2 weeks of long arm splint and 4 weeks of short arm cast.
Results: The preoperative VAS score improved from 5 points before surgery to 2 points 3 months after surgery, and the Quick DASH score improved from 72.72 points before surgery to 18.2 points 3 months after surgery.
Conclusions: Rupture of the extensor carpi ulnaris tendon is likely to occur after a distal radioulnar fracture, so when a patient with a healed distal radius fracture complains of ulnar side wrist pain, it is necessary to keep this possibility of ECU tendon injury in mind during the examination.

A-0097 THE EFFECT OF BRACHIORADIALIS RELEASE DURING DISTAL RADIUS MALUNION CORRECTIONS

Mark Stam[1], Charlotte L.E. Laane[1,2], Mathieu M.E. Wijffels[2], Abhiram R. Bhashyam[1,3], Neal C. Chen[1,3]
[1]Massachusetts General Hospital, Boston, US; [2]Erasmus MC, University Medical Centre Rotterdam, Rotterdam, The Netherlands; [3]Harvard Medical School, Boston, US

Introduction: In distal radius malunion corrections, restoring the distal radioulnar joint congruency with a corrective osteotomy of the radius improves pain and hand function. There are various techniques used to improve alignment including for example brachioradialis release.
Aim: This study aimed to compare the effects of m. Brachioradialis release with no release during corrective surgery of

distal radius malunions on radiological parameters.
Material & Methods: A retrospective cohort study at a multicenter academic institution was conducted and adult patients who underwent corrective osteotomy for a dorsally angulated extra-articular distal radius malunion between January 2005 and November 2022 were identified. The study cohort of 40 patients consisted of 11 males (11/40, 28%) with a mean age of 54 years. The median follow-up was 34 months.
Results: Twenty-three patients had a brachioradialis release (23/40, 58%), and 17 patients did not (17/40, 42%). The mean difference for patients with and without brachioradialis release between pre-operative and postoperative volar/dorsal angulation were 27.7° vs 25.4°, radial inclination were 6.3° vs 10.8°, radial height were 3.2 mm vs 4.4 mm, and were -2.2 mm vs -2.1 mm for ulnar variance. No statistically significant differences for the radiological parameters were observed between the group with and without brachioradialis release.
Conclusions: We did not find a statistical difference between patients with and without brachioradialis release during their corrective osteotomy. This outcome may be subject to imprecision of documentation. A prospective study should be considered to offer a more conclusive outcome.

A-0098 FACTORS ASSOCIATED WITH REOPERATION AFTER DISTAL RADIUS NONUNION REPAIR

Mark Stam[1], Lente H.M. Dankelman[1,2], Mathieu M.E. Wijffels[2], Abhiram R. Bhashyam[1,3], Neal C. Chen[1,3], Charlotte L.E. Laane[1,2]
[1]Massachusetts General Hospital, Boston, US; [2]Erasmus MC, University Medical Centre Rotterdam, Rotterdam, The Netherlands; [3]Harvard Medical School, Boston, US

Introduction: Nonunion after distal radius fracture or osteotomy for distal radius malunion is a challenge to treat. The incidence of symptomatic nonunion after a distal radius fracture varies between 0.2% and 1.3%, and may lead to substantial loss of hand and wrist function. Published surgical results for distal radius nonunion repair are limited.
Aim: This study aimed to evaluate the incidence of and factors associated with reoperation after distal radius nonunion repair.
Material & Methods: We conducted a retrospective cohort study at a multicenter academic institution and identified adult patients who underwent distal radius nonunion repair between January 2005 and August 2021. Thirty-three patients were included in this study. The cohort consisted of 13 males (13/33, 39%), and had a median age of 56 years (IQR 49-64). Median follow-up was 59 months (IQR 23-126).
Results: Unplanned reoperations occurred in 8 out of 33 patients (24%). The most common reasons for reoperation were irrigation and debridement (I&D) for infection, revision surgery for persistent nonunion, and unplanned hardware removal. In total, ten complications occurred in 9 patients. The most common complications were infection and persistent nonunion both with an incidence of 9%.
Conclusions: Reoperation after distal radius nonunion repair is required in approximately 1 out of 4 cases. This was similar to the complication rate.

A-0099 RELIABILITY OF CLINICAL TESTS FOR PREDICTION OF OCCULT SCAPHOID FRACTURES AND COST BENEFIT ANALYSIS OF A DEDICATED SCAPHOID PATHWAY

Andrew McDonough, Thomas Dawson, Julia Ruston, Lesley McKee, Lindsay Muir, Zaf Naqui
Northern Care Alliance, Salford, UK

Introduction: We published a review of the outcomes of our dedicated clinic for suspected scaphoid fractures in 2020

(BSSH European Edition). This paper is an extension to this review.
Aim: To test the reliability of accurately diagnosing an occult scaphoid fracture with a combination of anatomical snuff box, scaphoid tubercle, longitudinal compression tenderness, ulnar deviation and the pinch test. Our secondary outcome measure looked at cost savings of the new patient pathway compared against the recommended NICE guidance pathway of immediate MRI investigation
Material & Methods: A retrospective analysis of 1500 patients presenting to a dedicated scaphoid clinic within a major trauma hospital. Comparison of the varying combinations of five clinical tests and their ability to accurately predict a radiologically occult scaphoid fracture. A cost comparison is also performed of our pathway versus modelling of immediate MRI as suggested by NICE.
Results: Ninety scaphoid fractures were diagnosed and treated with one non-union reported. Anatomical snuff box tenderness was the most sensitive test (90%). A combination of five tests better excluded an occult fracture (82% accuracy)
Conclusions: When the cost of purchasing, maintaining and staffing a peripheral MRI scanner are calculated our pathway is more cost effective and reduces the burden on an already overstretched NHS and radiology departments. Whilst no set of tests can accurately predict or exclude a scaphoid fracture a combination of tests bests excludes a fracture.

A-0100 3D PRINTING FINGERS MODELS FOR MULTI-STEP COMPLETE TRAINING IN HAND SURGERY PROCEDURES INCLUDING DISSECTION, TENDON SUTURE, BONE FIXATION AND MICRO-SUTURES

Daniele Tosi[1], Federico Nicolosi[2], Pietro Francesco Delle Femmine[1], Giovanni Ruocco[1], Matteo Ornelli[1], Nicola Felici[1]
[1]San Camillo-Forlanini Hospital, Unit of Reconstructive Surgery of the Limbs, Rome, Italy; [2]University Hospital Milano Bicocca, Department of Medicine and Surgery, Neurosurgery, University of Milano-Bicocca, Milan, Italy

Introduction: Simulation in hand surgery procedures is mandatory to obtain and maintain over the time different surgical skills. The in vivo or ex-vivo models represent the gold standard for training but the costs of lab, the need to dedicated set up and ethical issue creates difficulties and limitations. In hand surgery training the microsurgical skills require, in addition, a proper skin incision, and dissection to identify and prepare the neurovascular bundle. Different morbidity could affect the hand in post-traumatic conditions like bone fractures, tendon lesion ad nerve or vascular lesions.
Aim: We developed an innovative portable 3D hand silicone-resins printed device for a complete multi-steps training in hand surgery procedures that include dissection, tendon suture, bone fixation and micro-sutures.
Material & Methods: The experience on simulator production demonstrated in last years by the UpSurgeOn in the field of neurosurgical training is translated on hand surgery. A dedicated team of digital artists create 3D manufactured device reproducing a medium size male hand. All the fingers of the hand could be dissecting starting a standard Brunner incision. After skin incision the subcutaneous tissue could be dissect to isolate the deep structures. On ring and small fingers tendon and bones could be identified; in index and middle finger all the structures like vessels, nerves, tendon and bone are reproduced. The idea is to create a multi-step training 3D printed hand in which is possible to increase the level of difficulty on training passing from one finger to the other. On small and ring fingers tendon sutures and bone procedures are trainable. On index and middle finger after dissection is possible to train on microsurgical sutures of vessels and nerves making a standard microsurgical termino-terminal anastomosis under microscope magnification. The patency system allows to verify the anastomose and the quality of micro sutures. Five highly experienced surgeons from the same FESSH hand trauma and replantation center, were involved on model validation study. Participants complete a questionnaire derived from the evaluation scale use on microsurgical courses endorsed by the Italian Society of Microsurgery.
Results: Each single 3D printed finger demonstrated a high level of realism. The participants to the study reported a

high-quality reproduction on skin, dermal and subcutaneous tissue. The vessels with the adventitial layer and nerves represents a high-fidelity simulator for microsurgical training; moreover, the patency test on the vessels allow to verify the quality of the vessel anastomosis. The tendons and bones resulted strong enough for training a standard tendon Kessler suture or fix the phalanx with k-wires or screws. The possibility to replace each finger is consider useful to restart the training and to have a sustainable device.
Conclusions: In hand surgery different steps are mandatory to approach different pathological conditions. The soft tissue dissection, microsurgical skills, the ability on tendon sutures and expertise on bone fixation should be trained before start real surgical approach. We create the first realistic 3D printed silicone-resins hand model for a multi-steps training approach in all these fields.

A-0101 COMPARISON OF THUMB CARPOMETACARPAL IMPLANT VERSUS RESECTION ARTHROPLASTY IN THE SAME PATIENT

Viviane Nietlispach, Miriam Marks, Jenny Imhof, Stephan Schindele, Daniel B. Herren
Schulthess Klinik, Zürich, Switzerland

Introduction: Thumb carpometacarpal (CMC) implant arthroplasty has become very popular in recent years for the treatment of thumb CMC osteoarthritis (OA). However, there have been no comparative studies of implant arthroplasty with resection-suspension-interposition (RSI) in the same patient.
Aim: The primary objective was to determine whether a thumb CMC implant arthroplasty leads to higher patient satisfaction in the medium term compared to RSI arthroplasty in the same patient. Furthermore, we determined which surgery patients preferred and compared clinical and patient-reported outcomes between the 2 hands.
Material & Methods: Patients with OA in both thumb CMC joints who had undergone implant arthroplasty (Touch®, KeriMedical, Switzerland) in one thumb and RSI arthroplasty in the other thumb were included. Patients were invited to a follow-up visit and completed a questionnaire including a satisfaction question answered on a 5-point Likert Scale. Patients also reported pain and completed the brief Michigan Hand Outcomes Questionnaire (MHQ). Pinch strength and radiographic implant loosening were assessed at follow-up. Post-operative complications were extracted from medical records. Data were presented as median (range). Differences between the 2 hands were analysed using the Wilcoxon signed-rank test (continuous data) and Fisher's exact test (nominal data).
Results: Seventeen women with bilateral surgery were identified in our clinic information system. Two patients declined participation, one patient died, and one could not be contacted. The follow-up of the 13 included patients after implant and RSI arthroplasty was 2.2 (0.8 to 3.9) and 6.3 years (1.8 to 12.8), respectively.
Eleven patients were satisfied or very satisfied with the outcome after implant arthroplasty, while 7 patients reported this level of satisfaction for RSI ($p=0.453$). Ten patients would choose an implant again, 1 patient would choose RSI and 2 patients were undecided ($p\leq0.001$). Key pinch strength was significantly higher with 6.3kg (4.5 to 8.0) in patients with implant arthroplasty compared to 4.8kg (2.0 to 7.5) in patients with RSI ($p\leq0.01$). Pain and the brief MHQ did not differ significantly at follow-up ($p>0.1$). Seven patients reported faster postoperative rehabilitation after implant arthroplasty than after RSI ($p\leq0.01$).
There were no complications or radiological loosening after implant arthroplasty, but two revision surgeries 1.5 years after RSI.
Conclusions: Patients are satisfied with both procedures, but if they had to choose again, they would prefer implant arthroplasty. Implant arthroplasty provides at least similar medium-term outcomes to RSI, with faster rehabilitation, greater strength and fewer complications after implant arthroplasty.

A-0102 BASAL OSTEOTOMY OF THE FIRST METACARPAL USING PATIENT-SPECIFIC GUIDES AND INSTRUMENTATION – BIOMECHANICAL AND 3D CT-BASED ANALYSIS

Cléa Nüesch, Andreas Schweizer, Lisa Reissner
Balgrist University Hospital Zurich, Switzerland

Introduction: The dorsal extending osteotomy described by Wilson, have shown good patient satisfaction with a high grip strength.
Aim: The aim of this study was to investigate the radiological outcomes of proximal closing metacarpal extension osteotomies using patient-specific guides and instruments (PSI) in early stage trapeziometacarpal osteoarthritis to gain further insight into the joint loading surface and the benefits of the procedure.
Material & Methods: In a prospective observational study, nine patients were included between 11/2020 and 12/2021, undergoing a total of ten proximal metacarpal extension osteotomies for basal thumb osteoarthritis. Computer-assisted surgical planning was performed using computed tomography and three-dimensional segmentation, allowing the fabrication of 3D-printed PSIs for surgical treatment. Inclusion criteria were a one-year follow-up by CT to assess postoperative correction of the positional shift of the first metacarpal (MC1) and the location of peak loads compared with the preoperative situation.
Results: Radiographic analysis of the peak loading zone revealed a mean displacement on the articular surface of the trapezius of 0.4 mm (SD 1.4mm) to radial and 0.1 mm (SD 1.2mm) to palmar, and on the articular surface of the MC1 of 0.4 mm (SD 1.4 mm) to radial and 0.1 mm (SD 1.2 mm) to dorsal.
Conclusion: There were trends indicating that a flatter pressure distribution and a dorsal shift of the peak loading zone may contribute to an improvement in subjective pain and patient satisfaction associated with this surgical procedure. The non-significant radiological results and the minor dorsal-radial shifts in our small study group limit a firm conclusion.

A-0104 MAIA DUAL MOBILITY CMCJ REPLACEMENT - LOW COMPLICATIONS AND HIGH SURVIVAL AT 6 YEARS

Debashis Dass, Jefin Edakalathur, Srinivas Cheruvu, Ibrahim Roushdi
Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust, Oswestry, UK

Introduction: Multiple surgical techniques have been developed to deal with CMCJ arthritis including trapeziectomy with multiple variations of ligament reconstruction and suspension techniques, arthrodesis, denervation, extension osteotomy of the thumb metacarpal and small joint arthroscopy. Each option has its own individual benefits and risks including prolonged postoperative recovery, weakness of pinch strength and feeling of instability. However, CMCJ arthroplasty has been becoming more common place and seen as alternative treatment option. Early generations of CMCJ total joint arthroplasty was associated with high risk of complications and revision surgery. Dual mobility aims to eliminate the dislocation risk.
Aim: The aim of the study is to review the patient reported, clinical and radiological outcomes. We also assessed the complication profile and survivorship of the MAIA Dual Mobility prosthesis.
Material & Methods: This single centre prospective study reviewed 116 MAIA Dual Mobility prosthesis were implanted consecutively between 2017-2022 . The institutional board approved the study and informed consent was obtained.
Patients were evaluated preoperatively and postoperatively for pain using a visual analogue score (VAS), opposition using Kapandji grading, power grip using a grip dynamometer, and tip-pinch strength. Functional scoring was developed by our own hand therapists as a tool to monitor progress of patients. Patients were clinically assessed using the validated,

Brief Michigan Hand Outcome Questionnaire (bMHQ) and radiographically until death or revision surgery. Post-operative complications, radiographic implant failure and indications for revision surgery were all reviewed. Complications were defined as any untoward medical that occurred in the post-operative period. Revision surgery was defined as any secondary procedure which involved implant modification or removal. Clinical and standardised radiological follow-up, with AP and Roberts view, was performed for each patient, with postoperative review at stopped the 6 week,12 months, 3 and up to 6 years.

Results: 116 patients were included in the study, average age of patients was 66 years. VAS improved from a preoperative score of 7 (IQR 7-8) to 1 (IQR 0-3) after surgery, this was statistically significant ($p < 0.005$, t-test). Pinch strength improved from 5 (IQR 3-6) to 8 lbs (IQR 5-10) ($p = 0.005$, Wilcoxon). Power grip strength improved from 37 (IQR 21-47) to 47 lbs (IQR 32-65) ($p = 0.09$, t-test).The function of the hand improved from a pre-operative score of 10 (IQR 6-13) to a post-operative score of 24 (IQR 18-27) ($p < 0.005$, Wilcoxon). The validated Brief Michigan Hand Outcome score improved from a pre-operative score of 42 (IQR 30-60) to 85 (IQR 65-98) this was both statistically and clinically significant ($p < 0.005$, t-test). There were two fractured trapeziums, two cups developed asymptomatic lucency around the cup and one case of De Quervain's in a patient post-operatively. Two MAIAs were revised for aseptic cup loosening. Survivorship was 97% at 6 years (95% CI 0.93-1).

Conclusions: MAIA dual mobility has shown good medium term outcomes at 6 years, with improvement in pain relief, strength, mobility, and patient reported outcomes. It has also eliminated the issues around dislocation, as experienced in early generation prosthesis' and has a low complication profile.

A-0105 SURGICAL TREATMENT OF HUMERUS SHAFT FRACTURE CAUSED BY ARM WRESTLING INJURY : APPLYING DUAL-PLATE UNDER ANTERO-LATERAL APPROACH

Cheungsoo Ha[1,2], Chi-Hoon Oh[1], Jaiwoo Chung[1], Soo-Hong Han[1]

[1]Department of Orthopaedic Surgery, CHA Bundang Medical Center, CHA University, Seongnam-si, Gyeonggi-do, South Korea; [2]Department of Orthopaedic Surgery, Armed Force Daejeon Hospital, Daejeon-si, South Korea

Introduction: Fractures of the humerus can occur as a result of arm wrestling, and in some cases, it can lead to radial nerve palsy. Surgical treatment was performed using Dual plate fixation for such fractures, and an anterolateral approach was used to visually assess the condition of the radial nerve.

Aim: The purpose of this study is to examine the characteristics of humerus fractures caused by arm wrestling, the frequency of radial nerve palsy occurrence, and the outcomes after surgical treatment.

Material & Methods: A retrospective analysis was conducted on 19 cases of diaphseal humerus fractures resulting from arm wrestling injuries among patients who underwent surgical treatment at a single institution from 2018 to 2023. The study participants were all male (100%), with an average age of 27 years (ranging from 17 to 39 years). We analyzed the patient's occupation, the direction of the injured arm during arm wrestling, the specific location of the distal humerus fracture, the presence and frequency of radial nerve palsy, the type of metal plate used during surgery, postoperative range of motion, Disabilities of Arm, Shoulder, and Hand (DASH) score, and complications during follow-up to assess the clinical outcomes.

Results: All fractures were classified using the AO classification system and occurred in the midshaft and distal one-third regions. Among the 19 patients, only 3 individuals pesented radial nerve palsy, but during the follow-up period after surgical treatment, they showed signs of improvement. The entire group achieved fracture union without any additional complications. Both DASH and range of motion (ROM) improved after surgical treatment. During the surgical procedure,

we used 4.5-mm narrow locking compression plates (LCP) and 3.5-mm LCP reconstruction plates.
Conclusions: Humerus fractures resulting from arm wrestling commonly occur at the distal one-third location in a spiral fracture pattern. Satisfactory results through anterolateral approach of dual metal plate fixation using were obtained and this method is effective to minimize Iatrogenic radial nerve palsy for similar injuries.

A-0106 ANTEROLATERAL DUAL PLATE FIXATION FOR DISTAL METAPHYSEAL DIAPHYSEAL JUNCTION FRACTURE OF THE HUMERUS: BIOMECHANICAL FINITE ELEMENT ANALYSIS WITH CLINICAL RESULTS

Cheungsoo Ha[1,4], Inrak Choi[2], Jun-Ku Lee[3], Chi-hoon Oh[1], Soo-Hong Han[1]
[1]Department of Orthopaedic Surgery, CHA Bundang Medical Center, CHA University, Seongnam-si, Gyeonggi-do, South Korea; [2]Intuitive Surgical, Inc, Sunnyvale, California, USA; [3]Department of Orthopaedic Surgery, National Health Insurance Service Ilsan Hospital, Goyang-si, Gyeonggi-do, South Korea; [4]Department of Orthopaedic Surgery, Armed Force Daejeon Hospital, Daejeon-si, South Korea

Introduction: Distal metaphyseal diaphyseal junction fracture of the humerus is a subset of injuries between humeral shaft fracture and distal intra-articular humerus fracture. A lack of space for distal fixation and the unique anatomy of concave curvature create difficulties during operative treatment. The closely lying radial nerve is another major concern. While understanding the anterolateral dual plate fixation on the distal junctional fracture of the humerus has been limited, we simultaneously performed a biomechanical study using finite element analysis and a clinical study using an extended large-number cohort.
Aim: The aim of this study was to determine whether anterolateral dual plate fixation could be effective for a distal junctional fracture of the humerus both biomechanically and clinically.
Material & Methods: A right humerus 3D model was obtained based on plain radiographs and computed tomography data of patients. Two fractures, a spiral, and a spiral wedge type were constructed. 3D models of locking compression plates and screws were constructed using materials provided by the manufacturer. The experiment was conducted by using COMSOL Multiphysics, a finite element analysis, solver, and simulation software package.
For the clinical study, from July 2008 to March 2021, a total of 72 patients were included. Their medical records were retrospectively reviewed to obtain patient demographics, elbow range of motion, Disabilities of the Arm, Shoulder, and Hand (DASH) scores, Mayo Elbow Performance Scores (MEPS), and hand grip strength.
Results: No fracture fixation construct completely restored stiffness to the intact model in torsion or compression. Combinations of the 7-hole and 5-hole and the 8-hole and 6-hole showed superior structural stiffness and stress than those with single lateral plates. At least three screws (6 cortices) should be inserted into the lateral plate to reduce the load effectively. For the anterior plate, it was sufficient to purchase only the near cortex. Regarding clinical results of the surgery, the range of motion showed satisfactory results in elbow flexion, elbow extension, and forearm rotation. The average DASH score was 4.3. The average MEPS was 88.2. The average grip power was 49.2 (lb), which was 96% of the grip power of the unaffected side.
Conclusions: Anterolateral dual plate fixation is biomechanically superior to the single plate method in finite element analysis of a distal junctional fracture of the humerus model. Anterolateral dual plate fixation is also clinically effective in a large cohort of patients with distal junctional fracture of the humerus.

A-0107 EFFECT OF REPETITIVE CORTICOSTEROID INJECTION ON TENNIS ELBOW SURGERY

Cheungsoo Ha[1,3], Weonmin Cho[1], Chi-hoon Oh[1], Junhyoung Park[2], Wooyeol Ahn[1], Soo-Hong Han[1]
[1]Department of Orthopaedic Surgery, CHA Bundang Medical Center, CHA University, Seongnam-si, Gyeonggi-do, South Korea; [2]Department of Artificial Intelligence, South Korea University, Seongbuk-ku, Seoul, South Korea; [3]Department of Orthopaedic Surgery, Armed Force Daejeon Hospital, Daejeon-si, South Korea

Introduction: Lateral epicondylitis is a chronic tendinopathy of humeral origin of the common extensor tendon. Most patients show improvement after nonoperative treatment. However, 4% to 11% of patients require surgical treatment. Although corticosteroid injection is one of the most commonly applied nonoperative treatment methods, to the authors' knowledge, no study has reported the effect of the number of preoperative corticosteroid injections on the final postoperative outcome.
Aim: The number of corticosteroid injections before surgical treatment does not affect postoperative clinical outcomes. Thus, the objective of this study was to determine the effect of the number of preoperative corticosteroid injections on postoperative clinical outcomes.
Material & Methods: As a retrospective review, from January 2007 to December 2019, a total of 99 patients who had undergone surgical treatment of lateral epicondylitis with a modified Nirschl technique were enrolled. The number of preoperative corticosteroid injections was investigated by medical record review. Outcome measurements included visual analog pain scale; Disabilities of the Arm, Shoulder and Hand (DASH) score; Mayo Elbow Performance Score; and the Nirschl and Pettrone grade. Grip power and wrist extension power were measured using a digital dynamometer.
Results: A total of 99 patients were included in this study. The mean total number of injections of patients was 4.37 ± 2.46 times (range, 1-15 times). Total duration of nonoperative treatment before surgery was 25.4 ± 20.5 months (range, 4-124.8 months). The mean postoperative follow-up period was 42.8 ± 28.0 months (range, 12-110 months). For all injection numbers, clinical scores showed significant improvement in visual analog pain scale, DASH score, Mayo elbow score, grip power, and wrist extension power after surgery. Regression analysis showed that the degree of improvement according to the injection number was not statistically significant. The Nirschl and Pettrone grade was excellent in 82 (82.8%) patients, good in 14 (14.1%) patients, fair in 2 (2%) patient, and failure in 1 (1%) patient.
Conclusions: The number of preoperative corticosteroid injections does not appear to affect postoperative clinical outcomes of patients with lateral epicondylitis who undergo surgery with a modified Nirschl technique.
Published AJSM on 2023 Jun

A-0108 EMERGENCY RECONSTRUCT TRAUMATIC MUSCLE DEFECTS WITH FUNCTIONAL SUPERFICIAL PARTITION VASTUS LATERALIS MUSCLE FLAP

Xiaoju Zheng, Baoshan Wang, Xinhong Wang, Haijun Li
Xi'an Fengcheng Hospital, Xi'an City, China

Introduction: Emergency reconstruct traumatic muscle defects with functional superficial partition vastus lateralis muscle flap
Aim: To investigate and discuss the feasibility and clinical effect of emergency muscle transplantation of the shallow region of the vastus lateralis in the functional reconstruction of major muscles with traumatic muscle group defects
Material & Methods: 15 patients with muscle defects were subject to the emergency power reconstruction of the shallow region of the vastus lateralis. The anatomical cross-sectional area and length of the corresponding muscle with defects on the healthy side were measured by musculoskeletal B-mode ultrasound. 1 or 2 corresponding muscle tissue blocks

were cut from the shallow region of the vastus medialis and the vastus lateralis and moved to the receiving area to cover the wound and fix the muscle. The contents were dynamic observation, follow-up evaluation and record through musculoskeletal B-mode ultrasound, electromyography and myodynamia.
Results: The transplanted muscle and skin flap survived in one stage without vascular crisis. The post-operation follow-up should be performed for 12 to 32 months . The myodynamia was evaluated according to the M4 strength of myodynamia. 12 patients' myodynamia recovered to M4 or above and They could move their joints freely. 3 patient' myodynamia recovered to M3+
Conclusions: The emergency muscle transplantation of the shallow region of the vastus lateralis in the functional reconstruction of muscles with traumatic muscle defects is feasible and effective with a good clinical effect.

A-0109 RECONSTRUCTION OF COMPLEX SOFT-TISSUE DEFECTS IN THE UPPER EXTREMITIES WITH CHIMERIC ANTEROLATERAL THIGH PERFORATOR FLAP

Xiaoju Zheng, Baoshan Wang, Xinhong Wang, Haijun Li
Xi'an Fengcheng Hospital, Xi'an City, China

Introduction: Reconstruction of complex soft-tissue defects in the upper extremities with chimeric anterolateral thigh perforator flap
Aim: To investigate the feasibility and results of performing transplantation of chimera of the superficial to vastus lateralis muscle to repair severe crush injury to upper extremities
Material & Methods: Emergency primary repair of severely injured upper extremities caused by crush in 30 cases.Bilateral or unilateral comminuted fractures of the ulnar radius, skin defects, or combined injuries of blood vessels, bone and muscle tissues were found in all of them. The skin defect area ranged from 5cm×5cm to 32cm×23 cm; the muscle defect was seen in 15 cases; the bone defect was found in 9 cases.The chimeric flaps of the anterolateral thigh were used in 27 cases, including 3 cases in which double chimeric flaps were used. Wound covering, muscle tamponade, reconstruction of muscle dynamics and bone repair were performed. The flap area was 11cm×5cm to 21cm×19cm, and the muscle volume was 8cm×4cm×1cm to20cm×13cm×1cm. Patients came to the hospital every 3 months after surgery for reexamination,for how well the flaps looked, bone healed and the functions of upper extremities and hands restored.
Results: The upper extremities of 28 cases were treated, and the limb salvage rate was 93.33%. The average number of operations was 2.6.The infection rate was 6.67%. It took an average of 6.7 months for the bone to heal. According to the Andsion score, the rate of excellent and good outcomes of surgery was 71.4%.
Conclusions: The limb salvage rate was high when the transplantation of chimera of the superficial to vastus lateralis muscle was used to repair the combined injuries of upper extremities caused by the severe crush.

A-0110 THE LATERAL CIRCUMFLEX FEMORAL ARTERY CHEMERIC TRANSPLANT COMBINED WITH IN- SITU PREFABRICATED AVULSED PALM SKIN IN THE TREATMENT OF SEVERE PALM INJURY

Xiaoju Zheng, Baoshan Wang, Xinhong Wang, Haijun Li
Xi'an Fengcheng Hospital, Xi'an City, China

Introduction: The lateral circumflex femoral artery chemeric transplant combined with in- situ prefabricated avulsed palm skin in the treatment of severe palm injury

Aim: To investigate the feasibility and clinical effect of lateral femoral circumflex artery chimeric transplant combined with in-situ prefabricated avulsed palm skin in the treatment of severe palm injury

Material & Methods: 12 patients with severe palm injury caused by various reasons were repaired primarily in the emergency department. For the avulsed palm skin prefabricated with muscle flap, the back of the hand was covered with skin flap; the blood vessels of the skin flap were bridged between the radial artery or the ulnar artery and the finger artery in order to recover the blood supply of their fingers, and then the survival, color, texture and postoperative function for the avulsed palm skin were observed.

Results: One patient failed in the operation and the other eleven patients successfully saved their palms. The follow-up of 4 months - 6 years showed the fabricated avulsed palm skin was soft, thick and tough in its texture and their feeling gradually recovered in 3-6 months. 37 fingers were replanted through Flow-through, in which 4 fingers were thumbs, and 26 fingers (2 thumbs) survived; bone healing time was about 4 months; the feeling of 7 patients reached s4, the feeling of 3 patients reached s3, and the feeling of 1 patient reached s1.

Conclusions: Lateral femoral circumflex artery chimeric transplant combined with in-situ prefabricated avulsed palm skin and/or Flow-through technique is a reliable and effective method for the repair of severe palm injury and has a better effect in functional recovery.

A-0111 APPLICATIONS OF WEARABLE SENSORS IN UPPER EXTREMITY MSK CONDITIONS: A SCOPING REVIEW

Sohrob Milani Zadeh[1], Joy MacDermid[1,2], James Johnson[1,2], Trevor B Birmingham[1], Erfan Shafiee[3]

[1]University of Western Ontario, London, Ontario, Canada; [2]Hand and Upper Limb Center, St Joseph's Health Center, London, Ontario, Canada; [3]Queen's University, Kingston, Ontario, Canada

Introduction: Musculoskeletal (MSK) conditions are a prevalent health concern, with significant implications for individuals' well-being and healthcare systems. Upper extremity musculoskeletal (UE-MSK) conditions, in particular, pose a substantial burden due to their high prevalence and impact on daily life. Wearable sensors offer promising solutions for better understanding, managing, and monitoring these conditions. This scoping review provides a comprehensive overview of the current literature on wearable sensor applications in UE-MSK conditions. We aim to identify trends, gaps, and potential research areas. This paper presents our methodology, findings, and implications, highlighting the diverse uses of wearable sensors in the context of MSK conditions.

Aim: This scoping review uniquely aims to map the current state of the literature on the applications of wearable sensors in people with or at risk of developing upper extremity musculoskeletal (UE-MSK) conditions, considering that MSK conditions or disorders have the highest rate of prevalence among other types of conditions or disorders that contribute to the need for rehabilitation services.

Material & Methods: The preferred reporting items for systematic reviews and meta-analysis (PRISMA) extension for scoping reviews guideline was followed in this scoping review. Two independent authors conducted a systematic search of four databases, including PubMed, Embase, Scopus, and IEEEXplore. We included studies that have applied wearable sensors on people with or at risk of developing UE-MSK condition published after 2010. We extracted study designs, aims, number of participants, sensor placement locations, sensor types, and number, and outcome(s) of interest from the included studies. The overall findings of our scoping review are presented in tables and diagrams to map an overview of the existing applications.

Results: The final review encompassed 80 studies categorized into clinical population (31 studies), workers' population (31 studies), and general wearable design/performance studies (18 studies). Most were observational, with 2 RCTs in

workers' studies. Clinical studies focused on UE-MSK conditions like rotator cuff tear and arthritis. Workers' studies involved industrial workers, surgeons, farmers, and at-risk healthy individuals. Wearable sensors were utilized for objective motion assessment, home-based rehabilitation monitoring, daily activity recording, physical risk characterization, and ergonomic assessments. IMU sensors were prevalent in designs (84%), with a minority including sEMG sensors (16%). Assessment applications dominated (80%), while treatment-focused studies constituted 20%. Home-based applicability was noted in 21% of the studies.
Conclusions: Wearable sensor technologies have been increasingly applied to the health care field. These applications include clinical assessments, home-based treatments of MSK disorders, and monitoring of workers' population in non-standardized areas such as work environments. Assessment-focused studies predominate over treatment studies. Additionally, wearable sensor designs predominantly use IMU sensors, with a subset of studies incorporating sEMG and other sensor types in wearable platforms to capture muscle activity and inertial data for the assessment or rehabilitation of MSK conditions.

A-0112 VALIDATION OF WEARABLE IMU-BASED MOTION SHIRT FOR OBJECTIVE ASSESSMENT OF SHOULDER MOTION IN PATIENTS AWAITING SHOULDER REPLACEMENT SURGERY

Sohrob Milani Zadeh[1], Joy MacDermid[1], James Johnson[1], Daniel G Langohr[1], Erfan Shafiee[2]
[1]University of Western Ontario, London, Ontario, Canada; [2]Queen's University, Kingston, Ontario, Canada

Introduction: Shoulder-related pathologies often necessitate surgical interventions, with shoulder replacement surgery being a prevalent choice. The need for objective and unbiased assessments of shoulder function and motion is paramount for effective rehabilitation and the evaluation of surgical outcomes. Wearable Inertial Measurement Unit (IMU) sensors have demonstrated considerable promise in providing real-time, unbiased movement data. This study is dedicated to the validation of a wearable IMU-based sensor system known as the "Motion Shirt" for the assessment of shoulder motion in patients awaiting shoulder replacement surgery.
Aim: This study's primary objective is to evaluate the concurrent construct validity and accuracy of the Motion Shirt system in the detection of shoulder motion arcs during the Functional Impairment Test-Hand and Neck/Shoulder/Arm (FIT-HaNSA) in patients awaiting shoulder replacement surgery. This evaluation is conducted by comparing the data collected by the Motion Shirt with the Dartfish Motion Analyzer software.
Materials and Methods: In this prospective study, patients aged 50 or older, who were awaiting shoulder replacement surgery, were recruited. The Motion Shirt, equipped with five IMU sensors, was employed to measure angular shoulder movements in two planes during the FIT-HaNSA test. Simultaneously, two GoPro cameras recorded the participants' movements to provide reference data. The data analysis utilized Bland-Altman plots and the Standard Error of Measurement (SEM).
Results: Thirteen participants underwent the FIT-HaNSA test while wearing the Motion Shirt. The Bland-Altman plots and aggregated motion data analysis revealed a substantial level of agreement between the Motion Shirt and Dartfish analysis in measuring shoulder motion. In Task-1, the Bland-Altman plots exhibited no significant systematic errors, with only 3.27% and 2.18% of data points exceeding the limits of agreement (LOA) in both elevation and the Plane of Elevation. Consequently, more than 95% of data points in both the Elevation and Plane of Elevation planes in Task-1 fell within these limits, signifying a high level of concordance. In Task-2, where participants performed fewer motions, a high level of agreement was also observed in Elevation, with only 3.8% of data points exceeding the LOA. However, 5.98% of data points exceeded LOA in the Plane of Elevation for Task-2. In Task-3, which involved sustained overhead activity,

the Motion Shirt exhibited a high level of agreement with Dartfish analysis in Elevation, with only 2.44% of data points exceeding the LOA. However, 7.32% of data points exceeded LOA in the Plane of Elevation, similar to Task-2.
Conclusion: The Motion Shirt, equipped with its embedded IMU sensors, demonstrated a robust concordance with the Dartfish Motion Analyzer system in assessing shoulder motion during the FIT-HaNSA test. These results affirm the Motion Shirt's suitability for objective motion analysis in patients awaiting shoulder replacement surgery, indicating its potential for broader applications in the assessment of shoulder function and rehabilitation. Further investigations involving larger sample sizes may offer additional insights into its performance.

A-0113 CONGENITAL MALFORMATIONS OF THE HAND ASSOCIATED WITH 12Q13.13 MICRODELETION

Howard Chu[1], Daisy Parsons[1], James Metcalfe[2], Alexander Armstrong[2]
[1]Department of Burns, Plastic and Reconstructive Surgery, Royal Devon and Exeter Hospital (Wonford) Royal Devon University Healthcare NHS Foundation Trust, Exeter, Devon; [2]Department of Burns, Plastic and Reconstructive Surgery, Derriford Hospital, University Hospitals Plymouth NHS Trust, Plymouth

Introduction: Deletions of the 12q13.13 are extremely rare and the description of its clinical manifestation within the literature remains limited. We present the clinical findings of the hand associated with this chromosomal abnormality.
Methods: We discuss a 15-year-old male who presents with a de novo deletion in the 12q13.13 region with developmental delay, facial dysmorphic features, lower limb contracture and hand atypia. This is the first reported case within the literature of this chromosomal abnormality associated with hand abnormalities. The details of this patient's rearrangement (1Mb, 53344343-54347294 deletion) have been entered into Decipher (NHS-SMB: 328250).
Conclusions: Case studies of rare variants help facilitate earlier diagnosis of these disorders, and hence initiation of appropriate treatment, ultimately leading to improved patient outcomes. Moreover these patients require complex multidisciplinary care to ensure all aspects of their medical conditions are addressed.

A-0114 AN ALL-ARTHROSCOPIC TECHNIQUE OF REPAIRING FOVEAL TEARS OF THE TRIANGULAR FIBROCARTILAGE COMPLEX USING A BONE ANCHOR–REPAIR MADE SIMPLE

Muntasir Mannan Choudhury, Robert Tze Jin Yap, Jackson Kian Hong Jiang, Dawn Sinn Yi Chia, Andrew Yuan Hui Chin
Department of Orthopaedic Surgery, Sengkang General Hospital, Singapore

Introduction: Traumatic foveal tears of the triangular fibrocartilage complex lead to ulnar sided wrist pain and instability resulting in painful motion and loss of grip strength with a severe impact on the overall function of the upper limb. Surgical repair is nothing new and has traversed through the realm of open repair to arthroscopic assisted to all arthroscopic repair techniques over the many decades with arthroscopic repairs showing better visualization, lesser trauma and equally favorable patient outcomes. Techniques had varied from using trans osseous tunnels to bone anchors, with or without the usage of special jigs.
Aim: Here we describe an arthroscopic technique of repairing the torn foveal insertion of the TFCC using a bone anchor inserted under arthroscopic and fluoroscopic guidance into the fovea. Both the dorsal and volar limbs of the TFCC are repaired arthroscopically resulting in a strong anatomical repair resulting in a stable and pain free wrist.
Material & Methods: 18 patients with foveal detachment of the triangular fibrocartilage complex was treated arthroscopically with a bone anchor

Results: All patients recovered completely within 6 months and returned to their premorbid vocations with complete resolution of symptoms and a pain-free fully functional wrist

Conclusions: Our technique is conducted entirely arthroscopically providing minimal invasion, good visualisation, and accuracy of repair. It does not need the aid of specialised jigs as in case of certain well-established trans osseous techniques[11] and it does not require a steep learning curve in creating the tunnels accurately at the site of the foveal footprint[16]. Our technique addresses the repair of both the limbs of the distal radioulnar ligaments restoring both the stability and biomechanics. Unlike other popular all- arthroscopic bone anchor repair techniques it requires just 3 portals- two of them being the conventional 3-4 and 6R portal and the 3rd being the distal DRUJ portal

A-0115 ARTHROSCOPIC EXAMINATION OF THE TRIANGULAR FIBROCARTILAGE COMPLEX IN GALEAZZI INJURIES: REVISITING A COMPLEX INJURY

Muntasir Mannan Choudhury, Sandip Singh Saggi, Chung Sze Ryn, Robert Tze Jin Ya, Dawn Sinn Yii Chia, Jackson Kian Hong Jiang, Andrew Yuan Hui Chin

Department of Orthopaedic Surgery, Sengkang General Hospital, Singapore

Introduction: Galeazzi fracture-dislocations result from severe trauma leading to loss of function of the wrist and forearm if not treated appropriately. To avoid such disastrous consequences, meticulous surgical management of the injury must be carried out.

The prevailing literature speaks about symptomatic distal radioulnar joint injuries in Galeazzi fracture-dislocations and the various approaches to managing instability.

Aim: Unfortunately, there is a shortage of data on the true incidence of injury to the triangular fibrocartilage in the backdrop of the severity of the mechanism of Galeazzi fractures and the damage that it may perpetrate as the triangular fibrocartilage complex is not inspected routinely as part of the management of such cases.

Material & Methods: A retrospective review of 6 consecutive Galeazzi fracture dislocations where wrist arthroscopy was performed

Results: All cases revealed complex tears of the triangular fibrocartilage complex involving large segments of the ligament and always involving the dorsal periphery. All tears followed the same pattern of disruption of the attachments of at least two sides of the triangular fibrocartilage complex

Conclusions: We believe our data will pave the path to further prospective studies in understanding the degree of damage in the triangular fibrocartilage in such devastating injuries and the need for meticulous arthroscopic repair.

A-0116 ARTHROSCOPIC BONE GRAFT AND INTERNAL FIXATION OF SCAPHOID NONUNION: REGULAR TO COMPLEX AND UNIQUE CASES

Muntasir Mannan Choudhury, Dawn Sinn Yii Chia, Jackson Kian Hong Jiang

Department of Orthopaedic Surgery, Sengkang General Hospital, Singapore

Introduction: Wrists with proximal pole fracture nonunions not only have a risk of avascular necrosis of the proximal pole, they also have a high chance of arthritis and thus have to be treated diligently. The literature remains controversial until now on the optimal surgical technique on bone grafting and internal fixation of such fracture nonunions. Arthroscopic bone grafting of scaphoid nonunions has paved the way with evidence in multiple studies in ensuring in union in the complex nonunions and even the very proximal proximal pole nonunions.

Aim: we will be describing arthroscopic surgical techniques in the treatment of simple proximal pole nonunions, the very distal proximal pole nonunion and nonunion after failed screw fixation with the aid of animations and intraoperative videos and photographs.
Material & Methods: We did a retrospective study of 15 scaphoid fracture nonunion which were treated with arthroscopic bone grafting. This included nonunions as old as 9 years old, failed screw fixations and also the very proximal proximal pole nonunion.
Results: All the fracture nonunion cases united within 3-6 months. There were no complications
Conclusions: Arthroscopic bone graft of non-united fracture of the scaphoid is a reliable safe technique once the surgical technique has mastered.
Even though we have a small cohort of patients and we have not managed to reach statistical significance for our results, the data appears to be promising. Our results clearly show that scaphoid nonunions can be treated arthroscopically using non-vascularized bone grafts with good bone healing, cosmetically favorable scars, lesser postoperative pain and faster wound healing. Arthroscopic bone graft internally fixation of the scaphoid non-union is safe reliable and equally as effective as other surgical techniques not only for the simple cases but for the more complex cases involving the very smll proximal pole and previous failed nonunions.

A-0117 UNVEILING THE TRUTH: RECONSIDERING ADDITIONAL TENOSYNOVECTOMY IN DE QUERVAIN'S DISEASE SURGERY

Nutdanai Neti, Yuwarat Monteerarat, Roongsak Limthongthang, Torpon Vathana, Panai Laohaprasitiporn
Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction: De Quervain's disease is a commonly encountered condition within the realm of wrist surgery. Although various surgical interventions have been performed, including open decompression alone and tenosynovectomy in conjunction with decompression, robust evidence is lacking in delineating the comparative efficacy of these procedures.
Aim: This study aimed to compare outcomes associated with first dorsal compartment decompression alone and decompression with additional tenosynovectomy.
Material & Methods: This study is a randomized controlled trial conducted on 73 wrists in 68 de Quervain's disease patients. We included patients presenting with clinical signs or symptoms of de Quervain's disease and showing no improvement after nonoperative treatment. Open decompression alone was performed on 36 wrists, and decompression with an additional tenosynovectomy was performed on 37 wrists. Comparative outcomes included post-operative pain, patient-reported functional outcome assessment tools, pinch strength, and complications at 1, 4, and 12 weeks after surgery.
Results: There were no statistically significant differences in post-operative numerical rating scale for pain, paracetamol use, PRWE score, QuickDASH score, EQ-5D-5L scores, and pinch strength between the open decompression alone group and the decompression with an additional tenosynovectomy group during the entire follow-up period. However, the additional tenosynovectomy group exhibited a significantly longer operative time (25 minutes in the additional tenosynovectomy group vs. 15 minutes in the decompression alone group, p-value < 0.001). Intra-operative tenosynovitis was detected in 97% of the patients, which correlated with the pathological findings.
Conclusions: The impact of mechanical compression of the first dorsal compartment had a more significant influence on the patient's symptoms than the inflammation originating from the tenosynovium itself. Despite the presence of tenosynovitis during the open decompression surgery in de Quervain's disease, the additional tenosynovectomy demonstrated minimal benefit and increased the operative time compared to open decompression alone.

A-0118 ARTHROSCOPIC WRIST SURGERY USING AN EXTENDED WALANT TECHNIQUE - A NEW STANDARD OF CARE?

Alexei Buruian[1], Joana Contente[2], Erica Marto[2], João Diogo Silva[2], Carlos Pina[2]
[1]Hospital Distrital da Figueira da Foz, Figueira da Foz Portugal; [2]Centro Hospitalar de Leiria, Leiria, Portugal

Introduction: Wrist arthroscopy is the gold standard for wrist pathology diagnosis and treatment of a variety of pathologies. Wrist arthroscopy under WALANT (Wide-Awake Local Anesthesia, No Tourniquet) uses lidocaine and epinephrine to enable surgery without general anesthesia, reducing risks and costs associated with traditional anaesthesia. A more extended WALANT anaesthesia is presented in this article.
Aim: literature review, technique description and patient reported outcomes.
Material & Methods: Retrospective study of 22 patients submitted to wrist arthroscopy under extended WALANT, interviewed by telephone. Literature review included 7 articles on terms "local anesthesia wrist arthroscopy" or "wide awake wrist arthroscopy".
Results: Mean Numeric Pain Rating Scale(NPRS) during anesthesia and during surgery 1,96 (SD 2,34; r 0-8) and 1,69 (SD 3,47; r 0-6), respectively; maximum NPRS during anesthesia and surgery 3,09 (SD 2,81 ; r 0-8) and 2,46 (SD 3,48 ; r 0-10). 95,5% were willing to be submitted to further WALANT procedures.
Conclusions: First review of the literature on the topic allowed to establish some interesting conclusions, namely that a more extended WALANT approach may improve pain scores, comfort levels and willingness to be submitted to further WALANT procedures. Randomized controlled studies are needed to confirm these findings.

A-0119 GOODNESS GRACIOUS GREAT BALLS OF FIRE THORN: A CASE REPORT UNPICKING THE RARE PRESENTATION OF PYROCANTHA COCCINEA-INDUCED TENOSYNOVITIS

Shahd Nour, Kiran Dhaliwal, Samuel George
University Hospitals of Birmingham, UK

Pyrocantha Coccinea (Fire thorn) is an evergreen shrub with large thorns that splinter on penetration of the skin and cause a subsequent severe inflammatory reaction. It is a very rare cause of tenosynovitis.
We present the case of a 53 year old gardener who presented with pain and swelling of the left hand one month after after a penetrating thorn injury. On examination he had a healed scar with tenderness and swelling on the dorsum of the hand and along the flexor sheath of the thumb.
X-ray and ultrasound (USS) showed no evidence of a foreign body. The USS confirmed a diagnosis of tenosynovitis of the flexor pollicus longus. He was managed with a futura splint and referred to hand therapy however his symptoms persisted. Magnetic Resonance Imaging was requested but unable to be performed due to a metallic foreign body in the patients hand.
A decision was made to operate. Intraoperatively he had a large indurated swelling with capsule formation around the thorn. The thorn was removed and capsule excised. The terminal branch of the superficial radial nerve was completely divided and had a neuroma. We excised the neuroma and carried out a direct epineural nerve repair. The patient made a full recovery at four-months follow up.
This case highlights the importance of having a high index of suspicion. Diagnosis is difficult as X-ray and USS may not identify a foreign body. Removal of the thorn is the only treatment option and usually results in prompt and full recovery.

A-0120 PREVALENCE OF TRANSTHYRETIN AMYLOIDOSIS IN PATIENTS UNDERGOING CARPAL TUNNEL SURGERY: A PROSPECTIVE COHORT STUDY AND RISK FACTOR ANALYSIS

Nicolas Bigorre, Alexandre Petit
Centre de la Main, Angers, France

Amyloidosis is a disease characterized by the accumulation of misfolded proteins, leading to structural and functional changes in various organs and tissues. Recent research has highlighted the importance of early diagnosis of transthyretin amyloidosis (TRTA), especially in heart failure.
This study aims to determine the incidence rate of synovial biopsy positivity for TTR amyloidosis in a specific age cohort and identify risk factors associated with carpal tunnel syndrome.
The study is a prospective observational cohort study that includes patients aged 60-80 with carpal tunnel syndrome who underwent surgery. Sociodemographic data, medical history, and clinical examination findings were collected. Synovial tissue biopsies were analyzed using Congo red and immunohistochemical staining. Data analysis included descriptive statistics, uni and multivariate analysis
The study included 254 patients, with a positive TTR amyloidosis biopsy rate of 18.5%. Risk factors for positive test results were identified as male gender, trigger finger, hearing disorders, and valvulopathies. A predictive analysis using logistic regression yielded a probability model for individuals belonging to the TTRA+ group.
Carpal tunnel syndrome is considered an important diagnostic indicator for TTRwt amyloidosis, often preceding cardiac signs by several years. Early diagnosis is crucial for effective treatment with specific therapies. This study identifies a high-risk population for TTR amyloidosis, suggesting that systematic screening should be considered, particularly in association with trigger finger and hearing disorders in men over 60 years old.

A-0121 FABRICATION OF ARTIFICIAL NERVES AS AN ALTERNATIVE OF AUTOLOGOUS NERVE GRAFT BASED ON TISSUE ENGINEERING CONCEPTS

Ryosuke Kakinoki[1], Yukitoshi Kaizawa[2], Kazuhiro Ohtani[1], Koichi Yoshimoto[1], Ryosuke Ikeguchi[3], Koji Goto[1]
[1]Department of Orthopedic Surgery, Kindai University Hospital; [2]Department of Orthopedic Surgery, Kansai Electric Power Hospital; [3]Department of Orthopedic Surgery, Graduate School of Medicine, Kyoto University

Introduction: Nerve regeneration within a conduit (tubulation) was described at the beginning of the 20th century. However, the nerve regeneration in tabulation is associated with several drawbacks; the nerve regeneration rate is slower and the nerve regeneration distance is shorter compared with autolougous nerve graft, although tabulation is not associated with of functional deficits of donor nerves. In rat sciatic nerve, the nerve regeneration distance through a silicone tube is known to be a 10mm in rat sciatic nerves1. To promote nerve regeneration within a conduit (tubulation), we have performed studies using a tube model based on four important concepts for tissue engineering: vascularity, growth factors, cells, and scaffolds.
Material & Methods: We created a model of a silicone conduit containing a blood vascular pedicle (vessel-containing tube) in rat sciatic nerve.2 We found it accelerated axon regeneration and increased the axon regeneration distance up to 25mm in rat sciatic nerve; however, it did not increase the number or diameter of the axons that regenerated within the tube.3 A vessel-containing tube with 1X107 bone-marrow-derived mesenchymal stem cell (BMSC) transplantation increased the number and diameter of regenerated axons, compared with the tube without BMSC transplantation.4 Decellularized allogenic nerve basal lamellae (DABLs)5 seeded with BMSCs was transplanted in a vessel-containing silicone tube in rats,

the nerve regeneration through which was compatible to a 20mm autolougous nerve graft.6
For the clinical application of nerve conduits, they should exhibit capillary permeability, biodegradability, and flexibility. Nerbridge® (Toyobo Co. Ltd., Osaka, Japan) is a commercially available artificial nerve conduit. The outer cylinder is a polyglycolic acid (PGA) fiber mesh and possesses capillary permeability. We used the outer cylinder of Nerbridge as a nerve conduit. A 20-mm sciatic nerve deficit was bridged by the PGA mesh tube containing DABLs and BMSCs with extratubular attachment of a vascular pedicle, and the resulting nerve regeneration was compared with that obtained through a 20-mm autologous nerve graft.
Results: About 70%–80% of nerve regeneration in 20-mm-long autologous nerve autografts was found in the new conduits.7
Discussion & Conclusions: Artificial nerve conduits should be capillary permeable, scar tissue preventive, biodegradable and soft and elastic. If capillary-permeable tubes are used, insertion of the vascular pedicle is not needed, if they are transplanted in well vascularized tissue. The PGA meshed tube is known that a molecule less than 600 KD can pass through the conduit wall. According to RECA-1 study, capillary invasion through the tube was confirmed.7 Histological analysis revealed that a remarkable scar tissue invasion into the tubular lumen was not found.7 A capillary-permeable tube has the possibility of leakage of fibrin matrix containing neurochemical factors, which must be formed in the initial process of nerve regeneration in tabulation8. DABLs were thought to work as a frame to maintain the fibrin matrix structure containing neurochemical factors and to anchor the transplanted stem cells within the tube.7 Comparison of nerve regeneration through a capillary permeable tube with a silicone tube, both of which contained DABLs seeded with BMSCs might have indicated the possibility of neurochemical factor leakage.

A-0122 OPERATIVE VERSUS NON-OPERATIVE TREATMENT OF CONCOMITANT ULNAR STYLOID PROCESS FRACTURES IN PATIENTS WITH DISTAL RADIUS FRACTURES – A SYSTEMATIC REVIEW AND META-ANALYSIS

Luke van Rossenberg[1,3], Bryan van de Wall[2], Mark van Heijl[3], Rolf Groenwold[4], Marijn Houwert[5], Frank Beeres[1,2]
[1]University of Lucerne, Lucerne, Switzerland; [2]Lucerne Cantonal Hospital, Lucerne, Switzerland; [3]The Diakonessenhuis Hospital, Utrecht, the Netherlands; [4]Leiden University Medical Center, Leiden, the Netherlands; [5]University Medical Center, Utrecht, the Netherlands

Introduction: Concomitant ulnar styloid process (USP) fractures are present in approximately 40-60% of distal radius fractures (DRF). Left untreated, USP non-union occurs in approximately 60% of cases and can cause ulnar sided wrist pain. However, most USP non-unions are ultimately asymptomatic. Currently no consensus has been reached whether to fixate USP fractures simultaneously with operatively managed distal radius fractures in adult patients.
Aim: This systematic review and meta-analysis aims to compare operative to non-operative treatment of concomitant ulnar styloid process fractures in adult patients with distal radius fractures regarding wrist function, union, gripstrength, pain scores and complications.
Material & Methods: Pubmed/Medline/Embase/CENTRAL databases were searched for eligible RCT's and comparative observational studies. Critical appraisal was performed with the NEXT-tool. Effect estimates were extracted and pooled analyses performed using random effect models to account for heterogeneity across studies. results were presented as (standardized) mean differences ((S)MD) or odds ratios (OR) and their corresponding 95% confidence intervals (95% CI).
Results: Two RCT's (161 patients) and two observational studies (112 patients) were included. Non-operatively treated patients had better wrist function at six months (SMD 0.57; 95%CI 0.3 – 0.9; I2=%), while operatively treated patients had higher rates of union (OR 0.06; 95%CI 0.03 – 0.15; I2=0%). Significantly more patients endured complications in the

operative group (73% vs 7%). Only two studies reported complications. No other significant differences were present regarding gripstrength (MD-0.28; 95%CI -0.6 – 0.06; I2=0%), pain scores (MD 0.72; 95%CI -0.76 – 2.2; I2=92%) and long term (>12 months) wrist function (MD 3.0; 95%CI -2.3 – 8.3; I2=94%).
Conclusions: Surgically fixating the ulnar styloid process results in a significantly higher union rate compared to conservative treatment, while conservative treatment results in better function at six months. However, no differences are present regarding wrist function, pain scores and grip strength longer than six months after injury. Satisfactory results can be achieved with either treatment strategy, although the greater risk of complications in the surgically treated group should be taken into consideration.

A-0124 A SINGLE CENTER, LONGITUDINAL COHORT ASSESSMENT OF A1 PULLEY RELEASE OUTCOMES IN PATIENTS WITH STENOSING FLEXOR TENOSYNOVITIS

Zhi Xuan Low, Camelia QY Tang, Mala Satkunanantham, Sreedharan Sechachalam
Department of Hand and Reconstructive Microsurgery, Tan Tock Seng Hospital, Singapore

Introduction: Stenosing tenosynovitis, also known as trigger finger, is a prevalent condition commonly treated by hand surgeons, especially in patients with metabolic syndrome. The modalities of treatment are conservative (hand therapy and lifestyle modification), corticosteroid injection and surgical release of the A1 pulley.
Aim: Our study aims to collect the outcomes of patients who underwent surgery to primarily study the time taken for return to normal activities without pain and discomfort, and for pain resolution. It also secondarily aims to investigate functional outcomes using objective measures such as grip strength and active range of motion
Material & Methods: Patients who underwent trigger release in a single center from June 2020 to July 2022 were prospectively enrolled into this longitudinal cohort study and followed up till they were fit for discharge or lost to follow-up. Data on their demographics, comorbidities, disease pattern and treatment history were recorded. Visual Analog Scale (VAS) score was used to assess pain level. Hand function was assessed using grip strength, active range of motion (AROM) and the quick Disabilities of the Arm, Shoulder and Hand (qDASH) outcome measure pre- and postoperatively. Patients were also interviewed on whether they have resumed their normal lifestyle at follow-up visits.
Results: 71 subjects were enrolled. Mean age was 64 years with a majority of 37 females (52%). The dominant (n = 43) and the right upper limb (n = 43) were more commonly affected (61%), of which 37 in the latter group (86%) were on the dominant side. The middle finger was most often treated (n = 42). 14 patients (20%) were treated for multiple trigger digits. 26 patients (37%) had received corticosteroid injection for the operated digit and 25 patients (35%) had previously undergone trigger release for other afflicted digit(s). Surgery was performed at an average of 13 months from diagnosis for trigger of Green's grade 3 severity (54%). 7 patients (10%) did not return after surgery. The mean follow-up duration of the remaining patients was 68 days. At the most recent assessment, all but 12 patients returned to normal activities, work, sport hobbies and lifestyle. The reason for this could be because 8 of the 12 patients (67%) did not return after their first postoperative review. After surgery, mean qDASH and VAS scores decreased from 24.1 to 15.8 and from 5.90 to 1.32 respectively. Postoperative AROM was satisfactory, averaging 86.6, 87.2 and 75.5 degrees in the metacarpophalangeal, proximal and distal interphalangeal joints respectively. Difference of grip strength between the affected limb and the contralateral side postoperatively averaged to 10kg and could be accounted for by the patients who had complications specifically finger stiffness (n = 3), finger numbness (n = 1) and persistent pain (n = 1).
Conclusions: Trigger release is overall a safe and effective procedure for helping patients with stenosing tenosynovitis reduce their pain and return to normal functional activities.

A-0125 PROPRIOCEPTIVE DEFICITS IN WRIST MOVEMENTS FOR MILD TO MODERATE CARPAL TUNNEL SYNDROME

Haktan Ayvaz[1], Çiğdem Ayhan Kuru[1], Seda Namaldı[1], İlhami Kuru[2]
[1]Hacettepe University, Faculty of Physiotherapy and Rehabilitation, Hand Rehabilitation Unit, Ankara, Turkey; [2]Başkent University, Department of Orthopedics and Traumatology, Ankara, Turkey

Introduction: The proprioceptive sense plays an important role in neuromuscular control of the wrist. Carpal tunnel syndrome (CTS) has been reported to impair proprioception during grasping and negatively affects fine motor skills required for pinching and grasping.
Aim: The primary aims of this study is to investigate wrist position sense in patients with CTS and to compare the proprioceptive deficit during wrist movements in mild to moderate CTS. Secondly, we investigated the relationship between proprioceptive deficit and function.
Material & Methods: Forty-eight patients (age, 47 (15) years) diagnosed with mild (n=24) or moderate (n=24) CTS on the basis of electrophysiological examination participated in the study. Patients with a history of trauma/surgery to the hand and wrist, double-crush syndromes, rheumatologic diseases, and patients who required regular use of analgesics were not included in the study. Wrist joint position sense (JPS) was assessed with a goniometric platform which has been found to be reliable method. Measurements were made using target angles during wrist flexion, extension, radial deviation, and ulnar deviation in a single session for the affected and unaffected sides. The absolute value of the difference between the patient's wrist position angle and the target angle was recorded as the "JPS error amount". Measurements were repeated three times and the mean value was calculated. Function was evaluated using Disabilities of Arm, Shoulder and Hand Questionnaire. Wilcoxon signed ranks test was used to compare affected and unaffected sides. Mann-Whitney U test was used to compare mild and moderate CTS. Spearman's correlation test was used the investigate the association between disability and proprioceptive deficit.
Results: Wrist position sense was decreased on the affected side compared to the unaffected side in wrist flexion ($p < 0.0001$), extension ($p < 0.0001$), ulnar deviation ($p < 0.0001$), and radial deviation ($p = 0.024$). The mean difference in proprioceptive deficit was 3.7° (1.8°) in extension, 1.9° (1.5°) in flexion, 1.8° (1.4°) in ulnar deviation and 1° (1.7°) in radial deviation. Patients with moderate CTS had more proprioceptive deficits in wrist extension ($p = 0.001$). There was no association between disability and proprioceptive deficit. disability and proprioceptive deficit.
Conclusions: The result of this study shows that wrist position sense is impaired in patients with mild to moderate CTS. To prevent incorrect mapping of proprioceptive information and cortical reorganization, incorporating conscious proprioceptive exercises into the early phase of CTS rehabilitation may provide additional benefit to neuromuscular control of the wrist. In addition, positional awareness exercises during wrist extension may be critical in patients with moderate CTS.

A-0126 ULTRASOUND-BASED MEASUREMENT OF DORSAL SCAPHOID DISPLACEMENT DURING WATSON TEST IN SCAPHOLUNATE LIGAMENT LESION

Nora Huber, Andreas Schweizer, Lisa Reissner
Balgrist University Hospital, Zürich, Switzerland

Introduction: Scapholunate ligament lesion is the most common ligament lesion in the wrist. Magnetic resonance imaging (MRI) with intraarticular contrast medium has a sensitivity to detect disruption of the ligament of 90%, however, it is not always wide available and has considerable costs.
Aim: The purpose of this study was to measure the sonographic dorsal scaphoid displacement during scaphoid shift test

(Watson test) in patients with scapholunate ligament lesion and to assess the reliability of the method.
Material & Methods: 20 patients with MRI and intraoperatively confirmed scapholunate ligament lesions were assessed preoperatively between July 2020 and April 2023. Sonography was performed in wrist neutral position and during Watson test and compared with the healthy contralateral side. The distance between the dorsal surface of the scaphoid and the dorsal surface of the lunate was measured by two independent investigators and one investigator repeated the measurements at another point in time to determine inter- and intrarater reliability.
Results: We found a statistically significant difference between the dorsal subluxation of the scaphoid of the healthy (0.89 mm, SD 0.67 mm) compared to the pathological side (1.67 mm, SD 0.95 mm). Intrarater as well as interrater reliability was very good (ICC>0.7 (CI 95%) and SEM was lower than 0.4mm for all measurements.
Conclusions: Sonographic measurement of dorsal scaphoid displacement during Watson test showed promising results with very good inter- and intrarater reliability and therefore is a good, inexpensive and wide available tool which can be routinely adopted for the detection of SL ligament lesions.

A-0127 PYROCARBON INTERPOSITION IN CMC-1 JOINT: OUTCOMES WITH A MINIMAL FOLLOW-UP OF 10 YEARS

Grégoire Chiarella[1], Ludovic Ardouin[2], Flore-Anne Lecoq[2], Clara Sos[2], Philippe Bellemere[2]
[1]CHU de Lille, France; [2]Institut de la Main Nantes Atlantique, Saint Herblain, France

Introduction: Treatment of CMC-1 osteoarthritis (OA) is widely debated. Beside classical trapeziectomy, CMC-1 arthroplasties with recent implants of total prosthesis or pyrocarbon interpositions are becoming more and more popular.
Pyrocardan® implant is a pyrocarbon interfacing interposition of CMC-1 joint used for treatment of OA with Eaton-Littler's stage 2 or 3.
Promising outcomes with this implant have been shown with no alteration of the clinical and radiological results between the short- and the medium-term follow-up period.
Aim: The aim of this retrospective study was to analyze the long-term outcomes with a minimal follow-up of 10 years.
Material & Methods: Between March 2009 and May 2013, in a single hand center, 199 implants were interposed in CMC-1 joint of 184 patients by six senior hand-surgeons.
Among them, 107 implants have been reviewed with a mean follow-up of 137 months (120 to 168 months).
The median age was 57 years. 16 patients (15%) were equal or less of 50 years-old.
Results: At the last follow-up, functional scores were significantly improved compared with preoperative data. Pain on VAS was 0.4/10 versus 7.2/10, PRWHE was 4/100 versus 61/100 and QuickDash was 9/100 versus 55/100.
Mobility and strength were symmetrical to the contralateral side.
Overall patient satisfaction was 99%.
The average time to return to work was 78 days, which is slightly less than three months. Radiographic analysis revealed no significant implant sinking compared with immediate postoperative views.
There were six re-operations, 5 of them during the short-term follow-up. Two interpositions were converted for total prosthesis and one for trapezectomy. Three patients required implant replacement because of an unsuitable initial size in two cases, and in one case because of implant fracture due to violent local trauma occurring after 3 years of follow-up.
The overall survival rate was 94.4%.
Conclusions: The Pyrocardan® interposition arthroplasty is therefore an entirely valid alternative to more invasive surgical treatments of CMC-1 OA such as trapeziectomy or total prosthesis.
Long term follow-up evaluation does not show deterioration of the outcomes with time.

A-0128 CUBITAL TUNNEL SYNDROME AND A SCHWANNOMA: A CASE REPORT AND LITERATURE REVIEW

Orlando Branco Simões[1], Luís Miragaia[1], Sebastião Serrasqueiro[2], Miguel Quesado[1], Rui Lemos[1]
[1]Centro Hospitalar de Vila Nova de Gaia/Espinho; [2]Centro Hospitalar Universitário de Coimbra

Introduction: Ulnar nerve schwannomas are rare benign tumors originating from Schwann cells. They often present as masses in the extremities, sometimes mimicking a cubital tunnel syndrome when they appear in the arm, and timely and accurate diagnosis is essential for planning optimal surgical intervention. We present the case of a 55-year-old woman with a longstanding mass of the ulnar nerve. This case study highlights the importance of precise preoperative diagnosis and the successful surgical removal of a schwannoma, resulting in complete symptom resolution.

Case Presentation: A 55-year-old woman noticed a gradually growing mass on her right arm for two years, accompanied by paresthesias in the fourth and fifth fingers. Ultrasonography revealed a 26x13x16mm heterogeneous nodule in the intermuscular septum region. Subsequent MRI confirmed the presence of a neurogenic tumor, with the two main diagnostic hypotheses being a neurofibroma or a schwannoma.

The patient underwent surgical resection of the mass. The tumor was carefully dissected from the ulnar nerve, and intraoperatively, it was noted that it was inside the ulnar nerve sheath, although not encasing the ulnar nerve. Surgical excision aimed to achieve complete removal of the tumor while preserving ulnar nerve function. The tumor was removed en bloc, ensuring the integrity of adjacent structures. Intraoperative nerve monitoring was used to safeguard ulnar nerve function throughout the procedure. Histology diagnosed the mass as a schwannoma. Two months post-surgery, the patient reported no residual symptoms, and clinical examination confirmed the absence of paresthesias in the fourth and fifth fingers.

Discussion: This case highlights the presence of a mass in the arm with concurring hand symptoms.

The tumor in this case mimics a cubital tunnel syndrome (CTS), although in the compression site of the nerve is proximal to the most common ones in CTS, this underscores the need to investigate for differential diagnosis when faced with this condition.

Although schwannomas and neurofibromas are often associated with systemic diseases, they can also be found in completely healthy individuals. This case also highlights the characteristics that often differentiate these tumors, being often described that their position relative to the affected nerve fiber is different from neurofibromas; they typically displace the nerve root, but do not envelope it, as seen in our case.

Conclusions: Ulnar nerve schwannomas are rare neoplasms that can present as intermuscular masses, often mimicking other neurogenic tumors. A precise preoperative diagnosis is crucial for planning the appropriate surgical intervention, which can lead to successful outcomes with complete symptom resolution. This case emphasizes the importance of considering schwannomas in the differential diagnosis of such cases and highlights the positive impact of timely and precise surgical management on patient outcomes.

A-0129 A BIBLIOMETRIC ANALYSIS OF REHABILITATION FOR FLEXOR TENDON INJURIES

Hasan Atacan Tonak
University of Health Sciences, Hamidiye Faculty of Health Sciences, Department of Occupational Therapy, Istanbul, Turkey

Introduction: Flexor tendon injuries are common and rehabilitation after injury and repair is a challenging process. An appropriate rehabilitation program should be applied at the appropriate stage of the healing process to protect the tendon, prevent adhesion formation, and maintain function. Surgical techniques and rehabilitation for flexor tendon injuries have

significantly advanced in recent decades. Rehabilitation protocols have become more comfortable for patients than in the past, allowing for better functional outcomes.
Aim: The aim of this study was to conduct a bibliometric analysis to describe the current state of research, development, and trends of rehabilitation of flexor tendon injuries.
Material & Methods: The Web of Science Core Collection database was used to obtain publications for bibliometric analysis. The search strategy was as follows: "flexor tendon" AND "rehabilitation" OR "flexor tendon" AND "therapy" OR "flexor tendon injury" AND "rehabilitation" OR "flexor tendon injury" AND "therapy" OR "flexor tendon repair" AND "rehabilitation" OR "flexor tendon repair" AND "therapy". Limitation by "topic" instead of "all fields" to focus the search. In addition, only research articles and reviews were included. VOSviewer package program was used for bibliometric analysis of publications, years, countries, authors, author collaboration networks, institutions, journals, citations, references, and keywords.
Results: Of the 792 published articles, 612 were included in the study. The year 2014 was the year with the highest number of publications (n=38). Amadio P.C. was the author who contributed the most to rehabilitation research for flexor tendon injuries (n=27). Among the countries with the highest number of publications, the United States of America ranked first with 229 publications, and the University of Washington produced the most publications on this topic with 29 publications. The Journal of Hand Surgery-American Volume (n=71) published the most articles on the subject. The most frequently cited article among rehabilitation studies in flexor tendon injuries was the study by Rees et al. (2006). The most frequently used keywords were flexor tendon, rehabilitation, tendon, flexor tendon repair, and tendon repair.
Conclusions: Rehabilitation of flexor tendon injuries is one of the most important research topics for professionals working in hand rehabilitation. The large number of research articles and reviews published on this topic shows that clinicians and researchers are interested in these studies. The literature on rehabilitation in flexor tendon injuries has increased linearly in recent years and is expected to continue to increase. This bibliometric analysis provides relevant information for researchers and evidence-based practitioners who are interested in the topic for the first time or are already working in this field. Over time, studies in this field will continue to be published; therefore, this bibliometric analysis needs to be updated periodically.

A-0130 THE EFFECT OF MIDCARPAL FUSIONS ON DART THROWER'S MOTION: A CADAVERIC STUDY

Alexandra Thompson[1], James Kennedy[1,2], Philippa Rust[1,2]
[1]The University of Edinburgh, Edinburgh, UK; [2]Hooper Hand Unit, St John's Hospital, Livingston, UK

Introduction: Midcarpal osteoarthritis that causes pain and loss of function can be managed with several different types of partial wrist fusion operation. Limited information is available regarding their effects on functional movement. Many daily activities require a coupled wrist movement, from radial extension to ulnar flexion, termed dart thrower's motion (DTM).
Aim: This study aimed to compare the effect of four different midcarpal fusions on DTM.
Material & Methods: Twelve fresh-frozen cadaveric specimens were dissected. A custom-made jig was used to measure the extent of DTM by sequential loading of tendons into radial extension and ulnar flexion. The arc of DTM was measured using a goniometer. Specimens were tested at baseline and following each fusion. Four different types of partial wrist fusion were performed on each specimen sequentially, using Kirschner wires: (1) scaphocapitate fusion, (2) lunocapitate fusion with scaphoid excision, (3) four-corner fusion with scaphoid excision, and (4) three-corner fusion with scaphoid and triquetral excision. Statistical analyses (one-way ANOVA and Tukey test) established the significance of differences in range of motion.
Results: Each procedure significantly decreased DTM compared with intact wrists. Scaphocapitate fusion resulted in the

smallest mean reduction in movement from 78° to 70° (p=0.0014). Four-corner fusion produced the greatest reduction in DTM from 78° to 63° (p<0.0001). The Tukey test, which accounted for multiple comparisons between fusions, revealed a significant difference in DTM between four-corner and scaphocapitate fusion (p=0.0338). There was no significant difference in the range of postoperative DTM between lunocapitate, three-corner, or four-corner fusions.
Conclusions: Our study showed that DTM, the most important functional movement of the wrist, was minimally affected by scaphocapitate fusion and maximally affected by four-corner fusion with scaphoid excision. A significant difference was seen between these two simulated operations. However, as a 44° to 87° range of DTM was maintained for four-corner fusion procedures, this is felt to be adequate for function. The results of this study could aid preoperative decision-making.

A-0131 THE RADIOGRAPHIC RISK FACTORS PREDICTING OCCURRENCE OF IDIOPATHIC CARPAL TUNNEL SYNDROME IN SIMPLE WRIST X-RAY

Beom Su Han, Ki Hong Kim, Kyu Jin Kim
Seoul Medical Center, Seoul, South Korea

Introduction: The causes of carpal tunnel syndrome are complex. However, little is known about the risk factors for carpal tunnel syndrome occurrence on simple radiographic images.
Aim: To determine the X-ray imaging factors that can predict idiopathic carpal tunnel syndrome occurrence, we compared a group diagnosed with idiopathic carpal tunnel syndrome who received carpal tunnel release with a control group that had no symptoms.
Material & Methods: Simple wrist X-ray findings of 75 patients diagnosed with idiopathic carpal tunnel syndrome and 87 patients selected for the control group were evaluated. All the carpal tunnel syndrome patients were diagnosed based on clinical symptoms and nerve conduction studies. Anteroposterior and lateral radiographs of the wrists were taken in all the groups. The radial inclination, volar tilt, ulnar variance, radiolunate angle, and lunate-to-axis-of-radius distance were measured. Data were measured using two independent raters. After calculating the average of each value, the two groups were statistically compared. Diagnostic performance of statistically different figures was confirmed by drawing receiver operator characteristic curves.
Results: There was a significant difference in the radiolunate angle and lunate-to-axis-of-radius distance between the two groups (p<0.01 and p=0.028, respectively). The odd ratios for each parameter were 1.052 and 1.319, respectively. Area under the receiver operator characteristic curve was 0.715 and 0.601, respectively.
Conclusions: In this study, radiolunate angle and lunate-to-axis-of-radius distance were useful as radiographic diagnostic tools. In other words, excessive dorsiflexion and volar displacement of the lunate can be considered as risk factors that may cause idiopathic carpal tunnel syndrome in the future.

A-0133 AUTOLOGOUS FREE TENDON GRAFT AND SYNTHETIC TAPE AUGMENTATION FOR CHRONIC SCAPHOLUNATE DISSOCIATION: MID-TERM CLINICAL EXPERIENCE AND RESULTS

Jeong-Han Lee, Il-Jung Park
The Catholic University of Korea, Seoul, South Korea

Introduction: Chronic scapholunate dissociation (SLD) is uncommon but treating chronic SLD can be challenging due to the poor quality of the surrounding tissues. Various surgical techniques have been developed to address this issue, but debates regarding the optimal approach continue.

Aim: This study aimed to report our mid-term clinical and radiological outcomes following the reconstruction with autologous tendon graft and synthetic tape augmentation for treating patients with chronic SLD.
Material & Methods: We reviewed nine patients with chronic SLD who underwent reconstruction using a combination of the free autologous palmaris longus tendon and synthetic tape. The study included patients with a follow-up period of more than one year. The radiological outcomes were evaluated by scapholunate gap (SL gap), SL angle (SLA), radiolunate angle (RLA), and dorsal scaphoid translation (DST). Clinical outcomes were assessed using the Mayo wrist score for evaluating function and the Visual Analog Scale (VAS) for measuring pain.
Results: In this study, all cases were male, with the average age was 49 years (range, 30-62 years), and they were classified as Garcia-Elias stage 4. The preoperative mean SL gap, SLA, RLA, and DST were 5.4 mm, 76.4°, 21.0°, and 2.6 mm, respectively. The mean immediate postoperative and final follow-up measurements for SL gap, SLA, RLA, and DST were 2.1 mm and 2.4 mm, 48.3° and 55.6°, 2.3° and 3.9°, and 0.6 mm and 0.9 mm, respectively. After surgery, there was a significant improvement in all radiological measurements and these improvements were sustained one year after the surgery. The mean preoperative and final follow-up Mayo Wrist Score and VAS were 51.1 and 88.3 and 7.0 and 1.7, respectively.
Conclusions: This suggests that a reconstruction using the autologous tendon graft in combination with synthetic tape augmentation could be considered a feasible and uncomplicated technique for addressing irreparable chronic SLD.

A-0135 THE ACCURACY OF SOONG GRADING IN VOLAR PLATE FIXATION OF DISTAL RADIUS FRACTURES

Benjamin James Fox, Russell Jones, Zubair Saeed, Thomas Yeoman, Sunil Auplish
York Teaching Hospital, York, UK

Introduction: Volar locking plate fixation is the most common surgical treatment option in displaced distal radius fractures (Wilson et al., 2018). The Soong classification is a grading based on the plate's location to the watershed line of the volar distal radius, allowing for correlation of plate placement with risk of tendon irritation/rupture (Soong et al., 2011).
Aim: No study to date has assessed interobserver reliability of Soong Grade 0,1 and 2 volar plate fixation for distal radius fractures using post-operative radiographs, and subsequently compared these to medium and long-term predictors of morbidity.
Material & Methods: 3 observers, one ST8 Orthopaedic trainee and two experienced Orthopaedic consultants, compared post-operative radiographs from patients who underwent volar plate fixation at York and Scarborough Hospital between the years 2015-2021. Inclusion criteria were all adults aged 18+, available antero-posterior and true lateral radiographs of the distal radius, >1 year post-fixation, and isolated distal radius fracture. When performing the interobserver agreement, each observer was blinded to identifiable patient details, and the order of patient radiographs was randomised for each individual.
Results: Of the 211 patients collated from historical data, 170 met the inclusion criteria. The mean time to follow-up was 2 years. A kappa agreement of 0.6 concluded that there was only moderate interobserver agreement on Soong grading. 29.4% of Soong gradings were consistent across all 3 observers. Subgroup analysis of these patients revealed greater pain and tendinopathy in patients with Soong gradings of 1 or 2, compared to 0 ($p=<0.01$).
Conclusions: This study shows that only moderate agreement is reached between Soong grading amongst senior clinicians. However, when consistency on grading is reached, higher grading corresponds to increased pain/tendinopathy. A more consistent grading system or modification to Soong grading, perhaps based on ultrasound measurements rather than radiographs, may benefit post-operative predictions of morbidity in this patient group.

A-0136 EFFORTS TO INTERVENE IN THE TREATMENT OF OSTEOPOROSIS IN PATIENTS AFTER DISTAL RADIUS FRACTURE

Mika Akahane[1], Kaoru Tada[1],Kazuko Okada[-2], Naoki Osamura[-3], Keito Shimanuki[-4], Yuta Nakamura[1], Soichiro Honda[1], Akari Mori[1], Satoru Demura[1]

[1]Department of Orthopaedic Surgery, Graduate School of Medical Sciences, Kanazawa University; [2]Department of Orthopedic Surgery, Matto Ishikawa Central Hospital; [3]Department of Orthopaedic Surgery, Kanazawa Medical Center; [4]Department of Orthopaedic Surgery, Ishikawa Central Hospital

Introduction: We have previously evaluated the status of therapeutic intervention for osteoporosis in patients after distal radius fracture. Our results showed that a high percentage of patients had osteoporosis after distal radius fracture, but both the rates of bone mineral density examination and therapeutic interventions for osteoporosis were low. Therefore, we developed a treatment protocol and conducted a multicenter prospective study in order to establish a practice system that can appropriately intervene in the treatment for osteoporosis.

Aim: We present the short-term results of conducted a multicenter prospective study.

Material & Methods: We included participants aged 50 years or older with distal radius fracture who visited our hospital and three affiliated hospitals, and excluded cases of high-energy trauma and pathological fracture. At the time of visit, patients were evaluated for bone mineral density, spine radiographs, history of fragility fractures, and treatment for osteoporosis. Treatment intervention was performed according to a protocol in which patients with bone mineral density less than 80% of the young adult mean or with a history of fracture in the spine or proximal femur were started on pharmacological treatment for osteoporosis.

Results: Ninety-one patients (6 males and 85 females) were registered in this study from October 2021 to May 2023. The mean age was 71.0 years, and 19 cases were treated conservatively while 72 cases underwent surgery. History of fragility fractures included spine fracture in six cases, distal radius fracture in six cases, and proximal femur fracture in four cases. The rate of bone mineral density examination was 100%, and the prevalence of osteoporosis was 85%. The rate of osteoporosis treatment for osteoporotic patients was 92%, with 53 patients who were introduced with medications for the first time, six patients changing medications from before the injury, and 12 patients continuing medications from before the injury.

Conclusion: Developing the treatment protocol and conducting a multicenter prospective study improved the rate of bone mineral density examination and treatment of osteoporosis in patients after distal radius fracture.

A-0137 SEASONAL VARIATION OF DISTAL RADIUS FRACTURE IN JAPAN USING INPATIENT DATABASE

Mika Akahane, Kaoru Tada, Yuta Nakamura, Soichiro Honda, Akari Mori, Satoru Demura

Department of Orthopaedic Surgery, Graduate School of Medical Sciences, Kanazawa University, Japan

Introduction: Distal radius fractures occur in humans across a wide range of age groups, from young to elderly, and it has been reported that climate, sports, and osteoporosis influence their occurrence. However, there are few epidemiological studies on distal radius fractures in Japan, and the actual situation has not been clarified.

Aim: The purpose of this study was to clarify the relationship between seasonal variation and distal radius fractures using diagnosis procedure combination data in Japan.

Material & Methods: The participants were hospitalized patients who underwent surgical treatment for distal radius fracture as the primary injury at hospitals that introduced the diagnosis procedure combination system between April 2011 and March 2016. We obtained a summary table of the month of admission, region of residence, age at admission, and sex of the patients from the Ministry of Health, Labour and Welfare and evaluated it by month, region, age group, and sex.

Results: The total number of patients for the 5 years from 2011 to 2016 was 105,025. There were 29,224 male and 75,801 female participants, with a female-to-male ratio of 2.6. The mean age was 60.2 (standard deviation, 20.8) years. Distal radius fractures occurred more frequently in the winter, especially among female individuals in eastern Japan. Female participants aged ≥50 years tended to have a higher incidence of distal radius fracture in winter. The incidence of distal radius fracture among male participants aged 0–19 years was higher from spring to autumn.
Conclusions: Surgically treated distal radius fractures occur more frequently during the winter months than the other seasons, among female individuals in eastern Japan or those aged ≥50 years and increase from school age to adolescence, especially in male individuals from spring to autumn. To prevent distal radius fractures, we should be aware of the high incidence of distal radius fractures in winter, especially in regions with snowfall and cold temperatures.

A-0138 DAY-TO-DAY PATIENT REPORTED PAIN AND USE OF ANALGESICS AFTER DISTAL RADIUS FRACTURE- A PROSPECTIVE PARALLEL GROUP STUDY

Joakim Strömberg[1,2], Elisabet Hagren[4], Eva Andersson[3], Ingrid Andreasson[1,5]
[1]University of Gothenburg, Sahlgrenska Academy, Department of Clinical Sciences, Gothenburg, Sweden; [2]Department of Surgery and Orthopaedics, Alingsås lasarett, Alingsås, Sweden; [3]Department of Occupational Therapy, Alingsås lasarett, Alingsås, Sweden; [4]Department of Occupational Therapy, Kungälvs sjukhus, Kungälv, Sweden; [5]Department of Occupational Therapy, Sahlgrenska University Hospital, Mölndal, Sweden

Introduction: Fracture of the distal radius is common, but the evidence regarding the patient experienced pain and the use of analgesics during the first three months is scarce.
Aim: The objective of this study was to describe and compare day-to-day patient reported pain and use of analgesics between non-operated and surgically treated patients with distal radius fracture.
Material & Methods: This is a prospective parallel group study with day-by-day patient reported pain (as recorded by Visual Analogue Scale) and day-to-day detailed record of the analgesics used during the first three months (91 days) after fracture of the distal radius. Fifty-six patients were enrolled and fifty completed the forms: twenty-five (20 women, 5 men with a mean age of 60 years) who received non-operative treatment with a cast for four weeks and twenty-five (19 women, 6 men with a mean age of 59 years) who underwent open reduction and internal fixation (ORIF) with plates. Patients in both groups were included between January and March 2023. Day one was defined as the day of the injury in the nonoperative group and the day after surgery in the ORIF group.
Results: There were no significant differences in day-to-day pain scores between the groups at any time, but patients in the ORIF group reported slightly higher pain throughout the study period. The mean pain score day one was 5.6/10 in the non-operated group and 6.2/10 in the ORIF group. At 30 days, 16 patients were pain free (9 in the non-operated group and 7 in the ORIF group), at 60 days 27 patients (15 in the non-operated group and 12 in the ORIF group) and at 90 days 33 (17 in the non-operated group and 16 in the ORIF group), respectively. Patients in the ORIF group used Paracetamol significantly longer, with a mean number of days until the last dose of 27 compared to 18 in the non-operated group. However, the weekly doses of Paracetamol were only significantly higher in the ORIF group during the first three weeks (mean total dose per week: 15.7 vs 6.7 g, 8.5 vs 4 g and 4.3 vs 2.6). For Oxycodone, the mean number of days until the last dose was 1.3 in the non-operated group compared to 6.2 in the ORIF group, and only 3 patients in the ORIF group used Oxycodone at three weeks compared to none in the non-operated group.
Conclusions: The preliminary results of this study could not detect any significant difference in patient reported pain between the two groups, a finding which might be attributed to the significantly higher doses of and longer treatment

period of Paracetamol in the ORIF group. Oxycodone was rarely used beyond the first week in either group. This study provides novel detailed information on pain and use of analgesics in patients with this common fracture.

A-0139 PALMAR 8 METACARPOPHALANGEAL TENODESIS FOR CORRECTION OF CLAW HAND DEFORMITIES TENODÈSE PALMAIRE EN 8 DE LA MÉTACARPO-PHALANGIENNE POUR CORRECTION DES DÉFORMATIONS EN GRIFFE

Philippe Bellemère, Thomas Druart
Polyclinique de l'atlantique, Saint-Herblain, France

Introduction: There are currently numerous techniques aimed at correcting claw deformities. All of these techniques require either an articular approach or the sacrifice of a tendon element, and therefore present risks of stiffness and postoperative loss of strength.
Aim: We present a new surgical technique which is an extra-articular and extra-tendinous procedure, consisting of a GoreTex CV/0 tenodesis.
Material & Methods: Our technique is indicated for claw hand deformities reducible by the Bouvier maneuver. On the other hand, we do not consider this technique to be suitable for spastic hands. The realization is simple, as are the resulting postoperative cares.
The assembly is placed in an eight-crossed configuration at the level of the metacarpophalangeal joint, in front of the flexor apparatus, to correct hyperextension.
We present here some cases for which the indications were varied: polyneuroneuritis, ulnar post-traumatic injury, old plexus injury, sequel of cervical osteoarthritis. We have used this technique since 2016 on leprous hands in a precarious environment, and on 4 patients in our center.
Results: The results are satisfactory after more than 2 years, allowing each patient to regain a palmo-digital grip.
Conclusions: This original technique appears us to be a valid alternative to more conventional techniques for treating soft claw deformities of the MCP joints.

A-0140 OUR EXPERIENCE WITH SIGNIFICANT COMPLICATIONS WITH TOTAL TRAPEZIOMETACARPAL PROSTHESIS AFTER 15 YEARS

Higinio Ayala, Manuel R. Sanchez, Fernando J. Del Canto, Jose Couceiro, David Santos
Hospital Universitario Marques de Valdecilla

Introduction: The treatment of rhizarthrosis using trapeziometacarpal prostheses (TMP) is increasing. Complications may lead to loss of the implant and result in salvage surgery. We aimed to assess significant complications using some PTM models and their rescue.
Aim: To identify and prevent any significant complications with trapeziometacarpal prosthesis.
Material and Method: Retrospective study on TMP implanted between 2006 and 2021. Models studied: Arpe®, Elektra®, Ivory®, Maïa®, Isis®, Touch®. Demographic data were assessed on implant placement by radiographic study, technical data, complications, salvage surgeries and final survival.
Results: Review of 224 MTP, 45 Arpe® with 95.5% survival rate follow-up (R) 6-16 years, 5 Elektra® 80% survival, R 13-14, 14 Ivory® 92.8% survival R 9-11, 7 Maïa® 100% survival R 8-9, 115 Isis® 99.1% survival R 1-8, 38 Touch® 100% survival R 1-4. The medial angle of the dome with the proximal articular surface of the trapezium (PAST) in the lateral plane was:

Arpe®: 8.85°, Elektra®: not assessable, Ivory®: 6.6°, Maïa®: 14.4°, Isis®: 3.8°, Touch®: 5.95°. The Isis® was placed 100% with scopic guidance, presenting a significantly lower angle than PAST. As main complications, we observed 3.5% of dislocations and 4% of mobilisations, with the Elektra® being responsible for 47% of these. Nineteen salvage surgeries were performed, with 3% of the implants lost.
Conclusions: Dislocation and mobilisation are the most observed complications; the Elektra® was responsible for almost half of them. Correct placement and implant design appears crucial to avoid them in the short and long term.

A-0141 SURGICAL OUTCOMES OF SEGMENTAL DIAPHYSEAL FOREARM FRACTURES IN ADULTS: A SMALL CASE SERIES ON PLATE OSTEOSYNTHESIS, INTRAMEDULLARY NAILING, AND OTHER SURGICAL METHODS

Dong Hee Kim[1], Hyo Seok Jang[2], Sang Ho Kwak[3], Sung Yoon Jung[4], Jong Min Jeon[1], Tae Young Ahn[5], Sang Hyun Lee[5], Hyun-Joo Lee[6]
[1]Departments of Orthopedic Surgery, Samsung Changwon Hospital, Sungkyunkwan University School of Medicine, South Korea; [2]Department of Orthopedic Surgery, Inje University Haeundae Paik Hospital, Inje University College of Medicine, South Korea; [3]Department of Orthopedic Surgery, SNU Seoul Hospital, South Korea; [4]Department of Orthopedic Surgery, College of Medicine, Dong-A University Hospital, South Korea; [5]Department of Orthopedic Surgery, Medical Research Institute, Pusan National University Hospital, Pusan National University School of Medicine, South Korea; [6]Department of Orthopedic Surgery, Kyungpook National University Hospital, University College of Medicine, South Korea

Introduction: Segmental fractures often result from high-energy or indirect trauma that causes bending or torsional forces with axial loading.
Aim: We evaluated surgical outcomes of patients with forearm segmental diaphyseal fractures
Material & Methods: We retrospectively analyzed data from patients with forearm segmental fractures for which they underwent surgery at the Pusan National University Trauma Center from March 2013 to March 2022. We also analyzed accompanying injuries, injury severity score (ISS), injury mechanism, occurrence of open fracture, surgical technique, and treatment results.
Results: Fifteen patients were identified, one with bilateral segmental diaphyseal forearm bone fracture, for a total of 16 cases. Nine of the patients were male. The overall mean age was 50 years, and the mean follow-up period was 16.2 months. Six cases who underwent surgery using plate osteosynthesis achieved bone union without length deformity at final follow-up. Three of seven patients who underwent intramedullary nailing alone underwent reoperation due to nonunion. Six cases achieved bone union at final follow-up, three of which showed length deformity. Three patients underwent surgery using a hybrid method of IM nailing, plates, and mini cables. One patient who underwent surgery with a plate and one patient who underwent surgery with IM nailing alone showed nonunion and were lost to follow-up.
Conclusions: Plate osteosynthesis is considered the gold standard for treatment of adult forearm diaphyseal segmental fractures. In this study, IM nailing was associated with high rates of non-union and length deformity. However, the combination of IM nailing and a plate-cable system may be an acceptable alternative in segmental diaphyseal forearm fracture, achieving a union rate similar to that provided by plate fixation.

A-0142 HOW CAN WE REDUCE THE ISCHEMIC TIME FOR FOREARM REPLANTATION? USE OF A 2-STAGE BONE-FIXATION TECHNIQUE

Dong Hee Kim[1], Hyo Seok Jang[2], Sang Ho Kwak[3], Sung Yoon Jung[4], Sang Hyun Lee[5]
[1]I Sungkyunkwan University School of Medicine, Changwon, South Korea; [2]Department of Orthopaedic Surgery, Inje University Haeundae Paik Hospital, Inje University College of Medicine, Busan, South Korea; [3]Department of Orthopaedic Surgery, SNU Seoul Hospital, Seoul, South Korea; [4]Department of Orthopaedic Surgery, College of Medicine, Dong-A University Hospital, Busan, South Korea; [5]Department of Orthopaedic Surgery, Medical Research Institute, Pusan National University Hospital, Pusan National University School, of Medicine, Busan, South Korea

Introduction: Ischemic time is a key factor in satisfactory functional results after forearm replantation.
Aim: In this study, we provide a detailed description of our surgical technique, the temporary screw plate fixation technique, which aimsto reduce ischemic time.
Material & Methods: From June 2007 to June 2017, we performed a retrospective study of 20 patients who underwent forearm replantation. Eighteen cases involved male patients, and their mean age was 46 years. The mechanism of injury was roller injuries in 5 cases, power saw injuries in 3 cases, traffic accident in 7 cases, rope injuries in 2 cases, machinery injuries in 2 cases, and crushing injuries by rebar beam in 1 case.
Results: A total of 20 replantation patients survived. According to injury level, there were 3 cases of the proximal type, 11 cases of the middle type, and 6 cases of the distal type. The average time to revascularization was 331 min. The total operation time was, on average, 5.73 h. In the rest of the 18 cases, the temporary screw plate fixation technique was performed, and the average time required for bone shortening and plate fixation was 38.3 min.
Conclusions: To reduce ischemic time, we need a plan that progressively reduces time at each stage. Among our tips, temporary screw plate fixation can reduce the initial bone surgical operation to < 40 min, does not have many complications,and can be used as definitive surgery. This method for bone fixation should be considered as a strategy to actively reduce operation time during forearm replantation.

A-0143 EMERGENCY REPAIR OF CRUSH INJURY TO FOREARMS WITH TRANSPLANTATION OF CHIMERA OF THE SUPERFICIAL TO VASTUS LATERALIS MUSCLE

Xiaoju Zheng
Hand and Microsurgery department of Xi'an Fengcheng Hospital, Xi'an, China

Introduction: Emergency Repair of Crush Injury to Forearms with Transplantation of Chimera of the Superficial to Vastus Lateralis Muscle
Aim: To investigate the feasibility and results of performing transplantation of chimera of the superficial to vastus lateralis muscle to repair severe crush injury to forearms
Material & Methods: Emergency primary repair of severely injured forearms caused by crush in 30 cases.Bilateral or unilateral comminuted fractures of the ulnar radius, skin defects, or combined injuries of blood vessels, bone and muscle tissues were found in all of them. The skin defect area ranged from 5cm×5cm to 32cm×23 cm; the muscle defect was seen in 15 cases; the bone defect was found in 9 cases.The chimeric flaps of the anterolateral thigh were used in 27 cases, including 3 cases in which double chimeric flaps were used. Wound covering, muscle tamponade, reconstruction of muscle dynamics and bone repair were performed. The flap area was 11cm×5cm to 21cm×19cm, and the muscle volume was 8cm×4cm×1cm to20cm×13cm×1cm. Patients came to the hospital every 3 months after surgery for reexamination,for how well the flaps looked, bone healed and the functions of forearms and hands restored.

Results: The forearms of 28 cases were treated, and the limb salvage rate was 93.33%. The average number of operations was 2.6.The infection rate was 6.67%. It took an average of 6.7 months for the bone to heal. According to the Andsion score, the rate of excellent and good outcomes of surgery was 71.4%.
Conclusions: The limb salvage rate was high when the transplantation of chimera of the superficial to vastus lateralis muscle was used to repair the combined injuries of forearms caused by the severe crush.

A-0144 THE RADIAL COLLATERAL ARTERY PERFORATOR BRANCH LEAVES FLAP TO REPAIR THE MULTIPLE WOUNDS OF THE HAND

Wei Wei Zhang
Department of Hand and Podiatric Microsurgery, Huludao, China

Introduction:The radial collateral artery perforator branch leaves flap to repair the multiple wounds of the hand
Aim: To discuss the treatment effect of radial collateral artery perforator branch leaves flap in repairing multiple wounds of hand
Material & Methods: The radial collateral artery perforator branch leaves flap was used to repair ll cases of multiple skin defects in hand.There were 3 parts of skin defect in 2 cases.2 parts of skin defect in 9 cases.Defect area: 2cm×2cm to 6cm× 7cm.The 2 to 3 leaves flaps pedicled with the posterior branch of the radial collateral artery were used for repairing. Two cases of bilateral proper digital artery rupture and defect in palmar side , and the terminal branch of the radial collateral artery perforator branch was bridged anastomosis with the distal of the proper digital artery in palmar side to reconstruct the blood supply of the distal finger
Results: In this group, 1 leaf of the 3 leaves flap was necrosis the rest of the flaps survived completely.They were followed up from 10 to 36 months after operation, and the flaps had good appearance and elasticity.Six months after the operation, 3 cases of the flaps recovered to S2, 3 cases to S3, and 2 cases to S4.There were 5 cases of hypoesthesia in the posterior forearm and 4 cases recovered after 6 months.1 case remain unrecovered
Conclusions: The lateral arm free leaves flap can repair multiple skin defects of hand at one time.The main blood vessels in the donor area are not sacrificed and sensation can be restored.

A-0145 ENHANCING CARPAL TUNNEL SYNDROME SCREENING WITH A SMARTPHONE APPLICATION: A NOVEL DIAGNOSTIC APPROACH

Koji Fujita[1], Takuro Waatanabe[2], Takafumi Koyama[1], Takuya Ibara[1], Eriku Yamada[1], Yuta Sugiura[2]
[1]Tokyo Medical and Dental University, Tokyo, Japan; [2]Keio University, Kanagawa, Japan

Introduction: Carpal tunnel syndrome (CTS) presents as compression of the median nerve within the carpal tunnel, manifesting symptoms that can compromise hand functionality. Conventional diagnostic practices, such as physical assessments and nerve conduction studies, confront issues regarding precision in diagnosis and the availability of requisite apparatus.
Aim: This study aims to develop and assess a smartphone app that employs a pioneering screening methodology for CTS. This method surmounts the constraints associated with traditional diagnostic techniques and enhances the accessibility of screening tools.
Material & Methods: A total of 36 subjects were enrolled, encompassing 36 hands affected by CTS and 27 unaffected hands.

Participants utilised the app to navigate a character through thumb movements. Thumb positioning and temporal data were amassed to create and validate a model for classifying CTS using autoencoders and anomaly detection, subsequently calculating the sensitivity, specificity, and area under the curve (AUC).
Results: The app successfully distinguished between hands with and without CTS, achieving a sensitivity of 94%, specificity of 67%, and an AUC of 0.86. Models focusing on the thumb opposition direction were particularly effective, with the highest AUC at 0.99, along with 92% sensitivity and 100% specificity.
Conclusions: The app has shown considerable efficacy as a screening instrument for CTS, offering both high sensitivity and specificity. It marks a notable improvement in the ease of access to CTS screening and holds promise for further refinement through anomaly detection algorithm enhancements.

A-0146 BIZARRE PAROSTEAL OSTEOCHONDROMATOUS PROLIFERATION (NORA'S LESION) AFFECTING THE CARPAL BONES OF WRIST: A RARE CASE REPORT

Samir Dwidmuthe[1], Vivek Tiwari[2], Mainak Roy[1], Suhas Aradhya BM[1], Sachin Chaudhary[3]
[1]Department of Orthopaedics, AIIMS Nagpur, Nagpur, India; [2]Department of Orthopaedics and Joint Replacement, Apollo Sage Hospital, Bhopal, India; [3]Department of Pathology, AIIMS Nagpur, Nagpur, India

Background: Bizarre parosteal osteochondromatous proliferation (BPOP), often referred to as "Nora's lesion," is an uncommon condition primarily found in the small bones of the hands and feet, manifesting as a parosteal mass. Instances of BPOP in long bones are exceedingly rare. Although BPOP is a benign condition that does not progress to malignancy, it is associated with a high recurrence rate after surgical removal. Due to its unusual imaging characteristics and histological features, it can be mistaken for malignant tumors such as osteochondromas with malignant transformation, parosteal osteosarcomas, or periosteal osteosarcomas.
Case presentation: We present the case of a 45-year-old woman who initially complained of left wrist pain and swelling since 2 years. Plain X-rays revealed abnormal bony mass the carpal bones. As her wrist pain worsened, accompanied by limited wrist extension, further evaluation was conducted using computed tomography and magnetic resonance imaging. Preoperative imaging studies led to the diagnosis of BPOP, and surgical excision of the lesion, coupled with cortical bone decortication, was performed to minimize the risk of recurrence. The pathological examination confirmed the diagnosis of BPOP. Two years post-surgery, the patient remains free from pain and has experienced an improved range of motion.
Conclusion: BPOP affecting the carpal bones of wrist are exceptionally rare occurrence. In our patient, the diagnosis of BPOP was primarily established through preoperative imaging findings, which guided the decision to perform cortical bone decortication to reduce the likelihood of recurrence. Ongoing vigilant monitoring of these patients is crucial, even in the absence of lesion recurrence.

A-0147 FUNCTIONAL OUTCOME IN CASE OF SURGICALLY AND CONSERVATIVELY TREATED BILATERAL DISTAL END RADIUS AND SCAPHOID FRACTURE: A RARE CASE REPORT

Samir Dwidmuthe, Amey S Sadar, Mainak Roy, Suhas Aradhya BM, Deepanjan Das
Department of Orthopaedics, AIIMS Nagpur, Nagpur, India

Introduction: Bilateral fractures of the distal radius and scaphoid are extremely rare injuries. Proper preoperative evaluation is must to know orientation of fracture. Treatment must be based on displacement of the fracture. If the fracture is displaced, rigid internal fixation is must and if the fracture is stable with minimal or null displacement, we can conserve such fractures.

Case presentation: A patient with displaced distal radius fractures and displaced scaphoid fracture on one side, along with displaced distal end radius fracture and undisplaced scaphoid fracture on the other side, was treated via internal fixation of the scaphoid fractures with Herbert screws and internal fixation of the distal radius fractures with locked volar plating on right side and below elbow cast in cup holding position on left side which was non dominant
Conclusion: the approach to treating fractures hinges on several factors: the specific location and alignment of the fracture, the patient's individual characteristics, and the surgeon's expertise. For fractures in the distal radius and scaphoid, employing a rigid internal fixation method allows for the early initiation of active wrist rehabilitation, eliminating the necessity for wrist immobilization using a plaster cast or external skeletal fixation.
On the other hand, a conservative treatment approach involving a below-elbow cast offers certain advantages, such as minimal blood loss and fewer complications related to wound healing, particularly for undisplaced fractures, especially when they occur in the non-dominant hand.

A-0148 HUGE TENDON SHEATH GIANT CELL TUMOUR OF INDEX FINGER- A RARE CASE REPORT

Vivek Tiwari[1], Mainak Roy[2], Samir Dwidmuthe[2], Suhas Aradhya Bhikshavarthi Math[2]
[1]Department of Orthopaedics and Joint Replacement, Apollo Sage Hospital, Bhopal, India; [2]Department of Orthopaedics, AIIMS Nagpur, Nagpur, India

Giant cell tumour of the tendon sheath (GCTTS) is a rare and benign soft tissue tumour. It typically occurs more frequently in the hand than in the ankle or foot and is characterized by painless, palpable swelling. The definitive diagnosis is usually made through histopathology following surgical removal, although pre-operative imaging and fine-needle aspiration cytology (FNAC) can help confirm its presence. This case report describes a 44-year-old male with a GCT of the flexor tendon sheath of his right index finger, an unusual occurrence. The patient had been experiencing a painless, gradually enlarging swelling on the palmar side of his right index finger for the past 1 year. Physical examination revealed approximately 3 cm firm swelling extending from tip to middle phalanx of the finger. X-ray results showed a localized soft tissue shadow without any bone involvement, and ultrasound confirmed the presence of a soft tissue mass. FNAC analysis indicated that the swelling was consistent with GCTTS, and an excisional biopsy was performed, confirming the diagnosis through histopathology. It's important for healthcare professionals to consider GCTTS as a potential diagnosis when encountering soft tissue tumours in the hand, particularly in adult patients. FNAC followed by surgical excision is not only diagnostic but also curative. However, it's crucial to follow up with patients to monitor for recurrences and ensure appropriate management if they occur.

A-0149 THE SAFETY AND COST OF REPEATED CORTICOSTEROID INJECTIONS FOR CARPAL TUNNEL SYNDROME

Tal frenkel Rutenberg[1,2], Nico Fang[1], Ran Rutenberg[2], Salman Shiraz[1], Elkin Leon Galvis[1]
[1]Christine M. Kleinert Institute for Hand & Microsurgery, Louisville, KY, USA; [2]Rabin Medical Center, Beilinson Hospital, affiliated to the Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

Introduction: Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the upper extremity. Treatment includes splinting, local steroid injections (LSI) and surgical release of the transverse carpal ligament (CTR).
Aim: To evaluated the safety and cost of repeated LSI for carpal tunnel syndrome, as a single treatment and prior to CTR
Material & Methods: Medical records of patients who received LSI between 2016-2017 were retrospectively reviewed for

5 years. The number of LSI, the reason for surgery and complications were collected. A regression analysis was performed for predictors of carpal tunnel release (CTR). The costs of the treatment modalities were calculated.
Results: Two-hundred-and-twenty-one patients were included. The mean number of LSI administered was 2.3 (SD2.3, 1-26). Two patients reported severe pain following their first LSI. 30.3% of wrists proceeded with CTR. No intraoperative complications were noted. Patients who underwent CTR had a longer duration of symptoms and a higher percentage of thenar atrophy. Only the acquisition of NCS were significant predictors for CTR. Persistent and worsening symptoms were the main reasons for surgery. Cost analysis revealed that performing four LSI before surgery, reduced cost.
Conclusions: Repeated LSI were found to be a safe modality in the treatment of CTS and did not affect morbidity of future CTR. Performing up-to four LSI before CTR reduced overall cost.

A-0151 A SYSTEMATIC CRITICAL APPRAISAL OF CLINICAL PRACTICE GUIDELINES FOR NON-PHARMACOLOGICAL CONSERVATIVE MANAGEMENT OF COMPLEX REGIONAL PAIN SYNDROME (CRPS) USING THE AGREE-II INSTRUMENT

Erfan Shafiee[1,2], Joy MacDermid[1], Tara Packham[3], David Walton[1], Ruby Grewal[1], Maryam Farzad[1]
[1]University of Western Ontario, London, Ontario, Canada; [2]Queen's University, Kingston, Ontario, Canada; [3]McMaster University, Hamilton, Ontario, Canada

Introduction: Complex regional pain syndrome (CRPS) is a rare debilitating neurological condition. Rehabilitation interventions have long been the frontline treatment for the management of CRPS. Several clinical practice guidelines (CPGs) have been developed for this condition.
Aim: In this study, we focused on the recommendations of CPGs for non-pharmacological conservative management of CRPS. The aim of our study was to identify, summarize, and appraise CPGs for non-pharmacological conservative management of CRPS and to describe the recommended practice in the management of CRPS.
Material & Methods: We systematically searched EMBASE, MEDLINE, Google Scholar, PEDro, and Cochrane electronic databases, from inception to January 2023 to include CPGs that focused on non-pharmacological conservative management of CRPS. We used the Appraisal of Guidelines for Research and Evaluation (AGREE)-II to evaluate the quality of the CPGs. Recommendations, core concepts, aims, and treatment algorithms of the CPGs were presented in a narrative format, thematic analysis, and matrixes to summarize, categorize, and compare the findings of the guidelines.
Results: A total of nine CPGs were included in our systematic review, of which three were updates of the previous versions. Two CPGs were rated as high-quality, two as moderate-quality, and two as low-quality. The most common interventions recommended by CPGs were pain management (100% of the CPGs) followed by functional restoration (83%), stress-loading (67%), psychotherapy (67%), edema management (67%), gentle active movements (67%), vocational rehabilitation (67%), normal functional activities (67%), general PT interventions (67%), and isometric-isotonic strengthening (67%). A total of nine CPGs were included in our systematic review, of which three were updates of the previous versions. Two CPGs were rated as high-quality, two as moderate-quality, and two as low-quality. The most common interventions recommended by CPGs were pain management (100% of the CPGs) followed by functional restoration (83%), stress-loading (67%), psychotherapy (67%), edema management (67%), gentle active movements (67%), vocational rehabilitation (67%), normal functional activities (67%), general PT interventions (67%), and isometric-isotonic strengthening (67%).
Conclusions: The majority of CPGs for non-pharmacological management of CRPS are based on expert opinion and clinical experience rather than peer-reviewed empirical evidence. Pain management, functional restoration, and inter/multidisciplinary care were the most recommended considerations in conservative management of CRPS. There is a need for high-quality primary research to explore the effectiveness of various conservative management on CRPS outcomes.

A-0152 A SURVEY OF PATIENT AND THERAPIST PREFERENCES AND PRIORITIES FOR CONSERVATIVE MANAGEMENT OF COMPLEX REGIONAL PAIN SYNDROME

Erfan Shafiee[1,2], Joy MacDermid[1], Tara Packham[3], David Walton[1], Ruby Grewal[1]
[1]University of Western Ontario, London, Ontario, Canada; [2]Queen's University, Kingston, Ontario, Canada; [3]McMaster University, Hamilton, Ontario, Canada

Introduction: A wide range of conservative management has been evaluated and recommended in the evidence and clinical practice guidelines for Complex Regional Pain Syndrome (CRPS). However, there is no consensus on the best and optimal practice for the conservative management of CRPS.
Aim: To identify and compare priorities and preferences of CRPS patients with those of therapists treating CRPS patients, regarding conservative management of CRPS.
Material & Methods: Two surveys were created by a group of physical/occupational therapy professors and clinicians for persons with CRPS and therapists treating CRPS patients. The surveys asked patients and therapists about their preferences and priorities regarding treatments, outcomes, and decision-making process. The surveys were distributed internationally to patients and therapists through social media. Descriptive statistics were used to present and compare the findings of the surveys.
Results: A total of 86 responses (33 patients and 46 therapists) were received. The mean age was 59 (42-70) for patients and 38 (25-71) for therapists.
The most important outcomes for patients were CRPS-related pain reduction (97%), improvement in function (94%) and stiffness improvement (78%). The most effective treatments from patients' perspectives were self-management (59%), general functional activities (56%), pain education (56%), and stretching and strengthening exercises (56%). Patients prioritized three reasons as the most important ones for choosing rehabilitation interventions as their treatment options: does not involve surgery (68%), coverage by insurance/benefits (66%), and ability to stop rehabilitation interventions at any time (66%). Most of the patients (79%) preferred shared decision-making to make the final decision for their treatment. Therapists prioritized pain reduction (95%), function improvement (91%), and hypersensitivity (84%) as the most important outcomes. The most desirable and preferred treatment options were general functional activities (89%), pain education (84%), and self-management (70%). As with patients, most of the therapists (77%) agreed on shared decision-making as the optimal way to make the final decision for the treatment of CRPS.
Conclusions: People living with CRPS often lack the information required to make informed decisions about their treatment. Both patients and therapists valued pain reduction and functional improvement as important outcomes and treatment targets. The majority of patients and therapists selected shared decision-making as the optimal approach to selecting a rehabilitation intervention.

A-0153 RELIABILITY AND VALIDITY OF USING SMARTPHONE PHOTOGRAPHY TO MEASURE HAND AND UPPER EXTREMITY JOINTS RANGE OF MOTION; A SYSTEMATIC REVIEW AND META-ANALYSIS

Steve Lu[3], Erfan Shafiee[1,2], Maryam Farzad[1]
[1]University of Western Ontario, London, Ontario, Canada; [2]Queen's University, Kingston, Ontario, Canada; [3]McMaster University, Hamilton, Ontario, Canada

Introduction: Range of motion (ROM) measurement is an essential part of clinical assessment and decision-making for clinicians to keep track of patients' improvements. In recent years, the number of studies evaluating the reliability, validity, and accuracy of smartphone photography for ROM assessment has increased. Given that the use of smartphone

technologies in the delivery of healthcare services is an emerging practice, it is important for clinicians and researchers to evaluate and report the measurement properties of smartphone photography for ROM assessment to be confident in the results generated by this method.

Aim: The aim of this systematic review and meta-analysis was to appraise and synthesis the available evidence on the reliability and validity of smartphone photography in assessing the ROM of hand and upper extremity joints.

Material & Methods: We searched the literature from the beginning to October 2023 to find relevant studies. We included studies in which "smartphone photography" was employed as the method of upper limb ROM measurement and compared this method to conventional and validated ROM measurement techniques. Two independent reviewers (ES and MF) assessed the methodological quality of reliability and validity studies using the QAREL and QUADAS tools, respectively. Qualitative synthesis and meta-analysis were the preferred methods of summarizing and presenting the results.

Results: A total of 12 studies were included in this study. The sample size across studies ranged from 30 to 94, and the mean age was 47 years old. Most of the studies (8/12; 66%) were of high quality. Seven studies used the camera of the smartphones directly to take the picture, which was then analyzed by a computer software for ROM measurement. However, three studies used DrGoniometer and two other studies used mROM and RateFast Goniometer applications to take a desired picture through the application and then analyze the picture in the application for the ROM measurement. The pooled estimate of the inter-rater reliability and validity was excellent (pooled ICC: 0.90 (95%CI: 0.86 to 0.95); I2=50%; pooled correlation coefficient: 0.88 (95%CI: 0.84 to 0.92); I2=42%).

Conclusions: The results of this review provide clinicians with high-quality evidence to support using smartphone photography for the purpose of hand and upper extremity ROM assessment. Measuring ROM using smartphone digital photography is a valid and reliable method and can be used for telerehabilitation purposes or instead of the hand-held goniometer.

A-0154 GIANT GIANT CELL TUMOR OF THE DISTAL RADIUS

Pavel Korpa[1], Jan Kovařík[2]

[1]Clinic of orthopedics and traumatology, University hospital in Pilsen, Czech Republic; [2]Clinic of trauma surgery, University hospital in Brno, Czech Republic

Introduction: The authors present a case report of surgical management of a giant cell tumor of the distal radius. A twelve year old girl was presented to the Czech humanitarian team of the Medevac project during a mission in Ghana, Africa. The tumor involved almost one half of the radius and caused ischemic pain, paresthesias and prevented the patient from moving.

Aim: The patient was recommended to our team for amputation, which, apart from the huge mutilation of the patient herself, means locally and culturally exclusion from everyday life. Our goal, therefore, was to avoid this solution and perform forearm reconstruction after tumor resection.

Material & Methods: Under general anesthesia using an improvised tourniquet, we performed a staged complete resection of the tumor from the dorsal approach. Subsequently, we proceeded with reconstruction of the forearm - we performed an osteotomy of the ulna at the site of radius resection and then osteosynthesis of the proximal part of the radius and distal fragment of the ulna. We then stabilized the wrist with total arthrodesis between the distal ulna, lunate, capitate and IV. metacarpus. With this technique, despite the resection of almost half of the distal radius, we achieved full elbow motion, preservation of full forearm rotation range, and a stable wrist. The postoperative course was uneventful, and the patient had 6 weeks of cast fixation, with no subsequent rehabilitation.

Results: At the one-year follow-up, the patient was satisfied, completely pain-free, with full elbow range of motion, full

forearm rotations, stable pain-free wrist, and full range of motion of the hand joints. According to X-ray, the forearm was free of local tumor recurrence, and the radius-ulna osteosynthesis and wrist arthrodesis were healed.
Conclusions: Even in such an extensive giant cell tumour of the distal radius (almost half of the bone), resection and reconstruction of the forearm and wrist can be performed with a good functional outcome, thus avoiding amputation which significantly impairs quality of life.

A-0155 ULNAR-SIDED SCLEROSIS OF THE LUNATE DOES NOT AFFECT OUTCOMES IN PATIENTS UNDERGOING VOLAR LOCKING PLATE FIXATION FOR DISTAL RADIUS FRACTURE

Jong-Hun Baek[1], Jae-Hoon Lee[2], Duke-Whan Chung[3], Ki-Hyeok Ku[3]
[1]Kyung Hee University Hospital, Seoul, South Korea; [2]Yeson Hospital, Bucheon, Gyeonggi-do, South Korea; [3]Kyung Hee University Hospital at Gangdong, Seoul, South Korea

Introduction: Background and aim: Radial shortening after distal radius fracture cause ulnar impaction and mild reduction loss of radial height occurs even after volar locking plate fixation.
Aim: This study aimed to determine whether preoperative ulnar-sided sclerosis affects clinical outcomes after volar locking plate fixation for distal radius fracture.
Material & Methods: Among 369 patients who underwent volar locking plate fixation for distal radius fracture, 18 with preoperative ulnar-sided sclerosis of the lunate were included in Group A and compared to a 1:4 age-, sex- and fracture pattern-matched cohort without sclerosis (72 patients, Group B). The visual analog scale (VAS), Disabilities of the Arm, Shoulder, and Hand (DASH) score, and grip strength were assessed as clinical outcomes. Ulnar variance (UV), radial inclination, radial length, and volar tilt at two weeks postoperative and the final follow-up were measured as radiographic outcomes.
Results: The mean VAS and DASH scores and grip strength did not differ between the two groups. The mean UV at two weeks postoperative and the last follow-up was significantly higher in Group A. The mean changes in UV were +0.62 mm in Group A and +0.48 mm in Group B. There were no significant intergroup differences. Neither UV nor its changes showed any association with DASH and VAS scores.
Conclusions: Preoperative ulnar-sided sclerosis of the lunate did not affect clinical outcomes after volar locking plate fixation, even if UV increased postoperatively.

A-0156 EFFECTIVENESS OF PERINEURAL NERVE BLOCK WITH LOCAL ANAESTHETIC AND DEXAMETHASONE IN PATIENTS WITH NEUROGENIC THORACIC OUTLET SYNDROME

Lucia Winkler, Christian Smolle, Andreas Fellner, Werner Girsch
Department of Plastic, Aesthetic and Reconstructive Surgery, Department of Anaesthesia and Intensive Care, Medical University of Graz, Austria

Introduction: Until now, the identification and management of TOS create a highly difficult challenge. According to the Cochrane Library 2017, it is proven that injections of Dexamethasone perineural prolong the duration of the local anaesthetic used for brachial plexus nerve blocks. However, the assumption that Dexamethasone perineural leads to pain relief is not yet scientifically proven but highly presumable.
Aim: This prospective study wants to demonstrate that a scalene nerve block with Dexamethasone perineural contributes

to a significant pain relief for the patients with neurogenic TOS. The primary objectives are to measure the extent and the duration of the pain reduction.
Material & Methods: The patient collective consists of 22 patients (3 male, 19 female, mean age 34 years) who are suffering from true or disputed neurogenic TOS. For verifying the diagnosis or pain treatment a scalene nerve block with 14 ml Naropin 0.5 % and 6 mg Dexamethasone was carried out ultrasound-guided. The follow-up examinations took place after 2, 6, 12 and 24 weeks. The current pain level was documented with the Numeric Pain Rating Scale (NRS). The questionnaire Quick-DASH was used for evaluation of the disability of the arm, shoulder and hand.
Results: Statistical evaluation of the NRS showed a significant pain reduction during the whole test phase. Before the intervention, the statistical mean of the NRS in relaxed position was 4.7 (n = 22), after 2 weeks 2.1 (n = 22), after 6 weeks 2.1 (n = 22), after 12 weeks 0.9 (n = 9) and after 24 weeks 0.3 (n = 9). The mean of the NRS under stress before the intervention was 8.1 (n = 22), after 2 weeks 4.3 (n = 22), after 6 weeks 4.6 (n = 22), after 12 weeks 3.0 (n = 9) and after 24 weeks 1.4 (n = 9). The evaluation of the Quick-DASH demonstrated a significant reduction of the disability of the upper extremity. The mean value of the Quick-DASH before the intervention was at 53.8 points (n = 22), after 2 weeks at 39.9 points (n = 22) after 6 weeks at 39.7 points (n = 22), after 12 weeks at 22.5 points (n = 9) and after 24 weeks at 17.5 points (n = 9). The reduced patient collective after 12 weeks can be explained by the patients who dropped out due to surgery (n = 12) or palliative care (n = 1).
Conclusions: The combined nerve block with a local anaesthetic and Dexamethasone perineural seems to represent a targeted and adequate treatment for patients with neurogenic TOS. Based on the results, this method might be appropriate for verifying the diagnosis of a disputed neurogenic TOS, as well as a temporary bridging from the diagnosis to surgery and even for long-term pain reduction therapy.

A-0157 EFFECT OF SCAPHOID DISTAL POLE EXCISION BASED ON STRUCTURE OF THE MIDCARPAL JOINT

Ronit Wollstein[1,2], Nicholas Parody[1], Paul Izard[1], Sallie Yassin[1], Steven Glickel[1]
[1]NYU Grossman School of Medicine, NY, NY USA; [2]UAB Heersink School of Medicine, Birmingham AL, USA

Introduction: Partial scaphoid excision (distal pole excision) is used to treat wrist arthritis following a scaphoid nonunion advanced collapse (SNAC). However, some patients develop midcarpal instability, and therefore this procedure has remained controversial. Since some studies suggest that the structure of the midcarpal joint affects the transfer of forces through the wrist, we hypothesized that midcarpal joint structure will affect force transfer when the distal scaphoid pole is excised.
Aim: Understanding these patterns may help identify those wrists that are prone to develop midcarpal instability following distal pole excision.
Material and Methods: Nineteen wrist CT scans were converted to .stl files. Ten Type-1, 9 Type-2. Using a previously established wrist finite element analysis (FEA) model, the scaphoid was split into proximal and distal halves. A 100N load was applied to the dorsal crests of the trapezoid and capitate (based on in-vivo data from push-ups) . Trapezoid, trapezium, scaphoid, capitate, and hamate displacement was recorded in the x, y, and z directions. A paired-sample t-test was used. Percent change from intact was calculated for Type-1 and 2 wrists.
Results: The model predicted differences in force-transfer between a normal wrist and a wrist following distal scaphoidectomy regardless of midcarpal joint type (200%).
Excision of the scaphoid distal pole showed greater displacement of all bones in Type-1 wrists. In Type-1 wrists the change in motion of the trapezium trapezoid and capitate were larger than in type 2 $p<0.05$.
Comparison between % difference in Type-1 and Type-2 wrists between scaphoid excision and intact wrists demonstrated

differences between trapezoid and trapezial motion. Differences in the direction/pattern of motion were observed between Type-1 and Type-2 wrists with scaphoid excision.

Conclusions:

• This study suggests that a Type-1 wrist is more prone to midcarpal collapse following excision of the distal pole of the scaphoid.

• Knowledge of patients' midcarpal joint type can be applied to surgical indications in a SNAC wrist.

• Further study is needed for clinical correlation.

A-0158 VOLAR LOCKING PLATE VERSUS CLOSED REDUCTION AND IMMOBILISATION FOR DISTAL RADIUS FRACTURES IN THE ELDERLY: SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

Niyaz Latypov[1,2], Igor Golubev[3,4], Alyona Borisova[5]

[1]"Private clinic Almaty", Almaty, Kazakhstan; [2]City clinical hospital №4, Almaty, Kazakhstan; [3]Federal State Budgetary Institution of the Ministry of Health of the, Russian Federation National Medical Research Center of, Traumatology and Orthopedics named after N.N. Priorov, Moscow, Russian Federation; [4]European Medical Center, European Clinic of Sports Traumatology, and Orthopedics (ECSTO) Moscow, Russia; [5]RUDN University, Medical Institute, Department of Normal, Physiology, Moscow, Russia

Introduction: Distal radius fractures(DRF) are one of the most common types of fractures. Number of such fractures increasing every year, and epidemiologists predict further increase in the coming decades. Despite its growing popularity, the effectiveness of surgical treatment for DRF using open reduction and internal fixation (ORIF) with Volar Locking Plates(VLP) in the elderly population remains debatable.

Aim: Compare the efficacy of surgical treatment using ORIF with VLP versus conservative treatment involving closed reduction and immobilisation in elderly patients aged 60 years and above with acute displaced distal radius fractures

Material & Methods: A search of MEDLINE, Scopus, and CENTRAL databases was conducted. The primary outcome was any patient-reported functional outcome at 12-month follow-up. We used the Cochrane risk-of-bias tool (RoB2) version 2 to assess the risk of bias. DASH, PRWE, range of motion at 3 and 12 months, and radiographic measures at 12 months were compared between the surgical treatment group and the conservative treatment group by pooling the mean difference. The complication rate was compared between the groups by pooling relative risk ratios. Pooled mean differences of DASH and PRWE results were compared with the published minimal clinically important difference (MCID) to assess the clinical relevance of the results.

Results: The initial search yielded 766 records, from which 6 articles were selected for the analysis. The analysis revealed significantly lower scores on the DASH questionnaire favoring the surgical group at both 3 months (-7.58 points; 95% CI, -11.61 to -3.55) and 12 months (-3.61 points; 95% CI, -6.48 to -0.73). The 3-month difference exceeded the DASH MCID of 7 points, suggesting clinical relevance. However, the 12-month disparity, although statistically significant, fell short of the MCID, indicating limited clinical relevance. At 3 months, the PRWE questionnaire scores favored surgical treatment (-8.97 points; 95% CI, -17.88 to -0.06), but no significant difference was observed at 12 months (-3.14 points; 95% CI, -7.32 to 1.04), failing to meet the PRWE DRF-specific MCID of 11.5 points. Radiological outcomes significantly favored the surgical approach, while overall complication rates did not differ significantly between groups.

Conclusions: Surgical treatment using ORIF with VLP did not offer clinically relevant benefits compared to conservative treatment at the 12-month mark, despite superior radiological outcomes. However, elderly patients treated surgically may experience functional benefits at the 3-month follow-up.

A-0159 LONG-TERM OUTCOMES OF PROXIMAL ROW CARPECTOMY IN PATIENTS < 45 YEARS OLD, A MINIMUM OF 10-YEAR FOLLOW-UP

Filippo Pantaleoni, Antonio Reitano, Federico Alfonso, Sofia Cagnolati, Davide Gravina, Paolo Boccolari, Serena Maini, Sabrina Distante, Roberto Adani
Department of Hand Surgery and Microsurgery, University Hospital of Modena, Italy

Introduction: Proximal row carpectomy (PRC), in a population > 45 years old, is a well-accepted surgical procedure which leads to reliable results with low complication rate, conceived to treat multiple wrist pathologies.
The age < 45 years is frequently considered a relative contraindication, it is indeed still debated if PRC can be performed in young patients because, after the operation, the anatomical incongruity of the lunate fossa and the capitate head predisposes to developing radio-capitate osteoarthritis and this process is enhanced in individuals with higher functional demands and longer life expectancy.
To our knowledge, only two papers analise the long-term outcomes of PRC in patients < 45 years old; this study not only reports the largest series but also records a greater number of variables.
Aim: The aim of this research is to assess the long-term outcomes of proximal row carpectomy in patients < 45 years old.
Material & Methods: We reviewed a retrospective cohort of patients aged < 45 years old, who underwent PRC between 2002 and 2013 in the University Hospital of Modena. Several exclusion criteria are added to reduce confounding variables: patients < 18 years old, use of RCPI prosthesis or K wires, concomitant radius fracture, spasticity or tetraplegia, fasciotomy, nerve decompression, Volkman syndrome, arthrogryposis. This is a preliminary report and we are still carrying out the study throughout December 2023: the results will be processed with statistical analysis and multiple data will be available: AROM (flex/ext/rad/uln), PRWHE, grip and pinch tests are compared to contralateral and related to the access (volar/dorsal), the surgical indication (SNAC/SLAC/Kienbock/inveterate perilunate dislocation/others) and the professional occupation.
Results: 138 patients were included in the study; the numbers of the excluded ones are as follows: 3 because < 18 years old, 7 for the use of RCPI prosthesis and 2 of K wires, 3 for spasticity or tetraplegia, 1 for concomitant fasciotomy, 2 for nerve decompressions, 3 for Volkman syndrome, 5 for arthrogryposis. Until now, more than 40 patients accepted to be enrolled in the research project.
X-rays before and after 10 years will be analised (has wrist anatomy got a role in the development of osteoarthritis after PRC?).
Conclusions: Our study aims to clarify the outcomes of PRC in young patients. We know that we should submit a completed study but we are confident that our research project is fresh and interesting, thanks to its rarity and large series: all the data are expected to be available by March 2024.

A-0160 TRAPEZIOMETACARPAL ARTHROPLASTY IN PATIENTS UNDER 50: RETROSPECTIVE EVALUATION AND CONSIDERATIONS ON RETURN TO WORK

Nicolas Bigorre, Alexandre Petit
Centre de la Main, Angers, France

Thumb arthritis in patients under 50 years old poses a challenge. The initial management of symptomatic osteoarthritis of the trapeziometacarpal joint is generally non-surgical, but in case of failure, there is no consensus on the management, particularly regarding the use of trapeziometacarpal prostheses. We retrospectively evaluated a series of patients who underwent trapeziometacarpal arthroplasty with a minimum follow-up of 24 months.

We reviewed 22 patients, including 21 women and 1 man. The average age of the patients at the time of the surgery was 48.5 years, with a symptomatic evolution of the pathology over 22 months. Before the intervention, all participants had received prior non surgical treatment. We assessed the QuickDASH, PRWE pre- and post-operatively, and analyzed the ability of patients to resume their professional activity.

At a mean follow-up of 38.4 months, we confirmed the improvement in QuickDASH scores from 53.1 to 15.3 (p=5.15e-9) and PRWE scores from 58.3 to 17.9 (p=2.42e-7). No surgical reintervention was observed at this time. Return to work was observed in nine patients in the same job, while other eight had to change jobs or became disabled. Those who returned to work had significantly better postoperative QuickDASH scores (p=0.002). Heavy manual work was not a risk factor for not returning to the same job (p=0.66), nor was age at the time of surgery (p=0.23).

In conclusion, trapeziometacarpal prosthesis emerges as a promising technique to improve joint function in patients under 50 years old. However, continuous monitoring, especially regarding polyethylene wear, is necessary. It is crucial to underline the vigilance required with regard to the potential absence of return to work in the same job and to inform the patient of this.

A-0161 MANAGEMENT OF SEQUELAE OF ARTICULAR FRACTURE OF THE HEAD OF THE 3RD METACARPAL USING 3D RECONSTRUCTION: A CASE REPORT

Ophelie Simon, Alexandre Petit, Nicolas Bigorre
Centre de la Main, Angers, France

Articular fractures of the metacarpal heads are rare and often require surgical intervention at the initial diagnosis to restore the joint satisfactorily [1]. Although it is the most common complication following this type of fracture, the occurrence of malunion is exceptional, but may, if necessary, require surgical correction by osteotomy [1].

We present the case of a 24-year-old woman who developed a malunion following an intra-articular fracture of the 3rd metacarpal head in her dominant hand, and whose radiological diagnosis was not initially established during her initial emergency department visit. Four months after the initial trauma, the patient consulted for painful discomfort and stiffness in the metacarpophalangeal joint, especially during digital flexion, with a range of motion limited to 40° in flexion and a 20° flexum. A new X-ray revealed a malunion from an intra-articular frontal fracture of the 3rd metacarpal head. Additional imaging through a CT scan showed an articular step of more than 1 mm.

The processing of these images allowed for the creation of a reconstruction with a 3D-printed anatomical model to better understand the deformation and plan the surgical intervention. We achieved this using a home 3D printer, not specifically designed for medical purposes.

We performed, an osteotomy of the 3rd metacarpal head using an oscillating saw as planned preoperatively with the 3D model and fixed with two cannulated screws.

At the last follow-up at 6 months, the patient achieved a good functional outcome, with complete restoration of the range of motion and a Jamar dynamometer grip strength of 85.7% compared to the opposite side. The latest X-rays showed bone consolidation with perfect joint congruence and no signs of metacarpal head necrosis.

Overall, in our case, this technology has proven to be invaluable for assessing and anticipating intraoperative challenges, simplifying the surgical procedure, and ultimately achieving favorable clinical and radiological outcomes. And we demonstrate that we could use a home printer for surgical planning.

A-0162 WALANT SURGERY FOR SNAPPING TRICEPS SYNDROME

Nikolai Karpinskii, Ivan Kostenko
St. Petersburg State University, Russia

Introduction: snapping triceps syndrome is a rare condition that might be misdiagnosed with ulnar nerve instability. It mostly affects young males who complain on painful snap on the medial side of the elbow. This snap appears when the elbow is being extended with resistance, for example during push-ups.
Recommended surgical treatment includes anterior transposition of the ulnar nerve and resection of the medial portion of triceps.
Aim: to analyse the results of surgical treatment done on wide awake patients using local anaesthetic without tourniquet.
Material & Methods: 21 patients were operated on 26 hands by one surgeon in the period from 2018 to 2023. Patients were assessed at least 6 months after surgery distantly via telephone calls, emails and messengers.
Results: 13 patients were reached for follow-up.
Amount of revision surgeries is 8 in this series with maximum number of 5 in one patient for both hands. 2 patients are still having different issues around their elbows.
Conclusions: patients with snapping triceps are not that easy group to treat despite the awareness of this rare condition. Most common reason for revision surgery is persistent snap even in those patients who were tested with active resisted extension during surgery. However we may conclude that successful surgery leads to full return to sport activities as none of our patients complained on loss of triceps power.

A-0163 HAND AND WRIST INJURIES-CONDITIONS IN ORTHOPAEDIC SURGEONS

Paul Izard[1], Sallie Yassin[1], Steven Glickel[1], Madeline Rocks[1], Ronit Wollstein[1,2]
[1]NYU Grossman School of Medicine, NY, NY, USA; [2]UAB Heersink School of Medicine, Birmingham AL, USA

Introduction: Overload of the hand and wrist may cause issues in any occupation that includes manual work. This pilot study evaluated hand and wrist injuries or issues in a cohort of orthopaedic surgeons. Since orthopaedic surgery requires handling of heavy tools and often heavy limbs, we hypothesized that there would be a significant amount of hand injuries/issues.
Aim: To identify factors associated and trending with hand and wrist injuries in orthopaedic surgeons for further study.
Material and Methods: A modification of the Standardized Nordic Questionnaire (anonymous survey) was distributed through Research Electronic Data Capture (REDCap). This is a validated online questionnaire that evaluates subject characteristics such as age and years in practice as well the existence of hand and or wrist issues.
Results: Hand injuries were commonly reported in orthopaedic surgeons (55%), and were more common in female respondents (67%). A low BMI was associated with female gender ($p=0.04$) and occurrence of hand issues ($p=0.01$). There were no differences between light and heavy orthopaedic subspecialties in the number of injuries reported. Increased age and career length increased the likelihood of hand/wrist issues and issues were more common in the dominant hand $p=0.65$. Ninety-eight percent of those experiencing pain did not report their issues to their employer.
Conclusions: This pilot study supports small hand-size, female gender, and low BMI as predisposing to the development of hand injuries/conditions in orthopaedic surgery. By adapting instruments used in the operating room to smaller surgeons, we may be able to address some inequities that exist within the orthopaedic profession as well as to promote professional longevity.

A-0164 TREATMENT OF THE TRAPEZIOMETACARPAL OSTEOARTHRITIS BY ARTHROPLASTY WITH A PYROCARBON IMPLANT

Bárbara Choupina[1], Marta Santos Silva[2], Vera Resende[2], Artur Neto[2]
[1]Centro Hospitalar Vila Nova de Gaia/Espinho, Portugal; [2]Centro Hospitalar Entre Douro e Vouga, Portugal

Introduction: Trapeziometacarpal joint (TMJ) osteoarthritis (OA), or rhizarthrosis, is the second most common degenerative joint disease.

Several surgical procedures have been described however the superiority of any one of them has not been demonstrated. Pyrocarbon has similar mechanical properties to cortical bone and has been extensively studied in the small joints of the hand and wrist.

Aim: The objectives of the present study are to evaluate the long term clinical and radiological results of interposition arthroplasty with a pyrocarbon implant, as well as the complications, rate and causes of revision surgeries.

Material & Methods: A retrospective review was performed of all patients having this pyrocarbon TMC joint arthroplasty at a single institution with a medium follow-up of 12 years.

The degree of satisfaction with the surgery was defined by one of three responses - dissatisfied, satisfied and very satisfied. Pain was assessed using the visual analogue scale (VAS). The degree of ability for tasks of daily living was measured using the DASH score - Disabilities of the Arm, Shoulder and Hand.

Thumb mobility in opposition and adduction was assessed using the Kapandji score.

Grip strength (kg) and pinch strength (kg) were obtained by the mean of three repeated measures with a hand-held dynamometer (Jamar® Hydraulic Hand Dynamometer to assess the grip strength and Jamar® Hydraulic Pinch Gauge to assess the pinch strength)

The preoperative, postoperative follow-up (Figure 2) and current radiographs (face and profile views) were also evaluated.

Results: A total of 17 patients (1 male and 16 females) were reviewed. In 3 patients, both sides were afected completing a total number of 20 arthroplasties. The patients had a mean age of 57.9 (range: 51 to 71) years and the mean follow-up was of 13.5 (range: 12 to 15) years. A total of 2 out of 17 patients had undergone revision surgery to remove the implant after instability episodes. The authors chose not to include them in their final clinical and radiological findings after revision. At the latest follow-up, the mean score on the VAS for pain was of 0.22 (0-10) and the average DASHscore was 29.66 (range: 5.8 to 51.7)

The mean values of the functional parameters of grip strength was 18,5kg/cm2 (range: 8.2 to 29.5); the mean values of pinch strength was 2.84 kg/cm2 (range: 1.25 to 5). The mean values for opposition (Kapandji) was 9.21 (range: 8 to 10). Regarding radiological outcomes, at the immediate postoperative period, 15 implants were perfectly centered and 3 had a displacement of one-fourth. At the latest follow-up, radiological evaluation (modified Herren scale) revealed a progression of osteolysis to grade I in 12 patients, to grade II in 5 patients and to grade III in 1 patient.

Conclusions: The treatment of TMC osteoarthritis is currently demanding, as there is no gold-standard surgery. In our study, a pyrocarbon implant enabled us to obtain good functional results in the long-term, with low risk of dislocation. Radiolucency lines do not relate to clinical outcomes and should not be considered in the decision to perform revision.

A-0166 A COMPARATIVE STUDY OF A CONVENTIONAL LOCKING COMPRESSION PLATE AND A SPECIAL PLATE IN THE TREATMENT OF ULNAR SHORTENING OSTEOTOMY

Keiichiro Nishikawa, Michiro Yamamoto, Katsuyuki Iwatsuki, Hidemasa Yoneda
Department of Hand Surgery, Nagoya University Hospital, Nagoya, Japan

Introduction: Ulna shortening osteotomy (USO) has been reported to have good postoperative results, but complications such as delayed union of the osteotomy site may occur. In recent years, a special plate has been used for ulna shortening osteotomy, and the difference from the conventional locking compression plate is not well understood.
Aim: To compare cases of ulnar wrist pain, including ulnar impaction syndrome and triangular fibrocartilage complex (TFCC) injury, treated with USO and divided into a conventional plate group and a special plate group.
Material & Methods: The subjects were 104 patients who underwent USO in our hospital between October 2006 and June 2023. There were 49 males and 55 females, with a mean age at surgery of 42.5 years (16-79) and a mean follow-up of 3.1 years (0.5-10). The conventional locking compression plate was used in 77 cases with transverse osteotomy site (conventional group) and the special plate for USO was used in 27 cases with oblique osteotomy site (special group). Age, smoking, amount of shortening, duration of bone union, preoperative and postoperative range of motion, grip strength unaffected side ratio, Hand20 score, complications, pain, and immobilization period were compared.
Results: There were no significant differences in age, smoking, amount of shortening, immobilization period, or complications between the conventional and special groups. Postoperative range of motion, grip strength unaffected side ratio, Hand20 score, and pain were significantly better in both groups than before surgery (all $p < 0.05$), with no significant differences between the two groups. The duration of bone union was shorter in the conventional group at 5.2 months and in the special group at 4.3 months ($p = 0.05$). The number of patients with delayed union(bone union required more than 6 months) was 24 cases (31%) in the conventional group and one case (4%) in the special group ($p < 0.05$).
Conclusions: Although there was no difference in patient characteristics between the two groups, the outcomes after USO were good and significantly better than before surgery. As for the duration of union, the special group had an earlier union and significantly less risk of delayed union. The use of a special plate is desirable to prevent delayed union after USO.

A-0167 DEVELOPMENT OF A DRAWING APPLICATION TO EVALUATE HAND AND WRIST FUNCTION

Jay Chandra[1,3,4]*, Charlotte L. E. Laane[1,2]*, Oscar Shen[1], Mark Stam[1], Jason Z. Shang[4], Nicole F. Yu[4], Neal C. Chen[1,3], Abhiram R. Bhashyam[1,3]
[1]Division of Hand Surgery, Dept of Orthopaedic Surgery, Massachusetts General Hospital; [2]Erasmus MC, University Medical Centre Rotterdam, Trauma Research Unit, Dept of Surgery; [3]Harvard Medical School, Boston, MA; [4]Global Alliance for Medical Innovation, Cambridge, MA

Introduction: In patients with hand and upper extremity pathology, symptom severity and treatment results are often measured using a combination of surgeon-reported outcomes, and patient-reported outcomes, such as pain and validated questionnaires. Many metrics have known floor effects, and these questionnaires have limited utility in the post-operative period where patients are explicitly instructed to avoid some activities. Drawing may be an ideal hybrid objective "patient-reported" outcome measure. As handwriting has previously shown to be useful in detecting hand and wrist pathology.
Aim: We developed a custom digital drawing application to assess hand function. We performed an initial validation study of this technique to: (1) assess which drawing features could be good indicators of hand function, (2) differentiate patients from controls for both dominant and non-dominant hands, and (3) assess the correlation of drawing features

with previously validated patient-reported outcome scores of upper extremity and global function.
Material & Methods: In this prospective study, participants were asked to draw multiple shapes on an Apple iPad with a digital pen using a custom digital app. Drawings from 142 hands in 73 participants were categorized based on hand dominance and patient/control. Raw data included pen coordinates, pressure, azimuth, and altitude over time. We calculated kinematic/geometric and pressure-based features that generalize to any drawn shape from the raw data (Figure 1). Machine learning models were used to statistically classify patients and controls, and to identify correlation with validated PROMS. Model performance for classification was assessed using accuracy, precision, recall, F1 score, and area under the curve (AUC).
Results: Patients and controls could not be differentiated by simple visual inspection of drawings; however, many drawing features were significantly different ($p<0.01$) between patients and controls for both dominant and non-dominant hand drawings. The circle drawings were the most informative and pressure features were the most important. The dominant and non-dominant hand classification metrics for discriminating patients from controls were similar (AUC = ~ 0.82, Accuracy = ~0.77, F1 = ~0.80). Drawing features were significantly correlated with PRWE, SF12, and qDASH scores ($p < 0.001$).
Conclusions: We developed a novel technique to objectively measure hand function using drawing. Drawing features were correlated with validated patient-reported outcome scores and could differentiate patients from controls, regardless of hand dominance.

A-0168 UNDERSTANDING THE NEED FOR OPIOIDS FOLLOWING DISTAL RADIUS FRACTURES TREATED NONOPERATIVELY

Santiago Rengifo[2], Sydney Somers[1], Katherine Valles[1], Micheal Weiser[2], Alexis Kasper[1], Asif M. Ilyas[1,2]
[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: The impact of the opioid epidemic has resulted in a great deal of research on opioid prescribing practices and opioid use following orthopaedic procedures2,3. However, within orthopaedics, few have compared opioid prescribing patterns for operative versus nonoperative patients.
Aim: This study evaluated the opioid prescribing practices among orthopaedic surgeons in a large academic practice following operative versus nonoperative treatment of distal radius fractures.
Material & Methods: A retrospective study was conducted at one large academic practice. All patients who were seen for distal radius fractures by 7 board-certified, hand surgery fellowship-trained orthopaedic surgeons between April 2018 and August 2019, were collected via a database query. All opioid prescriptions were collected from six months preoperatively to six months postoperatively. Descriptive statistics were performed.
Results: A total of 3071 patients who were seen for distal radius fractures met inclusion for analysis. Of them, 1344 (43%) received operative treatment, and 2082 (57%) were treated nonoperatively. Of the nonoperatively treated patients, 2.8% received opioids post-injury, while 73.6% of those who received operative treatment were prescribed opioids post-operatively. The average total MMEs were 120.3/patient prescribed an opioid for the nonoperative group and 174.7/patient for the operative group. Refill rates were 17.1% for nonoperative patients and 27.9% for operative patients.
Conclusions: Nonoperative management of distal radius fractures in the outpatient setting generally do not warrant prescription opioids. When prescribed, opioid utilization and refills are lower for nonoperative patients versus operative patients.

A-0169 FOREARM FRACTURE FIXATION WITH LOCKING PLATES: DOES SIZE MATTER?

William Justice[1], Alexander Adams[1], Alexis Kasper[1], Julian Takagi[2], Asif M. Ilyas[1,2]
[1]Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA; [2]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Forearm shaft fractures of the radius and/or ulna are typically repaired with plates and screws, with 3.5mm non-locking screws being generally recommended. However, smaller plates and screws, either non-locking or locking, can also be applied.
Aim: The purpose of this study was to retrospectively review whether fracture healing rates and related complications are affected by plate size and type.
Material & Methods: Patient demographic and descriptive data was retrospectively collected for all patients treated between 2017 through 2021, at a multi-provider and multi-location single institution, with a forearm shaft fracture treated with repair of the radial shaft and/or ulna shaft. Inclusion criteria involved the use of a locking plate with a minimum radiographic follow-up of 60 days and/or until fracture union was confirmed.
Results: A total of 110 patients met the inclusion criteria. There were 45 (40.9%) females and 65 (59.1%) males included with the mean age at the time of injury being 47(+/- 22). There were 34 (30.1%) isolated radius fractures, 50 (45.5%) isolated ulna fractures, and 26 (23.6%) both bone forearm fractures. Screw sizes consisted of 3.5mm (small frag) screws in 57 (52%) cases, while 2.7mm/2.5mm/2.4mm (mini frag) screws were used in 53 (48%) cases. Fracture union was confirmed in 108 (98%) cases. Among the two non-union cases 1 (50%) involved a small frag and 1 case (50%) involved a mini frag plate.
Conclusions: This study confirms that fracture union is high following any size plate fixation of radius and/or ulna fractures. Moreover, smaller screw sizes did not affect fracture union rates. Choice of plate type and screw diameter should be based on patient characteristics and surgeon preference and need not be limited to only 3.5mm plate and screws.

A-0170 RADIOGRAPHIC AND FUNCTIONAL OUTCOMES FOLLOWING HEADLESS NON-COMPRESSION INTRAMEDULLARY SCREW FIXATION OF METACARPAL FRACTURES

Terence Thomas[1], Connor Crutchfield[1], Rahul Muchintala[1], Kyle Plusch[1], Santiago Rengifo[2], Alexis Kasper[3], Christopher Jones[3], Asif Ilyas[2,3]
[1]Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA, USA; [2]Drexel University College of Medicine, Philadelphia, PA, USA; [3]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA

Introduction: Intramedullary screw fixation has emerged as a popular approach for the treatment of displaced metacarpal fractures.
Aim: The purpose of this study is to investigate functional and radiographic outcomes of a newly designed, fully non-compressive threaded intramedullary nail (t-IMN) for the treatment of metacarpal fractures.
Material & Methods: A retrospective chart review was performed on 49 consecutive patients (58 metacarpals) who were treated with t-IMN by three hand surgery fellowship-trained orthopaedic surgeons from October 2018 to September 2021 at a single institution. Patient-reported functional outcomes included quick Disabilities for the Arm, Shoulder and Hand (quickDASH) questionnaires, visual analog pain scores (VAS; 0-10), return to work/activity time, and overall satisfaction (1-5). Radiographic outcomes included time to radiographic union, change in angulation, and change in metacarpal length/shortening. All postoperative complications were recorded.
Results: A 50% response rate was achieved (n=24). Overall, patient satisfaction was 4.8 out of 5 at minimum 1-year

follow-up. Most patients (90%) reported being able to return to work at the same level by an average of 8.4±11.6 weeks postoperatively. Among those who participated in physical activity or sport, 100% returned to their activity at the same level by a mean of 7.8±6.5 weeks. Average quickDASH scores were 4.13±11.9 at minimum 1-year follow-up. Median radiographic healing time was 5.4 weeks (range, 1.1 to 88.9 weeks). The mean change in metacarpal length from initial to final radiographic follow-up was -1.3±1.8mm. Across oblique fractures (N=25), the mean change in metacarpal length was -1.6±1.3mm (p=0.412). Mean preoperative, initial postoperative, and final angulation measurements (AP/lateral) were 12.8^0/30.2^0, 5.1^0/7.4^0, and 5.8^0/7.3^0 respectively. Five complications were reported: three cases of persistent stiffness, one of which required formal hand therapy; one case of persistent pain; and one malunion/union. No patients required revision surgery nor experienced hardware failure or infection.

Conclusions: Our findings suggest that t-IMN is a safe and effective method for the treatment of surgically indicated metacarpal fractures. t-IMN allows for an overall fast return to work and physical activity, high patient satisfaction, low complication rate, and minimal shortening or change in angulation at final radiographic follow-up. Further long-term investigations are warranted that explore clinical outcomes of t-IMN compared to alternate fixation methods.

A-0171 UNDERSTANDING METACARPAL FRACTURES: AN ANALYSIS OF OVER 2000 FRACTURES WITH INCIDENCE AND TREATMENT STRATEGIES

Daniel Nemirov[1], Alexis Kasper[1], Hassan Siddiqui[2], Asif M. Ilyas[1,3]

[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Although metacarpal fractures are among the most common presenting injuries to the emergency department, there is a relative paucity of epidemiological data on the fracture. Furthermore, even less evidence in the literature addresses fracture morphologic data in the context of eventual management strategies.

Aim: The purpose of this study is to characterize the character and locations of metacarpal fractures while concurrently evaluating whether these observed trends differ between operatively and nonoperatively managed patients.

Material & Methods: Patient demographic and descriptive fracture data was retrospectively collected for individuals treated between 2017 and 2021 from a multi-provider, multi-location single institution. Baseline demographic data (Table 1) was subsequently matched between operative and nonoperative cohorts. Mann-Whitney U tests were used to compare continuous data and Chi-Square tests were used to compare categorical data.

Results: A total of 2044 patients were included in this study. Treatment analysis yielded that 511 patients underwent operative intervention while 1533 were managed nonoperatively. The average patient age was 36.2 (±18.0), which did not significantly differ between treatment groups (p=0.253). Metacarpal fractures were more commonly seen in men (77.8%), and sex did not differ between operative and nonoperative cohorts (p=.806). Right-sided fractures were more common (69.9%), and similarly, did not differ between study groups (p=.802). Unsurprisingly, a significantly higher percentage of fractures were displaced in the operative group compared to the nonoperative cohort (98.0% vs. 45.4%; p<0.001). Fractures of the fifth metacarpal were most common (59.1%) whereas fractures of the second metacarpal were least (6.56%) (Table 2). Metacarpal neck and shaft fractures were seen at a similar frequency (37.7% vs. 37.1%), with both occurring more regularly than those at the base (25.1%). There was a statistically significant difference between operative and non-operative groups regarding which metacarpal was fractured and at what location (p<0.001 and p<0.001 respectively). Most operative metacarpal fractures occurred at the shaft (43.2%), while fractures of the neck were most common among patients managed nonoperatively (40.2%).

Conclusions: This study confirms that metacarpal fractures are most often encountered in the fifth metacarpal of young men. Notably, this study demonstrates that displacement, metacarpal involvement, and fracture location all significantly affected treatment strategy, which provides both epidemiological and clinical insight into the natural progression of these injuries.

A-0172 METACARPAL REPAIR OUTCOMES: RE-OPERATION RATES AND CHARACTERISTICS FROM OVER 700 CASES

Benjamin Miltenberg[1], Daniel Nemirov[1], Alexis Kasper[1], Hassan Siddique[2], Asif M. Ilyas[1,3]
[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Metacarpal fractures are common injuries of the hand that often require operative repair. However, there is a paucity of data regarding the rate of reoperation and circumstances following metacarpal repair.
Aim: A retrospective study was undertaken to better understand metacarpal fracture repair outcomes focusing on reoperation rates and surgical characteristics.
Material & Methods: A retrospective review of all metacarpal fracture cases performed at a single private academic institution between 2017 & 2021 was performed. Patients with isolated, acute metacarpal fractures and follow-up of at least one year were included for review. Data on patient demographics, fracture morphology, surgical technique, rate of early reoperation, and reason for reoperation were collected.
Results: A total of 764 patients were identified to have undergone operative treatment for an isolated metacarpal fracture. The rate of unplanned early reoperation was 6.5% (n=50), with 8 patients (1.0%) requiring revision surgery and 42 patients (5.5%) requiring hardware removal. The most common reason for revision surgery was for peri-hardware fracture (n =3); the next most common reason for the revision was hardware failure (n=2). The average time to reoperation was 64.8 days (SD 59.4). The rate of reoperation for fractures of the metacarpal base was significantly higher (rate: 9.7% - X2[1, N=764]=4.4, p = 0.4) while the rate of reoperation for fracture of the metacarpal shaft was significantly lower (rate: 4.1% - X2[1, N=764]=4.2, p = 0.4). Other demographic factors and fracture characteristics failed to show significant correlations to the rate of reoperation.
Conclusions: In this large series of 764 patients, we identified an unplanned early reoperation rate of 6.5% after operative fixation of acute metacarpal fractures. The majority of reoperation was for hardware removal with an average time to reoperation of approximately 65 days. This information can be used to counsel patients and set expectations about the potential for further surgeries.

A-0173 RADIAL HEAD ARTHROPLASTY FOR FRACTURE: IMPLANT SURVIVORSHIP AND OUTCOMES AT 8 TO 10 YEARS

Benjamin R. Campbell[1], Catherine B. Wickes[2], Alexis Kasper[1], Santiago Rengifo[3], Asif M. Ilyas[1,3]
[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: The purpose of this study was to evaluate implant survivorship and clinical outcomes following Radial Head Arthroplasty (RHA) for fracture at long-term follow-up.
Aim: The purpose of this study was to evaluate implant survivorship and clinical outcomes following Radial Head Arthroplasty (RHA) for fracture at long-term follow-up.

Material & Methods: A retrospective analysis was conducted on adult patients who underwent primary uncemented RHA for fractures of the radial head or neck between 2012 and 2015. Medical records were reviewed to collect information regarding demographics, injury characteristics, reoperations, and revisions requiring implant removal. A bivariate analysis was conducted to identify potential risk factors for reoperation. A Kaplan-Meier curve was created to determine implant survival rates. Eligible patients were contacted to confirm any reoperations and obtain Quick Disability of the Arm, Shoulder, and Hand (QuickDASH) scores at long-term follow-up.
Results: A total of 89 patients were eligible for analysis and were assessed at a mean of 97 months post-operatively (range 81-128). The reoperation rate was 16% (14 out of 89 patients), including 5% that required implant removal or revision. However, 93% of reoperations occurred within the first 12 months of the index surgery. Fracture-dislocations of the elbow had a significantly higher rate of reoperation. A Kaplan-Meier survivorship curve demonstrated an implant survival rate of 96% at a 10-year follow-up. Of the patients who responded for follow-up, the mean QuickDASH score was 8.7 +/- 10.3, with none requiring additional reoperations or revisions. There was no significant difference in outcome scores among patients requiring reoperation.
Conclusions: While RHA for fracture has a high potential for reoperation within the first year, survival rates with uncemented implants remain high at 10 years, and patients report excellent QuickDASH scores at long-term follow-up, despite any need for reoperation. Fractures with associated elbow dislocation may be at higher risk for reoperation, and it is important to provide this prognostic information to patients who are likely to require arthroplasty for more extensive injuries.

A-0174 SCAPHOLUNATE LIGAMENT REPAIR WITH INTERNAL BRACE AUGMENTATION: OUTCOMES AT AN AVERAGE OF 4 YEARS

Meagan Wu[1], Kyle Plusch[1], Alexis Kasper[2], Asif M. Ilyas[2,3], Christopher M. Jones[2]
[1]Sidney Kimmel Medical College, Philadelphia, PA, USA; [2]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Injury to the scapholunate (SL) interosseous ligament (SLIL) is a common cause of carpal instability. Various reconstructive procedures for SL instability have been described, yet no consensus exists regarding the optimal method for SLIL repair. The internal brace augmentation technique has been utilized with ligament repairs in a variety of orthopedic procedures, including recent application for SLIL injuries, but studies of its clinical outcomes in hand surgery are lacking.
Aim: This study aims to describe the midterm outcomes for patients who underwent SLIL repair with internal brace augmentation.
Material & Methods: Patients that underwent SLIL repair with internal brace augmentation by one of three fellowship-trained hand and upper extremity surgeons at a single institution were identified via database search. All patients who underwent surgery greater than one year before May 2022 were contacted to assess midterm outcomes. Participating patients completed the Quick-DASH (qDASH) and Patient-Rated Wrist Evaluation (PRWE) surveys, and rated their satisfaction with the surgery on a scale of 1 to 5. Additionally, patients were asked to return to the office for new radiographs and physical examinations. Outcomes assessed included wrist range of motion, grip strength, Watson scaphoid shift test, and radiographic measurements including SL angle, SL interval, and evidence of radiocarpal arthritis. If patients could not be contacted but had received wrist radiographs and a physical examination greater than one year post-operatively, these were collected in the same fashion.
Results: Midterm outcome data was available for 14 SLIL repairs among 13 patients (12 male). The average length of radiographic follow-up for patients with x-ray data available was 39 months (n=10, range 17-64), and the average

length of follow-up for patients completing outcome surveys and the satisfaction scale was 43 months (n=10, range 22-63). Average calculated qDASH and PRWE scores at the latest follow-up were 6.6 and 11.7, respectively, indicating minimal to no pain or disability. Average patient satisfaction with their surgery was 4.4 out of 5. Only one patient did not feel that they returned to full functional status following surgery, although many noted minor loss of active motion in their injured wrist. Both SL angle and SL interval measurements remained decreased at midterm follow-up compared to pre-operative values (SL angle = 67 degrees post-operatively vs. 80 degrees pre-operatively, SL interval = 3.3 mm post-operatively vs. 4.2 mm pre-operatively). There was no radiocarpal joint space narrowing or other radiographic signs of degeneration. Average flexion and extension at midterm follow-up were 57 degrees and 63 degrees, respectively, and all Watson tests were stable.

Conclusions: Internal brace augmentation for SLIL repair is an effective technique that may provide long-term stability, as evidenced by our radiographic and physical examination findings. Patients are generally satisfied with the results of the procedure and can return to their prior functional status, although minor loss of motion in the injured wrist should be anticipated.

A-0175 TRIGGER FINGER RELEASE: ARE SKIN SUTURES EVEN NECESSARY?

Tiffany N. Bridges[1], Alexis Kasper[2], Jonas L. Matzon[2], Asif M. Ilyas[2,3]

[1]Rowan School of Medicine at Jefferson Health, Stratford, NJ, USA; [2]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Traditionally, glabrous skin following trigger finger release (TFR) is closed with nonabsorbable transdermal sutures. Recently, absorbable subdermal sutures with or without skin glue is gaining popularity.

Aim: The purpose of the study is to compare complications and the number of postoperative visits following TFR closed with nonabsorbable sutures versus absorbable sutures with glue.

Material & Methods: All single-digit open TFR performed under wide awake local anesthesia no tourniquet (WALANT) technique by two hand surgery fellowship-trained orthopaedic surgeons from 2019 to 2022 were retrospectively identified. Patients were divided into two cohorts based on closure technique: a control group with nonabsorbable 4-0 monofilament suture requiring removal ("Suture" group) and a study group with buried absorbable 4-0 monofilament suture not requiring removal with skin glue ("Glue" group). Electronic medical records were reviewed for the number of postoperative visits, wound complications, postoperative antibiotic use, hand therapy, corticosteroid injections, readmission, and reoperation. Statistical analyses were performed using Mann-Whitney U tests for continuous data and Chi Square and Fisher's Exact tests for categorical data with p-values <0.05 deemed as significant.

Results: A total of 305 digits underwent TFR within the 3 years consisting of 155 TFR in the "Suture" group and 150 TFR in the "Glue" group. The "Suture" group had significantly more postoperative visits (185 "Suture" vs 42 "Glue", $p<0.001$). When excluding initial visits within 14 days postoperatively, the two groups did not significantly differ in the number of additional evaluations (30 "Suture" vs 32 "Glue", $p=0.668$). Both groups had similar rates of superficial surgical site infections within 30 days (1.9% "Suture" vs 1.3% "Glue", $p=1.000$), requiring only oral antibiotics. Neither group had a deep infection requiring reoperation. Two patients for each group had non-infectious wound complications that required only non-operative wound care. The groups had comparable postoperative antibiotic use (5 "Suture" vs 4 "Glue", $p=1.000$), prescribed hand therapy (8 "Suture" vs 14 "Glue", $p=0.235$), and corticosteroid injections (3 "Suture" vs 4 "Glue", $p=0.719$). One patient from the "Glue" group received intravenous antibiotics at the emergency department. Otherwise, neither group had readmissions or reoperations.

Conclusions: Absorbable sutures with glue are a promising alternative to traditional transdermal nonabsorbable sutures following TFR. They require significantly fewer postoperative visits without increasing the risk of complications.

A-0176 TRAPEZIECTOMY WITH SUTURE VERSUS SUTURE BUTTON SUSPENSIONPLASTY FOR THUMB CARPOMETACARPAL JOINT OSTEOARTHRITIS

Lilah Fones[1], Calista Stevens[2], Alexis Kasper[1], Jonas Matzon[1], Asif M. Ilyas[1,3]
[1]Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA; [2]University of Connecticut School of Medicine, Farmington, CT, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Symptomatic thumb carpometacarpal (CMC) joint osteoarthritis is often treated with trapeziectomy. This study's primary objective is to compare two techniques for suspensionplasty following trapeziectomy for CMC arthritis, the suture button and suture suspensionplasty technique relative to clinical and radiographic outcomes.
Aim: The study hypothesis was that suture and suture button suspensionplasty will have similar clinical and radiographic outcomes.
Material & Methods: Data was collected on 42 patients at a minimum of 1 year post-operatively following trapeziectomy with suture suspensionplasty and suture button suspensionplasty for symptomatic Easton stage III-IV CMC osteoarthritis. Outcomes were measured using the Quick Disabilities of the Arm, Shoulder, and Hand (qDASH) questionnaire, Visual Analogue Scale (VAS) for pain, radiographic analysis of subsidence, and physical examination of lateral pinch strength and thumb opposition.
Results: Radiographs demonstrated 42% of trapezial space was maintained in the suture suspensionplasty group relative to 50% of trapezial space maintained in the suture button suspensionplasty group ($p=0.006$). Median post-operative qDash scores were to 3.41 [0;15.9] and 0 [0; 10] in the suture and suture button groups ($p=0.036$), both of which are similar to normative values in the population. Median post-operative VAS scores were 0 [0;0] in both groups ($p=0.502$). Post-operative thumb opposition was no different between groups ($p=0.563$). Post-operative pinch strength was 5.89 kg (1.79) and 5.77 kg (3.15) in the suture and suture button groups, respectively ($p=0.895$).
Conclusions: At a minimum of one year post-operatively, patients that underwent trapeziectomy with suture button suspensionplasty had improved subsidence and qDASH scores, but similar thumb range of motion and strength. Though statistically different, these differences likely do not represent a meaningful clinical difference between techniques.

A-0177 DEMOGRAPHIC AND TREATMENT TRENDS OF DISTAL RADIUS FRACTURES: A TRINETX DATABASE REVIEW OF 32,912 PATIENTS

Yusuf Mahmoud[1], Juliet Chung[2], Wali Pirzada[3], Alexis Kasper[4], Asif M. Ilyas[3,4]
[1]Hackensack Meridian School of Medicine, NJ, USA; [2]Pennsylvania State University School of Medicine, NJ, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA; [4]Rothman Orthopaedic Institute, Philadelphia, PA, USA

Introduction: Distal radius fractures (DRF) are among the most commonly encountered fractures. The United States population is rapidly growing, aging, and diversifying.
Aim: This study was undertaken to better understand current incidences and treatment trends across all ages, genders, and races to inform resource allocation and potentially address treatment inequities.
Material & Methods: The TriNetX US Collaborative Network was queried for all patients diagnosed with DRFs from 2017 to 2022. Cohorts were defined by the inclusion and exclusion of procedure CPT codes into operative and nonoperative

groups. Statistical analysis was performed to determine differences in management among demographic groups across the 6-year time period

Results: Incidence rates of operative intervention for DRF increased from 19.6% in 2017 to 23.6% in 2022 (P-value <0.0001). Incidence rates of operative intervention increased for females, 21.7% to 25.2% (p-value =0.0004), and males, 15.3% to 19.7% (p-value =0.004). All demographic groups had an overall higher incidence of nonoperative intervention. Patients aged 40-64 were more likely to undergo operative intervention than patients 18-39 (OR 1.476 (1.366-1.595). Females were more likely to undergo operative intervention than males (OR 0.684 (95% CI 0.647,0.723). White patients were more likely to undergo operative intervention than Black patients (OR 0.749 (95% CI 0.673, 0.834) and Asian patients (OR 0.846 (CI 0.793, 0.979).

Conclusions: The incidence of DRFs continues to climb, as does their rate of operative management. However, differences in management of DRF were also observed across different demographic groups, with ongoing racial disparities. Future consideration should be taken into optimizing treatment disparities relative to demographic status.

A-0178 FLEXOR POLLICIS LONGUS RUPTURE AFTER DISTAL RADIUS MALUNION. USING 3D PERSONALIZED OSTETOTOMY GUIDE

Alberto Planas Gil, Natalia Barberena Turrau, Jorge De la Fuente Gonzalez, Marina Compte Viver, Ángel Castro Sauras
Hospital Obispo Polanco, Teruel, Spain

Introduction: rnAs infrecuent as subcutaneus Flexor Pollicis Longus (FPL) ruputures are, they are usually linked to distal radius fractures (DRF) plates or scaphoid malunions. Moreover, we have not found any article published about treating both malunion and tendon complications in the same surgery. rnAim: rnTo describe our results of a subcutaneus FPL rupture after a DRF serious malunion treated using a 3D personlized guide. rnMaterial & Methods: rnWe present a case of a 61 years old women who had suffered a traumatism on her right hand. She first consults some months later when se was unable to flex thumb interphalangical joint (TIFJ). rnShe presents a subcutaneus rupture of FPL V zone due to a maior malunion of the radius (10mm of shortening, 0º of radial inclination, 0mm of radial height, 34º of dorsal inclination, negative ulnar variance). rnA bibliographic revisión is made, and we decide the following one step surgery protocol:

1. DFR: We use Newclip®- Mecomtech® 3D personalized guide to perform an ostetotomy to get correct this serious deformitiy. We use distal radius cadaver graft.
2. FPL: We perform end-to-end plastia using distal and proximal Pulvertaft suture and Palmaris Longus shelf graft.
3. Flexor Digitorum Profundus (FDP) 2nd finger: Kesller tenodesis to FDP 3rd finger of an almost complete intratendinous rupture discovered at surgery.

Results: We achieve what we hace planned prior to surgery designing personalized guide: not shortening, 19º of radial inclination, 8mm of radial height, 5º of dorsal inclination and 2mm of negative ulnar variance). At one year of follow up, she is painless and can pronosupinate completely. There are graft consolidation signs. She can make TIFJ with less strenght tan contralateral hand, with a 2cm lag of flexion 2nd finger due to quadriga effect. She can work and perform basic activities of daily living with no significant restictions.

Conclusions: The FPL subcutaneus rupture itself is rare. This is the fist case we have found linked to DRF malunion. Then, this is the first case in the tendon injury and radius deformity are treated at the same surgery. rnThere is increasing bibliography about 3D assited surgeries. This tool is very usefull to us to perform DRF osteotomies, a very demanding surgery, specially in this case with such a great deformity. 3D personalized guides let surgeons plan surgery more accurately before surgery, spending less time on certain aspects on surgery itself. We found them specially usefull in this case to decide to make an

ulnar osteotomy or not prior to surgery and to perform de tendon repair in the same surgery.
conclusión, we think 3D assited surgery will be an essential tool to hand surgeon, above all in complex injuries.

A-0179 HYPOTHENAR FAT PAD FLAP IN REVISION SURGERY FOR RECURRENT CARPAL TUNNEL SYNDROME. EVALUATION OF PROCEDURE'S EFFICACY BASED ON LONG-TERM CLINICAL RESULTS

Vasileios Akrivos, Efstratios Athanselis, Nikolaos Stefanou, Antonios Koutalos, Michael Hantes, Zoe Ntailiana, Sokratis Varitimidis
University General Hospital Larissa

Introduction: Persistent or recurrent carpal tunnel syndrome symptoms impose revision surgery which presents a complex challenge due to the altered anatomy and scar tissue formation, resulting from prior procedure(s). In such cases, novel surgical techniques are often used to optimize outcomes. One such innovative approach is the utilization of the hypothenar fat pad flap, a local option with potential advantages in addressing the unique complexities of revision surgery and effectively isolating and protecting the median nerve.
Aim: This article explores the efficacy and clinical outcomes of the use of hypothenar fat pad flap in revision carpal tunnel syndrome (CTS) surgery.
Material & Methods: A total of 11 patients (4 men, mean age 58) with recurrent symptoms after prior interventions underwent revision surgery with nerve release and hypothenar fat pad flap procedure. Clinical assessment including sensomotor evaluation, neurophysiology, nerve conduction studies, VAS, DN4, QuickDASH, and Mayo scores in a mean follow-up period of 8.5 years.
Results: Significant improvements were observed in VAS ($p < .001$), DN4 ($p < .001$), QuickDASH ($p < .001$), and Mayo ($p = .006$) scores postoperatively
Conclusions: According to study results, the hypothenar fat pad flap technique is a reliable option for addressing recurrent CTS operative treatment.

A-0180 THE INFLUENCE OF CASTING TYPE ON DISTAL RADIUS FRACTURE REDISPLACEMENT RATES: A CLUSTER-RANDOMIZED CONTROLLED TRIAL

Britt Barvelink[1], Max Reijman[1], Sanne Smidt[1], Pedro Miranda Afonso[2,3], Jan A N, Verhaar[1], Joost W Colaris[1], on behalf of the CAST study group
[1]Department of Orthopaedics and Sports Medicine, Erasmus MC, University Medical Center, Rotterdam, the Netherlands; [2]Department of Biostatistics, Erasmus MC, University Medical Center Rotterdam, the Netherlands; [3]Department of Epidemiology, Erasmus MC, University Medical Center Rotterdam, the Netherlands

Introduction: It is unclear which casting type provides the best fracture support in adult distal radius fractures (DRFs). Given that 32–64% of reduced DRFs redisplace, preventing redisplacement and thereby preventing a disabling malunion or belated surgery is preferred.
Aim: To investigate whether circumferential casting (CC) leads to fewer fracture redisplacements and better one-year outcomes compared to plaster splinting (PS).
Material & Methods: In a multicenter cluster-randomized trial, we compared two casting types (CC versus PS). Eligible participants had a displaced DRF that was acceptably aligned after closed reduction. The primary outcome was incident radiographic redisplacement within five weeks of cast immobilization. Secondary outcomes were cast complaints, clinical outcomes at three months, patient-reported outcomes (numeric rating of pain scale [NRS], Quick Disabilities of the Arm, Shoulder and Hand [QDASH] and Patient-Rated Wrist/Hand Evaluation [PRWHE] questionnaires), and adverse events

(e.g. compartment syndrome) during one-year of follow-up. We used multivariable mixed-effects logistic regression for the primary outcome analysis.
Results: The study sample comprised 420 patients. No significant difference existed in incident redisplacement between interventions (CC 49%, PS 47%, p = 0.85, OR = 1.05, 95% CI 0.65–1.70). PS patients reported more pain than the CC group during the first week of treatment (NRS 4.7 vs. 4.1, p = 0.014). Cast complaints, clinical outcomes and patient-reported outcomes did not differ between groups (p > 0.05). Compartment syndrome did not occur.
Conclusions: Circumferential casting did not result in fewer fracture redisplacements compared to plaster splinting. Both casting techniques resulted in comparable outcomes.

A-0181 TREATMENT DELAY IN PATIENTS UNDERGOING HEADACHE SURGERY (NERVE DECOMPRESSION SURGERY)

Merel H J Hazewinkel[1,4], Katya Remy[2], Leonard Knoedler[2], Sierra Tseng[2], Anna Schoenbrunner[3], Jeffrey Janis[3], William G Austen Jr.[2], Caroline A Hundepool[4], J Michiel Zuidam[4], Lisa Gfrerer[1]
[1]Weill Cornell Medicine, Division of Plastic and Reconstructive Surgery, New York, NY; [2]Harvard Medical School, Department of Plastic Surgery, Hand Surgery, and Peripheral, Nerve Surgery, Boston, MA; [3]Ohio State University Wexner Medical Center, Department of Plastic and Reconstructive Surgery, Columbus, OH; [4]Erasmus Medical Center Rotterdam, Department of Plastic, Reconstructive Surgery and Hand surgery, The Netherlands

Introduction: Although headache surgery has been shown to be an effective treatment option for refractory headache disorders, it has not been included as part of the headache disorders management algorithm by non-surgical providers.
Aim: This study aims to evaluate the delay in surgical management of patients with headache disorders. In addition, a cost comparison analysis between conservative and operative treatment of headache disorders was performed and the surgical outcomes of headache surgery were reported.
Material & Methods: Among the patients who were screened (1112), 271 (56%) patients underwent headache surgery. Data regarding onset of headache disorder and pre-and postoperative pain characteristics were prospectively collected. To perform a cost comparison analysis, direct and indirect costs associated with the conservative treatment of headache disorders were calculated.
Results: The median duration between onset of headache disorder symptoms and headache surgery was 20 (8.2-32) years. The annual mean cost of conservative treatment of headache disorders was $49,463.78 ($30,933.87-$66,553.70) per patient. Over the 20-year time period prior to surgery, the mean cost was $989,275.65 ($618,677.31-$1,331,073.99). In comparison, the mean cost of headache surgery was $11,000. The median pain days per month decreased by 16 (0-25) ($p<0.001$), the median pain intensity reduced by 4 (2-7) ($p<0.001$), and the median pain duration decreased by 11 hours (0-22) ($p<0.001$).
Conclusions: This study shows that patients experience symptoms of headache disorders for an average of 20 years prior to undergoing headache surgery. Surgical treatment not only significantly improves headache pain, but also reduces healthcare cost and should be implemented in the management algorithm of headache disorders.

A-0182 DEVELOPMENT OF A MOBILE APPLICATION FOR PATIENT SCREENING IN HEADACHE SURGERY

Leonard Knoedler[1], Merel HJ Hazewinkel[2], Simon Siddharth[2], Ankoor Talwar[2], William G. Austen, Jr.[1], Lisa Gfrerer[2]
[1]Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA; [2]Weill Cornell Medicine, New York, NY, USA

Introduction: Patient selection is crucial for satisfactory outcomes in headache surgery. Pain drawings are an important tool for presurgical patient screening, but their interpretation requires extensive training.
Aim: We aimed to A.) apply machine learning (ML) algorithms to pain drawing analysis and B.) integrate this tool into a mobile application to facilitate screening for providers.
Material & Methods: 115 pain drawings created by patients were analyzed and categorized for presence of nerve pain, anatomic distribution of pain, as well as candidacy for surgery by two headache surgery experts (WGA and LG). A random forest ML algorithm was developed based on this analysis and trained using 3208 copies of the initial patient drawings. The algorithm was asked to evaluate 200 randomly selected drawings. Android Studio 2.0 (Google, California, USA) was used to create a mobile application.
Results: The algorithm correctly determined nerve pain, the anatomic pain distribution of pain, and candidacy for surgery in 97.5% of test drawings (195/200). Across the different anatomic pain distributions, the mean algorithm accuracy was 98.4± 1.3%. The mobile application surface enabled non-surgical providers to successfully use the algorithm.
Conclusions: ML can be used in the interpretation of patient pain drawings. The integration of this screening tool into a mobile application will enable non-surgical providers such as neurologists and primary care physicians, as well patients to screen for nerve related headache increasing the likelihood of timely referral to a qualified headache surgeon.

A-0184 CASE SERIES OF INVASIVE STREP A INFECTIONS OF THE UPPER LIMB ADMITTED TO THE PLASTIC SURGERY DEPARTMENT AT ULSTER HOSPITAL, BELFAST OVER ONE YEAR PERIOD

Aine Cotter, Jamie Clements, Nicholas Hodgins
Ulster Hospital, Belfast, Northern Ireland

Introduction: In developed countries strep A infections resulting severe sequalae for patient have declined in the last century owing largely to improved living conditions and the availability of antibiotics. However, in 2022, France, Ireland, the Netherlands, Sweden, and the United Kingdom of Great Britain and Northern Ireland, observed an increase in cases of invasive group A streptococcus disease. For most patients, strep A infections largely lead to a self limiting illness such as cellulitis and pharyngitis. However, for the minority that are subject to invasive strep A consequences can be severe including shock, systemic sepsis, deep tissue destruction and transmission of the pathogen can even prove fatal. Unsurprisingly, among patients diagnosed with mono microbial type II necrotiscing fascitis strep A remains most common pathogen. When there is severe destruction of skin and soft tissue affecting patient's limbs the consequences can be devastating and leave individuals with life altering disabilities therefore early diagnosis and treatment is of utmost importance to prevent such events.
Aim: Primary aim was to identify any consistent patterns regarding presentation, patient demographics and outcomes for those diagnosed with invasive strep A infections of the upper limb. A further objective was to raise awareness of the potential adverse effects of these infections.
Material & Methods: A retrospective review of the all the patients admitted under the care of the only plastic surgery Dept in Northern Ireland over a one year period (June 2022-May 2023). Data was collected via chart review of all admissions. Information gathered included patient age, gender, initial clinical presentation, patient co-morbidities, antibiotics

prescribed, operations performed and functional outcomes.
Results: 18 patients in total were identified. One third of the patient cohort had documented substance abuse issues. Three patients had diabetes and three patients were taking immunosuppressive medications. Only one patient did not require an operation in the treatment of his infection due to a significant response to intravenous antibiotics. Two thirds of patients needed two or more operative interventions in order to manage their initial infections. Three patients had digits terminalised (16.6%). Four patients needed tissue coverage following debridement's, included two skin grafts, one free flap and one pedicled flap.
Conclusions: The results undoubtedly highlight the potential seriousness of Strep A infections and emphasise the need for close clinical monitoring. Most patients required more than one 'washout' in theatre and three terminalisation's is a significant proportion. Furthermore, clinicians should be cognisant of the fact that those presenting with hand infections may have etiology associated with strep A and therefore such individuals need vigilant attention, tissue sent to lab as soon as possible to confirm diagnosis and close liaison with microbiology colleagues.

A-0185 3D ANIMATIONS FOR TRAINING IN HAND SURGERY

Stephen Atherton, Dean Boyce
Welsh Centre for Plastic Surgery & Burns, Morriston Hospital, Swansea, Wales, UK

Introduction: Aim: Material & Methods: results 3D animations were created to illustrate techniques in flap reconstruction, tendon transfer, congenital hand surgery, nerve repair and many other areas
Conclusions: Animations created using... are effective in teaching and training of hand surgery, the beauty of these animations will be demonstrated in different teaching scenarios

A-0186 THE DEVELOPMENT OF AN OCCUPATIONAL THERAPIST LED HAND INJECTION CLINIC

Gillian Gavaghan, Mary Naughton, Paul Sullivan
Beaumont Hospital, Dublin, Ireland

Introduction: Therapist led models of care is a novel way of enhancing patient access to healthcare.
The addition of a therapy led injection pathway was identified as an opportunity to further develop an existing direct access OT led plastics hand clinic for GP referred hand/wrist complaints.
A therapist led injection pathway would remove additional patients from Plastics OPD and the minor procedure unit, expedite patient access times to injection therapy for troublesome hand complaints, and streamline the patient journey.
Aim: Train OT hand therapist in injection therapy.
Develop/implement a robust service framework.
Improve patient outcomes & patient experience.
Improve patient flow: reduce OPD & Minor Procedure Room attendances.
Material/Methods: 1. New skill acquisition:
Complete 3rd level module in injection therapy.
Mentoring, self-monitoring & reflective-practice.
2. Assuring clinical effectiveness:
Maintain database of injections administered, & the outcome of reassessment at intervals of 4 weeks, 12 weeks & 6

months post injection.
3. Developing a Service Framework:
Define the parameters of service by identifying where our skills may have the biggest impact - trigger fingers, DeQuervains primarily.
Engagement of stakeholders – Plastics team, secretaries, surgical directorate, OPD nurses, Pharmacy.
Develop an OT Led Injection Clinic SOP, reflective of our practice remit.
4. Injection administration:
Injections are administered by the OT in the Consultant led plastics clinic with medication administered per that surgeon's practice [Adcortyl 10mg/ml & Marcain 0.5% ~ 0.75-1ml volume].
All injections are landmark guided and are administered using a 'no-touch' technique.
5. Therapeutic Intervention:
Clinical examination and provocative testing, where relevant, was used to determine the pathology of a patient's symptoms.
Most patients underwent a period of splinting and protective movement prior to consideration of steroid injection.
Therapy management post injection for this patient cohort was standardised - customised splinting & protected movement.
Clinical reassessment was repeated at 4, 12 weeks & 6 months post injection.
Results: In the majority of cases, patients have a full resolution of their complaint.
81% trigger finger/thumb (N=26) & 87.5% DeQuervains (N=8) injected resolved/resolving at 4 weeks.
Patients are injected in <1month once need for injection is identified.
There have been no adverse outcomes/patient response from therapist administered steroid injections for hand/wrist tendinopathies.
Conclusions:
1. The addition of an OT led injection clinic further develops the scope of OT advanced practice in hand therapy.
Each patient seen via this injection pathway:
i. Removes a minimum of 2 OPD clinic slots with NCHD/Consultant [one for assessment (determining the need for steroid injection) and one for reassessment (reassess following steroid injection)]
ii. Saves a slot in minor procedure unit where hand steroid injections are typically administered.
2. The patients' pathway of care is consistent – first point of contact and all subsequent interventions are provided by 1-2 clinicians.
3. Streamlined – there is no time waiting for therapy intervention post injection, and reduced waiting when the need for steroid injection is identified.
4. Effective - majority of patients have a full resolution of their complaint. Where the complaint does not resolve the patient's journey to surgery is expedited.

A-0187 SURGICAL INNOVATION BEYOND THEATRES: A GREEN APPROACH TO HAND SURGERY

Preetham Kodumuri, James Brock
Wrexham Maelor Hospital, Wrexham, UK

Introduction: This study explores the feasibility and sustainability of hand surgery conducted outside traditional main theatres, utilizing a hybrid theatre set-up in an outpatient clinic room. The focus is on efficiency, resource utilisation, and environmental impact.
Aims: The primary objective is to assess the viability of performing hand surgeries in an outpatient clinic setting, aiming

to streamline surgical processes, enhance patient satisfaction, and significantly reduce the carbon footprint associated with these procedures.
Methods: Over a six-month period, 40 hand surgery procedures were conducted in the outpatient clinic room using a hybrid theatre set-up. Surgical trays were rationalized to essential instruments, and a minor field sterility with two small drapes was employed. Patient outcomes and procedural efficiency were evaluated, considering time spent in the hospital, manpower requirements, cost-effectiveness, and the environmental impact measured in carbon footprint and waste generation.
Results: The outcomes demonstrate the success of the sustainable hand surgery approach. No complications, including infections, were reported. Patient satisfaction averaged a rating of 10/10. The mean time spent in the hospital was drastically reduced to 55 minutes compared to 150 minutes in main theatres. Manpower requirements were reduced from 9 to 3 per patient, effectively freeing up valuable resources. The calculated carbon footprint reduction was nearly 90% compared to main theatres, resulting in a 75% cost reduction per case. Moreover, mean waste generated per case decreased from 4.5 kg to 0.6 kg.
Conclusion: Performing hand surgeries in an outpatient clinic using a hybrid theatre set-up proved not only clinically successful but also highly efficient and environmentally friendly. The findings underscore the potential for significant resource savings and environmental impact reduction, encouraging a shift towards sustainable practices in hand surgery. This approach has the potential to revolutionize the delivery of hand surgical services, providing a cost-effective and eco-friendly alternative to traditional main theatres.

A-0188 MICROSCOPIC DIP JOINT SYNOVECTOMY FOR MUCOUS CYST

Hiroyuki Ohi
Seirei Hamamatsu General Hospital, Hamamatsu, Japan

Objective: Standard treatment of mucous cysts was excision and local flap. Recently treatment does not performed cyst resection and local flap surgery. There are many reports that the method of excising the osteophytes and synovial joints from both sides of the terminal tendon gives good results. We performed surgery from a large transverse incision on the DIP joint until July 2017. The problem with this method was that 50.1% complained of numbness and hypoesthesia distal to the incision, and 15.6% complained of discomfort. Therefore, we operated with a transverse incision of about 3 mm. We performed synovectomy from bilateral incisions (radial & ulnar) or single incision (radial or ulnar) of the terminal tendon, and we report the results.
Material & Methods: There were 16 cases, 12 females and 4 males. The average age was 60.8 (48-72) years old. Bilateral incisions were 12 cases (6 cases irrelevant to the location of the cyst, 6 cases with central cyst) and 4 cases of single incision. The follow-up period was 12.1 (8-16) months in total, 12.5 (5-16) months for bilateral incision, and 11.0 (10-12) months for single incision. Anesthesia was metacarpal block. Using a microscope, the osteophyte and joint synovitis were resected with a micro punch (tip size: about 2 mm).
Results: The operation time was 17.6 (12-27) minutes for bilateral incisions and 14.3 (12-18) minutes for single incision. No recurrence was observed in all cases. Mild numbness was felt in 4 cases (33.3%) with bilateral incision and 1 case (25.0%) with single incision. And all cases were no complaints of discomfort.
Conclusions: The complaint of discomfort disappeared with the small transvers incision, but there were cases where mild numbness remained. We performed a small transverse incision of 3 mm, but vertical nerve damage was unavoidable. Therefore, in the future, we are considering measures such as vertical skin incision. In addition, although the number of

cases is small, there was no recurrence even with single incision in the case where the mucous cyst was on the radial or ulnar side. In such cases, it was suggested that there may be no problem even if surgery is performed with single incision.

A-0189 THE INFLUENCE OF CAST QUALITY, CAST APPLICANT AND TYPE OF CASTING ON THE REDISPLACEMENT RISK OF REDUCED ADULT DISTAL RADIUS FRACTURES

Britt Barvelink, Mirte Kok, Sanne Smidt, Kevin van Lakwijk, Jan Verhaar, Max Reijman, Joost Colaris, on behalf of the CAST study group
Erasmus MC, Rotterdam, The Netherlands

Introduction: Reduced distal radius fractures (DRFs) often redisplace in a cast. Poor cast molding might be a possible risk factor.
Aim: This study aims to evaluate the influence of cast molding quality, the cast applicant, and the material used on the redisplacement risk.
Material & Methods: This is a retrospective study, performed on prospectively collected data. A total of 172 consecutive cases were included with an acceptably reduced DRF and a complete two-week radiographic follow-up. Fracture alignment was measured on all radiographs (trauma, post-reduction and follow-up) conform the Dutch Guideline for DRFs. When a fracture was unacceptably aligned after two weeks follow-up, the DRF was labeled as redisplaced. Cast quality was measured using the three-point index (TPI), casting index (CI) and gap index (GI). An index score above the cut-off value (TPI $>$ 0.8, CI $>$ 0.7, GI $>$ 0.15) implicates bad cast molding quality. Multivariable logistic regression was used to test the influence of cast quality, cast applicant and casting type on the redisplacement risk. We corrected for patient age, intra-articular involvement, the degree of radial inclination and radial shortening.
Results: Redisplacement occurred in 40% of DRFs. Mean index scores were poor (TPI 0.94, CI 0.85, GI 0.22), referring to generally bad cast molding quality. All cast indices were not associated to the redisplacement risk (OR [95% CI]: TPI 1.2 [0.6 to 2.5], CI 2.4 [0.7 to 15.7], GI 1.6 [0.7 to 4.0]). We found that the odds of a fracture to redisplace is significantly lower for fractures that were casted by nurse practitioners compared to ER nurses. Fracture redisplacement occurred less often in synthetic casted DRFs (31% vs. 45%) but no significant association was found with the redisplacement risk (OR 0.6, 95%CI 0.3 to 1.2).
Conclusions: Cast quality – measured using cast indices - is not related to the redisplacement risk of reduced DRFs. Casts applied by nurse practitioners have a significant lower risk of redisplacement. Synthetic casts might provide better fracture support resulting in a lower redisplacement risk, but no significant association was found.

A-0190 DELLON TRIPLE DECOMPRESSION UNDER WALANT

Marcelo de Pinho Teixeira Alves, Catia Filipa Nunes, Sofia Alexandra Madeira, Maria Ines Rocha, Jose Miguel Carlos
Hospital Garcia de Orta, Portugal

Introduction: The Wide-Awake Local Anesthesia No Tourniquet (WALANT) Approach to Dellon Triple decompression involves the use of local anesthetic with epinephrine and no tourniquet. To date and our knowledge there is no current paper that puts together WALANT surgery and the Dellon triple decompression in the treatment of lower limb superimposed nerve compression to chronic diabetic neuropathy.
Aim: To show that WALANT can be a safe and effective procedure and can be performed in an outpatient setting for Dellon triple decompression surgery.

Material & Methods: During the year of 2022, a series of 10 patients with diabetic neuropathy were operated on for superimposed nerve compression of the common peroneal nerve in the knee (CPN), tibial nerve in the ankle (TN) and deep peroneal nerve (DPN) in the dorsum of the foot – the Dellon Triple surgical approach to superimposed nerve compression in diabetic neuropathy - using the WALANT technique.
Results: Complete release of the CPN, TN and DPN was achieved in all patients. There was no need for the use of phentolamine to revert the vasoconstriction effect. There was no need for insuflation of the tourniquet and the surgeries were performed in an almost bloodless field.
Conclusions: This study shows that WALANT is a safe and effective procedure and can be performed in an outpatient setting for the decompression of the common peroneal nerve in the knee, tibial nerve in the ankle and deep peroneal nerve in the dorsum of the foot in diabetic patients with superimposed nerve compressions to diabetic neuropathy. WALANT technique demonstrated to be a safe procedure to surgically treat diabetic patients with superimposed compressive neuropathy to diabetic neuropathy in the lower limbs and had no complications.

A-0191 BONE REMODELLING AFTER SCAPHOID FRACTURES – A LONGITUDINAL LONGTERM TRIAL

Stefan Benedikt[1], Kerstin Stock[1], Lukas Horling[1], Gernot Schmidle[1], Gerald Degenhart[2], Michael Schirmer[3], Claudia Lamina[4], Michael Blauth[1], Rohit Arora[1]
[1]Department of Orthopaedics and Traumatology, Medical University Innsbruck, Austria; [2]Department of Radiology, Medical University Innsbruck, Austria; [3]Department of Internal Medicine, Medical University Innsbruck, Austria; [4]Department of Medical Genetics, Molecular and Clinical Pharmacology, Austria

Introduction: Little is known about the exact bone remodelling processes during the healing of scaphoid fractures. In this context, delayed healing or non-unions are a challenging problem and should be prevented or at least detected and treated as soon as possible.
The aim of this study was the analysis of the bone remodelling process of scaphoid fractures to obtain a better understanding of the physiology and to create a basis for possible new diagnostic and therapeutic options.
Patients and Methods: In this single-centre prospective clinical trial 39 patients with an unilateral conservatively treated scaphoid fracture at the level of the waist or the distal pole were followed up over one year (2, 4, 6, 12 weeks, 6 and 12 months after trauma). Fracture healing was monitored by clinical examination, by bone remodelling markers analyzed in blood samples and radiologically using High-Resolution peripheral Quantitative Computed Tomography (HR-pQCT) for measuring bone density and microarchitectural parameters.
Results: None of the patients developed a non-union or other complications. Regarding the blood samples, bone resorption markers were increased until the twelve months follow-up, while bone proliferation markers showed hardly any changes. Radiologically, changes in trabecular number, trabecular thickness, trabecular separation and bone mineral density could be observed until the twelve months follow-up. In one third of cases complete fracture consolidation on HR-pQCT was evident no earlier than after the six-month follow-up after trauma.
Conclusion: This study depicted the bone healing process of scaphoid fractures at the level of the waist and the distal pole using both a laboratory chemical and radiologic approach. As certain parameters were still increased at the 12 months follow-up, it can be assumed that remodelling takes longer than a year, at least in some cases. Blood bone remodelling markers and HR-pQCT may represent valuable tools for future assessment of fracture remodelling and the detection of delayed healing in scaphoid fractures.

A-0192 NERVE TRANSFER FOR CENTRAL CORD SYNDROME - REDUCING SPASTICITY OR RECOVERING FUNCTION?

Madi El-Haj, Safran Ori, Sofia Vorobeitchik, Tal Eliav, Beyth Shaul
Hadassah Hebrew University medical center, Jerusalem, Israel

Introduction: Nerve transfers are increasingly utilized to restore upper extremity sensorimotor function in patients with complete tetraplegic cervical spinal cord injury (CSI). However, the role of nerve transfer in central cord syndrome has yet to be elucidated. Unlike complete tetraplegia, central cord syndrome is characterized by the presence of mixed upper and lower motor neuron (UMN, LMN) lesions of both the donor and the recipient muscles (e.g. spasticity and weakness).
Aim: Managing spasticity of the partially functioning recipient and augmentation of function while avoiding functional downgrading
Material & Methods: We present the case of a 25-year-old male who suffered central cord syndrome following a hyperextension neck injury. He underwent immediate C3-4 anterior cervical decompression fusion. Ten months post-injury, he presented with severe right shoulder medial scapular winging with inability to perform shoulder forward flexion more than 45 degrees as well as a left spastic hand, absence of efficient finger flexion and limited wrist-finger extension by the spastic hand-wrist flexors, spastic elbow flexion and absence of elbow extension. Preoperative electrodiagnostic evaluation (EDX) demonstrated upper and partial lower motor neuron injury of the flexor carpi radialis (FCR), flexor digitorum superficialis (FDS) on the left hand, with upper motor neuron injury of the left long head of the triceps. Ten months post-injury, he underwent right thoracodorsal (TDN) to long thoracic nerve (LTN) transfer, left TDN to triceps nerve transfer, and brachialis to FCR/FDS nerve transfer
Results: At 4 years postoperative follow up, the patient completely recovered resting right medial scapular winging, forward flexion of 120 degrees, 4/5 elbow extension, and significant resolution of elbow, hand, and wrist spasticity while recovering efficient grip function.
Conclusions: While nerve transfer for restoring upper extremity function is straightforward and well established in complete tetraplegia with predictable results, it is still elusive and unpredictable in the central spinal cord. The presence of spastic donors should not be excluded in the presence of volitional control. Using intraoperative EDX is of utmost importance for targeting the spastic component of the recipient nerves.

A-0193 INTRA-SCALENUS, INTRAMUSCULAR LONG THORACIC NERVE VARIANT IS ASSOCIATED WITH MEDIAL SCAPULAR WINGING ON THORACIC OUTLET PATIENTS- CLINICAL AND ANATOMICAL STUDY

Madi El-Haj, Safran Ori , Sofia Vorobeitchik, Tal Eliav, Beyth Shaul
Hadassah Hebrew university medical center, Jerusalem, Israel

Introduction: The long thoracic nerve (LTN) originates from the cervical spinal roots c5-6-7 -8 with variability and traverses the middle scalenus muscle. Compressive neuropathy of the LTN causes medial scapular winging. Scalenus muscles hypertrophy and fibrosis is associated with Thoracic outlet syndrome (TOS).
Aim: We aimed to investigate the prevalence of preoperative medial scapular winging in TOS patients and its correlation with the anatomical variation of the LTN scalenus route.
Material & Methods: A retrospective review was conducted between January 2019 to June 2023, including 71 patients: 40 with Neurogenic TOS (NTOS) and 31 patients with Venous TOS (VTOS) (Table 1), who underwent thoracic outlet decompression first rib resection utilizing supra and para- clavicular approaches respectively. Preoperative medial scapular winging was evaluated based on clinical observation of the medial and inferior scapular borders for winging

or prominence, lack a smooth, coordinated movement with early scapular elevation or during arm forward flexion, and rapid downward rotation during arm lowering from full flexion. Intraoperatively, prior to middle scalenectomy, the LTN was carefully dissected and electrically stimulated. Photographs and videoing of the anatomical variants were taken for the 71 patients. Intramuscular and extramacular LTN classification was done based on the passage of the main LTN trunk relative to the Middle Scalene muscle. Further sub-classification was done based on the root contribution variance (Figure 1). Data analysis of LTN variants' prevalence and correlation with preoperative medial winging was done using the chi-square test.

Results: Medial scapular winging was observed in 37.5 % of patients with NTOS and 29% with VTOS. Two main groups were characterized: Extramacular and Intramuscular types with sub-classifications (IA, IB, IIA, IIB, IIIA, IIIB, IV, VA, VB. VC, VI, and VII). The Intramuscular type was observed in 32.5 % and 16.1 % in NTOS and VTOS, respectively.

Scapular winging was observed in 94% of the intramuscular group vs 13% of the extra-muscular groups. A highly significant correlation was observed between LTN intramuscular variant and scapular winging within the 71 TOS patients and within the NTOS and VTOS separately. (Table -2) (p=0.000).

Conclusions: intramuscular LTN is associated with preoperative scapular winging in patients with thoracic outlet syndrome. Great care should be taken during middle scalenectomy to avoid iatrogenic LTN injury.

A-0194 GILLIATT-SUMNER HAND (GSH)– OPERATE BEFORE IT'S TOO LATE!

Madi El-Haj, Safran Ori, Sofia Vorobeitchik, Tal Eliav, Beyth Shaul
Hadassah Hebrew University Medical Center, Jerusalem, Israel

Introduction: Gilliatt-Sumner hand (GSH) is a chronic compressive neuropathy of the lower trunk of the brachial plexus that usually presents with pain, intrinsic hand muscle weakness and atrophy. If untreated, progressive irreversible atrophy of the hand musculature is inevitable.

Aim: The aim of the present case series was to describe the spectrum of disease, diagnosis, and treatment of GSH.

Material & Methods: Clinical manifestation GSH includes symptoms of neurogenic thoracic outlet syndrome (NTOS) with muscle atrophy of the abductor digiti minimi (ADM), abductor pollicis brevis (ABP), and/or interosseous musculature. As in patients with NTOS, electrodiagnostic (ED) assessments, upper extremity ultrasounds duplex both arterial and venous and MRI neurography of the brachial plexus was done. All patients with a diagnosis of NTOS-GSH had undergone thoracic outlet decompression (TOD) surgery using a supraclavicular approach. Preoperative assessment included: Brief Inventory Index (BPI), Pain Rating Index (PRI), SF-12, Pain Catastrophizing scale (PCS), and Zung Self-Rating Depression Scale (SDS). The standardized Elevated Arm Stress Test (sEAST) and pinch and grip strength was used to assess patient motor function before TOS decompression surgery.

Results: Forty-seven patients with NTOS underwent either supraclavicular, paraclavicular and/or pectoralis minor tenotomy. Five (10%) patients were diagnosed with GSH. Clinical examination revealed weakness and atrophy of the ADM, APB, and interosseous musculature in all five patients. The ED assessments showed neurogenic changes of the APB, (first dorsal interossei) FDI, and ADM in the absence of cubital or Guyon's canal conduction delay. MRI neurography showed an indented lower trunk of the brachial plexus ("glass deformity") that correlated with intraoperative findings. US duplex of confirmed additional vascular compression of the SCV and SCA in two patients, SCA in one patient, SCV in one patient, and no vascular compression in one patient. Post-operative pain lasted between 1 and 18 years. Severe atrophy and clawing presented in the first three patients with longer durations of pain (6, 6.5, and 18 years) whereas weakness with mild atrophy was more prominent in the two patients with a shorter duration (1 and 1.5 years). Following decompression MRC

grade of the APB, FDI improved in 4 patients; the patient with pain lasting 18 years failed to show any motor improvement. Conclusions: GSH is an NTOS vascular variant associated with progressive weakness and atrophy of intrinsic hand musculature. Clinical examination combined with MRI neurography and positive EDX studies is useful for establishing the diagnosis. Early decompression prevents irreversible intrinsic muscle loss

A-0195 THE RELIABILITY AND APPLICABILITY OF TEN TEST IN HAND INJURIES: A SYSTEMATIC REVIEW

Marcel Chua[1,2], Ishith Seth[1,2], Warren M. Rozen[1,2]
[1]Central Clinical School at Monash University, Victoria, Australia; [2]Peninsula Health, Victoria, Australia

Introduction: Early detection of nerve injuries in hand trauma is paramount to ensure optimal rehabilitation and functional outcomes. A multitude of examinations are available to assess sensation including the widely accepted gold standard Weinstein Enhanced Sensory Test (WEST). Another method of assessment is the Ten Test (TT), a two-point discrimination test, which quantifies sensory discrimination by comparing an injured area with a contralateral uninjured area on a ten-point Likert scale. It is quick, simple, equipment-free and repeatable, thus potentially being advantageous over other examinations. However, the process of quantifying a subjective measure raises concerns regarding the Ten Test's reliability and applicability, therefore needing further investigation.

Within the context of this study, reliability pertains to the consistent results produced by different examiners (inter-examiner reproducibility) or by the same examiner across multiple tests (intra-examiner repeatability).

Aim: To consolidate and evaluate current evidence in the reliability and applicability of the Ten Test.

Material & Methods: A systematic review was conducted with a formulated PICO question – if the index test TT has superior outcomes of inter- and intra-examiner reliability compared to the comparator test WEST in a population of adults >18 years old with acute hand injuries. A systematic search was conducted on major databases including PubMed, Scopus, Web of Science and Cochrane CENTRAL, extending from January 1901 to September 2023. The entirety of the search strategy, articles screening and selection adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P) and was registered in PROSPERO (ID: CRD42023465459). Peer-reviewed articles investigating TT as a variable of interest in a human population with injuries or nerve disorders of the hand were included. A qualitative assessment of inter- and intra-examiner reliability was conducted. Included articles were assessed for risk of bias according to QUADAS-2 and the overall certainty of evidence was summarised using the Grading of Recommendations, Assessments, Development, and Evaluations (GRADE) tool.

Results: Five articles were included in this review. High inter-examiner reliability was demonstrated with Inter-examiner reliability intraclass correlation coefficient (ICC) values of 0.9148 and 0.95, alongside a kappa statistic of 1, as reported by three distinct studies. Intra-examiner reliability, however, displayed some variance, with one study reporting a significant ICC in four out of six instances. Two studies corroborated that TT results corresponded with the findings of WEST, each presenting a Spearman rank coefficient of -0.71. Based on GRADE, TT's overall applicability remains uncertain.

Conclusions: Previous studies exhibited commendable inter-examiner consistency, though its intra-examiner repeatability might fluctuate based on examiner expertise and injury specifics. Nonetheless, the applicability of the TT into clinical practice is not yet achievable based on the current low certainty of evidence. Interestingly, certain studies touted TT's superiority over the WEST. While TT stands out for its simplicity, quickness, and equipment-free nature, it has not been extensively studied or adopted. Considering its potential clinical significance, deeper exploration into its predictive capacity for nerve damage in hand injuries is crucial. Future studies could juxtapose TT against objective benchmarks like nerve conduction studies.

A-0196 TECHNIQUES OF CONTINUOUS CATHETER IRRIGATION TO TREAT CLOSED SPACE HAND INFECTIONS

Wang Qiao, Duncan Angus McGrouther
Singapore General Hospital, Singapore

Introduction: We have developed a minimally invasive technique for the management of hand infections by continuous catheter irrigation . We introduce infant feeding catheters, or intravenous catheters by small incisions and deliver saline by infusion pump. The wounds are tagged to allow escape of fluid which is collected in bulky dressings. The technique has been applied for flexor tenosynovitis, septic arthritis of hand or wrist joints, subcutaneous abscesses or deep space infections. The patient is encouraged to move the affected part to prevent stiffness and this encourages the movement of fluid in small spaces. The mechanism appears to be dilution of inflammatory mediators. This effective technique avoids extensive excisional debridement procedures. Generally only one procedure is necessary without repeated debridement or secondary closure.

Surgical techniques

Flexor tenosynovitis

A one cm incision is made at distal palmar crease and A1 pulley was released. A second 5mm stab incision is made over the DIPJ crease and the distal margin of A5 pulley is opened. A 6-FG infant feeding catheter is inserted into tendon sheath. The distal catheter tip was tied into a tight knot. fenestration is made on the catheter wall to allow irrigation.

Septic arthritis of MCPJ

An 2cm dorsal longitudinal incision is made over MCPJ to expose sagittal band. A tunnel underneath the sagittal band is created within the joint capsule. A 6-FG infant feeding catheter is introduced through the tunnel. Similar distal tip tie and catheter fenestration are made.

Septic arthritis of PIPJ and DIPJ

For PIPJ septic arthritis, a small dorsal longitudinal incision is made over the joint. An 18G intravenous canula is used. Fenestration is made on the cannula with the needle in situ. The cannula is inserted through the skin, then passing between central slip and PIPJ collateral ligament, to the opposite side. The needle of the cannula is then removed, and the tip is lipped using ligaclips. Similar method is used for DIPJ irrigation.

Septic arthritis of wrist joint

Wrist joint is debrided using arthroscope. A 6-FG infant feeding catheter is passed through radiocarpal joint via 3,4 portal to 6R portal. Another catheter is passed though midcarpal joint via MCR to MCU portal. Similar distal tip tie and catheter fenestration are made.

Subcutaneous abscess and Deep space abscess

Open drainage is normally performed first. One or more catheters may be used to pass through the cavity based on the depth and orientation of infection. Similar distal tip tie and catheter fenestration are made.

Post-operative care

All incisions are tagged after intraoperative irrigation. In the ward, the irrigation catheter is connected to 0.9% normal saline delivered through a infusion pump for continuous irrigation at a rate of 5-10 mL/hour. Fluid is absorbed by the bulky wool dressing. Catheters are commonly removed after POD 4.

Outcomes

Compared to conventional open drainage, continuous catheter irrigation facilitates drainage of pus, dilutes the inflammation in the infected cavity, preserves critical structures and allows primary closure of wounds. Better clinical outcomes are observed.

A-0197 ONE BONE FOREARM AS SALVAGE PROCEDURE FOR FOREARM DEFORMITIES IN DEVELOPMENTAL AGE

Nunzio Catena[1], Chiara Arrigoni[1], Filippo M. Senes[2]
[1]IRCCS Gaslini Children Hospital, Genova, Italy; [2]San Giuseppe Hospital - Multimedica Group, Milano, Italy

Introduction: In adult population, one bone forearm (OBF) is a rarely used, usually as a salvage, procedure in recalcitrant forearm defects.
Conversely in children, it can be a useful solution for correction of forearm deformities consequence of congenital and hereditary pathology such as ulnar longitudinal deficiency (ULD) and multiple hereditary exostosis (MHE).
OBF allows the patients to improve forearm function, increasing their autonomy in daily life activities.
Aim: The authors describe their experience of more than 25 years.
Material & Methods: A retrospective review of all the patients treated for ULD and MHE from 1996 to 2023, has been carried out.
Eleven patients underwent OBF procedure; eight cases suffered from congenital ULD, two cases were affected by MHE and one case by multiples bone dysplasia.
Results: Patients with ulna longitudinal deficiency had the longer follow-up because treated by the senior author of the group while the three cases of other etiology had a short to medium time follow-up. The OBF was fixed with Kirschner wires in ULD cases whereas plate and screws were used in MHE and bone dysplasia patients.
OBF consolidation was achieved in 10 out of 11 cases; the last treated child is still under treatment.
A delayed consolidation was observed in one case of ULD.
All cases showed improvement of forearm function and of grasping ability of the hand.
In long-term radiographic control, in the cases of ulnar longitudinal deficit, there is the formation of a structure that was morphologically similar to that of the previously resected radial head.
Conclusions: OBF can be considered as a safe and reproducible procedure in children suffered from forearm deformities.
Kirschner wires allow a fast and inexpensive fixation of the osteotomy in children younger than 6 years while plate and screws should be considered during scholar age and teen age.
Despite being a salvage procedure, OBF has been demonstrated to be a procedure that allows to achieve a permanent forearm stability thus increasing the child's independence in many daily life activities.

A-0198 CONGENITAL ICHTHYOSIS: HOW CAN A HAND SURGEON CAN BE USEFUL TO?

Chiara Arrigoni, Nunzio Catena
Reconstructive Surgery and Hand Surgery Unit, IRCCS Gaslini Children Hospital, Genova, Italy

Ichthyosis is a heterogeneous group of keratinization disorders based on mutations of several genes. Congenital ones may be present at birth and, sometimes, can cause systemic or musculoskeletal involvement. The latter manifests itself at the acral level, particularly in the hands, with syndactyly, brachydactyly and constricting bands which, in severe forms, can lead to real amputations.
Being a rare condition and with a variable spectrum of clinical presentation, literature is very sparse about evaluation and treatment of hand manifestations and is always from dermatological and symptomatic perspective.
It may happen, however, that hand surgeon is involved in the management and, at times, even to express opinions in the case of prenatal diagnosis.
The dissertation has the purpose of disseminating knowledge of these rare diseases and explaining how the figure of the hand surgeon can be an active part of the diagnostic and therapeutic process.

A-0199 COLLAGENASE INJECTION COMPARED WITH LIMITED FASCIECTOMY FOR MODERATE DUPUYTREN'S CONTRACTURE: THE DISC NON-INFERIORITY RANDOMIZED CONTROLLED TRIAL

Joseph Dias[1], Puvanendran Tharmanathan[2], Catherine Arundel[2], Charlie Welch[2], Qi Wu[2], Paul Leighton[3], Maria Armaou[1], Belen Corbacho[2], Nick Johnson[4], Sophie James[2], John Cooke[1], Chris Bainbridge[4], Michael Craigen[5], David Warwick[6], Samantha Brady[2], Lydia G Flett[2], Judy Jones[1], Catherine Knowlson[2], Michelle Watson[2], Ada Keding[2], Catherine E Hewitt[2], David Torgerson[2]

[1]University Hospitals of Leicester NHS Trust; [2]York Trials Unit; [3]University of Nottingham; [4]Pulvertaft hand centre, Derby; [5]Royal Orthopaedic Hospital NHS Foundation Trust, Birmingham; [6]University Hospital Southampton NHS Foundation Trust

Introduction: Dupuytren's contracture (DC) is caused by cords which pull fingers towards the palm. Treatments include limited fasciectomy (LF) and collagenase injection. Evidence comparing LF with collagenase injection is limited.

Aim: The DISC trial compared collagenase injection to limited fasciectomy (LF) to treat Dupuytren's contracture (DC) of ≥30°, investigating clinical effectiveness to 2 years after treatment.

Material & Methods: Multicenter, pragmatic, two-arm, randomized controlled non-inferiority trial that compared collagenase injection to LF. Patients with moderate DC were recruited from 31 UK NHS hospitals and randomized 1:1 to either treatment. Neither participants nor clinicians were blind to treatment allocation.

The primary outcome was the Patient Evaluation Measure (PEM) Hand Health Questionnaire 1-year post-treatment. The pre-specified non-inferiority margin was 6 points. Secondary outcomes included; Unité Rhumatologique des Affections de la Main scale, Michigan Hand Questionnaire, Single Assessment Numeric Evaluation, contracture recurrence, extension deficit, re-intervention and complications.

Results: 672 participants were randomized (n=336 per group). Primary analysis included 599 (n=285 LF; n=314 collagenase).

Whilst collagenase led to a quicker recovery, by A6 months this difference had disappeared. and Bby t 1-year, collagenase was inferior to LF (difference in PEM scores 5.95 (95%CI: 3.12 to 8.77, p=0.49 one-sided test of H0:δ≥6) with the difference in favour favor of LF increasing at 2 years to 7.18 (95%CI: 4.18 to 10.88).

LF provided greater extension at 1 year (passive extension difference 10.10° (95%CI 6.46° to 13.73°, strong evidence).

Collagenase had was associated with more complications (n=267, 0.82/participant) than LF (n=177, 0.60/participant); LF had was associated with more "moderate"/"severe" complications (5% vs 2%). Contracture recurred more often after collagenase (OR 1.39, 95%CI 0.74 to 2.63, weak evidence) and required re-intervention sooner (HR 4.73; 95%CI 1.81 to 12.34, strong evidence).

Conclusions: Collagenase is less effective than LF. Future research should establish longer-term differences in recurrence and re-intervention rate.

A-0200 AGREEMENT BETWEEN PHOTOGRAPHIC AND GONIOMETRIC MEASUREMENTS OF DUPUYTREN'S CONTRACTURE – A DISC SUBSTUDY

Nick Johnson[1], Charlie Welch[2], Puvanendran Tharmanathan[2], Catherine Arundel[2], Joseph Dias[3]

[1]Pulvertaft hand centre, Derby, United Kingdom; [2]York clinical trials unit, York, United Kingdom; [3]University hospitals of Leicester, Leicester, United Kingdom

Introduction: Dupuytren's contracture is a fibro-proliferative disease that results in the contracture of one or more joints of the hand. These contractures need to be accurately measured to define and evaluate important outcomes such as severity, correction, and recurrence.

Aim: The aim of this study was to investigate whether measurements of joint contracture obtained using photographs reflect measurements obtained using goniometry by evaluating the agreement between photographic and goniometric measurements. We also investigated the reproducibility of each method of measurement.
Material & Methods: This was a substudy of the DISC trial: a randomised controlled trial investigating whether collagenase injection is not inferior to limited fasciectomy. Patients were shown how to take the required photographs of their hand and provided with detailed instructions. Joint angles of the photographed digit were measured by two observers, using anonymised digital images and a standardised measurement protocol. As part of the main study all participants had goniometric measurements and photographs of the contracted digit taken by a clinician. Repeat pre-operative goniometric and photographic measurements were used to assess reproducibility of each measurement method.
Results: Agreement between goniometric joint measurements obtained by an investigator and measurements obtained using photographs taken by participants at home was poor(n=97). After accounting for systematic differences between the two methods of measurement, the estimated 95% limits of agreement were approximately +/- 30° for the MCP joint, between +/- 12° and +/- 45° for the PIP joint (depending on the magnitude of contracture), and approximately +/- 20° for the DIP joint. Agreement between goniometry and measurements obtained using photographs taken in clinic showed similar patterns and limits of agreement(n=587). Both goniometric(n=364) and photographic(n=252) measurement methods had wide limits of agreement for repeated measurements made within 12 weeks of each other.
Conclusions: Measurements taken by the two different techniques cannot be used interchangeably to monitor disease progression or response to treatment.

A-0201 THE COST-EFFECTIVENESS OF COLLAGENASE INJECTION VERSUS LIMITED FASCIECTOMY FOR MODERATE DUPUYTREN'S CONTRACTURE: AN ECONOMIC EVALUATION OF THE DISC TRIAL AND A DECISION ANALYTICAL MODEL

Qi Wu[1],Charlie Welch[1], Puvanendran Tharmanathan[1], Catherine Arundel[1], Nick Johnson[2], Joseph Dias[3]
[1]York Trials Unit; [2]Pulvertaft hand centre, Derby; [3]University Hospitals of Leicester NHS Trust

Introduction: Existing literature has shown inconsistent conclusions about the cost-effectiveness of LF versus collagenase, highlighting the need for high-quality economic evaluation based on a prospective randomised controlled trial.
Aim: To compare the cost-effectiveness of collagenase injection (collagenase) and limited fasciectomy (LF) surgery in treating moderate Dupuytren's contracture (DC) in the UK over different time horizons.
Material & Methods: An incremental cost-effectiveness analysis (CEA) was conducted alongside a multicentre, pragmatic, parallel randomised controlled trial (DISC), to determine the short-term cost-effectiveness of collagenase compared to LF. A micro-costing approach provided detailed costs for both interventions. Quality-adjusted life years (QALYs) was the health outcome used for the economic analyses. A long-term Markov decision analytic model evaluated the lifetime cost-effectiveness of the two treatments.
Results: Collagenase was associated with significantly lower cost and lower QALY gain compared to LF at 1 year. The probability of collagenase being decrementally cost-effective was over 99% at willingness-to-pay (WTP) thresholds between £20,000 and £30,000 per QALY. These findings were robust across all sensitivity analyses. Over 2 years, collagenase was both significantly less costly and less effective compared to LF, and LF became the cost-effective treatment when the WTP threshold exceeded £25,488. There was a high level of uncertainty surrounding the 2-year results. Over a lifetime horizon, collagenase generated a cost saving of £2,968 per patient, but was associated with a mean QALY loss of -0.484. The probability of collagenase being cost-effective dropped to 22% and 16% at £20,000 and £30,000 per QALY, respectively.
Conclusions: Collagenase was less costly and less effective than LF in treating DC. The cost-effectiveness of collagenase

versus LF was time-dependent. Collagenase was highly cost-effective one-year post-treatment, but the probability of collagenase being cost-effective declined over time. The Markov model suggested that LF is more cost-effective over a lifetime horizon. This conclusion based on assumptions about model structure and inputs to simplify reality, and further research is recommended to validate the long-term cost-effectiveness of the two treatments.

A-0202 SIMPLE EXCISION OF PROXIMAL POLE SCAPHOID NONUNION. CAN THIS BE A TREATMENT?

Ana Scott-Tennent De Rivas[1,2], Pau Forcada Calvet[1,2], Mireia Esplugas Mimó[3], Álex Lluch Bergadà[3,4], Maria Larrea Zabalo[3], Ignacio Esteban Feliu[4], Marc García-Elias[3]

[1]Hospital Universitari Arnau de Vilanova, Lleida, Spain; [2]Hospital Universitari Santa Maria, Lleida, Spain; [3]Institut Kaplan, Barcelona, Spain; [4]Hospital Universitari Vall d'hebron, Barcelona, Spain

INTRODUCTION: Due to the biological, anatomical, and biomechanical features of the scaphoid, treatment of proximal pole nonunions is challenging. The location of the fracture or the nonunion in the proximal third of the scaphoid may have an influence on its natural history , as they can be proximal or distal to the dorsal apex.

AIM: Based on this concept, patients who have a proximal pole nonunion located proximal to the dorsal apex and maintain an intact insertion of the dorsal scapholunate ligament (DSSL) in the distal fragment may benefit from proximal pole simple excision. The aim of this clinical study is to revise how are the patients that have received this treatment coping.

MATERIAL AND METHODS: A retrospective multicenter (two hospitals) case series study was designed. Patients who were treated by surgical excision of a non-viable proximal pole because of painful scaphoid nonunion with a fracture line proximal to the dorsal apex and intraoperative confirmation of intact DSLL insertion were included.

Surgical Technique: The first stage was to confirm intraoperatively that the DSLL insertion was maintained in the distal fragment and the dorsal SL ligament was not injured, the fragment was not viable and that the proximal pole fracture line was proximal to the apex as suspected preoperatively by X Ray or CT scan. After this first staged was confirmed, the second was proximal pole excision.

OUTCOMES: Demographic characteristics and clinical outcome data was collected from clinical records, direct anamnesis and physical examination. Patient reported outcome measures were gathered through written questionnaires according to the ICHOM protocol for hand and wrist conditions (Wouters et al., 2021) when possible. For secondary objectives, information was collected from clinical history records and available X Rays or CT scans.

Statistics: Because of the nature of the study design, no sample size calculation was done, and the analysis was mainly descriptive. Although this is a case series study, statistical analysis was done in order to assess whether these differences were significant using non-parametric Wilcoxon signed rank test with continuity correction test was used. The p-value was adjusted by the method described by Benjamini and Hochberg in 1995.

RESULTS: 11 patients who had this treatment were retrospectively reviewed. Postoperative pain, PRWE, PSFS and ED-Q5 improved. 10/11 were highly satisfied. 10/11 returned to previous laboral activities. 4/11 patients complained about dorsoradial discomfort after surgery, but only 1 required surgical revision for radial styloidectomy. No radiological progression to SNAC pattern or other complications were found.

CONCLUSIONS: These findings support that simple excision of the proximal pole may be a relatively simple and valid treatment in cases of proximal pole scaphoid nonunion with a non viable proximal fragment in which a competent DSSL keeps its insertion in the distal fragment.

A-0203 RADIOLUCENT ILIZAROV MINI-APPARATUS

Alexander Zolotov, Julia Dyachkova, Semyon Azon
Medical Center, Far Eastern Federal University, Vladivostok, Russia

Introduction: The use of a radiolucent composite material permits easier and more accurate radiographic evaluation of the bone healing process, and results in a much lighter system (Baidya K.P. et al., 2001). Clear visualization is especially important when treating injuries and diseases of the finger joints. Most known mini external fixators are made of metal, so they obscure the image of bones and joints on radiographs. A "transparent" alternative to steel external fixators are devices made from polymers.

Aim: to analyze the first experience of using the Ilizarov mini-apparatus, the arcs of which are made of polymer material using 3D printing.

Material & Methods: We analyzed the treatment of eight patients (ages 15 to 67). A radiolucent Ilizarov mini-apparatus was used to reduce and fixate a phalanx fracture (1), to gradually eliminate finger deformities associated with Dupuytren's contracture (4), posttraumatic contracture (2) and rheumatoid arthritis (1). Before surgery, all parts of the Ilizarov mini-apparatus were sterilized in the traditional way. In addition, a comparative weighing of the original steel arc and polymer arc was carried out using electronic scales. The period of distraction and fixation in the apparatus was 21-45 days. Patients with severe Dupuytren's contracture underwent a partial fasciectomy after the removal of the external fixator. A patient with rheumatoid arthritis and a rigid boutonniere deformity underwent a section of the terminal band of the extensor apparatus at the level of the middle phalanx after eliminating the flexion contracture of the PIPJ.

Results: In all cases, the deformity was eliminated using a transparent Ilizarov mini-apparatus. The polymer arcs withstood sterilization and did not lose strength. The "invisible device" made it easier to control the image of bones and joints during X-ray examinations. During treatment, the polymer arcs retained the required strength. The weight of the steel arc was 9 g; the weight of the polymer one was 3 g.

Conclusions: The Ilizarov mini-apparatus, assembled from polymer arcs, was effective in the treatment of our patients with finger deformities. This device has positive properties - radio transparency and lightness. A transparent polymer device can be an alternative to the traditional original Ilizarov mini-apparatus and to similar external fixators made of metal.

A-0204 PYROCARBON INTERPOSITION VERSUS FOUR-CORNER FUSION IN PATIENTS AROUND 60 YEARS OF AGE: LONG-TERM RETROSPECTIVE STUDY FOR SLAC, SNAC OR SCAC STAGE 3

Lozano[1,2], Cointat[3], Bouju[1], Kerjean[1], Lecoq[1], Bellemère[1]
[1]Institut de la Main Nantes-Atlantique, Santé Atlantique, avenue Claude Bernard, Saint-Herblain, France; [2]Service de Chirurgie de la Main et Reconstruction de l'appareil locomoteur, Centre Chirurgical Emile Gallé, Centre Hospitalier Régional Universitaire de Nancy, Nancy, France; [3]Service de Chirurgie orthopédique et Chirurgie du Sport, Institut Universitaire Locomoteur et du Sport (iULS) CHU de Nice, Hôpital Pasteur 2, Nice, France

Introduction/Aim: We compared the outcomes of Amandys® and four-corner fusion in patients aged over 50 years old with grade 3 wrist osteoarthritis with a mean follow-up of five years.

Material & Methods: Clinical assessments were pain, mobility, strength, functional scores, and satisfaction. A radiographic analysis was performed. 46 patients with an average age of 63 years (28 4-CF and 21 Amandys®) were included.

Results: Pain relief, mobility and functional scores were not significantly different in the two groups at inclusion. At last follow-up, extension and grip were improved after Amandys® arthroplasty. Flexion decreased after four corner fusion. One

patient was not satisfied in the Amandys® group. One dislocation required repositioning of the implant in the Amandys® group. There were six non-unions of which one required revision surgery in the four-corner fusion group.
Conclusions: With the Amandys®, immobilization was shorter and mobilities improved making it a valid alternative to four corner fusion especially in elderly patients.

A-0205 TRAPEZIOMETACARPAL JOINT INSTABILITY. BIOMECHANICAL ANALYSIS OF LIGAMENT RECONSTRUCTIONS

Enric Domínguez Font[1], Montserrat Del Valle Jou[2], Angel Ferreres Claramunt[3], Guillem Salvà Coll[4], Alfonso Rodríguez Baeza[5]
[1]Parc de Salut Mar, Barcelona, Spain; [2]Hospital de l'Esperit Sant, Santa Coloma Gramanet, Spain; [3]Institut Kaplan, Barcelona, Spain; [4]Hospital Universitari Son Espases, Palma, Spain; [5]Facultat de medicina, Universitat Autònoma de Barcelona, Bellaterra (Cerdanyola del Vallès) Barcelona, Spain

Abstract
Purpose: In the presence of TMC joint instability, we must prioritize the ligaments that must be repaired to restore joint stability. Most of the studies have been focused on evaluating the importance of the different ligaments in the stability of the TMC joint. In contrast, there are no studies about the biomechanical behaviour of ligamentous reconstructions in this joint. The aim of our study was to analyse de biomechanical effect of two different dorsoradial ligament reconstructions of the TMC joint: (1) Monofascicular ligament reconstruction and (2) Bifascicular ligament reconstruction.
Methods: 10 fresh-frozen human cadaver specimens were dissected an attached to a testing device with the thumb positioned in the screw home torque position. To detect spatial changes in the TMC joint, a three-dimensional motion tracking system (Fastrak® system, Polhemus Inc., Colchester, VT, USA) was used. Those spatial changes were analysed in four different situations: (1) with the dorsoradial and intermetacarpal ligaments intact, (2) after their section, (3) after reconstruction with the bifascicular technique, and (4) after reconstruction with the monofascicular technique. In those four situations, a first measurement was performed without loading and a second measurement was done after applying a dorsoradial luxating force. The data were further analysed using the Shapiro-Wilk test. In those that followed a normal distribution, a T-test was performed. If any of the variables did not follow a normal distribution, a U of Mann-Whitney test was performed. The results were considered statistically significant at $p < 0.05$.
Results: The dorsoradial translation of the base of the first metacarpal after applying a luxating force was: 0.36 cm (SD 0.19 cm) with intact ligaments, 0.64 cm (SD 0.24 cm) after sectioning the ligaments, 0.31 cm (SD 0.16 cm) with a bifascicular ligament reconstruction, and 0.57 cm (SD 0.19 cm) with a monofascicular ligament reconstruction. No statistically significant differences were found between the intact ligaments and the bifascicular technique groups ($p=0.912$). By contrast, statistically significant differences were found between the intact ligaments group and the monofascicular technique group ($p=0.023$). In fact, no statistically significant differences were found between the ligaments section group and the monofascicular group ($p=0.510$).
Conclusions: The monofascicular reconstruction technique is insufficient to stabilize the TMC joint. The dorsoradial ligament and the dorsocentral ligament reconstruction with the bifascicular technique restores the original stability of the TMC joint and thereby impedes dorsoradial dislocation. Moreover, it is not necessary to reconstruct the intermetacarpal ligament to restore the dorsoradial stability of the TMC joint after bifascicular reconstruction.

A-0206 EVALUATION OF NUMBNESS USING NRS AND RELATED FACTORS AFTER CARPAL TUNNEL SYNDROME SURGERY

Takahiro Yamazaki, Yusuke Matsuura, Shinji Taniguchi, Ryutaro Iwasaki, Atsushi Hojo, Tatsuki Kobayashi, Kinshiro Nabeshima, Seiji Ohtori
Department of Orthopaedic Surgery, Chiba University Graduate School of Medicine, Japan

Purpose: The study aimed to identify factors contributing to the improvement of numbness following carpal tunnel surgery.
Methods: The study involved 70 patients (78 hands) who underwent carpal tunnel surgery at our hospital from April 2021 to March 2023. Four cases lost to follow-up before improvement, one case unable to undergo nerve conduction velocity tests preoperatively, and one case with cerebral hemorrhage were excluded, leaving 64 cases (72 hands) for analysis. Numbness severity was assessed using the Numeric Rating Scale (NRS), categorizing 0-1 as 'excellent,' 2-4 as 'good,' 5-7 as 'fair,' and 8-10 as 'poor.' Further, 'excellent' was grouped as E group and others as O group, examining various factors' associations.
Results: Participants included 28 males and 36 females, with an average age of 67.3 years (range: 32-92 years) and an average disease duration of 2.85 years (range: 3 months-30 years). NRS assessments resulted in 'excellent' for 41 cases, 'good' for 17 cases, 'fair' for 7 cases, and 'poor' for 7 cases. The average ages for E and O groups were 62.1 years (SD: 11.4 years) and 74.2 years (SD: 15 years), respectively, with average disease durations of 3.2 years (SD: 5.4 years) and 2.4 years (SD: 2.2 years). Diabetic patients were significantly higher in the O group (16 cases) compared to the E group (5 cases) ($P<0.001$). Nerve conduction velocity tests showed ES in 4 cases in the E group and 14 cases in the O group, significantly higher in the O group ($P<0.001$). Logistic regression analysis indicated significant associations of diabetes (odds ratio: 0.183, $P=0.015$) and nerve conduction velocity test results (odds ratio: 0.752, $P<0.001$) with numbness improvement. The ROC curve for nerve conduction velocity test latency at a cutoff of 8.66ms showed an AUC of 0.807, with a sensitivity of 0.805 and specificity of 0.774.
Discussion: This study revealed diabetes and nerve conduction velocity test latency as significant factors in the improvement of numbness following carpal tunnel surgery. Particularly, when the latency is below 8.66ms, about 80% of patients are predicted to rate their numbness improvement as 'excellent.

A-0207 HAND AND FOREARM INJURIES ASSOCIATED WITH BILATERAL RADIUS FRACTURES

Jae-min Lee, Jin-Rok Oh
Department of Orthopaedic Surgery, Wonju Severance Christian Hospital, Wonju, South Korea

Background: Bilateral distal radius fracture with concomitant hand and forearm injuries are very rare. Although there are several epidemiological studies, there has not yet been a study that analyzes associated hand and forearm injuries in bilateral distal radius fractures. This aims to aid health providers anticipate and diagnose additional injuries that can be neglected in patients with bilateral radius fracture.
Method: A retrospective study was done from 2004 January to 2022 September. 49 patients were identified with bilateral radius fractures, and medical records were analyzed for demographic, mechanism of injury, fracture type, and associated injury.
Results: Bilateral distal radius fracture was more common in high-energy trauma, male, and ages younger than 65. AO classification type C fracture was the most common, and total concomitant hand and forearm injuries were 36 cases. Among 36 concomitant injuries, ulna styloid fracture was the most common. Males showed higher number of cases

in ligament injury and scaphoid fracture compared to females. High energy trauma was more commonly seen in ages lower than 65 and males.
Conclusion: Patients with bilateral fractures were more commonly observed in male patients who suffered from high energy trauma. Among concomitant injuries, ulna styloid fracture was the most common. Compared to females, a greater proportion of males were younger than age 65 and were more likely to sustain high energy trauma. Also, males were more likely to sustain ligament injuries and scaphoid fractures. Therefore, it may be helpful to carefully examine ligament and scaphoid injuries in male bilateral radius fracture, as they can be easily missed.

A-0208 RECONSTRUCTIVE SURGERY OF CAPUT ULNAE SYNDROME WITH SAUVE-KAPANDJI PROCEDURE REGARDLESS OF RHEUMATOID ARTHRITIS

Hyun-woo Kim, Jin-Rok Oh
Department of Orthopaedic Surgery, Wonju Severance Christian Hospital, Wonju, South Korea

Introduction: Caput ulna syndrome is tendon rupture that occurs from increased pressure over the extensor compartments due to synovitis in DRUJ. It stretches the ECU subsheath and consequently leads the ECU subluxation, supination of the carpal bones away from the head of the ulna, and finally volar carpal subluxation. As a result, this can lead to dropped fingers from extensor tendon rupture, instability of the radioulnar joint and limited wrist dorsiflexion and limited supin5ation. In this paper, we aim to discuss the surgical technique of Caput ulnae syndrome.
Materials and Methods: From February 2019 to April 2021, we have done 4 cases disregarding the presence of rheumatic diseases. The author used two surgical techniques, 'Side Sutures' for 3 cases and PL tendon graft for 1 case. All cases incorporate the Sauve-Kapandji procedure, which includes distal ulnar osteotomy, arthrodesis DRUJ, and ECU tendon anchoring to distal portion of osteotomized proximal fragment.rnSide suture is used when 4th or 5th finger rupture occurs and normal tendon structure is intact. These ruptured tendons can be sutured to normal extensor tendons right next to them, which allows combined movement. rnPL tendon graft is used when 2nd, 3rd, 4th, and 5th extensor tendons are all ruptured. Since there is no normal tendon to support the 4 tendons nearby, chronically ruptured tendons are partially removed, and PL tendon is used to connect the 2nd, 3rd, 4th, 5th tendons into one bundle from proximal wrist to hand, which allow movement altogether. In this case, it is important for the tendon bundle not to move out of position, and therefore repairing the extensor retinaculum is key for the stability of the tendon movement.
Results: Side suture and PL tendon graft methods showed similar successful postoperative results. Recovery time showed a wide range from few weeks to few months. All patients were able to show active extension movement of phalanxes among 2, 3, 4, 5 digits after few weeks of surgery.
Conclusion: The two techniques both suture the chronically ruptured extensor tendon to the normal extensor tendon and allow both tendons to move together, which makes the grab and release function possible. This function is important for the patient's quality of life and day to day activity.rnCaput ulnar syndrome is a rare disease and few data exists on this topic. Our two surgical methods showed favorable results. Although the number of cases are small, considering the favorable results, side suture and PL tendon graft with Sauve-Kapandji operation could be both adequately used as treatment options according to the extent of tendon rupture.

A-0209 HYPERBARIC OXYGEN THERAPY AND PROSTAGLANDIN USAGE FOR SHRED INJURY IN THE FINGERS: A CASE REPORT

Hyun-woo Kim, Jin-Rok Oh
Department of Orthopaedic Surgery, Wonju Severance Christian Hospital, Wonju, South Korea

A 53-year-old woman came to the emergency department because her right hand had been stuck in a potato shredding machine for 30 minutes. The 2nd, 3rd, and 4th fingers were shredded into multiple slices deep into the phalangeal bone, which showed good circulation, and the wounds were cleaned with massive saline irrigation. The slices of each finger were put together to form the finger, which was sutured with nylon, and the circulation of the fingers remained good. Three weeks of gentamicin, cefazolin, and hyperbaric oxygen therapy(HBOT) were used for acute traumatic ischemia since color change of fingers were observed. Six weeks of prostaglandin(PG) was used for circulation recovery. The patient was able to grasp with minimal pain and do flexion and extension, and the wound was completely healed. X-ray showed the bone union process, and Digital Infrared Thermal Imaging (DITI) test showed relatively good circulation.
Keywords: shred injury, hyperbaric oxygen therapy, prostaglandin, vertical manner, primary repair

A-0210 EFFICACY OF OPERATIVE FIXATION FOR COMMINUTED DISTAL RADIAL FRACTURES IN THE ELDERLY PATIENTS AGED 75 AND ABOVE

Jae-Min Lee, Ji-su Park, Jin-Rok Oh
Department of Orthopaedic Surgery, Wonju Severance Christian Hospital, Wonju, South Korea

Introduction: In 2025, over 20% of South Korea's total population is expected to be aged 65 years or older and South Korea society is facing to enter hyper-aging society. Distal radial fracture is known to be the most common fracture in the elderly through even a simple fall. The effectiveness and functional outcome between surgical operation and conservative treatment of distal radial fractures in the elderly have been consistently debated. However, the need for surgical fixation of distal radial fractures in the elderly has been increasing. This study shows the effect of operative fixation for severely comminuted distal radial fractures in hyper-aged patient over 75 years old or more and the outcome of treatment and socioeconomic impact on aging society retrospectively.
Methods: From January 2011 to December 2021, 38 patients who were 75 years old or more with minimum 6 months follow up period were analyzed. Surgical fixation was done by single surgeon with either Arix® (JEIL Medical, Seoul, Korea) or Acu-loc® volar distal radius system (ACUMED, Hillsboro, OR, USA). In case of severe comminuted fractures or osteoporotic fractures, allo-chip bone was used as the structural scaffold. Authors measured functional outcome of wrist joint with Mayo Wrist Score System, and residence and labor status. Radial length, radial inclination, and volar tilt between preoperative, postoperative, and unaffected sides of each patients were measured. Postoperative states of distal radius were again evaluated at different time periods including 2 weeks, 1 month, and 3 months after the fixation using Wilcoxon rank-sum test. During postoperative follow up period, McNemar's test was used to analyze maintenance of proportion of acceptable reduction
Results: Among 38 elderly patients, 35 patients were female and median age was 80 (77-82). Most of the patients had AO/OTA type C3 fractures (24 cases, 63.2%). More than half of patients(56.8%) were diagnosed with osteoporosis. Mayo Wrist Score System(MWSS) at postoperative 6 months showed that 30 patients(78.9%) expressed excellent or good outcomes. Postoperative parameters indicated, radial length 6.90 mm (4.82-9.08), radial inclination 15.5 degrees (13.0-19.9), and volar tilt 10.8 degrees (7.2-14.5). These values were significantly different compared with preoperative values. There

were no significant difference in immediate postoperative radiologic parameters compared with unaffected sides. We identified with McNemar's test that in all time periods((2 weeks, 1 month, 3 months), there were no significant difference in the proportion of acceptable reduction in all parameters

Conclusion: Although treatment of distal radial fractures in the elderly is still controversial, operative treatment showed significantly improved functional and radiological outcomes and showed possibilities to reduce socioeconomic burden and to aid in early functional restoration and aesthetic deformity correction.

A-0211 USE OF ALLO-CANCELLOUS CHIP BONE GRAFT IN TREATMENT OF AO/OTA TYPE C3 COMMINUTED ARTICULAR DISTAL RADIUS FRACTURES

Ji-su Park, Jin-Rok Oh

Department of Orthopaedic Surgery, Wonju Severance Christian Hospital, Wonju, South Korea

Background: omminuted articular fractures of distal radius requires fine reduction of articular fragments and firm structural support in order to achieve bony union and anatomical restoration. Many locking plates' fixation systems have been introduced allowing firm fixation and early range of motion. However, comminuted fractures extending to articular line can leave bony defects that can lead to collapse and malunion. This retrospective study evaluated clinical and radiological outcomes of distal radius fractures treated with allo-cancellous chip bone grafting.

Methods: We performed a retrospective study on a cohort of 27 patients (11 male, 16 female). Preoperative and postoperative X-ray and CT scan were performed. The mean clinical and radiological follow-up period was 8.5 (6-31) months. Clinical results were assessed through the VAS pain score and Mayo wrist score. Radiological outcomes were assessed by radial inclination, volar tilt, and Soong grades were also measured. All patients had AO/OTA type C3 distal radial fractures.

Results: There were no adverse reactions or infections in all patients. Average age of the patients was 66.7 (53-84). All cases achieved bony union at 12.7±2.2 weeks in average. The mean radial inclination and volar tilt was 20.4±1.6 degrees and 6.7±2.3 degrees respectively. The mean Soong grade was 0.6 (0: 12 cases, 1: 13 case, 2: 2 case). The mean Mayo wrist score was 85.4, 9 patients (33.3%) showed excellent, 11 patients (40.7%) showed good, 6 cases (22.2%) showed fair, and 1 case (3.7%) showed poor. Total 74% of cases showed good or excellent. 4 cases had moderate limitation (50-74%) in range of motion and 9 cases showed slight decrease (75-99%). One 61 years old male patient with Soong grade 1 had FPL rupture at postoperative 11 months and was treated with PL tendon graft and implant removal. One 54 years old patient with Soong grade 2 had traumatic arthritis with stiffness and had undergone implant removal and rehabilitation and range of motion was improved to 70%.

Conclusion: In our experience, allo-cancellous chip bone can be used in order to fill the bony defect of comminution and can act as bony scaffold to support articular fracture fragments. Clinical and radiological outcomes were in acceptable range. We believe allo-cancellous chip bone grafting can be a good alternative strategy in treating AO/OTA type C3 distal radial fractures.

A-0212 GLOMUS TUMOR: TEN-YEAR EXPERIENCE

Bruno Morgado, Larissa Lanzaro, Leonor Caixeiro, Horácio Costa, Ana Pinto
Plastic and Reconstructive Surgery Department, Centro Hospitalar de Vila Nova de Gaia/Espinho, Gaia, Portugal

Introduction: Glomus tumors, recognized for their rarity and typically benign nature as vascular hamartomas, consist of cells mirroring the smooth muscle cells present in the normal glomus body. These tumors may manifest as solitary or multiple growths, with a predilection for solitary occurrences on the digits. Digital glomus tumors predominantly emerge in the subungual region and exhibit a pronounced female prevalence. This study outlines our experience with 27 patients diagnosed with hand glomus tumors over the past decade.
Material & Methods: The treatment encompassed 27 patients diagnosed with hand glomus tumors, all presenting with intense pain upon tumor palpation. Although imaging studies, including magnetic resonance imaging, offered limited assistance in delineating surface topography for tumor resection, meticulous dissection with a tourniquet and the use of loupes facilitated complete removal.
Results: Successful complete excision with free margins was confirmed in all 27 cases. While complete surgical excision often brings about complete symptom relief, recurrence is primarily attributed to incomplete excision. Three patients experienced tumor recurrence, manifesting between four weeks postoperatively and five years later. No additional recurrences were noted during the 1 to 10-year follow-up period. Postoperative recovery was generally uneventful, except for the development of deformed fingernails in eight patients.
Conclusions: Glomus tumors, though rare (encountered in only 27 cases over a decade), pose a surgical challenge. Imaging studies provide moderate assistance, and preoperative marking of the pain's maximum point aids clinical tumor localization. We emphasize the importance of a bloodless operative field and magnification for successful surgery. Notably, pain relief and the absence of recurrence after a few months do not necessarily indicate a cure, as exemplified by a recurrence in one patient five years later. Awareness of potential permanent nail deformities and disease recurrence is crucial and should be discussed with the patient preoperatively.

A-0213 THE PREFERRED TREATMENT FOR FLOATING ELBOW INJURY: ONE STAGE OR MORE STAGE APPROACH?

Luka Emeršič, Matej Andoljšek
General hospital Jesenice, Jesenice, Slovenia

Introduction: Floating elbow injury is a rare complex upper extremity injury, usually accompanying severe trauma. The term describes humerus fracture with ipsilateral forearm fracture. Till this date the acknowledge guideline for managing such injury is still controversial. It can be managed in one stage (with direct osteosynthesis) or two or more stage (first with external fixator) approach. Studies directly comparing these two management options are lacking, especially in floating elbow injuries.
Aim: While presenting our case, we wanted to compare different approaches in management of such injuries with a review of the literature. Our main goal was to show which approach is better, one stage or multistage.
Material & Methods: Our presentation will be based on a case of a complex distal humerus, proximal and distal forearm fracture (floating elbow injury) of a patient that suffered a fall in the mountains. We performed a multi-staged approach for treating these injuries with first applying external fixator and then definite internal osteosynthesis of first radius and then humerus and ulna fracture. We compared our treatment with the review of the English literature.
Results: In our case the patient had a good functional and radiographic outcome. The weakness of our presentation was lack of literature information. There are only few studies that directly compare one stage or two stage approach for

treating only one unit of the floating elbow (distal radius fracture), but none in comparing one or more stage approach for treating the whole unit.
Conclusions: Based on what can be found in the literature in comparison with our experience, there are no differences between one or more stage approaches regarding functional and radiographic outcome for treating complex distal radius fracture. Regarding stage approach for floating elbow injury information's are lacking. Maybe our presentation will encourage surgeons to explore which of the staged approach for such injury is the most suitable.

A-0214 TFCC FOVEAL TEAR WITH DISTAL RADIUS FRACTURE

Hiroshi Ono, Daisuke Suzuki, Ayumu Ishizaki, Ryotaro Fujitani
Hand Surgery Center, Nishinara Central Hospital, Nara, Japan

Introduction: Distal radius fractures (DRF) can be complicated by triangular fibrocartilage complex (TFCC) ulnar foveal tears. Neglected TFCC tear with DRF can be a cause of poor outcomes because of instability of the distal radioulnar joint (DRUJ). Therefore, early diagnosis and precise treatment of the TFCC tear with DRF is important. How to diagnose a TFCC ulnar foveal tear complicated by a DRF is problematic.
Aim: This study aims to evaluate the hypothesis that TFCC foveal tear is accompanied by DRF with severely dislocated distal fragment of the radius. We also determined which specific radiological parameters were associated with TFCC foveal tear.
Material & Methods: We retrospectively reviewed consecutive 150 patients with unstable DRFs treated by arthroscopic ORIF during a 3-year periods. There were 119 female and 31male, 71 right and 79 left hands, mean age 69-year-old. According to AO classification, type A was 28, B was 6, and C was 116 cases.
Radiographic parameters such as radial inclination (RI), ulnar variance (UV), volar tilt (VT) of preoperative standard PA and lateral radiographs of the wrist were measured in all cases.
At operation, TFCC foveal insertion was observed arthroscopically by DRUJ approach or radiocarpal approach through teared TFC disc proper if possible. The TFCC foveal insertion was divided into three groups (complete tear, partial tear, and normal). We compared the radiographic parameters between three groups by ANOVA and post-hoc test. The ROC analysis was performed to investigate the cutoff value.
Results: There were 17 cases in complete TFCC foveal tear group, 29 in partial TFCC foveal tear group and 104 in normal TFCC foveal group. The mean RI (degree), UV (mm), VT (degree) of three groups (complete /partial /normal) was 14.3 / 13.5 / 17.1, 6.0 / 3.1 / 2.4, -24.2 / -19.9 / -8.9, respectively. VT was significantly different between complete or partial tear groups and normal group. The ROC analysis showed the VT had the area under the curve at 69.1 %. Using a cutoff of -13.2 degree, VT had 58 % specificity and 75 % sensitivity for complete or partial TFCC foveal tear. UV was different between complete tear group and partial tear or normal groups. The ROC analysis showed the UV had the area under the curve at 65.6 %. Using a cutoff of 1.8 mm, UV had 34 % specificity and 94 % sensitivity for complete TFCC foveal tear.
Conclusions: Our data demonstrated more severely dislocated the distal radial fragment of DRF, more severely TFCC foveal tear.
If the VT is smaller than -13.2 degree and UV is larger than 1.8 mm, the TFCC foveal insertion should be observed directly or arthroscopically.

A-0215 DISTAL RADIUS FRACTURES AND „SPONTANEOUS" TENDON RUPTURES

Elisabeth Schellhaas, Senat Krasnici
Klinik für Unfall- und Wiederherstellungschirurgie, Johanniter-Krankenhaus Stendal, Germany

Introduction: Distal radius fractures are among the most common fractures in humans, increasing in incidence in an aging population. Open reduction and internal fixation (ORIF) using volar locking plates is widely used as the standard of care especially in displaced fractures. One of the most dreaded long-term complications following ORIF of distal radius fractures is tendon ruptures mainly of the long flexor and extensor of the thumb. But does this risk justify a general recommendation to get the plate removed once the fracture has healed?
Aim: The aim of this study was to investigate the frequency of non-traumatic tendon ruptures of the thumb and fingers and their association with distal radius fractures.
Material & Methods: We analysed all operations involving tendon transfer or tendon transposition between January 2008 and March 2023. Operations were selected from our hospital data base according to OPS codes. We searched for the OPS codes representing tendon transpositions, tendon plastics, and tendon coupling of the thumb and fingers. The results were then manually checked for relevance. We analysed patients' charts for a history of distal radius fracture and its treatment. In the same time interval, we looked for the numbers of patients at our department who underwent open reduction and fixation using a locking plate for distal radius fractures and those who underwent removal of their radius plates.
Results: Between January 2007 and March 2023, we operated on 17 patients because of "spontaneous" tendon ruptures of the thumb or fingers. Two patients had spontaneous rupture of an extensor-pollicis-longus tendon (EPL) without a history of distal radius fracture. Two EPL ruptures manifested ten and twenty years, respectively, after dorsal locking plate fixation of a distal radius fracture. We registered thirteen tendon ruptures after volar locking plate fixation: Four ruptures of the flexor pollicis longus (FPL) (manifesting at least three years after distal radius fracture), one rupture of flexor digitorum superficialis of the index 5 months after palmar plate fixation, one extensor digitorum communis II rupture 13 years after palmar plate fixation, and seven EPL ruptures. The patients with FPL ruptures had palmar radius plates that were positioned distal to the watershed line. Time intervals between palmar plate fixation and clinical manifestation of the EPL ruptures were 8 days, 10 days, 1 month, 5 weeks, 4 months (N=2), and 6 months. There were no EPL ruptures recorded more than six months after palmar plating of the distal radius. During the same time period, 1729 patients underwent plate fixation of distal radius fractures. 233 patients had their plates removed.
Conclusions: „Spontaneous" tendon ruptures following plate fixation of distal radius fractures are rare events, especially during long-term follow-up. In our patient cohort, most tendon ruptures manifested in the first few months after distal radius fracture fixation. Therefore, routine removal of distal radius plates because of the risk of late tendon ruptures seems not to be justified. This is especially true for volar locking plates in the correct position regarding the watershed line.

A-0216 DETECTING AVASCULAR NECROSIS OF THE LUNATE FROM RADIOGRAPHS USING A DEEP-LEARNING MODEL

Krista Wernér[1], Turkka Anttila[1], Sina Hulkkonen[1], Timo Viljakka[2], Ville Haapamäki[3], Jorma Ryhänen[1]
[1]Musculoskeletal and Plastic Surgery, Department of Hand Surgery, University of Helsinki and Helsinki University Hospital, Helsinki, Finland; [2]Tampere University Hospital, Tampere, Finland; [3]HUS Diagnostic Center, HUS Medical Imaging Center, Department of Radiology, Helsinki, Finland

Deep-learning (DL) algorithms have the potential to change medical image classification and diagnostics in the coming decade. Delayed diagnosis and treatment of avascular necrosis (AVN) of the lunate may have a detrimental effect on

patient hand function. The aim of this study was to use a segmentation-based DL model to diagnose AVN of the lunate from wrist postero-anterior radiographs. A total of 319 radiographs of the diseased lunate and 1228 control radiographs were gathered from Helsinki University Central Hospital Database. Of these, 10% were separated to form a test set for model validation. MRI confirmed the absence of disease. In cases of AVN of the lunate, a hand surgeon at Helsinki University Hospital validated the accurate diagnosis using either MRI or radiography. For detection of AVN, the model had a sensitivity of 93.33% (95% confidence interval [CI] 77.93-99.18%), specificity of 93.28% (95% CI 87.18-97.05%), and accuracy of 93.28% (95% CI 87.99-96.73%). The area under the receiver operating characteristic curve was 0.94 (95% CI 0.88-0.99). Compared to three clinical experts, the DL model had better AUC than one clinical expert and only one expert had higher accuracy than the DL model. The results were otherwise similar between the model and clinical experts. Our DL model performed well and may be a future beneficial tool for screening of AVN of the lunate.

A-0217 CLINICAL CONUNDRUMS OF ISOLATED LATERAL COMPARTMENT SYNDROME – A REVIEW OF EXISTING LITERATURE AND 2 CASES OF DELAYED, ATRAUMATIC PRESENTATIONS

Lim Hui Neng, Ruth Tan En Si, Sandeep Jacob Sebastin
National University Hospital, Singapore, Singapore

Introduction: Isolated lateral leg compartment syndrome, although rare, can result from peroneus longus rupture or arterial avulsion. It can occur without apparent trauma, leading to delayed diagnosis and treatment.
Materials & Methods: We describe 2 cases presenting atraumatically, compare clinical presentations, time to surgery, intraoperative findings, and outcomes with current literature.
Results: The first patient, a 22-year-old student, experienced foot drop over 3 months. This started a week following leg cramps after taking a walk. He had weak ankle dorsiflexion, foot dorsum numbness and positive Tinel's at the fibular head. The second patient, a 54-year-old woman, presented with leg swelling, pain and foot drop over 2 weeks after prolonged standing at work. This precipitated a fall that brought her to the hospital. She had calf swelling, weak ankle dorsiflexion and foot dorsum numbness.
Both had electrodiagnostic findings of common peroneal nerve palsy and radiological evidence of peroneus longus denervation oedema on Magnetic Resonance Imaging (MRI). They underwent decompression which revealed partial necrosis of peroneus longus muscle that was excised. Despite decompression and rehabilitation, both had poor recovery.
Our review identified 7 case reports involving 9 patients with acute lateral compartment syndrome after sporting injuries. Intra-operatively all had hematoma and peroneus longus muscle tears . In comparison, all underwent early decompression within days which resulted in full recovery.
In delayed and less florid presentations, diagnostic adjuncts can supplement clinical assessment. Invasive pressure devices may miss isolated syndromes if separate compartments are not measured. MRI is non-invasive and muscle signal changes estimate the extent of tissue damage and aid prognostication.
Conclusion: Clinical suspicion is crucial for identifying patients who require urgent nerve decompression. MRI is valuable in diagnosis of atypical presentations. When recovery is poor, tendon transfer procedures may be considered.

A-0218 24 MONTHS FOLLOW-UP OF CARPAL TUNNEL SYNDROME AFTER OPEN CARPAL TUNNEL RELEASE USING TWO-POINT DISCRIMINATION, NERVE CONDUCTION STUDY, AND MRI

Yusuke Hattori[1,2], Yohei Kawaguchi[1], Takuya Usami[1], Yuko Waguri-Nagaya[2], Hideki Murakami[1], Hideki Okamoto[1]
[1]Department of Orthopaedic Surgery, Nagoya City University Graduate School of Medical Sciences, Nagoya, Japan; [2]Department of Orthopaedic Surgery, Nagoya City University East Medical Center, Nagoya, Japan

Introduction: Some studies have reported that the cross-sectional area (CSA) measured on magnetic resonance imaging (MRI) is useful in evaluating patients with carpal tunnel syndrome (CTS). However, few previous studies have investigated long-term changes in CSA in relation to other neurological variables.
Aim: The purpose of this study is to investigate postoperative clinical outcomes and morphological changes in patients with CTS before and after open carpal tunnel release (OCTR) using two-point discrimination (2PD) test, nerve conduction study (NCV), and MRI.
Material & Methods: This is a retrospective study. Data from 29 hands that had undergone OCTR with at least 24 months of follow-up data were analyzed. 2PD scores were examined for the first three fingers. Distal motor latency (DML) and sensory conduction velocity (SCV) of the median nerve in NCV were evaluated. CSA of the carpal tunnel and the median nerve was calculated from MRI images at the hamate and pisiform levels. The distance from the median nerve to the volar carpal bone was also measured. In addition, the existence of the retinacular gap was assessed on the MRI images. Variables were compared before and 24 months after OCTR.
Results: Significant improvements were observed in almost all variables, including average 2PD scores (Finger I: 12.9 ± 6.1 vs. 7.6 ± 4.2, $p < 0.01$, Finger II: 11.8 ± 6.4 vs. 6.9 ± 3.4, $p < 0.01$, Finger III: 13.5 ± 5.9 vs. 7.7 ± 4.3, $p < 0.01$), average DML (8.2 ± 3.2 vs. 4.3 ± 0.6 m/s, $p < 0.01$), average SCV (30.8 ± 10.9 vs. 41.2 ± 5.2 m/s, $p < 0.01$), CSA of the carpal tunnel (hamate level: 193.6 ± 30.3 vs. 252.5 ± 46.8 mm2, $p < 0.01$, pisiform level: 242.6 ± 45.7 vs. 279.7 ± 55.7 mm2, $p < 0.01$), CSA of the median nerve at the hamate level (7.6 ± 1.8 vs. 11.1 ± 3.1 mm2, $p < 0.01$), and the distance between the median nerve and the volar carpal bone (hamate level: 8.7 ± 1.4 vs. 11.1 ± 1.5 mm, $p < 0.01$, pisiform level: 11.7 ± 1.7 vs. 13.6 ± 2.5 mm, $p < 0.01$). At 24 months, the retinaculum gap was not observed in all hands.
Conclusions: Our study suggests that the successful decompression and recovery of the median nerve in patients with CTS are achieved at 24 months after OCTR.

A-0219 TARGETED MUSCLE REINNERVATION INTO LUMBRICAL MUSCLES FOR TREATING SYMPTOMATIC DIGITAL STUMP NEUROMA

Michael Wirth, Martina Greminger, Inga Besmens, Maurizio Calcagni, Olga Politikou
University Hospital Zurich, Zurich, Switzerland

Introduction: Surgical treatment of digital stump neuromas continues to be a challenge for hand surgeons with mixed outcomes. Different traditional surgical options are available, none has been shown to result in superior results. Recently, targeted muscle reinnervation has shown promising results in treatment of painful neuroma.
Aim: To present the surgical technique and preliminary results of treatment of painful digital end-neuromas with targeted muscle reinnervation into lumbrical muscles
Material & Methods: Case presentation-Surgical technique: We performed neuroma excision and targeted muscle reinnervation into the second lumbrical muscle. The motor entry point is found approximately 18mm proximal to the A1 pulley (proximal end) of the middle finger. First, we began by dissecting the nerve to the lumbrical muscle, so that we would

not exceed the 20-min tourniquet time for nerve stimulation. The ulnopalmar digital nerve of the index was dissected to the level of the dorsal nerve branch at the metacarpophalangeal joint. Intraneural neurolysis was then performed from distal to proximal over another centimeter to preserve the dorsal branch and reach the target. The recipient nerve was transected about 8mm proximal to the motor entry point. Tension-free coaptation without size discrepancy was possible. The coaptation site was sealed with fibrin glue, and the nerve was blocked with an intraneural injection of ropivacaïn 1%. Results: At three-month follow-up the patient perceives no pain or slight pain (VAS 1-2) with light touch on the ulnar stump side. So far, we have treated three patients with painful digital stump neuromas with targeted muscle reinnervation into lumbrical muscles. Patient-reported outcomes show significant improvement in quality of life, sleep and mental health. Conclusions: Targeted muscle reinnervation into expendable hand muscles appears to be a new therapeutic option with promising results. The anatomy is constant, as shown by several previous anatomical studies.

A-0220 AN UNUSUAL CAUSE OF LOCKED DISTAL RADIO ULNAR JOINT DISLOCATION

Vinyet Reverter, Gloria Gonzalez, Josep Méndez, Carme Prat
Hospital Universitari Sagrat Cor, Spain

Introduction: Acute volar distal radioulnar joint (DRUJ) dislocation is a rare injury that usually can be solved by closed reduction. We present a single case where the ulnar head was volarle displaced and found to be buttonholed through the pronator quadratus muscle, posing a significant challenge in achieving joint reduction whose outcome was fully satisfactory using an only surgical volar approach.

Our patient, a 32-year-old male construction worker, experienced forced supination due to a fall from a ladder, leading to acute irreducible volar DRUJ dislocation. On examination, the forearm was locked in supination, with restricted pronation. The ulnar head was palpable on the volar side but absent dorsally. Numbness and tingling were reported in the second and third fingers after 24 hours of the injury

Aim: We would like to emphasize the need for tailored surgical approaches based on specific anatomical challenges encountered in individual cases.

Conclusion: While previous literature has discussed various obstructions leading to irreducible DRUJ dislocations, our approach differed notably. We opted for a single volar incision, which provided the necessary access to successfully address the unique anatomical hindrance and achieve reduction.

Summing up, we would like to highlight first of all the challenge that DRUJ dislocations can represent, as much for the correct diagnosis as for the correct treatment. We always must try the closed reduction at the emergency room and if it doesn't work, we should try with local anesthesia or even under total sedation of the patient. After we run out all these methods, we must try the open reduction. Tests like CT and MRI can help us to plan our surgery and discard other soft tissue injuries. We must advocate to perform an individualized approach which can be a volar single one without the need to make any other incisions. Once opened, we must identify of all the soft structures that are closed related or even can be involved in the joint DRUJ dislocations; including the extensor carpi ulnaris tendon (ECU), the TFCC, the volar joint capsule, the ulnar nerve and artery and, the pronator quadratus which in our case, was injured but also was guilty of the failure of a closed reduction.

A-0221 SURGICAL TREATMENT OF RADIAL TUNNEL SYNDROME. A 2-SURGEON CASE-SERIES OF 17 PATIENTS OVER 3.5 YEARS IN TWO SMALL PRIVATE MEDICAL CENTRES. RESULTS, DIAGNOSTIC DIFFICULTIES, PITFALLS AND LEARNING POINTS

Constantinos Kritiotis[1], Mohammadali Badri[2], Marios Tryfonidis[2,3]
[1]Iasis Private Hospital Paphos, Cyprus; [2]European University Cyprus Medical School, Nicosia, Cyprus; [3]Dikteon Medical Centre, Nicosia, Cyprus

Introduction: Radial nerve entrapment neuropathy is estimated to represent about two percent of all proximal nerve entrapments in the upper limb. The clinical features may vary and diagnosis requires high index of suspicion and appropriate clinical evaluation. When conservative treatment fails then surgical decompression is indicated. There is no consensus in measuring the outcome of treatment, so this depends heavily on the subjective impact of the condition on the patient's life. The published studies are heterogeneous in terms of surgical techniques and outcome measures.
Aim: We set out to evaluate the results of surgical treatment of radial entrapment neuropathy in the radial tunnel, in our two small private medical centres, as well as identify any problems, pitfalls, or other learning points in managing such patients
Material & Methods: Patients treated by two orthopaedic surgeons in two small private medical centres were recruited prospectively. Demographic and Clinical (pre and post-surgery) data were collected and QDASH scores were recorded. Surgery was carried out either with WALANT or General Anaesthesia as a day-case. Pre-operative nerve conduction studies were performed in all patients. Most surgical procedures (15) were performed via a posterior approach and the others via a volar approach. A full surgical nerve release was performed from all compressive anatomic structures. Postoperative analgesia and incremental exercises were encouraged
Results: We recruited 17 patients (8xF, 7xM), ages 12y – 71y (mean 47.76y), that had surgery between June 2020 and Nov 2023. Clinical features ranged from isolated pain, to isolated sensory symptoms, to mixed sensory-motor features, to isolated motor palsy. QDASH scores were obtained preoperatively and postoperatively. All but one patients had significant or complete resolution of symptoms postoperatively with a mean preop QDASH 61,18 Vs postop mean QDASH 22,24. The 12 year-old girl is the youngest reported case in the literature and was excluded from the QDASH evaluation). Other contributing pathologies (such as a case of intraneural tumour causing severe chronic compression), preop severity and chronicity of pathology seemed to contribute to the persistence of symptoms. Pre-operative electrophysiology studies were unhelpful in diagnosing the disease, but useful in excluding other neural pathologies. We had two cases of wound breakdown at two weeks post op and two cases of temporary neurapraxia of the superficial radial nerve
Conclusions: Radial tunnel syndrome surgery is beneficial with predictable results in the right patients. Exclusion of cervical spine and shoulder pathology is essential to help predict outcomes. Preopertive nerve conduction studies are useful mainly in ruling out other pathologies. Unnecessary delays in decision for surgery may contribute to suboptimal outcomes

A-0222 OUTCOMES OF SURGERY FOR BENIGN TUMOURS IN THE UPPER EXTREMITY

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Benign tumours of the upper extremity are common in hand surgeons' practice. The most commonly diagnosed are giant-cell tumours of the tendon sheath and lipomas.
Aim: An investigation into the distribution of tumours in the upper limb, their symptomatology and outcomes of surgery, particularly regarding the rate of recurrence.

Material & Methods: A total of 346 patients, 234 women (68%) and 112 men (32%), who had undergone surgery for tumours located in the upper extremity which were not ganglion cysts were enrolled into the study. The follow-up assessment was performed at a mean of 21 months (range 12-36) post-operatively.
Results: The most common tumour in this study was giant cell tumour of the tendon sheath - 96 cases (27.7%), followed by lipoma - 44 cases (12.7%). Most lesions - 231 (67%) were localized in the digits.
A total of 79 (23%) recurrences were noted, the most common after surgery for rheumatoid nodules - 43.3% and the giant-cell tumours of the tendon sheath - 31,3%. The independent factors increasing risk of recurrence following the tumour's resection were: histological type of the lesion - the giant-cell tumour of the tendon sheath (p=0.0086) and the rheumatoid nodule (p=0.0027), as well as a combination of incomplete (non-radical) and not "en block" resection of tumours. Strong points concern the big cohort of patients enrolled and meticulous analysis of the pre-and post-operative data, particularly factors influencing the risk of recurrence.
Conclusions: The results of this series suggest that greater care is needed when operating on hand tumours, particularly giant-cell tumours of the tendon sheath.

A-0223 OUTCOMES OF SURGERY FOR METASTASES OF MALIGNANT NEOPLASMS TO THE HAND

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Metastases of malignant neoplasms to the hand are very rare, constituting approximately 0,01% of whole distant metastases. They usually indicate generalized neoplastic disease, although sometimes can be a first manifestation of dissemination.
Aim: Analysis of outcomes of the treatment of four patients with metastases of malignant neoplasms to the hand
Material & Methods: The study presents 4 cases of metastatic tumours to the hands in patients with diagnosis of renal (2) and lung cancer (1) and one of unknown point of origin. The lesions were localized in the fingers in two patients and in the wrist in other two
Results: The patient with wrist involvement received excisional biopsy of the lesion, followed by forearm amputation. Two patients with finger tumours had their affected fingers amputated. The patient with the cyst involving the wrist received local excision of the lesion. Operative wounds healed uneventfully in all patients, but 3 of them eventually died within one year from hand operation.
Conclusions: Surgical treatment of for metastases of malignant neoplasms to the hand consists in amputation in most cases, since all these patients have generalized neoplastic disease.

A-0224 OUTCOMES OF SURGERY FOR SCHWANNOMAS OF THE UPPER EXTREMITY

Andrzej Zyluk, Ada Owczarska
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Schwannoma is a nerve tumour originating from Schwann-cells of the nerve sheath. It is found in all body regions, the most frequent in the head, neck and in the extremities.
Aim: The objective of this study was analysis of outcomes of surgery for these lesions in the authors' institution
Material & Methods: results of the treatment of 12 patients, 7 women and 5 men, aged a mean of 40 years with

schwannomas localized in the upper limb are presented. The follow-up assessment was performed in a form of telephone interview at a mean of 4,2 years post-operatively

Results: The tumours were located in the hand in 5 patients, in the forearm in other 5 and in the wrist in 2. In 3 patients the tumours originated form the median, in 2 from the ulnar and in 2 from the radial nerves; in 5 cases it grew from small nerve branches. All lesions of the median, ulnar and radial nerves were encapsulated without damage of the nerve fascicles, while in the hand they were resected in total. At a mean of 4,2 years follow-up, two recurrences (17%) occurred, both following resection of the tumour located in the hand. Complications were noted in 5 patients: two felt parasthesiae in the operated finger, two was disappointed due to unaesthetic scar and one patient following tumour resection from posterior interosseous nerve had incomplete finger extension.

Conclusions: Outcomes of surgery for these rare tumours are generally good, but functional deficits should be considered in cases of lesions involving motoric nerves

A-0225 IS THE ROUTINE HISTOPATHOLOGICAL EXAMINATION OF ALL TUMORS AT THE UPPER EXTREMITY JUSTIFIABLE?

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Most lesions of the upper extremity are common and benign, and many have questioned the need for routine pathology evaluation of these specimens.

Aim: Evaluation of the accordance of initial clinical and final histological diagnoses of tumours which clinical presentation and intraoperative findings indicated that they are most likely benign or malignant, and answer the question the routine histopathological examination of all tumours at the upper extremity justifiable.

Material & Methods: The results of histopathological examination of benign tumours resected in 346 patients, and malignant tumours resected in 6 patients were analysed.

Results: An analysis showed 100% accordance between initial (clinical) diagnoses of the tumours as benign or malignant and their final histopathological diagnoses. Only in 12 cases (3,5%) of initially benign tumours their clinical presentation and/or intraoperative findings raised doubts.

Conclusions: The results of this study show that routine histological evaluation of all tumours resected from the upper extremity is not justifiable, and may be confined to selected cases in which clinical presentation and/or intraoperative findings raise doubts

A-0226 RECURRENCE AFTER SURGERY FOR DUPUYTREN'S DISEASE: AN ANALYSIS OF CAUSES AND INCIDENCE

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: The incidence of recurrence Dupuytren's disease after surgery is estimated up to 50% in relation to progression of the disease, treatment modality and time of the follow-up.

Aim: An analysis of the causes and frequency of recurrences in patients following surgery for recurrent Dupuytren's disease. in the authors' institution in the years 2016–2018.

Material & Methods: Sixty-seven patients, 56 men (83%) and 11 women (17%) at a mean age of 59 years (range 40–81)

were treated in the authors' institution in the years 2016–2018. Of this number 27 patients (40%) underwent a 2nd operation to the same hand, 22 patients (33%) a 3rd operation, 14 (21%) a 4th operation, and the remaining 4 patients underwent more than 5 operations on the same hand.
Results: The defined rate of recurrence in the analyzed period was 20%. The mean time interval from the last operation and the appearance of signs of a relapse was 14 months; in 42 patients (63%) it was less than 1 year (3–12 months) and in the remaining 25 (37%) from 1 to 4 years. Progressing contracture of the previously operated finger and contracture of the adjacent finger which was not involved at the 1st operation, was the most frequently observed pattern of recurrence, found in 29 patients; it was a combination of true recurrence and extension of the disease.
Conclusions: The number of operations performed in a given patient was found to be a statistically significant risk factor of recurrence.

A-0227 CHANGES IN ORGANIZATION OF ACTIVITY OF HAND SURGERY DEPARTMENT DURING THE COVID-19 PANDEMIC

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: The COVID-19 pandemic has impacted many medical specialties throughout the world, including hand surgery. Emergency hand surgery deals with a wide spectrum of injuries, including bone fractures, nerve, tendon and vessel cuts, complex injuries and amputations. These traumas occur independently to the phase of the pandemic.
Aim: Presentation of changes in organization of activity of hand surgery department during the COVID-19 pandemic. Modifications of the activity were described in details.
Material & Methods: Data from the office of Emergency Department and Ward Database recorded during COVID-19 pandemic were analysed
Results: Over a period of the pandemic (from April 2020 to March 2022), a total of 4150 patients were treated, in this number 2327 (56%) with acute injuries and 1823 (44%) with common hand diseases. Forty-one (1%) patients were diagnosed COVID-19 positive, 19 (46%) with hand injuries and 32 (54%) with hand disorders. One case of work-related COVID-19 infection was registered in the 6-people clinic team in analysed period.
Conclusions: results of this study show effectiveness of measures undertaken in the author's institution to prevent the coronavirus infection and viral transmission in hand surgery staff

A-0228 RECURRENCE OF DUPUYTREN'S CONTRACTURE: MOVING TOWARDS A DEFINITION

Nicolas Bigorre, Guy Raimbeau, Thomas Albert, Alexandre Petit
Centre de la Main, Angers, France

One of the main determinants of the effectiveness of Dupuytren's disease treatment is the recurrence of contracture. Unfortunately, the lack of consensus in the literature on what constitutes a recurrence has led to a wide variety of definitions, making the comparison of published results nearly impossible.
Initially, we conducted a literature review on the management of Dupuytren's disease and its recurrence rates to determine the definitions used by various authors. From these diverse definitions, we sought to establish a classification based on the most commonly used criteria, aiming to facilitate widespread application.
From different databases, we identified 80 articles addressing the surgical management of Dupuytren's disease at an

early stage and discussing recurrence. The definition proposed by Leclercq, defining recurrence as "the reappearance of Dupuytren's tissue in a previously treated area," proved to be the most frequently adopted. Quantitative definitions describing an flexion deformity of 20 or 30 degrees were also regularly reported. We identified several aspects of recurrence, including the reappearance of primary lesions and the flexion deformity. To define the extension deficit in recurrence, it is important to determine the residual flexion deformity (RFD) after the initial intervention before characterising recurrence. This classification, organised into four stages, distinguishes the reappearance of elementary lesions without flexion deformity (stage 1), flexion deformity of PIP joint compared to RFD <20° (stage 2), flexion deformity of PIP joint compared to RFD >20° (stage 3), and flexion deformity of PIP joint compared to RFD >45° (stage 4).
We emphasise the importance of achieving homogenization in the definition of recurrence to facilitate the comparison of clinical results across different publications. The simplicity of our classification aims to ease this comparison and could thus serve as a valuable tool in clinical research.

A-0232 EMERGENCY METACARPOPHALANGEAL ARTHROPLASTY WITH BONE GRAFT IN TRAUMATIC JOINT DESTRUCTION

Amandine Ledoux, Christophe Duysens, Germain Pomares
Hôpital Kirchberg, Luxembourg

Introduction: Traumatic destruction of the metacarpophalangeal joints with bone defect is a technical challenge for surgeons, and maintaining joint mobility is a priority for the patient.
Osteoarticular defects can jeopardize the function of the limb concerned.
To provide this, we can use prosthetic arthroplasties but stabilizing the implant can sometimes be difficult.
Aim: We report a reconstruction technique for traumatic osteoarticular defects in metacarpo-phalangeal articulations, by bone grafting from the metacarpal head and emergency arthroplasty.
Material & Methods: Our series includes 5 cases of metacarpophalangeal joints destruction in 4 patients treated urgently, between 2015 and 2019.
There were 4 cases of circular saw trauma and one ballistic trauma.
These were flexion traumas to the metacarpophalangeal joints.
We had 3 osteoarticular defects of the dorsal surface, one case at the level of the palmar surface and 1 case of the entire base of the proximal phalanx.
A wide trimming was carried out, then an osteotomy of the metacarpal head was carried out, and we used it as a graft to fill in for the defect of the base of the proximal phalanx. We prepared the graft before realizing the osteosynthesis, using screws or pins.
Results: Consolidation was obtained for all the osseous grafts.
Radiographs at 6 months postoperatively showed the metacarpal head integrated at the level of the shaft of the proximal phalanx.
The mobility of the AMPs was 70° in active flexion and 0° in active extension.
The patients did not have any pain at six months postoperatively.
Conclusions: Our solution respects the principle of "all in one time with early mobilization".
It is technically simple and gives reliable results, so we recommand this technique.

A-0233 ANTEROGRADE HOMODACTYL ISLAND FLAPS: WHAT HAPPENS TO THE ARTERY?

Amandine Ledoux, Olivier Nicod, Christophe Duysens, Alban Fouasson Chailloux, Germain Pomares
Hôpital Kirchberg, Luxembourg

Introduction: During pulp amputations in zones 2 or 3, we prefer the realization of anterograde homodactyl island flaps over occlusive dressings or therapeutic alternatives which, in our opinion, do not meet the specifications for pulp reconstruction.
Aim: We attempted to determine the fate of the digital collateral artery included in the antegrade homodactyl flap.
Material & Methods: We carried out a prospective study over 4 years with a clinical and radiological follow-up of 1 year. Sixteen patients operated on by two surgeons were included in the study.
The inclusion criterias were:
- Pulp reconstruction after amputation in zone 2 or 3 by antegrade homodactyl flap
- Have a clinical examination and an angio-MRI of the hand 1 year postoperatively
The exclusion criterias were:
- The occurrence of a new vascular accident on the finger concerned
- A vascular or nervous lesion on the contralateral control finger
- Failure to present for clinical examination and/or angio-MRI 1 year postoperatively
We verified on MRI angiography whether there was a patent artery, the presence of neoangiogenesis, or thrombosis of the axis.
We also assessed pulp sensitivity by a comparative examination of the pulp of the contralateral finger, as well as the presence of cold intolerance and the patient's comorbidities.
Results: At the neurological level we did not find any significant difference in the monofilament test between the pulps of the operated fingers and those of the contralateral control fingers.
The Weber discrimination test reported a distance of 7.4 mm on average.
We do not report cold intolerance or hyperesthesia.
Of our 16 cases, MRI angiograms revealed 14 cases of entirely thrombosed collateral arteries and 2 cases of abnormally thin, filiform arteries.
No neoangiogenesis was observed.
Conclusions: Pulp reconstruction using a classic homodactyl flap therefore causes thrombosis of its arterial axis in 90%. Thus, we recommend performing a short flap so as not to sacrifice the arterial axis over its entire length.

A-0234 THE ROLE OF FEAR OF MOVEMENT AND PAIN CATASTROPHIZING IN COMPLEX REGIONAL PAIN SYNDROME (CRPS)

Maryam Farzad[1], Joy MacDermid[2], Tara Packham[3]
[1]Occupational Therapy, Post-doctorate Fellowship, Hand and Upper Limb Center, St. Joseph's Health Center, School of Physical Therapy, Department of Health and Rehabilitation Sciences, University of Western Ontario, London, Ontario, Canada; [2]Physical Therapy and Surgery, Western University, London, Ontario, Canada, and Co-director Clinical Research Lab, Hand and Upper Limb Center, St. Joseph's Health Center, London, Ontario, Professor Rehabilitation Science McMaster University, Hamilton, Ontario, Canada; [3]School of Rehabilitation Sciences, Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada

Introduction: Complex Regional Pain Syndrome (CRPS) is a debilitating condition characterized by severe pain and functional impairment, often triggered by trauma or surgery. While the exact pathophysiology of CRPS remains uncertain, emerging

evidence suggests that psychological factors, such as fear of movement and pain catastrophizing, may significantly influence its development and persistence.
Aim: This study aimed to assess the psychometric properties of the Persian version of the Tampa Scale for Kinesiophobia-11 (TSK-11) in individuals with upper limb CRPS. Specifically, we aimed to evaluate whether the factor structure of TSK-11 aligns with the original two-factor model, which includes "activity avoidance" and "somatic focus."
Material & Methods: A total of 142 individuals with upper limb CRPS, with a mean age of 42 (54% female), participated in this study. Participants completed the TSK-11 questionnaire. Psychometric evaluations included an assessment of internal consistency, test-retest reliability (intra-class correlation coefficient), and convergent construct validity. Structural validity was explored through confirmatory and exploratory factor analyses (CFA, EFA).
Results: The TSK-11 demonstrated excellent internal consistency (Cronbach alpha 0.93) and remarkable test-retest reliability (ICC = 0.93, 95% CI: 0.92 to 0.94). Standard Error of Measurement and Minimal Detectable Change were calculated at 4.3 and 11.7, respectively. Criterion validity analysis showed a robust correlation (r=0.81). However, CFA results indicated that the original two-factor model did not adequately fit the data. EFA revealed a new two-factor solution with different items, explaining 64.91% of the variance. These factors, namely Fear Avoidance beliefs and Magnification/Helplessness, exhibited acceptable internal consistency (>0.90) and were named based on expert consensus.
Conclusions: The study findings suggest that the TSK-11 is a reliable instrument for assessing fear of movement in individuals with upper limb CRPS. However, the original two-factor structure did not align with this specific population. Instead, a new two-factor structure emerged, representing Fear Avoidance beliefs and Magnification/Helplessness. Given the overlap between these constructs and the construct of pain catastrophizing, further research is warranted to clarify the content validity and unique aspects of each measure. Understanding the roles of fear of movement and pain catastrophizing in CRPS is crucial for more effective assessment and management of this challenging condition, ultimately improving the quality of life for individuals living with CRPS.

A-0235 TRAPEZIOMETACARPAL JOINT REPLACEMENTS: A PROSPECTIVE COHORT STUDY OVER 15 YEARS WITH 560 IMPLANTATIONS

Uwe Joosten, Julius Albert, Georg Becker, Christian Grüning, Ali Issa, Thomas Kusmenkov, Robert Schober
Marienhospital Osnabrück, Osnabrück, Germany

Aim: The total endoprosthesis at the thumb saddle joint (TMC TEP) is an increasingly considered and still controversial alternative to the standard procedure of resection arthroplasty in trapeziometacarpal osteoarthritis. We present the largest known published number of implants over a 15-year period.
Material & Methods: Between January 2008 and December 2022, all patients who underwent TMC TEP (Carpo-Fit®; Implantcat, Buxtehude, Germany) for symptomatic trapeziometacarpal osteoarthritis were consecutively included in the study. Patients were systematically examined preoperatively and at regular postoperative intervals of initially 6 and 12 months, and then every 5 years. The following parameters were assessed: mobility, strength in gross and fine grip, DASH score, VAS score and global satisfaction score. Radiological examination was routinely performed pre- and postoperatively, as well as after 12 months. Intermediate X-ray examinations were only conducted on clinical occasions. In addition, both immediate and late postoperative complications were recorded, with particular emphasis on determining the survival rates of the prostheses.
Results: Throughout the study period, 560 implantations were performed in 474 patients and included in the study. Of these, 231 had been implanted for more than 10 years. A total of 173 patients with 201 implants were fully re-examined

(drop-out: 12.9%). The prosthesis survival rate over the entire 15-year period was 95.6%. The range of motion in the operated thumb increased significantly in all directions postoperatively ($p<0.01$). Gross grip strength (+308%) and fine grip strength development (+288%) behaved similarly. The DASH score decreased from 47.7 points preoperatively to 10.8 points after 6 months and then remained constant ($p<0.01$). The VAS score significantly improved from 7.8 to 1.0. After 6 months, 90.7% had regained their original level of activity.
Conclusions: The implantation of a TMC TEP in symptomatic trapeziometacarpal osteoarthritis in our study showed a rapid, sustainable, and convincing restoration of joint function. With the TMC TEP used by us, the problems of earlier models, especially the rate of cup loosening, can be significantly minimized. The positive results of this procedure suggest that the TMC TEP may in the future assume a different significance as an alternative to the standard resection arthroplasty in the treatment of trapeziometacarpal osteoarthritis.

A-0236 LONG TERM OF DEEP FOREARM PAIN AND UNIDENTIFIED VASCULAR MALFORMATIONS: A DIAGNOSTIC AND THERAPEUTIC CHALLENGE

Luciana Marzella, Alberto Lazzerini
IRCCS Galeazzi Sant'Ambrogio, Milan, Italy

Introduction: Vascular Malformations (VM) are rare and complex pathologies that, despite their rarity have a rate of 30-60% involvement of the upper limb. For a long time these pathologies have been considered as a mother birthmark because of the poor knowledge on vascular anomalies. There is a big confusion within the different definitions, and a wrong diagnosis often leads to a wrong treatment. That's the reason why it's important to improve the exchange of informations about these rare pathologies to better diagnose, treat and reduce the risk of medicolegal issues.
Aim: The goal of this work is to help hand surgeons to identify rare vascular intramuscular anomalies of the upper limb that may cause unidentified long term forearm pain in young patients, guide the choice for the right imaging and address treatment.
Material & Methods: From 2016 to 2023 , 7patients (3 male and 4 females) from 25 to 45 yo with long term history of forearm pain, numbness and paresthesia in the territory of the median nerve have been observed.
Previous plain radiograms and MRI and nerve conduction studies were negative in all patients.
Symptoms were deep and incoercible pain on the volar side of the forearm, muscular tension, numbness, median nerve paresthesia.During the clinical evaluation all of the patients were diagnosed with Doppler ultrasound for a suspect of intramuscular Vascular Malformation. The upper limb AngioMRI confirmed the suspect with a direct study of vascularity of the entire upper limb showing arteriovenous malformations inside the pronator quadratus (3 cases) and flexor superficialis muscles (4cases) with involvement of radial artery(1case), anterior and posterior interosseous arteries (5cases)and ulnar artery(1case).According with the International Society for Study of Vascular Anomalies (ISVA) and the Italian Society for study of Vascular Malformations (SISAV) all the patients were treated with complete surgical eradication of the vascular malformation with muscular resection and closure of the nidus of the vascular anomaly.
Results: Complete pain resolution, restore of range of motion, quick return to all the activities after 1 month from surgery.
Conclusions: The poor knowledge on VM represents a big gap inside the education of most hand surgeons. It may have a big impact in term of wrong diagnosis and wrong treatment and consequently medicolegal problems.
The presence of a vascular malformation should be considered in cases with undiagnosed persistent deep forearm pain. In general the study of vascular anomalies should be a part of the educational programs of hand surgeons, and as for all rare and difficult conditions it is advisable to refer cases to centers with dedicated surgeons.

A-0237 INTRAOPERATIVE THREE-DIMENSIONAL NAVIGATION FOR SURGICAL TREATMENT OF OSTEOID OSTEOMA IN THE UPPER EXTREMITY: A SERIES OF 19 CASES

Ron Gurel, Kathrine Shehadeh, Etay Elbaz, Amit Benady, Shai Factor, Itay Ashkenazi, Yair Gortzak, Amir Sternheim, Solomon Dadia, Ortal Segal
Tel Aviv Medical Center, Affiliated to Tel Aviv University, Tel Aviv, Israel

Introduction: The surgical treatment for osteoid osteoma (OO) in the upper extremity is challenging due to the difficulty in locating the lesion and the crowding of sensitive structures within the anatomy. This study aimed to describe the outcomes of navigated minimally invasive radiofrequency ablation and those of navigated mini open-intralesional curettage in treating these lesions.
Material & Methods: Nineteen consecutive patients with OO in the upper limb who underwent navigated surgery were included.
Results: The average QuickDASH and Numeric Pain Rating Scale improved from 62.2 ± 23.7 to 11.7 ± 16.9 and from 8.1 ± 1.6 to 0.5 ± 1.8, respectively ($p < .01$ each) following the procedure. Two complications were recorded: one patient had persistent radial nerve palsy, and one patient had transient partial radial nerve weakness.
Conclusions: Navigation is an important tool in the surgical treatment of OO in the upper limb. A mini open approach to identify and protect neurovascular structures is recommended.
Aim:

A-0238 INCREASING BODY MASS INDEX AND THE RISK OF ULNAR NERVE ENTRAPMENT IN INDIVIDUALS WITHOUT DIABETES

Mattias Rydberg[1,2], Malin Zimmerman[1,2,3], Lars B. Dahlin[1,2]
[1]Department of Hand Surgery, Lund University, Skåne University Hospital, Malmö, Sweden; [2]Department of Translational Medicine – Hand Surgery, Lund University, Lund, Sweden; [3]Department of Orthopaedics, Helsingborg Hospital, Helsingborg, Sweden

Introduction: Ulnar nerve entrapment (UNE) is a common disorder with many associated risk factors. Identifying risk factors and predictors for UNE is essential for early diagnosis and possible early prevention. Diabetes mellitus (DM) is an established risk factor for UNE, but less is known about metabolic risk factors in individuals without diabetes. Recent studies have tried to elucidate the effects of dyslipidaemia and obesity on peripheral neuropathy.
Aim: Our study aims to explore the impact of an increasing body mass index (BMI) on incident UNE during long-term follow-up in a large population without DM.
Material & Methods: Data from the population-based cohort study Malmö Diet and Cancer Study (MDCS) and the Swedish Patient Register (NPR) was cross-linked. Between 1991-1996, 30,446 subjects were recruited to MDCS and were followed to either a diagnosis of UNE, emigration, death, or end of study on Dec. 31st 2020. BMI of study entry was stratified into normal weight (< 25), overweight (25-30), and obese (> 30). To exclude the effect of DM and hyperglycaemia, individuals with prevalent DM at baseline or incident DM during follow-up were excluded. Kaplan Meier curves were calculated to assess the cumulative incidence of UNE in each BMI category and proportionality. To calculate the effect of BMI on incident UNE, adjusted Cox proportional hazard models were used with confounders, including age, sex, hypertension, smoking, manual work, and alcohol consumption. BMI was imputed both as a continuous variable and using the tertiles with normal weight individuals (BMI < 25) as reference.
Results: After excluding individuals with prevalent (n = 1,418) or incident DM (n = 5,327), 23,641 individuals were followed

for a median of 25 years, of which a total of 196 (0.8%) individuals developed UNE. In the multivariate Cox regression models, adjusted for sex, age, alcohol consumption, hypertension, smoking, and manual work, BMI was independently associated with UNE (HR 1.07; 95% CI 1.03 – 1.11, $p < 0.001$). Furthermore, both overweight (HR 1.55 95% CI 1.12 – 2.15, $p < 0.01$) and obesity (HR 2.23; 95% CI 1.40 – 3.57, $p = 0.001$) were associated with a marked increased risk compared to individuals with normal weight.
Conclusions: High BMI is associated with the development of UNE, independent of age, sex, hypertension, smoking, manual work, and alcohol consumption in individuals without diabetes, indicating that obesity and high BMI are risk factors for the development of nerve entrapment disorders irrespective of hyperglycaemia. The worldwide rise in obesity highlights the importance of prevention, early lifestyle intervention, and patient information.

A-0239 CT IMAGING IN OPTIMIZING TRAPEZIO-METACARPAL PROSTHESIS PLACEMENT: PROPOSED RADIOGRAPHIC REFERENCES FOR ENHANCED CLINICAL OUTCOMES

Eleonora Piccirilli, Matteo Primavera, Chiara Salvati, Umberto Tarantino
Tor Vergata University Hospital, Rome, Italy

Introduction: Trapezio-metacarpal (TMC) joint replacement is a valid option in treating TMC joint osteoarthritis. TMC prosthesis have the advantage of preserving the length and more accurately reproduce the range of motion (ROM) of the thumb. Also, TMC prosthesis have an intrinsic risk of dislocation and aseptic loosening. Preoperative imaging analysis can limit complications and enhance prosthetic placement while postoperative images highlight pitfalls and successes that could refine the clinical outcomes.
Material & Methods: We conducted a prospective analysis of 15 patients with severe osteoarthritis treated with a Touch© (Kerimedical, Geneva, Switzerland) prosthesis: X-Ray and CT protocols were developed preoperatively and postoperatively to A) include patients with the right surgical indication, B) analyze the correct prosthesis placement and C) their correlation with the clinical outcomes (VAS, Kapandji and QuickDASH scores) by performing Spearman correlation analysis.
Results: The average difference in trapezium height and M1-M2 ratio, pre- and post-surgery was respectively: 1.8mm (SD $\pm$1.7; $p < 0.001$) and 0.04mm (SD $\pm$0.04; $p = 0.017$). Pre-to-postoperative M1 axis length increased by an average of 2.98mm (SD $\pm$3.84; $p = 0.017$). Trapezial cup sinking, indicated by the Trapezium Index, measured 4.6mm (SD $\pm$1.2). Metacarpal Index averaged at 11.3mm (SD $\pm$3.3). The distance between the centers of the trapezium distal surface and the prosthesis cup was 2.23mm (SD $\pm$1.4). The Spearman correlation gave the following: negative correlations were highlighted between postoperative VAS scores and M1/M2 ratio and residual trapezium height (correlation coefficient: -0.7, $p = 0.03$ and -0.064, $p = 0.03$ respectively) at 6 months; a negative correlation at 3-months mark between the QuickDASH and the trapezium residual height (correlation coefficient: -0.07, $p = 0.01$); a positive correlation was found for trapezium index at 1-month (correlation coefficient: 0.07, $p = 0.03$) and 3-months marks ($p = 0.04$) with the Kapandji score. Similarly, a positive correlation between the distance of the prosthesis and trapezium centers and QuickDASH at 1- and 3-months (correlation coefficient: 0.066, $p = 0.03$; correlation coefficient: 0.07, $p = 0.05$, respectively) and a positive correlation between prosthesis axis and residual 1st metacarpal angle with QuickDASH at 3 months (correlation coefficient: 0.07, $p = 0.02$).
Conclusions: Pre- and postoperative systematic imaging analysis should become a method for predicting complications and guiding recovery in TMC prosthesis: CT imaging could provide us with radiographical landmarks that are intrinsically linked to clinical outcomes. Further research is necessary to fuel a protocol for the correct intraoperative TMC prosthesis implantation.

A-0240 ADVANCING CARPAL TUNNEL SYNDROME DIAGNOSIS: ECHOGRAPHY AS A NON-INVASIVE ALTERNATIVE TO ELECTROMYOGRAPHY

Daniele Paravani[1], Matteo Primavera[2], Giorgio Antonietti[1], Priscilla Di Sette[1], Chiara Salvati[2], Michele Rampoldi[1]
[1]CTO A. Alesini, Rome, Italy; [2]Tor Vergata University Hospital, Rome, Italy

Introduction: Echography could be a valid tool for the staging and assessment of the carpal tunnel syndrome (CTS); when compared to electromyography, echo imaging is painless, cheaper, faster, and able to assess the median nerve along its entire course, and the carpal tunnel itself, by monitoring the disease progression over time.
Material & Methods: Our study analyzed 33 patients (6 males and 27 females) with unilateral symptoms positive for CTS. Patients were evaluated on two separate occasions by 2 orthopedic surgery residents using a 15mhz echography probe, to obtain the following parameters: the area of the median nerve at 4 points (at the beginning, in the middle, at the outlet of the transverse ligament, and halfway at the forearm), the antero-posterior (AP) and medio-lateral (ML) diameters, nerve flattening (NF) and palmar bowing (PB) ratios. There was no statistical differences between the 2 set of measurements, validating the reproducibility of the measurements. All patients underwent electromyography and were classified according to the Padua classification. A Spearman correlation test was performed to investigate a correlation between the echography parameters and the classifications of Padua to understand if more severe echography findings matched more severe electromyography values. Lastly, we divided patients into 2 groups (those with ≤3 parameters over their limit to diagnose CTS, according to the literature, and those with >4 parameters) and performed a Chi-Squared test to quantify a minimum number of factors to diagnose CTS.
Results: Our cohort had a median VAS score of 6.8 (range 5-10) with an average symptoms duration of 2.9 years; according to the electromyography 9 patients were registered as class 3 according to Padua, 4 as class 4, 9 as class 5 and 11 as class 6. The average median nerve areas of the affected side were inlet 10 (SD ±4) mm2; mid 8.1 (SD ±2.8) mm2, outlet 8.2 (SD ±3.9) mm2, forearm 6.2 (SD ±1.8) mm2. Also recorded: AP diameter 1.7 (SD ±0.6) mm, ML diameter 5.8 (SD ±1.7) mm, NF 3.6 (SD ±1.6), PB 0.11 (SD ±0.04). The following parameters showed a statistically significant correlation with the Padua classifications: median nerve area in the middle of the carpal tunnel (Rho 0.3; P-value 0.04), AP diameter (Rho 0.3; P-value 0.03); PB (Rho 0.3; P-value 0.04). The Chi-squared test did not result statistically significant, even if we described a positive tendency between the sum of over-the-limit parameters and CTS staging. All our patients found the echography painless while ¾ had pain/discomfort during the electromyography test.
Conclusions: Our results highlighted 3 parameters that positively correlate with CTS severity according to Padua. Also, echography gives reproducible and reliable measurements for CTS, being a much better-tolerated exam than EMG. Our conclusion is that, for patients with more advanced disease/severe stage with CTS signs and symptoms, US can potentially substitute EMG, with the advantage of being a real-time, tolerable, transportable, and non-invasive tool. For milder disease stages further research is still necessary to identify possible cut-off values.

A-0241 NERVE RECONSTRUCTION AFTER IATROGENIC INJURY IN PERCUTANEOUS ULTRASOUND-GUIDED CARPAL TUNNEL SURGERY

Belén Pardos, Juan María Pardo, Eudaldo Gallo, Enrique Peces, Carlos Ruiz
Hospital Universitario General de Villalba, Madrid, Spain

Introduction: ultrasound-guided percutaneous carpal tunnel release is a technique that is gaining popularity in recent years, reducing the average recovery time of patients without significantly increasing surgical time and cost.

Aim: we present the case of a 57-year-old patient undergoing ultrasound-guided percutaneous release of the CTS with an iatrogenic injury to the 3rd commissural branch of the median nerve after this technique, and subsequent nerve reconstruction.
Material & Methods: the patient came 1 month after the surgery with total anesthesia of the ulnar edge of the 3rd finger and the radial edge of the 4th finger, a positive Tinel sign at the level of the distal scar, as well as ANS changes in the skin of the 3rd commissural branch, so a surgical revision was decided due to the suspicion of an iatrogenic neuroma.
Results: an expanded palmar approach was performed, revealing a complete section of the 3rd commissural branch, distal to the superficial palmar arch, with a neuroma in the proximal end. A resection of the neuroma is performed, leaving a 12mm defect, with end-to-end suture not being possible. A nerve reconstruction is performed with an allograft 2-3mm in diameter x 15mm in length (Avance, Axogen) checking the absence of tension with the full range of mobility. From the 1st post-surgical week the patient presents a disappearance of Tinel's sign, and one month post-surgery only partial recovery from the anesthesia of the 3rd commissural, pending posterior evolution.
Conclusions: the percutaneous ultrasound-guided technique for CTS presents a demanding learning curve, and is not free of complications (incomplete release, iatrogenic lesions...), so it should be indicated with caution and with surgeons experienced in ultrasound techniques. Nerve allograft is an excellent option for the management of nerve injuries with extensive defects to avoid the added morbidity of autograft.

A-0242 USE OF MR NEUROGRAPHY IN THE DIAGNOSIS AND SURGICAL TREATMENT OF ELBOW ULNAR NERVE INJURIES

Maria Candelaria Torre, Daniela Binaghi, Hernan Blanchetiere, Adriana Pemoff
Las Manos del Músico, Buenos Aires, Argentina

Introduction: The development of MR neurography has made it possible to obtain images with a high degree of detail, showing with exquisite precision the path, structure and environment of the peripheral nerves.
The use of this diagnostic tool is not as widespread in our environment as electrophysiological or ultrasound studies, either due to lack of availability (because of economic issues or due to lack of complex equipment in the centers where we work) or because of ignorance of its properties.
Aim: Determine the scope of neurography in the diagnosis of ulnar nerve injuries in the elbow and compare the obtained images with surgical findings, with the final aim of increasing the range of the different kinds of ulnar nerve injuries in order to make the treatment more accurate.
Material & Methods: In a period of 5 years, 85 patients with symptoms involving the ulnar nerve in the elbow have been evaluated. Most of these patients were suffering an overuse condition with neuropathic manifestations so they were remitted with specific rehabilitation treatment.
In 35 cases, micro-coil MR neurographies were requested and 24 patients have been operated by the same surgical team, and the surgical results were compared with those of the neurography.
Although other complementary studies (neurophysiological studies and dynamic ultrasound) were requested along with neurography, this work was limited to the contribution of neurography in the pathology of the ulnar nerve in the elbow.
Results: In all patients that underwent surgery, there was a correlation between the images obtained and the surgical findings. These diagnostic images made it possible to plan the precise approach to the injury and perform targeted surgical management, locating the exact site of involvement. Therefore, it was possible to verify not only the intrinsic compromise of the nerve, but also other compression factors (like hypertrophic vastus medialis, supernumerary anconeus, neuroma, vascular alterations, fibrous bands, among others).

Conclusions: Advances in obtaining neurographic images by MR have radically improved the diagnosis of the ulnar nerve injuries at the elbow, which allowed us to expand the possibilities of differential diagnosis and facilitate surgical interventions, making nerve exploration less invasive and faster, simpler and more effective.

A-0243 OUTCOME OF THE TREATMENT OF SYMPTOMATIC OSTEOARTHRITIS OF THE TRAPEZIOMETACARPAL JOINT WITH AN ORAL COMPOUND CONTAINING HYALURONIC ACID, CHONDROITIN SULFATE, HYDROLYZED COLLAGEN TYPE II, AND HYDROLYZED KERATIN IN 40 PATIENTS

Maria Carolina Fra[1], Mattia Cason[1], Elmor Moore[1], Luca Cristani[3], Tommaso Maluta[1], Massimo Corain[2]
[1]U.O.C. Ortopedia e Traumatologia, Azienda Ospedaliera Universitaria Integrata Verona, Verona, Italy; [2]U.O.C. Chirurgia Della Mano, Azienda Ospedaliera Universitaria Integrata Verona, Verona, Italy; [3]Università degli Studi di Verona, Dipartimento di Informatica, Verona, Italy

Introduction: Trapeziometacarpal joint osteoarthritis (TMJ OA) is the second most common degenerative disease of the hand after interphalangeal joint osteoarthtritis (IPJ OA). This condition affecting the 10 percent of the population, is significantly influenced by aging and comorbidities determining an increase in pharmacological treatment and a high social and economic burden.
Lately, natural substances such as hyaluronic acid (HA), chondroitin sulfate (CS), and glucosamine are starting to be used as ground therapy to reduce the consumption of NSAIDs and their related adverse events.
Ialòral® 1500 (PharmaSuisse Laboratories Srl, Milan, Italy) is a natural compound made of BioCell Collagen, Cynantine, Manganese, and Bioperine like that of the human articular cartilage in synovial joints.
Aim: Our objective was to evaluate the effect of a 1-month therapy with Ialòral® 1500 through DASH score and to consider if this treatment leads to pain reduction (NRS score) and strength improvement (Jamar test and Pinch test).
Material & Methods: We selected 40 patients with TMJ OA visiting our Hand Unit in a 3 months'period. Patients were recruited at the outpatient clinic through X-ray (XR), Jamar test, Pinch test, NRS, and DASH score. Patients assumed an oral supplement of 120 mg HA, 240 mg CS, 300 mg K, keratin matrix, manganese, and piperine, once a day for 28 days. Patients were tested after 2, 4, 8 weeks from the beginning (T1, T2, T3) through NRS and DASH score; the power tests Jamar and pinch were assessed during the T2 and T3 evaluation.
Results: Our study showed improvement in DASH, NRS scores and in the grip and pincher movements. results were mainly significant
for the more advanced stages, meaning patients with worse prognosis benefit more from this treatment.
Conclusions: results are promising especially for those patients with contraindication to more invasive approaches. Therefore, this oral supplementation provides an additional non-invasive possibility of treatment of the of TMJ OA symptoms.

A-0244 RISK FACTORS IN DISTAL INTERPHALANGEAL JOINT ARTHRODESIS IN THE HAND

Nico Leibig, Steffen U. Eisenhardt, Horst Zajonc, Alexander Runkel
Dept. of Plastic and Hand Surgery, University Medical Center Freiburg, Freiburg, Germany

Introduction: The arthrodesis of a the distal interphalangeal joint is a frequently performed operation. Different techniques for this operation exist. However, there is little evidence which of them is favorable and what complication rate has to be expected.

Aim: In this retrospective study we aimed to analyse the risk factors for complications after different methods of distal interphalangeal arthrodesis in the hand.
Material & Methods: 173 DIP arthrodesis were evaluated regarding there technique, the indication, time to consolidate, and complications.
Results: orty-four per cent were treated with K-wire/cerclage fixation, 46% with X-fuse® implants (Stryker GmbH, Selzach, Switzerland) and 10% with headless compression screws (HBS®-screw, KLS Martin Group, Tuttlingen, Germany). The median follow-up was 16 weeks (range 6-224). The overall complication incidence was 44% (minor complications 29% and major 15%). The logistic regression showed that osteoarthritis, revisional arthrodesis and smoking had a negative impact on the total complication incidence. A Cox-regression analysis showed that HBS®-screw arthrodesis was associated with a significantly lower incidence of major complications compared with K-wire/cerclage and X-Fuse®-arthrodesis. Revisional arthrodesis was five times more frequently connected with major complications than primary surgery. Smokers were three times more likely to experience major complications than non-smokers.
Conclusions: We conclude that arthrodesis of the distal interphalangeal joint might be a small operation, but leads often to complications. Risk factors must be kept in mind.

A-0246 TREATMENT STRATEGIES AND PROBLEMS OF TERRIBLE TRIAD INJURY

Yuki Sugimoto[1], Hideyuki Ota[2,3], Yuki Fujihara[2,3], Satoshi Niwa[2,3], Yoshiyuki Inagaki[3], Yuki Nishimura[3], Wakana Kawaguchi[3]
[1]Clinical Training Center, Nagoya Ekisaikai Hospital, Nagoya, Japan; [2]Department of Orthopaedic, Nagoya Ekisaikai Hospital, Nagoya, Japan; [3]Hand and Microsurgery Center, Nagoya Ekisaikai Hospital, Nagoya, Japan

Introduction: Terrible triad injury (TTI) is a traumatic injury involving a coronoid process fracture and a radial head and neck fracture with an elbow dislocation; it is often difficult to treat. In this study, we describe the treatment strategies and problems in TTI based on the results of our procedure.
Material & Methods: We reviewed retrospectively 16 TTI cases treated in our institution from 2008 to 2022. The patients included 11 men and five women with an average age of 42. We reviewed the mean follow-up period, range of motion of the elbow joint at final follow-up, open reduction and internal fixation (ORIF) for radial head and neck fracture, details of ligament injury and repair, presence of ORIF for a coronoid process fracture, implants, and order of surgery.
Results: The causes of injuries were nine cases of falls, five cases of drop, and two cases of being thrown by judo. The treatment procedures for each injury were as follows. For 16 cases of radial head and neck fractures, radial head resection and conservative treatment; steel wire fixation was performed in one case, plate fixation in three cases, and headless screw fixation in 10 cases. For ligament injury, four cases required medial (MCL) and lateral (LUCL) repair, while 12 cases required only MCL or LUCL repair. ORIF of a coronoid process fracture was performed in four cases. In one case, the elbow remained unstable despite bilateral ligament repair of the elbow and ORIF of a coronoid fracture. Therefore, a hinged-type external fixator was applied. The first step in our approach is ORIF to radial head fracture, followed by the repair of LUCL and/or MCL; if elbow instability persists, the next step is ORIF of coronoid process fracture. If instability persists, a hinged-type external fixator is applied. Our approach delivered, on average, the mean range of motion of the elbow of 130° of flexion and -18° of extension at the final follow-up.
Conclusions: The reasons why TTI is considered difficult to treat are: 1) the bone fragments of radial head and neck fractures may be small or highly comminuted. It complicates the osteosynthesis technique; 2) determining preoperatively whether to apply osteosynthesis for a coronoid fracture is challenging; 3) there are few opportunities to experience osteosynthesis of coronoid fractures, making it challenging to improve and enhance the surgeon's skills.

Our results suggest that ligament repair with ORIF of radial head and neck fractures is necessary. On the other hand, it is difficult to determine the necessity and indication for ORIF of a coronoid process fracture; one must respond according to the intraoperative findings. The necessity of a hinged-type external fixator is also challenging to determine preoperatively.

A-0247 A RARE TYPE OF DISLOCATION; TRANS-SCAPHOID INTERCARPAL DISLOCATION. A CASE REPORT

Muhammet Okkan[1], Zeynel Mert Asfuroğlu[2]
[1,2]Mersin University Department of Hand Surgery, Mersin, Turkey

Carpal dislocations are uncommon and complex wrist injuries that frequently occur as a consequence of high-energy trauma, such as falls, road traffic accidents, and industrial incidents. In order to minimize long-term disability and achieve favorable outcomes, timely diagnosis and appropriate surgical treatment are crucial. At this point we report a case of a 26-year-old male who experienced a trans-scaphoid intercarpal fracture dislocation as a result of a motorbike accident. The radiographs showed a complicated fracture-dislocation of the carpal bones, involving the trans-scaphoid and dorso-radial dislocation of the distal carpal row, accompanied by a scaphoid fracture. (Figure 1). The magnetic resonance imaging revealed that the scapholunate ligament was undamaged, while the lunotriquetral and radioscapholunate ligaments were found to be ruptured. The fracture of scaphoid was fixed with single cannulated screw (2.5 mm) through a dorsal incision. Lunotriquetral and radioscapholunate ligaments were repaired with anchor sutures. A 1.2 mm K wire was used to stabilize the scapholunate, and a 1.4 K wire was used to stabilize the lunotriquetral joint. No distal radioulnar joint instability was found intraoperatively. After six weeks following the surgery, the K wires were removed, and the patient was recommended to undergo physiotherapy in order to initiate range of motion activities. Periodic follow-up schedules and X-rays were performed to monitor the advancement of bone healing and the preservation of alignment. The patient exhibited enhanced wrist function and increased range of motion. The X-rays revealed satisfactory bone healing and correct positioning of the carpal bones. This type of trans-scaphoid intercarpal dislocations are rare. The case detailed an uncommon wrist injury, which was effectively treated through timely diagnosis, surgical intervention, and postoperative rehabilitation, resulting in the restoration of both function and stability.

A-0248 LESS RECURRENCE OF DUPUYTREN'S CONTRACTURE AFTER TREATMENT WITH COLLAGENASE INJECTION COMPARED TO NEEDLE FASCIOTOMY AFTER FIVE YEARS: A RANDOMIZED CONTROLLED TRIAL

Rasmus Wejnold Jørgensen, Claus Hjorth Jensen, Stig Jørring
Department for Hand Surgery, Herlev and Gentofte University Hospital, Denmark

Introduction: Dupuytren's disease is treated in various ways. Two treatment options are needle fasciotomy and collagenase injections. Previous studies have failed to find any differences in outcomes following these two treatment modalities. We compared the recurrence of Dupuytren's disease following needle fasciotomy or collagenase injection treatment for isolated metacarpophalangeal (MCP) joint contractures after 5 years in a randomized controlled trial.
Aim: The aim was to compare the recurrence of Dupuytren's disease 5 years following treatment with either collagenase (CCH) or needle fasciotomy (PNF).
Material & Methods: Inclusion of patients was between 2013 and 2015. We conducted a single centre randomized controlled clinical trial with an independent blinded observer. Patients were randomized between collagenase clostridium histolyticum injections (Xiapex®) and percutaneous needle fasciotomy. We randomized 36 patients to the PNF group and

32 to the CCH group. Two patients in the PNF group died before the 5 year follow up.
Results: Patients who were treated with CCH had significantly less recurrence and recurrence later than patients treated with PNF during the period ($p = 0.032$ Kaplan-Meier, Gehan-Breslow-Wilcoxon test). In the PNF group, 20 of 34 (59%) had recurrence or progression leading to further treatment. In the CCH group, 14 of 32 (44%) had recurrence or progression. No serious adverse event was reported in any of the groups.
Conclusions: 5 years following treatment of isolated metacarpophalangeal joint contracture there is less recurrence and progression of Dupuytren's disease when treated with collagenase injection as compared to needle fasciotomy.

A-0249 WRIST WEIGHT-BEARING TOLERANCE IN HEALTHY ADULTS

Susan J. Barlow, Jan-Stephan Scholtz, Wendy Medeiros
Department of Physical Therapy, University of Lynchburg, Lynchburg, VA, USA

Introduction: No information is available in the literature regarding the amount of weight-bearing tolerance in a normal human wrist.
Aim: To establish the normal limits of human wrist weight-bearing tolerance and to determine if gender, age and height are predictors of this weight-bearing tolerance.
Material & Methods: A sample ($N = 465$) of healthy adults ages 18-64 completed a questionnaire indicating their gender, age range and height. Subjects were instructed in performing a wrist weight-bearing tolerance test using a calibrated analog scale. The amount of pressure that the subject was able to apply to the scale in 3 independent trials was recorded and analyzed.
Results: A strong positive correlation was found between average weight- bearing values achieved through the right and left hands for the subjects of this study, $r(463) = .97$, $P < .001$. A 2-way analysis of covariance revealed main effects for both gender (20.9, 95% CI [15.7, 26.0] pounds, $P < .001$) and age ($F(4, 454) = 6.143$, $P < .001$, partial $\eta 2 = .051$). The highest weight-bearing tolerance was observed in males and individuals 25-34 years of age. Multiple regression analysis affirmed that gender, height and age categories of 45-54 and 55 to 64 were all statistically significant predictors of wrist weight-bearing tolerance, $P < .01$.
Conclusions: These results could allow identification of pathologies associated with wrist instability.

A-0251 SECOND METACARPOPHALANGEAL JOINT RECONSTRUCTION POST-TRAUMATIC OSTEOMYELITIS; MASQUELET TECHNIQUE AND CUSTOM PLATE ARTHRODESIS: A CASE REPORT

Inés Farré-Galofré, Xavier Mir-Bullo, Lidia Ana Martín-Domínguez, Albert Pardo-Pol, Sergi Alabau-Rodriguez
Institut Català de Traumatologia i Medicina de l'Esport (ICATME), Hospital Universitari Quiron-Dexeus, Barcelona, Spain

Introduction: Septic arthritis of the hand is a clinical challenge that often leads to joint dysfunction or the need of finger amputation. The index and middle fingers are the most commonly affected by infections due to penetrating trauma, with Staphylococcus aureus being the primary pathogenic agent involved. When joint cartilage is damaged and osteomyelitis sets in, bone resection and arthrodesis becomes crucial for effective pain management and infection eradication.
Material and methods: We present a case of a 51-year-old healthy male who arrived at an emergency department with a saw injury to the dorsal hand and 2nd metacarpophalangeal (MCP) joint. First debridement and skin closure was performed. He returned three days later with fever and cellulitis, at which point additional debridement was performed and a dose of

IV cefuroxime was administrated. One week later, he presented at our hospital with fever, a skin defect over the second MCP joint, suppurative exudate and pain. After debridement and obtaining cultures, growth of Staphylococcus aureus and Streptococcus anginosus led to specific antibiotic therapy with levofloxacin and cefepime. Following an extensive debridement due to damage to the bone, MCP joint, extensor apparatus, and collateral ligaments requiring VAC therapy, intravenous antibiotics were modified according to antibiogram results and were manteined for 26 days.
After clinical improvement and normalization of infection parameters, a posterior interosseous pedicled flap was performed, followed by a good postoperative recovery. However, the patient later developed a purulent exudate along the radial edge of the MCP joint. Oral antibiotics were administered, and conservative management was opted. Despite a decrease in exudate and no infection clinical signs, MRI revealed bone and 1st and 2nd interosseous muscle edema and a collection with a cutaneous fistula as well as a positive leukocytes gammagraphy.
We performed the Masquelet technique, which involved resection of the distal phalanx and proximal metacarpal head, and placement of a gentamicin/vancomycin cement spacer. Following a 8-week course of antibiotics, the infection parameters normalized.
A subsequent MRI excluded persistent infection, and a bilateral CT scan making a pinch was conducted to aid in designing a custom plate for MCP joint arthrodesis. Utilizing iliac crest bone graft, the custom plate was successfully fitted, resulting in satisfactory clinical and radiological outcomes.
Complete arthrodesis was achieved six months post-surgery; with the patient experiencing no pain and having good pinch strength, despite some difficulty with fine motor tasks.
Conclusions: The successful resolution of this case highlights the Masquelet technique as a viable method for addressing bone infection defects, even within the small joints of the hand such as the metacarpophalangeal joint, where its application is less documented. The integration of this technique with specific antibiotic therapy and the use of a custom-designed arthrodesis plate led to effective infection control and functional recovery, emphasizing its potential in complex septic arthritis cases.

A-0252 OUTCOMES OF FUNCTIONAL TREATMENT OF HAND FRACTURES WITHOUT ANY IMMOBILIZATION

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Hand fractures (metacarpal and phalangeal) are common injuries in adults. Most of them is only slightly displaced and stable, what means that can be treated conservatively; fractures which are severely dislocated and unstable require rather operative treatment. Typical conservative treatment consists in immobilization of the hand or finger in a thermoplastic splint for 4-5 weeks.
Aim: An analysis of outcomes of functional treatment of hand fractures without any immobilization.
Material & Methods: Twenty-one patients, 15 men and 6 women at a mean age of 27 years with stable fractures of the metacarpal bones and phalanges were treated in the author institution. Each patient was instructed to make a full flexion and extension of all fingers drew up in one block (the fingers kept close each other). No additional immobilization was used. The results were assessed at one and 3 months from the beginning of therapy.
Results: All patients achieved consolidation of their fractures confirmed radiologically at 3 months. All patients achieved full finger movement and very good function of the hand. In none patient change of the treatment into operative was necessary.
Conclusions: Treatment of stable fractures of the metacarpal bones and phalanges according to presented protocol is safe, well tolerated by the patients and gives excellent outcomes.

A-0253 FUNCTIONAL IMPAIRMENT OF THE EXTREMITIES IN PATIENTS WHO GOT OVER COMPLEX REGIONAL PAIN SYNDROME

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Complex regional pain syndrome (CRPS) is a descriptive term for a complex of symptoms and signs, including pain, swelling and vasomotor disturbances. The disease causes also functional impairment of the affected extremity and limitation in daily activities. Even after effective treatment, the condition frequently leaves residual symptoms and impairment of the limb.
Aim: An assessment of the level of functional impairment in patients who got over CRPS
Material & Methods: Fifty-two patients, 45 women (86%) and 7 men (14%) in a mean age of 57 years who were got over CRPS were asked to fill 2 questionnaires for assessment of function of their upper limbs in daily living. The questionnaires included the Raadboud Skills Questionnaire (the RASQ) and the Disability of Arm, Shoulder and Hand (the DASH)
Results: results of this study show statistically significant differences in functional impairment of the limbs between the groups with different recovery status and duration of CRPS: the patients with longer lasting disease and those, who did not feel recovered showed greater functional impairment of their limbs than remaining patients
Conclusions: These results suggest that, in spite of a satisfactory outcome of treatment, significant long-term sequelae of the disease impair function of the affected limbs and reduce quality of life in a proportion of patients

A-0254 13 YEARS OF HAND SURGERY WITHOUT ANESTHESIOLOGIST ASSISTANCE. AN ANALYSIS OF EFFICACY AND SAFETY OF ANESTHESIA TO OPERATIONS PERFORMED BY SURGEONS, WITHOUT ASSISTANCE OF ANESTHESIOLOGIST

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: . Assistance of anaesthesiologist is considered inseparable element at most surgical procedures, except of minor operations performed under local anaesthesia. In hand surgery, most of operations, even those lasting several hours can be done under regional (brachial plexus block) or local (infiltration) anaesthesia. These procedures can be done by surgeons themselves what allows operating without assistance of anesthesiologist.
Aim: An analysis of efficacy and safety of anesthesia to operations in hand surgery performed in institution run by the author by surgeons, without assistance of anesthesiologists.
Material & Methods: This analysis was based on records of anesthesia protocols filled by surgeons who performed the procedure and who operated on the patients. The following variables were considered: efficacy of anesthesia, adverse effects associated with anesthesia and complications.
Results: Over a period of 13 years (2010-2022), a total of 24 703 operations were done, of this number 22 228 (91%) under anesthesia performed by surgeons, without assistance of anesthesiologists. Efficacy of these procedures (local and brachial plexus blocks) was 99%. A total of 631 (2,8%) adverse reactions were noted associated with anesthesia, most of them transient, requiring emergency intervention and without serious consequences. In only 17 cases (0,07%) adverse effects caused cancellation and postponing of scheduled operation.
Conclusions: Anesthesia for operations in hand surgery performed by surgeons themselves and without assistance of anesthesiologists is effective, safe and is associated with numerous benefits for patients, surgeons and budget of medical care system

A-0255 THE EFFECT OF COMORBIDITIES ON CLINICAL PROFILE AND OUTCOMES OF SURGERY FOR CARPAL TUNNEL SYNDROME

Andrzej Zyluk, Paulina Zyluk-Gadowska
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: results of some studies showed that predictors of less favourable outcomes of surgery for carpal tunnel syndrome might include presence of comorbidities, such as diabetes and thyroid gland diseases. However, the role of these factors is not clearly determined.
Aim: An investigation of the effect of concomitant diseases on clinical profile and outcomes of surgery for carpal tunnel syndrome.
Material & Methods: The study group consisted of 1117 patients, 909 women (81%) and 208 men (19%) at a mean age of 63 years. A total of 972 patients (87%) declared at least one comorbidity, whereas 145 patients (13%) declared no comorbidities The measurements were performed preoperatively and at 6 months post-operatively and included pain intensity, total grip and key-pinch strength, digital sensibility and hand function with the Levine questionnaire.
Results: At baseline, the patients with comorbidities had significantly worse digital sensiblility, weaker total grip strength and grater functional impairment of the hand, but only difference in grip strength reached minimal clinical importance. Surgery resulted in significant improvement for all patients, although outcomes at 6 months were less favourable for those with comorbidities with regard to digital sensiblility, total grip and pinch strength and function of the hand. These differences were statistically significant, but only grip strength reached minimal clinical importance.
Conclusions: Presence of comorbidities had statistically and clinically significant negative effect only on the total grip strength pre- and postoperatively, but had no significant effect on outcomes of surgery which was satisfactory in all patients.

A-0256 PAIN CONTROL IN CHRONIC, REFRACTORY CRPS BY CONTINUOUS BRACHIAL PLEXUS ANALGESIA

Andrzej Zyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

Introduction: Some CRPS patients develop a specific subtype of the condition called “chronic, refractory CRPS”. This form affects almost exclusively young women and is characterised by severe pain (reaching 9-10 VAS) and other painful phenomena (hyperpathia, allodynia), need for regular analgesic consumption (including opioids), severe functional impairment of the affected extremity and no- or poor responsiveness to the treatment. No effective standard treatment is known that allows medium-term freedom from pain in these patients. In this situation, a continuous brachial plexus analgesia may offer some benefit (“a last chance” treatment).
Aim: Analysis of outcomes of treatment of chronic, refractory CRPS by continuous brachial plexus analgesia
Material & Methods: We report outcomes of treatment for severe pain associated with long-standing, refractory CRPS in 10 female patients by continuous brachial plexus analgesia. Duration of the disease prior to treatment was 3.5 years on average and baseline pain intensity was a mean of 8.3 in NRS. All patients met the Budapest criteria of CRPS diagnosis. Spinal catheter was implanted into the brachial plexus via open axillary approach.
Results: Each patient had performed a mean of 4.4 (range 2-8) spinal catheter implantations. Rapid and strong analgesic effect was obtained immediately after beginning of injection of bupivacaine solution: pain decreased from a mean of 8.3 to 1.6. Duration of maintaining the catheter in the brachial plexus and effective analgesia was 5.3 months (range 2-12).

After removal of the catheter the pain returned to baseline. No patient obtained permanent or at least partial reduction of her pain after completion of this therapy.
Conclusions: The reported technique is typically palliative and does not resolve problem of the pain over a longer perspective. However, although all patients returned to their baseline situation, the relatively long period of being free from intractable pain was considered by them to be priceless. We believe that presenting this study will contribute to current knowledge about treatment options for the most severe, "hopeless" cases of CRPS.

A-0257 EFFECTIVENESS OF INTRAOPERATIVE LEUCOCYTE-POOR PLATELET-RICH PLASMA INSTILLATION AFTER CARPAL TUNNEL RELEASE IN PATIENTS WITH CARPAL TUNNEL SYNDROME: A DOUBLE-BLIND, RANDOMIZED CONTROLLED TRIAL

Korawish Mekariya[1], Chayaporn Chotiyarnwong[2], Yuwarat Monteerarat[1], Roongsak Limthongthang[1], Torpon Vathana[1], Panai Laohaprasitiporn[1]
[1]Department of Orthopaedic Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand; [2]Department of Department of Rehabilitation Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction: Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of extremities. Despite the high success rate following carpal tunnel release (CTR), there are documented instances wherein patients report persistent numbness and weakness of hand strength after the surgery, especially in severe CTS patients with long-standing symptoms. Platelet-rich plasma (PRP) is an autologous blood derivative enriched with biological growth factors. Recent studies have shown its advantageous impact on nerve regeneration, indicating effectiveness in treating CTS. However, the data regarding utilization of PRP as an adjuvant treatment after CTR remains insufficiently explored.
Aim: This study aims to evaluate the effectiveness of incorporating localized PRP during CTR surgery in patients with moderate to severe CTS
Material & Methods: This is a double-blinded, randomized controlled trial conducted at a tertiary care hospital in Thailand. Patients diagnosed with moderate to severe CTS, as confirmed by an electrodiagnostic study (EDX), and who exhibited unsuccessful response to conservative treatment over three months were included. Patients were randomly allocated, using a stratified approach based on severity, employing permuted block randomizations and assigned to receive either CTR with localized PRP instillation (PRP group) or undergo CTR without PRP instillation (control group). Two groups received the same mini-open CTR technique. In PRP group, 4ml of leucocyte-poor PRP (Arthrex ACP®, Double-Syringe System) was directly instilled around the median nerve before closing the incision. The primary outcome was the Boston Carpal Tunnel Questionnaire (BCTQ) score at 3 months follow-up. Secondary outcomes included Numerical Pain Rating Scale (NPRS), grip strength, pinch strength, Semmes-Weinstein monofilament test, numbness resolution, and presence of neuropathic pain using neuropathic pain diagnostic questionnaire (DN4). Outcomes were assessed at 2 weeks, 6 weeks, 3 months, and 6 months follow-up periods. Additionally, the EDX was repeated at 3-month postoperative follow-up.
Results: A total of 72 patients were enrolled, with 36 patients in each group (6 moderate and 30 severe CTS). Both groups showed a significant improvement in BCTQ scores and NPRS from baseline to 6-month follow-up. However, BCTQ scores and NPRS demonstrated no significant difference between groups ($p > 0.05$). The PRP group reported a significantly higher complete numbness resolution than in the control group at 6 weeks (52.8% vs. 27.8%; $p = 0.038$) and 3 months (61% vs 36%; $p = 0.033$). Postoperative distal sensory latency was significantly lower in the PRP group compared to the control group (4.84 m/s vs. 5.53 m/s; $p = 0.02$). However, no significant difference was observed in other EDX parameters or other outcome measurements.

Conclusions: The utilization of intraoperative leucocyte-poor PRP instillation during CTR provides comparable improvement in pain alleviation, hand functions, and strength. However, it notably outperformed the standard CTR alone by demonstrating better resolving numbness and reducing distal sensory latency in patients with moderate to severe CTS.

A-0258 DUPUYTREN'S DISEASE AND BODY MASS INDEX

Claudia Gonzalez Garcia[1], Rebecca Nicholas[2], Sallie Yassin[2], Belen Garcia Medrano[3], Steven Glickel[2], Jacques Hacquebord[2,4]
[1]Orthopedic Surgery Department, Hospital Universitario Virgen de la Victoria, Málaga, Spain; [2]Division of Hand Surgery, Department of Orthopedic Surgery, NYU Langone Health, New York, USA; [3]Hand Surgery Unit, Orthopedic Surgery Department, Hospital Clínico Universitario de Valladolid, Spain; [4]Hansjörg Wyss Department of Plastic Surgery, NYU Langone Health, New York, NY, USA

Introduction: The literature suggests that lower BMI (Body Mass Index) increases risk for Dupuytren's Disease (DD).1-3 Tubiana's score stages DD based on total flexion deformity (TFD) at the metacarpophalangeal, proximal and distal interphalangeal joints (N=Palmar nodule only; 1=0-45°; 2=45-90°; 3=90-135°; 4=>135°).4

Aim: We hypothesized that: (i) An inverse relationship between incidence of DD and BMI would be observed in our patient population; (ii) Increasing DD severity (Tubiana score N, 1, 2, 3 or 4) would correlate with decreasing BMI.

Material & Methods: We conducted a single-site, case-control retrospective review of all patients with a DD diagnosis on our prospectively-populated electronic database from September 2020-December 2022. Institutional review board approval was obtained. Medical records were reviewed for age, sex, smoking status, alcohol consumption, ethnicity, comorbidities and BMI.

DD cases were matched to non-DD patients on age and sex via nearest-neighbor propensity score matching without replacement. Differences in demograhics and risk factors were assessed using a Fischer's exact test, chi-square test, and t-test. A sub-analysis of DD patients was conducted to assess risk factors for DD severity (Tubiana score) via t-test and Fischer's exact test. Analyses were two-tailed, set at the $p<0.05$ level.

Results: 135 patients with DD were matched with 135 controls (N=270). Most patients were male (69%), white (82%), over 50yrs (87%), alcohol-consumers (72%), with bilateral disease (65%). Mean BMI of DD patients was 25.92 and 28.77 for non-DD patients ($p<0.001$). According to the logistic regression model, DD patients' BMI was 3.341 (mean) lower than non-DD patients ($b1=-3.341$, $p<0.001$).

In the sub-analysis, mean BMI was not statistically different among Tubiana stages, but as the stage increased, the variability in BMI among groups decreased (Figure 1). The 3 patients with higher Tubiana stage (3) were non-obese (BMI approximately 25), but no clear correlation between DD severity and BMI was demonstrated. Male sex was associated with a higher Tubiana score ($p=0.039$). No other risk factors were identified for Tubiana stage.

Conclusions:

- Our study findings accord with known risk factors for DD: increasing age, male sex, and caucasian ethnicity.
- Patients with dupuytren's disease had a significantly lower mean BMI than those without dupuytren's disease.
- Men were identified at risk for a higher Tubiana stage (stage 3 and 4). We were unable to demonstrate a clear correlation between lower BMI and increasing disease severity.

A-0259 SURGICAL FASCIECTOMY VERSUS COLLAGENASE INJECTION IN TREATING RECURRENT DUPUYTREN DISEASE: 1-YEAR RESULTS OF A RANDOMIZED CONTROLLED TRIAL

David Eckerdal[1], Jesper Nordenskjöld[1], Anna Lauritzson[2], Philippe Kopylov[1], Isam Atroshi[1]
[1]Department of Clinical Sciences - Orthopedics, Lund University, Department of Orthopedics, Hässleholm-Kristianstad, Lund, Sweden; [2]Department of Orthopedics, Hässleholm-Kristianstad, Hässleholm, Sweden

Introduction: In Dupuytren disease recurrence is common irrespective of treatment method. Surgical fasciectomy for recurrent contracture is associated with a high risk of complications. Collagenase injection has shown good efficacy in primary Dupuytren disease, but little is known about its efficacy when treating recurrent contracture.
Aim: To compare 1-year outcomes after surgical fasciectomy versus collagenase injection in treatment of recurrent Dupuytren contracture.
Material & Methods: We conducted a single-center randomized controlled trial. The inclusion criteria were recurrent contracture in ≥1 of the 3 ulnar fingers after surgical fasciectomy, collagenase injection or needle fasciotomy, palpable cord, and passive extension deficit ≥30° in the metacarpophalangeal (MCP) or proximal interphalangeal (PIP) joint.
Primary outcome was total (MCP+PIP) active extension deficit (TAED) in the treated fingers. Sample size (minimal important difference 20°) was estimated to be 25 patients/group. Computer-generated sequence and sealed envelopes were used for randomization. Joint contractures were measured by two occupational hand therapists at baseline, 12 and 52 weeks. Patient-reported outcomes measures (PROMs) were completed at baseline, 3, 6, 12 and 52 weeks. Fasciectomies were performed by two surgeons and collagenase treatments by a single (different) surgeon. Adverse events were recorded. Patient were enrolled between March 2018 and June 2022.
Results: 60 patients were randomized. 1 patient randomized to fasciectomy declined treatment and was excluded. 59 patients received their allocated treatment (28 patients (29 hands) [33 fingers] fasciectomy and 31 patients (31 hands) [39 fingers] collagenase); 3 women in each group. Six patients in each group had recurrence after fasciectomy.
In the fasciectomy group, 1 patient withdrew from the study after 6 weeks, and 2 patients missed 1-year follow-up but completed PROMs (1 patient due to the covid pandemic and 1 due to a severe illness). All remaining patients completed follow-up. Thus 56 patients (25 in the fasciectomy and 31 in the collagenase group) completed the 1-year follow-up and 59 (28 fasciectomy, 31 collagenase) completed PROMs. Mean age was 72 (SD 9) and 71 (SD 6) years for the fasciectomy and collagenase groups, respectively.
Between baseline and 1 year, both groups improved significantly in TAED with no statistically significant difference between the groups. Mean improvement was 51° (SD 25) and 42° (SD 28) for fasciectomy and collagenase respectively; adjusted mean difference 7.7° (95% CI -3.2 to 18.6). At 1 year, no statistically significant or clinically relevant between-group differences were found in QuickDASH score, pain score, or EQ-5D index. Mean patient satisfaction score (visual analog scale 0 to 100) was 76 (SD 31) for the fasciectomy and 74 (SD 31) for the collagenase group. Adverse events in the fasciectomy group included digital nerve injury (1 finger) and vascular injury (2 fingers), and in the collagenase group skin tears that healed with standard wound care (9 fingers).
Conclusions: In patients with recurrent Dupuytren contracture randomized to either surgical fasciectomy or collagenase, both treatments resulted in large improvement in active extension deficit at 1 year with no statistically significant or clinically relevant difference between the groups, and with similar patient satisfaction.

A-0260 GLOMUS TUMORS OF THE HAND

Takaaki Shinohara, Kimitoshi Noto, Takamasa Masuda
Hand and Microsurgery Center, Daido Hospital, Nagoya, Japan

Introduction: Aim: The purpose of this study was to report on our experience with surgical treatment for glomus tumors of the hand.
Material & Methods: We retrospectively reviewed 61 fingers or thumbs in 59 patients who underwent surgical removal for glomus tumors of the hand. The mean age at the time of surgery was 44 years. Detailed information regarding the interval between the onset of symptoms and diagnosis, the location of the tumor, nail deformity, the classic triad of symptoms (spontaneous pain, localized tenderness, cold sensitivity), operative procedure, and tumor size from medical records.
Results: The mean time between the onset of symptoms and diagnosis was 7.4 years. Fifty-one of tumors were located in the subungual region, 10 were in the pulp region. There were 22 nail deformity. Spontaneous pain was observed in 49, localized tenderness was in all, cold sensitivity was in 46 fingers or thumbs. All surgery was performed using the microscope or magnifying glass. When the tumor was located in the subungual region, total or partial of the nail plate was elevated with a proximal base and a longitudinal incision was made in the nail bed over the tumor. After full exposure of the tumor, the mass was dissected. In cases of pulp tumors, a mid-lateral or volar incision was made. The average tumors size was 3.7×4.1mm.
Conclusions: Glomus tumors account for 1%–5% of all soft-tissue tumors of the hand. a long duration of symptoms has been noted before correct diagnosis and treatment. The classic triad of symptoms makes easy their diagnosis. However, care should be taken because there are some patients who do not have spontaneous pain or cold sensitivity. Surgical excision is the only feasible method for the treatment of glomus tumors. Since the tumor is small and the nail bed and matrix needs to be treated atraumatically, careful surgery using the microscope or magnifying glass is requisite.

A-0262 THE RISK FACTORS FOR SUBSEQUENT FRACTURES AFTER DISTAL RADIUS FRACTURE

Eic Ju Lim[1], Jae Kwang Kim[2], Huijeong Kim[2], Young Ho Shin[2]
[1]Department of Orthopaedic Surgery, Chungbuk National University Hospital, Cheongju, South Korea; [2]Department of Orthopaedic Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, South Korea

Introduction: No studies have evaluated the risk factors for subsequent fractures after distal radius fracture (DRF), compromising the demographic characteristics, bone fragility parameters, and underlying diseases of the individuals.
Aim: The purpose of this study was to evaluate the risk factors for subsequent fractures after DRF.
Material & Methods: We retrospectively reviewed 705 patients with DRF who performed dual-energy X-ray absorptiometry within six months before or after the DRF and followed more than 12 months. We identified patients with subsequent fractures and multivariate logistic regression analyses were conducted with demographic information, underlying disease status, and bone fragility parameters at the time of DRF to evaluate the risk factors for subsequent fractures.
Results: Subsequent fractures occurred in 56 patients (7.9% of 705 patients) with 65 fractures at a mean time of 33.5 months after DRF. In multivariate logistic regression analysis, older age (OR 1.032; 95% CI, 1.001–1.064, $p = 0.044$), diabetes mellitus (DM) (OR 2.663; 95% CI, 1.429–4.963, $p = 0.002$) and previous fracture history (OR 1.917; 95% CI, 1.019–3.607, $p = 0.043$), and low total hip BMD (OR 1.410; 95% CI, 1.083–1.836, $p = 0.011$) were significant risk factors for the occurrence of subsequent fractures.
Conclusions: This study demonstrated that older age, DM, previous fracture history and low hip BMD are the risk factors

for subsequent fractures after DRF. Active glycemic control would have a role in patients with DM and a more aggressive treat-to-target approach may be necessary for patients with low BMDs to prevent subsequent fractures after DRF.

A-0263 RECALCITRANT TRIGGER DIGIT CAUSED BY AMYLOIDOSIS- A CASE REPORT

Anette Chemnitz[1], Diane Grélaud[2]
[1]Hand Center Malmö, Atleva Specialist Care, Sweden; [2]Department of Pathology, Skåne University Hospital, Malmö, Sweden

Introduction: Amyloidosis is a systemic disease that can cause deposition of abnormal proteins in different body organs, thereby altering the normal body organ function. The disease can be hereditary or acquired and as knowledge increases, studies indicate a higher prevalence than expected. Amyloid deposits in the hand can be an early manifestation of the disease and have been associated with bilateral carpal tunnel syndrome, and in rare cases, trigger digits.
Material & Methods: Case report: A seventy-year-old gentleman presented with recurrent triggering of his left long finger despite several previous surgeries in the same finger, in another health care institution using local anesthesia. He described former triggering of multiple digits, with repeated surgeries. Ten years ago, he underwent surgery for bilateral carpal tunnel syndrome. He denied any other systemic symptoms, nor taking any medications. There was no previous family history of systemic disease.
An additional surgery was decided. Using a brachial plexus nerve block and tourniquet, tenosynovitis was confirmed in the flexor tendons, with no signs of inadequate pulley release. A part of the FDS slip was excised and sent for pathological analysis.
Microscopical analysis showed chronic inflammation and an extracellular eosinophilic acellular amorphous material, which made the pathologist perform a Congo red staining, indicating amyloid deposits in the tissue. The staining was repeated with the same result and the sample was sent to a specialist center for additional analysis. The presence of transthyretin amyloidosis was confirmed, and the patient referred for further investigations. He was eventually diagnosed with transthyretin amyloidosis- wild type.
Conclusions: Amyloid deposits in the hand causing trigger digits are rare but should be considered in cases with recurrence, despite adequate surgical pulley release, as well as in patients with multiple digits involved. An increased awareness among surgeons treating these patients and a low threshold for tenosynovial biopsies during surgery, can promote early diagnosis and a better clinical outcome.

A-0264 TREATING PAIN IN CARPAL TUNNEL SINDROME: CASE REPORT USING NON-INASIVE INTERACTIVE NEUROSTIMULATION

Aurora Badiali[1,2]
[1]Fisio shoulder, Modena, Italy; [2]Poliambulatorio Modus, Castelfranco Emilia, Italy

Introduction: Carpal Tunnel Syndrome is one of the most common nerve entrapments of the upper extremity. In fact, the American Academy of Orthopaedic Surgeons (AAOS) Clinical Guidelines on the Diagnosis of CTS defines it as a symptomatic compression neuropathy of the median nerve at the level of the wrist (2007). Common symptoms are numbness, tingling, nocturnal paresthesias of the thumb, index and middle finger volarly (Ibrahim et al., 2012). Treatment may vary based on severity of symptoms and nerve compression. Conservative treatment, such as splinting, administration of oral drugs, injections, manual tenchiques and neural gliding exercises, is suitable for mild to moderate cases. Instead, severe cases

are usually treated surgically. In the clinical practice our aim is to relieve symptoms and improve quality of life. Treating neuropathic pain is often a challenge, especially in later stages of the syndrome, where patien QoL is compromised.
During our daily clinical practice we are used to treat pain with non invasive interactive neurostimulation (NIN), which is a form of electric therapy that works by locating areas of lower skin impedance. The low impedance on the skin is caused by an increase in the sympathetic skin response and research shows that these points correlate to myofascial trigger points and major nerve branches (Schultz et al., 2007).
Aim: Describe a case report presenting CTS treated with NIN
Material & Methods: We present a case report of a 67 year old woman presenting with bilateral carpal tunnel syndrome. Patient went to the physician for pain of left hand and wrist, started two months before and no symptoms for the right one. At the clinical examination she reported pain in finger extension and wrist flexion. Phalen test and Tinel sign are positive. The ecographic exam underlines inflammation of flexor tendons but no alterations of the left median nerve. Electomyography reports moderate left CTS. She referred to our centre immediately after the first appointment with the surgeon trying to resolve bilateral hand pain, particularly the left one. The treatment consisted firstly in NIN, manual therapy and the application of a cts orthosis on the left hand for 4 weeks until the second appointment with the surgeon, to evaluate the eligibility for the surgical treatment. Therapist's assessment included grip strength, DASH questionnaire, pinch strength and Semmens monofilament test.
Results: Immediately after the first treatments with NIN the patient reported decrease intensity of the symptoms, which were basically resolved after the application of the orthosis for two weeks. In particular improvements were noticed during the assessment with DASH questionnaire, underling a halving of the baseline score and decreased perceived disability. For what concerns grip strength, it was 7kg at baseline and 10 kg after a month. The same changes are superimposable for pinch strength. Changes in tactile sensitivity were not significant.
Conclusions: For sure, we can't solve nerve compression, but NIN may represent a further instrument for pain management. Unfortunately, in litterature there is poor evidence for this approach, especially in hand therapy. Further studies are recommended to investigate its role

A-0265 IDEAL PIN LENGTH AND INTERVAL IN TENSION BAND WIRING USING RING PINS FOR TRANSVERSE OLECRANON FRACTURE: A BIOMECHANICAL STUDY

Seung Hoo Lee[1], Young Ho Lee[2]
[1]Department of Orthopaedic Surgery, Chungnam National University Sejong Hospital, Chungnam National University College of Medicine, Sejong, South Korea; [2]Department of Orthopaedic Surgery, Seoul National University Hospital, Seoul National University College of Medicine, South Korea

Introduction: Though several clinical and biomechanical studies on tension band wiring (TBW) using a ring pin system have been conducted, no consensus on the ideal surgical technique has been reached.
Aim: This study aimed to determine the ideal interval and length of ring pins for the treatment of transverse olecranon fractures using TBW with a ring pin system.
Material & Methods: A biomechanical study was performed using 32 fourth-generation composite ulnae and a ring pin system specially designed for TBW. Four groups of eight sawbones were created based on the interval and length of the ring pins. A cyclic loading test was performed to measure stability during active range of motion exercises. A load-to-failure test measured the maximal load until fixation loss.
Results: All groups were stable, with a micromotion of < 1.0 mm except for Group 3 (length: 50 mm, interval: 10 mm)

during the cyclic loading test. The mean micromotion and displacement of Group 3 were significantly higher than those of Groups 2 and 4 (length: 90 mm, interval: 10 mm). The maximal load to failure in Group 3 was significantly lower than that of Groups 2 and 4.
Conclusions: Inserting two ring pins in parallel at a 10 mm interval with a length of ≥ 70 mm for TBW in transverse olecranon fractures is recommended. Further widening of the pin interval provides no biomechanical benefit and may result in technical difficulties owing to the anatomical features of the ulna; 50 mm ring pins show significantly lower mechanical strength.

A-0266 SUBCHONDRAL RADIAL AND ULNAR K-WIRE POSITIONING WITH CANCELLOUS BONE GRAFT SHORTENS UNION TIME IN SCAPHOID WAIST NON-UNION

Seung Hoo Lee[1], Hyun Dae Shin[2], Soo Min Cha[3], Yun Ki Kim[3]
[1]Department of Orthopaedic Surgery, Chungnam National University Sejong Hospital, Chungnam National University College of Medicine, Sejong-si, South Korea; [2]Department of Orthopaedic Surgery, Seoul Hyun Hospital, Naseongbuk-ro, Sejong-si, South Korea; [3]Department of Orthopedic Surgery, Regional Rheumatoid and Degenerative Arthritis Center, Chungnam National University Hospital, Chungnam National University School of Medicine, Daejeon, South Korea

Introduction: Bone grafting in patients with scaphoid waist non-union can present several technical challenges.
Aim: In this study, we aimed to present a modified surgical technique for scaphoid waist non-union, which consisted of subchondral radial and ulnar K-wires positions with cancellous bone graft, and to compare the clinical outcome of this modified technique with the conventional method.
Material & Methods: We retrospectively reviewed 72 patients with scaphoid waist non-union who had been surgically treated between January 2011 and December 2020. Of these, 34 patients were treated with the modified method and 38 with the conventional method. Debridement of the non-union site was performed using a curette, rongeur, and micro-burr. Two or three K-wires were inserted along the cancellous portion of the scaphoid in the conventional method. In the modified method, two K-wires were inserted along the ulnar and radial subchondral portion of the scaphoid to increase the space for bone grafting in the cancellous portion of the scaphoid. The autologous cancellous bone grafted in both the methods. Demographic, radiological, and clinical outcomes were reviewed and compared between the groups.
Results: There were no significant differences in demographics and characteristics of non-union between the two groups of patients. The modified method group showed significantly shorter union time than the conventional method group (conventional group: 13.0 ± 1.3 weeks, modified group: 11.4 ± 1.1 weeks, $p < 0.001$). The bony union rate was 97.1% for the modified method and 89.5% for the conventional method. Satisfactory clinical outcomes (excellent and good Mayo wrist scores) were achieved in 27 cases (81.8%) using the modified method and 22 cases (64.7%) using the conventional method.
Conclusions: Subchondral radial and ulnar K-wire positioning with cancellous bone graft (modified method) can improve the union time with satisfactory clinical outcomes in the treatment of scaphoid waist non-union.

A-0267 TREATMENT OF SCAPHOLUNATE LIGAMENT RUPTURE WITH ECRL TENODESIS: MEDIUM-TERM RESULTS OF THIS SIMPLE AND DYNAMIC METHOD

Nina Knie[1], Christian Kindler[2], Kai Megerle[1]
[1]Center for Hand Surgery, Microsurgery and Plastic Surgery, Schoen Clinic Munich Harlaching, Germany; [2]Department of Hand Surgery and Elbow Surgery, RoMed Clinic Prien, Germany

To successfully treat a scapholunate ligament rupture has always been a challenging task among hand surgeons, especially when adressing an old injury. A ruptured scapholunate ligament results in instability of the carpus. It is therefore of great importance to restore proper carpal alignement und prevent osteoarthritis. Consequently, a retrospective study with 20 patients was conducted to discover the effects of ECRL tenodesis on scapholunate ligament rupture. ECRL tenodesis is a dynamic method to treat scapholunate ligament rupture which uses part of the ECRL tendon to avoid flexion of the scaphoid. Firstly, the scapholunate ligament rupture is determined arthroscopically with absent of osteoarthritic changes. Secondly, the skin is incised over the dorsal scaphoid and a k-wire is inserted into the distal part of the scaphoid. Then, a part of the ECRL tendon is dissected and cut distally. It is brought into the predrilled hole within the scaphoid and fixed with a tenodesis screw while the right amount of tension is applied to reduce the dislocated scaphoid. Time of follow-up ranged from 12-22 months. The results showed a patient satisfaction of 94% with a significantly decrease of wrist pain and improvement of the DASH score. The effect on radiologic parameters showed a significantly improved scapholunate distance, both in static and dynamic views, and improved scapholunate angle. In conclusion, the medium-term results of ECRL tenodesis are comparable to those of more complex methods although being less invasive. Finally, ECRL tenodesis is a simple and safe method to treat scapholunate rupture and seems to be able to prevent subluxation of the scaphoid in medium-term results and therefore osteoarthritis.

A-0268 EARLY OUTCOME OF MICROFASCIECTOMY IN DUPUYTREN

Ilse Degreef
Leuven University hospitals, Leuven, Belgium

Introduction: Microfasciectomy is a surgical technique to increase safety and efficiency of fasciectomy in primary and recurrent Dupuytren disease by using the operating microscope for the whole procedure. This increases experience but has a learning curve and may impact time efficiency in theatre.
Aim: The aim of this preliminary case review is to investigate the possible beneficial effect of microfasciectomy in surgical outcome and influence on operating time, compared to standard loupe fasciectomy
Material & Methods: The data of a one-year historical loop cohort in 2017 were compared to a recent 2020 microfasciectomy cohort.
Results: A group of 63 patients with loup fasciectomy was compared to 60 patients with microfasciectomy, Demographics were similar in both groups (age, gender, primary versus recurrent, operated digits). Mean operating times increased from 46 - 87 minutes to 69 - 120 minutes in primary fasciectomy to dermatofasciectomy with full thickness skin grafting, with a mean increase of 14-20 minutes of operating time. The number of procedures in recurrence increased in microfasciectomy. Arterial lesions were similar but anastomosis number (versus coagulation) increased, digital numbness deceased significantly and ischemia was non-existent in the microfasciectomy group.
Conclusions: Microfasciectomy as a standard procedure in fasciectomy for Dupuytren disease, may slightly increase operating time, but decreases digital ischemia and nerve injury. Also, bounderies to (recurrent) surgery are pushed and

microrsurgical skills of hand surgery are intensively trained, which skills may benefit other hand surgery patients such as in trauma and replantation.

A-0270 ROBOT-ASSISTED MICROSURGERY IN HAND SURGERY

Tom van Mulken, Yasmine Jonis, Gijs Debeij, Shan Shan Qui, Rene van der Hulst
Maastricht University Hospital, The Netherlands

Microsurgery has become standard part of care in hand surgery.
Completing microsurgical anastomosis requires great technical skill, precision and years of training. The eyes of the surgeon are assisted through the use of microscopes. In the evolution of microscopes and microsurgical instruments the precision and dexterity of our hands remains a limiting factor. Robot-assistance could help to overcome these human limitations by tremor filtration and motion scaling.
Microsurgeons of the Maastricht University Medical Center and technical engineers from Eindhoven University of Technology have developed world's first dedicated robotic platform for (super)microsurgery, Microsure's MUSA-robot.
We will present our clinical studies on robot assisted microsurgery using this new microsurgical robot and elaborate on future possibilities of robot-assisted microsurgery in hand surgery.

A-0271 BIOMECHANICAL CADAVERIC STUDY OF A METHOD FOR REINSERTION OF THE TRIANGULAR FIBROCARTILAGE COMPLEX WITHOUT FOVEAL PERFORATION

Maria Tibau Alberdi[1], Miguel Pérez Abad[1,2], Àngel Ferreres Claramunt[2], Montserrat del Valle Jou[3], Diana Noriego Muñoz[4], Alfonso Rodríguez Baeza[5]
[1]Hospital de Mataró, Mataró, Spain; [2]Institut kaplan, Barcelona, Spain; [3]Hospital de l'Esperit Sant, Santa Coloma de Gramenet, Spain; [4]Hospital Josep Trueta, Girona, Spain; [5]Universitat Autònoma de Barcelona, Barcelona, Spain

Introduction: Ulnar wrist pain is often attributed to Triangular Fibrocartilage Complex (TFCC) injuries, which creates diagnostic challenges. TFCC injuries affecting the foveal insertion can lead to distal radioulnar joint (DRUJ) instability. Various techniques have been proposed for TFCC reattachment, with concerns about precision and potential complications.
Aim: This biomechanical study evaluates the safety and reliability of the technique clinically described by Mantovani for Atzei's type 2 lesions.
Material & Methods: Twenty fresh-frozen cadaveric upper extremities were used, simulating Atzei type 2 lesions. Distal ulna ballottement tests were conducted, excluding unstable specimens. A 3kg load was applied to the radius to assess displacement in three TFCC conditions (non-injured, injured, repaired) and three forearm positions (neutral, pronation, supination). Measurements were obtained using the FASTRAK® 3D tracking system.
Results: Statistical analysis revealed significant displacement differences between uninjured and injured TFCC conditions ($p < 0.05$), indicating increased displacement in injured TFCC. Similarly, injured TFCC showed significantly higher displacement than repaired TFCC ($p < 0.05$). No significant differences were found between uninjured and repaired TFCC conditions ($p > 0.05$).
Conclusions: The study highlights the role of the deep TFCC component in DRUJ stability. Detachment at the foveal level increased displacement, aligning with prior biomechanical studies. The modified reinsertion technique demonstrated a comparable displacement to an uninjured TFCC, suggesting its efficacy for Atzei type 2 injuries.
The arthroscopic adaptation could be a reliable technique for these injuries.

A-0272 UNVEILING OUR RECENT JOURNEY IN EXPLORING OUTCOMES AND EXPERIENCES WITH LACERTUS RELEASE FOR MEDIAN NERVE SYMPTOMS

Diogo de Sousa Gaspar, José Lucena Caldeira, Rui Viegas, Rui Cró Freitas
Hospital Beatriz Ângelo, Lisbon, Portugal

Introduction: Lacertus syndrome, a rare condition involving proximal median nerve entrapment at the elbow, results from constriction by the lacertus, a ligamentous tissue just beyond the elbow. Accurate diagnosis is crucial due to its infrequency and unclear prevalence. Unlike carpal tunnel syndrome, diagnosis relies heavily on clinical symptoms and physical examination, as traditional electrodiagnostic techniques are ineffective. Key indicators include median paraesthesia, hand or forearm weakness, positive lacertus compression test, pain during resisted elbow flexion at 90º, and a positive Tinel sign over lacertus.

Aim: Report the outcome and describe our recent experience with the lacertus release in resolving median nerve compression symptoms.

Material & Methods: This retrospective study, aimed to examine cases of Lacertus Syndrome diagnosed based on clinical symptoms and physical examination, at a district hospital from March 2019 to August 2023. The surgical approach involved a transverse incision of 4-5 cm, starting 2 cm distally and 2 cm radially to the medial epicondyle.

Patient demographics, surgical details, and experiences with wide-awake local anaesthesia without a tourniquet (Walant) were assessed.

Twenty patients were included in the study, and the surgical procedure was performed under wide-awake local anesthesia without a tourniquet (Walant) in thirteen patients, they received 20 ml of Lidocaine 1% mixed with 1:100,000 adrenaline and sodium bicarbonate.

Post-surgery, patients were evaluated using a comprehensive set of measures, including the Walant questionnaire, Quick Disabilities of The Arm, Shoulder, and Hand (QuickDASH) score, grip strength, and key pinch strength.

Results: Over a span of 5 years, this study enrolled a total of twenty patients to investigate the outcomes of Lacertus Syndrome surgery.

The average age of the twenty patients included in the study was 51 years, with a notable majority being women (90%). Simultaneous carpal tunnel release was performed in 65% of patients, with two individuals undergoing simultaneous Lacertus and carpal tunnel release on both sides. About 40% of the patients had previous surgery to carpal syndrome on the same side.

Postoperative assessments revealed a mean QuickDASH score of 26. Grip strength on the surgery side averaged 29 kg, while on the opposite side, it averaged 30 kg. Key pinch strength on the surgery side was measured at 16 kg, and on the opposite side, it averaged 15 kg.

Walant questionnaire responses showed 76% likening the procedure's pain to a dental experience. Remarkably, 90% would recommend this anaesthesia, and 92% were open to similar surgeries with the same anaesthesia. During anaesthesia, 75% felt little or no pain, echoed by 85% during surgery. Overall, 80% reported satisfaction with the surgical experience.

Conclusions: In summary, our analysis of Lacertus Syndrome cases at Hospital Beatriz Ângelo (March 2019 to August 2023) underscores the importance of careful clinical evaluation for this infrequently diagnosed condition involving proximal median nerve entrapment at the elbow. The study contributes to evolving knowledge, highlighting the effectiveness of lacertus release and positive patient experiences with Walant anaesthesia. Continued research and follow-ups aim to refine our understanding and improve clinical management.

A-0273 ARTHROSCOPICAL ROUND-BLOCK CAPSULO-LIGAMENTOPLASTY FOR DYNAMIC SCAPHOLUNATE INSTABILITY: CLINICAL RESULTS AFTER AT LEAST 12 MONTHS

Chul Ki Goorens[1], Kjell van Royen[2,3], Niels Debaenst[1], Gilles van Eetvelde[4], Andrea Atzei[5]

[1]Hagelandse Orthopedische Praktijk, Regionaal Ziekenhuis Tienen, Tienen, Belgium; [2]OLV-Aalst, Aalst, Tienen; [3]Universitair Ziekenhuis Brussel, VUB, Brussels, Belgium; [4]AZ-Sint Lucas, Gent, Belgium; [5]PRO-Mano, Hand Surgery and Rehabilitation Team, Treviso, Italy

Introduction: Several treatment options exist for the management of symptomatic dynamic scapholunate (SL) instability. Challenge remains to adequately treat this condition, before irreversible changes appear. Arthroscopic techniques are gaining more interest.

Aim: We evaluated the results of a series of patients treated with the arthroscopic dorsal DICL "round-block" capsulo-ligamentoplasty technique, developed by the senior author (AA).

Material & Methods: Technique: in order to stabilize the SL interval, a Fiberwire is used to create a purse-string suture around the dorsal aspect of the proximal row, following the course of dorsal intercarpal ligament (DICL). The suture travels between the radiocarpal and midcarpal space, piercing the scaphoid and triquetrum attachments of the DICL. The suture tightening produces also an extension lever correcting the scaphoid flexion. Moreover, the Fiberwire suture induces a fibrotic healing that reinforces the dorso-capsule scapholunate septum (DCSS). In a clinical prospective setting, 29 patients were selected, 7 male/ 22 female, mean age 41,9 years (range 23-69 years) with dynamic SL instability, which was diagnosed with normal and stress radiographs and MRI. Outcome was measured with pain VAS, range of motion, grip strength, quickDASH, satisfaction VAS and radiological parameter assesment.

Results: Mean onset of symptoms was 10,5 months (range 3-36 months). Arthroscopy revealed 2 EWAS type 2, 7 EWAS type 3B and 20 EWAS type 3C, which were all treated. rnMean follow-up after surgery was 17,3 months (range 12-23 months) and was at least one year. Mean VAS pain decreased by 87%, mean flexion by 19%, mean extension by 17%, mean quickDASH by 84%. Mean grip strength increased by 5%. Mean satisfaction was 9/10 and 96% would do the procedure again. Normal activities were restarted after mean 2,7 months (range 2-5 months). No major complications occurred. Mean preoperative SL distance was 2,2 mm on normal radiograph and 3,2 mm on clenched fist radiograph. Mean SL distance after surgery was 1,9 mm. Arthroscopically, SL stability improved to EWAS 1 in 21 patients or 2 in 8 patients. Mean SL angle reduced minimally from 55° to 53°, while the radiolunate (6°) and capitolunate (6°) angle remained unchanged. The "round-block" technique, which is indicated for dynamic SL instability, resulted in a satisfactory clinical, arthroscopic and radiological outcome. Compared to other capsulodesis technique, the all-inside suturing, without additional damage to the SL complex, is theoretically likely to produce less stiffness. In higher grade of SL instability, other arthroscopic techniques like the ADCLR or variants can possibly be added to achieve sufficient SL stability, or it may be converted into more invasive techniques. Finally, the wrist remains practically undamaged after surgery: no bone tunnels, bone anchors or tendon grafts are required, thus enabling all possible secondary procedures. Will this satisfactory outcome persist on the longterm? Is the advancement to higher grades of SL dysfunction with osteoarthritic changes, delayed by this plasty or not? Longterm studies are needed.

Conclusions: The "round-block" technique resulted in a satisfactory clinical, arthroscopic and radiological outcome. This technique may also serve as complement to other arthroscopic capsular sutures in more complex instabilities.

A-0274 COMPARATIVE STUDY OF POSTOPERATIVE OUTCOMES IN METACARPOPHALANGEAL JOINT ARTHROPLASTY USING INTEGRA AND AVANTA FINGER PROSTHESES

Shuichi Naniwa[1], Chinatsu Ichikawa[1], Noriyuki Shimizu[1], Ryuichi Nakahara[2], Yoshihisa Nasu[2], Toshifumi Ozaki[3], Keiichiro Nishida[2]

[1]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan; [2]Locomotive Pain Center, Okayama University Hospital, Okayama, Japan; [3]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Faculty of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama, Japan

Aim: This study aims to compare the postoperative outcomes of two different prostheses, INTEGRA silicone and AVANTA implants, used for the correction of metacarpophalangeal(MCP) joint deformities in patients with inflammatory arthritis.
Material & Methods: This retrospective study included a total of 34 consecutive cases of MCP joint arthroplasty performed at our institution between July 2018 and October 2022. The cases were divided into two groups: those with the AVANTA prosthesis (Group A, up to April 2020) and INTEGRA prosthesis (Group I, after April 2020). Group A consisted of 59 fingers from 17 patients, while Group I comprised 48 fingers from 17 patients. The range of motion of the MCP joint, grip strength, pinch strength, Hand20 and Disabilities of the Arm, Shoulder and Hand(DASH) score were compared between the two groups before and one year after surgery. Furthermore, the presence of implant fractures was evaluated using radiographic images at the final follow-up.
Results: The mean preoperative extension and flexion angles (in degrees) for each group (Group A/I) were -43.4/-37.9 and 78.3/78.0, respectively. The mean postoperative extension and flexion angles were -13.4/-17.8 and 59.8/68.5, respectively. The pre- and postoperative grip strengths (in mmHg) were 93.8/103 and 100/130, respectively. The pre- and postoperative pinch strengths (in kg) were 1.85/1.61 and 1.71/2.55, respectively. Significant differences were observed in the change in flexion angle($p=0.0376$, student t-test) and pinch strength($p=0.0039$, student t-test) between the two groups postoperatively. There was no significant difference in clinical scores. Three cases of implant fractures were observed during the mean observation period of 36.1 months in Group A, while none were observed during the mean observation period of 23.4 months in Group I.
Discussion: INTEGRA silicone is a pre-flexed type and is thought to have an advantage in flexion compared to the straight type implant. In this study, INTEGRA tended to have greater flexion angle and pinch strength postoperatively. Although there were no cases of early implant fractures in INTEGRA silicone, further studies, with an increased number of cases and extended observation periods, are necessary to discuss the rate of implant fractures and functional outcomes.
Conclusions: In a comparison of the postoperative outcomes of AVANTA and INTEGRA MCP joint arthroplasty, better flexion and pinch strength were observed in the INTEGRA group.

A-0278 BIORESORBABLE ARTIFICIAL NERVE CONDUIT PREPARED FROM SILK FIBROIN WITH UNIQUE MECHANICAL PROPERTIES

Tomoki Matsuo[1,2], Takuji Iwamoto[1], Yasuhiro Kiyota[1], Hiroo Kimura[1], Taku Suzuki[1], Narihito Nagoshi[1], Makoto Sasaki[3,4], Yasushi Tamada[5], Masaya Nakamura[1]

[1]Department of Orthopaedic Surgery, Keio University School of Medicine, Tokyo, Japan; [2]Department of Orthopaedic Surgery, Ogikubo Hospital, Tokyo, Japan; [3]Faculty of Advanced Science and Technology, Kumamoto University, Kumamoto, Japan; [4]Charlie Lab Inc., Kumamoto, Japan; [5]Faculty of Textile Science and Technology, Shinshu University, Nagano, Japan

Introduction: While various scaffolds and conditions for nerve conduits have been reported, a unified consensus remains elusive. We developed a novel silk fibroin (SF)-based nerve conduit. SF is a natural protein obtained by removing sericin

(degumming) from cocoons of Bombx mori silkworms. The conduit can be formed from SF aqueous solution using our unique method.
Aim: This study aims to elucidate the effect of physical properties of SF conduits on peripheral nerve regeneration for artificial nerve applications.
Materials & Methods: SF aqueous solution was obtained by dissolving SF in LiBr solution and purifying it using dialysis membrane. Then, SF conduit was formed by freezing and thawing the aqueous solution including a small amount of water miscible organic solvent such as DMSO in an original mold. Consequently, two types of SF conduits were prepared using 4% and 8% SF aqueous solutions (4% SF conduit and 8% SF conduit, respectively). We evaluated their physical properties such as water content, porosity, compressive stress and degradability against protease XIV as a model of biodegradation. In animal experiments, these conduits were transplanted into rats with 15mm sciatic nerve defects, and nerve regeneration effects were assessed via immunostaining (MBP, NFH, CD-31) at 1 and 3 months post-transplantation.
Results: High values of water content and porosity indicated that each conduit was composed of more than 90 wt% water. The 8% SF conduit exhibited significantly higher compressive stress compared to the 4% SF conduit. Additionally, the 8% SF conduit remained its tubular structure for more than 1 month during the immersion in protease XIV aqueous solution. In animal experiments, the 8% SF conduit demonstrated increased proliferation of vascular endothelial cells within the lumen at 1 month post-transplantation compared to the 4% SF conduit. At 3 months post-transplantation, they displayed robust axonal regeneration with myelination within the lumen.
Conclusions: The 8% SF conduit exhibited superior water content, porosity, compressive stress and durability against protease XIV compared to the 4% SF conduit. Animal experiments suggested that their physical properties contributed to cellular affinity and subsequent axonal elongation. Importantly, it was confirmed that the 8% SF conduit served as an advantageous scaffold for nerve regeneration. These results provide useful information about the physical properties of SF conduits for artificial nerve applications.

A-0279 SURGERY, NEEDLE, OR COLLAGENASE FOR DUPUYTREN'S CONTRACTURE: THREE-MONTH AND TWO-YEAR RESULTS FROM A RANDOMIZED CONTROLLED TRIAL WITH 302 PATIENTS

Mikko P Räisänen[1,2], Olli Leppänen[3], Janne Soikkeli[4], Aleksi Reito[5], Antti Malmivaara[6,7], Rachelle Buchbinder[8], Hannu Kautiainen[9], Antti Kaivorinne[3], Susanna Stjernberg-Salmela[10], Minna Lappalainen[1], Toni Luokkala[11], Annele Pönkkö[4], Hanna-Stiina Taskinen[12], Markus Pääkkönen[12], Kati Jaatinen[11], Joona Juurakko[11], Venla-Linnea Karjalainen[2], Teemu Karjalainen[11]
[1]Department of Orthopedics, Traumatology and Hand Surgery, Kuopio University Hospital, Kuopio, Finland; [2]Tampere University, Tampere, Finland; [3]Department of Hand surgery and Microsurgery, Tampere University Hospital, Tampere, Finland; [4]Department of Hand surgery and Orthopedics, Oulu University Hospital, Oulu, Finland; [5]Department of Orthopedics, Tampere University Hospital, Tampere, Finland; [7]Orthon Orthopedic Hospital, Helsinki, Finland; [8]Musculoskeletal Health and Wiser Health Care Units, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia; [9]Medcare LLC, Helsinki, Finland; [10]Department of Musculoskeletal and Plastic Surgery, Helsinki University Hospital, Helsinki, Finland; [11]Department of Surgery, Wellbeing Services County of Central Finland / Hospital Nova of Central Finland, Jyväskylä, Finland; [12]Department of Orthopedic and Traumatology, Turku University Hospital, Turku, Finland

Introduction: Common treatments of Dupuytren's contracture include surgery, collagenase injection, and percutaneous needle fasciotomy. The treatment decision requires balancing initial morbidity and costs of surgery against its potential long-term benefits over needle and collagenase. Evidence regarding treatments´ comparative effectiveness is limited.
Aim: To compare effectiveness of primary interventions for Dupuytren's contracture at three-months and two-years follow-up.

Material & Methods: This is a multicenter, randomized, outcome assessor-blinded, superiority trial registered at ClinicalTrials.gov (NCT03192020). Investigated interventions were surgery, needle, and collagenase. Patients were recruited from six public hospitals in Finland. The study was approved by the institutional review board of Tampere University Hospital. The inclusion and exclusion criteria were designed so that people who had any other condition affecting the function of the finger, or the outcome of the treatment were excluded. Severe contractures (> 135°, Tubiana IV) were excluded because percutaneous treatments may be exceedingly difficult to address percutaneously due to accompanying skin contracture. The participants were allocated 1:1:1 with a random block size stratified by the dominantly affected joint.
The primary outcome was the success rate, defined as > 50% contracture release and patients reaching the patient-acceptable symptom state at both three months and two years. Secondary outcomes included hand function (QuickDASH), pain, quality of life (EQ-5D-3L), patient satisfaction (proportion of participants achieving PASS), residual contracture angle, finger flexion, and serious adverse events.
Results: We recruited 302 participants; surgery (n=101), needle (n=101), and collagenase (n=100); with treatment naïve Dupuytren's contracture (contracture angle < 135 degrees) out of 767 screened patients between September 15, 2017, and February 2, 2021. At three months, 292 (97%) completed the three-month follow-up, and at two-years follow up 284 (94%). Success rates at three months were comparable, 70% for surgery, 74% for needle, and 73% for collagenase, with no relevant differences in secondary outcomes either. At three months, we observed no evidence of clinically relevant between-group differences for secondary outcomes. At two years, surgery demonstrated superior outcomes compared to needle [78% vs. 50%; adjusted Risk Difference (RD) 0.29 (0.17 to 0.42)] and collagenase 78% vs. 65% [RD 0.13 (0.06 to 0.25)]. Surgery also showed lower risk of re-treatment compared to needle fasciotomy [Hazard Ratio (HR) 0.16; 95%CI 0.04 to 0.76] and collagenase (HR 0.21; 95% CI 0.04 to 0.99). Residual contracture was statistically lower compared with needle (11°) and collagenase (7°), clinical significance unclear, and participants in surgery arm had higher rate of PASS and would have chosen the same treatment again more often.
Conclusions: Surgery, Needle, and collagenase yield comparable short-term outcomes in people with treatment-naïve Dupuytren's contracture. However, surgery maintains higher success rates at the two-year follow-up, while success rates appear to decline with needle and collagenase, despite re-treatments. The treatment decision, therefore, involves considering the tradeoff between the immediate costs and recovery as wells as the superior long-term outcomes. Collagenase is likely a viable alternative to needle only if its costs are substantially reduced.

A-0280 OVERLOOKED TRANSSCAPHOID PERILUNATE DISLOCATION - TWO STAGE PROCEDURE TREATMENT - CASE REPORT

Tomislav Palibrk[1,2], Herbert Mugabe[1], Ivana Glišović Jovanović[1,2], Aleksandra Petrović[1], Marina Popović[1], Slađana Matić[1,2]
[1]Orthopaedic and Traumatology Clinic, University Clinical Center of Serbia, Belgrade, Serbia; [2]University of Belgrade, Faculty of Medicine, Belgrade, Serbia

Introduction: Transscaphoid perilunate dislocations are complex osseoligamentous injuries. Although clinical features can make us suspect and radiography can show characteristic signs these injuries are frequently missed.
Aim: Two stage treatment of chronic transscaphoid perilunate dislocation.
Material & Methods: We present a case of a 27-year-old man with injury sustained one year before surgery. He fell from a horse and landed on a right arm. Initially pain and oedema was present with limited range of motion. On initial radiography no fracture or dislocation was noticed so patient was sent to physical therapy. 8 months after the injury transscaphoid perilunate dislocation was diagnosed. Limited range of motion and pain was present. Patient was not motivated for any

of the salvage procedure so we decided to do two stage procedure. First stage of treatment was Ilizarov procedure for wrist distraction. Second procedure was open reduction and fixation of carpal bones and ligament reconstruction with K wires and anchor sutures.
Results: 8 months after second procedure patient DASH score, grip strength and ROM was measured. He was pain free, returned to sport activities (Triathlon athlete) and can perform his daily activities with mild discomfort.
Conclusions: Staged reduction can be solution for neglected cases of transscaphoid perilunate dislocations. Satisfactory results considering pain and functionality can be achieved in some selected cases.

A-0281 3D CT FOREARM MEASUREMENTS IN PATIENTS WITH A DISTAL RADIUS MALUNION DEMONSTRATE SUBSTANTIAL ULNAR LENGTH DIFFERENCES

Camiel J. Smees[1,2], Koen D. Oude Nijhuis[3], Stein van der Heide[1], Judith olde Heuvel[1], Job. N. Doornberg[3], Anne J.H. Vochteloo[1], Gabriëlle J.M. Tuijthof[3]
[1]Centre for Orthopaedic Surgery OCON, Hengelo, the Netherlands; [2]University of Twente, Enschede, the Netherlands; [3]University Medical Centre Groningen, Groningen, the Netherlands

Introduction: Distal radius malunion is a complication after initial treatment of distal radius fractures, with rates as high as 35%. Treatment of symptomatic distal radius malunions can be performed through a corrective osteotomy. This should be planned, as it often encompasses correction in multiple planes, which is hard to reliably achieve without preoperative planning.
Due to this multi-planar correction, three-dimensional (3D) preoperative planning is increasingly used, as opposed to conventional X-ray based planning. In 3D preoperative planning, the contralateral arm is used as a healthy template for the malunion. The ulna is used to correct for any difference in underarm length.rnThis assumes that the bilateral length differences in a malunion population behave similar to the differences in a healthy population. However, literature has stated that forces on the ipsilateral ulna of a malunited radius may affect ulnar length. If these forces have a significant impact on the ulnar length, ulnar length differences may be less usable to correct for radial length differences.
Aim: The goals of this study were 1) to analyse the difference in ulnar length in a distal radius malunion population and 2) to investigate if there is an influence of age, sex, or side of radius malunion (dominant vs non-dominant) on this difference.
Material & Methods: In this retrospective cohort study, 65 adult patients with a symptomatic distal radius malunion and a bilateral CT-scan were included. The ulnae in all CT-scans were converted to 3D surface models.rnA standardised measurement axis was defined based on the definition of the International Society of Biomechanics (ISB). Measurements were performed by first mirroring the left ulna and aligning the models. The longest ulna was determined, and cut in half, after which the measurement axis was defined from the middle of the cut surface to the middle of the ulnar head. Along this axis, the difference in ulnar length (mm) between both aligned models was determined.rnMeasurements were performed by two observers. Large differences between observers (>1mm) were reviewed by a third observer. An intra-class coefficient was determined between both observers.rnThe influences of age, sex and side of radius malunion were tested using t-tests. Age was divided in two groups; younger than 50, and 50 and older.
Results: A mean absolute length difference in the distal radius malunion population of 2.57mm (SD 1.81) was observed (min 0.05mm, max 7.23mm). The length differences were not significantly affected by age (<50: 2.71mm, SD 2.07; ≥50: 2.31mm, SD 1.51; p=0.38), sex (m: 2.95mm, SD 2.17; f: 2.37mm, SD 1.68; p=0.27) or malunion side (dom: 2.63mm, SD 1.74; non dom: 2.41mm, SD 1.89; p=0.62).
Conclusions: Substantial forearm length differences are present in a population of patients with a distal radius malunion.

These length differences are comparable to healthy populations previously described in literature; 2.08mm (SD 2.33) and 2.54mm (SD 1.87). Therefore, the current workflow of using the ulna to correct for forearm length differences is also a viable method in a distal radius malunion population.rn

A-0282 REROUTED EXTENSOR POLLICIS BREVIS TRANSFER OPPONENSPLASTY USING GUYON'S CANAL AS A PULLEY

Norihiko Sugita[1], Kazuki Kawakami[1], Youichi Miyazaki[2], Eiji Kaida[2]
[1]Ichinomiyanishi Hospital, Aichi, Japan; [2]Aino Memorial Hospital, Nagasaki, Japan

Introduction: In patients with severe chronic carpal tunnel syndrome (CTS), thumb opposition is frequently impaired. This study reports the outcome of a novel opponensplasty technique that rerouted extensor pollicis brevis (EPB) and transferred to palmaris longus (PL) with Guyon's canal acting as a pulley for treating severe CTS.
Material & Methods: CTS was defined as "severe" when Compound Motor Action Potential (CMAP) from the APB was undetectable. Patients with severe CTS, with thenar atrophy who could not pinch or grasp objects during their activities of daily living, and those with a disease duration greater than one year were indicated for opponensplasty.
Twenty-two adult patients (6 male, 16 female) who underwent this procedure and had a follow-up period of more than six months were included in this study. The mean age at the time of operation was 79 years old (range 63–93 years).
Further details of the surgical techniques are described below.
After open carpal tunnel release, the PL is identified and cut distally. The EPB is transected at the musculotendinous junction and routed through the metacarpophalangeal incision. Then, the EPB is pulled subcutaneously toward the Guyon's canal and passed through the canal from distal to proximal. Finally, at 10° wrist flexion, the EPB and the cut PL are interlaced and then sutured at zone V with the thumb in full palmar abduction.
Early exercise therapy is initiated at postoperative day one.
Results: All patients were evaluated by experienced hand therapists at preoperative and final follow-up.
Significant improvements ($p < 0.05$) in several parameters from pre- to postoperatively were observed as follows: Kapandji Index (2.3 preoperatively to 8.5 postoperatively), active palmar abduction of thumb (26.5° to 44.3°), pulp pinch strength (1.8kg to 3.6kg), lateral pinch strength (3.6 kg to 5.4kg). The Carpal Tunnel Syndrome Instrument consisting of the symptom severity scale significantly improved from 31 to 17.6, whereas the function domain improved from 25.8 to 14.2. Whilst not statistically significant, grip strength increased postoperatively (14.4kg to 18.8kg).
CMAP became detectable in 10 cases but remained undetectable in 12 cases. Thenar atrophy tended to show modest recovery but did not return to normal.
Discussion: The most notable benefit of this technique is that early exercise therapy is possible as the Guyon's canal is expected to provide the initial strength of the pulley. The interlacing sutures of these tendons provide initial stability at the tendon junction. As the PL is the contralateral synergist of the APB, muscle re-education is simplified; the transferred tendon moves naturally towards the pisiform, similarly to the APB. The rerouted "anatomically-based" EPB provides thumb abduction and pronation. The friction in the Guyon's canal is reportedly low; the tendon can glide smoothly through it. Lastly, there is no need to create a pulley in this procedure, and the tendons can be sutured at zone V, resulting in a simple technique.
Conclusion: This opponensplasty is a practical, anatomical, and simple procedure with the benefits of possible early exercise due to the initial strength of the tendon sutures and the pulley.

A-0283 UTILIZING THE SPINAL ACCESSORY NERVE TRANSFER TO THE MUSCULOCUTANEOUS NERVE IN BIRTH BRACHIAL PLEXUS PALSY

Tala Thammaroj, Surut Jianmongkol, Chaiyos Vinitpairot
Khon Kaen University, Khon Kaen, Thailand

Introduction: In the birth brachial plexus palsy patient, who had limited intraplexus donors, needs the extraplexus donors. Concerning on the respiratory problem from harvesting the intercostal nerve and phrenic nerves leads to the other option. Spinal accessory nerve (SAN) is one of the options transferring to restore the elbow flexion in adult brachial plexus with a good result, however there are few reports in the birth brachial plexus palsy.

Aim: This study aims to report the result of transferring Spinal Accessory nerve to Musculocutaneous nerve (MCN) in birth brachial plexus palsy.

Material & Methods: The patient who had undergone SAN to MCN nerve transfer was included in this study. The chart was reviewed and time of grade M1 and M6 recovery of elbow according to the Active movement scale (AMS) were obtained. Patient was classified according to Narakas classification.

Results: Eleven patients underwent transferring SAN to MCN with interposition nerve graft. The mean birthweight was 4,070 (3,300-4,670) grams. Time to operation was 6.45(4-10) months on average. Of 11 patients, 3 were Narakas type 3 while the other were grade4. One patient did not recover the elbow flexion and underwent the late tendon transfer while the other reached grade M4 recovery. The median time of grade M1 elbow flexion recovery was 8(IQR 2.5) months and of grade M6 was 26(IQR 22.3) months.

Conclusions: SAN to MCN with interposition nerve graft is a viable option for restoring elbow flexion. It is safe and reliable for using in the birth brachial plexus palsy.

A-0284 CHRONIC PAIN CHARACTERISTICS OF PATIENTS WITH THORACIC OUTLET SYNDROME

Şule Tüzen Tek[1], Tüzün Fırat[2], Ayten Kayı Cangır[3]
[1]Graduate School of Health Sciences, Hacettepe University, Ankara, Turkey; [2]Faculty of Physical Therapy and Rehabilitation, Hacettepe University, Ankara, Turkey; [3]Department of Thoracic Surgery, Medicine Faculty of Ankara University, Ankara, Turkey

Introduction: Thoracic outlet syndrome is a complex syndrome caused by compression of the brachial plexus and subclavian artery and vein at the thoracic outlet.

Aim: The aim of our study was to determine the pain characteristics of patients diagnosed with thoracic outlet syndrome (TOS).

Material & Methods: Ninety-seven patients were included in the study. Pain intensity was assessed using Visual Analog Scale (VAS) and central sensitization and alexithymia were evaluated with Central Sensitization Scale, Toronto Alexithymia Scale (TAS), respectively. Additionally, the symptom duration was recorded.

Results: A total of 86 female and 11 male patients with a mean age of 36.97 $\pm$ 9.73 years were assessed. The symptom duration was 5.78 $\pm$ 4.91 years. VAS resting, activity and night scores were 4.15 $\pm$ 2.88, 6.63 $\pm$ 2.79 and 5.31 $\pm$ 3.41, respectively. Central Sensitization Inventory scores of patients were 38$\pm$15.06 and Toronto Alexithymia Scale scores of patients were 49.25$\pm$10.6. There was a positive correlation between the symptom duration and Central Sensitization Inventory ($r=0.278$, $p=0.006$). There was no relationship symptom duration and VAS resting ($r=0.085$, $p=0.407$), VAS activity ($r=0.143$, $p=0.164$), VAS night ($r=0.082$, $p=0.427$) and TAS ($r=0.132$, $p=0.199$). There was a positive correlation between the Central Sensitization Inventory and VAS resting ($r=0.409$, $p=0.000$), VAS activity ($r=0.240$, $p=0.018$), VAS

night (r=0.325, p=0.001) and TAS (r=0.323, p=0.001).
Conclusions: Central sensitization is effective on pain scores in TOS patients. Although TOS is considered a musculoskeletal disease, TOS patients are affected by chronic pain Patients' altered pain perceptions and maladaptive behavioral patterns may affect the success of conservative or surgical treatment. In addition, increasing symptom duration increases central sensitization. Increased symptom duration contributes to chronic pain characteristics. This may limit the effectiveness of both surgical and conservative treatment methods. The application of biopsychosocial approaches may increase treatment success. The impact of chronic pain in TOS patients should be considered in both the evaluation and treatment process.

A-0285 PERI-NEURAL LIPOGRAFTING AND NEUROLYSIS IN RECALCITRANT CARPAL TUNNEL SYNDROME RECURRENCE EFFECTIVELY TREATS SYMPTOMS AND PREVENTS RECURRENCE IN THE LONG-TERM

Olivier F.E. Gostelie[1], Ileen Domela Nieuwenhuis[2,3], Geraldine L. Nanninga[3], Sjoerd B. Paulusma[3], Joris A. van Dongen[2], Brigitte E.P.A. van der Heijden[4,5], Michiel A. Tellier[6], J. Henk Coert[2], Jean Bart Jaquet[3]
[1]Plastic and reconstructive surgery, Catharina Hospital, Eindhoven, the Netherlands; [2]Plastic and reconstructive surgery, University Medical Centre, Utrecht, the Netherlands; [3]Plastic and reconstructive surgery, Maasstad Hospital, Rotterdam, the Netherlands; [4]Plastic and reconstructive surgery, Radboudumc, Nijmegen, the Netherlands; [5]Plastic and reconstructive surgery, Jeroen Bosch Hospital, 's Hertogenbosch, the Netherlands; [6]Plastic and reconstructive surgery, Isala Hospital, Zwolle, the Netherlands

Introduction: There is no consensus on the treatment for recalcitrant recurrent CTS, a problem mostly caused by fibrous perineural adhesions and scarring around the median nerve. Neurolysis can be performed with or without interposition of vascularised fat, fascia, or muscle- tissue which is labour-intensive and causes considerable donor site morbidity. Lipografting is an option with a short learning curve, less donor site morbidity, and positive effects from adipose derived stromal cells (ASCs) in adipose tissue which might help to recover nerve damage and prevent adhesions.
Aim: The authors hypothesized that lipografting combined with extensive neurolysis improves symptoms and reduces CTS recurrences in recalcitrant CTS.
Material & Methods: Patients with a 2nd to 5th CTS recurrence (n=29) were prospectively included and treated with external neurolysis combined with perineural lipografting. Our primary outcome is the Boston Carpal Tunnel Questionnaire (BCTQ), with subscales SSS and FSS scores and MCID calculated per person. The BCTQ was administered preoperatively and 2.5 years postoperatively, the short-term follow-up. To determine whether patients experienced recurrence or required additional surgery, long-term follow-up data was collected up to 10 years after surgery, including the BCTQ and patient satisfaction.
Results: BCTQ scores improved for 86% of patients and remained stable during both short and long-term follow-up. Accordingly, SSS and FSS scores median (IQR), also significantly decreased postoperatively, 3.75 (2.75, 4.38) to 2.12 (1.12, 3.45) ($p<0.0001$), and 3.73 (3.27, 4.18) to 1.86 (1.09, 2.48) ($p<0.001$), respectively. The decrease in SSS and FSS scores was clinically relevant in 55% and 52% of patients in the short-term follow-up. No patient had to undergo any other surgical intervention during our long-term follow-up. 76% of patients reported their result as good or excellent.
Conclusions: Extensive re-neurolysis of the median nerve combined with perineural lipografting in recalcitrant CTS recurrence improves symptoms and prevents repetitive operative treatment found after a long follow-up.

A-0286 LACERTUS RELEASE EFFECTIVELY REDUCES INTRANEURAL PRESSURE IN THE PROXIMAL MEDIAN NERVE, SEQUENTIAL PRONATOR RELEASE ATTRIBUTES WITH A SMALL ADDITIONAL REDUCTION.

Ileen Domela Nieuwenhuis[1,2], Jean Bart Jaquet[1], Niels WL Schep[3], Ronald LAW Bleys[2], J Henk Coert[2]
[1]Plastic and reconstructive surgery, Maasstad Hospital, Rotterdam, the Netherlands; [2]Plastic and reconstructive surgery, University Medical Centre, Utrecht, the Netherlands; [3]Trauma surgery, Maasstad Hospital, Rotterdam, the Netherlands

Introduction: The etiology of a proximal median nerve compression (PMNC) remains unknown and various treatments are performed today. The lacertus syndrome, a PMNC, has become widely known and its release is frequently performed. The lacertus release (LR) has clinically been proven effective in releasing PMNC symptoms and can be performed minimally invasive under WALANT because it is in fact a superficial fascial release. The question arises if the indication for more invasive deep release of the median nerve at the pronator muscle will decrease. Despite the clinical success of LR, studies comparing PMNC release at the pronator (PR) and lacertus are sparse. The effect of nerve decompressions can be objectified by measuring the intraneural pressure of the compressed nerve.
Aim: In this study, we evaluate the intraneural pressure in the median nerve after a superficial LR and subsequent deep PR of the median nerve.
Materials & Methods: eight arms from four fresh frozen human bodies were used for this study, the arms were still attached to the torso. Surgical releases were performed by a professor in hand and wrist surgery: LR mini-open and PR endoscopically. Intraneural pressure measurements were done before and after LR, and after PR. Pressures were measured with an arterial pressure catheter in the proximal forearm under the pronator teres muscle, placed 1cm intraneural under the perineurium using ultrasound guidance. Intraneural pressures were measured in the following positions: maximal elbow extension and flexion and forearm pronation and supination.
Results: After LR the maximal intraneural pressure is reduced by 40% (-44 ±37 mmHg, mean delta ±SD), from 98 ±42mmHg (mean ±SD) at baseline to 54 ±25mmHg after LR, respectively. This mean delta of 44mmHg is significant and has a large effect (effect size 1.2). The sequential PR has a significant but small effect on the intraneural pressure with an additional 10 ±8mmHg reduction (effect size 0.4). Intraneural pressure was the highest with 90 degrees of elbow flexion, however, the decrease in intraneural pressure after release was not affected by elbow flexion or forearm supination and pronation. Furthermore, there was also no difference between left and right arms or between males and females.
Conclusions: Lacertus release, a superficial PMNC release, appears effective in lowering the intraneural pressure of the median nerve. Performing a sequential pronator release, a deep PMNC release, only has a small additional reduction of the intraneural pressure. Based on our findings, lacertus release can be considered the treatment for PMNC, without releasing the deep part of the trajectory of the median nerve.

A-0287 INSTANT POST-OPERATIVE RETURN OF TIP-TIP PINCH STRENGTH DIRECTLY AFTER LACERTUS RELEASE

Ileen Domela Nieuwenhuis[1,2], Sjoerd B Paulusma[1], Niels WL Schep[3], J Henk Coert[2], Jean Bart Jaquet[1]
[1]Plastic and reconstructive surgery, Maasstad Hospital, Rotterdam, the Netherlands; [2]Plastic and reconstructive surgery, University Medical Centre, Utrecht, the Netherlands; [3]Trauma surgery, Maasstad Hospital, Rotterdam, the Netherlands

Introduction: Return of tip pinch strength may be helpful as a peri-operative tool under WALANT to evaluate the effect of a proximal median nerve compression (PMNC) release. Tip-tip pinch weakness is typical for PMNC and may help to differentiate between PMNC and carpal tunnel syndrome (CTS), as the muscles responsible for the tip pinch are not affected in CTS. The tip pinch movement involves flexion of the flexor pollicis longus (FPL) and flexor digitorum profundus

of the second digit (FDP2), bringing the tuft of the thumb and second digit into contact by flexing the DIP joint. Both FPL and FDP2 are innervated by the anterior interosseous nerve (AIN), a branch of the median nerve in the forearm. Decompression of the proximal median nerve also positively affects the AIN and its motor signals, potentially leading to an immediate return of strength.
Aim: To evaluate the change in tip-tip pinch strength after lacertus release. Furthermore, tip-tip pinch strength was evaluated after carpal tunnel release to compare proximal and distal median nerve decompressions.
Material & Methods: We included patients planned for median nerve decompression in the arm under local anesthesia. Patients underwent a lacertus release (LR), carpal tunnel release (CTR), or both. Tip-tip pinch strength was measured with a Baseline Pinch Gauge directly preoperative and 5-10 minutes postoperative. Each measurement was repeated three times. Tip pinch strength was measured on both hands to correct measurements for general conditions, such as preoperative anxiety.
Results: 24 patients were included, including 8 males, with an average age of 59 years (range 32, 83 years). 8 patients received an LR, 8 patients a CTR and 8 patients both an LR and CTR. There was a median strength gain of +46% (range -33, +267%) for LR patients directly postoperative. Patients who received both LR and CTR experienced a median strength improvement of +43% (range -12, +157%). After CTR, the median difference in strength was -3% (range -33, +12%). A decrease in strength is possibly caused by patients' fear of stitch failure or complications despite clinicians' reassurances.
Conclusions: We found an instant improvement of tip-tip pinch strength directly following lacertus release, both for solitary lacertus release as well as in combination with a carpal tunnel release. As anticipated, we found no change in tip pinch strength after solitary carpal tunnel. Return of tip-tip pinch strength after proximal median nerve decompression is evident and may be a promising tool to diagnose lacertus syndrome peri-operatively.

A-0288 RESULTS OF ARTHROSCOPIC PARTIAL TRAPEZIECTOMY WITH SUTURE-BUTTON SUSPENSIONPLASTY FOR THUMB CARPOMETACARPAL ARTHRITIS

Ryosuke Ikeguchi, Takashi Noguchi, Koichi Yoshimoto, Daichi Sakamoto, Terunobu Iwai, Kazuaki Fujita, Shuichi Matsuda
Kyoto University, Kyoto, Japan

Introduction: For symptomatic grade II and III thumb carpometacarpal arthritis, hand surgeons perform many kinds of surgeries, and it has been reported that no single operation produces better outcomes than another. Arthroscopic arthroplasty with suture-bottom suspensionplasty has been developed and predictable results have been reported. To date, however, few studies have reported that this procedure improves the range of motion of the thumb carpometacarpal joint.
Aim: This study represents the clinical results, especially range of motion (ROM) improvement, of arthroscopic partial trapeziectomy with suture-bottom suspensionplasty for symptomatic grade II and III thumb carpometacarpal arthritis with a minimum one year follow-up.
Material & Methods: Thirty-nine cases of thumb carpometacarpal arthritis (grade II and III) in which conservative treatment was ineffective were included (mean age 69.0 years, 48 to 84 years old). Postoperative observation was more than one year. Twenty-eight patients are female and eleven are male. The surgical method is partial resection of the distal trapezium articular surface under carpometacarpal arthroscopy and suture-button suspensionplasty between the first metacarpal base and the second metacarpal shaft. Postoperative treatment is one week immobilization and to start active range of motion exercise. The physical assessments included ROM, pain visual analogue scale (VAS), strength, and the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire before surgery and at final follow-up. The Wilcoxon signed-ranked test was used to analyze the VAS results before surgery with those at final examination. Paired t tests were used to

compare the other assessment results. Statistical significance was set at $p < .05$.
Results: Preoperative VAS score (70.5±13.5) significantly reduced at the final follow-up (10.9±13.0). Preoperative radial abduction and palmar abduction (45.4±14.9° and 51.4±13.9°, respectively) significantly increased at the final follow-up (58.2±15.9° and 63.4±14.0°, respectively). Preoperative percentages of pinch strength (57.6±26.9%) significantly increased at the final follow-up (84.8±41.4%).Preoperative DASH score (39.3±16.4) significantly improved at the final follow-up (11.0±9.2).
Conclusions: An arthroscopic partial trapeziectomy with suture-button suspensionplasty is considered an effective treatment with significant pain relief and preserving joint motion.

A-0290 EFFECTIVENESS OF PLATELET-RICH PLASMA INJECTION AS AN ADJUNCTIVE TREATMENT TO ARTHROSCOPY FOR TFCC INJURY: A RETROSPECTIVE COHORT STUDY

Abdulaziz Asiry, Hattan Mortada, Lorenzo Merlini
Institut de la main Paris, France

Abstract
Purpose: To evaluate and compare the use of platelet-rich plasma (PRP) as an adjunctive treatment in patients undergoing arthroscopic repair of triangular fibrocartilage complex (TFCC) tears.
Background: Triangular fibrocartilage complex (TFCC) injuries can be a significant source of pain and dysfunction in patients. Arthroscopic repair is a common surgical approach for the treatment of TFCC injuries, providing minimally invasive access to the injured area while maintaining the integrity of the surrounding tissues. Platelet-rich plasma (PRP) has also gained attention as an adjunctive treatment in patients who receive arthroscopic repair of TFCC injury, with studies suggesting that PRP may enhance the healing process and improve patient outcomes.
Methodology: A total of 33 patients treated with arthroscopically assisted repair of the TFCC between 2021 and 2022 and a minimum follow-up of three months were retrospectively reviewed. Patients were divided into two groups: PRP group and control group. The PRP group received PRP injections after arthroscopic treatment, whereas the control group did not receive PRP injections. Physical examination was performed before and after the treatment, including flexion and extension, and radial and ulnar inclination of the normal and affected parts. The pain visual scale and the DASH score were used to assess improvements in pain and function. pre-operative and post-operative pain and function were compared using the pain visual scale, Disability of Arm, Shoulder, and Hand score (QuickDASH).
Results: This retrospective study included 20 males and 13 females included into this retrospective study with a mean age of 30.55 ± 9.17 years old (Table 1). There were 16 patients in the PRP group and 17 in the control group. There were no significant differences in the preoperative wrist function and pain between the two groups. The mean postoperative follow-up duration was 3.94 ± 1.66 months. A statistically significant improvement was observed in the improvement of functionality scores (quickDASH) between the two groups.
Conclusion: There is still debate regarding the effect of PRP as a treatment option for TFCC injuries after arthroscopic treatment. It can improve pain and function, and promote tissue healing and regeneration. Further studies are required to confirm these findings and determine the optimal PRP injection protocol for the treatment of TFCC injuries.

A-0291 POSTTRAUMATIC UPPER LIMB RECONSTRUCTION WITH VASCULARIZED FIBULA FLAP: SURGICAL EXPERIENCE AND TECHNICAL CONSIDERATIONS

Javier Pérez-Rodríguez[1], Luis Díaz-Ojeda[2], Javier Alfaro-Abadía[1], Mercedes Ruiz-Domínguez[2], Aleksandar Lovic[1]
[1]La Paz University Hospital, Madrid, Spain; [2]Fraternidad-Muprespa Habana Hospital, Madrid, Spain

Introduction: Microsurgical reconstruction of the post-traumatic upper limb with a vascularized fibula is a versatile and valuable option in cases with multiple previous interventions, but also in acute situations. The free fibula flap offers a wide variety of reconstructive possibilities from the clavicle to the hand.
Aim: The objective of this study is to present our experience in the reconstruction of the post-traumatic upper limb using a free fibula flap and share surgical considerations depending on the anatomic area.
Material & Methods: The records of 23 cases of microsurgical bone reconstruction of the upper limb, performed between 2019 and 2023, were reviewed. The medical records were examined and the surgical data, complications, bone healing, pain (Visual Analogue Scale) and functional results were analysed using the Disabilities of the Arm, Shoulder and Hand (quickDASH) questionnaire.
Results: Reconstruction with vascularized fibula was performed in different anatomical regions of the upper limb, including the clavicle (7 cases), the humerus (8 cases: 2 from the proximal third, 4 from the middle third and 2 from the distal third), the radius (4 cases) and the ulna (4 cases). The cohort included both cases of recalcitrant nonunion and primary cases of fractures of the upper limb. Fixation was performed with compression plates in all situations, which evolved from previous and less invasive procedures as K-Wires. In 100% of cases bone consolidation was achieved, but there were cases of delayed union which required reintervention and fixation (ulna and clavicle reconstruction). No flap failure was registered. Complications included one case of pulmonary thromboembolism, delayed union which required reintervention to change fixation material. Functional results using the quickDASH showed significant recovery of upper limb function even in the short term.
Conclusions: The vascularized fibula flap is an effective option for the treatment of posttraumatic upper limb defects, both in the case of nonunion and in the acute setting. Fixation methods evolved in our unit from minimal fixation to more stable constructs that offer compression and stability to allow early mobilisation. It is, however, a technically complex procedure with potential complications that require strict monitoring. It is an option with good results in cases where there are not many other reconstruction alternatives, which allows the recovery of the quality of life of post-traumatic patients.

A-0292 ULNAR SHORTENING OSTEOTOMY - HOW LONG DO I HAVE TO IMMOBILIZE?

Richard-Tobias Moeller, Martin Mentzel, Simon Bauknecht
Department of Orthopedic Trauma, Ulm University Medical Center, Ulm, Germany

Introduction: The surgical procedure of diaphyseal ulnar shortening osteotomy (USO) being the causal treatment of ulnar impaction syndrome is standardized nowadays with good to very good results. In contrast, a wide spectrum of different postoperative treatment regimens can be found in the current literature ranging from immobilization in an above-elbow cast for 4 weeks to immobilization in a forearm cast for 8 weeks to no immobilization at all.
Aim: The results after USO with modern, angular stable implants without and with immobilization for 2 weeks are presented.
Materials and Methods: A retrospective database analysis identified 65 patients (39 women, 26 men, mean age 36.7 years) with a total of 67 USO over a 13-year period and were followed up for 76.8 weeks (15.9 - 192.9). All USO were obliquely

sawed and stabilized with palmar stable-angle implants. Sixteen USO were treated postoperatively without immobilization (group A) and 51 USO were immobilized postoperatively in a forearm splint in 30° extension for 2 weeks (group B).
Results: No significant difference was found between the two groups with regard to the duration of bony healing and wrist mobility ($p>0.05$). All USO consolidated on average after 7.1 weeks (±1.9; 4.9 - 14.1). Wrist range of motion was significantly ($p<0.05$) improved in extension/flexion from 108.1° (±2.5; 60 - 155) preoperatively to 123.5° (±17.7; 75 - 160) postoperatively and in ulnar/radial reduction from 54.9° (±14; 25 - 90) to 59.2° (±12.4; 30 - 90). Pain level was significantly ($p<0.01$) reduced from median 3 (±2.8; 0 - 9) to 0 (±1; 0 - 5) at rest and from 8 (±1.4; 4 - 10) to 0 (±2,1; 0 - 9) under weight bearing. A total of 6 complications (9%) were noted. Delayed bone healing or pseudarthrosis were not found. No statistically significant difference was found between the two groups in terms of age, gender, manual activity, extent of ulnar shortening or duration of follow-up treatment.
Conclusion: By using modern angular stable implants to stabilize an USO, the duration and extent of immobilization can be reduced to a dorsal forearm splint for 2 weeks without compromising bone healing. Immobilization can even be omitted completely in individual cases if the patient has the necessary compliance.

A-0293 OUTCOMES OF COMPOSITE GRAFTS FOR PEDIATRIC FINGERTIP AMPUTATIONS: A SYSTEMATIC REVIEW

Noemi Jester[1,2], Seunghee Han[3], Manwi Singh[1,2], Avula Aishwarya Rao[1,2], Balamrit Sokhal[4], Yangmyung Ma[1], Andrea Jester[1]
[1]Birmingham Women's and Children's Hospital, Birmingham, United Kingdom; [2]Sheffield Medical School, Sheffield University, Sheffield, United Kingdom

Introduction: The aim of this study was to explore the outcomes of composite grafts in fingertip amputations in children as well as the contributing factors that may affect outcomes.
Material & Methods: Literature search was conducted across six databases in March 2022 to select studies on the use of composite grafts on fingertip amputations in the pediatric population.
Results: Twelve articles with 735 composite grafts were identified for review. Most fingertip injuries occurred in the less than 5-year age group and were due to crush type injuries. In studies that reported "complete" graft take as a separate outcome measure, 17.3% of fingertips with this result were observed. In the studies that reported "complete" and "partial" graft take together as an outcome measure, 81.6% of fingertips achieved this outcome. A lower proportion of failed graft take was observed in more distal fingertip amputations. Infection (3.8%) and nail abnormalities (3.4%) were the most common complications following composite grafting.
Conclusions: Composite grafting can be considered as a useful method of treatment in this population. Clinicians should be aware of the potential complications following this method of treatment such as infection and nail abnormalities. More proximal fingertip amputations may warrant other surgical interventions (beyond Level II on the modified Ishikawa/Ishikawa classification). Significant heterogeneity was observed within the studies, mainly due to lack of standardization in assessment and reporting of outcomes.

A-0294 EVALUATION OF BLEEDING UNDER WALANT IN THE SURGERY OF DISTAL WOUNDS OF THE UPPER LIMB: PROSPECTIVE SINGLE-CENTER DESCRIPTIVE STUDY

Victor Maigné[1] Thomas Grégory[2] Bihes Karkazan[3]
[1]Université Paris-Saclay, France; [2]Assistante publique des hôpitaux de Paris, France; [3]Université Paris Sorbonne Nord, France

WALANT (Wide Awake Local Anesthesia No Tourniquet) is a local anesthesia technique allowing surgery without a tourniquet with an awake patient.
The aim of this single-center prospective descriptive study is to evaluate intraoperative bleeding in surgery for distal wounds of the upper limb under WALANT.
Patients who presented with a wound of the elbow, forearm, wrist, hand or fingers or an infection such as a small abscess or collected paronychia accessible to surgery under WALANT were included from February 2023 to April 2023. The first operating surgeon completed a questionnaire concerning the subjective evaluation of intraoperative bleeding.
A total of 106 consecutive patients were included. Absence of bleeding was found in 50 patients (47%). Light and non-troublesome bleeding was found in 28 patients (26%). Seventeen patients (16%) required the placement of a tourniquet due to significant intraoperative bleeding. The surgeons' satisfaction with their WALANT was on average 8.7/10.
In conclusion, WALANT is an anesthetic technique that effectively limits intraoperative bleeding.

A-0295 INTERPOSITION-SUSPENSION TECHNIQUE WITH THE ABDUCTOR POLLICIS LONGUS FASCICLE FOR RHIZARTHROSIS TREATMENT

Lucía Madero, Luis Felipe Fort, Elvira Moreda, Catalina Rubín, Ana Dolores Izquierdo
Hospital Virgen de la Luz, Cuenca, Spain

Introduction: Osteoarthritis of the trapeziometacarpal (TMC) is characterized by the presence of pain in thenar eminence and the TMC joint, as well as when gripping and pinching. It can also cause a feeling of joint instability.
According to the severity of joint destruction, Eaton classified it into 4 stages, ranging from subchondral sclerosis (stage I) to total loss of articular surfaces, osteophytes > 2 mm, significant subluxation and involvement of other adjacent joints (stage IV).
Depending on the joint degeneration, treatment can be non-surgical, in the initial stages; or surgical when advanced. There are multiple surgical options: simple trapezectomy, trapeziometacarpal arthrodesis, ligamentous reconstruction techniques, or arthroplasties (interposition, interposition-suspension, or with endoprosthesis).
Aim: To present the results of 31 patients operated for advanced rhizarthrosis using the interposition-suspension technique with the abductor pollicis longus fascicle.
Material & Methods: Using the Wagner surgical approach, the joint capsule between the abductor longus and extensor pollicis brevis tendons is incised. Capsulotomy and total trapezectomy are performed. The palmaris major tendon is identified, on which two non-absorbable sutures are stitched. A fascicle of the abductor pollicis longus is then dissected, which is sutured to the palmaris major, maintaining the finger in a functional position. Finally, capsulorrhaphy and suturing of the skin is performed. A splint should be used for the first 3 weeks before rehabilitation treatment begins.
Results: Between 2016 and 2023, 31 hands were operated on (16 right, 15 left) for advanced rhizarthrosis. The mean age of the patients was 63 years (48-78 years). 3 patients underwent surgery for ipsilateral carpal tunnel syndrome, one patient had an osteosynthesis screw removed from a previous scaphoid fracture, and another case had rescue surgery after failed TMC arthrodesis with a plate. 24 patients received rehabilitation treatment once the immobilization was removed.

Regarding perioperative complications, 3 patients presented surgical wound infection, progressing satisfactorily with empirical antibiotic treatment. Another patient presented a deep wound infection that required surgical debridement, evolving satisfactorily afterward. 3 patients had postsurgical De Quervain tendinitis that improved after local infiltration with corticosteroids. Finally, one patient had a painful scar, which improved with capsaicin cream.
Regarding pre- and post-surgical TMC joint pain, only 1 patient had no clinical improvement. The majority of patients are asymptomatic or have mild discomfort due to overexertion, with complete or almost complete mobility of the 1st finger (complete opposition of the thumb or at least to the base of the 5th finger).
Radiologically, the 1st radius maintains a correct position, with an average collapse of 34.7% of the TMC joint space.
At 3 months after surgery, 80% of patients report improvement in grip and pinching strength.
Conclusions: Interposition-suspension arthroplasty with the abductor pollicis longus tendon is a simple technique that offers very good clinical and functional results in patients with advanced rhizarthrosis (Eaton III-IV).
With experience, it has been seen that the rate of De Quervain tendinitis has been considerably reduced by intraoperative infiltration of the 1st dorsal carpal groove.
After surgery, immobilization is recommended for 3 weeks, and subsequent rehabilitation to regain thumb opposition and strength.

A-0296 THE TREND OF HAND SURGERIES IN THE BIOLOGIC ERA (2004-2022) FOR RHEUMATOID ARTHRITIS AT A SINGLE INSTITUTE

Chinatsu Ichikawa[1], Shuichi Naniwa[1], Ryuichi Nakahara[2], Yoshihisa Nasu[2], Toshifumi Ozaki[3], Keiichiro Nishida[2]
[1]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan; [2]Locomotive Pain Center, Okayama University Hospital, Okayama, Japan; [3]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Faculty of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama, Japan

Introduction: The pharmacological treatment of Rheumatoid Arthritis (RA) has significantly improved with the advent of biologic/target synthetic disease-modifying anti-rheumatic drugs (b/tsDMARDs). It is speculated that the suppression of joint destruction has considerably influenced the trend of surgical treatment for RA.
Aim: This study aims to investigate the recent trend in patient backgrounds and types of hand surgeries performed on RA patients at our facility.
Material & Methods: We retrospectively investigated the medical records of 581 RA cases who underwent hand surgeries at our hospital between 2004 and 2022. Patient backgrounds and clinical data (age, disease duration, medication (methotrexate; MTX, glucocorticoid; GC, b/tsDMARDs), preoperative serum CRP level), and types of surgeries performed were classified into finger surgery (arthrodesis, arthroplasty, and joint replacement), wrist surgery (total/partial arthrodesis, Sauvé-Kapandji procedure, Darrach procedure, and total wrist arthroplasty), and others. We analyzed the trends in these annual changes. Furthermore, we compared patient backgrounds and performed surgeries between the b/tsDMARDs user group (B group, n=199) and the non-user group (N group, n=382). The Cochran-Armitage trend test, t-test, and Chi-square test were used for statistical analysis, and $p<0.05$ was considered significant.
Results: The average age of the patients was 61.3 years (18-89 years), with 38 males and 543 females, and the average disease duration was 21.9 years (0.8-58 years). MTX was used in 353 cases (61%), GC in 355 cases (61%), and b/ts DMARDs in 199 cases (34%). The average dose of MTX was 7.0mg/week (2-16mg/week), and the average dose of GC was 4.4mg/day (1-14mg/day). While the use of b/ts DMARDs increased (2004: 0%, 2022: 44%), the use of GC decreased (2004: 83%, 2022:

59%). The overall number of hand surgeries showed an increasing trend (2004: 18 cases, 2022: 27 cases). Among these, the proportion of the finger surgery had significantly increased (2004: 53%, 2022: 70%). Furthermore, the proportion of joint replacements within the finger surgery cases, and the proportion of SK procedures within the wrist surgery cases showed an increasing trend. The mean preoperative CRP level showed a decreasing trend (2004: 30mg/L, 2022: 20mg/L). The mean CRP level and the rate of GC use were lower in the B group (4.3±10.6mg/L and 53%, respectively) than in the N group (8.8±15.7mg/L and 65%, respectively). The proportion of finger surgeries was higher in the B group (69%) than in the N group (62%).
Conclusions: The rate of b/tsDMARDs use has increased in RA patients who underwent hand surgery. Compared to the non-user group, the b/tsDMARDs user group showed a lower preoperative CRP level and rate of GC use, and a higher proportion of finger surgeries. This suggests that b/tsDMARDs contribute to an increasing trend for more peripheral joint surgery with improved disease control in recent RA patients.

A-0297 HARNESSING AI FOR RAPID DEVELOPMENT OF MRI IMAGE ANALYSIS: A NOVICE'S JOURNEY WITH CHATGPT

Rajan Choudhary, Shahd Nour, Janak Bechar
Queen Elizabeth Hospital Birmingham, Birmingham, UK

Aims: The ability to code can significantly streamline repetitive, analytic tasks in research, allowing doctors to focus on other aspects of training. However, not everyone can afford the time to learn coding due to its opportunity costs. This project explores the potential of ChatGPT, an advanced large language model, as a tool to bridge this gap. It also aimed to share insights on how to effectively use ChatGPT for coding, particularly in creating Python scripts.
Method: ChatGPT-4 was prompted to generate a Python script to load MRI wrist images, label 15 structures and calculate distances. The initial prompt was brief and resulted in disjointed and erroneous code. Learning from this, the prompts were revised to first create a skeleton code, fill it with short segments of code below the GPT output word limit, self-refer to previous prompts and code versions and debug it for mistakes.
Results: The revised approach led to the successful generation of a reliable and accurate Python script within 30 minutes, with an additional 2 hours spent on debugging. The script allowed users to load images, calibrate distances, label structures, and calculate and display distances between these structures to determine a safe window for carpal tunnel injections.
Conclusions: This study underscores the potential of AI, specifically ChatGPT, as a tool to assist doctors in coding tasks, thereby enhancing their research capabilities. The insights shared on effective usage of ChatGPT for coding can serve as a valuable guide for healthcare professionals seeking to harness AI for similar tasks.

A-0298 PROXIMAL INTERPHALANGEAL JOINT PYROCARBON HEMIARTHROPLASTY THROUGH LATERAL APPROACH

Istvan Zoltan Rigo, Preben Olsson Dovland, Asgeir Amundsen, Jan-Ragnar Haugstvedt
Ostfold Hospital Trust, Moss, Norway

Introduction: Several publications have shoved promising results with pyrocarbon hemiarthroplasty, replacing only the head of the basal phalanx treating PIP joint osteoarthritis. This is a less invasive surgical alternative to a total joint replacement with less bone resection. However, using the traditional dorsal approach the patient should protect the repaired extensor tendon throughout the rehabilitation. The volar approach would not violate the central slip, however the guiding instruments for the pyrocarbon PIP joint replacement were designed for dorsal use. Lateral approach was

originally described for PIP silicone arthroplasty, a technique that does not violate the extensor tendons and enables free mobilization.
Aim: Evaluating the results of PIP joint hemiarthroplasty with lateral approach.
Material & Methods: Eight patient were operated in totally ten fingers (1 index, 5 long and 4 ring fingers) for primary PIP joint osteoarthritis with proximal pyrocarbon hemiarthroplasty. Lateral approach was used, detaching one collateral ligament proximally, dislocating the joint laterally, then the proximal phalanx was prepared and the proximal part of the pyrocarbon total arthroplasty was implanted. Then the finger was reduced, and the ligament was reattached using an osteosuture. The finger was freely mobilized after a few days of immobilization.
Results: One patient, whose finger was mobilized immediately, sustained wound dehiscence that developed to a deep infection. This implant was removed, and the PIP joint was fused. The remaining nine fingers were functionally evaluated with a mean follow-up of 6 months. The PIP extension deficit changed from a median of 20 to 10 degrees and the active flexion from a median of 60 to 75 degrees with a significant median active ROM gain of 25 degrees. The pain VAS score decreased significantly from a median of 8 to 0 and all these patients were satisfied with the result.
Conclusions: Pyrocarbon hemiarthroplasty through lateral approach enables early mobilization and provides good functional results in treatment of primary PIP joint osteoarthritis.

A-0299 TRACING THE BOUNDARY MOVEMENT OF THE THUMB-BASE JOINT IN SPACE

Tianyun Yuan[1], Yu Song[1], Ian F. Blom[2], Nina M.C. Mathijssen[2], Richard H.M. Goossens[1], Gerald A. Kraan[2]
[1]Delft University and Technology, Delft, the Netherlands; [2]Reinier de Graaf Hospital, Delft, the Netherlands

Introduction: Aim: The 1st carpometacarpal joint (CMC-1) at the thumb-base is an essential joint for an independent daily living. Implant replacement is one of the surgical options to restore the joint mobility for patients suffering CMC-1 osteoarthritis, however the outcome is still debatable. The goal of this study was to investigate the In-vivo biomechanics of CMC-1 joint is essential to support the treatment and the implant replacement design for the CMC-1.
Material & Methods: In this study, the maximum thumb circumduction motion of 47 healthy participants was recorded with 4D CT scanning technique. The relative movement between the first metacarpal (MC1) to the trapezium (TPM) was extracted from the medical images. Then, the motion trace of the boundary movement was analyzed by simplifying the MC1 bone as a 50mm straight bar.
Results: The outcome suggested that the relative movement of the first metacarpal (MC1) to the trapezium (TPM) formed a skewed hyperboloid shape with two main features. First, the waist of the shape located on the metacarpal side instead of the trapezium side. Second, The ends of the metacarpal bone follow a trace similar to the ellipse. The peak of the rotations and the translations were concurrent around the ends of the major axis of the ellipse-like trace. The trace formed by the natural asymptomatic CMC-1 joint is different to the theoretical boundary trace of a ball-socket design. Yet further study considering the restriction from the ligaments and muscles are needed.
Conclusions: Based on the in-vivo dynamic measurement, we investigated the joint motion trace in space. It was shown that the trace formed by the natural asymptomatic CMC-1 joint is different to the theoretical boundary trace of a ball-socket design. The understanding of the movement of the asymptomatic CMC-1 joint is important to the etiology research and provides the baseline for the optimization and validation of implant replacement design.

A-0300 A COMPARATIVE STUDY OF VOLAR LOCKING-PLATE FIXATION WITH CORTICOCANCELLOUS AND PURE CANCELLOUS BONE GRAFTS FOR SCAPHOID NONUNION WITH DORSAL INTERCALATED SEGMENTAL INSTABILITY SECONDARY TO SCAPHOID HUMPBACK DEFORMITY

Joung Woo Shin, Jong Woong Park, Jung Il Lee
Department of Orthopedic Surgery, Korea University College of Medicine, Seoul, South Korea

Introduction: Surgical treatment for scaphoid nonunion with deformity typically involves reduction of the scaphoid deformity, internal fixation, and bone grafting. Bone grafts utilized include a cortcicocancellous bone graft or pure cancellous bone graft.
Aim: This study compared the outcomes between using corticocancellous and using pure cancellous bone grafts when employing an anatomically pre-contoured volar locking-plate in patients with scaphoid nonunion with associated dorsal intercalated segmental instability (DISI), secondary to scaphoid humpback deformity.
Material & Methods: This retrospective study included patients with scaphoid nonunion and DISI due to humpback deformity treated between March 2017 and January 2022. Surgical procedures involved a volar approach, curettage of fibrotic tissue and sclerotic bone, and bone grafting from the iliac crest. In the corticocancellous group, a wedge-shaped graft was used, while the pure cancellous group received graft chips. In both groups, a 1.5-mm anatomically pre-contoured locking plate was used for fixation. Radiographic evaluations included the union rate and carpal alignment. Clinical assessments encompassed wrist range-of-motion, grip strength, and patient-reported outcomes.
Results: Thirty-nine patients met the inclusion criteria, with 22/24 and 13/15 in the corticocancellous and pure cancellous groups, respectively, achieving union. Postoperatively, radiographic parameters had been corrected, and parameters were similar between groups. Clinical outcomes, including the flex–extension arc and grip strength, were comparable. Quick Disabilities of the Arm, Shoulder, and Hand scores and Mayo Wrist Scores also showed no significant intergroup differences.
Conclusions: Use of anatomically pre-contoured volar locking-plate fixation with pure cancellous bone grafts achieved outcomes comparable to those achieved with corticocancellous bone grafts in scaphoid nonunion with DISI secondary to scaphoid humpback deformity, possibly due to the biomechanical advantages and ability of the volar plate to provide structural supports. This study suggests that pure cancellous bone grafts may be a viable option in such cases, offering easier surgical preparation and satisfactory results. Nevertheless, careful plate placement remains crucial to prevent complications.

A-0301 MAGNETIC RESONANCE IMAGING ANALYSIS OF THE DISTRIBUTION OF CARTILAGE DAMAGE IN SCAPHOID NONUNION

Hyoung Seok Jung[1], Sujin Kim[2], Bo Mi Chung[2], Hyun il Lee[3], Jae-Sung Lee[4]
[1]Department of Orthopaedic Surgery, Chung-Ang University Gwangmyeong Hospital, Gwangmyeong, South Korea; [2]Department of Radiology, Hospital of Chung-Ang University of Medicine, Seoul, South Korea; [3]Department of Orthopaedic Surgery, Ilsan-Paik Hospital, Inje University College of Medicine, Goyang, South Korea; [4]Department of Orthopaedic Surgery, Hospital of Chung-Ang University of Medicine, Seoul, South Korea

Introduction: To our knowledge, no previous study has attempted to evaluate the distribution and severity of cartilage damage associated with scaphoid nonunion using magnetic resonance imaging (MRI). Although arthroscopy remains the gold standard for detecting cartilaginous lesions, MRI is still a useful diagnostic tool for cartilaginous lesions of the wrist. As treatment can be influenced by the SNAC stage, it is essential to evaluate if the distribution of cartilage damage associated with SNAC follows the same pattern.

Aim: This study aimed to evaluate the distribution and severity of cartilage damage in patients with scaphoid nonunion assessed using magnetic resonance imaging (MRI) and the scaphoid nonunion advanced collapse (SNAC) staging system.
Material & Methods: We retrospectively analysed MRI of patients who underwent osteosynthesis for scaphoid nonunion. Fractures were classified as located in the proximal, middle, or distal third of the scaphoid. Cartilage damage was assessed in eight wrist regions using a modified Whole-Organ Magnetic Resonance Imaging Score (WORMS). The frequencies of regions affected by any cartilage damage (WORMS ≥2.5) depicted on MRI were analysed. The two-tailed Mann–Whitney U test evaluated whether cartilage damage scores varied by nonunion location.
Results: The study included 32 patients (31 men and 1 woman), with a mean age of 32.1 ± 11 years (range 19–60). Nine patients (28%) had proximal scaphoid nonunion, and 23 patients (72%) had scaphoid waist nonunion. The distal radioscaphoid (91%), scaphotrapeziotrapezoid (STT; 69%), proximal radioscaphoid (44%), and scaphocapitate (34%) joints were most commonly affected by degenerative cartilage damage. Modified WORMS analysis based on the location of nonunion revealed no significant intergroup differences in cartilage wear in all affected joints). The mean score of global cartilage damage was also not significantly different between the groups (14.43 ± 5.48 for waist nonunion versus 14.56 ± 5.32 for proximal nonunion).
Conclusions: In conclusion, contrary to previous theory, the STT and proximal radioscaphoid joints were especially involved in early-stage of SNAC. Thus, surgeons should carefully investigate the cartilage status of these joints during decision-making for scaphoid nonunion surgery. It is not yet known if this early cartilage damage affects the outcome of fixation and bone grafting for scaphoid nonunion.

A-0302 HOW DOES THE ADDITION OF DEXAMETHASONE TO A BRACHIAL PLEXUS BLOCK CHANGE PAIN PATTERNS AFTER SURGERY FOR DISTAL RADIUS FRACTURES? A RANDOMIZED, DOUBLE-BLIND STUDY

Min Kyoung Kim[1], Yong-Hee Park[2], Jae Sung Lee[3], Hyoung-Seok Jung[4]
[1]Department of Anesthesiology and Pain Medicine, Chung-Ang University Gwangmyeong Hospital, Gwangmyeong, South Korea; [2]Department of Anesthesiology and Pain Medicine, Chung-Ang University Hospital, Seoul, South Korea; [3]Department of Orthopaedic Surgery, Chung-Ang University Hospital, Seoul, South Korea; [4]Department of Orthopaedic Surgery, Chung-Ang University Gwangmyeong Hospital, Gwangmyeong, South Korea

Introduction: Although prior studies have suggested that anesthesia can be prolonged by adding dexamethasone to regional blocks, no randomized trials we are aware of have ascertained whether doing so will make a clinically important difference in pain after surgery for distal radius fractures.
Aim: Do patients who receive supplemental dexamethasone in a brachial plexus block for volar plating of unstable distal radius fractures have better pain scores postoperatively than patients who have not received dexamethasone
Method: This randomized double-blind trial included 69 patients undergoing surgery for distal radius fractures under ultrasound-guided supraclavicular brachial plexus blocks who were randomly allocated into two groups: a nondexamethasone group receiving a brachial plexus block with 0.5% ropivacaine and a dexamethasone group receiving 0.5% ropivacaine and 5 mg of dexamethasone.The primary outcome was postoperative pain, evaluated using a 10-mm VAS at 4, 8, 12, 24, and 48 hours after surgery. The minimum clinically important difference for the VAS score was 2 of 10 points. Secondary outcome variables included the count of fentanyl administration as a rescue analgesic, the number of patients receiving antiemetic medications because of fentanyl administration, and the duration of brachial plexus block.
Results: The only clinically important between-group difference in VAS pain scores was at 8 hours, favoring the group that received dexamethasone over the group that did not (1.9 ± 1.6 versus 4.7 ± 2.7; mean difference -2.8 [95% CI -3.9

to -1.6]; $p < 0.001$). After brachial plexus block, the most severe pain score in both groups was reported at 12 hours postoperatively and gradually diminished over time. There was no between-group difference in fentanyl use between those who received dexamethasone and those who did not (21 ± 38 mcg versus 31 ± 29 mcg; mean difference -10 [95% CI -27.4 to 7.4]; $p = 0.26$). Furthermore, the use of antiemetics did not differ between the groups (27% [eight of 30] versus 37% [11 of 30]; odds ratio 1.6 [95% confidence interval 0.5 to 4.8]; $p = 0.41$). Baseline and 24-hour postoperative serum blood glucose level did not differ between the groups. However, the immediately postoperative serum blood glucose was higher in the dexamethasone group than in the nondexamethasone group (121 ± 29 versus 104 ± 20; mean difference 16 [95% CI 3.3 to 28.8]; $p = 0.02$). The brachial plexus block duration was 3 hours longer (95% CI 0.8 to 5.2 hours) in the dexamethasone group than that in the nondexamethasone group (11 ± 5 hours versus 8 ± 3 hours; $p = 0.01$).
Conclusion: The postoperative pain level in patients who received supplemental dexamethasone in a regional block was not clinically different from that of patients who received conventional brachial plexus block anesthesia when undergoing volar plating for distal radius fractures. However, patients who received a brachial plexus block with dexamethasone experienced slight prolongation of their block and decrease in pain 8 hours after surgery.

A-0303 THE RELATIONSHIP BETWEEN PATIENT FACTORS AND CLINICAL OUTCOMES OF FREE FUNCTIONAL MUSCLE TRANSFER IN PATIENTS WITH COMPLETE TRAUMATIC BRACHIAL PLEXUS INJURY

Heri Suroto[1,2,3], Indrayuni Lukitra Wardhani[4], Ratna Darjanti Haryadi[4], Dina Aprilya[5], Steven Samijo[6], Firman Pribadi[1]
[1]Master of Hospital Administration, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia; [2]Department of Orthopedics & Traumatology, Faculty of Medicine, Universitas Airlangga/Dr Soetomo General Academic Hospital, Surabaya, Indonesia; [3]Cell & Tissue Bank Regenerative Medicine, Dr Soetomo General Academic Hospital, Surabaya, Indonesia; [4]Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Universitas Airlangga/Dr Soetomo General Academic Hospital, Surabaya, Indonesia; [5]Orthopedic and Traumatology, Siloam Agora Hospital, Jakarta, Indonesia; [6]Orthopedic and Traumatology, Zuyderland Medisch Centrum, Limburg, Netherlands

Introduction: Traumatic brachial plexus injury (TBPI) causes severe disabilities to the patients, affecting not only upper limb function but also the psychosocial and economic aspects. Free functional muscle transfer (FFMT) is one of the reconstruction modalities for the management of TBPI.
Aim: To evaluate the functional outcomes and their correlation to patient factors.
Material & Methods: This is a retrospective study of 131 patients who suffered from complete TBPI (C5-T1) and were treated with the FFMT procedure to restore elbow flexion and wrist extension from 2010 to 2018 in our institution. We evaluated the active range of motion (AROM), muscle power with MRC (Medical Research Council) scale, DASH score, and complications, with a minimum of 12-month follow-up.
Results: Following FFMT surgery, elbow flexion was significantly and successfully restored (MRC ≥ 3) in 75.5% of patients with an average AROM of 88.17 ± 41.29°. The wrist extension was restored in 42% of the patients with an average AROM of 20.69 ± 18.72°. There was no correlation between age, side of injury, and time to surgery with the functional outcomes. There was a weak correlation between education level, rehabilitation compliance, and elbow functional outcomes.
Conclusions: FFMT is a reliable surgical option to restore elbow flexion in TBPI with a high satisfactory result. Our findings suggested that the FFMT indication is potentially expanded regardless of the patient factors.

A-0304 THE NEW OPERATIVE METHOD, INTRACYSTIC VALVE RESECTION FOR GANGLION COMPARING WITH TOTAL CYST RESECTION

Michio Sano, Tomokazu Sawada, Michihito Miyagi, Keika Nishi, Takao Omura, Yukihiro Matsuyama
Hand Elbow Shoulder Center, Shizuoka City Shizuoka Hospital, Shizuoka City, Japan

Introduction: Ganglion is usual tumor like region in wrist and hand. Until now, total cyst resection has usually been performed. However, ganglions are deeply connected to joints or tendon sheaths, and there is a high possibility of recurrence unless the valve in the pedicle is completely removed. We utilized the new operative method for ganglion since 2014. Briefly, the new surgical method involves incising the ganglion capsule, observing the lumen of the cyst, finding the pedicle, and resecting the pedicle firmly into the joint capsule. We examined the new method comparing with ordinary resection.

Patients and methos: The subjects were 49 patients who underwent surgery at our hospital from 2014 to 2021 and were pathologically diagnosed as ganglion. Among them, 47 cases excluding arthroscopic surgery were included. There were 20 male and 27 female patients, the average age at the time of surgery was 52.2 years, and the average follow-up period was 6.6 months.

The all operations were performed by a single expert hand surgeon. Explaining the intracystic surgery method, it involves incising the superficial membrane of the ganglion and observing the lumen of the cyst, finding the pedicle, and resecting the pedicle firmly into the joint capsule. The surgery was completed with the ganglion body left in the wound without being removed.

35 cases in which the area around the ganglion was dissected using standard surgical techniques and total excision was performed (TE group), and 12 cases in which only the pedicle was excised by entering from the ganglion cyst cavity under direct vision (IE group)

We examined the site of occurrence, surgical time, amount of intraoperative blood loss, postoperative paralysis, and postoperative local recurrence. A t-test/Fisher's exact test was used for the test, and a p value of 0.05 or less was considered significant.

Result: Total excision group (TE 35 cases): The affected areas were fingers in 20 cases, wrist to palm in 11 cases, elbow to forearm in 3 cases, and shoulder joint in 1 case. Intracystic excision group (IE 12 cases): The affected areas were fingers in 6 cases, wrist to palm in 5 cases, elbow to forearm in 1 case. The average operative time was 24.7 minutes in the TE group and 15.7 minutes in the IE group($p=0.211$). There were 3 cases of postoperative local recurrence in the TE group. There were no recurrences in the IE group($p=0.404$).

Conclusion: Ganglions are usually treated with total resection. The local recurrence rate when total resection is performed is reported 10% to 40%. It has been reported. Conventional total resection provides a sufficient field of view and makes it easy to find the pedicle, but it is necessary to fully expand the area around the tumor. On the other hand, the intracystic resection method is a simple procedure, and we believe that this method is particularly effective when there are nerves and blood vessels around the tumor.

A-0305 EARLY SOLEUS TO DEEP PERONEAL NERVE TRANSFER IS ASSOCIATED WITH FAVORABLE OUTCOMES IN DEEP PERONEAL NERVE TRAUMATIC INJURY

Madi El-Haj, Safran Ori, Sofia Vorobeitchik, Tal Eliav, Beyth Shaul
Hadassah Hebrew University Medical Center, Jerusalem, Israel

Introduction: Injury to Deep Peroneal Nerve (DPN) results in loss of ankle dorsiflexion and drop foot. Traumatic knee dislocation, iatrogenic high sciatic nerve injury, nerve tumor are among the different mechanisms of DPN injuries. DPN nerve grafting yields poor results, recovering the native dorsiflexor muscles yields the best functional outcomes, while tendon transfer remains the salvage procedure.
Aim: The purpose of our case series to emphasize the need for early aggressive treatment of complete DPN axonal injury.
Material & Methods: we retrospectively reviewed the medical records of 5 consecutive patients treated with Tibial (Soleus /lateral Gastrocnemius) to Deep Peroneal Nerve Transfer. Pre- and postoperative the ankle dorsiflexion strength was evaluated using British Medical Research Council grading system. Patients ages, mechanism of injury, time elapsed between the injury and surgical intervention, pre- and post-operative outcomes are summarized in (Table -1)
Results: The mean age of the patients was 14.8 (3-24) years and duration of injury to surgery and follow-up was 6.8 (4-11) and 25.4 (15-36) months, respectively. At the end of the follow-up, ankle dorsiflexion force was M5 in 1 patient, 4/5 in 2 patients, 2/5 in one and 0/5 in one patient in whom nerve transfer was delayed 11 months post injury (Table1).
Conclusions: In the presence of definite evidence of complete deep peroneal nerve axonal injury, earlier Nerve transfer of soleus nerve to deep peroneal nerve prior to 6 months post injury, yields successful results and avoids irreversible muscle atrophy. Soleus nerve branch is superior donor than LGS nerve branch.

A-0306 TRAPEZIUS ELBOW FLEXO-PLASTY: A NOVEL TECHNIQUE TO RESTORE SHOULDER AND ELBOW FUNCTION IN LATE PREGANGLIONIC PAN PLEXUS INJURIES

Khalid Masood, Shoaib Javed, Hafsa Ahmed, Anam Zafar, Rabia Masood, Usman Arshad
Hand & Upper Limb Surgery Center CMH Lahore, HESS (Hand, Elbow, Shoulder Solutions) Center Farooq Hospital Lahore, Pakistan

Introduction: Late preganglionic pan plexus injuries always present with flaccid nonfunctional limb leaving no other option except free functional muscle transfers, arthrodesis, prosthetic limb or amputation. All have their own pros and cons. We have experienced a novel technique of transferring the Trapezius to the biceps with the additional attachment of Facia Lata with quite satisfactory outcome.
Aim: The objective of this study is to share our experience of single muscle transfer to achieve abduction at shoulder and flexion at elbow for flail upper limb in late pan plexus injuries (C5-T1 roots avulsion) when options are negligible.
Material & Methods: We managed 42 cases of pre-ganglionic pan plexus injuries during last 4.5 years. Mean duration of presentation was 3.5 years after injury. All patients were having flail limb with zero power of all muscles of upper limb including latissimus dorsi and pectoralis major. Mean age of the patients was 32 years including 3 females. Minimum age was 14 years. We lifted upper and middle parts of trapezius muscle from its site of insertion and transferred to the Biceps tendon with the help of intervening Tensor Facia Lata graft. In addition, Levator Scapulae was transferred to the Supraspinatus. An improvised splint was applied to keep the shoulder and elbow at 90 degree for 04-6 weeks. Assisted movements followed by active physiotherapy was started at 06 weeks.
Results: Maximum range of movements was achieved within 6-9 months. 39 (91%) patients showed improvement. On the basis of achieved movements and muscle strength 11 patients showed very good, 19 good, 06 fair results while 04

patients showed poor results those were improved by adjusting tension in secondary procedure. 03 patients didn't show any improvement. On average, 62 degrees of abduction at shoulder and 68 degrees of flexion at elbow was achieved with mean <_ M3 power by 12 months. Additional procedures were performed at wrist and fingers as per patient's need. Conclusions: Trapezius transfer with the help of Tensor Fascia Lata graft to the Biceps tendon is a useful option to achieve reasonable movements at shoulder and elbow in patients presented with late pan-plexus injuries with flail upper extremity.

A-0307 FUNCTIONAL OUTCOME OF DISTAL NERVE TRANSFERS FOR HIGH MIXED PERIPHERAL NERVE INJURIES

khalid Masood, Shoaib Javed, Hafsa Ahmed, Rabia Masood, Anam Zafar, Usman Arshad
Hand & Upper Limb Surgery Center Lahore, HESS (Hand Elbow Shoulder Solutions) Center Farooq Hospital Lahore, Pakistan

Introduction: Primary repair of a high peripheral nerve injury results in a uniformly poor outcome as a result of the great distance between the site of injury and the innervated muscles. Distal nerve transfers are one of many options available to the hand surgeons caring for these patients, those are further squeezed in case of mixed nerve injuries.
Aim: to evaluate functional outcome of distal nerve transfers in mixed peripheral nerve injuries at high level in addition to primary repair.
Material & Methods: Prospective study of 5 year conducted at HULS department, CMH Lahore from 2016 to 2021 with follow up period of 3 years. Total number of 14 patients with high mixed nerve injuries with different combinations were treated with distal nerve transfers in addition to primary neurorrhaphy.
Results: This resulted in timely return of function to the extrinsic and intrinsic muscles of the hand within a year those were documented further by electromyography. Sensations were also improved measured by fine touch, pain and 2 points discrimination tests.
Conclusions: Distal nerve transfers for the treatment of high mixed nerve injuries is a much better approach than the traditional primary neurorrhaphy only that that results in reinnervation period and allows quick recovery which is critical to the function of the hand.

A-0308 INTRAARTICULAR OSTEOID OSTEOMA OF THE HAND

Aleix Sala Pujals, Enric Dominguez Font, Daniel Valverde Vilamala, Jan Martinez Lozano
Hospital del Mar, Barcelona, Spain

Introduction: Osteoid osteoma (OO) is the third most common benign bone tumour. The main location of this tumour is in long bones, mainly in the proximal metaphysis of the tibia or in the femoral neck. However, its occurrence in the hand is very rare and poses a diagnostic and therapeutic challenge.
Aim: The aim of this case is to illustrate the diagnostic process and to share the therapeutic decisions of a rare lesion.
Material & Methods: A 52-year-old female patient presents to the emergency department after a fall with a bicycle. She was diagnosed with a fracture of the distal radius and treated with volar plate osteosynthesis using a modified Henry approach. Postoperatively, the patient complained of pain on the dorsum of the hand, mainly in the radial aspect, extending towards the first and second fingers, predominantly at night, forcing the patient to take painkillers daily, which improved the symptoms. During follow-up, the radius fracture shows correct consolidation and diagnoses compatible with the clinical picture such as rhizarthrosis or carpal tunnel syndrome are ruled out. The radius plate is removed without clinical improvement, so an MRI scan is requested. The main finding is an intra-articular lesion at the base of the second metacarpal

with a large perilesional bone oedema which, by means of gammagraphy, osteomyelitis is ruled out. Thanks to the tomography scan images, it is classified as an intra-articular osteoid osteoma as the nidus is surrounded by a hypointense halo. The time of the diagnostic process is 28 months.
Surgical intervention is performed using a dorsal approach to the capo-metacarpal joint of the second finger and curettage was performed under radiographic control and filling of the cavity defect with cancellous allograft.
Postoperatively, a compressive bandage was applied until the stitches were removed, with free mobility from the first postoperative day.
Results: At 6 months follow-up, the pain had completely disappeared. There was no alteration in hand mobility or stiffness and no nerve deficits. Pathological anatomy confirmed the diagnosis of osteoid osteoma and successive followup radiographs showed no residual alteration.
Conclusions: Due to their low frequency and non-specific clinical features, osteoid osteomas in the hand pose a challenge to the orthopaedic surgeon leading to diagnostic delay. The surgical approach is safe, effective and shows a good functional outcome.

A-0309 ARTHROSCOPIC RESECTION OF DORSAL AND VOLAR GANGLIONS OF THE WRIST

Aleix Sala Pujals, Daniel Valverde Vilamala, Jan Martinez Lozano, Enric Dominguez Font
Hospital del Mar, Barcelona, Spain

Introduction: Wrist ganglions are benign tumours that can disappear spontaneously, so conservative treatment is the best primary treatment. If they are symptomatic, arthroscopic resection is a simple and minimally invasive technique that avoids the complications of open surgery and allows the diagnosis of associated intra-articular lesions. The risk of recurrence appears similar to that of open surgery.
Aim: The aim of the work is to show the results of our series of patients who underwent arthroscopic surgery for volar or dorsal lymph nodes between 2019 and 2022.
Material & Methods: All patients who underwent arthroscopic resection of volar or dorsal ganglions between 2019 and 2022 were included. The intervention was performed under regional anaesthesia with ischemia of the limb. In all cases, the midcarpal and radiocarpal joints were reviewed to define the origin of the ganglion and the associated lesions. The total ischemia time was also noted.
Patients were seen two weeks, one month and six months after surgery. The variables studied were recurrence, postoperative complications, the need for rehabilitation and time off work for patients who were active.
Results: A total of 45 patients (8 men and 37 women) with a mean age of 36 years (16-67) were treated. 94% of the patients were right-handed, with the right wrist being affected in 65% of the cases. In 37 cases the ganglion was dorsal in origin (63% from the midcarpal and 37% from the radiocarpal) and in 8 it was dorsal. The mean ischemia time was 36 minutes. In two cases (4.4%) there was a recurrence of the dorsal ganglion at 28 and 120 days. Neither of the two patients wanted to undergo reoperation.
The most frequent complication was stiffness one month after surgery, which was observed in 8% of patients, who required rehabilitative treatment. At 6 months all patients had complete joint balance. No other complications were recorded.
All active patients returned to work with an average of 21 days after surgery.
Conclusions: Arthroscopic resection of volar and dorsal wrist ganglion is a simple, effective technique with a low complication rate that allows early return to work. The recurrence rate in our series was 4%.

A-0310 END-TO-LATERAL ANTERIOR INTEROSSEOUS NERVE TO ULNAR MOTOR NERVE TRANSFER FOR HIGH ULNAR NERVE INJURIES

Aleix Sala Pujals, Daniel Valverde Vilamala, Jan Martinez Lozano, Enric Dominguez Font
Hospital del Mar, Barcelona, Spain

Introduction: High ulnar nerve injuries have exceptionally poor outcomes particularly because the motor endplates irreversibly degenerate before the regenerated ulnar nerve axons can reinnervate the intrinsic hand muscles. To reduce reinnervation time of the intrinsic motor endplates, an end-to-lateral transfer of the anterior interosseous nerve to the ulnar motor nerve has been proposed.
Aim: The objective is to present two clinical cases with severe neuropathy of the ulnar nerve at the elbow in which this surgical technique was performed
Material & Methods: The first patient was a 24-year-old man who attended outpatient clinics presenting with severe cubital tunnel syndrome confirmed by electromyography associated with atrophy of the intrinsic muscles of the right hand. He had had a prolonged admission to the ICU five months before because of an attempted suicide. A double-level release of the ulnar nerve was performed (cubital tunnel and Guyon canal) and a transfer of the anterior interosseous nerve to the motor branch of the ulnar nerve.
The second patient was a 29-year-old man who came to the clinic presenting with hypoesthesia of the 4th and 5th fingers of the right hand and atrophy of the interosseous muscles of 4 months' duration with no known triggering history. The electromyogrphy showed severe partial axonotmesis of the ulnar nerve, so the same treatment was performed.
Results: Six months after surgery, both patients showed complete recovery of the interosseous muscles and sensitivity of the ulnar territory of the hand.
Control electromyography confirmed the profuse reinnervation of musculature dependent on the ulnar nerve in the hand.
Conclusions: End-to-lateral anterior interosseous nerve to ulnar motor nerve transfer is a successful procedure with low morbidity, which can restore intrinsic function in patients with proximal nerve injuries.

A-0311 ANALYSIS OF FUNCTIONAL REGENERATION IN A RAT MODEL OF MEDIAN NERVE INJURY AND REPAIR - EVALUATION OF MECHANICAL ALLODYNIA, GRIP STRENGTH AND GAIT BEHAVIOR

Jana Ritter[1], Cosima Prahm[1], Manuela Büttcher[1,2], Thomas Wuttke[3,4], Adrien Daigeler[1], Johannes Heinzel[1,5,6], Jonas Kolbenschlag[1]
[1]Department of Hand-, Plastic, Reconstructive and Burn Surgery, BG Klinik Tuebingen, Eberhard Karls University Tuebingen, Tuebingen, Germany; [2]Facility for Animal Welfare, Veterinary Service and Laboratory Animal Science, Eberhard Karls University Tuebingen, Tuebingen, Germany; [3]Department of Neurology and Epileptology, Hertie Institute for Clinical Brain Research, University of Tuebingen, Tuebingen, Germany; [4]Department of Neurosurgery, University of Tuebingen, Tuebingen, Germany; [5]Ludwig Boltzmann Institute for Traumatology - The research center in cooperation with AUVA, Vienna, Austria; [6]Austrian Cluster for Tissue Regeneration, Vienna, Austria

Introduction: Despite extensive scientific efforts, functional deficits after nerve injuries pose a major clinical problem, severely affecting the respective patients' quality of life. This highlights the importance of the implementation of reproducible methods allowing valid and comprehensive quantification of functional recovery in preclinical research. In the evaluation of sensory recovery after nerve injury, a response to tactile stimulation can erroneously be allocated to regeneration of the injured nerve, disregarding the process of collateral spouting of adjacent uninjured nerves into the denervated skin. In the rat sciatic nerve model a significant influence of collateral sprouting of intact nerves on the

development of neuropathic pain could already be revealed.
Aim: Our project aimed to analyze and correlate sensory and motor recovery and investigate the contribution of collateral nerve sprouting in a rat model of median nerve injury and repair.
Material & Methods: Male Wistar rats (n=10) underwent transection (Neurotmesis) and immediate reconstruction of the median nerve with epineurial end-to end sutures in one forelimb. In the contralateral forelimb, 15mm of the median nerve were resected and the nerve stumps were coaptated to surrounding muscles to prevent regeneration. For 12 weeks after surgery, mechanical allodynia, grip strength and gait behavior were assessed weekly by means of the Von Frey Test, the Grasping Test and the CatWalk gait analysis system. To analyze the effects of collateral sprouting, Von Frey Monofilaments were applied to predefined test areas considering the sensory innervation of the forepaws: Medial and lateral areas selectively innervated by the median and ulnar nerve and the central area non-selectively innervated by both nerves.
Results: Already one week postoperatively, early mechanical allodynia was evident in the areas of the forepaw selectively innervated by the ulnar nerve and the overlapping area innervated by the median and ulnar nerves. Subsequently, mechanical allodynia developed in the areas of the paw innervated by the median nerve. This was associated with a significant decrease in grip strength and Print Area. From week 6, mechanical allodynia increased in the median nerve innervated territory, which was associated with regeneration of grip strength and Print Area. Mechanical allodynia persisted in all areas of the forepaws until week 12. The results of the functional tests correlated significantly and revealed a marked effect of nerve reconstruction on functional outcome.
Conclusions: Collateral sprouting of adjacent uninjured nerves and regeneration of the injured nerve contribute differently to sensory reinnervation and development od neuropathic pain after nerve injury. The use of distinct functional tests to evaluate both, motor and sensory recovery provides profound insights into the interaction of these processes and adds to the understanding of the development and maintenance of neuropathic pain.

A-0312 CLINICAL AND ULTRASOUND EVALUATION AFTER PERIPHERAL NERVE REPAIR WITH CHITOSAN NEUROTUBE REAXON NERVE GUIDE

Joanna Kot, Robert Rokicki
University Teaching Hospital Military Medical Academy, Łódź, Poland

Introduction: peripheralnerve injuries with substance loss are challenge because direct repair may result in malfunction due to nerve suture tension. Autologous nerve grafts ale alternative, but have its disadvantages. Synthetic substitutes are options to bridge the gap and assist nerve regeneration, but the literaturę lacks studies to evaluate their results.
Aim: As a case series this research will add some information about treatment prognosis and results to be expected.
Material & Methods: This research was designed to clinically evaluate patients undergoing repair of peripheral nerve in hand area after trauma or due to tumor treatment. We describe results of 15 case series, where chitosan neurotube Reaxon by Keri Medical was used. Subjective and objective clinical evaluations with monofilament testing nad 2-point discrimination will be rated, ultrasound imaging and nerve conduction test will be performed and registered.
Results: to be shown on FESSH Congress.
Conclusions: to be shown on FESSH Congress.

A-0313 MADUROMYCOSIS IN THE HAND: A RARE CASE

Vwrene Chia, Azrul Rashid, Zareze Abd Rahman, Sung Siang Mooi, Jeremy Silvanathan
Hand and Microsurgery Unit, Department of Orthopaedics, Kuala Lumpur Hospital, Kuala Lumpur, Malaysia

Introduction: Maduromycosis, is a chronic granulomatous infection caused by true fungi, or higher bacteria. The affected region is usually associated with trauma, resultingin the inoculation of the causative agent into the tissues. The foot most commonly infected, due to walking barefoot, followed by the hands, and rarely, the head, trunk or back. Patients typically present with a painless, progressively enlarging mass, with discharge containing granules.

Case Report: A 70 year-old gentleman, presented with complaints left thumb swelling for 3 years. He is a worker in a palm oil plantation. He was unsuccessfully treated with multiple courses of antibiotics due to presence of purulent discharge from the lesion, and was referred to our centre for further workup.

Upon physical examination, a non-tender, firm lesion measuring 3x3cm was noted over the dorso-radial border of his left thumb, with multiple healed puncti over its surface. There was no obvious discharge. The lesion was unaffected by thumb flexion and extension, nor was it pulsatile.

Plain radiographs revealed no bony involvment. MRI demonstrated a well-defined lobulated lesion partially encasing the proximal phalanx of the thumb, measuring 2.3x4.1x3.2cm, with enhancing internal septations and cystic components within. There was no tendinous involvment. A Tru-cut biopsy and subsequent histopathological examination revealed fibrocollagenous tissue with multiple areas of neutrophilic abscess walled by granulation tissue with basophilic filamentous intertwined aggregates of a gram positive organism, suggestive of a mycetoma.

The lesion was excised under an elective list. The main lesion, along with several smaller lesions, were excised from the thumb. Incision into the excised lesion revealed a greyish-gelatinous interior, with black granules scattered within. The resulting tissue defect was addressed with a reverse radial forearm flap.

Discussion: The first reported case of mycetoma was by Carter in 1861 in Madurai, India, and was aptly named Madura's foot. It is a chronic, progressively destructive infection of the tissues. It may be caused by bacterial, or fungal infections. More than 70 different causative bacteria or fungi have currently been identified. Males working as agriculturalists, labourers and herdsmen, living in tropical or subtropical environments are susceptible to infection. Infection occurs through a skin breach, with resulting inoculation of the causative agent into the tissues. The foot is the most commonly infected region, attributed to walking barefoot, followed by the hands, and rarely the thighs, head, neck and back. McElroy et al described 3 cardinal features associated with maduromycosis, namely tumefaction, formation of sinus tracts, and presence of grains in affected tissue. Due to its painless nature, slow progression and lack of awareness regarding the disease, patients generally present late to the appropriate diagnostic centre, and some may ultimately require amputation as form as treatment, due to extensive infection and limb deformity.

Conclusion: Though uncommonly occuring in the upper limbs, clinicians should have high awareness regarding the possibility of maduromycosis infection, especially in environments where the condition is considered to be endemic. Timely diagnosis and adequate treatment of the condition will reduce the morbidity that the condition brings to the patient.

A-0314 ARTHROSCOPIC PROXIMAL TRAPEZIOTRAPEZOID RESECTION FOR STT OSTEOARTHRITIS – 2 CASE SERIES AND VIDEO TECHNIQUE

Alexei Buruian[1,2], Filipa Santos Silva[2]
[1]Hospital Distrital da Figueira da Foz, Figueira da Foz, Portugal; [2]Hospital CUF Descobertas, Lisbon, Portugal

Introduction: Isolated scaphotrapeziotrapezoid (STT) osteoarthritis is a common wrist disorder, with radiographic prevalence of 2-15%. Arthroscopic treatment consists most frequently in the resection of the distal pole of the scaphoid, which may result in carpal instability. To overcome these limitations, proximal trapezium and trapezoid resection arthroplasty technique (STT/RA) has been developed.
Aim: Two case series report with functional outcomes and surgical video technique.
Material & Methods: In August 2023, two patients, with isolated STT osteoarthritis were submitted to STT/RA. Patient A was a 58-year-old male and patient B was a 60-year-old female.
Results: At 3-month follow-up, during maximum effort, patient A presented a VAS score of 1 (7 preop), QuickDash (QD) 11,4 and patient B VAS 5 (10 preop), QD 37.5, both with full painless wrist motion during rest. Intraoperative video technique and 6-month follow-up with clinical images and functional scores will be shown at the Congress.
Conclusions: Proximal trapezium and trapezoid resection arthroplasty technique provides good pain relief and functional outcomes in patients with isolated scaphotrapeziotrapezoid osteoarthritis.

A-0315 ARTHROSCOPIC DORSAL SCAPHOLUNATE (SL) CAPSULO-LIGAMENTOUS REPAIR AND DORSAL RADIOCARPAL (DRC) LIGAMENT ANCHOR REINSERTION FOR FLOATING LUNATE

Alexei Buruian[1,2], Filipa Santos Silva[2]
[1]Hospital Distrital da Figueira da Foz, Figueira da Foz, Portugal; [2]Hospital CUF Descobertas, Lisbon, Portugal

Introduction: In 2009, Badia described the "floating lunate," a severe ligamentous injury caused by complete tears of the scapholunate (SL) and lunotriquetral (LT) ligaments, in which the lunate bone floats into a neutral position.
Aim: Case report and video technique presentation.
Material & Methods: A woman in her 50s presented with dorsal right wrist pain after a fall nine months prior. She had a positive Watson sign, with painful unilateral crepitation. MRI suggested a dorsal scapholunate (SL) injury, with no distal intercarpal (DISI) or volar intercarpal instability (VISI) deformity. Arthroscopic inspection of the midcarpal joint revealed a Grade II (Geissler) SL tear, mostly on the volar side, and a Grade III (Geissler) LT tear, mostly on the dorsal side, with articular incongruency. Careful lunate probing revealed marked instability with a positive rocking chair sign, typical of a floating lunate injury. Because both the SL and LT tears were partial and on the weakest portion of the ligaments, we inferred that an additional extrinsic ligamentous tear must have occurred. Judging by the capsular detachment from the triquetral bone and the relative dorsal subluxation of the triquetral relative to the lunate, we inferred that a dorsal radiocarpal (DRC) ligament avulsion off the triquetral bone was most likely. We performed an arthroscopic dorsal capsulo-ligamentous repair for the SL injury as described by Mathoulin. For the DRC avulsion lesion, we reduced the LT interval arthroscopically and reinserted the ligaments on the triquetrum bone using an anchor. Afterwards, the LT spaced closed and no additional intervention for this ligament was deemed necessary. The wrist was immobilized in a dorsal splint for five weeks.
Results: At 9-month follow-up, the patient had no pain at rest, occasional pain during effort, 80 degrees of wrist flexion and extension, 24 kg grip strength in the right wrist (30 kg in the left), and a QuickDASH score of 36.4. The intraoperative

video technique and clinical images will be presented at the Congress.
Conclusions: Extrinsic ligamentous injury should be highly suspected in cases of marked carpal instability.

A-0316 A COMPARISON OF NONOPERATIVE TREATMENT OF FULL-THICKNESS THUMB ULNAR COLLATERAL LIGAMENT TEARS VS. MINIMALLY DISPLACED AVULSION FRACTURES

Ingmar Legerstee[1,2,3], Kevin Kooi[1,4], Yannick Hoftiezer[1,5], Sarah Lipson[1,6], Rob Nelissen[2], Kyle Eberlin[1,6], Neal Chen[1,6]
[1]Massachusetts General Hospital, Boston, Massachusetts; [2]Leiden University Medical Center, Leiden, the Netherlands; [3]Erasmus Medical Center, Rotterdam, the Netherlands; [4]Amsterdam UMC, Amsterdam, The Netherlands; [5]Radboud University Medical Center, Nijmegen, The Netherlands; [6]Harvard Medical School, Boston, Massachusetts

Introduction: There is debate regarding nonoperative versus acute surgical treatment of complete thumb ulnar collateral ligament (UCL) tears without Stener lesions and UCL avulsion fractures.
Aim: The aim of this study was to compare the success rate of nonoperative treatment of full-thickness tears versus minimally displaced avulsion fractures of the thumb UCL.
Material & Methods: Six urban hospital databases in a single city in the United States were queried for patients with full-thickness thumb UCL tears or minimally displaced avulsion fractures (≤ 2 mm) who underwent nonoperative treatment for a minimum of 4 weeks between January 2004 and December 2021. Nonoperative treatment was considered successful if patients had a stable thumb metacarpophalangeal joint and no indication for surgery after the immobilization period. Fisher's exact test was performed to compare the treatment success rates between full-thickness tears and avulsion fracture injuries.
Results: Fifty-seven out of 60 (95%) patients with a minimally displaced fracture and 16 out of 21 patients (76%) with a full-thickness tear had successful nonoperative treatment. The success rate in the minimally displaced fracture group was significantly higher than in the full-thickness tear group (p-value 0.03).
Conclusions: Nonoperative treatment of minimally displaced UCL avulsion fractures may be more successful than prior reports in literature. Although the nonoperative treatment success rate was higher in the minimally displaced fracture group, a near 3/4 success rate in patients with full-thickness tears without Stener lesions is reasonably high.
Level of Evidence: III (Therapeutic)

A-0317 METACARPAL HEAD ROUNDNESS OF THUMB ULNAR COLLATERAL LIGAMENT RUPTURE PATIENTS VS. HEALTHY CONTROLS

Ingmar Legerstee[1,2], Liliane Freundt[1], Jayanth Pratap[1,3], Jonathan Lans[1,4], Abhiram Bhashyam[1,4], Neal Chen[1,4]
[1]Massachusetts General Hospital, Boston, Massachusetts; [2]Erasmus Medical Center, Rotterdam, the Netherlands; [3]Harvard University, Boston, Massachusetts; [4]Harvard Medical School, Boston, Massachusetts

Introduction: Authors have suggested that a flat metacarpal head of the thumb might be more prone to ligamentous injuries due to its small range of motion. Understanding the relationship between metacarpal head morphology and ulnar collateral ligament (UCL) ruptures may be beneficial in establishing the probability of this diagnosis prior to ordering advanced imaging modalities.
Aim: This study aimed to compare the roundness of the thumb metacarpal head in individuals with a UCL rupture to the roundness in patients without thumb pathology on radiographs.
Material & Methods: Six urban hospital databases in a single city in the United States were searched between January 2004

and December 2021 to find patients with a thumb UCL rupture and patients without thumb pathology on radiographs. To analyze the roundness of the metacarpal head, the distance (A) from the ulnar to the radial edge of the articular surface was divided by the radius (r) of the circle that fits through the surface of the metacarpal head on an anterior-posterior hand radiograph. The mean A/r ratio of the metacarpal head in thumb UCL rupture patients was compared to that in healthy control patients using an unpaired student's t-test.
Results: The A/r (roundness) ratios ranged between 0.47 and 1.95 across all 182 patients in the dataset. The mean roundness for healthy control patients ($n = 100$) was 1.125 ± 0.025 (mean $\pm$ standard error of the mean). The mean roundness for UCL rupture patients ($n = 82$) was 1.164 ± 0.029. An unpaired Student's t-test showed no significant difference in means ($p = 0.485$).
Conclusions: We found no difference in metacarpal head roundness between patients with a full-thickness thumb UCL tear compared to healthy control patients. This suggests a small range of motion of the metacarpophalangeal joint of the thumb does not raise the probability of sustaining a thumb UCL full-thickness tear in the case of trauma.
Level of Evidence: III (Diagnostic)

A-0318 COMPLICATIONS AND UNPLANNED REOPERATION AFTER THUMB METACARPOPHALANGEAL ARTHRODESIS

Ingmar Legerstee[1,2], Oscar Shen[1], Kevin Kooi[1,3], Yannick Hoftiezer[1,4], Kyle Eberlin[1,5], Neal Chen[1,5]
[1]Massachusetts General Hospital, Boston, Massachusetts; [2]Erasmus Medical Center, Rotterdam, the Netherlands; [3]Amsterdam UMC, Amsterdam, The Netherlands; [4]Radboud University Medical Center, Nijmegen, The Netherlands; [5]Harvard Medical School, Boston, Massachusetts

Introduction: Arthrodesis of the metacarpophalangeal (MP) joint of the thumb is a common procedure to treat patients with arthritis or instability. Studies reporting hardware complications and nonunion rates after thumb MP joint arthrodesis report on small sample sizes.
Aim: We aimed to describe the hardware complication rate, the nonunion rate, and the number of thumbs that achieve union among patients undergoing thumb MP joint arthrodesis.
Material & Methods: A database spanning five urban hospitals in a single metropolitan region in the United States was searched for patients who underwent thumb MP joint arthrodesis between January 1, 2004, and January 1, 2020. After reviewing patient records, we identified 122 thumbs that underwent MP joint arthrodesis and had a minimum follow-up of 90 days. The primary outcome was unplanned reoperation after hardware complications and nonunion. Secondly, the number of thumbs that achieved radiographic union was reported for the tension band and screw fixation arthrodesis group.
Results: Twenty-two out of 122 thumbs (18%) had hardware complications after thumb MP joint arthrodesis and 11 out of 122 thumbs (9%) developed a nonunion. Patients who underwent screw fixation arthrodesis had no events of hardware complications and subsequent hardware removal. The nonunion rate was 9/65 (14%) in the tension band arthrodesis group and 2/45 (4%) in the screw fixation arthrodesis group. Of the thumbs that had available radiographs to assess the healing of the arthrodesis, 34/42 (81%) were radiographically united in the tension band arthrodesis group and 29/32 (91%) in the screw fixation group.
Conclusions: Our data suggests that screw fixation has fewer hardware complications and a lower reoperation rate than tension band arthrodesis.
Level of Evidence: Prognosis IV

A-0319 CLINICAL OUTCOMES AFTER PRIMARY REPAIR FOR THUMB ULNAR COLLATERAL LIGAMENT TEARS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Ingmar Legerstee[1,2], Bas Derksen[1], Mark van der Oest[1,3], Caroline Hundepool[1,3], Liron Duraku[1,3], Ruud Selles[1,3], Michiel Zuidam[1,3]

[1]Erasmus Medical Center, Rotterdam, the Netherlands; [2]Massachusetts General Hospital, Boston, Massachusetts; [3]Xpert Clinics, Amsterdam, the Netherlands

Introduction: There is currently no consensus on the best surgical technique for treating thumb ulnar collateral ligament (UCL) ruptures.

Aim: This systematic review and meta-analysis investigates which primary repair technique and postoperative immobilization protocol result in the best clinical outcomes.

Material & Methods: A literature search was conducted in Embase, Medline ALL Ovid, Web of Science Core Selection, and Cochrane Central Register of Controlled Trials. Studies describing clinical outcomes of thumb UCL repair were eligible. Pain, stability, tip pinch strength, key pinch strength, grip strength, return to work, and metacarpophalangeal joint range of motion were collected as postoperative outcomes.

Results: Thirty studies were included. All surgical techniques resulted in satisfactory clinical outcomes, with no significant differences between bone anchor reinsertion, suture fixation, K-wire fixation, and a combination of techniques. K-wire immobilization did not result in better clinical outcomes than immobilization without K-wire.

Conclusions: In conclusion, clinical outcomes after thumb UCL repair are excellent with no differences in clinical outcomes between surgical techniques.

A-0320 PATIENT-REPORTED AND CLINICAL OUTCOMES AFTER TENDON AUTOGRAFT RECONSTRUCTION OF THE THUMB ULNAR COLLATERAL LIGAMENT

Ingmar Legerstee[1,2], Mark van der Oest[1], Sebastiaan Souer[3], Caroline Hundepool[1], Liron Duraku[4], Ruud Selles[1], Michiel Zuidam[1]

[1]Erasmus Medical Center, Rotterdam, the Netherlands; [2]Massachusetts General Hospital, Boston, Massachusetts; [3]Xpert Clinics, Amsterdam, the Netherlands; [4]Amsterdam UMC, Amsterdam, The Netherlands

Introduction: Prospectively collected patient-reported outcomes after reconstruction of the ulnar collateral ligament (UCL) of the thumb have been scarcely reported.

Aim: This study aimed to report clinical and prospectively collected patient-reported outcomes after thumb UCL reconstruction with a free tendon autograft. Furthermore, the patient-reported outcomes of patients with persistent instability after reconstruction and patients with concomitant MP joint arthritis diagnosed during surgery were analyzed.

Material & Methods: Patients undergoing reconstruction with a tendon autograft were included between December 2011 and February 2021. Patients filled out the Michigan Hand Outcomes Questionnaire (MHQ), and the results at baseline were compared to those at 3 and 12 months after surgery. Stability was tested at three months after surgery. Tip and key pinch strength and MP joint range of motion were measured at baseline and 12 months after surgery.

Results: We included 31 patients with thumb UCL insufficiency or failed UCL surgery who underwent reconstruction with a free tendon graft. The MHQ Total Score improved significantly from 62 (IQR 42 – 70) at baseline to 75 (IQR 66 – 83, p-value 0.005) at 3 months and continued to increase to 84 (IQR 74 - 92, p-value 0.04) at 12 months after surgery. Furthermore, the median MHQ Function and Pain Scores improved significantly from intake to 3 and 12 months after surgery. Twenty-six of 31 patients (84%) retrieved postoperative metacarpophalangeal stability. Key pinch strength

improved significantly 12 months after surgery from 5.2 kg (SD 2.5) at baseline to 6.4 kg (SD 2.4) at 12 months (p-value 0.046). The MHQ Total, Pain, and Function Scores of patients with persistent instability remained similar from baseline to 12 months after surgery. In four patients with metacarpophalangeal arthritis, the MHQ Total and Pain Score improved significantly from baseline to 3 and 12 months after surgery.
Conclusions: Patient-reported outcomes, including pain and function, improved after thumb UCL reconstruction with a tendon autograft. Although the sample size of patients with thumb MP arthritis diagnosed during surgery was small, they reached adequate patient-reported outcomes at 12 months after surgery.
Level of Evidence: III (Therapeutic)

A-0321 RADIOLOGIC FINDINGS IN PMRI AND THEIR APPLICATION TO THE SURGICAL TREATMENT

In Hyeok Rhyou, Ji-Ho Lee, Kee Baek Ahn, Jung Hyun Lee, Min Ho Lee
Department of Orthopaedic Surgery, Upper Extremity and Microsurgery Center, Pohang SM Christianity Hospital, Pohang, South Korea

Introduction: In the case of PMRI, early diagnosis and appropriate treatment are being emphasized as traumatic arthritis can occur at a relatively early stage if appropriate treatment is not given early, but there are still various opinions on appropriate treatment, all of which rely on experience and lack validity against theoretical background.
Aim: We would like to analyze more objective radiological findings based on biomechanical studies to suggest appropriate treatment strategies.
Material & Methods: Of the 61 cases that visited our center with PMRI, 58 cases with 3D-CT and MRI (1.5T or higher) were included in the study. We investigated 1) the size and location of AMCF, 2) the degree of LCLC tear and displacement, 3) the UCL tear and location, and 4) Instability of the ulno-humeral joint (UHJ) and radio-capitellar joint (RCJ) at the angle of the elbow joint at the time of CT and MRI scans, which are known to be associated with elbow instability.
AMCF displacement of more than 6 mm, LCLC displacement of more than 3 mm, and UCL tears with flexor muscle injury were considered candidates for surgical treatment or immobilization, O'Driscoll type was divided into 1-1 (G1), 1-2 (G2), 1-3 (G3).
Results: There were 8, 41, and 9 cases of G1, 2, and 3, respectively, with G2 being the most common. 1)The size of AMCF was 3, 7, and 10mm in G1,2,3, respectively; 2) LCLC complete rupture were 100%, 85%, and 56% in G1.2,3, with 88%, 59%, and 33% of cases requiring surgical repair for displacement of more than 3mm; 3) UCL rupture was 25%, 30%, and 78% in G1,2,3, with 63%, 54%, and 22% of cases with only posterior partial rupture, and no cases with complete flexor rupture. 4) The degree of instability of the UHJ and RCJ in the CT and MRI imaging angles were as follows: for G1,2,3, CT was taken at an average of 63°,70°,57°, unstable UHJ was 100%, 78%,78%, and unstable RCJ was 25%,17%,11%, and MRI at 25°, 25°, and 30° on average, with unstable UHJ was 75%, 70%,100%, and unstable RCJ was 63%,76%,67%. From G1 to G2 and G3, there was a trend towards larger AMCFs, more complete UCL tears and fewer LCLC injuries requiring surgical repair.
Conclusions: In order to achieve stability of the elbow joint, LCLC repair on the lateral side in G1 and AMCF fixation with UCL repair on the medial side in G3 are necessary, and G2 shows intermediate features between G1 and G3, and it is thought that a decision on whether to approach the contralateral side after medial or lateral approach is necessary.

A-0322 EFFORTS OF AN ORTHOPEDIC SURGEON WITH SYMBRACHYDACTYLY TYPE 2

Tatsuki Kobayashi[1], Yusuke Matsuura[1], Takahiro Yamazaki[1], Tomoyo Akasaka[1], Aya Kanazuka[1], Takane Suzuki[1], Kazuki Kuniyoshi[2], Seiji Ohtori[1]
[1]Graduate School of Medicine, Chiba University, Chiba, Japan; [2]Sereno Orthopedic Clinic, Kashiwa, Japan

This report discusses the efforts of an orthopedic surgeon with left symbrachydactyly type 2. The case is a 33-year-old male. At birth, the index, middle, and ring fingers of his left hand were completely missing, while the thumb row was relatively preserved. However, only a short fifth metacarpal remained for the little finger row. At the age of 3, he underwent bone lengthening surgery using a ring fixator, and at 5, osteotomy of the thumb and little finger metacarpals was performed. He is able to perform a pinch grip with the proximal part of his fingers and is independent in daily activities. As an orthopedic surgeon, the problems he faced were: (1) the lack of steel instruments that could be handled with the left hand, difficulty in grasping tweezers, and challenges in performing techniques such as suturing; (2) the absence of gloves that fit the shape of his left hand, making manipulation difficult. Therefore, our department created a custom-made pair of tweezers and gloves. For the custom-made tweezers, five prototypes and adjustments were made over a year to complete them. A ring for gripping was attached, and because the abductor muscles of the thumb and little finger were stronger than the adductors, the tweezers were designed to pinch when the fingers were abducted. They were used in actual surgeries and underwent adjustments, such as length modification. For the custom-made gloves, it took two and a half years from the decision to use them until actual application. 3D CT and plaster casts were used to create molds for production. So far, he has performed surgery in 444 cases without any problems with the custom-made tweezers and gloves, cooperating with assistant physicians and nurses. We are currently working on creating micro-tweezers for surgical use in hand surgery and on producing additional sterilized gloves. This initiative could serve as a reference for children and families with similar congenital anomalies, helping them consider disabilities and future prospects.

A-0323 HAND THERAPY EXPERIENCE AFTER THE MAJOR 2023 EARTHQUAKE IN TÜRKIYE

Zeynep Emir[1], Öznur Güney[2], Kadir Çevik[3]
[1]Gazi University Faculty of Health Sciences, Ankara, Türkiye; [2]Gazi University Institute of Health Sciences, Ankara, Türkiye; [3]Başakşehir Çam ve Sakura City Hospital, İstanbul, Türkiye

On 6 February 2023, at 04:17, a Mw 7.8 earthquake struck southeastern Türkiye, followed by a Mw 7.7 earthquake at 13:24 on the same day. There was widespread damage and tens of thousands of fatalities. In this study, we would like to present our hand therapy experience at a single hand surgeon outpatient clinic in Ankara after this disaster. This experience is limited as Ankara is not located in the disaster region. However, it would be valuable as no evidence specific to hand therapy after major earthquakes is available.

From February to June, we saw 24 victims in our clinic. They were between 5 and 63 years old.

Sixteen patients were female (%67). All the patients had at least one surgery on the upper extremity.

Compartment syndrome and related fasciotomy, crush injury, amputation, and fractures were among the most common diagnoses. We could see the first victims after 18 days; due to the delay, all the patients had stiff metacarpophalangeal joints and web space contractures. All of them needed splints to correct the deformities. Edema control, wound care, and appropriate extremity positioning were the first-line treatments in hand therapy, followed by passive/active assistive/active exercises.

Glenohumeral and scapular mobilizations were performed to enhance lymphatic drainage. Electrical stimulation of the

denervated and weak muscles was also considered for indicated patients. After a few months, pre-operative therapy for the upcoming reconstructive procedures like free flaps for wrist and finger flexion restoration were planned. However, in the mid-term, we could follow up only a few patients due to several factors.
There were several limitations in the follow-up of the victims. Firstly, most of the patients were transferred by ambulance to Ankara, and they had no relatives or friends as they were also injured or died in the disaster. Therefore, patients could not comply with the treatment well and depended only on self-interventions as they needed help with the exercises. The second barrier in the follow-up was that most of them moved to their relatives' homes in other cities after discharge from the hospital as their house was damaged. These barriers resulted in incompliance with the follow-up visits. The other most limiting factor was the victims' communication problems. Post-traumatic stress disorder affected each victim, and it was a severe problem that limited the efficacy of the treatment as most of them were unwilling to contribute to the hand therapy program.
Hand therapy is not a life-saving treatment. Thus, we could see the victims after several weeks with various surgical and systemic interventions. The victims had multi-system injuries, including musculoskeletal problems. However, life-threatening problems like crush syndrome were in the first line of the treatment. Therefore, treatments for upper extremity injuries like fractures or nerve injuries were delayed for a while. We wished to see patients earlier -even in the intensive care units- for appropriate positioning of the upper extremity, especially the hand, to prevent potential deformities and stiffness.

A-0324 COLD INTOLERANCE SYMPTOM SEVERITY (CISS-ARM) SCALE. ARMENIAN TRANSLATION, INTERCULTURAL CORRESPONDENCE AND APPROVAL

Gayane A. Mkhitaryan[1,2], Haykanush V. Stepanyan[2], Zakar S. Khojabaghyan[1], Artavazd B. Sahakyan[1], David O. Abrahamyan[3], Armine Chopikyan[4]
[1]Yerevan N 1st University Hospital Complex after Mkhitar Heratsi, Yerevan, Armenia; [2]NewMed Medical Center, Yerevan, Armenia; [3]National Institute of Health named after Academician S. Avdalbekyan, Yerevan, Armenia; [4]Yerevan State Medical University after Mkhitar Heratsi, Yerevan, Armenia

Introduction: Cold intolerance is a pathological pain of the hand or fingers in cold conditions, which may be combined with discoloration, numbness, weakness. It is a common problem among people with hand injuries and diseases. The most common of the questionnaires used to assess cold intolerance acquired due to upper extremity injuries and illnesses is the Cold Intolerance Symptom Severity Questionnaire (CISS).
Aim: The aim of the research is the Armenian translation of the CISS scale and intercultural adaptation for Armenian-speaking patients with upper extremity injuries/diseases and for professional circles.
Material & Methods: All five internationally accepted stages of the translation and intercultural adaptation process have been preserved. For clinical trial, 43 patients (M/ W: 35/8, average age: 39.9 years [14:74]) suffering with the upper extremity injuries or pathologies filled in the Armenian version of the QuickDASH and CISS (CISS-Arm2) scale. Statistical calculations were performed using the Statistical Package for the Social Sciences version 23.0 using accepted biostatistical methods. The correlation between the questionnaire scores was checked by calculating the Spearman coefficient. The Cronbach alpha(α) was determined to assess the internal consistency, reliability and structural verification of the CISS-Arm scale.
Results: 74.4% of the 43 patients surveyed had symptoms of cold intolerance in the postoperative period (CISS>0). 53.1% (n = 17) of them showed pain, skin discoloration with a bluish tinge 43.8% (n = 14), which in the majority of respondents (n = 23) passed in a few minutes in hot conditions. The largest share of the answers suggests that the cold weather is the

main provocative mechanism in the manifestation of symptoms of cold intolerance. For CISS-Arm it was 24.26 [0: 86], and for QuickDASH the average value is 14.01 [0:75] out of a possible 100 points. The obtained high index (Cronbach's alpha = 0.901) testifies to the structural verification and reliability of the CISS-Arm.
Conclusions: The high index obtained for CISS-Arm indicates the high reliability of the scale, and statistically reliable positive correlation of QuickDASH's and CISS-ARM's medium-strength (rS = 0.473, p = 0.001) indicates that the mentioned questionnaires don't replace, but complement each other and assist to evaluate effectiveness of treatment.

A-0325 EFFECTS OF SODIUM-HYALURONATE ON FLEXOR TENDON HEALING

Alexandra Titova, Ivan Dovgalevich, Alexey Volotovskiy
Belarusian State Medical University, Minsk, Belarus

Introduction: The long-term outcomes of the treatment of zone II flexor tendon injuries often remain unsatisfactory. Adhesion to the walls of the bony-fibrous canal and fibrous changes are the most common causes of problems with finger flexor tendon sutures.
Aim: To improve the results of finger flexor tendon repair
Material & Methods: This study was designed to evaluate the effects of Sodium-Hyaluronate (NaH) on full thickness tendon rupture in the early phase of healing in rats. The experiment was performed on the Achilles tendon of Wistar rats on the basis of the university laboratory.
Twelve white Wistar mature male rats were randomly divided into three equal groups of achilles tendon injured. The model of the experiment: after full thickness tendon perpendicular transection and surgical repair, using modified Tsuge technique, the injured legs sutured without casting for 6 weeks. In the first group, there was no pharmacological effect on the damaged area. In the second group Sodium-Hyaluronate 10 mg/1ml was injected intraoperatively in suture zone and peritendinously.
In the third group photoinduced Sodium-Hyaluronate 10 mg/1ml was injected intraoperatively in suture zone and peritendinously.
The rats were euthanized on the 40th day and the tendons were assessed for macroscopic, histopathologic analysis.
Results: Macroscopically, the first group showed pronounced adhesion of the suture zone to the surrounding tissues and pronounced fibrosis of the injured Achilles tendon. In the second and third groups, adhesion was significantly lower, a tendon-like tissue was formed in suture zone. By the 42nd day, histology specimens of rats in a control group demonstrated granulation tissue characterized by the presence of a large number of capillaries and numerous fibroblasts with thin collagen fiber bundles. There was a significant growth of granulation tissue and formation of connective tissue adhesions between the tendon and the surrounding tissues. In the second group, longitudinally directed collagen fibers were formed in the injured area with numerous tenoblast clusters between them. Moderate signs of adhesion were detected. In the third group, significant tendon regeneration was observed. In the injured area, mostly longitudinally directed collagenous fibers with an uneven density of cellular elements were formed. A significant number of capillaries were found in some locations.
Conclusions: Treatment of NaH has been shown to be effective in restoring the morphological and biomechanical properties of lacerated tendons of rats and may be valuable in the clinical trial studies.

A-0326 SURGICAL RECONSTRUCTION IN ULNAR LONGITUDINAL DEFICIENCY

Werner Girsch[1], Tanja Kraus[2], Martin Svehlik[2]
[1]Department of Plastic, Aesthetic and Reconstructive Surgery, Clinic of Surgery, Medical University Graz, Austria; [2]Department of Pediatric Orthopedia, Clinic of Orthopedic and Trauma, Medical University Graz, Austria

Introduction: Ulnar longitudinal deficiency (ULD1-4 according to Bayne) represents one of the most severe but rare congenital deformity (Prevalence >1/1 000 000 births), presenting high variances concerning forearm and hand.
Aim: Our study is focused on surgical interventions to elbow and forearm, not the deformities of the hand.
Material & Methods: We report 7 healthy patients, presenting ULD as an isolated congenital malformation of one upper extremity. 3 patients exhibiting grade 2B, 1 with grade 3A (with proximal ulna), 1 with grade 3B (without ulna) and 2 patient with grade 4.
6 patients underwent surgery, in 1 patient (grade 3B) surgery is under discussion. All surgically treated patient had removed their "ulnar anlage". In 4 patients (ULD2 and 3A) a "single bone formation" was constructed at an age of 3, 3, 4 and 14 years of age. The proximal ulna was fused with the distal radius 2x in a single stage procedure, 2x after distalisation of the radius with Ilizarov device. 2 patients with ULD 4 received a correction osteotomia at the level of their humeroradial synostosis to reposition the forearm into a functionally useful posture.
Results: All surgeries were performed without complications. In all surgically treated children we achieved stable skeletal conditions at elbow and forearm with the hand positioned in neutral wrist posture in front of the body. They all show good integration of the extremity into the body schema by regular use in ADLs.
Conclusions: „Leave them as they are – they do astonishing well". We do not consider this phrase to represent the optimal treatment strategy in UDL. Resection of the "ulna anlage" and reconstruction of a hand-grip-function, if necessary and possible are well accepted. Moreover a recommendation could consist of "single-bone-formation" for ULD2 and 3A and humeroradial fusion in physiologic position of the forearm for ULD4. In fact each of these deformities requires exact evaluation and an individualized treatment concept. Surgical interventions should be performed at an early age to obtain optimal integration of the extremity into the body schema and to achieve optimal functionality for the childs upper extremity function.

A-0327 UPPER LIMB AMPUTATIONS. A CLINICAL CASE

Ana M. Far-Riera[1], Jose M. Rapariz Gonzalez[1], Carlos Perez-Uribarri[2]
[1]Hospital Universitari Son Llatzer, Palma de Mallorca, Spain; [2]Hospital Universitario Cruces, Bilbao, Spain

Introduction: While the amputation of a digit is more common, major upper extremity amputations comprise up to a quarter of all amputations. This percentage has increased from previous estimates due to improved trauma and critical care medicine, which preserves the lives of severely injured patients. The incidence is likely to rise further due to an aging population with higher comorbidity rates, including diabetes and vascular disease.
The effects of upper extremity amputation are significant, greatly impacting the quality of life. Despite decades of research and clinical experience, controversy persists regarding the ideal level of amputation in patients requiring hand removal. If the residual limb preserves the distal radioulnar joint (DRUJ), the patient will maintain good pronation and supination. However, additional length in a wrist disarticulation creates a limb-length discrepancy with the uninvolved side when a prosthesis is worn. A myoelectric terminal device may add several centimeters, posing aesthetic concerns and making it more difficult for a patient to reach the anatomical midline. Consequently, patients with wrist disarticulations are more

likely to abandon their prostheses than those with transradial amputations. Amputation 8 to 10 cm proximal to the ulnar styloid provides the greatest variety of prosthetic options for functional restoration of the extremity, preserving an adequate arc of pronation and supination and a reasonable lever arm for elbow flexion.
Clinical Case: We present the case of a 46-year-old female patient with AML, who underwent prolonged hospitalization due to chemotherapy. She developed nosocomial pneumonia (Pseudomonas Aeruginosa) evolving into septic shock while in the ICU. Necrosis in acral parts of both upper and lower limbs occurred due to treatment with noradrenaline and argipressin.
Discussion: Both upper extremities were amputated: a disarticulation at the wrist on the right side and a transradial amputation on the left side. Skin incisions followed a "fish-mouth" pattern, with osteotomies on the left side lying 1 to 2 cm proximal to the skin incision. The radial and ulnar arteries were ligated, interosseous vessels cauterized, and musculature divided. Osteotomies were made with an oscillating saw, and myodesis was completed to the bone with deep musculature. Superficial musculature was sutured in agonist/antagonist pairing to recreate physiologic tension. This tension aims to maximize postoperative contractions for eventual control of a myoelectric prosthesis. The wound was closed in layers, and a bulky compressive dressing was applied.
Conclusion: The technical principles of upper extremity amputations remain constant, irrespective of surgery indication or amputation level:

- Durable coverage of the residual limb for long-term prosthetic use
- Preservation of functional length
- Prevention of symptomatic neuromas
- Prevention of adjacent joint contractures
- Early prosthetic fitting ("golden period")

A-0329 COMPLEX REGIONAL PAIN SYNDROME: EVALUATION OF TREATMENT WITH PERIPHERAL NERVE STIMULATION

Maximilian Girsch, Christian Smolle, Werner Girsch
Department of Plastic, Aesthetic and Reconstructive Surgery, Clinic of Surgery, University Clinic Graz, Austria

Introduction: Treatment of complex regional pain syndrome (CRPS) has been proven to be a difficult and complex task as many conventional therapy options fail to produce acceptable results. Peripheral nerve stimulation (PNS) as the ultima ration has been evaluated in the past and proven to be an effective tool in regard of pain re-duction.
Aim: This prospective study aims to evaluate PNS further in regard of pain reduction, functionality and quality of life (QoL).
Material & Methods: Between 2021 and 2023 ten patients suffering from CRPS were treated with a PNS system as ultima ratio. The patients were assessed regarding their pain scores, health related quality of life (HRQoL) and functionality of the affected ex-tremity pre and post intervention on four different points of time. Patient satisfac-tion was evaluated after the 6 month follow up. The collected data was analyzed via IBM SPSS, where the median values were compared to each other from a test phase up to a 6 month follow up and were tested for significance.
Results: A satisfying pain reduction was reached for every patient in rest and for 71,42% of the patients in motion. Significant pain reduction was observed right after the test phase. No significant difference in HRQoL and functionality parameters pre inter-ventional and at the end of the 6 month follow up were found but Descriptive anal-ysis showed a mediocre increase of physical health. Patient satisfaction with PNS treatment showed positive results as 85,71% patients would undergo treatment with PNS again.
Conclusions: PNS treatment is safe and should serve as ultima ratio for patients with conven-tional therapy resistant CRPS. This study shows that PNS reduces pain scores significantly while failing to produce a harmful or negative effect

on the treated extremity. PNS treatment is a very individual option and may not fit for every pa-tient. A strict indication alongside an obligatory test phase is necessary.

A-0330 RECONSTRUCTION OF A METACARPAL BONE BY ILIAC CREST BONE GRAFT AFTER SHRAPNEL INJURY

Gayane A. Mkhitaryan[1,2], Artavazd B. Sahakyan[1], Makar M. Davtyan[1], Svetlana A. Avagyan[3]
[1]Yerevan N 1st University Hospital Complex after Mkhitar Heratsi, Yerevan, Armenia; [2]NewMed Medical Center, Yerevan, Armenia; [3]MEDinES Clinic, Yerevan, Armenia

Introduction: There is a rapid increase in the frequency of encountering shrapnel injuries alongside with the increase in the frequency of regional conflicts. Around 400 patients with shrapnel injuries of upper limb were admitted in our Department of Plastic and Reconstructive Surgery at Yerevan N 1st University Hospital Complex after Mkhitar Heratsi, during the second was in the Nagorno-Karabakh region.
Predominantly, shrapnel injuries tend to develop soft-tissue and bone defects and very often are accompanied by infections (e.g. gas gangrene, necrotizing fasciitis, osteomyelitis, etc.).
Aim: Our primary goal for this particular case is to prevent the development of complications in the early period and on later stages reconstruct the bone defect with the most suitable method.
Material & Methods: A 29 y. o. police officer on the 4th of October, 2020 was admitted to the emergency department with multiple shrapnel injuries in the region of the head, face, right shoulder, right and left hands, thorax and both lower limbs. After a thorough examination, X-ray radiographs demonstrate fractures of the right clavicle, multi-fragmentary fractures of the 2nd and 3rd metacarpal bones of the right hand, presence of metal splinter in the shaft of the 2nd metacarpal bone. After primary surgical treatment of wounds and removal of the splinter from the 2nd metacarpal bone (approximately 2.5x2.0cm), a large bone defect was formed. The bone fragments of the 2nd and 3rd metacarpal bones were stabilized by K-wires for prevention of movements.
On the 20th of December, 2020 the reconstruction of the 2nd metacarpal bone defect (4cm in length, 1cm in width) by Iliac crest bone autologous graft was performed. Secondary stabilization of the 3rd and 2nd metacarpal bones were done after bone fragments and graft repositioning, respectively.
Discussion: In the described case, counting the type of trauma, accompanying injuries, the patient's exhausted state and high risk of infection was decided to postpone secondary reconstruction for 2 months. The available options for secondary reconstruction were either alloplastic or autologous bone grafts. Despite all the well-known advantages of allografts, the complete resorption of some components of the latter made us to abandon this opinion and take into account autogenic bone graft as a first-choice option. Our priority of choosing iliac crest bone graft was based on complexity of surgical intervention, less traumatization to the donor area and the reduced risk of postoperative complications.
Conclusions: Based on the data observation of our clinic during the period of 27.09.2020-27.09.2022, nearly 58.3% (n=35) of patients with bone defects, had undergone iliac crest bone graft replacement surgery. The postoperative radiographs and follow-up demonstrate satisfactory functional and aesthetic results. The patient is able to perform full range of movements, skin color is normal, sensational findings are within normal range, he has fully returned to his daily routine and is satisfied with the outcome.

A-0331 EXTENSOR INDICES TRANSPOSITION AFTER PEDIATRIC RUPTURE OF THE EXTENSOR POLLICIS LONGUS TENDON – GIVE IT A LIKE!

Richard-Tobias Moeller, Martin Mentzel, Simon Bauknecht
Department of Orthopedic Trauma, Ulm University Medical Center, Ulm, Germany

Introduction: Forearm fractures are among the most common fractures in pediatric patients. If surgical stabilization is required, it is achieved using percutaneously inserted Kirschner wires or elastic stabile intramedullary nails (ESIN). A rare but typical perioperative complication is injury to the extensor pollicis longus (EPL) tendon. Suturing of the EPL tendon is rarely possible due to the existing defect, so that, analogous to adults, either interposition of a tendon graft or transposition of the extensor indicis (EI) tendon is required to reconstruct the function of the EPL tendon.
Aim: A long-term follow-up examination determines the effects in children and adolescents after reconstruction of the EPL tendon with transposition of the EI tendon following EPL rupture caused by surgically treated forearm fracture.
Material & Methods: Over a period of 15 years (2007 – 2021), 22 children up to the age of 16 were treated with EI transposition analogous to adult care. 15 patients (six girls, 9 boys) with an average age of 10,9 years (±3,9; 5-16) could be followed up for an average of 66,5 months (±37,7; 12-134) after transposition of the EI tendon. The range of motion of the finger joints, retropulsion of the index finger and thumb as well as abduction and opposition of the thumb were examined. In addition, hand span and strength in the gross, key, and point grasp were measured. The results were compared with the unaffected opposite side. Subjective complaints were questioned, and the DASH score was assessed.
Results: Rupture of the EPL tendon is a rare complication, accounting for 1 % of all surgically treated pediatric forearm fractures. Significant differences were found in reduced mobility of the metacarpophalangeal joint of the thumb (56.3°; ±14.8; 30-50; 85%, p=0.006), isolated extension of the index finger (6 cm; ±0.8; 5-7; 93.4%; p=0.037), a reduced span between the thumb and index finger in palmar abduction (15.3 cm; ±2.0; 11.5 – 18.5; 96.6%; p=0.03), and reduced strength in the pointed grip (4.7 kg; ±1.7; 2.0-7.5; 86.7%; p=0.009). The DASH score was 2.8 points (±5.5; 0-21). Subjectively, the differences between the sides of the body were not noticed by the patients and their parents in everyday life.
Conclusions: Transposition of the EI tendon for reconstruction of a ruptured EPL tendon as a rare complication after pediatric forearm fracture does lead to a measurable and significant reduction in index finger and thumb mobility on the affected side in the long term, but without subjective limitations of the children.

A-0332 A MACHINE LEARNING-BASED APPROACH FOR PREDICTING CLINICAL IMPROVEMENT AFTER SURGICAL TREATMENT OF IDIOPATHIC CUBITAL TUNNEL SYNDROME

Jun-Hyuk Lim, Myung-Sun Kim
Chonnam National University Hospital, Gwangju, South Korea

Introduction: Cubital tunnel syndrome (CuTS) describes dysfunction of the ulnar nerve in the region of the elbow. It is the second most common compression neuropathy in the upper extremity. There are several risk factors associated with the development of cubital tunnel syndrome. Electrodiagnostic studies are used as information to suggest diagnostic criteria or predict prognosis.
Aim: The purpose of this study is to analyze various factors related to the outcome of idiopathic cubital tunnel syndrome and to predict patient-specific postoperative prognosis through machine learning algorithms.
Material & Methods: We performed a retrospective analysis on 332 patients who underwent anterior transposition of ulnar nerve for ulnar neuropathy at the elbow level between 2005 and 2021. Patients with concomitant peripheral neuropathy,

cervical radiculopathy, diabetic neuropathy, elbow OA, previous elbow trauma, and surgery were excluded. The study was conducted on 110 patients (119 elbows) after further excluding patients with difficult-to-evaluate medical records or less than 1 year of follow-up. Gender, BMI, smoking history, occupational history, and medical comorbidities were obtained from medical records. The patient's occupational coefficient was categorized into nine levels using the British Standard Occupational Classification, and the elbow carrying angle was measured for evaluation of elbow alignment through elbow anterior to posterior (AP) view. Final follow-up outcomes were assessed using modified McGowan's classification for preoperative scoring and Messina's criteria for postoperative scoring. Univariate and multivariate analyses were performed on 17 variables, including EMG data, which could potentially impact the outcome of idiopathic cubital tunnel syndrome. We defined groups with excellent and good scoring as good outcome, and groups with fair and poor scoring as bad outcome, to create a binary classification model based on Messina's criteria. Six machine learning algorithms (Extremely randomized tree, XGBoost, multilayer perception, support vector machine, elastic-net, and random forest) were trained using ten-fold cross-validation.

Results: 110 patients (119 elbows) with idiopathic cubital tunnel syndrome who underwent anterior transposition of ulnar nerve were included in this study. Among 119 elbows, 68 elbows had good outcomes and 51 elbow had bad outcomes. Among the 17 variables, preoperative scoring and abductor digiti minimi (ADM) motor amplitude measured at wrist level showed statistically significant results in univariate and multivariate analyses. The AUC value was 0.928. The Extremely Randomized Tree (ET) model demonstrated the best performance with AUC 0.927, F1 score 0.867 and 0.11 Brier score among 6 different machine learning algorithms. The motor amplitude at the wrist level was identified as the most important prognostic factor for the ET algorithm. Specific cut-off values were found to be a good postoperative outcome: motor amplitude (wrist) $\geq$ 6.7mV, modified McGowan's classification $\leq$ Grade 2A, motor amplitude (below elbow) $\geq$ 7.54 mV and motor amplitude (above elbow) $\geq$ 6.2 mV.

Conclusions: In conclusion, Extremely Randomized Tree (ET) machine learning algorithm is the best performance for predicting good outcome in patients with idiopathic CuTs. Using the prediction model in preoperative counselling would be a great help for decision making and expectation management of idiopathic cubital tunnel syndrome.

A-0333 THE OUTCOME OF PRIMARY TOTAL ELBOW ARTHROPLASTY FOR ACUTE DISTAL HUMERUS FRACTURE AT MID TERM FOLLOW-UP

Jun-Hyuk Lim, Myung-Sun Kim
Chonnam National University Hospital, Gwangju, South Korea

Introduction: Acute distal humerus fractures can cause severe disability and morbidity in the affected patients. Primary total elbow arthroplasty (TEA) is one of the treatment options for complex distal humerus fractures and is commonly considered for patients with poor bone quality.

Aim: Our purpose was to evaluate the mid-term outcomes of primary TEA for acute distal humerus fractures in a single institution.

Material & Methods: We retrospectively reviewed the medical records of 25 patients who underwent primary TEA for acute distal humerus fractures between January 2005 and December 2017. We excluded patients with less than five years of follow-up, a total of 13 patients (13 elbow) were included in our study group. The mean follow-up period was 6.5 years. Five patients had rheumatoid arthritis (RA). At the last follow-up, we measured the degree of pain relief, range of motion, and functional outcome. Functional outcome was assessed using the Mayo Elbow Performance Score (MEPS) and Disabilities of Arm, Shoulder and Hand score (DASH score), pain VAS and grip power was measured in both the affected

and unaffected elbow. Radiological evaluation was performed using elbow anterior to posterior and lateral views to assess implant complications such as loosening, polyethylene bushing wear and periprosthetic fracture.
Results: The results showed that primary TEA provided satisfactory pain relief and functional improvement in most patients, with a mean Mayo Elbow Performance Score of 82.3 and DASH score of 33.5. Mean visual analog scale for pain of 2.1 at the last follow-up. The mean flexion was 130 degrees and mean range of motion (ROM) was 16.5 to 130 degrees. In terms of grip strengths, patients showed greater strength in their dominant hand regardless of the surgical site. However, the overall complication rate was 69.2% (9 of 13 patients). The most common complication is bushing wear, followed by loosening, ulnar nerve symptoms and periprosthetic fracture.
Conclusions: In conclusion, primary total elbow arthroplasty is can be a favorable option for patients with distal humerus fractures for whom ORIF is not feasible. Our study demonstrated that the majority of patients experienced pain relief and improvement in functional outcomes in the mid-term. However, despite relatively good functional outcomes in the mid-term, the overall complication rate remains high.

A-0334 FLAP RECONSTRUCTION IN LIMB SURGERY: A REPORT OF 73 CASES

Amar Belkacem Djeffel[1], Yacine Talbi[2]
[1]Skikda, Algeria; [2]Algies, Algeria

Introduction: During centuries, transfer of flap was used by surgeons to cover skin substance loss; several techniques can be applied.
Aim: In light of these 73 cases, we report our experience about the repair of skin defects in upper and low limb using flaps.
Material & Methods: We reviewed 73 cases of skin defects, treated between 2004 and 2015 .There were 47 flaps applied to upper limb and 26 to low limb.
Many flaps were used, at the upper limb, there were: 13 groin flaps to cover defects involving the forearm and the hand, two forearm radial flaps to cover defects at the elbow,four distally based ulnar artery flap to coverage defects at the hand, one posterior interosseous flap, five kite flaps, seven proximally based pedicled Island flaps from the fingers and three distally based pedicled Island flaps, 12 cross-fingers flaps .
And for skin loss at the low limb we realised six gastrocnemius muscle flaps,five hemisoleus flaps, 12 neurocutaneous flaps, one flap using tibialis anterior , one flap from the extensor digitorum brevis and a latissimus dorsi flap as a free flap.
Results: The results were assess on the final aspect of skin coverage and the articular limb motion, from the 73 flaps there were some complications: necrosis of six flaps (one ulnar forearm flap,one hemisoleus flap, one gastrocnemius muscle flap , two neurocutaneous flaps and latissimus dorsi flap)and sepsis of four flaps (two groin flaps,one neurocutaneous flap and one gastrocnemius muscle flap realized for a sepsis of knee arthroplasty)
Conclusions: many techniques of flaps can be used to repair skin defects, several criteria must be considered: an urgent wound excision, a carefully planned decision to choose the appropriate flap, using an ample tissue to cover the surface comfortably and to be attached without tension.

A-0335 RESULTS AFTER SURGERY FOR HETEROTOPIC OSSIFICATION OF THE ELBOW: A REPORT OF 13 CASES

Amar Belkacem Djeffel[1], Yacine Talbi[2]
[1]Skikda, Algeria; [2]Algies, Algeria

Introduction: Heterotopic ossification of the elbow are rare, it develops in non osseous periarticular tissues and can hindering motion, the histological study of calcification denotes deposits of calcium pyrophosphates. The determination of the specific cause is difficult although heterotopic ossification occurs when one or more conditions are present.
Aim: Our purpose is to report and to evaluate our experience about surgical release for heterotopic ossification of the elbow
Material & Methods: We reviewed ten patients presenting 13 elbows with restriction of motion caused by heterotopic ossification treated between 2008 and 2016 .There were eight men and two women: six patients were managed before for a coma,three after thermal burns and iatrogenic ankylosis after surgery for sequelea of obstetrical brachial plexus for the last patient ; All the patients developed ankylosis .Medical records including radiographics with computed tomography and three dimensional reconstruction also CT angiographys were available in elbows with anterior ossification . For surgical release, the choice of the skin incisions was dictated by the location of the ossifications. All the patients had an indwelling catheter to obtain continuous analgesia in order to allow rehabilitation of the elbow at the first day after surgery.
Results: At a follow-up of 36 months, to assess the results we used video-assisted measurement of the active range of motion of the elbow and patients satisfaction: A full recovery was noted in patients who had only heterotopic ossification,the result was less good when heterotopic ossification associated burns sequelae and skin retraction or skin graft. Finally the outcome was poor in patients with spastic elbow.
Conclusions: Heterotopic ossification of the elbow develops after direct trauma, brain injury or thermal burn. Surgical release of elbow stiffness procures satisfactory functional result when there is no concomitant spasticity or burn sequelae,this factors could hamper the good progress of rehabilitation program.

A-0336 TREATMENT OF NEGLECTED PERILUNATE DISLOCATION: A REPORT OF 2 CASES

Amar Belkacem Djeffel[1], Yacine Talbi[2]
[1]Skikda, Algeria; [2]Algies, Algeria

Introduction: Perilunate dislocations are comparatively uncommon and despite the severity of the injury the diagnosis can be missed at that time.
There is no consensus as to the optimum treatment of the unrecognized perilunate dislocation.
Aim: The purpose of this study was to assess the functional outcomes of open reduction and internal fixation as a treatment of neglected perilunate dislocation.
Material & Methods: : We reviewed two patients treated for neglected perilunate dislocation who had open reduction and internal fixation in 2016 for the first patient and in 2019 for the second patient. Their respectively ages at the time of injury were 27 years and 39 years old. The delay of management was 28 days for the first patient and 32 days for the second, the diagnosis was adjusted at the consultation and both they were seen after being splinted for sprain.The type of injury was respectively: Perilunate dislocation with scaphoid fracture and Perilunate dislocations,sustained to the dominant limb. A dorsal approach was used and we also used an anterior approach for the second patient to release the median nerve because of paresthesis .after bones reduction, K wires provided fixation.
Postoperatively, wrist was immobilized in below elbow cast, the K wires and the cast were removed after eight weeks and mobilization of the wrist commenced.

Results: At a follow-up of four years for the first patient and 42 months for the second, outcome assessment included radiographs of the wrist, a video-assisted measurement of the active range of motion and the use of the clinical scoring as reported by Cooney WP (modified from Green DP and O'brien ET).
For the first patient radiographs showed midcarpal arthritis and dorsal intercalated segment instability, he reported a barometric pain with total scoring of 60/100.
No pain was noted for the second patient with volar intercalated segment instability showed by radiographs and total scoring of 75/100. Patients were satisfied with the outcome and they returned to their regular employment (driver on civil engineering and farmer)
Conclusions: The management of neglected perilunate dislocation is difficult and the maximum possible time period after injury that a neglected perilunate dislocation may be reduced is still subject to discussion.
Open reduction and internal fixation can give good functional outcome despite the unsatisfactory radiographs.

A-0337 TREATMENT OF ELBOW FLEXION CONTRACTURE IN OBSTETRIC BRACHIAL PLEXUS PALSY SEQUELAE: A CASE REPORT

Amar Belkacem Djeffel[1], Yacine Talbi[2]
[1]Skikda, Algeria; [2]Algies, Algeria

Introduction: Flexion contracture of the elbow resulting from obstetrical brachial plexus palsy
Includes loss of extension; Patients may show a significant upper limb functional impairment
Various methods have been described but there is few number of articles and the studied series are restricted
Aim: The purpose of this study was to report and to assess the surgical and functional outcomes of anterior release of the elbow with tenodesis of the biceps tendon to the brachialis
Material & Methods: patient of 15 years old, with (C5-C6) upper obstetric brachial plexus palsy and elbow flexion contractures;
The patient had active elbow flexor and extensor muscles. Preoperatively, elbow morphology was
Analyzed with X ray and three-dimensional tomography.
Loss of elbow extension measured 95 degrees and elbow flexion at 110degrees.
We performed an anterior release of the elbow with lengthening of the distal tendons of the biceps and the anterior brachialis muscle followed by tenodesis of the biceps tendon to the brachialis.
At the end of surgery, loss of elbow extension was evaluated 27 degrees and elbow flexion at 110 degrees .
Postoperatively, upper limb was splinted at maximum extension.
Outcome assessment included a video-assisted measurement of the active range of motion of the elbow, the flexion strength graded according to Medical Research Council grading system , patient self-evaluation of supination ,patient and parent's satisfaction.
Results: At follow up of 01 year, deficit in extension of the elbow accounted 35 degrees (08 degrees less than obtained at surgery) and flexion measured 110 degrees, flexion strength graded M4.
As well, supination was good in daily activities ;Parents and patient were satisfied with outcome .
Conclusions: Anterior release of the elbow with tenodesis of the biceps tendon to the brachialis is a viable option for high elbow flexion contracture in Obstetric Brachial Plexus Palsy sequelae to improve both lack of extension and esthetic aspect.

A-0338 THE POTENTIAL EFFECT OF INTRAOPERATIVE ELECTRICAL STIMULATION (SUPRA-MAXIMUM CHARGING) TO BOOST NERVE REGENERATION IN BRACHIAL PLEXUS SURGERY: A SHORT-TERM REPORT IN THREE CASES

Dina Aprilya[1], Wahyu Widodo[1,2]
[1]Fatmawati General Hospital, Jakarta, Indonesia; [2]Faculty of Medicine, Universitas Indonesia

Introduction: Chronic peripheral nerve injuries, particularly brachial plexus injuries (BPI), have devastating consequences and often result in poor functional recovery, especially in adults. Currently, the surgical treatment of chronic PNI includes end-to-end or end-to-side nerve transfer and nerve grafting. However, the nerve regeneration has a slow pace, taking weeks to months (4–9 months) until the evidence of the first flickers of contraction appears. Currently, there is growing evidence in animal models to enhance the nerve regeneration process through electrical stimulation. However, the evidence in humans has not yet been reported.
Aim: This is an early report in humans before we develop a randomized controlled trial as our next project
Material and Methods: We present three cases of brachial plexus injuries (BPI): 1. Left total type BPI, 5 months onset with a fairly good recovery of shoulder abduction and elbow flexion (M4) and weak hand function (M1); 2. Right upper type BPI, which has been recovered for the elbow flexion with weak shoulder abduction (M3) and external rotation (M1); and 3. Right total type BPI, 7 months onset with zero motoric function of the brachial plexus muscles. The nerve supramaximum charging (SMC) was given to all patients, which is described as giving 5 mA of nerve stimulation for 10 minutes per nerve, either as the primary treatment (cases 1 and 2) or as an adjunctive to the nerve transfer procedure (case 3).
Results: In the first case, the patient returned to the outpatient clinic ten days after surgery and reported a nearly normal motion with a significant increase in strength (M0 to M4). The second patient can do external rotation of the shoulder (M3) on the 6th day with increasing strength of shoulder abduction (M5). The last patient reported an increase in shoulder control for the previously flailing upper limb as early as the fourth day after surgery.
Conclusions: This is the earliest evidence of nerve regeneration enhancement using intraoperative electrical stimulation in humans that resulted in rapid nerve regeneration approximately within the first week after surgery.

A-0339 DORSAL INTERCARPAL LIGAMENT TEARS: AN ARTHROSCOPIC CLASSIFICATION AND CLINICAL OUTCOMES STUDY

Lorenzo Merlini[1]*, Sze Ryn Chung[1,2]*, Martin Caloia[3]
[1]International Wrist Center, Clinique Bizet, Paris, France; [2]Hand and Reconstructive Microsurgery, Singapore General Hospital, Singapore; [3]Division of Hand and Upper Extremity Surgery, Austral University Hospital, Buenos Aires, Argentina

Introduction: The dorsal intercarpal (DIC) ligament plays a significant role in carpal stability and is often associated with other carpal ligament injuries. Isolated DIC ligament injuries are rare and can present as a ligament avulsion, bony avulsion, or attenuation due to chronic Injury. Previously, we described the first isolated DIC ligament avulsion and proposed an arthroscopic repair technique.
Aim: We propose an arthroscopic classification and treatment algorithm for DIC ligament complex injuries, and report outcomes in a larger patient series.
Material & Methods: A retrospective review was conducted on 16 patients who had undergone arthroscopic repair of the DIC ligament from 2018 to 2022. Intraoperative arthroscopic findings were documented, leading to the proposal of a classification system for DIC ligament tears. Pre- and postoperative outcomes, including the range of motion, grip strength, visual analog scale (VAS) pain scores, and Quick Disabilities of the Arm, Shoulder, and Hand questionnaire (QuickDASH) outcomes, were assessed in this cohort.

Results: At a mean follow-up of 17.8 months, there was a statistically significant improvement in wrist flexion (65.3 to 74.3 degrees), wrist extension (77.8 to 84.5 degrees), comparative grip strength (46.4% to 87% compared to contralateral wrist), VAS score (6.3 to 0.6), and QuickDASH score (54.8 to 4.5). Four out of 16 patients (25%) had isolated DIC ligament tears, and the remaining 12 (75%) had concomitant intercarpal ligament injuries.
Conclusions: The study introduces an arthroscopic classification for the evaluation of DIC ligament complex injuries and its role in carpal stability.

A-0340 DOES PROPHYLACTIC ENDOSCOPIC CARPAL TUNNEL RELEASE DURING DISTAL RADIUS FRACTURE FIXATION IMPROVE POSTOPERATIVE FUNCTIONAL OUTCOMES? A RANDOMIZED CONTROLLED TRIAL

Panai Laohaprasitiporn, Sawitt Sirasittikarn, Niya Pimpan, Witchuree Wejjakul, Yuwarat Monteerarat
Department of Orthopaedic Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction: Distal radius fractures (DRF) often lead to prolonged soft tissue trauma around the wrist, causing increased carpal tunnel pressure and potential functional disturbances. The advantages of performing prophylactic carpal tunnel release (CTR) during DRF fixation, particularly concerning its impact on the functional outcomes of DRF patients, are still a subject of debate.
Aim: This study compares functional outcomes in DRF patients undergoing endoscopic CTR versus those without CTR, as a control group, during fracture fixation.
Methods: A double-blind, randomized controlled trial at a tertiary care hospital enrolled 60 DRF patients undergoing volar locking plate fixation. Participants were randomized and equally divided into either endoscopic CTR or control groups. Functional assessments using patient-rated wrist evaluation (PRWE), Quick Disabilities of Arm, Shoulder, and Hand (QuickDASH), pain numerical rating scale (NRS), Boston carpal tunnel questionnaire (BCTQ), grip strength, finger-to-palm (FTP) distance, and EQ5D5L were conducted at intervals up to 12 months using generalized estimating equations (GEE).
Results: Most participants were female, with median ages of 60.5 years in the endoscopic CTR group and 64.5 years in the control group. Both groups mostly sustained AO/OTA type 2R3C fractures. The endoscopic CTR group had a median operative time of 100 minutes, whereas the control group had a median operative time of 85 minutes. No statistically significant differences were observed in functional outcomes and complications between the two groups. However, upon conducting subgroup analysis, it was found that in patients with severe comminuted fractures (AO/OTA type 2R3C), the endoscopic CTR group exhibited significantly less FTP distance compared to the control group, especially during the first three months.
Conclusions: Augmenting DRF fixation with endoscopic CTR appears safe, requiring minimal additional operative time. While it potentially enhances finger motion and prevents finger stiffness in the severely comminuted fracture of the distal radius, it is worth noting that other functional outcomes may not show additional benefits.
Keywords: distal radius fracture, carpal tunnel release, functional outcomes, volar locking plate, randomized controlled trial

A-0341 RISK FACTORS FOR FAILURE AFTER TOTAL WRIST ARTHROPLASTY AND IMPLANT REVISION STRATEGY

Sandra Pfanner, Anna Rosa Rizzo, marco Biondi, Irene Felici, Andrea Poggetti
Hand Surgery and Reconstructive Microsurgery Department, AOU Careggi Florence, Italy

Introduction: To date, total wrist arthroplasty (TWA) is recognized as being effective in relieving pain and preserving movement. But as with other joints, high failure rates are reported (where failure means a new surgical step) requiring a revision or salvage procedure

Aim: We reported our experience with TWA and the outcomes of revision surgery during a period of twenty years. .The aim of this study is to evaluate the results of the total wrist prosthesis and risk factors for failure After Total Wrist Arthroplasty with specific Implant Revision Strategy .
Material & Methods: Since 2003 we performed 57prosthetic replacements of the wrist joint in 5 patients (2 bilateral). 36 patients were affected by Inflammatory arthritis, 15 postraumatic arthrosis (SLAC-SNAC) and 6 failures of previous surgery. We used a Universal 2 (25 cases), Freedom (15 cases), Remotion (16 cases, 4 of it were Hemi-arthroplasty) and 1 Midcarpal . Objective and subjective data were recorded at follow-up including standard X-rays controls, Short and long-term complications.
Results: 10 revision arthroplasties and 9 salvage procedure in 19 patients were done, 14 RA and 5 Post-traumatic. Primary indications for a repeat revision surgery were symptomatic aseptic implant loosening related to biological characteristic (AR ongoing disease), to material features and wear or component malposition (with Metallosis, Poly Debrie, Pseudotumor) and recently connected to biomechanics aspect (high interface wrist's overload and stress shielding).
Conclusions: Risk factors and implant revision strategy are discussed.

A-0342 3D SYSTEM FOREARM FRACTURE RECONSTRUCTION: A COMPLEX CASE WITH NUMEROUS POINT OF MEDITATION

sandra pfanner[1], prospero bigazzi[2], andrea poggetti[3]
Hand Surgery and Reconstructive Microsurgery Department, AOU Careggi Florence (Italy)

Introduction: The forearm is truly a component of both the wrist and the elbow with pathology in one area potentially affecting other areas as well. Diaphyseal forearm fractures in adults account for 1–2% of all fractures of the limbs. Their treatment is generally based on open osteosynthesis with plates and screws. Aseptic non-union, synostosis and malunion are the most common complications of forearm diaphyseal fractures.
Aim: IPS Gate®-KLS Martin web-based platform and app guides surgeons is an innovative system for the preoperative planning in case of malunion of the forearm and allows preoperative simulations of corrective osteotomies plus model for bone graft, the fabrication of patient-specific osteotomy guides custom-made and dimensional printed titanium plates. The mirror-model is used for a reconstruction template but in some cases it is a problem as in bilateral Forearm Complex Fractures.
Material & Methods: A 36 years old policeman had a motorcycle accident. He was treated in emergency (external fixator on the right side and K. Wires on the left side) and a month later with the definitive treatment : osteosynthesis by plate and screws. A year later he showed malunion of the radius and ulna in both forearms with, on the right side, a severe reduction of ROM near anchilosis (TAM 10°). CT was done and then IPS CT mirror -model study with a biometric model in alternative because we have both forearms malunion. A first surgery with the IPS system was performed which was fundamental for the three-dimensional spatial reconstruction of the radius but the complexity of the case also required an extensive lysis of the IOM and the release of the EDM remained incarcerated in the RUDJ. The head of the ulna was completely degenerated, so Darrak's surgery was carried out as he did not have a prosthesis of the ulna head available. Two months later the patient was reoperated with new synthesis by conventional plate for custom-plate rupture and prosthesis positioning of the ulna head, achieving complete recovery at 3 months.
Results: the evaluation takes into account the clinical outcomes and radiographic results in the preoperative phase (ankilosis and pain) , post surgery and after second surgery (complete recovery).
Conclusions: In long bones, bone healing and adequate realignment and restoration of normal anatomy are associated

with an overall positive clinical outcome. Therefore, an exact and reproducible preoperative planning and the realization of the plan in surgery are essential for this purpose. Recently for multiplanar correction of forearm malunions with restoration of ulnar variance are introduced the use of 3-dimensional technology to improve preoperative planning and develop customized cutting guides for osteotomies of the forearm bones and the 3-dimensional printed patient-specific forearm plates also in patients with both forearms compromised by biometric models. This system is essential in the forearm in all cases it is mandatory to think not only the bony part, but always remember that the forearm is a complex and composite functional unit : the "third" joint of the forearm.

A-0343 ISOLATED DISLOCATION OF THE ULNA HEAD: OUR EXPERIENCE AND ALGORITHM OF TREATMENT

Anna Rosa Rizzo, Sandra Pfanner
Hand Surgery and Reconstructive Microsurgery Department, AOU Careggi Florence, Italy

Introduction: Pure dislocation of the ulna head in the absence of associated radius fractures is very rare. In literature there is very little material on the subject, as they are mostly case reports
Aim: The purpose of this study is to report our experience on the subject by collecting the cases diagnosed and treated in a single center, proposing a classification and a algorithm of treatment
Material & Methods: From 2007 to 2019, 9 patients with ulna head dislocation were treated at our Center, aged between 20 and 58 years (average 30,6). They have been categorized according to the type of dislocation (volar or dorsal), associated injuries (pure dislocation or with fracture), and timing of presentation (acute, sub-acute, chronic dislocations). Of these, 4 dislocation were dorsal and 5 volar, 2 acute, 2 sub-acute, 5 chronic. 3 dislocations were pure (1 acute and 2 chronic), 2 with associated ulnar styloid fracture (1 acute and one sub-acute), and 4 were chronic with previous wrist fracture (fractures attributable to pediatric age). Patients underwent different procedures based on the timing of treatment: TFCC reduction and reinsertion (acute), biological ulna arthroplasty in sub-acute and chronic (Bowers resection, Wafer resection, matched ulna resection), prosthetic replacement of the ulna head in a chronic dislocation. Patients were evaluated at a mean follow-up of 7 years (range 1-13 years) from a radiographic and clinical point of view
Results: All patients significantly reduced the pain compared to preoperative (VAS scale), e they had a clear increase of the wrist range of motion and wrist function (ROM, PWRE Score and QuickDash Score, $p<0,001$ .None of the patients developed painful instability of the RUD. Based on the results and our experience, we propose a treatment algorithm for acute, sub-acute and chronic dislocation of ulnar head.
Conclusions: Early diagnosis of this injury and the right treatment are the key to long-lasting good results. The proposed algorithm may guide the Hand Surgeon for the best treatment choice.

A-0344 EARLY ACTIVE MOTION WITH A LUCERNE CAST FOR PROXIMAL PHALANX FRACTURES. A RETROSPECTIVE STUDY.

Skrallan Verhasselt, Jasper De Geyter, Nona Hacha, David Scoliers, Katrien Gevens
ZNA Jan Palfijn hospital, Merksem, Antwerp, Belgium

Introduction: Proximal phalanx (P1) fractures account for 22% of all hand fractures.
Stiffness is a well-known complication due to the immobilisation during conservative treatment and adhesions in operative cases. To overcome this complication, we need a treatment consisting of direct mobilisation and stability of the fracture.

Burkhalter and Reyes (1984) postulated that an unstable P1 fracture can be stabilized by the extensor apparatus through its ability to envelop the proximal two-thirds of the P1 when the MCP joint is in the intrinsic plus (IP) position. The act of PIP and DIP flexion in this position evokes compressive forces to the fracture encouraging healing. By respecting this principle, early active mobilisation (EAM) prevents stiffness.

Aim: To investigate the results of our conservative EAM treatment protocol for proximal phalangeal fractures. In this protocol, we utilize a Lucerne cast during four weeks after trauma with the MCP joint in IP position. This cast authorizes to flex the MCP, PIP and DIP joint.

Material & Methods: We've conducted a retrospective study of our patients treated with this protocol. The exclusion criteria included: minor patients, open fractures, concomitant lesions other than proximal phalanx fractures, concomitant pathology in the ipsi- or contralateral hand. P1 fractures with no or minimal clinical derotation nor shortening with extension lag were included. No radiographic parameter was used. All patients received a Lucerne type of cast for four weeks. In average, the protocol was started 7 days after trauma. Range of motion of the MCP, PIP and DIP joint were noted at week 0,1,4 and 8. We evaluated patient files as well as clinical and radiographical parameters during follow-up. Secondly, with a minimal follow-up of 6 months, we re-evaluated them clinically (VAS, Satisfaction, SF-36 score, PRMWHE, Return to work (RTW), Key pinch, Grip strength, TAM score, Michigan hand outcome, VAS) comparing the injured with the contralateral hand.

Results: A consecutive series of 71 patients (n=93 fractures; n=30 intra-articular; n=41 extra-articular) were included. At four weeks, the mean flexion of the MCP joint was 74.8 ° (SD 12.2), PIP 78.8 ° (SD 13.5) and DIP 54.6 ° (SD 19.6). The mean extension deficit in the PIP joint was 8.3 ° (SD 10.1). At eight weeks, the mean flexion of the MCP joint was 78.5 ° (SD 10.5), PIP 88.0 ° (SD 11.8) and DIP 62.2 ° (SD 16.4). The mean extension deficit in the PIP joint was 6.1 ° (SD 8.6). At minimal follow-up of 6 months (54 patients, 71 fractures, response rate 76%): VAS 1.0 ± 1.6; Satisfaction 86,2 ± 17.2%; SF-36 score 74.7± 14.7; PRMWHE 15.1 ± 19.1 and RTW 12 ± 16.3 weeks. In comparison with the uninjured hand: Key pinch 8.1 ± 2.8kg vs 8.6 ± 2.8kg; Grip strength 26.2 ± 15.3 vs 36.6 ± 15.1; TAM 231.6 ± 38.9° vs 254.4 ± 31.2° (TAM% 91 ± 14.4%) and Michigan hand outcome 83.3 ± 14.2 vs 92.9± 10.0.

Conclusions: Conservative treatment of extra- and intra-articular P1 fractures by EAM in a Lucerne cast is a good option with excellent results in terms of mobility, force and function.

A-0345 POSTRAUMATIC SYNOSTOSIS OF THE FOREARM

Sandra Pfanner, Prospero Bigazzi, Irene Felici, Andrea Poggetti, Anna Rosa Rizzo
Hand Surgery and Reconstructive Microsurgery Department, AOU Careggi Florence, Italy

Introduction: Synostosis between radius and ulna, resulting in fractures of the forearm and its surgical treatment, it is a rather rare occurrence that still represents a significant functional limitation for the patient due to the complete loss of pronation-supination. The cause of such an event is not known although it was observed more frequently in patients with multiple trauma with concomitant trauma to the central nervous system, burns, extensive soft tissue injury, etc ...

Aim: The aim of surgery is to remove the bony bridge and restore the correct ROM permanently in time. Currently there is no treatment surgical shared even if in the literature is shown as the interposition of an inert material reduces the possibility of the reforming of the bone bridge.

Material & Methods: 6 patients were treated for radioulnar synostosis all are males. Tha age at the time of surgical treatment was between 24 to 36 years . In all cases the bony bridge was resulting in forearm fractures surgically treated with internal fixation. The time between the surgical treatment of fractures and our surgery was from 12 months to 24 months; in all cases there were a complete loss of pronosupination both active and passive in the absence of pain.

We performed the removal of the synostosis and we wrapped the bone's shaft to prevent the recurrence of synostosis used donor's fascia lata combined with targeted medical therapy for three months and specific rehabilitation protocol.
Results: At present, with a mean follow up of 4 years , patients maintained full range of AROM and PROM in pronosupination in absence of pain or functional limitation. The pronosupination was immediately complete and excluding the first two weeks post-surgical pain in which he represented the real limit to the mobilization.
Conclusions: The formation of a radioulnar bone bridge resulting in trauma represents a strong limitation on the scope of activities by the patient. At this moment there is no agreement in the type of surgical treatment to be applied to the patient and the subsequent treatment with drugs or radiation therapy at low doses. In any case, after the removal of synostosis, the interposition of inert material is recommended by the literature to prevent its recurrence. The removal treatment synostosis and positioning of fascia lata graft from cadaver proved in our experience and in literature effective for the prevention of recurrence.

A-0346 A VIABLE ALTERNATIVE TO LOCAL FLAPS IN THE HAND? A CASE REPORT DEMONSTRATING THE SUCCESSFUL USE OF A COMPLETELY BIODEGRADABLE AND SYNTHETIC DERMAL TEMPLATE IN HAND TRAUMA

Iain Roy, Robert Manton, Samuel Coulson-Woodley, Patrick Goon
Department of Plastic Surgery, Lister Hospital, Stevenage, UK

Introduction: Soft tissue reconstruction is a common requirement in managing hand trauma, with an eclectic mixture of flaps described for when vascularised tissue is required. These techniques often utilise tissue from a neighbouring uninjured digit or other part of the hand, thereby extending the zone of injury to the hand. With the advent of synthetic dermal regeneration templates, the options for resurfacing areas of soft tissue defects have expanded, and here we report the novel use of NovoSorb® Biodegradable Temporising Matrix (NovoSorb® BTM) for a finger defect. Its principal use has been in the management of burn injuries, but there are scant reports in non-burn hand trauma defects.
Case report: The index case was a 49-year-old right-hand-dominant male construction worker who suffered an injury from a circular saw to the radial border of his right middle finger, resulting in soft tissue loss to the radial border including cortical loss from the distal phalanx and exposure of the middle phalanx, proximal interphalangeal joint and flexor tendons. The radial neurovascular bundle was non-salvageable and there was complete loss of the radial collateral ligament to the proximal interphalangeal joint. The patient refused any form of shortening or flap reconstruction, thus the decision was taken to manage the wound with NovoSorb® BTM. He returned to theatre at 48 hours for minimal debridement and NovoSorb® BTM application. Post-operatively the NovoSorb® BTM was infiltrated by vascularised tissue producing a healthy graftable bed which was split thickness skin grafted at four weeks. A subsequent graft check one week post-operatively revealed 100% take and the donor site healed as expected. Six months post injury, the digit had a full active range of movement at the MCPJ, 5-86 degrees at the PIPJ and 10-70 degrees at the DIPJ. The soft tissue was robust, soft and pliable, with durable thickness and excellent contouring even after scar maturation. The patient reported no limitations to his daily activities, returning to his full activities of daily living as well as his pre-morbid career, with a DASH score of 0.
Conclusions: Dermal regeneration templates have been widely used for wound reconstruction where split thickness skin grafts in isolation are not suitable. In this particular case, the wound precluded the use of many currently available DRTs due to exposed bone and joint surfaces, and normally would warrant flap reconstruction, patient choice notwithstanding. The patient was able to mobilise his finger and start his rehabilitation from day one following placement of NovoSorb® BTM, even before his final skin grafting. The granulation and scar tissue formed from NovoSorb® BTM has also shown to provide an adequate "pseudo collateral ligament complex" in such cases where this may be required. In addition to the

functional outcome, it also negates the additional risk to structures as would be the case in both homo- and heterodigital flap reconstruction. NovoSorb® BTM is manufactured entirely from biodegradable polyurethane and contains no biological products making it inexpensive to produce, more resistant to degradation by infection and more acceptable to those with certain cultural and ethical beliefs.

A-0347 ORTHOPLASTIC SURGERY OF THE SEVERE GUNSHOT AND BLAST INJURIES OF THE HAND

Andrey Aristov
Scientific Research Institute – Ochapovsky Regional Clinic Hospital N1 Krasnodar, Russia

Introduction: Treatment of gunshot and blast injuries of the hand is always a challenge for surgeons. It requires the staged approach from the limb salvage surgery and primary debridement to the secondary procedures, aimed to the function restoration.
Aim: To present our experience of treatment severe gunshot and blast injuries of the hand, and the mutilated hands after war traumas in the Regional Trauma and Orthopedic center.
Material & Methods: There are our series of 48 patients after gunshot and blast injuries, operated between 2015 and 2023 at the Regional Trauma center. All of them required the orthoplastic approach by the necessity of surgery over bones and soft tissues. Patients were divided in 2 groups: First – 26 patients not more than 1 month after injury. Second – 22 patients, underwent the primary surgery in another hospitals and time after injury was more than 1 month (from 2 to 6 months). Male- 45, female – 3.
For the treatment of acute injury we used the staged debridements, external fixation and NPWT. The coverage of soft tissue defects was done by regional flaps of the forearm or groin flap. In the cases with high suspicious for the inflammation and septic complications it was much safer to use the skin grafts.
The secondary surgery consisted of different stages too. Firstly, there were the scar incisions, soft tissues reconstructions, made by the posterior interosseus, radial, groin and FDMA flaps. Simultaneously we did the bone reconstructions by grafts from the illiac crest. In the case of high suspicion for the infection and inflammation we prefer to use the cement spacers. Later the Masquelet technic was used. In this stage there were joint fusions, pollicization, nerve decompressions. The next stage of secondary surgery consists of the two-stage tendonplasties and tendontransfers. The nerve reconstructions we usually did by suralis grafts.
In three patients there were the arthroplasty of MCP joints.
Results: In all patients the soft-tissue envelop has been restored. There was one case of interosseus posterior flap necrosis, which required the debridement and coverage by groin flap. Three cases of inflammation after bone grafting. Here we used the cement spacers. 26 patients were satisfied after soft tissue and bone reconstructions and refused further surgery. 22 patients passed through staged reconstructions to the acceptable function of their hands.
Conclusions: The orthoplastic surgery of severe gunshot and blast injuries of the hand is based on the staged approach for soft tissues and bones reconstruction with the priority of flaps, aimed for the salvage of limb and its function restoration. In all stages there should be high suspicion for the inflammation and septic complications.

A-0348 JOINT PROSTHESIS REPLACING JOINT FUSION: A NOVEL APPROACH FOR FAILED THUMB CARPOMETACARPAL JOINT FUSION

Naeem Yusuf, Jessica Larwood, Alethea MY Tan, Samuel G Coulson-Woodley, Patrick KY Goon
Department of Plastic Surgery, Lister Hospital, Stevenage, UK

Introduction: Osteoarthritis of the thumb CMCJ is a common disease affecting both men and women of increasing age. Quoted radiographic prevalence in age group above 55 in the general population is estimated to be as high as 35%. The clinical burden of thumb CMCJ OA is considerable. Patients often report pain associated with weakening grip strength with disease progression. In many cases, this affects personal and domestic activities of daily living and even the loss of an occupation. Several recognised techniques for the surgical management of CMCJ OA are available, with pain relief and restoration of pinch strength and range of motion being the primary goals; they include denervation, simple trapeziectomy, trapeziectomy with tendon interposition and/or ligament reconstruction, fusion with or without bone graft, and prosthesis arthroplasty. The choice of surgery should consider factors such as age, grading of arthritis, hand dominance, functional demands and previous strength. Trapeziometacarpal arthrodesis provides a valid alternative to trapeziectomies particularly in the younger patients. This method gives very good pain relief with preservation of grip and pinch strength. The final range of motion of the thumb is close to normal, despite earlier reports to the contrary. However, non-union rates are reported to be as high as 8-21%.

Case: This case involves a 38-year-old mechanic with bilateral base of thumb osteoarthritis (OA) in the carpometacarpal joints (CMCJ). Due to the patient's demanding occupation and young age, fusion was considered. The right thumb was successfully fused, but the left thumb CMCJ was complicated by a failed fusion and established non-union, and a novel solution was sought. A CMCJ joint prosthesis arthroplasty was carefully considered and performed, a procedure previously unreported for post-fusion salvage. The patient experienced lasting relief and full function, comparable to the contralateral thumb.

Conclusion: In our case, a salvage procedure in the form of a joint arthroplasty was a very reasonable solution, with the fallback of a salvage trapeziectomy should this be required. A redo fusion procedure would technically still be possible in the presence of a prosthesis but would be difficult. The patient has so far been completely satisfied with the prosthesis and currently has no issues, with comparable outcome measurements to his other thumb. To our knowledge, no prior instances have been documented in published reports that CMCJ prosthesis was used as a salvage procedure following an unsuccessful fusion attempt.1 It should be acknowledged that our investigation is bound by a relatively brief follow-up duration, although we anticipate comprehensive reporting of long-term outcomes. In summary, the adoption of the MAIATM prosthesis as a salvage strategy for cases of unsuccessful thumb CMCJ fusion presents itself as a valuable salvage alternative, even in high demand patients.

A-0349 CUSTOMIZABLE AUTOLOGOUS TISSUE ENGINEERED GRAFT FOR PHALANX CONSTRUCTION IN CHILDREN WITH SYMBRACHYDACTYLY

Adrien Moya[2], Romain Schaller[1], Robert Paillaud[2], Gangyu Zhang[2], Dirk Johannes Schaefer[1], Alexandre Kämpfen[1], Ivan Martin[2], Arnaud Scherberich[1,2]
[1]Department of Plastic, Reconstructive, Aesthetic, and Hand Surgery, University Hospital Basel, Basel, Switzerland; [2]Department of Biomedicine, University Hospital Basel, University of Basel, Basel, Switzerland

Introduction: Symbrachydactyly is a rare congenital upper limb anomaly, that occurs in 1/30,000- 1/40,000 live births resulting in children born with short boneless fingers. Nowadays, these pediatric patients are treated with phalangeal

bone transfer from the foot. However, morbidities are occurring at the donor site which result in unstable toes with significant disfigurations that worsen with the child growth.
Aim: In this project, we used adipose-derived stromal cells (ASC) from adult and pediatric donors in a developmentally-inspired strategy to engineer osteogenic grafts for phalanx reconstruction via endochondral ossification (ECO).
Material & Methods: Paediatric (age 1-4) human ASCs isolated from the stromal vascular fraction (SVF) were seeded first onto collagen sponges and exposed for one week to chondrogenic in vitro to generate individual cartilage spheres (10-30mm3). Then, the cartilage spheres are assembled together (stacked on a 27G needle) and matured for 3 weeks in vitro to generate clinically-pertinent osteogenic grafts shaped as a phalanx. Finally, the bone forming capacity of these HCTs was assessed by implantation in an ectopic immunocompromised mouse model, reflecting the clinical scenario of phalangeal soft tissue pocket, for up to 12 weeks.
Results: In vitro, we were able to generate phalanx graft in cylindrical shape of clinically relevant sizes (length ranging from 6 to 10mm width ranging from 2 to 5mm) using adult and pediatric (15- to 24-month-old) donors. The presence of large pockets of cartilage tissues within the constructs was confirmed by histology.
In vivo, after 4 weeks of implantation, we could observe early signs of endochondral ossification evidenced mineralization of the implanted cartilage tissues revealed by micro-CT with some bone remodeling. After 8 to 12 weeks of implantation, the bone remodeling was more advanced with an increase of the bone content and the presence of bone marrow pockets in the implanted constructs observed on histological sections.
Conclusions: Taken together, these results demonstrate the feasibility of an autologous approach using ASCs to generate osteogenic phalanx grafts of pertinent clinical size for children born with symbrachydactyly and allows to approach authorities to gain permission for clinical use

A-0350 DATABASE REPORTING OF HAND AND UPPER EXTREMITY SURGICAL SITE INFECTIONS: IS IT ACCURATE?

Fraser J. Leversedge, Nicholas Robbins, Sagar Shah, Jeremy Ansah-Twum, Louis W. Catalano III, Alexander Lauder
University of Colorado, Aurora, Colorado, USA

Introduction: Utilization of software and large database searches to assess surgical site infection (SSI) incidence and associated risk factors has increased; however, methodological validity and accuracy has not been assessed. Database accuracy relies on subjective reporting of complications which may not be appropriately coded in the medical record. No studies have quantified potential discrepancy between coded and treated SSI.
Aim: We hypothesized that SSI rates derived solely from coding underrepresents the actual clinical experience and may not support conclusions that presume database search accuracy. This study retrospectively evaluated the accuracy of SSI rates, comparing a database search of ICD 9/10 and CPT coding to direct, manual electronic medical record (EMR) review of documented clinically identified infections and treatment.
Material & Methods: The EMRs for all adult patients undergoing outpatient hand surgery at one institution between 2014-2019 were included to determine true infection rate compared to that documented by ICD9/10 diagnosis codes. SSI was considered a documented postoperative infection requiring medical (antibiotic) and / or surgical management within 180 days of the index procedure. True SSI was defined as a postoperative infection confirmed by manual EMR review, including its relationship to the index procedure. A coded SSI was defined as an infection with an associated SSI infection code occurring within 180 days of the index procedure. Coded SSIs were analyzed subsequently to determine true infection rate. Descriptive statistical analyses were performed.
Results: Group 1 (True SSI, control): 27/800 (3.38%) patients were identified by chart review with a true SSI, of which

none (0%) had a corresponding ICD9,10 infection code documented in the EMR. Group 2 (Coded SSI, no EMR validation): 109/3026 (3.60%) were coded as having an SSI of which only 44/3026 (1.45%) were determined to be accurate after exclusions for infection diagnoses prior to surgery or >180 days from surgery. Group 3 (Coded SSI, with EMR validation): EMR review of the 109 patients coded for infection confirmed only 37/3026 (1.22%) accuracy.
Conclusions: • Accuracy of reported SSI based on large patient database searches may be limited.
• Analyses of perioperative risk factors associated with SSI may not be valid when relying on large database searches alone.
• As database study outcomes have the potential to guide treatment protocols to mitigate SSI risk, critical outcomes analyses should be performed to validate the database findings.

A-0351 CLOSED REDUCTION OF DISTAL RADIUS FRACTURE - HOW TO REDUCE PAIN? A COMPARATIVE STUDY BETWEEN HAEMATOMA BLOCK AND HAEMATOMA BLOCK PLUS POSTERIOR INTEROSSEUS NERVE BLOCK

Sofia Madeira, Cátia Nunes, Inês Rocha, Ricardo Ferreira, Mário Tapadinhas, Marcelo Alves
Hospital Garcia de Orta, Almada, Portugal

Introduction: Fractures of the distal radius are among the most frequent pathologies in an Orthopaedics Emergency Department. If displaced, these fractures need reduction and the majority can be treated in a conservatory fashion if this is obtained. During closed reduction, pain does not let the patient collaborate appropriately and can make the reduction more difficult. In our experience, even after an haematoma block (HB), patients sometimes still report severe pain during reduction. Although being a predominantly a motor nerve, the posterior interosseous nerve (PIN) also provides important sensory fibres to the ligaments and various articulations of the wrist. The addition of the PIN block might be an option to improve the reduction of the pain during the reduction maneuver.
Aim: The main objective of this work is to compare the simple haematoma block with the addition of the posterior interosseous nerve block (HBPIN) in the reduction of distal radius fractures in terms of improving the pain during reduction.
Material & Methods: We performed a prospective longitudinal study, characterized by a consecutive series of distal radial fractures that were initially observed and immobilized in our hospital in the emergency department. This work was IRB approved and all patients signed an informed consent.
All patients went through the Manchester Triage System; all had a two-plane radiograph of the affected wrist before and after the reduction. The pain during the reduction maneuver was evaluated by the Visual Analogue Scale (VAS), by a direct question to the patient.
We used lidocaine at 2% as a local anesthetic. The patients were blinded to what type of blockage would be applied. We performed a classic haematoma block (HB) or HB plus posterior interosseous nerve block (HBPIN). Ten minutes after the administration of the local anesthetic, the reduction was performed and the forearm was immobilized with a cast. After reduction, all patients performed an x-ray in order to confirm the reduction.
All patients were then followed up and directed towards conservative or surgical treatment, according to the result of the reduction.
Results: We included 52 cases, from which 42 where females (81%). The mean age was 60 years (26 – 94 years). We treated 24 with HB and 28 with HBPIN.
In the HB group, the mean VAS during the reduction was 3,6 points (minimal 0, maximum 7) and in the HBPIN group it was 1,2 (0-4). We did not have any complications.
Conclusions: The addition of the posterior interosseous nerve block to the haematoma block was effective in the reduction of the perceived pain during the reduction maneuver in distal radius fractures.

A-0352 A COMPARISON OF PRONATOR QUADRATUS PRESERVATION AND DISSECTION APPROACHES FOR VOLAR PLATING OF COMMINUTED INTRA-ARTICULAR DISTAL RADIUS FRACTURE

Sang Ki Lee, Sang Beom Ma, Young Sun An, Won Sik Choi
Eulji University College of Medicine, Daejeon, South Korea

Introduction: Although the pronator quadratus (PQ) preservation approach for volar plating of distal radius fracture has been commonly used recently, its superiority to the conventional PQ dissection approach, especially for comminuted intra-articular distal radius fractures, has not been well established.
Aim: The purpose of this study is to assess the efficacy of PQ preservation for comminuted intra-articular fractures and to evaluate the healed PQ during hardware removal surgery.
Material & Methods: From January 2016 to March 2023, 86 patients who underwent both volar plating for AO Foundation/ Orthopedic Trauma Association (AO/OTA) classification type C2 or C3 distal radius fractures and subsequent hardware removal were assessed in this study. Radiographic measurements, clinical outcomes at each follow-up, and the integrity of healed PQ during hardware removal were compared between the PQ dissection (group D) and PQ preservation (group P) groups.
Results: Complete union with acceptable reduction on radiographic measurements was achieved in both groups. Group P showed a statistically significant earlier recovery of clinical outcomes at 2 weeks and 1 month postoperatively and improved anatomical restoration of PQ muscle covering the plate, which was identified during hardware removal surgery. Flexor tendon rupture was identified in two patients (5%) and tenosynovitis in six patients (14%) in group D; no patient had flexor tendon rupture (0%) and two patients (5%) had tenosynovitis in group P.
Conclusions: PQ preservation approach for volar plating is easily applicable and useful even for comminuted intra-articular distal radius fractures and is helpful for earlier restoration of wrist function and in preventing flexor tendon problems in the latter postoperative period.

A-0353 THE OPTIMAL DONOR SITE FROM THE FOOT AS A NON-VASCULARIZED OSTEOCHONDRAL GRAFT FOR THE RECONSTRUCTION OF LUNATE FACET DEFECTS IN DISTAL RADIUS INTRAARTICULAR FRACTURE MALUNION

Marianne Therese S. Feng[1,2], Seo-Jun Lee[2], In Chul Choi[2], Jong Woong Park[2]
[1]Department of Orthopedic Surgery, Vicente Sotto Memorial Medical Center, Cebu, The Philippines; [2]Department of Orthopedic Surgery, College of Medicine, Korea University, Seoul, South Korea

Introduction: Lunate facet defects after articular surface malunion in intraarticular fractures of the distal radius leads to irreversible posttraumatic arthritis. Very limited reconstructive strategies have been introduced to restore damaged articular surface.
Aim: This study aims to identify the optimal donor site for a non-vascularized osteochondral graft from the foot to be used to reconstruct the lunate facet defects of distal radius intraarticular fracture malunion.
Material & Methods: We measured the configuration of the articular surface of the lunate facet of the distal radius in 56 wrist computed tomography (CT) scans and the articular surfaces of the second and third metatarsals with the second and third cuneiforms respectively in 60 foot CT scans.
In wrist CT scans, the following measurements were taken: dorsal and volar width, length, and concavity of the lunate facet. For foot CT scans, the measurements included dorsal width, plantar width, concavity or convexity, inflection point, and cartilage thickness of each bone. Additionally, the location of an accessory facet in the 2nd and 3rd metatarsal was evaluated when present.

Results: The articular surface size of the 2nd and 3rd metatarsal bases measured 15mm dorsally and 13mm plantarly, with a dorsoplantar length of 22mm for the 2nd metatarsal base. The 3rd metatarsal base measured 15mm dorsally, 16mm plantarly, and 17mm dorsoplantar length. The 2nd metatarsal base exhibited concavity in 100% of cases with a concavity depth of 1.19mm. In contrast, the 3rd metatarsal base showed concavity in 21.7% of cases, with a concavity depth of 0.77mm, and convexity in 78.33% of cases, with a convexity depth of 0.86mm. 95% of the 2nd metatarsal base featured an accessory facet on its dorsal, while 90% of the 3rd metatarsal base had an accessory facet on its dorsal.
The articular surface size of 2nd and 3rd cuneiforms were 15mm dorsally, 11mm plantarly with a dorsoplantar length of 22mm for the 2nd cuneiform. The 3rd cuneiform measured 15mm dorsally, 17mm plantarly, with a dorsoplantar length of 17mm. The 2nd cuneiform exhibited convexity in all cases (100%) with a convexity depth of 1.09mm. On the other hand, the 3rd cuneiform showed concavity in 78.3% of cases, with a concavity depth of 0.84mm, and convexity in 21.7% of cases, with a convexity depth of 0.79mm. The articular cartilage thickness on the articulating surfaces between the 2nd metatarsal base and the 2nd cuneiform was 0.64mm, while the thickness between the 3rd metatarsal base and the 3rd cuneiform was 0.89mm.
The average size of the lunate facet were as follows: dorsal width of 11.4mm, volar width of 13.85mm, and a dorsovolar length of 17.4mm.
Conclusions: For the reconstruction of lunate facet articular surface defects in distal radius intraarticular malunion, the 3rd cuneiform is the optimal osteochondral graft donor from the foot site due to its more consistent concave articular surface and its size is sufficient for larger defects.

A-0354 THE EFFECT OF TWO DIFFERENT PROTOCOL IN WRIST JOINT LIMITATION AFTER DISTAL RADIUS END FRACTURES: PNF VS MULLIGAN CONCEPT: PRELIMINARY RESULTS

İrem Güney[1], Zeynep Hoşbay[2], Güzin Kaya Aytutuldu[3], Necdet Demir[4], Ömer Ayık[5], Albert Çakar[6]
[1]Biruni University, Postgraduate Education Institute, Department of Physiotherapy and Rehabilitation, İstanbul, Turkey; [2]Biruni University, Faculty of Health Sciences, Department of Physiotherapy and, Rehabilitation, İstanbul, Turkey; [3]Biruni University, Faculty of Health Sciences, Department of Physiotherapy and, Rehabilitation (English) İstanbul, Turkey; [4]Biruni University, Faculty of Medicine, Department of Orthopedics and Traumatology, İstanbul, Turkey; [5]İstanbul University, Faculty of Medicine, Department of Orthopedics and Traumatology, İstanbul, Turkey;6 İstanbul Training and Research Hospital, Department of Orthopedics and Traumatology, İstanbul, Turkey

Introduction: The wrist joint is the joint most commonly exposed to traumas. Distal radius fractures constitute approximately 20% of fracture cases presenting to the emergency department and account for 75% of all forearm fractures. In cases of distal radius fractures, the primary goals of physiotherapy are to control swelling and pain, as well as to restore normal joint range of motion to the patient
Aim: The aim of the study is to compare the effects of proprioceptive neuromuscular facilitation (PNF) based stretching and Mulligan mobilization on pain, muscle strength and functionality in patients with joint limitation after distal radius end fracture.
Material & Methods: Eighteen patients (11F,8M) have wrist joint limitation after distal radius end fracture a mean age of 49.66± 11.10/year were included in this study. Demographic and clinical characteristics were recorded. MicroFET®2 Digital Handheld Dynamometer was used to evaluate the strength of wrist flexor and extensor muscles, ulnar and radial deviation muscles, supination and pronation muscles. For the pain assessment, while the Visual Analog Scale (VAS) can be used to assess pain which perceived by patients, the pressure pain threshold in the wrist joint was evaluated with the Baseline

Dolorimeter 66 pounds. The Patient Based Wrist Evaluation (PRWE) was used to evaluate the functionality of patients. After the assessments patients are randomly divided into two treatment groups. The exercise program was performed with the same physiotherapist for 6 weeks, 2 days a week, 45 minutes for both groups. In addition to exercise program, PNF 'hold-relax' technique was applied to first group and Mulligan mobilization was applied to second group. The assessments were done after the treatment programs.
Results: The pain, muscle strength and functionality scores were similar at the baseline of the study. There were statistically significant improvements in perceived pain, pain threshold, forearm and wrist muscle strength, functionality in both groups but there were no statistically significant difference between two groups.
Conclusions: In addition to the exercise program, the PNF in hold and relax technique or the mulligan concept can be preferred and added to the treatment program to improve muscle strength, pain, or functionality.

A-0355 LOCAL PXL01 APPLICATION DECREASES INFLAMMATION WITH NO EFFECT ON AXONAL OUTGROWTH OR SCHWANN CELL RESPONSE AFTER NERVE TRANSECTION AND REPAIR IN HEALTHY RATS

Burcu Hazer Rosberg[1,2], Lena Stenberg[1], Margit Mahlapuu[3], Lars B. Dahlin[1,2,4]
[1]Department of Translational Medicine Hand Surgery, Lund University, Skåne University Hospital, Malmö, Sweden; [2]Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden; [3]Department of Chemistry & Molecular Biology, Göteborg University, Göteborg, Sweden; [4]Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden

Introduction: Outcome is still insufficient after a microsurgical repair of a peripheral nerve injury. Therefore, a pharmacological approach can be an alternative as an adjunct to surgery. PXL01 is a lactoferrin peptide that has been clinically used as an anti-adhesive treatment in flexor tendon surgery in the hand and in other conditions to prevent adhesions. In the clinical flexor tendon study, treatment with PLX01 indicated an improved outcome after repair of a concomitant repaired digital nerve injury, but the mechanisms behind the observation were not clarified
Aim: Our study focuses on axonal outgrowth, response of Schwann cells, neuroprotection and expression of macrophages after local application of PXL01 in sciatic nerve injury and repair model in healthy Wistar rats.
Material & Methods: Different treatment agents were locally applied around the nerve repair: PXL01 in carrier sodium hyaluronate (n=10), hyaluronate (n=10) or natrium chloride solution (n=10) in 0.2mL as placebo immediately after nerve transection and immediate nerve repair. After 6 days, immunohistochemical analysis was performed on the sciatic nerves, together with dorsal root ganglia (DRGs) bilaterally, evaluating axonal outgrowth (length of neurofilaments), numbers of activated (ATF3 stained) and apoptotic (cleaved caspase 3 stained) Schwann cells, numbers of pan-macrophages (hereby defined as activated) and pro-healing macrophages (CD68 and CD206, respectively) in sciatic nerve, numbers of activated sensory neurons in DRG (ATF3 stained), as well as HSP27 expression in sciatic nerves and DRGs (neuroprotection).
Results: Local PXL01 administration, but not administration of the carrier sodium hyaluronate or application of sodium chloride, decreased the number of activated macrophages (CD68-stained) in the repaired nerves without any effect on the pro-healing macrophages (CD206-stained). However, there was no difference between treatment groups with respect of axonal outgrowth, Schwann cell response, activated sensory neurons or expression of HSP27 in sciatic nerve or DRG.
Conclusions: We conclude that local application of PLX01 has an inhibitory effect on inflammation in transected and immediately repaired rat sciatic nerves without affecting nerve regeneration. We speculate that PLX01 can be used to treat "tethered/scarred" neuroma without affecting nerve regeneration mechanisms.

A-0356 THE INSIDE-OUT VOLAR MIDCARPAL DIRECT SCAPHOID (VMDSC) PORTAL FOR THE ARTHROSCOPIC TREATMENT OF THE PROXIMAL POLE OR WAIST SCAPHOID NONUNION. ANATOMICAL STUDY AND TECHNICAL RECOMMENDATIONS

Maria Larrea Zabalo[1,2], Mireia Esplugas[1], Ana Scott-Tennent[3,4], Alex Lluch[1,5], Ana Maria Carreño[1,6], Guillem Salvà[7,8], A. Rodríguez-Baeza[9]

[1]Institut Kaplan, Barcelona, Spain; [2]Mutua Universal Delfos, Barcelona, Spain; [3]Arnau de Vilanova University Hospital, Lleida, Spain; [4]Santa Maria de Lleida University Hospital, Lleida, Spain; [5]Vall d'Hebron University Hospital. Orthopaedic Hand Unit Chief, Barcelona, Spain; [6]Clínic of Barcelona University Hospital, Barcelona, Spain; [7]Son Espases University Hospital, Palma de Mallorca, Spain; [8]Ibacma, Balearic Institut of Hand Surgery, Palma de Mallorca, Spain; [9]Department of Morphological Sciences, Anatomy and Embryology Unit, Medicine Faculty, Barcelona Autonoma University, Barcelona, Spain

Introduction: This study describes how to safely establish a midcarpal volar direct fracture or nonunion scaphoid portal (DVSc), using the inside-out technique through the bone defect. For this purpose, we analyze the surrounding anatomical structures at risk. In describing this new portal, we adhered to two key principles: ensuring easy access to the volar aspect of the scaphoid fracture or nonunion box site and prioritizing safety.

Aim: To describe the placement of a volar direct scaphoid portal, using the inside-out technique, and the surrounding anatomical structures are at risk.

Material & Methods: Ten fresh-frozen cadavers were used. The inside-out Volar Midcarpal Direct Scaphoid (VMDSc) portal was placed through the bone scaphoid defect area, at the radial margin of the radioscaphocapitate (RSC) ligament, using an inside-out technique. The distance between this portal to surrounding volar anatomical structures was measured using a millimeter ruler.

Results: The VDSc portal pierced the Flexor Carpi Radialis tendon in four specimens; in the other six, it was radial to the tendon with an average distance of 1.2 mm. It was an average of 7.6 and 1.9 mm away from the radial and the radiopalmar arteries, respectively. The portal was an average of 7.1 and 5.7 mm away from the median nerve and its palmar cutaneous branch, respectively. Finally, it was an average of 13.2 mm away from the dorsal sensory branch of the radial nerve.

Conclusions: The inside-out Volar Midcarpal Direct Scaphoid (VMDSc) portal establishment is safe for main neurovascular bundles but is risky for the radiopalmar artery and the FCR tendon. Clinical relevance Instrumentation for the arthroscopic midshaft and proximal pole scaphoid nonunion treatment benefits from the establishment of the inside-out Volar Midcarpal Direct Scaphoid (VMDSc). A one centimeter incision, radial to the FCR tendon, between both wrist creases, is recommended to avoid the radiopalmar artery injury.

A-0357 OUTCOMES OF ARTHRODESIS FOR THUMB CARPOMETACARPAL JOINT OSTEOARTHRITIS USING A HEADLESS COMPRESSION SCREW AND LOCKING PLATE: ONE-YEAR FOLLOW-UP

Akari Mori, Mika Akahane, Soichiro Honda, Kaoru Tada, Satoru Demura

Department of Orthopedic Surgery, Graduate School of Medical Sciences, Kanazawa University, Kanazawa, Japan

Introduction: Various surgical techniques are used for joint arthrodesis in patients with thumb carpometacarpal (CMC) osteoarthritis. However, pseudoarthrosis is a common complication associated with these methods.

Aim: In this study, we analyzed the results at one-year follow-up after CMC joint arthrodesis surgery using autologous bone transplantation, headless compression screw (HCS) fixation, and locking plate placement in recent years.

Material & Methods: The study included 17 patients (17 hands) who underwent CMC joint arthrodesis surgery for thumb CMC osteoarthritis at our department. We investigated 4 men and 13 women, with Eaton classification stages 2 and 3

in 9 and 8 patients, respectively. Patients' mean age was 62.5 years (54–74 years). We used a dorsal-radial approach to the thumb, with excision of the subchondral bone under the cartilage surface using a sharp spoon or surgical air tome, provisional fixation using a guide pin, autologous bone transplantation from the ilium or radius, and insertion of one HCS for adequate bone apposition, followed by locking plate placement. All patients underwent fixation using a rigid brace for 8 weeks postoperatively. We recorded the time until postoperative bone union and the visual analog scale (VAS) of pain, disabilities of the arm, shoulder, and hand (DASH), and Kapandji scores preoperatively and one year postoperatively. Results: The bone union was achieved in all patients (mean bone union duration 10.6 weeks). The VAS scores improved significantly from 67.3 to 10.2. The DASH scores also improved significantly from 37.0 to 21.0. The Kapandji score decreased from 9.2 to 8.8.

A-0358 INVESTIGATION OF THE RELATIONSHIP BETWEEN SMARTPHONE ADDDICITON AND HAND GRIP AND PINCH STRENGTH IN HEALTHY UNIVERSITY STUDENTS

Barış Celbek[1,2], Eylem Küçük[3], Zeynep Hoşbay[4]

[1]Physiotherapy Program, Department of Medical Services and Techniques, Vocational School of Health Services, Istanbul Aydin University, Istanbul, Turkey; [2]Department of Physiotherapy and Rehabilitation, Institute of Graduate Studies, Biruni University, Istanbul, Turkey; [3]Physiotherapy Program, Department of Medical Services and Techniques, Sabuncuoğlu Şerefeddin Vocational School of Health Services, Amasya University, Amasya, Turkey; [4]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Biruni University, İstanbul, Turkey

Introduction: Smartphone is the most widely used technological device in young adults today. Excessive use of smartphones is known to cause upper extremity musculoskeletal complications.

Aim: The aim of this study was to examine the relationship between smartphone addiction and hand grip&pinch strength.

Material & Methods: 225 (21.15±9.75; 64% female) healthy university students were included in the study. Smartphone usage habits of the participants were assessed with the Smartphone Addiction Scale-Short Form (SAS-SF), hand grip was assessed with a hand dynanometer (Jamar®), and pinch grip was assessed with a pinchmeter (Baseline Hydraulic Pinch Gaug®). Statistical analysis was performed with Spearman Correlation Analysis in SPSS v 19.0.

Results: There was found a negative and low level significant correlation between the participants' scores on the SAS-SF dominant hand grip strenght and and both dominant and nondominant hand pinch grip strengths (p=0.003, rho=0.416; p=0.002, rho=0.439; p=0.007, rho=0.383, respectively).

Conclusions: Our study showed that participants with high smartphone use had low gross and pinch grip strength. It should be taken into consideration that muscle weakness due to prolonged phone use may be an important factor predisposing to musculoskeletal injuries involving the upper extremities.

In our study, it was found that participants with high smartphone use had low hand and pinch grip strength. We think that smartphone addiction and related muscle weaknesses should be considered as a factor that may predispose to musculoskeletal injuries common in the upper extremities.

A-0359 CARPAL TUNNEL SYNDROME DETECTION USING SMARTPHONE VIDEO ANALYSIS AND MACHINE LEARNING

Kazuya Tsukamoto[1], Ryota Matsui[2], Toru Sasaki[1], Takuya Ibara[3], Eriku Yamada[1], Akiko Yamamoto[1], Tomohiko Waki[1], Akimoto Nimura[3], Yuta Sugiura[2], Koji Fujita[3,4]

[1]Department of Orthopedic and Spinal Surgery, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, Japan; [2]School of Science for Open and Environmental System, Graduate School of Science and Technology, Keio University, Kanagawa, Japan; [3]Department of Functional Joint Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, Japan; [4]Division of Medical and Dental Innovations, Open Innovation Center, Institute of Research Innovation, Tokyo Medical and Dental University, Tokyo, Japan

Introduction: Patients with carpal tunnel syndrome (CTS) exhibit changes in finger motion from the early stages of the disease, but there is no method that can objectively evaluate the minute changes in movements. We developed a CTS screening system by combining video analysis of hand during grip-and-release movement of patients with CTS with machine learning, using a technique that can objectively evaluate the minute changes in movements by combining motion capture system and machine learning.

Aim: We aimed to verified the accuracy of our CTS screening method.

Material & Methods: 25 patients with CTS (38 hands) and 34 healthy volunteers (65 hands) were recorded their finger motion during grip-and-release movement at maximum speed. We performed pose estimation with Media Pipe Hands (Google), generated time series data, extracted 32 frequency components by Fast Fourier Transformation, created a CTS screening model for each direction of motion focusing on each finger tip and joint using machine learning, and calculated their sensitivity, specificity and Area Under Curve (AUC) values. We also performed multiple regression analysis to create a model to predict the electrophysiological severity of CTS (Bland classification) and calculated correlation coefficients with the actual scores.

Results: The highest accuracy of screening for CTS was achieved with the model focusing on the little finger's DIP joint in the volar flexion-dorsiflexion direction (sensitivity 89%, specificity 83%, AUC 0.89). The correlation coefficient between the severity prediction model and the Bland classification was 0.68.

Conclusions: We could screen for CTS with high accuracy by video analysis of finger motion using a smartphone. The screening performance was high for the model focusing on little finger motion, suggesting the influence of compensations by digits not affected by CTS (i.e. ring and little finger) and coordination deficits with those affected by CTS (i.e. thumb, index, and middle finger). Correlation with electrophysiological test was also observed, confirming the presence of finger motion disorders from the early stages of the disease. This method does not require special equipment or knowledge and may be an effective tool for the early detection of CTS outside hospitals. This may allow for the early detection of CTS, prompting patients to visit hand surgeons to receive early treatment.

A-0360 WRIST RECONSTRUCTION USING FREE VFG FOLLOWING INTRALESIONAL EXCISION FOR CAMPANACCI GRADE 3 GIANT CELL TUMORS INVOLVING THE ARTICULAR SURFACE OF THE DISTAL RADIUS

Jong Hun Baek[1], Duke Whan Chung[2], Ki Hyeok Ku[2], Jae Hoon Lee[3], Jin Sung Park[3]

[1]Department of Orthopedic Surgery, Kyung Hee University, South Korea; [2]Department of Orthopedic Surgery, Kyung Hee University Hospital at Gangdong, South Korea; [3]Department of Orthopedic Surgery, Yeson Hospital, South Korea

Introduction: Reconstruction of the distal radius with a free VFG after en-bloc excision of a grade 3 giant cell tumor (GCT) can achieve effective control of local recurrence. However, it leads to the loss of wrist motion. Another option is intralesional excision and cementation, which preserves wrist movement but does not restore the articular surface.

Aim: We reviewed the results of a patient who underwent wrist reconstruction using free VFG following intralesional excision for a grade 3 GCT of the distal radius with the articular surface invasion of the distal radius
Material & Methods: Between 2001 and 2015, 5 patients underwent reconstruction using free VFG after intralesional excision for grade 3 GCT involving the articular surface of the distal radius. The median follow-up period was 6.4 years (range, 1.4-10.8 years). All of the grafts were supplied by the anterior tibial vasculature.
Results: All the transferred proximal fibula survived and united at the recipient site at a median 13.2 weeks (range, 12.1-16.5 weeks) after surgery. The overall range of motion was 72.8 percent of the contralateral extremity. The median grip strength was 75.8% of the contralateral side. Subluxation in the wrist joint was not observed. Mild osteoarthritic change was observed in one patients aged 64 years old. No local recurrence or lung metastasis was detected. No major complication occurred at the recipient site.
Conclusions: Wrist reconstruction using free VFG following intralesional excision in patients with this type of lesion, can prevent local tumor recurrence, restore the articular surface and maintain movement of the wrist joint.

A-0361 DIRECT MOBILIZATION VERSUS SIX WEEKS IMMOBILIZATION AFTER TFCC RECONSTRUCTION

Nadia S. Scholtmeijer, Marius A. Kemler
Martini Hospital, Groningen, The Netherlands

Several surgical techniques exist for TFCC reconstruction, one being the Adams-Berger technique. Direct graft fixation is an emerging option for this reconstructive technique. This study compared the outcomes of TFCC reconstruction according to the Adams-Berger technique using direct graft fixation with a biotenodesis screw and early mobilization against the traditional knot technique with a six-week cast immobilization. Research groups consisted of ten patients. In both groups, pain intensity (VAS), mobility (pro- and supination, E-link), strength (Jamar grip strength) and function (PRWHE-DLV, PSFS) were assessed at baseline, six weeks, three months, six months and one year postoperatively. After one-year patients were also asked about their global perceived effect (GPE) and return to full work activity was recorded. results demonstrated that one year postoperative the direct fixation technique with early mobilization led to a significantly higher patient satisfaction level. Patients with direct fixation reported a mean GPE of 6.3 where the control group reported a mean of 5.6 ($p=0.01$). The direct fixation group also reported an earlier return to full work activities at 114.7 days, compared to the control group at 171 days ($p=0.049$). Furthermore, a slightly quicker recovery of range of motion and grip strength, as well as reduced pain intensity was also noted during the rehabilitation period compared to the control group. However, at one year comparison these results were not significant in this patient sample size. During the study no complications were reported. The study supports the effectiveness of direct graft fixation with early mobilization in TFCC reconstruction, offering improved patient outcomes and potentially reducing healthcare costs. Further research with larger sample sizes is warranted to reconfirm these findings.

A-0362 INTRODUCING THE HEALO APP- A DIGITAL SYSTEM DESIGNED FOR REHABILITATION OF HAND PATIENTS

Anette Chemnitz[1], Theodor Jikander[2], Johanna Blom[1]
[1]Hand Center Malmö, Atleva Specialist Care, Malmö, Sweden; [2]Empowered Health, Lund, Sweden

Introduction: In the year 2020, the world was facing a new pandemic with tremendous impact on the health care system. Still struggling with the aftermath and lack of resources, the evolution of modern digital systems in health care can

nevertheless help us provide care for our patients and evaluate outcomes after treatment. Atleva Specialist Care offers medical investigation, treatment, and rehabilitation in hand surgery in four different hand units in Sweden. We would like to present the "Healo app", a digital system developed and customized for rehabilitation in hand surgery, used in our hand units since the year 2020.
Material & Methods: The Healo app is provided by Empowered Health, Sweden, and has been approved by the Medical Products Agency, Authority for Privacy Protection and Health and Social Care Inspectorate in Sweden. Patients eligible for rehabilitation at our hand units, are offered participation and enrollment in the Healo care plan. Goals are set for each patient according to SMART (Specific, Measurable, Achievable, Relevant and Time bound). A diagnosis specific digital training program is started, and the patient is asked to register baseline measurements such as VAS for pain, Quick Dash for functional impairment and EQ5D for quality of life. The frequency of measurements can be adjusted in the program, based on the caregiver's preference. Training sessions may be modified based on individual needs and can be adjusted during the patient´s rehab journey.
Results: During the period January 2020- November 2023, a total of 6, 518 patients in our four different hand units, have been enrolled in the Healo app. Almost 40 000 training sessions and 5, 292 digital care visits have been recorded. The patients can perform their rehabilitation exercises when and where it is suitable, without the need to travel, which saves time for the patient and is environmentally friendly. The digital set up is independent of the care takers specific knowledge which contributes to equal quality during the treatment period. The digital set up has also shown to save up to 10 minutes per visit for the care giver.
Conclusions: Introduction of digital systems such as the Healo App, can help us facilitate patient engagement and motivation for rehabilitation in hand surgery. Care givers can also estimate adherence to rehabilitation, which helps decision-making before surgical procedures. Not all patients have access to mobile phones or computers, nor the cognitive capacity to participate in a digital rehabilitation plan. However, by using this or similar digital systems, resources can be redistributed and used more efficiently. In addition, clinical outcomes and goal achievements in hand surgery can be monitored and used for research.

A-0363 NEW SUTURE MATERIALS IN TENDON TRANSFER SURGERIES. A BIOMECHANICAL COMPARATIVE ANALYSIS

Tatjana Pastor[1,2], Ivan Zderic[1], Mehar Dhillon[1], Boyko Gueorguiev[1], Torsten Pastor[3], Esther Vögelin[2]
[1]AO Research Institute Davos, Davos, Switzerland; [2]Department for Plastic and Hand Surgery, Inselspital University Hospital Bern, University of Bern, Bern, Switzerland; [3]Department of Orthopaedic and Trauma Surgery, Lucerne Cantonal Hospital, Lucerne, Switzerland

Introduction: Commonly used high-strength suture material for tendon transfer surgeries is designed to withstand high tensile forces and secure the repaired structures in place. However, slippage of the knot is inevitable when these sutures are heavily loaded leading to laxity and gap formation between the repaired structures. On the other hand, early mobilization after tendon transfer surgery is crucial to avoid commonly observed postoperative soft tissue adhesions. Recently, a new suture was introduced (Dynacord) with a salt-infused silicone core which is designed to minimize laxity and preserve consistent tissue approximation.
Aim: To compare the biomechanical competence of Dynacord against a conventional high strength suture (Fiberwire) in a human cadaveric tendon transfer model under an early rehabilitation protocol.
Material & Methods: Tendon transfers (FDS IV to FPL) were performed in 8 pairs human cadaveric forearms using either Dynacord(DC) or Fiberwire(FW) in a paired study design. Markings were made approximately 1cm proximal and 1cm

distal to the level of the interweaving zone of the transfer. All specimens underwent repetitive thumb flexion against resistance in nine intermittent series of 300 cycles each, simulating the postoperative rehabilitation protocol. After each series the distance of the proximal marker to the interweaving zone (proximal), the length of the interweaving zone (intermediate) and the distance of the distal marker to the interweaving zone (distal) were measured.
Results: Pooled data over all nine series, normalized to the immediate postoperative status, demonstrated significantly higher zone lengthening for FW compared to DC ($p \leq 0.038$) proximally and distally. However, at the intermediate zone, DC was associated with significant ($p < 0.001$) length shortening compared to FW, the latter remaining without length changes. Proximally, whereas for FW zone lengthening significantly increased over the cycles ($p = 0.009$) it remained neutral for DC ($p = 0.132$). Distally, both sutures remained without significant length changes over the cycles ($p \geq 0.105$).
Conclusions: Biomechanically, DC preserved or even increased tissue approximation, and can thus be considered as valid alternative suture material to a conventional high-strength suture, the latter leading to a significant tissue laxity under cyclic loading. Therefore, DC might allow for a more aggressive early postoperative rehabilitation program to avoid soft tissue adhesion and thus reoperations.

A-0364 THE USE OF CHONDROSTIMULATING INTRA-ARTICULAR INJECTION FOR TRAPEZIOMETACARPAL OSTEOARTHRITIS. LONG-TERM FOLLOW UP

Massimo Corain, Umberto Lavagnolo, Mattia Giardini, Filippo Zanotti
Hand Surgery Unit - Regional reference center for Hand Surgery and Microsurgery – Polo Confortini - University Hospital of Verona, Veneto, Italy

Introduction: Trapeziometacarpal osteoarthritis, a debilitating hand condition, induces pain, stiffness, and weakness, leading to compromised hand function and strength. Non-surgical interventions primarily encompass activity modifications, NSAID administration, splinting, and corticosteroid injections. Following unsuccessful conservative treatment, various surgical techniques are available.
ChondroFiller Liquid®, a resorbable filler incorporating type I collagen and a neutralizing solution, is employed to create a protective layer around cartilage defects. It stimulates chondrocyte growth, facilitating cartilage regeneration and is specifically indicated for repairing cartilage lesions with a maximum surface area of 3 square centimeters.
Aim: A previous study demonstrated that ChondroFiller Liquid® effectively reduces painful symptoms, enhances grip strength (evaluated through the Jamar test and pinch test), improves Patient-Reported Outcome Measures (PROMS) as indicated by the DASH score, and diminishes MRI-assessed bone edema and periarticular effusion in patients with rhizoarthrosis during a 12-month follow-up period.
This study extends the follow-up to 24 months to assess the sustainability of clinical improvements.
Material & Methods: Forty patients from the initial study were enrolled, categorized into two severity groups according to the Eaton-Littler classification. At 18 months post-ChondroFiller Liquid® infiltration (time 1), all patients underwent clinical re-evaluation using the Numeric Rating Scale (NRS) and DASH score. Subsequent re-evaluation at 24 months post-infiltration (time 2) included the Jamar test, Pinch test, NRS, and DASH score.
Results: The findings indicate a sustained improvement in pain symptoms, coupled with increased strength in pincer and grip movements observed through clinical tests at the 18-month mark. However, a subset of patients demonstrated a reduction in clinical benefits during the 24-month follow-up.
Conclusions: ChondroFiller Liquid® emerges as a viable alternative to surgery, demonstrating efficacy in mitigating the progression of painful symptoms and functional limitations, even in the long- term. The observed clinical improvements support the use of infiltrative approaches, potentially delaying or obviating the need for subsequent surgical interventions.

A-0365 MAGNETIC RESONANCE NEUROGRAPHY FINDINGS IN PATIENTS WITH POSTERIOR INTEROSSEOUS NERVE SYNDROME

Kim Jeongkeun, Lee Jeounghun, Shim Jaewoo
Samsung Medical Center, Seoul, South korea

Introduction: Posterior interosseous nerve (PIN) syndrome has been known to occur mainly when the radial nerve is compressed by supinator muscle. However, with the development of high resolution magnetic resonance imaging, abnormal findings in various parts of the nerve have been reported.
Aim: The purpose of this study was to report the findings of Magnetic resonance (MR) neurography and clinical course in patients with PIN syndrome.
Material & Methods: This study included patients with radial nerve palsy symptoms (wrist or finger extension limitation) and electromyographic confirmed radial neuropathy at our hospital from 2019 to 2022. Of these, patients who underwent MR neurography were investigated. A total of 23 patients were finally included. The demographic data and clinical course of the patients were investigated through chart review. MR neurography was performed with 3-tesla and included the upper arm, elbow, and forearm. MR neurography was analyzed by a radiologist. In MR neurographic findings, changes in signal intensity, changes in diameter, presence of constriction, and presence of structural compression of radial nerves were investigated.
Results: The 23 patients were 16 males and 7 females, with an average age of 47 years. MR neurography was performed an average of 5 months after onset of paralysis. Constriction was observed in 11 (48%) patients. The constrictions were observed in the middle to distal part of arm (n=8), the proximal forearm (n=2), and the upper arm (n=1). An increase in signal intensity and diameter was observed in 9 patients (39%). The increase in signal intensity and diameter were observed in the supinator tunnel (n=4), extensive area (n=3), upper arm (n=1), distal arm (n=1). In 1 patient, compression by tumor was observed. There were no obvious abnormal findings in 2 patients..
Seven of the 11 patients with constrictions underwent surgical treatment (resection and nerve repair in 3 patients, resection and nerve graft in 2 patients, and neurolysis in 2 patients) 7 months after the onset of paralysis symptoms on average. Among them, 3 out of 4 patients who were followed up for more than 1 year showed complete recovery and 1 patient showed partial recovery. Of the 9 patients with increase in signal intensity and diameter, 8 recovered spontaneously. One patient did not improve and received release surgery.
Conclusions: In PIN syndrome, neuropathy due to upper arm constriction was observed in 48%. MR neurography is useful in diagnosing these constrictions.

A-0366 ASSESSING RE-FRACTURE RISK IN SCAPHOID WAIST FRACTURE PARTIAL UNIONS SUBJECT TO SPORTING LOADS: A FINITE ELEMENT STUDY

James Martin[1], Nick Johnson[2], Jenny Shepherd[3], Joseph Dias[1]
[1]University Hospitals of Leicester, Infirmary Square, Leicester; [2]Department of Health Sciences, University of Leicester, University Road, Leicester; [3]School of Engineering, University of Leicester, University Road, Leicester

Introduction: Recent evidence advocates conservative management for scaphoid waist fractures displaced ≤ 2 millimetres. However, literature on the conservative management of partial unions is sparse. Recent finite element research suggested 30% union is required to return to normal function, but has not explored returning to sport, which in a young adult population is a common question.

Aim: This study aimed to assess the risk of re-fracture in scaphoid waist fracture partial unions, in three known fracture patterns, when subjected to escalating force using a finite element method.
Material & Methods: A physiologically enhanced scaphoid model was created using 3D Slicer freeware from a CT scan of a normal hand and wrist. This included modelling the known graduation in bone mineral density and the ratio of subchondral to cancellous bone. The model was subsequently uploaded into COMSOL Multiphysics for finite element analysis (FEA). Three different waist fracture patterns, from the Russe classification, were generated. An axial force of 100N – 700N, in 100N increments, was applied to each fracture pattern with different partial union proportions, ranging from 30% to 95% in 5% increments. Unions < 30% were not assessed as they have previously been shown to be safe to return to ADLs of the hand and wrist. The risk of re-fracture was assessed through analysis of the maximum Von Mises stress.
Results: The transverse fracture plane showed the greatest stability, with the first notable maximum Von Mises stress rise at 65% union. The oblique fracture planes had notable rises at 70% and 75% for the vertical and horizontal fractures respectively. In all three fracture planes, re-fracture was predicted to occur at the volar point of union, as this was the region where notable increases in the maximum Von Mises stress occurred. The transverse fracture also had lower maximum and average Von Mises stress values compared to the oblique fracture planes, further emphasising its greater stability.
Conclusions: In our previous paper, we stated that 30% union was required to return to ADLs. We now propose a rule of thirds when approaching return to function during waist fracture healing. We suggest that one third union is required to return to ADLs and two thirds, in the most commonly observed transverse pattern, to return to sport. In the oblique fracture planes, 70% and 75% union are required in the vertical and horizontal fractures respectively when returning to sporting activities.

A-0367 THE FIGURE-OF-EIGHT LIGAMENT RECONSTRUCTION IN THUMB CARPOMETACARPAL INSTABILITY: SURGICAL TECHNIQUE AND CLINICAL OUTCOMES

Isabel C. Jongen[1], Niek J. Nieuwdorp[1], Caroline A. Hundepool[1], Mark J.W. Van der Oest[1], Thybout M. Moojen[2], Ruud W. Selles[3], Hand-Wrist Study Group[1,2], Michiel J. Zuidam[1]
[1]Department of Plastic, Reconstructive and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands; [2]Hand and Wrist Center, Xpert Clinics, The Netherlands; [3]Department of Rehabilitation Medicine, Erasmus MC, Rotterdam, The Netherlands

Introduction: In thumb carpometacarpal (CMC) instability, laxity of the stabilizing ligaments of the joint leads to pain and reduced grip and pinch strength. Surgical stabilization is indicated when nonoperative treatment remains insufficient. Various surgical techniques have been described, including the well-known Eaton-Littler procedure, which primarily focuses on stabilizing the volar aspect of the joint. However, recent advancements in joint anatomy and kinematics have led to a shift of focus from reconstructing the volar ligaments to the dorsal ligaments. In this study, we introduce the "figure-of-eight ligament reconstruction", a novel technique in the surgical management of thumb CMC instability. This technique distinguishes itself from procedures like Eaton-Littler's by establishing joint stability through forces originating within the CMC joint and providing volar as well as dorsal support.
Aim: This study describes the surgical technique and clinical outcomes of the "figure-of-eight ligament reconstruction", a novel technique in the surgical management of thumb CMC instability.
Material & Methods: Seventeen patients with non-traumatic, non-arthritic CMC instability were treated with the figure-of-eight ligament reconstruction. This technique involves the weaving of the palmaris longus tendon through two bone tunnels, one in the first metacarpal bone and the other in the trapezium bone. The figure-of-eight fashion of tendon weaving generates double oblique forces, pulling the base of the first metacarpal on top of the trapezium, ensuring volar

support, and preventing dorsoradial subluxation by directing a counteracting force. Preoperative Visual Analogue Scale (VAS, 0–100) for pain and Michigan Hand Outcomes Questionnaire (MHQ, 0–100) total scores were compared to 3- and 12-months postoperative. Secondary outcomes included range of motion (ROM), patient satisfaction, return to work (RTW), and complications. All data were prospectively collected.
Results: The seventeen included patients were predominantly female (15/17), with a mean age of 33 years (standard deviation (SD) 9), treated with the figure-of-eight technique between June 2012 and May 2018. A significant improvement between intake and 12 months postoperative is observed for both the MHQ total score (52, SD 10 vs. 70, SD 14) and VAS pain scores (63, SD 15 vs. 32, SD 29) (P<.001). Additionally, after surgery, restored thumb CMC joint stability was reported for all patients while preserving range of motion. Tip and tripod pinch improved significantly between intake and 12 months after surgery (P<.01). The median return to work was 6 weeks and complications were reported in three patients. Patient satisfaction was "excellent" or "good" in 65% of patients and 77% reported that they were willing to undergo the same treatment again.
Conclusions: The figure-of-eight ligament reconstruction significantly improves pain and function in patients with non-traumatic, non-arthritic thumb CMC instability, while restoring joint stability and preserving range of motion, making it a suitable technique.

A-0368 CHOICE FOR SURGICAL TECHNIQUE IN NEUROMA TREATMENT MAY AFFECT ASTROCYTE INFILTRATION IN THE SPINAL CORD IN RATS

EM Brakkee[1], E DeVinney[1], W v Hecke[2], N Eijkelkamp[3], JH Coert[1]
[1]Umc Utrecht, Department of Plastic and Reconstructive Surgery, Utrecht, the Netherlands; [2]Umc Utrecht, Department of Pathology, Utrecht, the Netherlands; [3]Umc Utrecht, Center for Translational Immunology, Utrecht, the Netherlands

Introduction: Peripheral nerve injury may cause painful neuromas. The traditional treatment for a painful neuroma entails surgical removal of the neuroma and burying the proximal nerve end into muscle (muscle burying, MB). More recently, Regenerative Peripheral Nerve Interfaces (RPNI), have been developed as alternative approaches for nerve termination in the treatment of painful neuroma.
Aim: In this study, we have studied whether MB and RPNI apart from reduction of neuroma pain, can also affect astrocyte infiltrration in the spinal cord of rats.
Material & Methods: A total of 75 Sprague Dawley rats were randomized over five experimental groups (n=15/group) and were subjected to either sham, or Tibial Neuroma Transposition model (TNT, positive control) with no specific surgical implantation or Muscle Burying (MB), vascularized RPNI (vRPNI) or devascularized RPNI (dRPNI). Mechanical allodynia was assessed with von Frey hairs at the pretibial neuroma site. At 12 weeks after the initial surgery, rats were terminated. Signs of spinal astrocytes activation were analyzed, by staining the spinal cord with GFAP.
Results: At week 9, 10 and 12, both vRPNI and dRPNI operated rats had significantly higher mechanical allodynia compared to Sham ($p<0.05$). Importantly, at 9 and 12 weeks after surgery, MB rats had significant lower mechanical hypersensitivity than rats where the nerve was not treated ($p<0.05$). The spinal cord data show significantly that TNT induces astrogliosis in the spinal cord at 12 weeks after surgery, which is significantly reduced when the tibial nerve is buried in muscle (MB). MB has a comparable astrocyte infiltration to Sham. Astrocytes are more present in vRPNI and dRPNI treated nerves, with dRPNI being almost similar to TNT.
Conclusions: Our data have shown that a surgical technique conducted to treat neuroma pain can directly affect astrocyte activation at the level of the spinal cord. Thus, burying a nerve into muscle does not only protect against mechanical

stimulation, but also directly affects immune cell infiltration in the central nervous system that are known to be important in the development of chronic neuropathic pain. More research needs to be conducted to unravel the causality between immune cell infiltration and the local milieu around a painful neuroma.

A-0369 SURGICAL TECHNIQUES IN NON-TRAUMATIC MIDCARPAL INSTABILITY: EVALUATING THE DORSAL CAPSULODESIS AND THREE-LIGAMENT TENODESIS TECHNIQUE

Stefanie N. Hakkesteegt[1], Isabel C. Jongen[1], Caroline A. Hundepool[1], Mark J.W. van der Oest[1], Liron S. Duraku[3], Reinier Feitz[1,2], Hand-Wrist Study Group, Michiel J. Zuidam[1]

[1]Department of Plastic, Reconstructive and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands; [2]Hand and Wrist Center, Xpert Clinic, The Netherlands; [3]Department of Plastic, Reconstructive and Hand Surgery, Amsterdam UMC, Amsterdam, the Netherlands

Introduction: In midcarpal instability (MCI), also referred to as carpal instability nondissociative (CIND), laxity of the stabilizing ligaments causes clunking of the wrist with subsequent synovitis, pain, and weakness in strength. However, no definite surgical treatment guidelines have been established, as surgical management remains controversial due to the limited evidence on different techniques. Surgical treatment therefore often depends on the surgeon's preference. The dorsal capsulodesis and three-ligament tenodesis (3LT) are two surgical techniques currently used in the management of MCI. Dorsal capsulodesis achieves stability through capsule augmentation, while 3LT focuses on ligament reconstruction using the flexor carpi radialis tendon.

Aim: This study aimed to assess and compare the differences in patient-reported pain, hand and wrist function, satisfaction, range of motion (ROM), and return to work (RTW) in patients treated with either dorsal capsulodesis or 3LT.

Material & Methods: Patients with MCI who continued to experience symptoms of instability after conservative treatment were considered eligible for inclusion. We excluded patients with connective tissue diseases, preceding traumatic injury, or chondropathy of the carpal bones. Primary outcomes included patient satisfaction with treatment result and the Patient Rated Wrist Evaluation (PRWE) at intake, three and 12 months postoperative. Secondary outcomes included ROM, RTW, and complications following treatment.

Results: A total of 112 patients were included between December 2011 and October 2019, with 91 patients undergoing dorsal capsulodesis and 21 patients undergoing 3LT. PRWE function, pain, and total scores improved significantly between intake and 12 months after surgery for both study groups ($p<0.05$). However, at three months postoperative, the dorsal capsulodesis group exhibited significantly better outcomes ($P<.01$), followed by a greater return to work (72%) when compared to the 3LT group (50%). Both groups experienced a decreased range of motion at three months, which was subsequently restored at 12 months postoperative. No significant difference in patient satisfaction with treatment was observed.

Conclusions: Both dorsal capsulodesis and 3LT are suitable surgical techniques for treating non-traumatic midcarpal instability nonresponsive to conservative treatment. Patients treated with dorsal capsulodesis have a quicker recovery and return to work, therefore when a surgeon has equal reason to perform a dorsal capsulodesis or a 3LT, the capsulodesis seems to be favorable. A better understanding of the pathomechanism behind midcarpal instability and implementing uniform terminology is essential when deciding on surgical treatment.

A-0371 CAN WE PREDICT THE OUTCOME OF TRAUMATIC PAEDIATRIC UPPER LIMB PERIPHERAL NERVE INJURIES USING ELECTROPHYSIOLOGY AND ULTRASOUND STUDIES? A CASE SERIES

Pavandeep Kaur Virdee[1], Haneen Abed[2], Andrea Jester[3], Andrew Lawley[3]
[1]Sandwell General Hospital, Birmingham, UK; [2]University Hospital Coventry and Warwickshire, Coventry, UK; [3]Birmingham Children's Hospital, Birmingham, UK

Introduction: Management of traumatic paediatric upper limb peripheral nerve injury varies across clinical practice. Clinical examination is often completed, with some clinicians opting for additional investigations including electrophysiology and/or imaging, including ultrasound, to guide diagnosis.
Aim: This case series compares findings of electrophysiology (EP) and ultrasound studies (US), to establish optimal diagnosis and subsequent management, in traumatic paediatric upper limb peripheral nerve injuries.
Material & Methods: A retrospective case series of seventeen paediatric traumatic upper limb peripheral nerve injuries presenting at a paediatric major trauma centre between January 2019 and August 2023 was undertaken. Data was collected regarding the type and date of injury, immediate intervention, US and EP findings, and subsequent management.
Results: The ulnar nerve was most injured, and half of the nerve injuries were caused by supracondylar fractures. Thirteen cases had EP which showed axonotmesis and three showed evidence of possible neurotmesis. One individual had a combination of axonotmesis and neurotmesis injury to all three peripheral nerves. US visualised nerve continuity in thirteen cases and two cases showed discontinuity. Two US studies were unable to visualise nerve continuity due to scarring. One study visualised a neuroma. EP and US were concordant in twelve studies, whilst three cases showed conflicting findings. Out of these three, concordance was achieved in two instances after EP and/or US studies were repeated. Thirteen patients were managed conservatively, and four cases were planned for surgery.
Conclusions: Our case series demonstrates that EP and US often shows concordance in paediatric traumatic peripheral nerve injury. In some cases, EP and US findings were not in agreement, however this improved after repeated studies. results suggest a combination of these investigations may provide better diagnostic accuracy to guide appropriate management. EP and US may prevent an initial over estimation of injury burden. In addition, early US may demonstrate additional clinically relevant findings such as presence of a neuroma or nerve tethering due to formation of scar tissue, not available from clinical examination or electrophysiology. To our knowledge, this is the first study comparing EP and US findings in paediatric traumatic upper limb peripheral nerve injuries. Future studies would benefit from comparing multi-institutional datasets to guide gold-standard investigations to aid correct diagnosis and surgical decision making.

A-0372 SECONDARY INTENTION HEALING FOR FINGERTIP AMPUTATIONS: THE SINGAPORE EXPERIENCE

Jie Hui Nah[1], Camelia Qian Ying Tang[2], Muntasir Mannan Choudhury[3,4], Dawn Sinn Yii Chia[3], Duncan Angus Mcgrouther[2,4], Jackson Kian Hong Jiang[3,4]
[1]Yong Loo Lin School of Medicine, National University Singapore, Singapore; [2]Department of Hand and Reconstructive Microsurgery, Singapore General Hospital, Singapore; [3]Department of Orthopaedic Surgery, Sengkang General Hospital, Singapore; [4]SingHealth Duke-NUS Musculoskeletal Sciences ACP

Background: Various studies have examined occlusive dressings in fingertip amputations and reported good outcomes. Occlusive dressing preserves appropriate pH, cell accumulation and moisture for healing, thereby limiting scar formation and deformity. To our knowledge, no study was performed in tropical Asia.
Methods: All patients who presented to our institution with fingertip amputations from 1 July 2020 to 31 July 2022 were

retrospectively analysed. 17 patients (15 male, 2 female) of mean age 37.2 ± 9.4 years old with 18 injured digits were retrospectively analysed. 12 (66.7%) were Allen Type III injuries, and 1 patient required distal phalangeal k-wire fixation.
Results: Patients were dressed with semi-occlusive dressing for an average of 20.1 ± 6.83 days. The average total duration of dressing is 36.78 ± 18.88 days over an average of 7.18 ± 4.03 dressing visits. Mean duration of follow up was 108 ± 63.46 days. Good outcome measures in sensation, pulp contour, nail deformity, and range of motion similar to existing literature were reported.
Conclusion: Occlusive dressing remains a viable and feasible treatment option for fingertip amputation even in tropical climate. While this simple treatment method may require more effort from patient, wound healing was attained after 36.8 ± 18.9 days of dressing

A-0373 FUNCTIONAL OUTCOMES AFTER A 3D PLANNED CORRECTIVE OSTEOTOMY FOR A SYMPTOMATIC MALUNION OF THE RADIUS

Lotte M.T. Oude Reimer[1], Judith olde Heuvel[1], Camiel J. Smees[1,2], Anne J.H. Vochteloo[1]
[1]Centre for Orthopaedic Surgery OCON, Hengelo, the Netherlands; [2]University of Twente, Enschede, the Netherlands

Introduction: A malunion of the distal radius after conservative fracture treatment can cause pain, loss of strength, and restricted range of motion (ROM). To address these problems, a corrective osteotomy can be performed. Proper execution of this procedure appears crucial for postoperative improvements in range of motion (ROM), strength, and pain reduction.
Aim: The aim of this study is to answer the question of how 3D planned corrective osteotomy influences pain, strength, and ROM in patients with a radius malunion. These results aim to contribute to decision-making for both the patient and the orthopedic surgeon regarding the choice to apply corrective osteotomy or not and can be utilized in addressing patient concerns.
Material & Methods: Prospective follow-up study of 21 patients with a symptomatic radius malunion. They were at least sixteen years old, understood Dutch language, and were capable of undergoing physical measurements. Pain was measured using the Numeric Pain Rating Scale (NPRS), strength with hand grip strength (Jamar), and ROM with a goniometer. The measurements were performed pre-operative and 12 months post-operative. To assess the change in pain, strength and ROM, data was analyzed using the Wilcoxon Signed Rank Test and paired T-test. The correlation between pain and ROM was assessed using Spearman's rho test.
Results: Pain significantly improved after surgery with a median decrease of 5 points ($P=0.002$), dorso/palmar flexion improved by an average of 21°, and pronation/supination improved by 13° ($P\leq0.001$). Hand grip strength increased by 4.3 kg ($P=0.045$). The correlation between NPRS and improvement of pro/supination was $P=0.002$, and the correlation between improvement of dorso/palmar flexion and NPRS was $P=-0.233$. The percentage of patients with the same ROM as the healthy side twelve months postoperatively was 71% for pronation/supination and 14% for dorsiflexion/palmar flexion.
Conclusion: This study demonstrated that patients who underwent a 3D planned radius corrective osteotomy of the radius showed a significant improvement of strength and ROM and decrease in pain twelve months postoperatively, but did not always obtain the ROM of the contralateral wrist. A clear correlation between improvement of ROM and decrease in pain was not found.

A-0374 SCHWANNOMA OF THE DIGITAL NERVE - A RARE FINDING

Carla Kellenberger, Mathias Häfeli, Christian Wirtz, Tim Cordier
Kantonsspital Graubünden, Chur, Switzerland

Introduction: Soft-tissue tumors of the hand are common and most often benign. Location, patient history and clinical presentation mostly determine diagnosis as well as typical imaging features. However, the diagnosis is not always clear and can only be confirmed histologically.
Aim: We report of a schwannoma of the digital nerve as one reason for soft-tissue swelling in the finger. Our aim is to emphasise, that rare entities should be considered in the differential diagnosis, as they can affect surgery and aftercare.
Material & Methods: A 46-year-old woman presented with a slowly growing mass over the last 3 months at the ulnopalmar side of her ring finger. The mass was painful and progressively compromising the flexion of the finger. There was neither an impairment of capillary refill or sensibility nor a Tinel sign. We palpated a firm, elastic mass, which was mobile to surrounding tissue. Ultrasound showed an 11x4x6mm well defined, rounded, hypoechoic mass in proximity to the ulnopalmar digital artery without any Doppler flow. The ulnopalmar digital nerve was not clearly identifiable.
Results: During Surgery, we identified the ulnopalmar neuro-vascular bundle. The tumor presented as an elliptic, beige mass, incorporated in the digital nerve's sheath and was bluntly separated from the nerve fascicles. Histologic results confirmed the diagnosis of a schwannoma. After 4 weeks, the patient was pain-free with a good range of motion. There was a painless Tinel sign over the digital nerve with normal sensibility.
Conclusions: A schwannoma is a benign tumor growing from Schwann cells and with about 90% the most common peripheral nerve tumor (Pertea2022). Usually growing slowly and eccentrically in the peripheral nerve sheath it can remain asymptomatic until it causes functional deficit or pain. To define the relationship to adjacent structures diagnostic imaging is helpful. MRI can differ between a malignant and benign lesion but cannot distinguish a schwannoma from a neurofibroma. Ultrasound shows a well-defined, fusiform, hypoechoic mass with loss of fascicular patterns. Final diagnosis can only be made histologically. Only few cases of occurrence in the hand have been reported so far. Still, it should be considered as a differential diagnosis of neoplasms such as ganglion cyst, giant cell tumor, lipoma or neurofibroma. If symptomatic, surgical excision is advised.

A-0375 WRIST ARTHRODESIS WITH STRUCTURAL DISTAL TIBIA ALLOGRAFT IN SEVERE BONE LOSS AFTER FAILED WRIST ARTHROPLASTY

Ana Carreño[1,2], Laia Sabaté[1], Raquel Garcia[1], Juana Medina[1], Joaquin Fores,[1] Angel Ferreres[2]
[1]Hospital Clinic Barcelona, Spain; [2]Kaplan Hand Institute, Barcelona, Spain

Introduction: Patients with failed wrist arthroplasty often require a salvage procedure by arthrodesis. This procedure usually represents a challenging reconstructive problem because the significant bone loss after removal of the prosthesis, poor quality of bone, and soft tissue defects. Reconstruction after explantation of the implant requires filling of the carpal space to provide adequate bone for consistent fusion and recover length for correct function of the extrinsic muscles of the hand. Different Structural bone grafts have been used, as iliac crest or contoured cancellous femoral head allograft.
Aim: Our purpose is to describe a technique for wrist arthrodesis after failed total wrist arthroplasty with severe bone loss using fresh-frozen distal tibia allograft and dorsal plate fixation.
Material & Methods: We present our experience in 2 cases of symptomatic loosening of total wrist prosthesis implanted 8 and 19 years ago respectively. Age of the patients was 60 and 71 years and the underlying pathology was Systemic

Lupus and Rheumatoid Arthritis. The loosened distal implants were removed, affected soft tissues were debrided and bone defect was measured (44 x 37 mm and 41 x 36mm). Longitudinal osteotomy was performed on the radius to remove the proximal component. Structural allograft of the distal tibia was placed between the distal radius and the base of the metacarpals, whose shape adapts to the defect and requires minimal remodeling. Locking wrist fusion plate (DePuy Synthes) was used in both cases. Follow-up was 28 and 26 months .
Results: Wrists fused at a median of 3,5 months. Wrist deformity was corrected. Functional hand and pain-free wrist at final follow up was achieved in both cases.
Conclusions: The distal tibial structural allograft has a shape that adapts to the bone defect remaining after removal of loosened wrist prosthesis and requires little remodeling. Wrist deformity is corrected, wrist height can be restored, stable fixation is obtained, and a high rate of fusion is achieved despite filling large defects.

A-0376 PERCUTANEOUS ULTRASOUND-GUIDED SECTION OF THE TRANSVERSE CARPAL LIGAMENT VS. OPEN SURGERY FOR THE SURGICAL TREATMENT OF CARPAL TUNNEL SYNDROME

Patricia Balvís-Balvís, Manuel Castro-Menéndez, Inés Oiartzabal-Alberdi, Lucia Ferradás-García, Javier Yañez-Calvo
Hospital Alvaro Cunqueiro, Vigo, Spain

Introduction: The gold standard of carpal tunnel syndrome (CTS) treatment is the section of the transverse carpal ligament, the most common technique being the palmar cutaneous incision. Percutaneous techniques have been developed, although their risk/benefit ratio remains controversial.
Aim: To analyse the functional outcome of patients undergoing CTS percutaneously ultrasound-guided and compare it with those of open surgery
Material & Methods: Prospective observational cohort study of 50 patients undergoing CTS (25 percutaneous with WALANT technique and 25 by open surgery with local anaesthesia and tourniquet). Open surgery was performed using a short palmar incision. The percutaneous technique was performed anterograde using the Kemis H3® scalpel (Newclip). A preoperative and postoperative assessment was performed at 2 weeks, 6 weeks and 3 months. Demographic data, presence of complications, grip strength and Levine test score (BCTQ) were collected.
Results: The sample consists of 14 men and 36 women with a mean age of 51.4 years (95% CI: 48.4-54.5). Percutaneous technique was performed anterograde using the Kemis H3® scalpel (Newclip). All patients improved from their CTS clinic without obtaining statistically significant differences in BCTQ score, nor in the presence of complications ($p>0.05$). Patients operated on percutaneously recovered faster grip strength at 6 weeks, but it was similar in the final review
Conclusions: In view of the results obtained, percutaneous ultrasound-guided surgery is a good alternative for the surgical treatment of CTS. Logically, this technique requires its learning curve and familiarisation with the ultrasound visualisation of the anatomical structures to be treated

A-0377 BLOCKED VOLAR DISLOCATION OF THE METACARPOPHALANGEAL JOINT OF THE THUMB. OPEN REDUCTION WITH WALANT TECHNIQUE

Beatriz Hernández González[1], Constantino Iglesias Núñez[1], Patricia Balvis Balvis[2], María Ferreirós Conde[2], Aida Herrero Castilla[2], Manuel Castro Menendez[2]

[1]Hospital do Salnés, Vilagarcia de Arousa, Pontevedra, Spain; [2]Hospital Alvaro Cunqueiro, Vigo. Pontevedra, Spain

Introduction: The MCP joint of the thumb is made up of a set of basic elements for its complete functioning: the volar plate, the capsule and the collateral ligaments. Dislocation of this joint is a rare entity, and most cases are dorsal dislocations.
Clinical Case: We present the clinical case of a patient who suffers a volar dislocation of the metacarpophalangeal (MCP) joint of the thumb in the left hand. We objectified the need for open reduction given the severe associated joint instability, due to the rupture of the ulnar collateral ligament (UCL) and the interposition of soft tissues. For the surgical revision we use the WALANT technique, an anesthetic technique used in upper limb surgeries that is demonstrating important advantages over the usual techniques.
Conclusion: Locked dislocations cannot be reduced closed, since generally, there is an interposition of the EPL and/or EPB tendons in the joint in addition to a complete injury to the CCL, which requires open reduction and surgical repair. The use of the WALANT technique is an anesthetic method that reduces the patient's pre-surgical stress, favors their collaboration during the intervention, reduces the use of postoperative analgesics and thus the hospital stay.

A-0378 SUPERIOR STERNOCLAVICULAR JOINT DISLOCATION. PRESENTATION OF A CASE AND REVIEW OF THE BIBLIOGRAPHY

Ines Oiartzabal Alberdi, Miguel Cela Lopez, Monica Rodriguez, Arenas, Angela Garcia Perez, Patricia Balvis Balvis, Manuel Castro Menendez, Javier Yañez Calvo

Hospital Álvaro Cunqueiro, Vigo, Pontevedra, España

Introduction/Aim: Sternoclavicular joint dislocation accounts for 1% of dislocations in the human population and most often occurs anterior or posteriorly. After a review of the literature, only seven cases of dislocation of the superior sternoclavicular joint have been described in the literature.
Clinical case: We present a 59-year-old athlete with pain and deformity in the upper chest that caused partial functional impotence for the mobility of the left shoulder. In the complementary tests, the presence of an upper sternoclavicular dislocation was observed that was managed conservatively by sling and analgesia. After 3 months the patient was asymptomatic resuming his previous sports activity.
Conclusions: Superior dislocations of the sternoclavicular joint are rare entities secondary to high intensity trauma that can go unnoticed due to their low frequency and the important association with other more serious injuries. They do not present a risk of complications due to mediastinal compression and treatment is usually conservative. It is important to inform the patient about the degree of aesthetic deformity in said joint, which has not reported any type of sequelae in the cases reviewed.

A-0379 THE EATON-LITTLER LIGAMENT RECONSTRUCTION IN THUMB CARPOMETACARPAL JOINT INSTABILITY: OUTCOMES AND PROGNOSTIC FACTORS IN 74 PATIENTS

Niek J. Nieuwdorp[1], Isabel C. Jongen[1], Caroline A. Hundepool[1], Mark J. W. van der Oest[1], Thybout M. Moojen[2], Ruud W. Selles[1,3], the Hand-Wrist Study Group, J. Michiel Zuidam[1]

[1]Department of Plastic, Reconstructive and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands; [2]Hand and Wrist Center, Xpert Clinics, The Netherlands; [3]Department of Rehabilitation Medicine, Erasmus MC, Rotterdam, the Netherlands

Introduction: Laxity of the ligaments and joint capsule results in carpometacarpal (CMC) joint instability, causing pain, functional limitations, and reduced pinch and grip strength. The Eaton-Littler ligament reconstruction is a well-known approach to thumb CMC joint stabilization. The current literature lacks a thorough examination of the Eaton-Littler ligament reconstruction in non-traumatic and non-arthritic CMC instability, leaving the prognostic factors of postoperative outcomes unknown.

Aim: This study aimed to assesses the prospectively collected outcomes of the Eaton-Littler ligament reconstruction in non-traumatic CMC instability. Furthermore, this study aimed to identify prognostic factors associated with postoperative pain.

Material & Methods: For this prospective cohort study, patients presenting with nontraumatic thumb CMC joint instability undergoing Eaton-Littler ligament reconstruction were considered eligible for inclusion. We excluded patients with connective tissue disease or chondropathy of the thumb CMC or STT joint. The primary outcomes were the Visual Analogue Scale (VAS) for pain and the Michigan Hand Outcome Questionnaire (MHQ) total score at 3- and 12-months postoperative. The secondary outcomes were postoperative range of motion, grip and pinch strength, patient satisfaction, return to work and complications. Furthermore, we analyzed the association between preoperative variables and the 12-month MHQ pain score using multivariable linear regression.

Results: Seventy-four patients were included, for whom conservative treatment yielded insufficient results. The patients were predominantly female (67, 91%) with a median age of 39 years [IQR 27-45.75]. Of these patients, 15 (20.3%) underwent an additional surgical intervention to treat pathologies resulting from generalized joint laxity (e.g. tendinitis, synovitis). The median VAS pain score improved significantly ($p < 0.001$) between intake (70 [IQR 63–78]) and 12 months postoperative (27 [IQR 7–56]). The mean MHQ total score also improved significantly ($p < 0.001$) between intake (52, SD 13) and 12 months (74, SD 17). However, substantial inter-subject variance in these outcome measures was observed. All thumbs were stable at follow-up whilst preserving the range of motion. Grip and pinch strength improved significantly following surgery. A total of 81% of patients reported that they were willing to undergo this treatment again. The median return to work was 12 weeks and complications were reported in 13 (18%) patients. Undergoing a concurrent operation during ligament reconstruction (Beta 13.928; 95% CI, 0.97; 26.88) and a better MHQ pain score at intake (Beta 0.547; 95% CI, 0.13; 0.96) were found to be predictors of a favorable postoperative MHQ pain score.

Conclusions: Patient- and clinician-reported outcomes improved significantly at 3- and 12-months after Eaton-Littler ligament reconstruction, making it a suitable technique in the treatment of non-traumatic CMC instability. During ligament reconstruction, we advise to simultaneously treat other hand pathologies resulting from instability.

A-0380 CHANGES IN FLEXOR POLLICIS LONGUS TENDON CROSS-SECTIONAL DIMENSIONS AFTER A1 PULLEY RELEASE FOR PAEDIATRIC TRIGGER THUMB

Cha Hyeong Ok, Young Ho Shin, Ho Yeon Kim and Jae Kwang Kim
Asan medical center, Seoul, South Korea

Introduction: Paediatric trigger thumb is a common condition characterized by flexion deformity of the thumb interphalangeal (IP) joint. At the level of the metacarpophalangeal joint, Notta's nodule can be palpable, and is thought to be an enlargement of the flexor pollicis longus (FPL) just proximal to the A1 pulley. This size mismatch due to proximal enlargement of the FPL may be a possible cause of paediatric trigger thumb, but it remains unknown why the FPL tendon can become enlarged proximal to the A1 pulley.

Aim: The purpose of this study is to examine the cross-sectional changes in the FPL tendon at the area just proximal to the A1 pulley and underneath the A1 pulley following A1 pulley release using ultrasonography in paediatric trigger thumb.

Material & Methods: 30 patients with unilateral paediatric trigger thumb were examined with measurements taken within 1 month before surgery, and at 3 months after surgery. We measured the dorsal-palmar (DP) diameter, radioulnar (RU) diameter and cross-sectional area (CSA) of the flexor pollicis longus (FPL) tendon at two sites: just proximal to the A1 pulley and underneath the A1 pulley using ultrasonography.

Results: Following surgical A1 pulley release, the DP diameter, RU diameter and CSA of the FPL tendon just proximal to the A1 pulley significantly decreased from 2.6mm to 2.2 mm, from 5.1mm to 4.2mm and from 11mm2 to 7.8mm2, respectively. Additionally, the RU diameter and CSA of the FPL tendon at the area beneath the A1 pulley significantly increased from 2.2mm to 3.2mm and from 4.3mm2 to 5.8mm2, respectively.

Conclusions: This finding suggests that the conformation of the FPL tendon of the affected thumb tends to return to that of the contralateral uninvolved thumb after A1 pulley release. Underdevelopment of the inner space around the A1 pulley may contribute to the development of paediatric trigger thumb.

A-0382 EFFICACY OF A HYALURONAN BASED SCAFFOLD SEEDED WITH MESENCHYMAL STEM CELLS IN THREE-DIMENSIONAL ENTHESIS RECONSTRUCTION IN THE ROTATOR CUFF TEAR MODEL

Ahmet Rıfat Doğramacı[1], Gökçe Yıldıran[1], Gülsemin Çiçek[2], Zeliha Esin Çelik[3], Fatma Öz Bağcı[2], Zekeriya Tosun[1]
[1]Selçuk University Faculty of Medicine, Plastic Reconstructive and Aesthetic Surgery Department, Konya, Türkiye; [2]Necmettin Erbakan University Faculty of Medicine Histology and Embryology Department, Konya, Türkiye; [3]Selçuk University Faculty of Medicine, Pathology Department, Konya, Türkiye

Introduction: Enthesis, the tendon-bone junction, plays a crucial role in stress transfer. Unfortunately, up to 93% of injuries to this unit become chronic post-surgery, often healing with scar tissue instead of the physiologic interface, which should consist of four layers after surgical repair.

Aim: This study aims to create a bioengineered multilayered enthesis unit using a hyaluronan-based scaffold seeded with mesenchymal stem cells (MSCs) for rat rotator cuff tear repair.

Material & Methods:

A. In vitro stage

Wharton's jelly mesenchymal stem cells (WJ-MSCs) were isolated,cultured, and validated for implantation into scaffolds. The hyaluronan based scaffold, selected for its compatibility with WJ-MSC's attachment, proliferation and differentiation, was evaluated using electron microscopy to confirm its suitability.

B. In vivo stage
In 48 Sprague Dawley rats, bilateral supraspinatus tendon (SSP) ruptures were created at the bony junction. The SSP was cut at its attachment point to the bone and the tendon remnants were removed. A tunnel was drilled into the bone and a scaffold was attached to the tendon-bone junction. The tendon was then fixed in the bone tunnel.
The rats were divided into four groups:
Group1 (Sham Control) : Surgical intervention only.
Group2 (Control): Scaffold and minimal essential media with surgery.
Group3 : Scaffold and conditioned medium with surgery.
Group4: Scaffold and WJ-MSC with surgery.
On day 30, enbloc excisions of the humerus and the supraspinatus muscle were performed for analysis.
Results: Histology: Collagen structure parameters were higher in the WJ-MSC and CM groups than in the other groups. However, the four zones of the enthesis unit were only visible in all subjects of the WJ-MSC group.
Immunohistochemistry: FGF and BMP were found to be high in the WJ-MSC group.
Biomechanical Evaluation: Load to failure and maximum tensile strength were highest in WJ-MSC group.
Micro-CT: New bone formation was highest in the WJ-MSC and CM groups.
Conclusions: Enthesis repairs are prone to rupture and chronicity due to scar tissue formation. Zhou et al. found that the most important factor required to create an enthesis unit with high mechanical strength is osteogenesis. Chen et al. found that paracrine factors such as FGF, VEGF, and IGF improve collagen structure during enthesis healing. Pasquinelli et al. found that decorin and fibronectin are produced on the 21st day after implantation of MSCs into the scaffold with hyaluronan structure.
Our successful results might be attributed to three parameters:
1- The ability of WJ-MSCs to differentiate osteogenesis. This parameter is demonstrated by new bone formation on micro-CT.
2- Immunomodulation of WJ-MSC. Paracrine factors in WJ-MSC reduce inflammation via the SMAD-2/3 pathway by polarization of macrophages and induce changes in collagen structure with fibroblast accumulation. This parameter was demonstrated histologically and immunohistochemically with the evaluation of collagen and growth factors.
3- The indispensable part of enthesis is the fibrocartilage structure. In this study, a fibrocartilage structure was created by implanting mesenchymal stem cells into a hyaluronan-based scaffold.
This approach enabled the formation of an enthesis unit with bone, non-mineralized and mineralized fibrocartilage, and tendon, exhibiting high mechanical properties.

A-0383 ACUTE CALCIFIC PERIARTHRITIS IN SMALL JOINTS OF THE HAND

Oghenetega T Ekakitie, Sharmila Jivan
Pinderfields General Hospital, Wakefield, United Kingdom

Introduction: Calcific periarthritis, also known as calcific tendinitis, is a musculoskeletal disorder that results from the accumulation of calcium hydroxyapatite crystals in the soft tissues that surround a joint. This condition is characterized by localized pain, tenderness, and stiffness in the affected area, which can lead to a restricted range of motion. This condition is most commonly seen in the shoulder, but it can also occur in other joints, such as the hip, wrist, and ankle. It is however uncommon in the digits.
Aim: We aim to highlight the important features that help differentiate between calcific periarthritis of the hand from other more common conditions such as infection or inflammatory arthropathy.

Material & Methods: We present a case series of calcific periarthritis affecting hand joints, that were treated at Pinderfields Hospital from January to August 2023.
Results: We treated two male and one female patients. All three patients presented acutely with localized pain, restricted range of motion, and tenderness involving the interphalangeal joint of the thumb, the metacarpophalangeal joint of the little finger, and the proximal interphalangeal joint of the index finger.
X-ray imaging confirmed the presence of calcific deposits in the soft tissues surrounding the joints. Expert opinion was sought from our consultant radiologist who diagnosed acute calcific periarthritis in our first patient. Subsequent patients were quickly recognized as they presented with similar signs and symptoms. Treatment included symptomatic relief through analgesics, elevation, nonsteroidal anti-inflammatory drugs, and hand therapy. All patients had symptoms and even radiological resolution after receiving the appropriate medical treatment.
Conclusions: Accurate diagnosis is essential for effective management of acute calcific periarthritis as it can mimic other hand pathologies. Misdiagnosis as an infective or inflammatory condition is common. Having awareness of this entity can reduce unnecessary invasive treatments such as intravenous antibiotics and/or surgical exploration.
Acute calcific periarthritis is usually associated with a palpable rather than a visible tender lump. This helps to differentiate it from crystal deposition disorders which often present with visible lumps. Radiologically, the presence of monoarticular soft tissue calcification not involving the joint itself differentiates it from infective and inflammatory arthropathy.

A-0384 EVALUATION OF A HYBRID SURGICAL TECHNIQUE IN DUPUYTREN'S DISEASE

Marie Plomion, Ludovic Ardouin, Philippe Bellemère
Institut de la Main Nantes-Atlantique, Saint Herblain, France

Introduction: Nowadays, the therapeutic arsenal for Dupuytren's disease (DD) consists of treatments of varying degrees of invasiveness. The debate continues, particularly between percutaneous needle fasciotomy (PNF) and segmental fasciectomy (SF). It revolves around recovery times, recurrence rates and complications. Although PNF is often acclaimed for its safety, it appears to be less effective than SF in terms of recurrence.
Aim: The aim of our study is to evaluate a mixed surgical technique which consists of PNF supplemented by limited fasciectomy (PNF+LF) performed by the frequently occurring skin tear. We compared it with the conventional SF technique. Our hypothesis is that it could be a compromise between the two historical techniques, preserving the safety of PNF while reaching the efficacy to SF.
Material & Methods: We conducted a retrospective, single-center, comparative study evaluating 69 patients treated between 2018 and 2019 by PNF+LF (31 patients) or SF (38 patients). Both groups were comparable in terms of age, sex, severity of DD and diathesis scores. Clinical evaluation was based on measurement of digital extension gain, recovery time, need for physiotherapy, satisfaction, Quick DASH and URAM functional scores, recurrence rate and complications.
Results: At a mean follow-up of 49.8 months, there were no significant difference between the 2 groups regarding the total digital extension gain, satisfaction rate, and functional scores. However, SF group had significantly longer recovery time and bigger need of physiotherapy. The recurrence rate was 50% in SF group and 19.4% in PNF+LF group. Complications occurred 8 times in the SF group (4 nervous, 4 cutaneous) and 3 times in PNF+LF (3 cases of hypoesthesia)
Discussion: results of PNF+LF look similar to those of other surgical techniques of DD reported in the literature in terms of gain of digital extension, including disappointing results for PIP joint. However, recurrence rate of this technique appears to be lower than series evaluating PNF alone in the medium term and its safety is similar.
Conclusion: This technique of PNF+LF may represent a compromise between PNF alone and SF techniques. Its results encourage us to continue our investigations in the long term, with a larger number of patients, and on a prospective basis.

A-0385 MINIOPEN CORRECTIVE OSTEOTOMY AND RETROGRADE INTRAMEDULLARY CANNULATED HEADLESS SCREW (RICHS) FIXATION FOR TREATMENT OF EXTRA-ARTICULAR THUMB METACARPAL BASE MALUNIONS

Sergi Alabau-Rodríguez, Lidia Ana Martín-Domínguez, Albert Pardo-Pol, Inés Farré-Galofré, Xavier Mir-Bulló
ICATME- Quiron Dexeus University Hospital, Barcelona, Spain

Introduction: Extraarticular malunions of the thumb metacarpal are not common but can affect on the quality of life. They are commonly localized at the proximal metaphyseal-diaphyseal junction and patients refer decreased pinch strength and pain at the MCP joint due to a compensatory position in hyperextension. Primary aims in the treatment of extra-articular malunions of the base of the thumb metacarpal are restoring the initial length and flexion of the metacarpal thumb, preserving the opening of the first web space and to correct de compensatory hyperextension of MCP joint.
Aim: The purpose of the study was to evaluate clinical and radiological outcomes of extra-articular malunions involving the base of the thumb metacarpal treated with a mini open corrective osteotomy through the malunion and a percutaneous fixation using a retrograde intramedullary cannulated headless screw (RICHS).
Material & Methods: A review of prospectively collected data was conducted on a consecutive series of 4 patients, treated with a mini open corrective osteotomy through the malunion and a percutaneous fixation using 4.0mm retrograde intramedullary cannulated headless screws for base of thumb malunions. Soft bandage was used for postoperative treatment, without immobilization.
Results: All patients achieved radiographic union with good radiological parameters and without malrotation by 9 weeks. At 3 months follow-up, all range of motion measurements in the treated and untreated thumb were similar. All workers resumed full duties, while nonworkers returned to unlimited leisure activities within a mean of 54 days. Mean visual analogue pain score was 0 at rest and 1,2. during exercise and mean Quick Disabilities of the Arm, Shoulder, and Hand score was 5. Complications were not detected in any case. The osteosynthesis material dit no cause pain or discomfort and any case required removal.
Conclusions: We conclude that mini open corrective osteotomy and intramedullary headless screw fixation is safe and reliable for base of thumb metacarpal malunions, allowing for early postoperative motion and good functional recovery.

A-0386 NON-IATROGENIC NEONATAL LIMB ISCHAEMIA: QUESTIONS ASKED, AND QUESTIONS ANSWERED? - A SYSTEMATIC REVIEW

Aayushi Singal, Yangmyung Ma, Noemi Jester, Avula Aishwarya Rao, Manwi Singh, Andrea Jester
Department of Plastic Surgery, Birmingham Women's and Children's NHS Foundation Trust, Birmingham, United Kingdom

Introduction: Non-iatrogenic neonatal limb ischemia (NLI) is a condition with varying clinical expressions, from transient pallor to compartment syndrome. It can result in complete loss of digits and limbs.
Aim: The aim of this systematic review is to understand the maternal and neonatal factors associated with non-iatrogenic neonatal limb ischemia, the causes of ischaemia, and its non-surgical, medical, and surgical management.
Material & Methods: A literature search using pre-selected keywords and MeSH terms was conducted via databases which included Medline (PubMed), Scopus, Embase, Google Scholar and Cochrane Database of Systematic Review. Relevant articles were selected for the review after screening against the inclusion/exclusion criteria. The study protocol was registered in PROSPERO and was reported via the Preferred Reporting Items for Systematic Review and Meta-Analyses guidelines.
Results: The literature search yielded a total of 116 articles for analysis (114 case reports and two retrospective studies), and a total of 177 neonates were found. The results of this study were divided into two sections; NLI discovered at birth

and NLI discovered after birth (>5 minutes after birth). For NLI discovered at birth, a total of 116 neonates (66%) were analysed, of which half were male. Most neonates presented with ischaemia of the upper limbs (72%), and the causative factor for ischaemia in most cases was a thrombus/embolus (70%). Twenty-nine neonates presented with foetal distress during labour. There were 22 cases of neonates born with cardiorespiratory distress. The most common medical condition noted in the mothers was Type 1/Type 2 diabetes mellitus (17%). The majority of investigations for NLI were normal; however, the most notable abnormal results were elevated D-dimer (86%, n=14), CT angiogram (100%, n=9), and brain MRI (93%, n=14). The most common genetic mutation tested was the MTHFR C677T gene (n=14), with 79% abnormal results. The most common management choices were dressings (n=23), heparin (n=42), and amputation (n=38). For NLI discovered at birth, a total of 37 neonates were analysed, of which 68% were male. Most neonates presented with ischaemia in the upper limb (59%), and the causative factor for ischaemia in most cases was embolus/thrombus (59%). It was noted that 8% of the mothers had Type 1/Type 2 diabetes mellitus. The majority of investigations were normal, with notable abnormal results being positive vesicular fluid cultures (71%, n=7), and CT limb angiogram (100%, n=3). The most common management options were antibiotics (n=16), heparin (n=12), and fasciotomies (n=8).
Conclusions: Non-iatrogenic NLI has severe implications leading to necrosis and gangrene of the limb. This review noted that NLI was associated with maternal diabetes, elevated D-dimer and mutations in the MTHFR C667T gene. Limb ultrasound and CT/MRI angiography were common imaging modalities used to investigate this condition. Common methods of management were heparin, debridement, and amputations. Early intervention is necessary for limb survival, and thus, a combination of treatment options should be considered to maximise management and outcome. Further prospective studies are required to formulate a treatment protocol for this condition.

A-0387 DIVERSITY AMONGST CURRENT HAND FELLOWSHIP DIRECTORS

Ugochukwu N. Udogwu, Catherine C. May, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Diversity, equity and inclusion amongst faculty members within a healthcare system is known to be an important aspect of providing quality and competent care. Previous studies have shown that orthopaedic surgery remains the least diverse specialty in medicine and continues to lag compared to other medical specialties, even as efforts to diversify the orthopaedic workforce continue. While it is important to examine diversity within the orthopaedic surgery workforce, it is prudent to note diversity in leadership as one of the many avenues that can encourage diversity amongst trainees, and subsequently, amongst the orthopaedic surgeon workforce.
Aim: This study aims to examine the racial/ethnic and gender diversity amongst hand surgery Fellowship Directors.
Material & Methods: All hand surgery fellowships in the United States of America were reviewed via the American Society for Surgery of the Hand Fellowship Directory. Each fellowship website was examined to collect demographic information regarding the fellowship director in the following areas: race/ethnicity, sex, fellowship training background (orthopaedic vs general surgery/plastic surgery), and fellowship location. The categories for race/ethnicity include Black/African American, Native American, White/Caucasian, East Asian, Middle Eastern/South Asian, and Hispanic/Latin/South American. For this study, racial/ethnic groups underrepresented in medicine (URM) were defined as Black/African American, Hispanic/Latin/South American, and Native American while non-URM was defined as White and Asian. Simple statistics were performed.
Results: Of the 94 distinct hand fellowship directors in the USA, 71% of current fellowship directors completed orthopaedic surgery training, compared to 29% with training in plastic surgery. With regards to sex, 87% (n=82) of current fellowship directors are men and 13% (n=12) are women. Nine of the 12 (75%) female fellowship driectors were trained in orthopaedic

surgery. Regarding race/ethnicity, 77% (n=72) of fellowship directors are White/Caucasian, 21% (n=20) of fellowship driectors are Asian, 1% (n=1) of fellowship directors are Black/African American, and 1% (n=1) of fellowship directorss are Hispanic/Latin/South American. URM fellowship directors make up only 2% of hand fellowship directors and non-URM fellowship directorss make up 98% of hand fellowship directors.
Conclusions: This study examines the diversity amongst current hand fellowship directors across the USA and found that hand fellowship directors who are considered URM make up only 2% of hand fellowship directors while women make up only 13% of the current hand fellowship directors. The data provided in this study can help direct efforts to increase diversity amongst hand fellowship directors, and as leaders in the field, subsequently amongst the hand surgeon workforce.

A-0388 LONG-TERM RESULTS OF RADIOCARPAL PYROCARBON IMPLANT INTERPOSITION : 41 IMPLANTS WITH A MINIMUM FOLLOW-UP OF 10 YEARS

Clément Berry[1], Etienne Gaisne[2], Yves Kerjean[2], Thierry Loubersac[2], Philippe Bellemère[2]
[1]CHU Amiens Picardie, France; [2]Institut de la main Nantes Atlantiques, France

Introduction: Radiocarpal pyrocarbon implant interposition is indicated for the treatment of degenerative, arthritic, and inflammatory wrists with preserved radiocarpal alignment, particularly in the sagittal plane.
This implant has been proposed as an alternative to total wrist arthroplasty or total wrist fusion, and promising results in the short and medium term has been reported.
Aim: The objective of this study was to evaluate the clinical and radiological outcomes of a radiocarpal pyrocarbon implant interposition with a minimum follow-up of 10 years.
Material & Methods: This retrospective monocentric study included 84 implants in 76 patients who underwent a radiocarpal pyrocarbon implant interposition performed by 4 senior surgeons between November 2008 and May 2013.
Preoperative and final follow-up assessments included pain, range of motion, grip strength, QuickDash and PRWE functional scores, patient satisfaction, and standard wrist radiographs.
Implant survival was determined by the presence or absence of revision surgery.
Results: 41 implants in 39 patients were evaluated at a mean follow-up of 12.64 years (10 to 14 years).
At the final follow-up, average scores for pain (VAS) was 2.3, PRWE 26.3, QuickDash 30.8.
Grip strength was 20.8 kg (71% of contralateral side).
Flexion and extension ROM were respectively 32° and 37°.
The satisfaction rate (satisfied or very satisfied) was 94.9%.
There were 10 revision surgeries (13.6%), with only one occurring after 15 months: 9 for implant instability (5 rotation and 4 dislocation) treated by repositioning the implant with or without changing its size, and one for ulnocarpal conflict.
The survival rate was 86.4%.
There were no significant differences in functional scores between patients who underwent revision surgery and those who did not.
No patient required salvage surgery with alternative technique (total prosthesis or fusion).
There were no significant instability of the carpus nor modifications for carpal sagittal subluxation, carpus height, and ulnar translation between postoperative and last follow-up.
Radiological findings between the mid-term and long-term follow-up remained stable.
Conclusions: With this long-term follow-up, radiocarpal pyrocarbon implant interposition confirms that it is a valid alternative to wrist fusion and total wrist arthroplasty.

Clinical and radiological results remain stable over time.
The implant survival rate does not deteriorate at long term and remains very high for a wrist arthroplasty.
The final satisfaction rate of the patients is also very high.

A-0389 THE EFFECT OF NON-STEROIDAL ANTI-INFLAMMATORY MEDICATIONS ON UNION RATES AFTER OPERATIVE FIXATION OF DISTAL RADIUS FRACTURES

Michael Chang[1,2], Juliet Chung[2], Alexis Kasper[2], Justin Wright[1,2], Margaret Pennington[1,2], Asif Ilyas[1,2]
[1]Thomas Jefferson University Hospital, Philadelphia, USA; [2]Rothman Orthopaedic Institute, Philadelphia, USA

Introduction: Multi-modal pain management strategies for postoperative pain often relies on non-steroidal anti-inflammatory drugs (NSAIDS). However, there remains some reluctance in prescribing NSAIDS postoperatively due to concerns for diminished bone healing following fracture surgery.
Aim: The goal of this study is to compare union rates between patients prescribed and not prescribed NSAIDS for postoperative pain after surgical repair (ORIF) of closed distal radius fractures.
Material & Methods: This was a retrospective case-control study of 494 patients who underwent ORIF of closed distal radius fractures with a volar locking plate, between the years 2020-2022, at a single academic institution. Cases were reviewed from five fellowship trained orthopaedic hand surgeons. Exclusion criteria included those with less than 12-weeks follow-up, open or pathologic fractures, or infection. Baseline demographics included: age, sex, race, ethnicity, BMI, smoking status, alcohol consumption, and medical comorbidities at the time of surgery. Pain control data included the types/numbers of analgesics prescribed. Time to union (in weeks) was based on each surgeon's documentation of a united/healed fracture at follow-up visit. The cohort was divided into two groups: those prescribed NSAIDS (N+) and those who were not (N-). Comparisons between the groups in relation to categorical and continuous variables were analyzed using Chi-squared tests and independent samples t-tests respectively. Significance was set at $p<0.05$.
Results: Of the 494 patients, 115 were prescribed NSAIDS (N+) and 379 were not (N-). The average age was 60 years. Baseline demographics were balanced except in relation to younger age (57 vs. 61 years, $p=0.01$) and number of patients with type 2 diabetes mellitus (0% vs. 5%, $p=0.04$) in the N+ group. Of the NSAIDS prescribed, naproxen, ibuprofen and ketorolac accounted for 80%, 15%, and 5%, respectively. Both groups were prescribed a similar number of opioids including oxycodone (36%), oxycodone/acetaminophen (35%), hydrocodone/acetaminophen (17%), tramadol (6%), codeine/acetaminophen (2%), and no opioids (3%). The overall nonunion rate was 1.2% (6 out of 494). Of these six cases, 2 were in the N+ and 4 were in the N- group. There was no difference in union rate between the two groups (1.7% vs. 1.1%, $p=0.34$). While there was a trend towards quicker time to union in the N+ group (12.6 vs. 14.3 weeks, $p=0.01$), a sub-analysis was performed given that one of the surgeons had a distinctively different follow-up schedule that lent towards documentation of bony union later in the postoperative period. After removal of patients of that one surgeon ($n=117$), time to union was comparable for the remaining cohort (12.3 vs 12.5 weeks, $p=0.24$). Of the six nonunion cases, 4 went on to revision surgery with or without corrective osteotomies within four-months postoperatively, 1 was asymptomatic, and 1 was lost to follow-up after diagnosis.
Conclusions: The prescribing of NSAIDS after ORIF of distal radius fractures was not associated with an increased nonunion rate in this study. This study confirms that NSAIDS can be used as part of multimodal pain control following ORIF of distal radius fractures without jeopardizing bony healing.

A-0390 FREEZE-DRIED AMNIOTIC MEMBRANES AND ADIPOSE-DERIVED MESENCHYMAL STEM CELLS WRAPPING FOR NERVE TRANSFER AUGMENTATION IN BRACHIAL PLEXUS INJURIES

Tabita Prajasari[1], Brigita De Vega[23], Marquee Tumbelaka[4], Heri Suroto[25]
[1]Adi Husada Undaan Hospital Surabaya, Indonesia; [2]Cell & Tissue Bank Regenerative Medicine Center, Dr. Soetomo General Academic Hospital Surabaya, Indonesia; [3]Department of Surgery and Interventional Science, University College London, Royal Free Hospital Campus, UK; [4]dr. Esnawan Antariksa Air Force Hospital Jakarta, Indonesia; [5]Department of Orthopaedic and Traumatology, Dr. Soetomo General Academic Hospital Surabaya, Indonesia

Introduction: Despite nerve transfer advancements, functional recovery after brachial plexus injuries (BPI) remains unfavorable. Regenerating axons' failure in recognizing their original endoneurial tubes causes wrong reinnervation and submaximal outcomes.
Aim: We aim to modulate endogenous nerve regenerative responses by augmenting nerve connections using freeze-dried allogeneic amniotic membranes and adipose-derived mesenchymal stem cells composite (HAM-AdMSC) wrapping.
Methods: This preliminary report of a non-randomized clinical trial (clinicaltrial.gov identifier: NCT04654286) included upper BPI patients (C5-C6/C5-C7 lesion for < 12 months) aged 15-55 years. We observed the active range of motion/AROM; functional motor power (Medical Research Council/MRC scale); pain (visual analogue scale/VAS); sensory function (modified Highet criteria); and DASH (Disabilities of the Arm, Shoulder, and Hand) score. Ten patients (30.30±9.56 years, male/female=9:1) were enrolled into two groups, comprising five patients each: group A (HAM-AdMSC) and group B (control).
Results: We found overall better outcomes in group A, with significant differences were observed in AROM and MRC improvements of elbow flexion (118.0±14.8 vs. 78.0±27.7, p=0.022 and 4.2±0.4 vs. 3.0±0.7, p=0.032, respectively) and shoulder internal rotation (54.0±19.5 vs. 32.0±4.5, p=0.043 and 3.0 vs. 2.2±0.4, p=0.014, respectively).
Conclusion: The nerve tissue engineering approach using HAM-AdMSC wrapping augmentation following nerve transfer procedures in BPI patients may promote axonal regeneration, resulting in better outcomes.

A-0391 WHAT AFFECTS THE PARENTAL STRESS DURING SURGICAL TREATMENT OF CONGENITAL HAND/FOOT DUPLICATION?

Jihyeung Kim, Ji Sup Hwang, Changhyon Lee, Young Ho Lee, Hyun Sik Gong, Yohan Lee, Kee Jeong Bae, Dong Uk Jin, Wan Kee Hong
Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: Stress management is important for parents of children with congenital hand/foot duplication. However, no study can be found that pointed out the characteristics of the parental stress.
Aim: We tried to answer the following two questions: (1) how is the parental stress distributed throughout the treatment period? (2) what are the predictive factors for the parental stress?
Material & Methods: Between July and September 2023, at our clinic, we prospectively enrolled parents of 75 children who were surgically treated with their congenital hand (37 children) or foot (38 children) duplications. We evaluated them with a 11-item questionnaire that were grouped into four blocks: socioeconomic status (4 items), diagnosis-related (1 item), treatment-related (4 items), and stress (2 items). As for the stress, its amount was evaluated between 0 (no stress) and 10 (maximum stress) at five different periods during the treatment: at first detection, at first clinic visit, surgery candidate, during surgery, and post-surgery. Children's clinical data were achieved from electronic medical record. We calculated the predictive factors for the stress score using multivariable linear regression analysis at each time period.
Results: Mean stress score was 9.0 ± 1.9 at first detection, 6.4 ± 1.8 at first clinic visit, 7.2 ± 2.1 surgery candidate, 7.7

± 2.3 during surgery, and 2.4 ± 2.2 post-surgery. Higher stress score was associated with presence of sibling (β = 1.08 ± 0.50, p = 0.04) and college graduate of father (β = 1.42 ± 0.67, p = 0.04) at first detection; prenatal diagnosis (β = -1.72 ± 0.41, p < 0.01) at first clinic visit; girl (β = 1.13 ± 0.56, p = 0.05), post-graduate education (β = 2.63 ± 0.96, p = 0.01) and college graduate (β = 1.56 ± 0.73, p = 0.04) of mother, and prenatal diagnosis (β = -1.84 ± 0.47, p < 0.01) at surgery candidate; and college graduate of mother (β = 1.93 ± 0.86, p = 0.03) and prenatal diagnosis (β = -1.18 ± 0.56, p = 0.04) during surgery.

Conclusions: Parents of children with congenital hand/foot duplication were the most stressed at first detection of the anomaly, followed by during surgery. We also found that the parental stress was higher if the diagnosis was made after pregnancy and the education level of the parents were high. These results suggest that an adequate stress management is required for carefully selected parents.

A-0392 CORRECTION OF CONGENITAL RING-LITTLE FINGER METACARPAL SYNOSTOSIS THROUGH SIMULTANEOUS INTERPOSITIONAL ALLOGRAFT BONE AFTER SPLIT OSTEOTOMY OF THE SYNOSTOSIS SITE AND DISTRACTION LENGTHENING PROCEDURE OF THE FIFTH METACARPAL

Jihyeung Kim, Ji Sup Hwang, Changhyon Lee, Young Ho Lee, Hyun Sik Gong, Yohan Lee, Kee Jeong Bae, Dong Uk Jin, Wan Kee Hong

Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: We attempted a novel technique for patients with congenital ring-little finger metacarpal synostosis involving simultaneous interpositional allograft bone after split osteotomy of the synostosis site and distraction lengthening procedure of the fifth metacarpal along with correction of the metacarpal joint abduction contracture.

Aim: The purpose of this study was to describe the surgical technique and its outcomes.

Material & Methods: We reviewed the medical records of children with congenital ring-little finger metacarpal synostosis surgically treated at our institute. Eight hands of six children with average of 5.0 (range, 1.7-9.3) years of age were treated by simultaneous interpositional allograft bone after split osteotomy, distraction lengthening procedure, and tenotomy of abductor digiti minimi. We measured the metacarpal head-to-capitate ratios from serial radiographs and analyzed them according to age. We also measured the change in the intermetacarpal angle (IMA) and metacarpal length ratio during average 8.1 (range, 1.4-16.8) years of follow-up. These changes were compared to changes in seven hands of five children (control group) with average 8.1 (range, 1.5-15.6) years of age treated by the same method without distraction lengthening procedure of the fifth metacarpal and followed up by average 12.1 (range, 4.1-19.8) years.

Results: Abnormal metacarpal head-to-capitate ratio before surgery was normalized in all patients within the first two years after surgery. The IMA change averaged 39.8 degrees and the metacarpal length ratio change 17%. The IMA change was not different than that of the control group, but the metacarpal length ratio change was significantly greater.

Conclusions: Simultaneous interpositional allograft bone after split osteotomy of the synostosis site and distraction lengthening procedure of fifth metacarpal along with correction of metacarpal joint abduction contracture can restore the radiographic parameters in congenital ring-little finger metacarpal synostosis. The catch-up growth of the 5th metacarpal heads indicates the safety of the surgical procedure.

A-0393 COMPARISON OF LONG-TERM OUTCOMES BETWEEN NONOPERATIVE TREATMENT AND VASCULARIZED BONE GRAFT FOR KIENBÖCK DISEASE: A SYSTEMATIC REVIEW AND SINGLE-ARM META-ANALYSIS

Sungjoo Cheon, Jae Kwang Kim, Young Ho Shin
Department of Orthopedic Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, South Korea

Introduction: Since the prevalence of Kienböck disease is too low for large-scale comparative or prospective tudies,4) a systematic review is a pragmatic option to assess the superiority of VBG to nonoperative treatments. Thus, in the present study, we performed a systematic literature review comparing the long-term outcomes of nonoperative treatment and VBG in patients with Kienböck disease.

Aim: This systematic literature review compared long-term outcomes between nonoperative treatment and vascularized bone graft (VBG) in patients with Kienböck disease.

Material & Methods: We systematically reviewed studies on nonoperative treatment and VBG for Kienböck disease with a mean follow-up of ≥ 5 years. A systematic search was conducted in the Cochrane Central Register of Controlled Trials (CENTRAL), PubMed, and Embase databases to select relevant articles. Data on patient demographics, treatment details, and outcomes were extracted.

Results: Twelve studies (6 for nonoperative treatment and 6 for VBG) were included. The proportion of wrists showing worsening Lichtman stages after treatment was 40.2% (95% confidence interval [CI], 25.7–56.6) and 17.0% (95% CI, 10.2%–26.9%) in the nonoperative treatment group and VBG group, respectively. No change in the stage was observed in 52.4% (95% CI, 25.5%–78.0%) and 77.8% (95% CI, 66.7%–86.0%) of the wrists in the nonoperative treatment group and VBG group, respectively. The proportion of wrists without pain at the final follow-up was 29.2% (95% CI, 16.6%–46.1%) and 35.9% (95% CI, 22.6%–52.0%) in the nonoperative treatment group and VBG group, respectively. The proportion of wrists with more than a moderate degree was 30.4% (95% CI, 22.7%–39.4%) and 12.9% (95% CI, 5.5%–27.4%) in the nonoperative treatment group and VBG group, respectively. The 95% CIs of the mean wrist range of motion and mean grip strength ratio of the affected side to the contralateral side substantially overlapped in the two groups.

Conclusions: The VBG group showed greater improvement in the radiographic stage and wrist pain than did the nonoperative treatment group after treatment, but meaningful differences in parameters were not observed. Further well-designed studies are needed to confirm the superiority of VBG to nonoperative treatment regarding radiographic and clinical outcomes.

A-0394 HOW DOES THE SUBCHONDRAL BONE DENSITY DISTRIBUTION OF THE DISTAL HUMERUS CHANGE BETWEEN EARLY AND ADVANCED STAGES OF OSTEOARTHRITIS?

Changhyon Lee, Ji Sup Hwang, Hyun Sik Gong, Jihyeung Kim, Kee Jeong Bae, Yohan Lee, Dong Uk Jin, Wan Kee Hong, Young Ho Lee
Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: The distribution of subchondral bone density in a joint represents stress that is applied to the joint. Knowing this information is important for understanding the pathophysiology of osteoarthritis (OA). In the elbow, however, this has not been studied before.

Aim: We therefore asked: (1) Is advanced-stage elbow OA associated with more radially distributed subchondral bone density than earlier stages? (2) What demographic (age and sex) and radiographic (osteophyte location and carrying angle) factors are associated with increased radial shift in subchondral bone density?

Material & Methods: Between March 2001 and December 2021, we treated 301 patients for elbow OA. We considered patients with plain radiographs and conventional CT scanning as potentially eligible. Thus, 68% (206 patients) were eligible; a further 27% (80 patients) were excluded because of a history of any injury or surgery or known inflammatory joint disease, leaving 42% (126 patients) for analysis here. Their mean ± standard deviation age was 60 ± 10 years. Early OA with minimal joint space narrowing and osteophyte formation was found in 33% (42 of 126) of patients and advanced OA was found in the remaining 67% (84 of 126). Three-dimensional distal humerus subchondral bone models were derived from CT images, and in the central intra-articulating portion, we measured the subchondral bone density in two different sites: where it articulates with the radius (SBDrad) and with the ulna (SBDulna). We further defined the SBDratio as the percent ratio of SBDrad to SBDulna. We also evaluated osteophyte severity based on its size at the radiocapitellar and ulnotrochlear joints, and alignment through measuring the carrying angle on radiographs. To assess interobserver reliability, two orthopaedic surgeons took measurements independently from each other. All measurements had excellent intraoberver and interobserver reliabilities. Then, we compared the subchondral bone parameters between early and advanced OA and performed a multivariable analysis of the factors associated with subchondral bone parameters, including age, sex, osteophyte location, and carrying angle.
Results: Radial versus ulna subchondral bone density (SBDratio) was modestly higher in patients with advanced OA (118% ± 17%) than in patients with early OA (109% ± 17%, mean difference 9% [95% CI 2.3 to 15.3]; $p = 0.01$). With increasing radial deviation in subchondral bone density, cubitus valgus had a modest association ($\beta = 0.46 \pm 0.23$; $p = 0.04$) and severe osteophytes at the radiocapitellar joint had a large association ($\beta = 9.51 \pm 3.06$; $p = 0.002$).
Conclusions: According to subchondral bone density distribution, stress concentration was more radially deviated in patients with the advanced stages of elbow OA than in those with the early stages. We also found that an increase in carrying angle is associated with radial deviation of stress. A future study that examines longitudinal changes in the subchondral bone density might be required to confirm changes in stress concentration with OA progression.

A-0395 EFFECT OF ANTIRESORPTIVE THERAPY ON DEVELOPMENT OF POST-TRAUMATIC OSTEOARTHRITIS AFTER INTRA-ARTICULAR DISTAL RADIUS FRACTURE

Ji Sup Hwang, Hyun Sik Gong, Wan Kee Hong, Dong Uk Jin, Jihyeung Kim, Yohan Lee, Kee Jeong Bae, Young Ho Lee
Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: Subchondral bone is a potential target of osteoarthritis (OA) prevention. Anti-resorptive therapy has been demonstrated to be chondroprotective in surgically induced OA animal models, but results were mixed in clinical studies. We wanted to know whether patients with traumatic joint injury might benefit from the anti-resorptive therapy, and whether one's bone health status might affect the chondroprotective effect, if any, of the therapy.
Aim: We therefore asked: (1) Is there a preventive effect of the anti-resorptive therapy for post-traumatic OA development after intra-articular distal radius fracture? (2) Is there any difference in the effect according to osteoporosis status?
Material & Methods: Between March 2001 to December 2020, we treated 438 patients for intra-articular distal radius fracture through open reduction and internal fixation. We considered patients who were female and were followed up for at least one year as potentially eligible. Thus, 80% (351 patients) of patients were eligible; a further 12% (52 patients) were excluded because of associated carpal bone fracture or history of any anti-osteoporosis therapy before the surgery, leaving 68% (299 patients) for analysis here. The mean age of the included patients was 64.7 ± 8.6 years. According to the WHO diagnostic criteria, 27% (80 patients) were osteoporotic, and 50% (149 patients) indicated for secondary prevention of osteoporosis started anti-resorptive therapy immediately after surgery. From the plain radiographs, we evaluated

development of radiographic OA at one year postoperatively. Odds ratio (OR) for the OA development was analyzed using logistic regressions for factors including age, lowest T score, bone mineral density, presence of osteoporosis, residual step-off after surgery, and anti-resorptive therapy. To delineate the effect of the presence of osteoporosis, subgroup analyses were performed.
Results: Development of radiographic OA was identified in 27% (80 patients). In the regression analysis, radiographic OA was associated with presence of osteoporosis (OR = 3.97; 95% CI = 1.89-8.32), residual step-off (OR = 3.68; 95% CI = 1.45-9.39), and not starting the anti-resorptive therapy (OR = 0.29; 95% CI = 0.14-0.61). In subgroup analysis according to osteoporosis status, radiographic OA was associated with not starting the anti-resorptive therapy (OR = 0.24; 95% CI = 0.07-0.93) for patients without osteoporosis. However, for patients with osteoporosis, no association was found between radiographic OA and the evaluated factors.
Conclusions: Initiation of anti-resorptive therapy was associated with a lower incidence of radiographic OA after intra-articular distal radius fracture, especially in those without osteoporosis. This study suggests that attempts to decrease bone remodeling might be effective for OA prevention in a joint at risk.

A-0396 THREE-DIMENSIONAL VOLUMETRIC ASSESSMENT OF FRACTURE HEALING AFTER OPEN REPAIR OF DISTAL RADIUS FRACTURE AND IMMEDIATE USE OF ANTIRESORPTIVE AGENTS

Ji Sup Hwang, Hyun Sik Gong, Wan Kee Hong, Jin Dong Uk, Jihyeung Kim, Yohan Lee, Kee Jeong Bae, Young Ho Lee
Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: Although use of anti-resorptive agents did not affect fracture healing in previous studies, the amount of healing was not examined quantitatively in patients starting on medication after fracture. We wanted to examine fracture healing quantitatively by three-dimensional volumetric assessment after surgical repair of distal radius fracture in patients starting on either denosumab or risedronate.
Aim: We questioned: (1) Is the fracture healing ratio correlated with patient factors? (2) Is there any difference in the fracture healing ratio between the two commonly prescribed anti-resorptive agents (denosumab or risedronate)?
Material & Methods: We retrospectively reviewed 74 patients who underwent surgical repair for distal radius fracture and started denosumab (n = 46) or risedronate (n = 28) immediately after surgery. Computed tomography (CT) scans were analyzed by using the imaging software (Materialize Mimics) for three-dimensional assessment of cortical volume at the fracture site. The fracture healing ratio was calculated semi-automatically in both groups. Pearson's coefficients were calculated between demographic factors, osteoporosis-related parameters, and fracture healing ratio. And we compared the fracture healing ratio between the two groups using ANCOVA.
Results: Fracture healing ratio averaged 84.0 % ± 9.8 % and showed a positive correlation with lumbar BMD (R = 0.271, p = 0.02) and femur neck BMD (R = 0.231, p = 0.05). When BMD values were adjusted, denosumab users showed a significantly higher fracture healing ratio (85.9 % ± 1.4 %) than the risedronate users (81.0 % ± 1.8 %).
Conclusions: Our finding suggests that one's osteoporosis status is closely related to the amount of healing after a fracture. And starting anti-resorptive therapy after distal radius fracture did not impede fracture healing, with denosumab potentially showing a higher healing ratio compared to risedronate.

A-0397 BIOMECHANICAL INVESTIGATION OF THE 0° LONGITUDINAL PULL VERSUS THE 90° TRANSVERSE PULL FORCE ON KNOT

Snow Lin Yunni[1], Yoke Rung Wong[2], Duncan Angus McGrouther[2,3]
[1]Yong Loo Lin School of Medicine, National University of Singapore, Singapore; [2]Biomechanics Laboratory, Singapore General Hospital, Singapore; [3]Department of Hand Surgery and Reconstructive Microsurgery, Singapore General Hospital, Singapore

Introduction: There is a myriad of techniques used to make a surgical knot. Secure knots are crucial for safe surgical and interventional practice, serving its function in ensuring hemostasis, anastomosis, and appropriate apposition of wounds. However, few biomechanical studies focused on the intricacies of the suturing steps and techniques and its influence on knot security.

Aim: This paper aims to develop a biomechanical testing method and evaluate the biomechanical performance of reef knots made by using the 0° longitudinal pull and 90° transverse pull at the last throw.

Material & Methods: 40 samples of fresh porcine skin were sutured with either a 0° longitudinal pull (n = 20) or a 90° transverse pull (n = 20) using Prolene® 4.0 suture. Instron 3343 was used to standardize the tying force at 4±0.5N and thereafter survival testing on the samples was performed by using Instron E-1000. The medians of the slippage/breakage force and the nth cycles before breakage were tabulated. Both knot slippage or suture breakage were considered as failure criteria for the test. Non-parametric Mann-Whitney U Test was utilised to compute the statistically significant difference in between groups.

Results: The 0° longitudinal pull had a higher survival rate compared to the 90° transverse pull, (Stage 1: 85% vs. 80%, Stage 2: 65% vs. 40%). A single knot slippage was noted on a sample of the 90° transverse pull group, while the rest of the knots failed due to knot breakage. However, statistical analysis reported no statistically significant difference in between the group of 0° longitudinal pull and 90° transverse pull for the knot strength (21.8N vs. 20.0, $p = 0.258$) and the nth cycles before breakage (436 cycles vs 209 cycles, $p = 0.120$).

Conclusions: The low survival of the 90° transverse pull could be possibly attributed to the steeper learning curve but its higher nth cycles before breakage warrants further studies to investigate if this hypothesis holds true for different types of suture techniques, suture material and operators of a different skill level.

A-0398 COLLAGENASE CLOSTRIDIUM HISTOLYTICUM VERSUS LIMITED FASCIECTOMY FOR DUPUYTREN'S DISEASE – EARLY POSTINTERVENTIONAL CLINICAL IMPLICATIONS

Julia Bernhard, Rémy Liechti, Dominique Nellie Merky, Ramin Ipaktchi, Esther Vögelin
Department of Plastic and Hand Surgery, University Hospital of Bern, Bern, Switzerland

Introduction: Since the withdrawal of the market authorisation of Collagenase clostridium histolyticum (CCH) in Europe in March 2020, the value of this treatment option in Dupuytren's disease became more evident. The aim of this study was to compare outcomes of patients receiving CCH injection with patients undergoing limited fasciectomy (LF) with focus on the early postinterventional soft tissue conditions and individual burden measured by the frequency of surgeon and hand therapy visits.

Materials and methods: All consecutive patients undergoing either CCH injection or LF as a first line treatment in a 15 year period (2006-2021) at the University Hospital of Bern, Switzerland were assessed for eligibility. Propensity score matching involving confounding factors (age, gender, diabetes, family history, disease severity and number of rays involved) was performed to minimize selection bias. Primary outcome analysis was focused on the early postinterventional wound

condition of the hand using a soft tissue score with points given for hyperemia, tenderness, scar mobility, swelling, and toughness. Secondary outcomes included the number of medical and hand therapy visits.
Results: In the mentioned timeframe, 195 patients were treated for Dupuytren's disease at the University Hospital of Bern, Switzerland. After exclusion and propensity score matching, two treatment groups of 26 patients each were formed. Mean age was 71.7 years (SD 8.5 years) in the CCH group and 70.9 years (SD 11.9 years) in the LF group. There were no significant differences in baseline characteristics and initial correction of extension deficit between treatment groups. The early postinterventional soft tissue score was significantly worse in the LF group than in the CCH group (mean 0.46 vs. 0.12 points, MD 0.34, 95% CI [0.10, 0.58], $p = 0.033$). The number of surgeon and hand therapy visits was significantly higher in the LF group (mean 4.3 vs. 1.9 visits, MD 2.4, 95% CI [1.5, 3.3], $p < 0.001$ and mean 10.5 vs. 4.3 visits, MD 6.2, 95% CI [0.7, 11.7], $p = 0.036$, respectively).
Conclusion: Evidence of the present study suggests that patients undergoing CCH injection have a significantly less complicated wound healing with softer scar conditions requiring less intensive surgical and hand therapy aftercare. In our opinion, CCH treatment remains an important tool in the armamentarium for the treatment of Dupuytren's disease and the reintroduction or approval of a generic drug worthy of being supported.

A-0399 RECONSTRUCTION OF HIGH RADIAL NERVE INJURY DUE TO STAB INJURY USING HUMAN ACELLULAR NERVE ALLOGRAFT: A CASE REPORT

Jinil Choi, Sung Tack Kwon, Byung Jun Kim
Department of Plastic and Reconstructive Surgery, Seoul National University Hospital, Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: The radial nerve is one of the most commonly injured nerve and various treatment options are utilized such as tendon transfer, nerve transfer or nerve repair using conduit or autograft. Human acellular nerve allograft have increased its use in clinical practice even in high level, large diameter, mixed nerve injuries.
Aim: Here, we present a case of high radial nerve injury due to stab injury, reconstructed with human acellular nerve allograft with favorable clinical recovery course.
Material & Methods: A 27-years-old male patient presented with left side wrist drop and hand dorsum numbness after stab injury of left upper arm posterolateral side 2 month ago. Wrist and finger extension was totally impossible and dorsoradial side sensation was lost. Ultraonography revealed complete transection of radial nerve and 1.6cm of its discontinuity. 3 month after injury, wound exploration was performed. Severe scar adhesion and neuroma formation was identified between proximal and distal radial nerve stump. Neuroma was excised and 25mm nerve gap was formed. 3mm diameter and 30mm length human acellular nerve allograft was grafted between proximal and distal stump and epineural suture was done. Rehabilitation started 1 month after graft.
Results: 1 month after graft, medical research council (MRC) scale for muscle strength of finger extension was 2, thumb extension was 0, wrist extension was 0. Dorsoradial hand sensation was not recovered but tingling sensation and tinel sign was positive. 4 month after graft, MRC grade of finger extension was 2, thumb extension was 2, and wrist extension was 3. Dorsoradial hand showed 50% hypesthesia compared to normal side. 5 month after graft, MRC grade of finger extension was 3, thumb extension was 3, and wrist extension was 4. Dorsoradial hand showed 80% hypesthesia.
Conclusions: Despite long term result is not assessed for this patient, this case shows favorable motor and sensory recovery of the patient who underwent human acellular nerve allograft to high radial nerve injury due to stab injury. Acellular nerve allograft can be good option for high level, large diameter, mixed nerve injuries without donor site morbidity.

A-0400 TREATMENT OF THE PARAFFIN-INJECTED INTRACTABLE WOUND OF THE BILATERAL HAND DORSUM

Jinil Choi, Sung Tack Kwon, Byung Jun Kim
Department of Plastic and Reconstructive Surgery, Seoul National University Hospital, Seoul National University College of Medicine, Seoul, Republic of Korea

Introduction: Paraffin injection had been commonly used for body contouring of augmentation. Despite a long history of medical applications, paraffin is proven to be harmful, showing complications such as migration, deformity, wound problem like ulceration, and skin necrosis.
Aim: Paraffinoma of penis, breast, and face have been reported widely but to the best of our knowledge, report of paraffinoma of hand is extremely rare. Here, we present a case of 80 years old female patient, suffered from recurrent wound problem after paraffin injection to her bilateral hand dorsum.
Material & Methods: The patient received paraffin injection by a non-medical practitioner to her hands about 40 years ago. The patient was referred to our clinic due to recurrent wound problem of her right-hand dorsum. The patient had 1cm size ulceration with swelling, redness and firm change of her right-hand dorsum. There was MCP joint flexion limitation up to 40 degrees, otherwise there was no ROM limitation. MRI showed diffuse soft tissue thickening located outer side of extensor tendon. At first, extirpation of paraffin infiltrated soft tissue leaving skin flap for primary closure was planned because the patient was reluctant to extensive debridement and reconstruction. The surgical findings revealed a firm mass, mixed with fibroadipose tissue and severe adhesion with extensor digitorum communis tendon. Permanent biopsy result was consistent with paraffinoma. After initial operation, recurrent wound dehiscence and wound infection was occurred due to compromised skin perfusion. Serial debridement procedures were performed until clean wound bed formation and reconstruction with full thickness skin graft was followed. The patient showed same range of motion with her initial visit except limitation of ring finger MCP active extension. (Extension lag about 10 degree) The patient complained about the contracture, the depressed contour and numbness of her hand dorsum. After 3 years, the patient showed similar wound problem, with 2 cm sized ulceration with swelling, redness and firm change of her left-hand dorsum.
Results: This time thorough debridement and one stage reconstruction with free flap was planned. Debridement was performed including whole affected dorsum skin and soft tissue above EDC tendons. EDC tendons were preserved. Thin free ALT flap was elevated along subfascial plane to minimize disruption of EDC tendon gliding and lateral femoral cutaneous nerve was included to promote sensory recovery. Flap vessels were anastomosed to radial artery, dorsal vein in end-to-end method, and neurorrhaphy of flap nerve was performed to superficial branch of radial nerve in end-to-side method. The patient showed good postoperative course with fair ROM, fair contour and without contracture of her hand dorsum.
Conclusions: Paraffin injection to hand can lead to intractable wound problems long after the injection, as we can see in this case. This case highlights the importance of radical resection of paraffin infiltrated tissue including affected skin. Conservative debridement can cause wound infection and recurrent wound problems. After enough debridement of affected soft tissue, thin fasciocutaneous, sensate free flap can be a good option to match hand dorsum contour and sensory restoration without contracture and interruption of tendon gliding.

A-0401 GENETIC CHARACTERIZATION OF THE NON-SYNDROMIC CONGENITAL HAND DIFFERENCES

Byung Jun Kim[1], Jinil Choi[1], Sung Yoon Cho[2], Min Sun Kim[2], Hyojung Park[2], Dong-Kyu Jin[2], Sung Tack Kwon[1]
[1]Department of Plastic and Reconstructive Surgery, Seoul National University Hospital, Seoul National University College of Medicine, Seoul, Korea; [2]Department of Pediatrics, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

Introduction: Polydactyly is one of the most common congenital hand anomalies. The incidence is known to be 1-2/1,000 in Asians or Caucasians. Post-axial type, which means extradigit expressed at the little finger, shows increased risk of foot involvement and genetic inheritance.
Aim: In the present study, we evaluated the genetic characterization of the non-syndromic congenital hand differences, especially focused on the post-axial type polydactyly.
Material & Methods: Genetic study was performed using diagnostic exome sequencing (DES). Once a mutation is found related to the polydactyly-related gene, Sanger sequencing was performed to segregate the results of family members enrolled in the study. An additional group of 1000genome without skeletal deformities was recruited for examining the allele frequencies in ethnicity matched control.
Results: We presented the clinical features and molecular evaluations of 6 probands. In all subjects, anomalies were found in bilateral hands and feet. Four showed family history. GLI3 mutations were identified in 4 (67%) of probands including two novel missense mutation c.2360A>G (p.Asn787Ser) and nonsense mutation c.1451G>A (p.Trp484*)
Conclusions: The results support the concept that GLI3 is a main gene for polydactyly that affects both hands and feet bilaterally. Genetic characterization can be effectively used when counseling the patients with the congenital hand differences.

A-0402 CLINICAL RESULTS OF UNLINKED TYPE TOTAL ELBOW ARTHROPLASTY FOR STIFF ELBOWS IN PATIENTS WITH RHEUMATOID ARTHRITIS

Yasuhiro Kiyota[1], Takuji Iwamoto[1], Taku Suzuki[1], Noboru Matsumura[1], Kazuki Sato[2]
[1]Department of Orthopaedic Surgery, School of Medicine, Keio University, Tokyo, Japan; [2]Institute for Integrated Sports Medicine, Keio University School of Medicine, Tokyo, Japan

Introduction: The elbow motion is crucial for daily activities, and the increased use of devices like computers and mobile phones necessitates increased upper-extremity mobility. Consequently, elbow contracture is thought to impede daily activities significantly. Only a few reports in the literature describe the results of total elbow arthroplasty (TEA) for the treatment of stiff elbow. Conventionally, linked-type TEA has been favored in the literature to prevent postoperative instability. However, in the treatment of a stiff elbow, surgery is often required at a relatively young age, leading us to choose unlinked type TEA as our preferred option.
Aim: To examine the clinical results of unlinked type TEA for stiff elbows in RA patients.
Material & Methods: We conducted a retrospective case series involving 9 patients (10 elbows) with stiff elbows resulting from RA who underwent a primary TEA using an unlinked type K-NOW implant (Teijin-Nakashima Medical, Okayama, Japan) between December 2012 and August 2022. Patients with a preoperative arc of elbow motion of 60˚ or less were categorized as stiff elbows. All patients were female, with an average age of 58 years (range, 41-79 years) at the time of surgery. Preoperative radiographs revealed grade 3 in 6 elbows, and grade 4 in 4 elbows according to the Larsen grading system. The right arm was affected in 5 cases, while the left arm was affected in the remaining 5. The average postoperative

follow-up period was 53 months (range, 24-129 months). All surgeries used a triceps-on (lateral paraolecranon) approach. Tension adjustment was achieved through bone resection, aiming to maximize the range of motion while preserving elbow joint stability. The follow-up assessment included evaluations of ROM of the elbow joint, function, and complications. Elbow motion was assessed using a goniometer. Functional results were evaluated according to the Mayo Elbow Performance Score (MEPS). Anteroposterior and lateral radiographs were meticulously reviewed, evaluating the presence of implant loosening.

Results: Postoperative ROM demonstrated improvement, with a preoperative extension of -60˚ and flexion of 101˚ progressing to a postoperative extension of -38˚ and flexion of 123˚. The acquired range of motion showed an extension of 22˚ and flexion of 22˚. MEPS significantly improved, with preoperative scores of 53 and postoperative scores of 93. Two cases experienced transient postoperative ulnar nerve impairment, but there were no instances of dislocations or implant loosening.

Conclusions: Improvement in range of motion and functional recovery were achieved in cases of stiff elbows due to RA using the unlinked type TEA. However, since the acquired range of motion was similar for both extension and flexion, careful consideration is needed when applying unlinked TEA in cases with severe extension contracture.

A-0403 STRESS CHANGES IN THE LUNATE AND SCAPHOID BONE DUE TO CLOSING RADIAL WEDGE OSTEOTOMY; INVESTIGATION OF OPTIMAL OSTEOTOMY ANGLE FOR KIENBOCK'S AND PREISER'S DISEASE USING FINITE ELEMENT ANALYSIS

Atsushi Hojo, Yusuke Matsuura, Takahiro Yamazaki, Takashi Nomoto, Ryutaro Iwasaki, Seiji Ohtori
Department of Orthopedic Surgery, Chiba University, Japan

Introduction: One of the options in surgical treatment for Kienbock's disease and Preiser's disease is decompression surgery such as radial shortening. Closing radial wedge osteotomy (CRWO), one of the decompression techniques, is said to reduce the load on lunate bone, but it is also used to decompress the load on scaphoid bone. However, it is unclear that the effect of load reduction in each bone, and which angles are most effective in CRWO.

Aim: The purpose of this study was to evaluate the stresses on the lunate and scaphoid bones using finite element analysis (FEA) to determine the optimal osteotomy angle for CRWO.

Material & Methods: Five fresh-frozen cadavers were used for the analysis. CT images were taken at neutral position and ulnar deviation at 5, 10, 15, and 20 degrees. Patient-specific CT-based finite element model was created using MECHANICAL FINDER (Computational Mechanics Research Center, Inc.). The proximal radius and ulna were rotated to each osteotomy angle, and a total load of 102 N was applied parallel to each metacarpal bone axis to constrain the proximal radius and ulna. The equivalent stress and minimum principal stress in the lunate and scaphoid bones were examined by calculating the rate of change from the neutral position at each osteotomy angle.

Results: The percent change in minimum principal stress in the lunate and scaphoid bones was -5.9/ -6.4, -9.5/ -10.8, -22.0/ ±0, and -25.7/ -4.5 percents at 5, 10, 15, and 20 degrees of osteotomies, respectively. The percent change in equivalent stress of the lunate and scaphoid bones was -0.3/ 4.5, -4.3/ 10.2, -14.1/ 0.9, and -19.9/ -5.2, respectively. 20 degrees osteotomy angle showed the greatest decrease in minimum principal stress and equivalent stress of the lunate and a decrease in stress of the scaphoid bone.

Conclusions: FEA of the CRWO showed its effectiveness as a decompression technique for the lunate, with the maximum decompression at 20 degrees. And the result suggesting that the scaphoid bone can also be decompressed by the osteotomy angle.

A-0404 PATIENT REPORTED OUTCOMES AND FUNCTION AFTER LIGAMENT RECONSTRUCTION FOR TRAUMATIC THUMB CARPOMETACARPAL INSTABILITY

Niek J. Nieuwdorp[1], Isabel C. Jongen[1], Caroline A. Hundepool[1], Mark J. W. van der Oest[1], Thybout M. Moojen[2], Ruud W. Selles[1,3], the Hand-Wrist Study Group, J. Michiel Zuidam[1]

[1]Department of Plastic, Reconstructive and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands; [2]Hand and Wrist Center, Xpert Clinics, The Netherlands; [3]Department of Rehabilitation Medicine, Erasmus MC, Rotterdam, the Netherlands

Introduction: Injury to the thumb carpometacarpal (CMC) joint may lead to rupture or attenuation of its ligaments, resulting in CMC joint instability. Patients present with pain, functional limitations, and reduced grip and pinch strength. Ligament reconstruction can be indicated to restore stability and alleviate complaints in non-arthritic instability, unresponsive to conservative therapy. In the current literature, varying results are being published regarding the feasibility of ligament reconstruction in traumatic CMC joint instability.

Aim: This study aimed to assess prospectively collected patient- and clinician-reported outcomes of ligament reconstruction in patients presenting with traumatic thumb CMC joint instability.

Material & Methods: Patients with traumatic thumb CMC joint instability undergoing ligament reconstruction were considered eligible for inclusion into this prospective cohort study. We excluded patients with connective tissue diseases or chondropathy of the STT or CMC joint. The patients were treated with either the Eaton-Littler ligament reconstruction, the figure-of-eight ligament reconstruction, or the dorsal ligament reconstruction. The primary outcomes were the Visual Analogue Scale (VAS) for pain and the Michigan Hand Outcome Questionnaire (MHQ) total score at 3- and 12-months postoperative. Secondary outcomes included postoperative range of motion, grip and pinch strength, patient satisfaction, return to work, and complications.

Results: Twenty-three patients were included, predominantly female (19, 83%), with a median age of 38 years [IQR 29.5–45.5]. Of the included patients, 3 (13%) had a history of a Bennet fracture. Significant improvements were observed in the VAS pain score ($p<0.001$) from intake (60 [IQR 48-67]) to 12-months postoperative (12 [IQR 4-44]) and in the MHQ total score ($p<0.001$) from intake (63 [IQR 51-68]) to 12-months (80 [IQR 70-90]). We observed a large between-subject variability at all timepoints for both outcomes. All thumbs were stable upon physical examination and range of motion remained preserved following surgery. Grip and pinch strength improved notably. A total of 87% of patients reported that they were willing to undergo this treatment again. The median time to return to work was 4 weeks and complications were reported in 2 patients (9%). One patient showed progression to arthritis during the follow up time.

Conclusions: Patient- and clinician-reported outcomes improved significantly at 3- and 12-months following surgery showing favorable postoperative pain, function, and stability. Additionally, patients were highly satisfied with this treatment, affirming that ligament reconstruction is a suitable option in the treatment of traumatic thumb CMC instability.

A-0405 THE EFFECT OF MOTIVATIONAL INTERVIEWING ON PAIN, FUNCTIONALITY, SLEEP, CENTRAL SENSITIZATION IN PATIENTS WITH THORACIC OUTLET SYNDROME: A PRELIMINARY STUDY

Şule Tüzen Tek[1], Nur Sena Topdaş[1], Gülay Uzun[1], Tüzün Fırat[2], Ayten Kayı Cangır[3]

[1]Graduate School of Health Sciences, Hacettepe University, Ankara, Turkey; [2]Faculty of Physical Therapy and Rehabilitation, Hacettepe University, Ankara, Turkey; [3]Department of Thoracic Surgery, Medicine Faculty of Ankara University, Ankara, Turkey

Introduction: Thoracic Outlet Syndrome (TOS) is a complex syndrome caused by compression of the brachial plexus, subclavian artery and vein at the thoracic outlet. Since its differential diagnosis is difficult, due to delayed diagnosis TOS

patients are generally affected by chronic pain. Combating chronic pain is one of the main approaches in the treatment of TOS. For this purpose, behavioral therapies are used in TOS. Motivational interview aims to provide a therapeutic alliance in people with ambivalence and uncertainty and aims to change behavior by addressing people from a biopsychosocial perspective.
Aim: The aim of our study was to investigate the effect of motivational interviewing techniques on TOS symptoms in TOS patients.
Material & Methods: Twelve women were included in the study. Pain intensity was assessed using Visual Analog Scale (VAS). Central sensitization, alexithymia, functionality and sleep were evaluated with Central Sensitization Scale (CSI), Toronto Alexithymia Scale (TAS), A Self-Questionnaire for Functional Evaluation in Thoracic Outlet Syndrome (FETOS) and Jenkins Sleep Scale (JSS), respectively. The patients underwent 4 sessions of motivational interviewing. The evaluations were performed before the first interview and the end of the forth interview. Behavioral change was aimed by using open-ended questioning, support, reflective reflection, and summarizing techniques that form the basis of motivational interviewing. Regular physiotherapy program was started after 4 interviews and the results of physiotherapy were not reported in this study.
Results: Mean age of the patients was 42.17±12.28 years. After 4 sessions of interview, an increase in sleep quality ($p=0.005$), a decrease in pain intensity ($p=0.005$) and in central sensitization ($p=0.034$) were observed. Functionality ($p=0.068$) and alexithymia did not change ($p=0.695$).
Conclusions: Four sessions of motivational interviewing techniques are effective on resting pain intensity, central sensitization, and sleep in TOS patients. TOS patients have chronic pain characteristics. Patients show maladaptive behavior patterns that contribute to chronic pain. Therefore, TOS patients should be evaluated and treated biopsychosocial perspective. According to the preliminary results, motivational interviewing techniques are effective on pain, central sensitization, and sleep in the treatment of TOS. Motivational interviewing technique can be applied to control chronic pain components prior to conventional treatment programs.

A-0406 HOW MIRNAS REGULATE SCHWANN CELLS DURING PERIPHERAL NERVE REGENERATION—A SYSTEMATIC REVIEW

Borger A, Stadlmayr S, Haertinger M, Semmler L, Supper S, Millesi F, Radtke C
Departement for Plastic, Reconstructive and Aesthetic Surgery, Medical University of Vienna

Introduction: A growing body of studies indicate that small noncoding RNAs, especially microRNAs (miRNA), play a crucial role in response to peripheral nerve injuries. During Wallerian degeneration and regeneration processes, they orchestrate several pathways, in particular the MAPK, AKT, and EGR2 (KROX20) pathways. Certain miRNAs show specific expression profiles upon a nerve lesion correlating with the subsequent nerve regeneration stages such as dedifferentiation and with migration of Schwann cells, uptake of debris, neurite outgrowth and finally remyelination of regenerated axons.
Aim:(a) the specific expression profiles of miRNAs upon a nerve lesion and (b) how miRNAs regulate nerve regeneration by acting on distinct pathways and linked proteins.
Material & Methods: Systematic literature Review
Results: We identified 28 miRNAs with described mechanism and target and their role in Schwann cells. Furthermore, we could create their expression profiles during the main stages of nerve injury and regeneration (nerve injury, wallerian degeneration, Schwann cell reorganization, demyelination)
Conclusions: miRNAs play a tremendous role as modulators of cellular function during peripheral nerve injuries and

regeneration. A total number of 28 miRNAs could be identified and characterized at the present status of research. That provides us with a therapeutic opportunity to promote desired or readjust dysregulated processes, respectively. Their potential in precision medicine warrants further research on the field of miRNAs.

A-0407 SURGICAL MANAGEMENT OF SEVERE RECURRENT FORMS OF DUPUYTREN'S CONTRACTURE - FISH TECHNIQUE

Tomas Hellmuth[1], Radek Kebrle[1,2], Daniela Horackova[1], Jiri Caithaml[1]
[1]Hand and Plastic Surgery Institute, Vysoke nad Jizerou, Czech Republic; [2]Dr. Pirek Hospital, Mladá Boleslav, Czech Republic

Introduction: Surgical treatment of severe recurrent forms of Dupuytren's contracture brings many problems and complications. Early complications include wound breakdown, skin necrosis, injury to neurovascular bundles with subsequent impairment of sensation and blood supply. Late complications include cold intolerance, trophic disorder, and necrosis of the middle and distal phalanx. Other complications include frequent recurrence of the disease with further progression of flexion contracture.
Aim: In this presentation, the authors show, step by step, a salvage surgical technique that significantly reduces these complications.
Material & Methods: The procedure is most performed under local anaesthesia – brachial plexus block, tourniquet, and the use of surgical loupes. The principle of the described technique is segmental aponeurectomy, performed from transverse incisions in the distal horizontal flexion crease of the palm and in the flexion crease of the metacarpophalangeal and interphalangeal joints of the affected fingers. Under the visualization of neurovascular bundles, not only knots and strips of overgrown palmar fascia are removed, but also subcutaneous ligamentous scars from previous surgeries. In the case of flexion contractures of the middle joints, the procedure is usually supplemented by volar capsulotomy and, if necessary, disconnection of the superficial flexor tendon. Residual skin defects that arise after the release of flexion contractures are primarily covered with a full-thickness skin autograft. Suturing is performed with absorbable material. The most common site of harvesting is the volar side of the operated forearm. The harvest site is primarily sutured with a long-absorbable ID suture. The first dressing is performed in 5-7 days, the sutures are washed out in 2-3 weeks. This is followed by intensive controlled physiotherapy and night splinting to stretch for 2-3 months.
Results: The results are documented in a retrospective study of 52 patients treated with this technique over the last ten years.
Excellent results were achieved in 52% of cases (full range of motion), very good results were achieved in 21% of cases (residual flexion contracture up to 20 degrees clenching into a full fist with a deficit of 1-2cm). Unsatisfactory results were in 7% of cases (3x reFISH, 1x refasciectomy, 3x amputation).
Conclusions: FISH mouth technique is a functional and a relatively gentle surgical technique with low risk of complications. It enables treatment of all levels and fingers at one time and does not burn bridges, surgery can be repeated. This technique has a lower recurrence rate than re-fasciectomy. The disadvantage may be prolonged healing after graft necrosis.

A-0408 RECONSTRUCTION OF PERIPHERAL NERVES AFTER NEUROMA, AND TUMOR RESECTION WITH PROCESSED ALLOGENIC NERVE GRAFT (AVANCE® NERVE GRAFT)

Anton Borger, Lorenz Semmler, Paul Supper, Bernhard Gesslbauer, Christine Radtke
Departement of Plastic, Reconstructive and Aesthetic Surgery, Medical University of Vienna, Austria

Introduction: Autologous nerve grafts are accompanied by morbidity of the donor site, leading to loss of sensation and possible complications such as end neuroma formation or persistent pain. Moreover, the indications are narrow mostly limited to defects in larger motor nerves with good prognosis. One alternative to autografts might be the commercially available allograft (Avance® Nerve Graft).
Aim: he aim of this study was to assess the safety and outcome of the Avance® Nerve Graft for the reconstruction of peripheral nerves after neuromas, and tumor resection.
Material & Methods: For this purpose, thirteen patients with fifteen nerves were recruited for the prospective study. Nine patients suffered from a neuroma and received a secondary reconstruction. Four patients required a nerve reconstruction after Schwannoma resection. Peripheral nerves were reconstructed with the Avance® Nerve Graft. The patients were followed up for at least one year by assessing recovery of motor, and sensibility and pain reduction.
Results: A significant decrease of pain levels could be achieved after reconstruction. Patients presented mostly a conserved function preoperatively. Thus, an improvement or rather preservation of sensibility and motor function could be observed in eleven patients. Two patients received a revisional reconstruction due to recurrent neuroma formation.
Conclusions: The reconstruction with Avance® Nerve Graft demonstrated good outcomes for motor, and sensory function, by achieving a pain reduction in all patients. Of particular interest, was the reconstruction of lesioned purely sensible nerves, for those currently no reasonable reconstruction option exists.

A-0409 TWO CASES OF GIANT INTRAMUSCULAR LIPOMA OF THE THENAR

Petr Machac, Petra Hartmann
University of Szeged - Department of Traumatology, Szeged, Hungary

Introduction: Lipoma is a very common benign tumor of the adipose tissue. Its incidence in the hand is low, and is usually to arise around tendon sheath, in the carpal tunnel, Guyon canal or in the deep palmar space. The intramuscular localisation in the thenar region and around the first metacarpal is very rare. We present 2 cases of intramuscular thenar lipoma.
Material & Methods: 2 Caucasian female patients (67 and 52 years old) were admitted to our hospital with a tumor that has been growing in the thenar region for the last 6–7 years. This caused progressive restriction of movement of the thumb and was aesthetically unpleasing. Neither peripheral sensation nor vascularity was compromised. In both cases, a preoperative MRI was performed and showed well-circumscribed soft tissue tumor structure. In both cases, intramuscular localisation and infiltration of the first web space was observed, and in one case, it was radially extended to the dorsal side around the first metacarpal bone.
Results: Both patients were treated with surgery. Due to the well-defined margin on the MRI, complete removal in one step was preferred over primary biopsy. Intraoperatively, the tumors showed a lobulary structure. All tumors were more than 6 cm in length. The third digital nerve was located on the ulnar border of the tumors. The first and second digital nerve were found between the lobuli of the tumors. The tumors were excised in toto, leaving the digital nerves and arteries intact. The first web space was restored using a Z-plasty to prevent a skin contracture. The whole tumors were sent for histopathological examination, which confirmed a benign lipoma without signs of malignancy. Postoperatively,

complete recovery of the ROM was achieved in one case. In the second case, with nearly circulatory presented tumor around the first metacarpal, non-substantial persistent restriction of ROM was observed. Postoperative peripheral sensation and vascularization remained intact.
Conclusions: Intramuscular lipoma of the thenar region is a rare condition that, if not treated, can affect the quality of life and function of the hand. The preoperative imaging can bring useful information about the structure, localisation and size of the tumor. In case of well circumscribed tumor, complete removal in one stage can be performed and is preferred. Should the tumor be not well defined through preoperative imaging, a primary biopsy is recommended prior to exstirpation. Differential diagnoses, such as liposarcoma, fibrolipoma, angiolipoma, superficial angiomyxoma, neurofibroma, myxoid chondrosarcoma etc. should be considered and a histopathological verification of the tumor's dignity performed.

A-0410 ARTHROSCOPIC USE OF CHONDROFILLER IN SEMILUNATE ULCERS

Anna Escolà Benet, Marta Martí Puenete, Joaquin Rodriguez Miralles, Xavier Solernou Soler
Hospital Universitario General de Catalunya, Sant Cugat del Vallès, Barcelona, Spain

Introduction: ChondroFiller@ is a treatment for defects in the hyaline joint cartilage. It is a biological, acellular cartilage implant on a collagen basis for regeneration purposes of joint cartilage defects. It can be used to treat localized cartilage damage in joints.
The collagen is liquid and is delivered arthroscopically with a syringe into the affected joint. A few minutes after being applied, it forms a gel that resurfaces the cartilage defect and filling perfectly the defect.
The Chondrofiller@ it is used to treat grade III or grade IV ulcers in joint cartilage damage based on the Outerbridge classification, as well as deep and/or subchondral defects and osteochondral defects in the case of partial injuries to the joint cartilage.
Case reports: We present 4 cases of young patients with chondral defect in the semilunar bone treated with Chondrofiller@
All of them were clinical evaluated and studied with X-ray and MRI previously to the surgery to confirm the lesions.
They underwent a wrist arthroscopy observing the chondral lesions in the semilunar bone. The lesions were initially debrided and then injected with Chondrofiller@ to resurface the lesions.
After the surgery they were immobilized during 2 weeks. Once this period has passed, the immobilization is removed and the patients are referred to physiotherapy.
All of them refer disappearance of pain and got complete range of motion.
Discussion: Chondrofiller@ is indicated in hand and wrist injuries, in patients beetwen 16 and 65 years old.
Our results show that there was an improvement in pain symptoms, associated with an increase in force and grip movements.
ChondroFiller Liquid® has proven to be a valid complement to the arthroscopy approach, at least to slow down the progression of painful symptoms and functional limitation.

A-0411 3D PRINTING AND PRACTICAL APPLICATIONS IN HAND SURGERY

Mauro Magnani, Alice Clemente, Arturo Nozzolillo, Simona Odella, Pierluigi Tos
Chirurgia della mano e Microchirurgia Ricostruttiva, Centro Specialistico Ortopedico Traumatologico Gaetano Pini - CTO, Milano, Italy

Introduction: 3D printing is a manufacturing technology that allows the production of three-dimensional models of a computer-designed model or data from medical imaging technologies using specially designed printers. Current fields of application are the training of young hand surgeons, patient education, pre-operative planning, the manufacture of customised rehabilitation devices and customised surgical guides, implants, and prostheses.
Aim: The use of 3D models has mainly focused on preoperative planning in patients with intra-articular fractures of the distal radius or scaphoid pathologies, post-traumatic malunion, elbow or wrist infections, bone loss or necrosis. 3D-printed guides are an important tool to perform osteotomy in case of malunion, to make customised plates or prostheses.
Material & Methods: In our department, 11 patients have benefited from 3D technology in the last 3 years:
- in 1 case we used an antibiotic spacer for loss of substance in elbow infection;
- in 3 cases we replaced a lunate affected by Kienbock's disease type 2 by implanting a titanium nitride (TiN) coated prosthesis designed using the lunate of the healthy wrist;
- in 1 case we replaced a phalanx affected by giant cell tumour with a customised TiN-coated prosthesis;
- in 1 case we replaced the PIP joint of a worker's index finger due to significant post-traumatic deformity, loss of substance and instability with a custom-fitted constrained prosthesis;
- in 2 cases to design the radius osteotomy;
- in 2 cases for the reconstruction of the vascularised bone graft for the scaphoid and lunate;
- in the last case for the preoperative planning of a free fibula flap for the proximal ulna in a rheumatoid patient.

This technology allowed us to better study the reconstructions of the bones and joints involved, resulting in more precise and faster reconstructions.
Results: The use of this customised technology allowed for adequate management of complex cases with good functional results and patient satisfaction. On the other hand, the use of conventional devices would probably not have guaranteed the same results as they were required to adapt to an anatomy that presented significant variations.
Conclusions: We consider 3D printing technology to be an invaluable tool for planning difficult surgeries and for designing customised prostheses in cases of bone necrosis, major loss of substance or non-repairable joint surfaces. Moreover, this technology is also important for planning cutting guides in case of malunion and dedicated plates to reconstruct the anatomy.

A-0412 THE RESULTS OF TENDON TRANSFERS IN RADIAL NERVE PALSIES: COMPARISON OF VARIOUS EVALUATION SYSTEMS IN A HOMOGENEOUS CASE SERIES

Mauro Magnani[1], Micaela Reina[2], Alice Clemente[1], Alessandro Crosio[3], Francesco Locatelli[1], Simona Odella[1], Pierluigi Tos[1]
[1]Chirurgia della Mano e Microchirurgia Ricostruttiva, ASST Gaetano Pini – CTO, Milan, Italy; [2]ASST degli Spedali Civili DI Brescia, Brescia, Italy; [3]CTO Centro Traumatologico Ortopedico, Turin, Italy

Introduction: Evaluating the results of tendon transfers in radial nerve palsies is of fundamental importance, but the various evaluation systems do not allow for a precise study that can consider the various functional aspects.
Aim: This study presents a new assessment scheme based on functional movements of the wrist and finger joints, as well

as the independence of the fingers themselves. The aim is to provide a simple and reproducible assessment system that minimises the subjective error of the examiner and assesses the independence of movements.
Material & Methods: Fourteen patients with isolated radial nerve palsy were included in the study. All patients underwent tendon transfers performed by the same surgeon using specific techniques to restore wrist, finger and thumb function. The FCU pro EDC was used to restore finger extension, the PT pro ECRB to restore wrist extension, and the PL or BR pro EPL to restore thumb extension using Scuderi's modified technique in which the EPL is rerouted from Lister's tubercle to the anatomical snuffbox to allow recovery of both thumb extension and abduction. The minimum follow-up was 3 years. Outcomes were assessed through measurements of wrist range of motion, finger extension, thumb extension and flexion, grip strength and finger independence. The DASH score was also used to assess the patient's overall function.
Results: Various assessment systems are presented and compared with each other, and an original scheme is proposed. Analysis of the results using our evaluation scheme showed that 2 patients achieved a poor result, 3 a sufficient result, 4 a good result and 5 an excellent result in terms of range of motion. The average grip strength was 18.75 kg. The assessment of thumb opposition showed that the patients were able to touch the tip of the fifth finger on average at the Kapandji test. The average DASH score was 22.8.
Conclusions: Surgery of patients with radial nerve palsy is a well-known and standardised procedure that is often compared to nerve transfers for the type of results. It is thought that nerve transfers give greater independence of movement, especially for the extensor tendons of the fingers. We have noticed that in tendon transfer operations (without associated plexus paralysis), a certain dexterity and independence of the fingers can be maintained.

A-0413 ARTHROSCOPIC TREATMENT'S OF FRACTURES OF THE BASE OF THUMB

Alberto Sgarbossa
Istituto Clinico S.Anna, Brescia, Italy

Introduction: Management of Bennett's fractures has been controversial. Early reports supported closed reduction and casting with or without percutaneous pinning. Later, open reduction and internal fixation was advocated through volar approach. The purpose of this presentation is to assess the surgical treatment using a arthroscopic assistance for reduction and fixation of the fragment by k-wire.
Aim: Evaluation of results and feasibility of arthroscopy for treatment of fractures to the base of thumb
Material & Methods: Between March 2019 and June 2023, 12 patients with intra-articular first metacarpal fractures displaced more than 1 mm were operated on using an arthroscopic approach and 1 or 2 k-wire fixation, additional 2 patients with symptomatic malunion of Bennett's fractures was treated with the same technique. The articular step-off, secondary displacement incidence and consolidation rate time were measured. At final follow-up, I assessed the thumbs for range of motion, residual pain, and grip strength. Sensitive areas around the portals scar were evaluated. Mean follow-up was 6 months.
Results: Anatomical reduction was achieved in 10 of 12 patients and in both cases of corrective osteotomy. No secondary displacement was registered. The mean distance between the tip of the thumb and the fifth metacarpophalangeal joint was less than 10 mm; reposition was complete. Mean palmar abduction was 60°. Grip strength averaged 90.6% of the opposite side. The mean visual analog scale score was 0. No sensory disturbances around the portals scar were recorded.
Conclusions: The correct anatomical reduction in Bennett's fractures was complex by percutaneous pinning , correct reduction and stabilization is not achieve in many cases, open reduction by volar approach was an valid option but it's an aggressive surgery that provide muscle and capsular detachment. Arthroscopic assistance for reduction represent

a valid option , the traction thumb necessary for arthroscopic procedure help to reduce the fragment and the direct arthroscopic visualization achieve correct reduction and correct positions of k wires. In rare cases of corrective osteotomies the procedure was practicable with moderate tricky arthroscopic's surgeon experience.

A-0414 SURGICAL ANATOMY OF THE HYPOTHENAR FAT PAD: EXPOSURE AND PRESERVATION IN OPEN CARPAL TUNNEL SURGERY

Ildefonso Muñoz Romero, Robbert Notenboom, Martijn Malessy
Leiden University Medical Center, Netherlands

Introduction: Postoperative pain may occur following open carpal tunnel release (OCTR). Various causes have been postulated. During OCTR, adipose tissue located between the palmar aponeurosis and the flexor retinaculum (FR) is exposed. It is unknown whether damage to this pad of supraretinacular fat (SRF) may contribute to postoperative palmar pain or tenderness.
Aim: We studied the neurovascular supply and histology of the SRF exposed in OCTR. Additionally, we explored the local anatomical relationships relevant to the surgical handling of this fat pad in order to maintain its integrity.
Material & Methods: A microanatomic dissection was performed of the innervation and vascular supply of the SRF in 25 embalmed human cadaveric upper limbs. Eight fat pads were removed en bloc for histological evaluation. Three-dimensional reconstructions were made based on immunohistochemically stained sections using computer-assisted microscopy.
Results: The SRF is the radial continuation of the hypothenar fat pad, that covers the neurovascular bundle in Guyon's canal. The fat pad is richly innervated and contains Pacinian corpuscles. The neurovascular supply originates exclusively from the ulnar nerve (palmar branch) and ulnar artery. The integrity of the SRF can be preserved by detaching it from the FR in a radial to ulnar fashion.
Conclusions: The SRF, which is exposed during OCTR, is richly innervated by sensory fibers from the ulnar nerve. It is the radial most extension of the hypothenar fat pad. Preserving its integrity during OCTR is technically possible and might contribute to minimize postoperative pain generation.

A-0415 ARTHROSCOPIC RESECTION ARTHROPLASTY FOR NEGLECTED OR FAILED OSTEOSYNTHESIS IN BENNETT FRACTURE

Carlos Perez-Uribarri[1], Ana Maria Far-Riera[2], Alfonso Andres-Alonso[1]
[1]Hospital Universitario de Cruces, Bilbao, Spain; [2]Hospital Universitario Son Llatzer, Palma de Mallorca, Spain

Introduction: Partial resection of the trapezium with or without tenosuspension is considered as an option in the basal thumb osteoarthritis, yielding outcomes comparable to other thumb base arthroplasties. Bennett fracture is a common injury typically treated with closed reduction and percutaneous fixation, with open reduction and screw osteosynthesis also being an option. Both treatments generally provide good results. In cases of osteosynthesis failure or undiagnosed cases, the limited literature on this topic often suggests CMC arthrodesis, trapeziectomy, or prosthetic surgery, but specific papers addressing this problem are scarce.
Aim: Basal thumb arthroscopic resection arthroplasty as an option in Bennett sequelae
Material & Methods: We present two cases of Bennett fracture in young patients treated with resection arthroplasty

of the first metacarpal base and trapezium. In the first case, the Bennett fracture went undiagnosed in the context of polytrauma. The second case involves a polytrauma patient treated with open reduction and osteosynthesis for the Bennett fracture and other metacarpal injuries in the same hand.
In both cases, the thumb presented subluxation and adduction, with significant functional loss.
Results: Arthroscopic resection of the articular step and free fragments, along with resection arthroplasty of the metacarpal base and trapezium, was proposed. This was complemented with tenosuspension using a thread system (Microlink, Conmed) for joint distraction. Immobilization lasted for 10 days, with suture removal followed by a rehabilitation program. Progressive improvement in function and pain began around the third month post-surgery. At the 6-month , both cases showed highly satisfactory results with improved functionality and QDASH scores.
Conclusions: Arthroscopic resection arthroplasty of the thumb base may serve as a less aggressive alternative to arthrodesis or other tendon suspension techniques in the case of delayed presentation of sequelae from a Bennett fracture with trapeziometacarpal arthritis in young adults.

A-0416 MANAGEMENT OF PEDIATRIC VOLAR PLATE AVULSION FRACTURES OF THE PROXIMAL INTERPHALANGEAL JOINT: A SYSTEMATIC REVIEW

Hongseo Choi[1], Seong Hui Moon[2], Hosouk Lee[3], Sabrina Poppy Barnes[4], Yangmyung Ma[5], Andrea Jester[5], Sami A. Al-Ani[6]
[1]College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK; [2]Hampshire Hospital NHS Foundation Trust, Hampshire, UK; [3]George Eliot Hospital NHS Trust, Warwickshire, UK; [4]Hull York Medical School, York, UK; [5]Birmingham Women's and Children's NHS Foundation Trust, Birmingham, UK; [6]Aston Medical School, Birmingham, UK

Introduction: Sudden, forced hyperextension injuries to the proximal interphalangeal joint (PIPJ) leading to volar plate avulsion fractures are common hand injuries in children. Suboptimal management of these fractures can lead to the development of long-term complications such as stiffness, flexion contracture and joint deformity. However, existing data on the management of such fractures is scarce and predominantly focused on the adult population (using Eaton/Keifhaber-Stern classification) and as a result, recommendations on management are often guided by clinical experience.
Aim: This systematic review aims to understand the outcomes of both non-surgical and surgical management of volar plate avulsion fractures of the PIPJ in children and explore any factors that might affect these outcomes. We hope to provide recommendations on management of these fractures in this patient population depending on the presentation.
Material & Methods: MEDLINE (PubMed), Scopus, Embase, Google Scholar and Cochrane CENTRAL databases were systematically searched, and additional studies were found through reference of papers up to 15th June 2023. Identified articles were assessed using pre-determined inclusion/exclusion criteria. The review was registered via PROSPERO and reported according to the PRISMA guidelines.
Results: Twenty-five articles were included, involving 268 patients with ages from 3 to 17 years (Mean: 11.09, Median: 16). Most fractures presented with dorsal displacement (35%) and were of acute (<4 weeks) presentation (54%). X-ray was the primary diagnostic modality used for 65% of patients. Fractures with less than 30% joint involvement, classified as Eaton Type I or II, or designated as 'Stable' in the Keifhaber-Stern classification, were treated through non-surgical means. Surgical interventions, encompassing open reduction and internal fixation, were reserved for fractures with over 30% joint involvement and/or meeting criteria such as Eaton Type IIIa or IIIb and Keifhaber-Stern "Tenuous" or "Unstable". Positive outcomes were seen in 99.5% of patients receiving non-surgical treatment, compared with 85.7% in the surgical cohort.
Conclusions: The literature demonstrated positive outcomes for fractures presenting with less than 30% joint involvement that were managed non-surgically. In fractures with more than 30% joint involvement, surgical interventions yielded

positive results. In addition, the literature strongly suggests that positive outcomes are linked to the early commencement of treatment (<4 weeks). The management of volar plate avulsion fracture in the pediatric population should integrate a comprehensive history, clinical examination, and investigation, including anteroposterior and lateral views of plain film radiograph to assess the severity of injury, after which the decision on the management technique can be made. To further substantiate these findings, larger prospective studies with uniform measures are needed to validate the results of this study.

A-0417 MANAGEMENT OF PAEDIATRIC FIFTH METACARPAL NECK FRACTURES: A SYSTEMATIC REVIEW

Dernas Suhail[1], Yangmyung Ma[2], Perlina Chung[1], Sami A. Al-Ani[3], Andrea Jester[2]
[1]Hull York Medical School, Hull, United Kingdom; [2]Hand and Upper Limb Service, Birmingham Women's and Children's Hospital, Birmingham, United Kingdom; [3]Aston Medical School, Birmingham, United Kingdom

Introduction: Fifth metacarpal neck fractures are common presentations in the paediatric population, particularly among the 13-to-16 year age group. Despite its commonality, there is no widely accepted approach to managing these fractures among children and young people. Current management options include immobilisation alone, closed reduction and immobilisation, closed reduction and Kirschner wire (K-wire) fixation or open reduction and internal fixation (ORIF). Although it is commonly agreed that rotational or deviational deformities necessitate surgical management, there is heterogeneity particularly on the threshold for surgical intervention, namely degree of fracture angulation, with some studies suggesting 30 - 40° as the acceptable limit and other studies stating up to 70° as the limit.
Aim: This systematic review aims to evaluate the available literature on the management of paediatric fifth metacarpal neck fractures and establish appropriate approaches for its management.
Material & Methods: PubMed (Medline), EMBASE, Scopus and Google Scholar as well as grey literature was used to identify evidence pertaining to the management of these fractures. The databases were accessed from January 2023 till database inception. This review was conducted according to the PRISMA guidelines and was registered on PROSPERO. The articles were screened based on predetermined inclusion/exclusion criteria.
Results: Eleven studies were identified, involving 237 patients of which 90% were male. The average fracture angulation at presentation was 42°. Non-surgical interventions were used for 114 patients whereas 121 patients underwent surgical intervention. Good outcomes were particularly observed in patients who underwent immobilisation only or closed reduction and intramedullary fixation. Indications for non-surgical intervention were most commonly when rotational deformity was clinically excluded and when 'excessive angulation' was excluded radiographically. For fractures requiring surgical intervention, average baseline fracture angulation was 51° and presented with rotational deformity. Most studies described an antegrade method for achieving fixation but there was heterogeneity in the technique. Of note, all patients with rotational deformity that were managed with closed reduction and immobilisation required conversion to surgery as well as fractures that sustained significant angulation at follow-up radiographs (>45°).
Conclusions: Immobilisation alone for paediatric fifth metacarpal neck fractures without 'excessive angulation' and rotational deformity yields good results, while surgical management in the form of closed reduction with antegrade intramedullary fixation generates good radiographic and clinical patient outcomes for fractures presenting with 'excessive angulation' and rotational deformity. However, the criteria for 'excessive angulation' found in the included studies was largely subjective and the specific angulation boundaries set for surgical management were arbitrary. Hence, it is unclear what angulation can be used as a clear cut-off point to warrant surgical intervention. Additionally, further primary studies are needed, directly comparing outcomes of paediatric patients with fifth metacarpal neck fractures treated surgically

versus non-surgically, as there are currently no such studies in the literature. Furthermore, standardisation of methods and techniques used to radiographically investigate these fractures and angulations are required, as well as reporting of whether these fractures involved open/closed physis to ensure greater comparability of outcomes between studies.

A-0418 LAMBDA (Λ) REPAIR: A NOVEL REPAIR TECHNIQUE FOR BOUTONNIÈRE DEFORMITY

Yu-Te Lin, Che-Hsiung Lee, Shwu-Huei Lien, Shih-Heng Chen, Chung-Chen Hsu, Cheng-Hung Lin
Chang Gung Memorial Hospital, Linkou, Taiwan

Introduction: When a Boutonnière deformity of the finger is encountered and volar subluxation of the lateral bands cannot be corrected by conservative treatment, different surgical techniques have been described in the literatures. To restore physiologic dorsal-volar translation of the lateral bands is the ideal goal for both finger extension and flexion. Not every surgical technique achieves the goal.
Aim: A novel repair technique, lambda (λ) repair, is introduced for functional reconstruction of the extensor mechanism.
Material & Methods: The method involves an end-to-side tenorrhaphy of the lateral bands resembling the Greek letter λ. Cadaveric model was created to test the repair technique for a Boutonnière deformity. Patients who underwent a λ repair were retrospectively evaluated with pre- and postoperative measurements of PIP joint movement.
Results: In cadaveric model, the lateral bands repaired by λ technique were able to glide volarly and dorsally while flexion and extension of the digit. Clinically, we included 7 fingers of 6 patients (4 male, 2 female, median age 38.5 years) with a median follow-up period of 9 months. Six fingers underwent λ repair for isolated Boutonnière deformities and one finger received a vascularized free toe transfer combined with a λ repair. The preoperative average PIP joint extension lag or deficit was 28.75°and could be reduced to 15°. Preoperative average PIP joint active flexion was 60° which was also improved to 88.75°. No complications were observed.
Conclusions: The λ repair is a new tool in the reconstruction of Boutonnière deformity, further expanding the armamentarium of hand surgeons.

A-0419 BILATERAL UPPER LIMB PALSY IN NEWBORNS (BULPN): DIFFERENTIAL DIAGNOSIS AND ALGORITHM TO MANAGEMENT

Yangmyung Ma, Lucy Taylor, Bassant Abdelfadeel, Kanwal Yousaf, Andrea Jester
Birmingham Children's Hospital, UK

Introduction: BULPN (Bilateral upper limb palsy in new-born) is one of the rarely seen and diagnosed conditions which requires early evaluation and decision for management. Bilateral upper limb palsy is a simultaneous weakness in both limbs with a loss of mobility due to neuromotor flaccid paralysis to one or several brachial plexus roots. The degree of severity may vary on each side, ranging from complete palsy to very subtle weakness. Limb palsy can cause long-term morbidity, hence every BULPN should be thoroughly evaluated for possible aetiologies to guide timely identification, management and prevention of avoidable sequelae affecting the shoulder, elbow and hand. Strategies should especially be devised to identify newborns with limb palsies that will not recover spontaneously and in whom early intervention may be beneficial.
Aim: To review the literature regarding clinical presentations of BULPN, their aetiologies and possible differential diagnoses and long-term prognosis to propose a management algorithm. In this way, the clinician should be able to identify, assess,

examine, investigate and predict the outcome of a suspected BULPN based on the literature.
Material & Methods: A literature review was conducted on PubMed (Medline) using predetermined MeSH terms and keywords. References of articles as well as grey literature was used to find articles. The articles were subject to predetermined inclusion/exclusion criteria before extraction of data.
Results: Through literature search, causes of BULPN were categorised into infective, trauma, vascular, autoimmune and congenital. For example, some of the possible causes for BULPN included: cord compression secondary to vertebral osteomyelitis, transverse myelitis, stroke, spinal cord injuries, congenital (in utero) brachial plexus palsy, Guillain-Barré Syndrome-like syndromes and intermediate type of obstetric brachial plexus palsy. The investigation and management of the differential diagnoses depended on the category in which they were placed.
Conclusions: The importance in identifying, examining, investigating, managing and predicting the outcome of a suspected BULPN is paramount in preventing long-term morbidity. This literature review presents an algorithm for the investigation and management of BULPN, which will help the health care professionals to understand and act appropriately to manage such patients.

A-0420 TREATMENT OF CHRONIC, TRAUMATIC SWAN NECK WITH FLEXOR DIGITORUM SUPERFICIAIS TENODESIS: A CASE REPORT

Claudio Rodrigues de Lima, Diego Figueiredo Melara, Leonardo Ayres Neiva
Armed Forces Hospital, Brasília, Brazil

Extensor mechanism imbalance of the finger – swan-neck deformity - can be the result of trauma. This post traumatic deformity should not be confused with those associated with inflammatory arthritis because the treatment options are often very different. We present a rare post traumatic case within 30 years of evolution treated surgically. There are a few techniques for the treatment. We performed the technique using flexor digitorium (FDS) superficialis tenodesis using one slip of the FDS. Our result show that this technique was a success for the treatment of this chronic, traumatic hypertension deformity of the proximal interphalangeal. The follow up evaluation had an excellent result and the patient was capable of return to the previous occupation and recreative activity.

A-0421 COMPLEX REGION PAIN SYNDROME IN UPPER OR LOWER LIMBS IS ASSOCIATED WITH USE OF PSYCHOTROPIC MEDICATION AS A PROXY FOR PSYCHOLOGICAL HEALTH

Lars B. Dahlin[1,2,3], Raquel Perez[1,4], Erika Nyman[3,5], Malin Zimmerman[1,2,6], Juan Merlo[4,7]
[1]Department of Translational Medicine – Hand Surgery, Malmö, Sweden; [2]Department of Hand Surgery, Malmö, Sweden; [3]Department of Biomedical and Clinical Sciences, Linköping, Sweden; [4]Unit for Social Epidemiology, Department of Clinical Sciences (Malmö) Malmö, Sweden; [5]Department of Hand Surgery, Plastic Surgery and Burns, Linköping, Sweden; [6]Department of Orthopedics, Helsingborg, Sweden; [7]Center for Primary Health Research, Malmö, Sweden

Introduction: Complex Regional Pain Syndrome (CRPS) is a pain disorder of multifactorial origin. It can be triggered by an injury, with or without nerve damage, in the upper or lower limbs. Risk factors related to CRPS are still vaguely reported, including an associated impaired psychological health.
Aim: Our aim was to investigate the use of psychotropic drugs, i.e., psycholeptics, antidepressants, or psycholeptics and psychoanaleptics in combination, as a proxy for psychological health, in subjects with CRPS type 1 and type 2 as well as in

subjects with a nerve injury in the upper or lower limbs in relation to the general population, adjusting for demographic and socioeconomic factors.

Material & Methods: An extensive national record linkage database, using five Swedish databases, was used to analyse 4,706,821 subjects (25-64 years) residing in Sweden December 31st, 2010 – 2014, of which 1,034 were diagnosed with CRPS (type 1=809; type 2=225) or with nerve injuries without CRPS (n=25,178) during 2011-2013 by applying stratified logistic regressions to estimate absolute risk difference (ARD) and 95% confidence intervals (CI) by socio-economic factors.

Results: Consumption of psychotropic drugs in the general population without CRPS was high (14.73%) and even higher among CRPS subjects (35.59%), but lower in those with nerve injuries (26.20%; somewhat higher among those in lower limb). Compared to the general population, prevalence ratio (PR, 95% CI; adjusted for demographic and socioeconomic factors) of psychotropic consumption was 1.10 (1.07-1.12) in patients with nerve injuries, 1.08 (1.16-1.17) in CRPS type 1 and 1.36 (1.11-1.68) in CRPS type 2.

Higher ARDs were observed in subjects with CRPS type 2 in all income categories than in subjects with CRPS type 1, or nerve injuries in upper or lower limb. Among the CRPS type 2 subjects, ARD was higher for the high-income category [ARDs=17.25 (4.72-29.78)] than the middle- or low-income categories (ARDs 8.13 and 7.33, respectively). Working status, based on skill groups, presented higher ARDs among the CRPS type 2 subjects, with extremely high values for middle-high and high working status level ([ARDs=34.65 (10.25-58.78) and ARDs=25.03 (3.73-46.33), respectively].

Higher ARDs were observed in subjects with nerve injuries and CRPS type 1 and CRPS type 2 in all immigrant categories, being especially high for CRPS type 2 [ARDs=14.21 (4.57-23.85)]. Concerning ARDs for age interval, they were higher for subjects with nerve injuries and CRPS type 1 and CRPS type 2, and again particularly prominent for CRPS type 2, at the age interval 25-34 years [ARDs=33.66 (16.50-50.82)].

Conclusions: Subjects with nerve injuries and CRPS have a high risk of using psychotropic drugs as a proxy for psychological health problems. The risk is predominantly prominent in CRPS type 2, also indicating the impact of nerve injury in CRPS.

A-0422 SPONTANEOUS RUPTURE OF THE EXTENSOR POLLICIS LONGUS TENDON IN A 14-YEAR-OLD MALE WITH ABSOLUTELY NO RISK FACTORS

Alessandro Camagna, Carlos Perez-Uribarri
Hospital Universitario de Cruces, Bilbao, Spain

Introduction: Spontaneous rupture of the extensor pollicis longus (EPL) tendon is a clinical condition historically associated with multiple predisposing factors. The most recognized risk factor is a non-displaced fracture of the distal radius. Other conditions, such as chronic inflammatory wrist arthritis, systemic or local steroid treatment, and chronic tenosynovitis due to excessive or repetitive use in sports/occupational activities, have been proposed as risk factors for EPL rupture.

We present a case of a young sedentary male patient with none of these identifiable risk factors who suffered a spontaneous EPL tendon rupture.

Materials & Methods: A 15-year-old male patient presented to our institution with complaints of an inability to extend his right thumb that started about one year earlier. He hadn't consulted any physician until the moment. He had no history of trauma, inflammatory arthritis, or drug consumption, and he didn't experience any pain in his wrist, thumb, or forearm. He denied any participation in sports activities at the time of the injury or previously and mentioned having quite sedentary habits.

During the physical examination, an inability to extend the right thumb at the interphalangeal joint was observed, along with reduced strength in extension at the metacarpophalangeal joint. Flexion of the thumb was maintained, no pain

was elicited at wrist palpation, but a deficiency in the EPL tendon at the wrist could be observed. Wrist X-ray showed no signs of recent or old trauma or bone abnormalities. Ultrasound demonstrated a complete EPL rupture at the level of Lister's tubercle. A CT scan did not reveal any bone abnormalities at that level.
Surgery was performed under WALANT (lidocaine 1% epinephrine 1/100,000). The distal portion of the EPL tendon was found at the level of Lister's tubercle, while the proximal end was retracted into the forearm. The tendon was attenuated, and fraying of the extremities was observed, making it unsuitable for a primary end-to-end suture. The extensor indicis proprius (EIP) tendon was transferred to the distal end of the EPL tendon using Pulvertaft's technique. Postoperatively, a short-arm splint was applied to the wrist in extension and the thumb in extension and abduction. Two weeks later, the splint was removed, and the patient started passive and active motion exercises. Two months after surgery, satisfactory and complete thumb range of extension was observed.
Conclusions: Spontaneous rupture of the EPL (extensor pollicis longus) is a relatively frequent complication in rheumatic patients or as a late complication of distal radius fracture. EPL rupture in young patients is exceptional. Although in some cases the cause has not been identified, it has been associated with sports activities or those requiring repetitive wrist movements, previous fractures, or bone variations at Lister's tubercle level. The exceptionality of our case is that we have not found any risk factors, such as sports, old injury, or anatomical variants that could explain the rupture. Finally, WALANT tendon repair provides a confident repair and allows for shorter immobilization and earlier physiotherapy.

A-0423 RATER AGREEMENT OF POST-TRAUMATIC OSTEOARTHRITIS OF THE DISTAL INTERPHALANGEAL JOINT 12 YEARS AFTER A MALLET FINGER FRACTURE

Malou Slichter[1,2,3], Nina Mathijssen[2,3], Linda Koobs[3], Gerald Kraan[2,3]
[1]Erasmus University Medical Centre, Rotterdam, The Netherlands; [2]Reinier Haga Orthopedisch Centrum, Zoetermeer, The Netherlands; [3]Reinier de Graaf Hospital, Delft, The Netherlands

Introduction: In long term follow-up studies on mallet finger fractures (MFF), radiological osteoarthritis (OA) is a frequently used primary or secondary outcome in addition to functional outcomes. However, there is no agreement on which OA classification provides the most reliable, valid and easy-to-use method and allows for comparison between studies. Multiple classification systems for OA of the distal interphalangeal (DIP) joint are described in literature on hand OA to quantify and standardize the degree of OA. A consensus driven and evidence based set of guidelines for the conduct of clinical trials in hand OA was published by a Task Force of the Osteoarthritis Research Society International in 2015. Most of these recommendations are focused on the polyarticular nature of hand OA. However, no statements are made on the use of these classifications in the assessment of post-traumatic OA of the hand, which may be considered a different phenotype of OA compared to polyarticular hand OA.
Aim: To determine 1) the rater agreement of the Kellgren and Lawrence (KL) and Osteoarthritis Research Society International (OARSI) classification for grading OA in the DIP joint after a MFF and 2) the correlation between both classifications.
Material & Methods: DIP joint radiographs of patients with a MFF from a previously conducted cohort study with 12 years of follow-up were assessed for radiographic OA using the KL and OARSI classification. The radiographs of the affected DIP joint at follow up were independently and consecutively assessed by a senior musculoskeletal radiologist and a senior orthopaedic surgeon to determine the inter-rater agreement. The orthopaedic surgeon assessed all radiographs again with a nine-week interval to determine the intra-rater agreement.
Results: 57 DIP joint radiographs of 58 patients were used. 52 (90%) patients were treated non-operatively with a splint

or cast and 6 (10%) patients were treated surgically. The KL classification showed fair intra-rater agreement, κw = 0.59, p <0.001 and slight inter-rater agreement, κw = 0.34, p <0.001. Intra-rater agreement of features on the OARSI classification were: osteophytes, κw = 0.51; JSN, κw = 0.37, p <0.001. Kappa values for inter-rater agreement were: osteophytes, κw = 0.28; JSN, κw = 0.38; malalignment, κC = 0.66; subchondral sclerosis, κC = 1.00, p <0.001. A strong positive correlation between the KL classification and the OARSI classification, ρ (55) = 0.90, p < .001 was found.
Conclusions: The KL classification showed fair intra-rater and slight inter-rater agreement. Individual features of the OARSI classification showed varying intra- and inter-rater agreement. A strong positive correlation between the KL classification and the total OARSI classification was found in DIP joints 12 years after a MFF.

A-0424 3D ANALYSIS OF THE THUMB AFTER TRAPEZIOMETACARPAL JOINT SURGERY

Sophie Brackertz, Gabriella Fischer, Maurizio Calcagni, Lisa Reissner
Balgrist University Hospital Zurich, Switzerland

Introduction: Osteoarthritis of the trapeziometacarpal (TMC) joint can effectively be treated surgically with first metacarpal osteotomy (WO), trapeziectomy with ligament reconstruction and tendon interposition (LRTI) and implant arthroplasty (TP).
Aim: The aim of the study was to compare the thumb motion during basic motion tasks and activities of daily living (ADL) in patients following WO, LRTI or TP.
Material & Methods: Thirty-one patients (max. age 60 years) who had been treated with Wilson osteotomy (WO, n=11), implant arthroplasty with TOUCH® prosthesis (TP; n=10) and LRTI (n=10) were recorded with a motion capture system during the performance of basic motion tasks as well as three ADLs: opening a jar, bottle and turning a key. Median follow-up was 20 months (range 12 - 71). The patients subjective hand function was evaluated using the Michigan Hand Questionnaire (MHQ). TMC range of motion (ROM) were calculated for each movement trial. Additionally, forces during each ADL were measured using a torque measurement device. results are reported as median [range] and compared between groups using the Kruskal-Wallis test (α=0.05).
Results: During isolated movements in the standard anatomical planes TMC flexion-extension ROM after WO (44°, [30-62°]) was not significantly different compared to healthy control subjects (53°, [42-63°]). However, ROM in TP (39°, [24-53°]) and LRTI (29°, [19-34°]) was significantly worse. During thumb opposition, TMC ROM was significantly reduced (p<0.005) in all patient's groups (TP 48°, [28-58°]; WO 47, [33-58°]; LRTI 17, [8-28°]) compare the healthy subjects. There were no retropulsion in the LRTI group and retropulsion was significantly reduced (p=0.037) compared to the WO. When turning a key clockwise, patients after WO reached a median of 96% (85-107) of strength compared to the contralateral side, 54% (42-103) after LRTI and statistically significant 122% (79-128) after TP compared to the former group. Median MHQ was similar after all treatments of TMC osteoarthritis (WO 78, TP 91, LRTI 84).
Conclusions: Looking at the ROM in the standard anatomic plane we found no significant difference of the WO group compared to the healthy subjects. TP and LRTI were significantly worse when moving in flexion/extension. However, one has to critically assess if this can correlate to the functional results and is not represented in the subjective assessment of the patient. In the combined motion of opposition/retropulsion, we found a significant difference in favor of the WO compared to the LRTIs. Looking at ADLs like key turning we found a similar range of motion of the TMC joint in all groups, but different compensation movements in the connecting joints, markedly a hyperextension of the MCP in the LRTI group. Finally looking at the subjective hand function all groups showed satisfying results. With regard to the evaluated kinematic and kinetic parameters, patients after LRTI had the poorest outcome, while Osteotomy and Touch prosthesis groups showed advantages depending on the considered outcome measure.

A-0425 THE DIFFERENCE OF THE HAMATE MOTION IN THE WRIST X-RAY ULNAR DEVIATION VIEW IS USEFUL TO CLASSIFY THE LUNATE TYPE

Nobuyuki Sasaki, Takuya Kameda, Shunsuke Sato, Yuki Fushimi, Yoshihiro Matsumoto
Department of Orthopaedic Surgery, Fukushima Medical University School of Medicine, Fukushima City, Fukushima, Japan

Introduction: There are two types of lunate due to the difference in the presence of the hamato-lunate joint. It is difficult to identify accurately whether the lunate has the hamato-lunate joint or not, even if using CT and MRI. We investigated the usefulness of the wrist X-ray of the ulnar deviation view for lunate type classification observing the hamate behavior against the lunate during ulnar deviation.
Methods: Fifteen scaphoid pseudarthrosis patients, 5 ulnar abutment syndrome patients, and 5 triangular fibrocartilage complex (TFCC) injury patients who underwent surgery at our hospital were included in the study (19 males and 6 females, aged from 15 to 65 years old). The lunates with no hamato-lunate joint were classified as Type 1 and those with the hamato-lunate joint were classified as Type 2 using CT and MRI.
In the wrist X-ray of the ulnar deviation view, the un-slide type was defined as the hamate did not slide radially across the border of the luno-triquetrum joint, and the radial slide type as the hamate slid radially across the border of the luno-triquetrum joint.
We investigated the concordance rate between the classification by CT and MRI and that by the wrist X-ray of the ulnar deviation view.
Results: There were 11 type 1 and 14 type 2. All of the type 1 cases were un-slide type. Type 2 included 3 un-slide type cases and 11 slide type cases. When we considered that type 1 was equal to the un-slide type and type 2 was equal to the radial slide type, the concordance rate was 88 %.
Discussion: The lunate morphological differences influence the biomechanics of the midcarpal and radial carpal joint.
When classifying the lunate, it is difficult to identify the presence of the hamato-lunate joint even on MRI or CT in cases with a small articular surface. The wrist X-ray of the ulnar deviation view is less radiation exposure and is lower in cost compared with CT.
Conclusion: The wrist X-ray of the ulnar deviation view was useful in classifying the lunate.

A-0426 DUAL MINIPLATE INTERNAL FIXATION FOR FOREARM DIAPHYSIS FRACTURES - CLINICAL AND BIOMECHANICAL STUDY

Jinsik Park[1], Chang-Hun Lee[2], Kwanghyun Lee[3], Young Seok Lee[4], Joo-Hak Kim[5], Wan-Sun Choi[6]
[1]Department of Orthopaedic Surgery, MS Reconstruction Hospital, Daegu, South Korea; [2]Department of Orthopaedic Surgery, Hanyang University College of Medicine, Seoul, South Korea; [3]Jeju Regional Rehabilitation Hospital; [4]Department of Orthopedic Surgery, Hanyang University Guri Hospital, Guri, South Korea; [5]Department of Orthopedic Surgery, Myongji Hospital, Hanyang University, Goyang, South Korea; [6]Department of Orthopaedic Surgery, Ajou University College of Medicine, Suwon, South Korea

Purpose: This study aimed to investigate the radiographic and clinical outcomes of dual miniplate fixation for forearm diaphysis fractures. Additionally, we sought to compare the biomechanical properties of a dual 2.4mm miniplate fixation construct to conventional single 3.5mm large plate fixation for forearm diaphysis fractures.
Methods: We retrospectively reviewed medical charts and radiographic data for 24 patients who underwent open reduction and internal fixation using 2.0 or 2.4mm dual miniplates for 29 forearm diaphyseal fractures. For the biomechanical study, a sawbones model compared a conventional single 3.5mm Locking Compression Plate (LCP) construct to 1) dual 2.4mm

LCP with all non-locking screws, or 2) dual 2.4mm LCP with combined locking and non-locking screws.
Results: The average follow-up period was 322.6 days (range 66 – 653). All cases achieved anatomical reduction and complete fracture union. The average time to union was 119.2 days, with a median of 99 days (range 43-251). There were two cases of delayed union. No infections or hardware irritations were recorded. After achieving solid bone union, 11 cases underwent hardware removal, including 3 radii and 8 ulnas. All removal surgeries were performed based on the patients' preferences, and none of these cases were associated with hardware irritation. One patient experienced metal failure (screw breakage), and the same patient experienced a refracture at the previous fracture location after the removal of the implants.
In biomechanical testing, under torsional loading, the 3.5mm single LCP group was significantly more rigid than the other two 2.4mm dual miniplate LCP groups. For axial stiffness and anteroposterior (AP) cantilever bending stiffness, there was no significant difference among the three groups. Regarding lateral cantilever bending stiffness, the 3.5mm single LCP group was significantly more rigid than the group of 2.4mm dual miniplate LCP with all non-locking screws, but there was no significant difference between the 3.5mm single LCP group and the 2.4mm dual LCP group with a combination of locking and non-locking screws. Finally, the 3.5mm single LCP group showed significantly higher AP cantilever bending load to failure compared to the other two 2.4mm dual LCP groups.
Conclusion: The dual miniplate fixation technique for forearm diaphyseal fractures demonstrated excellent clinical outcomes with anatomical reduction, high union rates, and minimal complications, despite the construct having lower torsional stiffness than conventional large single plate fixation.

A-0427 EARLY EXPERIENCE WITH THE HAPTIC PROSTHESIS ON THE PIP JOINT

Armin Zadra, Reinhard Ehall
General Hospital, Orthopedic department, Bad Radkersburg, Austria

Introduction: The limited case numbers of artificial joint replacement of the PIP joint of the hand, is increasingly restricting the availability of such prostheses from a commercial perspective. Due to the need for cementless anchoring, the number of suitable materials is also limited.
Aim: The HAPTic prosthesis developed by Implantcast is exclusively used for cementless implantation and consists of a titanium-nitride hardened proximal component, which is coated with a bioactive surface (titanium plasma + hydroxyapatite), and a socket component for the middle phalanx, which is made of a hydrocarbon compound (PEEK) and also coated with a bioactive surface. It is the first PIP prothesis with hydroxyapatite surface.
Material & Methods: In the period from January 2023 to April 2023, a total of 10 prostheses of this design were implanted at our hospital. The primary surgical technique proposed has proven to be a viable method.
Initial follow-up results show a safe ingrowth behaviour and good clinical results after a short-term immobilisation of 14 days.
We prospectively analysed 10 patients with a follow-up of 6 months.
The mean age was 61.6 years, there were 4 men and 6 women.
We analysed the following parameters: ROM, VAS, DASH, pinch grip (north medical) as well as the collateral ligament stability.
Results: We measured an improvement in mobility from 0/6/67° to 0/7/83°, the VAS improved from 5.9 to 3 points and the DASH from 34 to 18 points. The pinch grip deteriorated from 1.3 to 0.8 kg (2.3 kg in the side-by-side comparison), but this was to be expected after 6 months. Changes in VAS and DASH had highly statistical significance. All joints were

collateral ligament stable and radiological examination showed complete osteointegration of the prosthesis after 6 months. Conclusions: In early results Haptic prothesis is a reliable implant regarding bone ingrow as it represents the first PIP implant with hydroxyapatite surface. Close clinical and radiological monitoring of our patients who were fitted with this prosthesis is planned. Further studies will report on the further progress.

A-0428 IMPACT OF THE USE OF BIOLOGICAL AND TARGETED SYNTHETIC DMARDS ON THE INCIDENCE OF SURGICAL SITE INFECTION (SSI) AND DELAYED WOUND HEALING IN THE HAND AND WRIST SURGERY FOR RHEUMATOID ARTHRITIS

Chinatsu Ichikawa[1], Noriyuki Shimizu[1], Shuichi Naniwa[1], Ryuichi Nakahara[2], Yoshihisa Nasu[2], Toshifumi Ozaki[3], Keiichiro Nishida[2]

[1]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan; [2]Locomotive Pain Center, Okayama University Hospital, Okayama, Japan; [3]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Faculty of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama, Japan

Introduction: Biological / targeted synthetic disease-modifying anti-rheumatic drugs (b/ts DMARDs) have been widely used for the treatment of rheumatoid arthritis (RA), and their impact on the perioperative complications have been discussed in the field of orthopaedic surgery. However, there are few studies conducted for hand and wrist surgeries.
Objective: To investigate whether the use of b/tsDMARDs affects the incidence of surgical site infection (SSI) and delayed wound healing (DWH) after hand and wrist surgery for patients with RA.
Methods: We retrospectively reviewed the medical records of 429 cases who underwent hand or wrist surgery for RA in our hospital from 2013 to 2022. The surgeries included 101 cases of wrist surgery and 328 cases of finger surgery. There were 194 cases of b/tsDMARDs user (bDMARDs:187 cases, JAK inhibitor: 7 cases) and 235 cases of b/tsDMARDs non-user. The bDMARDs were discontinued preoperatively based on their half-lives and restarted after suture removal. Because of the short half-life, JAK inhibitors were not discontinued preoperatively to avoid disease flare-up.
We compared the rate of methotrexate (MTX) and glucocorticoid (GC) use at the time of surgery, background factors such as diabetes mellitus (DM), smoking, and the type of surgeries, and the incidence of SSI and DWH between the b/ts DMARDs user group and the non-user group. We also investigated the number of cases of postoperative disease flare-up of RA (defined as cases complaining joint pain except the surgical site).
The t-test, chi-squared test, and Fisher's exact test were used for statistical analysis, and p-values of less than 0.05 were considered significant.
Results: The b/tsDMARDs user group was significantly younger than the non-user group and had lower preoperative CRP and higher BMI. There was no significant difference in disease duration, rate of MTX use, GC use, concomitant DM, smoking, and type of surgeries. There were eight cases (1.9%) of SSI and seven cases (1.6%) of DWH in all surgeries. There were two cases (1.0%) of SSI and two cases (1.0%) of DWH in the b/tsDMARDs user group, and there were six cases (2.3%) of SSI and five cases (2.1%) of DWH in the non-user group. There was no significant difference in the incidence of SSI and DWH between the two groups. There were nine cases (4.6%) with flare-up of RA in the b/tsDMARDs user group.
Conclusion: Although we set relatively shorter periods of perioperative bDMARDs discontinuation, the increase of the incidence of SSI and DWH were not observed in cases of b/tsDMARDs user group who underwent hand and wrist surgeries. However, as there was significant number of disease flare occurred in some cases, the decision on whether to discontinue b/ts DMARDs and the duration of discontinuation should be made on a case-by-case basis.

A-0430 INNOVATION IN UPPER LIMB SURGERY – ANALYSING 50 YEARS OF PATENT DATA

Chiraag Karia, Varuni Bhatnagar, Grainne Bourke
Department of Plastic & Reconstructive Surgery, Leeds Teaching Hospitals NHS Trust, Leeds, UK

Introduction: The advancement of technology can significantly impact how we perform upper limb surgery. It is therefore important to understand patented innovations in our field and the innovation landscape. However, systematic profiling of these innovations has been limited.
Aim: This study aims to analyse and characterise the most significant patented innovations in upper limb surgery over the last fifty years. The objective is to identify prevailing trends, uncover gaps in technology, and guide future research and development.
Material & Methods: Patents related to upper limb surgery from 1970 to 2022 were comprehensively reviewed using an open, global patent search platform (Lens.org). This analysis was restricted to granted patents in English and employed Boolean search strategies. Patents were limited to single members of patent families to avoid duplication. Patents were categorised into relevant technology clusters. An innovation index was used to normalise patent counts and adjust for the increasing trend in patenting over time.
Results: From 1970 to 2022, 442 patents were identified, accruing 3,536 citations in total. The primary contributors to this pool were the United States (90 patents), Russia (35 patents), and China (23 patents). A significant increase in patents was observed in the last five years, constituting 53% (n=236) of the total. The analysis revealed that prostheses were the most active area of technology development. Other notable areas included computer-aided surgery and surgical instruments, with a particular emphasis on endoscopic tools. The top three cited patents predominantly focused on surgical instruments designed to improve wound closure techniques.
Conclusions: This analysis highlights a surge in upper limb surgery-related patents, especially in the last five years, indicating a rapid evolution in the field. The prominence of minimally invasive and computer-aided surgery, suggests an ongoing transformation in upper limb surgery, driven by technological innovation. Recognising these trends is crucial for directing future research and aligning it with the evolving needs of surgical practice. This study provides a foundational understanding of the patent landscape in hand surgery, offering valuable insights for researchers and practitioners in the field.

A-0431 DISTAL RADIUS FRACTURES IN PATIENTS OVER 65 YEARS: COMPARISON OF RADIOGRAPHIC AND FUNCTIONAL OUTCOMES BETWEEN SURGICAL AND CONSERVATIVE TREATMENT

Joana Páscoa Pinheiro, Mariana Nabais, Ângela Pinto, Catarina Massano, João Marques, Joaquim Soares do Brito
North Lisbon University Hospital Centre - CHULN

Introduction: Distal radius fractures (DRF) among patients over 65-years-old are one of the most common injuries.
Aim: This study intends to compare radiographic results and functional outcomes between patients with DRF managed surgically and conservatively.
Material & Methods: This study is a retrospective analysis of 161 consecutive patients over 65-years-old with DRF. Patient's demographics, radiographic parameters (articular/extra-articular, radial height, inclination, volar tilt, ulnar variance), functional outcomes including DASH score and a health-related quality of life questionnaire (HRQOL) SF-36 (including physical and mental component summary), and complications were measured at the final follow-up. A p-value of less than 0,05 was considered statistically significant.

Results: 79 surgically treated patients (group A) with a mean age of 70.5 years-old, and 82 conservatively treated patients (group B) with a mean age of 85-years-old were identified. Eleven extra-articular, 22 partial and 46 articular fractures were found in group A, while 48 extra-articular, 16 partial and 18 articular fractures were identified in group B. Mean follow-up for group A was 6,5 months and for group B 6,5 weeks.

At final follow-up radiographic parameters were statistically significant better in the surgical group. Group A versus group B presented an average radial height of 10.5mm and 8.01 mm ($p<.05$); radial inclination of 21,6° and 16,9 ($p<.05$); volar tilt of 4,3° and -2,6° ($p<.05$), respectively. Group A presented 10 patients with negative ulnar variance, 45 neutral and 11 positive, while in group B 23 had a negative ulnar variance, 24 neutral and 22 positive. One patient from group A underwent a second surgery at 3 months to remove hardware because of an articular screw.

Regarding functional outcomes, DASH score was 18,3 in group A and 17,7 in group B, with no significant difference between groups. There was no significant difference between patients surgically treated (A) vs conservative (B) with regards to HRQOL. In the physical component patients reported 62,04 vs 60,59 and in the mental component 74,04 vs 78,99, respectively.

Conclusions: Better radiographic outcomes are obtained with surgery for DRF, however, this difference has no impact on functional outcomes in patients over 65 years old since patients present similar functional results at last follow-up.

A-0433 INCIDENTAL TRIANGULAR FIBROCARTILAGE COMPLEX CHANGES ON WRIST MAGNETIC RESONANCE IMAGING

Lilah Fones[1], Molly Milano[2], Asif Ilyas[1,3]

[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Triangular fibrocartilage complex (TFCC) changes on wrist magnetic resonance imaging (MRI) may occur in patients without associated ulnar-sided wrist pain or examination findings consistent with TFCC pathology. Awareness of the rate of such changes is important to inform clinical decision making for these patients.

Aim: The aim of this study is to define the rate of TFCC changes on MRI in patients undergoing wrist MRI for indications other than ulnar-sided wrist pain.

Material & Methods: With institutional review board approval, all patients that underwent wrist MRI at a single orthopaedic practice over a two-year study period were identified by Current Procedural Terminology code 73221. This yielded 2,619 patients that underwent an upper extremity MRI, including shoulder, elbow, wrist, and hand MRIs. Patients with an associated diagnosis including “hand”, “wrist”, “radius”, “radial”, “scaphoid”, “navicular”, and “DeQuervain” were filtered from the initial list, yielding 148 patients. Patients were excluded if MRI was not conducted on the wrist (12 patients) or MRI report or presenting symptoms were not available (4 patients). Medical records were retrospectively reviewed to identify demographics, presenting symptoms and exam, wrist trauma history, and wrist MRI findings. Patients with ulnar-sided wrist pain were excluded from the primary study cohort.

Results: Of the 148 patients, a total of 132 patients had wrist MRIs available for review. Of these, 40 patients presenting with ulnar-sided wrist pain were excluded, yielding 92 patients in the primary study cohort with an average age of 36.6 years (standard deviation 18.0). MRI indication was wrist pain other than ulnar-sided wrist pain (59 patients, 64.1%), hand or thumb pain (20 patients, 21.7%), wrist mass (11 patients, 12.0%), and hand numbness and tingling (2 patients, 2.2%). Abnormal TFCC was reported in 40 patients (43.5%). Of these, 18 patients (45%) had isolated central TFCC changes, 10 patients (25%) had isolated peripheral TFCC changes, and 12 patients (30%) had both central and peripheral TFCC changes. Forty-seven (51.1%) reported wrist trauma prior to the onset of symptoms. In contrast, the rate of TFCC changes

in the 40 patients with ulnar-sided wrist pain that were excluded from the primary analysis was 80%.
Conclusions: TFCC MRI changes were seen in 43.5% of patients without ulnar-sided wrist pain or pre-imaging examination consistent with TFCC pathology. The high rate of incidental MRI TFCC changes highlights the importance of interpreting TFCC MRI findings in combination with the patient's symptoms and exam in determining appropriate treatment plan.

A-0434 USE OF NERVE WRAPS IN THE UPPER EXTREMITY

Lilah Fones[1], Maura Depascal[1], Alexis Kasper[1], Asif M. Ilyas[1,2]
[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Nerve wraps have been used to potentially decrease perineural scarring and to create a local environment conducive to nerve healing, but no consensus exists on the indications for their use.
Aim: The primary purpose of this study is to review the operative indications for the use of the porcine extracellular matrix (PEM) nerve wrap in the upper extremity at a single center.
Material & Methods: A retrospective review of all patients that underwent PEM nerve wrapping over an eight-year period by hand and upper extremity surgeons at a single orthopaedic practice yielded 104 procedures in 102 patients for analysis.
Results: The most common indication for surgery was for nerve wrapping of acute traumatic nerve injuries in 57 patients (54.8%), most frequently involving lacerations of the hand and forearm. Neurolysis and nerve wrapping for cases of chronic nerve compression with perineural scarring and fibrosis was the second most common indication, involving 41 patients (39.4%), most frequently for revision carpal and cubital tunnel release surgery. Six patients (5.8%) underwent mass removal or contracture release involving neurolysis with nerve wrapping. Three patients (2.9%) required reoperation, two in the acute group and one in the chronic group. However, there were no cases of nerve wrap rejection or extrusion.
Conclusions: PEM nerve wrapping was used for a wide range of nerve injuries ranging from acute lacerations to recalcitrant chronic compression and mass excision. Further studies are necessary to determine whether patient outcomes are improved with the PEM nerve wrap.

A-0435 THUMB BASAL JOINT ARTHROPLASTY : THE 5 YEAR REOPERATION RATE

Adam N. Fano[1], Jack G. Graham[1], Jonathan Dang[2], Asif M. Ilyas[1,2]
[1]Rothman Orthopaedic Institute at Thomas Jefferson University, Philadelphia, PA, USA; [2]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Thumb basal joint arthroplasty (BJA), also known as CMC arthroplasty, is commonly performed for symptomatic thumb basal joint arthritis, and is associated with a generally high patient satisfaction rate. However, complications occur, and a previous study reported an early reoperation risk (within 2 years) of 1.5%.
Aim: The purpose of this study was to extend this investigation and determine the risk of and reasons for reoperation within 5 years of index surgery.
Material & Methods: All cases of primary BJA performed between 2014-2016 within a single private academic center were included. All cases requiring reoperation were collected regarding the index surgical technique, reason for reoperation, time to reoperation, and reoperation technique. Risk of reoperation and revision arthroplasty within 5 years of index surgery were calculated.

Results: A total of 686 primary thumb BJAs were performed in 637 patients. The reoperation rate of 2.0% (14/686) for all circumstances within 5 years of the index BJA surgery. The rate of revision BJA was 1.0% (7/686) within 5 years of the BJA surgery. Reasons for the reoperation included 4 cases of symptomatic subsidence (28.6%), 3 cases for postoperative infection/seroma (21.4%), 3 cases of persistent pain/neuritis (21.4%), 2 cases of symptomatic hardware (14.3%), and 2 cases of cyst formation at the surgical site (14.3%). Time between index and reoperation ranged from 16 days to 4.6 years (mean 10.3 months). Risk of reoperation was 1.4% (7/515) following ligament reconstruction and tendon interposition (LRTI), 3.4% (4/119) following tightrope, 8.6% (3/35) following trapezium resection with pinning, and 0% (0/17) following trapezium resection with suture suspensionplasty.
Conclusions: Risk of unplanned reoperation and revision arthroplasty within 5 years of index thumb BJA remain low at 2% and 1%, respectively. These figures are lower than those reported by other centers, and this information may prove useful in the counseling of patients considering thumb BJA.

A-0436 RELOCATION NERVE GRAFTING FOR INVALIDATING NEUROPATHIC PAIN – EXPANDING THE NERVE SURGEON`S TOOLBOX

Liane Batel, Jan Plock, Florian Früh
Cantonal Hospital Aarau, Aarau, Switzerland

Neuropathic pain after peripheral nerve injury is a debilitating and socio-economically relevant complication. Peripheral nerve surgeons have developed different treatment strategies without one being accepted as gold standard.
We report a case of a 32-years-old patient with severe neuropathic pain due to a lesion of the median nerve of the right dominant hand following a milling injury 5 years ago. The injury was treated with N1-3 reconstruction using Avance® allografts. Within one year the patient developed severe allodynia in the palm with a Tinel sign. Nerve conduction studies and ultrasound revealed intact nerves to all digits with neuroma formation. Three years after the initial reconstruction, revision surgery with N1-N3 neuroma excision and autologous medial antebrachial cutaneous nerve grafting of N1/N2 as well as end-to-side neurorrhaphy of N3 to N4 was performed. Despite revision surgery and ongoing intense occupational therapy as well as multimodal pain medication, the patient was unable to move and tolerate touch.
Two years after the revision surgery, we offered the patient a "last resort" procedure with relocation nerve grafting. For that purpose, the median nerve was re-decompressed and the affected digital nerves were intraneurally dissected out of the palm using microscopical magnification with preservation of the motor branch to the thenar. Using a 70mm Avance® allograft, the nerves were buried in the forearm between the superficial and deep flexor muscle bellies. Special attention was given to prevent a mechanical conflict of the buried allograft and the gliding flexor tendons. Perioperative pain treatment was achieved with a supraclavicular pain catheter over 5 days.
Six weeks postoperatively the patient reported significant pain relief with VAS reduction from 10 to 2 during movement and 3 to 0 at rest as well as thumb opposition from full immobility due to pain to Kapandji 7. After almost 5 years of debilitating pain he is now using the hand again with a grip strength of 8kg (preoperatively, 0 kg). After three months grip strength and opposition even could be ameliorated and were stable after 6 months. Pain medication could be reduced. The ongoing follow-up is pending.
In conclusion, neurotomy with nerve stump relocation into muscle, vein or bone is described in the literature with inconsistent long-term results. Relocation nerve grafting using long allografts is a promising and powerful tool that might become a gamechanger in the treatment of invalidating neuropathic pain.

A-0437 CORRECTIVE SURGERY FOLLOWING DISTAL RADIUS FRACTURE IN ELDERLY PATIENTS

Johannes Rois
Trauma Center Vienna Meidling

Introduction: Distal radius fractures in patients of advanced age are treated in most cases conservatively. Studies have shown that the radiological result does not always correlate with the clinical outcome and functionally satisfactory results can be achieved.
Aim: Are there indications for corrective surgery for a malaligned distal radius fracture in advanced age?
Material & Methods: In all cases corrective surgery were carried out by using a volar approach and insertion of a bicortical bone block (from the iliac crest). Due to stable supply with an angle-stable plate, loss of correction could be avoided and bony healing could be achieved. Postoperative follow-up treatment was carried out with a removeable dorsal plastic splint.
Results: Good clinical results were achieved with this technique.
Conclusions: When indicated correctly and carried out correctly, the corrective surgery on the distal radius improves wrist mobility and leads to significant pain relief. Good healing potential of the distal radius metaphysis with excellent remodeling can also be found in patients of advanced age.

A-0438 NERVE TRANSFERS FOR TREATMENT OF RADIAL NERVE PARALYSIS

Julia Benitez[1,2], Aritz Ortega[1], Rosa Morro[2,3], Manuel Llusa[2,3], Joaquim Casañas[1,4]
[1]Bellvitge University Hospital, Barcelona, Spain; [2]Anatomy Department - Faculty of Medicine, University of Barcelona, Spain; [3]Vall d'Hebron University Hospital, Barcelona, Spain; [4]Teknon Hospital, Barcelona, Spain

Introduction: Radial nerve paralysis is a frequent nerve injury in the upper limb. Traditionally, palliative surgery with tendon transfers has provided good results in established radial nerve paralysis. Nonetheless, nerve transfers can provide a useful alternative to restore active wrist, finger and thumb extension.
Aim: The aim of this study was to describe our nerve transfer technique for radial nerve paralysis using median nerve branches as donors and its functional results.
Material & Methods: A retrospective study was carried out in ten patients, aged between 24 and 61 years-old, with radial nerve paralysis. The aetiology was a direct injury to the radial nerve in eight cases and a non-recovered lesion of the posterior cord of the brachial plexus in two cases. In all patients, intraoperative neurophysiological monitoring was used to identify and record the nerve action potential of the branches of the pronator teres (PT), extensor carpi radialis brevis (ECRB), flexor carpi radialis (FCR) and the posterior interosseous nerve (PIN). The distal branch of the PT and the FCR were transferred to the branch of the ECRB and the PIN, respectively. A free-tension end-to-end suture was used in all cases, except in one patient with evidence of PIN reinnervation in which a reverse-end-to-side suture (RETS) was performed.
Results: Nine out of ten patients recovered active extension of the wrist, as well as active and independent extension of the fingers and the thumb. The first electromyographic signs of reinnervation were observed between 3 to 9 months post-operatively at the ECRB.
Conclusions: Nerve transfers represent a solid and reproducible surgical option for the treatment of radial nerve paralysis, obtaining good functional results in wrist and fingers active extension compared with tendon transfers.

A-0439 HOW TO AVOID COMPLICATIONS ON THE DISTAL RADIOULNAR JOINT FOLLOWING PALMAR PLATING OF UNSTABLE DISTAL RADIUS FRACTURES

Johannes Rois
Trauma Center Vienna Meidling

Introduction: Fractures of the distal radius are the most common fracture in the upper extremity. Open reduction and palmar fixed-angle plating is nowadays the most common used treatment method for unstable distal radius fractures. The complication rate of this treatment reported in the literature vary between 8% and 40%. The most common cause of wrist disability after distal radius fracture is the distal radioulnar joint (DRUJ) involvement.
Aim: The aim of this study is to find sustainable solutions and to offer practical tips and tricks to prevent this type of complications.
Material & Methods: Based on an own retrospective study with 127 cases on the topic of palmar plating of unstable distal radius fractures, and on the literature review the different complication types were studied and classified. Focussed on preventable complications they were classified into surgeon-related and surgeon-independent complications. The surgeon-related complications (malunion, tendon complications, screw length, intraarticular screw placement, secondary dislocation,...) were analyzed.
Results: Based on these results and also taking into account biomechanical studies, possibilities of avoidance of complications on the DRUJ will be offered by means of case reports. To prevent complications is not restricted solely to the surgical technique – approach, reduction, plate position, screw position, screw length – but begins with the preoperative assessment of the fracture which results in surgery planning.
Conclusions: It will definitely not be possible to achieve a complete avoidance of complications that are associated with palmar plating of unstable distal radius fractures. Awareness of the possible complications and how to deal with them may help to minimize the complication rate and on the other hand to recognize complications at an early stage allowing timely treatment.

A-0440 TRANSFER OF THE INFERIOR MOTOR BRANCH OF THE LATISSIMUS DORSI FOR THE TREATMENT OF LONG THORACIC NERVE PARALYSIS

Julia Benitez[1,2], Aritz Ortega[1], Rosa Morro[2,3], Manuel Llusa[2,3], Joaquim Casañas[1,4]
[1]Bellvitge University Hospital, Barcelona, Spain; [2]Anatomy Department - Faculty of Medicine, University of Barcelona, Spain; [3]Vall d'Hebron University Hospital, Barcelona, Spain; [4]Teknon Hospital, Barcelona, Spain

Introduction: Long thoracic nerve lesions result in serratus anterior paralysis with a consequent distortion of the shoulder mobility and a scapular winging.
Aim: The aim of this study is to describe the surgical technique and its functional results for the transfer of the inferior branch of the thoracodorsal nerve for the latissimus dorsi to the long thoracic nerve.
Material & Methods: A retrospective study was carried out in seven patients, aged between 26 and 53 years-old, with a long thoracic nerve paralysis secondary to a direct traumatic injury or a Parsonage Turner syndrome. All patients had presented a decreased shoulder range of motion and a winging scapula for more than six months, as well as signs of denervation in nerve conduction studies. Surgery was performed using intraoperative neurophysiological recording monitoring. In all cases nerve action potential (NAP) of the long thoracic nerve was inferior to 50 uV. The inferior motor branch of the thoracodorsal nerve to the latissimus dorsi with a minimum of 250 uV of NAP was selected as the donor branch for the long thoracic nerve.

Results: All patients presented effective reinnervation with correction of the scapular winging and improvement of shoulder active mobility.
Conclusions: We recommend the present nerve transfer for restoration of shoulder function in a long thoracic nerve paralysis either of traumatic origin or a Parsonage Turner sequel.

A-0441 POSTERIOR DELTOID BRANCH TO THE SPINAL ACCESSORY NERVE TRANSFER

Julia Benitez[1,2], Aritz Ortega[1], Rosa Morro[2,3], Manuel Llusa[2,3], Joaquim Casañas[1,4]
[1]Bellvitge University Hospital, Barcelona, Spain; [2]Anatomy Department - Faculty of Medicine, University of Barcelona, Spain; [3]Vall d'Hebron University Hospital, Barcelona, Spain; [4]Teknon Hospital, Barcelona, Spain

Introduction: Spinal accessory nerve is susceptible to iatrogenic injury due to its superficial location. Pain and decreased strength of the shoulder are the most frequent symptoms in these patients. Diagnosis is challenging and therefore often delayed. Surgical options for established paralysis are tendon transfers and nerve transfers.
Aim: The aim of this study was to describe our clinical results of the posterior deltoid branch to the spinal accessory nerve.
Material & Methods: A retrospective study was carried out in four patients diagnosed of a iatrogenic injury of the spinal accessory nerve. Mean time from injury to surgery was 2,5 years. Preoperative electromyographic and nerve conduction studies confirmed the diagnosis and the presence of fibrillation in the trapezius muscle. In all cases, intraoperative monitoring was used to identify the fascicle of the superior trunk to the posterior deltoid. The chosen fascicle was used as a donor for the spinal accessory nerve using a free-of-tension end-to-end suture.
Results: Satisfactory reinnervation was achieved in three out of four patients, with a recovery from muscular atrophy and a mean range of motion for flexo-abduction of the shoulder of 180º. Postoperative complications included two cases of temporary dysesthesia and one case of adhesive capsulitis of the shoulder.
Conclusions: We consider the posterior deltoid fascicle to the spinal accessory nerve transfer a good surgical option in patients with electromyographical signs of fibrillation in the trapezius muscle.

A-0442 FRACTURE OF THE METACARPAL. FIXATION USING INTRAMEDULLARY SCREW. OUR EXPERIENCE

Jose Félix Garrido Ferrer[1], Xavier Mir-Bulló[2], Lidia Ana Martín-Domínguez[2], Albert Pardo-Pol[2], Inés Farré-Galofré[2], Sergi Alabau-Rodríguez[2]
[1]Hospital General Universitario, Valencia, Spain; [2]Icatme. Hospital Universitario Quirón Dexeus, Barcelona, Spain

Introduction: There is a growing trend in the use of closed reduction and internal fixation with retrograde intramedullary cannulated compression screws (RICHS) in metacarpal fractures. While conservative treatment is an option for non-displaced stable fractures, surgical treatment is recommended for displaced and unstable ones. However common surgical techniques like K-wires, locking plates and screws have a high complication rate. The minimally invasive approach, minimal immobilization, rapid functional recovery and low complication rate support the RICHS technique for most displaced metacarpal fractures.
Aim: The aim of this study is to clinically, radiologically, and functionally analyze a series of patients treated at our center using RICHS.
Material & Methods: A single-center, retrospective descriptive study was conducted on a series of 157 patients operated on between January 2018 and December 2023 by the same surgical team in a specialized hand unit. A total of 282 surgical

treated metacarpal fractures were initially considered; we excluded those treated with ORIF (plates, screws), K-wires as well as fractures with articular pattern at the base of the metacarpal. We also excluded malunions and non-unions. After applying inclusion and exclusion criteria, a series of 194 fractures in 157 patients were studied. All patients exhibited instability criteria, and closed reduction and retrograde internal fixation were performed using RICHS technique. The average age of the population was 40,04 years (15 - 74), including 134 males (85.3%) and 23 females (14.6%). After surgery, clinical, functional, and radiological parameters were assessed, along with complications and additional surgical procedures when necessary.

Results: Both single and multiple fractures were observed in all metacarpal, with the majority occurring in the fifth metacarpal (63%), often in isolation. All types of fracture patterns (transverse, short oblique, spiral and comminuted) have been detected. Subcapital fractures were the most common (50.9%), followed by diaphyseal (37.6%). After surgery, the mean collapse was 1,09 mm, with significant differences related to the fracture pattern, particularly in comminuted and oblique long fractures. Metacarpal shortening, a controversial aspect in the literature, averaged 2,85 mm, showing no correlation with extension deficit or total active motion (TAM). Only one case of atrophic nonunion was reported, asymptomatic in the patient, with the rest demonstrating complete consolidation at an average of 6.4 weeks. A total of 15 fractures had complications (0,09%), with a reintervention rate of 3.2%, primarily due to protrusion of osteosynthesis material and one case of screw breakage after a direct trauma. Additional interventions were performed in only four cases (2.5%), and in two cases, the initial indication had to be modified during surgery, resulting in eventual open reduction.

Conclusions: In appropriately selected patients with metacarpal fractures, intramedullary screw fixation (RICHS) offers a therapeutic advantage, demonstrating validated outcomes and a low complication rate during follow-up.

A-0443 SARCOIDOSIS OF THE HAND: CASE REPORT AND LITERATURE REVIEW

Laura Rey-Fernández[1], Inma Puig de la Bellacasa[2], Marti Bernaus[2], Margarita Veloso[2], Lluis Font-Vizcarra[3]

[1]Department of Orthopaedics and Traumatology, Althaia, Xarxa Assistencial Universitària de Manresa, Manresa, Spain; [2]Department of Orthopaedics and Traumatology, Hospital Universitari Mutua de Terrassa, Terrassa, Spain; [3]Head of Department of Orthopaedics and Traumatology, Hospital Moises Broggi and Hospital General de Hospitalet, Consorci Sanitari Integral, Barcelona, Spain

Introduction: Systemic inflammatory diseases often affect hands. Differential diagnosis should include them when reporting destructive osseous diseases.

Aim: This case provides a brief clinical and radiological review of the entities that can show radiological bone involvement.

Material and method: We report a case of a 54-year-old male who presents with pain, swelling, and mild erythema in the metacarpophalangeal joint of the right fourth finger. On physical examination, he presents an extension limitation of 40º. Flexion is preserved. He explains morning stiffness.

The blood tests show an ESR of 10 mm/hour, normal blood count, negative C-reactive protein (CRP), rheumatoid factor, antinuclear antibodies (ANA), human leukocyte antigen B27 (HLA B27), and negative Brucella serology.

X-rays reveal osseous destruction, with bulky subchondral geodes and cavities, preserving the joint surface. Ultrasound shows grade II synovitis of the fourth metacarpophalangeal joint with thickening of the joint capsule and soft tissues, without signs of flexor tenosynovitis or alteration of the echostructure of the extensor tendon.

The patient is a biologist and works with aquariums. He refers to possible wounds with materials from inside the water, which is why Mycobacteria infection is initially suspected given the epidemiological history.

Surgical treatment is indicated with debridement and synovectomy. A dorsal approach at the fourth metacarpophalangeal,

midline incision of the extensor, with dorsal capsulotomy is performed. Macroscopically, preservation of the joint is observed with cavitation at the subchondral bone level of the metacarpal and phalanx. Sampling for microbiological (including mycobacteria and anaerobes), and anatomopathological study from granulomatous, synovial, and bone tissue is included.
Results: Cultures from surgery were ¼ positive for Cutibacterium acnes. Mycobacterial-specific cultures and chain reaction polymerization were performed obtaining negative results. The pathology result showed non-necrotizing chronic granulomatous inflammation, with fibrovascular connective tissue, foci of lymphoplasmacytic inflammatory infiltrate, with non-necrotizing granulomas, composed of epithelioid histiocytes and a scarce lymphocytic component. Acid-alcohol-resistant bacilli were not observed with PAS-diastase and Kinyoun stains.
Surgical debridement resulted in cessation of clinical symptom progression at 1-year clinical follow-up evaluation. He was never treated with antibiotics and he is currently pain-free, following immunosuppressor therapy.
The diagnosis of sarcoidosis was made based on the granuloma and by the exclusion of infectious and neoplastic causes. Apart from infection by atypical mycobacteria, a differential diagnosis must be made with sarcoidosis. Sarcoidosis exceptionally affects a single joint, but some cases have been described in current literature.
Conclusion: This case provides a brief clinical and radiological review of the entities that can show radiological bone involvement with metacarpophalangeal inflammation with chronic granulomatous inflammation and non-necrotizing granulomas. They are rare entities, which constitute a diagnostic challenge and must be guided by a correct differential diagnosis. Early recognition improves symptoms and reduces the impact on the patient's quality of life and the function of their hand.

A-0444 EXTENDED LATERAL FASCIOCUTANEOUS ARM FLAP INTERPOSITION FOR PREVENTION OF RECURRENCE IN PROXIMAL RADIOULNAR SYNOSTOSIS RELEASE

Saskia Kamphuis, Nick Menzinger, Dirk Schaefer, Alexandre Kaempfen
University Hospital Basel, Basel, Switzerland

Introduction: Proximal radioulnar synostosis is a relatively rare congenital or post-traumatic condition with severe functional consequences for the patient. Over the years, several operative techniques have been proposed for treating radioulnar synostosis. Literature shows a significant number of failures with synostosis resection only. Clinical results improve when including a rotational osteotomy of the radius to position the hand in a more functional position (Barik et al, 2021). Interposition of allograft or synthetic material and avascular fascial interposition after release of the synostosis is a topic of controversy and yields mixed results. However, Kanaya et al (2016) have introduced a 3D reconstructive approach with autologous vascularized tissue interposition with satisfying results.
Our case series analyses the results of interposition of the extended lateral fasciocutaneous arm flap.
Material & Methods: We present three cases with a radioulnar synostosis and their treatments. The surgical technique comprises elevation harvest of an extended lateral arm flap with a true distal skin island on a long pedicle and rerouting it through the cubital fossa in the space created by the resection of the synostosis. The skin island is reinserted in the skin just proximal to the harvest zone, adjusting for the longer passage of the pedicle. Intraoperative range of motion control is needed to secure the vascularization. The flap monitors vascularity of the fascia during exercises, which commences immediately. Outcome was analyzed by chart review of range of motion, complication rate and recurrence.
Results: Three patients were treated using the described technique. The first patient concerns a 9-year-old boy who presented after multiple operations in another hospital following a Monteggia-like injury. Postoperatively, partial necrosis of the skin island was noted, which healed uneventfully by secondary intention. One year after the operation,

the patient showed a pronosupination of 90/0/85° is can perform all activities of daily life again. He will stay in aftercare until growth is complete.
The second patient was an 11-year-old female patient who presented after a radial head fracture-dislocation of the elbow, primarily treated abroad. We performed a radial head reconstruction using a costochondral graft combined with a synostosis separation and soft tissue interposition. A recurrence of the synostosis developed distally to the pedicle. A revision operation was performed to excise the recurrence and reposition the flap pedicle. The final objective result remained poor at 30° to 40° pronosupination one year after revision surgery with a completely pain free and satisfied patient who claimed to be able to fulfill all of her daily activities.
The final patient concerns a 17-year-old male who presented with a primary congenital synostosis in our clinic due to inability of sufficient pronation as an accountant. After treatment and follow-up, a pronosupination of 80° was noted with a very satisfied patient who completely recovered a temporary postoperative radial nerve palsy.
Conclusions: In our hands, soft tissue interposition using a pedicled extended lateral arm flap is a demanding procedure with a learning curve. The results are highly rewarding as gaining only 30-60° of pronosupination is a functional game changer.

A-0445 COMPARISON OF INFECTION RATES BETWEEN INTRAMEDULLARY NAIL, WIRE, AND PLATE FIXATION OF OPEN METACARPAL AND PHALANGEAL FRACTURES

Casey Zhang, Pooja Reddy, Nia Buckner, Sierra Short, Teun Teunis
University of Pittsburgh Medical Center, Pittsburgh, PA, USA

Introduction: Phalangeal and metacarpal fractures are the second and third most common upper extremity fractures. There are multiple fixation techniques for displaced fractures. Intramedullary nail fixation is an increasingly used method for fracture fixation of the hand. Removal of intramedullary (IM) nails used for metacarpal or phalanx fracture fixation in case of infection is more difficult than removal of plates and wires, which might limit their application in open fracture fixation.
Aim: This study aims to compare infection rates between IM nail fixation, K-wire, and plate fixation for open metacarpal and phalangeal fractures. Secondarily, we aim to compare range of motion outcomes across various fixation techniques.
Material & Methods: A retrospective review was performed of all adult patients who underwent surgical fixation of open, extra-articular phalangeal and metacarpal fractures at a single center between August 2005- September 2023. Bivariate analysis by Fisher's Exact test was performed to test for association between factors associated with development of infection. Three hundred forty-six patients met inclusion criteria. Average age was 44.3 $\pm$ 17.5 years. Flexor tendon injury occurred in 24.9% of cases, extensor tendon injury in 41.4%, and neurovascular injury in 32.7% of cases. Thirty-four (9.8%) patients underwent intramedullary nail fixation, 282 (81.5%) underwent wire fixation, and 30 (8.7%) underwent plates/screw fixation.
Results: Fixation technique was not associated with infection (p=.22). Thirty-six (10.4%) patients developed infection. Infection rate of IM nails was 2.9%, 11.7% for wire fixation, and 6.7% with plates/screws. Sixty-seven percent (66.7%) of infections with K-wire fixation occurred before pins were removed. No difference was found in re-operation rate for infection across all groups (p=.74). There was no difference in change of ray total active motion compared to plate and wire fixation, although this analysis is hindered by low sample size (73.7 $\pm$ 76 degrees vs. 40.7 $\pm$ 63.6 degrees, 35.0 degrees; p=.16).
Conclusions: The absence of infection after IM nail placement in open metacarpal and phalanx fractures is assuring. IM nail placement also produces comparable range of motion and functional outcomes compared to other techniques. However, the sample size in this study is low and our findings need confirmation in a larger, preferably randomized, study.

A-0446 TREATMENT OF THE ULNAR IMPINGEMENT SYNDROME BY DECOMPRESSION CORRECTIVE OSTEOTOMY OF THE DISTAL RADIUS – CLINICAL RESULTS

Petr Machac[1,2], René Schandl[1], Roman Wolters[1], Hermann Krimmer[1]
[1]Hand Center Ravensburg, Germany; [2]University of Szeged - Department of Traumatology, Szeged, Hungary

Introduction: Altered shape of the sigmoid notch in conjunction with an ulna-minus variance can lead to painful impingement in the distal radioulnar joint. In 2016 a new method dealing with this syndrome was described, the goal of which was to restore the osseous congruency and to decompress the DRUJ. The etiology of this incongruency can be either congenital, posttraumatic or iatrogenic. Furthermore, this problematic can also, though rarely, occur in combination with aseptic necrosis of the lunate.
Aim: The purpose of this study is to summarize and evaluate the to date performed operations in our hand center.
Material & Methods: The correction of the sigmoid notch is based on the shortening closed-wedge osteotomy of the distal radius and the DRUJ-decompression achieved through detensioning of the distal oblique bundle of the interosseous membrane by ulnar translation of the radial shaft. By concomitant aseptic necrosis of the lunate, this method is also used as a levelling procedure. The evaluation of the results included measuring of the pain level using VAS, the range of motion, grip strength and Krimmer Wrist Score.
Results: Over 11 years (2011 – 2022) 75 operations were performed on 68 patients (24 men, 44 women). 29 patients were operated on the right, 32 on the left side and 7 patients bilaterally. The etiology was by 45 patients congenital, by 16 congenital with contemporary aseptic lunate necrosis, by 12 patients posttraumatic and by 2 iatrogenic (after excessive ulnar shortening osteotomy). All groups were assessed separately, and all showed statistically significant decreased pain level ($p < .001$), increased grip strength and no change in range of motion postoperatively. In almost 90% of cases good to excellent results were achieved using the Krimmer Wrist Score. The potential complications include too distally performed osteotomy with joint surface destruction, progression of degenerative changes and instability of the DRUJ.
Conclusions: Regarding the symptomatic ulnar impingement syndrome, our proposed corrective osteotomy can be, in case of failure of non-operative treatment, a safe and joint retaining solution, where previously only salvage procedures or alloarthroplasty were available. Essential for the good results is the preoperative examination and patient selection. Preventive aspect on the degenerative joint disease due to decreasing of the repetitive irritative state is still to be investigate in further studies.

A-0447 NEW ARTICULATED CLAMP FOR JOSHI'S EXTERNAL FIXATOR

Mauro Magnani, Alessandro Bezza, Simona Odella, Joil Ramazzotti, Francesco Locatell, Alice Clemente, Pierluigi Tos
Chirurgia della mano e Microchirurgia Ricostruttiva, Centro Specialistico Ortopedico Traumatologico Gaetano Pini - CTO, Milan, Italy

Introduction: Fractures of the proximal interphalangeal (PIP) joint are particularly complex to treat surgically as they require both adequate stability and rapid recovery of articulation. The use of dynamic biaxial distractors ('Suzuki frames') may be considered a viable option. However, they require the use of Kirschner wires together with elastics, springs or chips that may prove cumbersome, difficult to apply and not always usable.
Aim: Presenting a new clamp developed in collaboration with engineers that can be used with the Joshi system in a monoaxial manner providing movement of the joint.
Material & Methods: With the contribution of engineers and the company that currently manufactures the Joshi fixator

in Italy (Dialmedica), a new clamp has been developed that can guarantee movement and a certain degree of dynamic distraction for joint fractures of the PIP or MP joint; use is facilitated in the second and fifth finger. In this preliminary study conducted on 3 patients with a similar pilon fracture, we present the model, uses, possible complications and preliminary results. We evaluated fracture healing over time with serial radiographs, and measured TAM, aROM and VAS during treatment at 1-, 3- and 6-months follow-up respectively.
Results: The use of this new construct allowed the treatment of joint fractures by ensuring early protected mobilisation of the joint while also reducing the rehabilitation phase after removal of the device. The VAS values were always low (1-3) and the aROM and TAM were optimal, also allowing patients a resumption of activities in a relatively short time, without the requirement for a second operation to remove the device.
Conclusions: Joshi's external fixation system has the advantage of adopting Kirschner wires through versatile configurations that best suit the fracture pattern, even in the case of exposed injuries. Specifically, the articulating and uniaxial clamp configuration allows the management of articular fractures of the PIP and MP joint of the second and fifth fingers, even complex ones, providing 'protection' but without sacrificing movement or having to apply excessive tension.

A-0448 THE REHABILITATION PROCESS AFTER FLEXOR TENDON REPAIR WITH AN EARLY ACTIVE REGIME: A COMPREHENSIVE REPORT COVERING AN EXAMINATION PERIOD OF OVER SIX MONTHS

Tim Friebe, Joerg van Schoonhoven
Rhön Klinikum, Bad Neustadt an der Saale, Germany

Introduction: The data on the post-treatment of flexor tendon repairs has increased in recent years. Often, strict exclusion criteria for compliance and additional injuries have been applied. We present a detailed follow-up study using the early active regime with the sole exclusion of pre-existing flexion contractures and vulnerable patient groups.
Aim: To evaluate the effectiveness of our in-house early active flexor tendon rehabilitation treatment and to identify the factors that contribute to a poor outcome.
Material & Methods: Premiminary!!!
We examined >80 digits (>70 Patients) with a mean age of 39 (range 14–77) using a variety of assessments like DASH, Strickland, Jamar-Grip-Strength and 9-Hole-Peg-Test to determine the functional outcome. Participants received their therapy externally and came for follow-up at 0, 3, 6, 9, 12, and 24 weeks. Non-hospital therapy between these check dates took place in private occupational therapy and physiotherapy practices. The applied splint is manufactured within the first four days with the wrist in 0° while a dorsal block at the metacarpophalangeal joints permits an extension of 70° and unlimited flexion and extension of the proximal and distal interphalangeal joints. Our rehabilitation concept follows an early active motion plan and allows the participant to exercise independently both flexion and extension. If there is a flexion contracture, we begin using a night splint in extension starting from the ninth week.
Results: Preliminary results, final results are available for presentation. The median outcome measured with the original Strickland score was while clinical stay 60 (Fair), after three weeks of ambulant care it persists fair (60). At week 6 it increases 63 (fair), improved to week 9 66 (fair) and reached 75 (good) at week 12 and completed with an average good result 81 at week 24 (31% excellent, 9 % good, 9% fair, 4% poor). The mean DASH-score after 24 weeks was 12,9 (range 1,6 - 46,7). There was a 4,9% rupture rate. 55,5% developed an intermittently flexion contracture in the proximal interphalangeal joint, of which 86,67% in the ambulant setting between the clinical discharge and week 3.
Conclusions: Preliminary conclusion, final conclusion is available for presentation. Our in-house early active flexor tendon rehabilitation treatment provides good functional outcome after completion. An indicator of a poor outcome appears to be most pronounced during the first three weeks.

A-0449 IMPACT OF OPEN INJURY IN PROXIMAL PHALANX DIAPHYSEAL FRACTURES

Adrienn Lakatos, Klaudia Jager, Balazs Lenkei
B.-A.-Z. County Teaching Hospital, Traumatology Department, Miskolc, Hungary

Introduction and aim: We meet many patients with the fracture of the proximal phalanx on the fingers. The goal of the treatment is a moving, functional, painless finger. Many of these injuries are open fractures. Our aim was to investigate if open fractures worse results and pain scores compared to closed fractures.
Materials and methods: A retrospective study was conducted on patients with proximal phalanx diaphyseal fractures operated in 2021 and 2022. X-ray and medical data were reviewed, and patients were asked to answer our questions via telephone on function (QuickDASH), pain and satisfaction (VAS 1-10). Two groups were formed regarding if it was an open or closed fracture. Concomitant injuries, means of fixation, time of splint fixation, time of implant removal, need for therapy, extension and flexion deficit and rotational dislocation was registered. Significance was measured with t-test (p=0,05).
Results: Altogether 88 patients were operated at our unit in this period. 49 of them answered our questionnaire. In the closed fracture group, there were 25 patients with the mean age of 40,4. 68% were male. 80% of them were fixed with K-wire. On average they were immobilized in splints for 3,9 weeks postoperatively. Implant removal took place after 5,5 weeks on average. 56% of them went to hand therapy for one month. After 3 months 24% had flexion deficit, 28% had extension deficit and no rotational dislocation was registered. The average QuickDASH (QD) score was 4,82, level of satisfaction was 7,88 and level of pain was 1,56.
In the open fracture group, there were 24 patients with the mean age of 49,5. 88% were male. 54% had concomitant tendon injury and 21% had nerve injury too. 91% were fixed with K-wire. They wore splints for 4,9 weeks postop on average. Implant removal was after 6,9 weeks on average. 45% went to hand therapy for one month. 3 months postop 25% had flexion deficit, 20% had extension deficit and no rotational dislocation was registered. The average QD score was 13,35, level of satisfaction was 7,08, level of pain was 1,79.
Conclusions: Between the two groups we found statistically significant difference in only the QuickDASH scores (p=0,028). The closed fracture group had better functional outcome. The level of pain was lower, and level of satisfaction was higher in the group with closed fracture but without significant differences. We found no major differences in the ratio of extension or flexion deficit. According to our data, altogether we can expect slightly worse functional results after open proximal phalanx fractures but with acceptable pain and satisfaction levels.

A-0450 IATROGENIC NERVE INJURIES OF THE HAND AND UPPER LIMB AND LEGAL IMPLICATIONS

Dionysia Vasdeki[1], Sokratis E Varitimidis[1], Charalambos Chryssanthakis[2], Effrosyni Bompou[3], Zoe H. Dailiana[1,4]
[1]Department of Orthopaedic Surgery, Faculty of Medicine, School of Health Sciences, University of Thessaly, Larissa, Greece; [2]Department of Administrative Science and Public Administration, National and Kapodistrian University of Athens, Athens, Greece; [3]Department of General Surgery, Faculty of Medicine, School of Health Sciences, University of Thessaly, Larissa, Greece; [4]Department of Hand, Upper Extremity Surgery and Microsurgery, Iaso Thessalias, Larissa, Greece

Introduction: Peripheral nerve injuries are among the commonest iatrogenic complications and most commonly are the result of direct intraoperative damage. Although a great percentage of these injuries are preventable, they do occur, and they can result in serious distress and long-term morbidity. They add a considerable financial burden to the healthcare system, while they constitute a well-known source of medicolegal implications. There have been a few published articles presenting the medico-legal consequences of the iatrogenic injuries of nerves, while there are no published reports

related to these issues in Greece.
Aim: Purpose of this study was to describe the incidence, the reasons and the outcomes of malpractice claims associated to iatrogenic peripheral nerve injuries of the hand and upper limb in Greece.
Material & Methods: This is a retrospective study of all malpractice claims, related to iatrogenic nerve injuries of the hand and upper limb, which ended to a trial in Greece within a 20-year period (2000-2019). Data were obtained from the archives of the Council of State of Greece, which were further analysed to identify the number of claims related to non-traumatic nerve injuries of the hand and the upper limb.
Results: In total there were thirteen cases, associated with iatrogenic injury of the spinal accessory nerve, the brachial plexus, the median nerve, the radial nerve, and the fingers' digital nerves. The injuries were sustained during cervical lymph node biopsy, vaginal deliveries, more frequently complicated with shoulder dystocia, release of carpal tunnel, reduction and fixation of humeral fracture, excision of Dupuytren's disease and surgical removal of giant cell tumour of a finger. The involved surgical specialties included general and orthopaedic surgeons, and obstetricians. Eight cases were in favour of the plaintiff, three in favour of the defendant, while two cases remained still open, at the time the study was conducted. The mean indemnity payment was €67.634,42 (€10.000-€201.697), with the highest payments set for cases that required further operative reconstruction.
Conclusions: Iatrogenic peripheral nerve injuries of the hand and the upper limb are a preventable complication, with associated significant morbidity, financial and legal implications. Considering that there is an increasing tendency in negligence claims worldwide, with considerable impact on the health systems and the involved surgeons, it is important to identify the reasons why patients fill malpractice claims and the reasons of successful litigations, to improve our practice and minimise these implications.

A-0451 DOES TIMING OF IMPLANT REMOVAL AFFECT THE RESULTS OF PROXIMAL PHALANX DIAPHYSIS FRACTURE FIXATIONS?

Adrienn Lakatos, Diana Jager, Balazs Lenkei
B.-A.-Z. County Teaching Hospital, Traumatology Department, Miskolc, Hungary

Introduction: In Hungary, the guideline says thet K-wires should be removed after at least 6 weeks postoperatively in case of proximal phalanx diaphyseal fractures. In more and more cases we remove them earlier for different reasons. Some authors say that the wires can be removed if there is no pain anymore at the fracture site.
Aim: To investigate if patients with early implant removal have better results.
Material & Methods: A retrospective study was conducted on patients with proximal phalanx diaphyseal fractures operated in 2021 and 2022. X-ray and medical data were reviewed, and patients were asked to answer our questions via telephone on function (QuickDASH), pain and satisfaction (VAS 1-10). Two groups were formed regarding the timing of implant removal: less than 6 weeks and 6 or more weeks. Means of fixation, time of splint fixation, need for therapy, extension and flexion deficit and rotational dislocation was registered. Significance was measured with t-test ($p=0,05$).
Results: Altogether 88 patients were operated in this period. The average age was 43,25 years. 40 of them answered our questionnaire. In the group with early implant removal, we had 14 patients. The average time of implant removal was 4,28 weeks. 42% was open injury. 78% went to have hand therapy for one month. 3 months postop 14% had extension and flexion deficit. No rotational dislocation was registered. The average QuickDASH score was 7,3, level of satisfaction was 7,85 and level of pain was 1,5.
In the group with implant removal at 6 weeks or later we had 26 patients. The average time of implant removal was 7,3

weeks. 46% was open injury. 50% went to have hand therapy for 3 months postop 38% had flexion deficit, 34% had extension deficit and no rotation dislocation was registered. The average QuickDASH score was 11,27, level of satisfaction was 7,26 and level of pain was 1,73.
Conclusions: We found no statistically significant difference between the two groups. However, the results in case of early implant removal were slightly better in average. Flexion and extension deficit occurred twice more often if the implant was in place for longer time. According to our data it is worth considering earlier implant removal.

A-0452 DIAGNOSIS OF CARPAL TUNNEL SYNDROME : THE EFFECTIVENESS OF ULTRASONOGRAPHIC ELASTOGRAPHY

Kijin Jung
Soonchunhyang University Hospital Cheonan, South Korea

Introduction: Carpal tunnel syndrome (CTS) is a common compression neuropathy of median nerve (MN) at the level of the wrist. The pathophysiologic mechanism of CTS is not fully understood but mechanical aspects of injury are most likely. Anatomically increased carpal tunnel pressure caused by repetitive motions and vibrations makes changes of microvascular structure of the nerve and ischemic injury to MN.
Aim: The purpose of this study was to investigate the diagnostic role of shear-wave elastography in patients with carpal tunnel syndrome (CTS).
Material & Methods: The study included a total of 65 patients (98 wrists) with a definitive clinical diagnosis of CTS who underwent electrodiagnostic testing (EDT) and 15 healthy volunteers (30 wrists). Elastography of the median nerve (MN) was performed by defining the boundaries of a segment of the nerve at sagittal plane at the level of proximal carpal row. Additionally, the cross-sectional area (CSA) of the median nerve by ultrasound was studied. Patients were further subgrouped based on the severity into mild CTS and moderate–severe CTS by Bland's electrophysiological grading scale.
Results: In CTS patients CSA of MN was 10.3 mm2 ; IQR 7.2 -13.4 mm2. In control group, CSA of MN was 5.9 mm2 ; IQR 3.9-7.9 mm2. Patients with CTS had significantly higher CSA of MN compared to control group. ($P<0.001$). The MN mean stiffness was remarkably higher in the CTS group (61.2 kPa) than in controls (30.1 kPa) ($P<0.001$) and higher in the moderate-severe group (98.3 kPa) than the mild group (52.3 kPa) ($P<0.001$). A 40 kPa cut-off value on elastogram revealed sensitivity, specificity of 70.34% and 83.33%, respectively.
Conclusions: Shear-wave elastography and diffusion tensor imaging are helpful imaging modalities in diagnosing carpal tunnel syndrome and assessing its severity

A-0453 EXTRACELLULAR VESICLES FROM HUMAN OLFACTORY MESENCHYMAL STEM CELLS IMPROVE PERIPHERAL NERVE REGENERATION

Marie Witters[1,2], Maxime Bonnet[1,3], Mostafa Seblani[1,3], Patrick Decherchi[3], François Feron[1], Gaëlle Guiraudie-Capraz[1], Charlotte Jaloux[1,2]
[1]CNRS, INP - Institut de Neuropathophysiologie, Equipe Nasal Olfactory Stemness and Epigenesis (NOSE), Aix Marseille University, Marseille, France; [2]Department of Hand Surgery and Reconstructive Surgery of the Limbs, La Timone University Hospital, Assistance Publique Hôpitaux de Marseille, Marseille, France; [3]CNRS, ISM - Institut des Sciences du Mouvement Etienne-Jules Marey, Equipe Plasticité des Systèmes Nerveux et Musculaire (PSNM), Parc Scientifique et Technologique de Luminy, Aix Marseille University, Marseille, France

INTRODUCTION: Peripheral nerve injury results in severe functional impairment. Our team was the first to demonstrate

that olfactory ecto-mesenchymal stem cell (OSC) transplantation improves peripheral nerve regeneration. OSC are localized in the olfactory mucosa, a site of permanent neurogenesis, which belongs to the peripheral nervous system and makes them ideal candidates to enhance nerve recovery. Their effects are due to their paracrine effect, mediated by the extracellular vesicles (EVs) which they produce. EVs are lipid bilayer particles that contain numerous molecules playing a key role in intercellular communication, microenvironment regulation and tissue regeneration. EVs are known to share the same function as the cells from which they originate. They are an innovative alternative to cellular therapy avoiding the constraints associated with cell transplantation (time, cost of autologous cultures, immuno-compatibility, neoplasic risk), and offering clear benefits: availability at the acute phase, low immunogenicity and an absence of anarchic differentiation.
AIMS: Demonstrate that olfactory stem cells-derived extracellular vesicles (OSC-EV) improve nerve regeneration after peripheral nerve lesions.
MATERIAL & METHODS: (1) Purification and characterization of the OSC-EVs according to the "Minimal information for studies of extracellular vesicles" international recommendations (MISEV): OSC were cultured on a medium compatible with human use, OSC-EVs were purified from culture supernatants using ultracentrifugation, size exclusion chromatography and characterized by Western blot, electron microscopy and Tunable Resistive Pulse Sensing (size, quantification).
(2) OSC-EVs induced differentiation of a murine neuroblast (N2a): OSC-EVs (20,000, 200,000 or 2 000 000) were added into N2a cells culture. Differentiated neural cells and the neurite length were recorded with the \"NeuronJ\" plugin of ImageJ software.
(3) OSC-EVs injection to repair injured rat peroneal nerve: After a 7 mm nerve gap, 5 000 000 fresh or frozen OSC-EVs were injected into a venous bridge inserted between the proximal and distal ends of the lesion. Two control groups were constituted: 1) EV-free medium injection in the vein – 2) Nerve graft (gold standard). Sensorimotor functions were assessed weekly for 12 weeks, after which electrophysiological recordings were performed, and biopsy samples were collected for histological analysis.
RESULTS: (1) We developed a standardized protocol to purify OSC-EVs. Their characterization shows the expression of protein markers of EVs, non-cell and cell specific, a mean diameter of 254nm, and an EV typical morphology in electron microscopy.
(2) OSC-EVs increase the neuroblasts differentiation and the length of neurites.
(3) Both fresh or frozen OSC-EVs maintain the contractile phenotype of the target muscle, increase the number of growing axons and increase locomotor recovery. A significant difference was found between OSC-EVs groups compared to control groups, and as early as post-operative week 5. Total recovery was found only for OSC-EVs groups at 12 weeks.
CONCLUSIONS: OSC-EVs represent a new clinical opportunity in regenerative cell-free therapies. These preclinical studies support that OSC-EVs improve functional recovery after peripheral nerve injuries. Characterization of the OSC-EVs content and studies on larger animals and humans are currently undertaken to better understand the biomechanisms of their efficacy and validate their use for peripheral nerve injuries in humans.
KEYWORDS: olfactory ecto-mesenchymal stem cell, extracellular vesicles, peripheral nerve regeneration, preclinical studies, regenerative medecine.rn

A-0454 INTRAOPERATIVE CUP-REVISION IN PRIMARY CMC-1 ARTHROPLASTY

Kevin Knappe[1,2], Mareike Schonhoff[2], Sebastian Jaeger[2], Berthold Bickert[3], Leila Harhaus[3], Benjamin Panzram[1]
[1]Clinic for Orthopedic Surgery, University Hospital, Heidelberg, Germany; [2]Laboratory of Biomechanics and Implant Research, Clinic for Orthopedic Surgery, University Hospital Heidelberg, Germany; [3]Department of Hand, Plastic and Reconstructive Surgery, Microsurgery, Burn Trauma Center, BG Trauma Center Ludwigshafen am Rhein, Germany

Introduction: Endoprosthetic joint replacement as a treatment option for advanced CMC-1 arthritis has shown a significant increase in recent years. The latest generation of prostheses with a dual mobility design lead to excellent functional results with reduced loosening and dislocation rates in the short and medium-term follow-up.
Biomechanical studies have shown that the central placement of the cup and the parallel alignment of the cup to the proximal articular surface of the trapezium (PAST) are crucial for cup stability and dislocation prevention. Despite correct positioning of the guide wire, incorrect placement or tilting of the cup can occur, requiring intraoperative revision.
Aim: The aim of this study was to present possible revision options depending on the intraoperative complication and the cup model used.
Material & Methods: Both cup models (spherical and conical) in the corresponding sizes 9 and 10 were transformed into a computer-aided design data set. Depending on the intraoperative complication (e.g. tilting, incorrect placement), the revision options resulting from the various combinations of the different cup types and sizes were simulated and analysed according to the resulting defect areas and bony contact surfaces.
Results: If no sufficient stability is obtained by a size 9 conical cup it seems possible to revise it into a spherical cup of the same size. Vice Versa this does not seem feasible.
If the conical cup size 9 is tilted by 20°, the best revision option appears to be the usage of a cup size 10 positioned deeper in the cancellous bone and removal of the sclerotic margin.
If a size 9 spherical or conical cup is misplaced in the dorso-palmar or radio-ulnar plane of the trapezium, the position can be corrected implanting a cup size 10 deeper into the trapezium in a central position and remaining defect can be filled with cancellous bone. The conical cup size 10 showed the highest contact area to the bone.
Conclusions: The intraoperative cup revision depends on the type of complication and the applied cup model. Revision options that appear beneficial based on computer-based measurements must be verified in anatomical studies.

A-0455 PUSH THE BOUNDARIES- EXTENDING THERAPY IN HAND SURGERY THROUGH 3D PRINTING TECHNOLOGIES

Benjamin Panzram, Kevin Walter Knappe, Pia-Elene Frey, Leila Harhaus
Clinic for Orthopedics, Heidelberg University, Germany

Introduction: Computer-aided surgical planning and 3D printing technologies are increasingly being used. They now represent a reliable addition to surgical Therapie , especially for corrective osteotomies of the forearm. In the field of hand surgery, these technologies can be used to offer therapy concepts for various clinical pictures that were previously not possible or were significantly less precise.
Aim: We would like to use 4 different cases to demonstrate the wide applications of 3D printing technologies in hand surgery.
Material & Methods: The first example describes the targeted resection of a partial fusion of an epiphyseal plate after a child's distal radius fracture and subsequent malgrowth. The second case describes the correction of a CIA (Carpal Instability Adaptive) after malunion of a forearm fracture. The third example shows the correction of a Madelungs deformity using

double osteotomy and plate osteosynthesis of the radius. The fourth example describes the isolated reconstruction of the radio-lunar joint via a 3D guiding-assisted transplantation of the 2nd metatarsophalangeal joint.
Results: We present the process of preoperative CT-based surgical planning, including web-based exchange between engineers and surgeons to enable the production of 3D-printed patient specific guides and implants as well as the reimbursement of costs and the intraoperative experiences and results.
Conclusions: 3D printing technologies allow surgical reconstructions in the hand and forearm with the highest possible precision and safety, thereby expanding the therapeutic spectrum for many indications. Certainly, further developments and further establishment of the processes and results remain to be seen.

A-0456 ANALYSIS OF SURGICAL OUTCOMES IN PERIPHERAL NERVE TORSION

Jong Woo Kang[1], Ji Jun Shin[1], Ki Hoon Kim[2], Dong Hwee Kim[2]
[1]Department of Orthopedic Surgery, Korea University College of Medicine, Seoul, South Korea; [2]Department of Physical Medicine and Rehabilitation, Korea University College of Medicine, Seoul, South Korea

Introduction: The majority of peripheral nerve torsion needs surgical treatment. However, It is still unknown which surgical techniques are appropriate for certain nerve conditions and how are the surgical outcome of specific surgical techniques.
Aim: We aimed to analyze the clinical outcomes of peripheral nerve torsion in patients with neuralgic amyotrophy according to the degree of nerve torsion and surgical method, and to verify the appropriate time for surgery and type of surgical approach.
Material & Methods: We retrospectively reviewed the history, neurological symptoms, physical examinations, findings of ultrasonographic images and electrodiagnostic studies, and the surgical appearances including the degree of the torsion in 9 patients with peripheral nerve torsion. Also, surgical outcomes after 2 years were evaluated.
Results: Five patients had radial or posterior interosseous nerve torsions, while others had median or anterior interosseous nerve torsions. All the torsions were located at the level above the elbow. Initial severe muscle weakness was found in the nerve torsion over 180 degrees. Favorable recovery from severe muscle weakness was correlated with short duration from the symptom onset to the surgery.
Conclusions: In case of severe weakness due to the suspected peripheral nerve torsion, we suggest early surgical exploration to select appropriate surgery (neurolysis or neurorrhaphy) according to the nerve torsion degree.

A-0457 AN ABNORMAL COURSE OF DORSAL SENSORY BRANCHES OF THE ULNAR NERVE

Jong Woo Kang, Ji Jun Shin
Department of Orthopedic Surgery, Korea University College of Medicine, Seoul, Korea

A dorsal sensory branch of ulnar nerve commonly arises from ulnar nerve at distal thirds of forearm and at the level of ulnar styloid process, it is situated dorsally and medially. It is mandatory to know the anatomical course of the dorsal sensory branches of the ulnar nerve in the surgical and medical procedures dealing with ulnar sided wrist or distal ulna. In this report, we present a case of an abnormal course of dorsal sensory branches of the ulnar nerve. The abnormality was observed in the ulnar shortening osteotomy of a right forearm of a 38 year old female. The dorsal sensory branch of ulnar nerve ran ulnodorally across ulnar border of forearm at proximal 4 cm from ulnar styloid process in this case. To our knowledge, this type of variation has never been published before. This type of variation may be useful during surgeries and electrophysiological examinations of the area.

A-0458 APPLICATION OF THE TRUEDEPTH CAMERA IN MEASURING ANGLES OF SMALL HAND JOINTS

Jan Menoušek[1,2], Jan Dalecký[3], Zdeněk. Dvořák[1,2], Andrej Berkeš[1,2], Pavel Janeček[1], Tomáš Návrat[3]
[1]Department of Plastic and Aesthetic Surgery, University Hospital at St. Anne in Brno and Faculty of Medicine of the Masaryk University, Brno, Czech Republic; [2]Faculty of Medicine, Masaryk University, Brno, Czech Republic; [3]Department of Mechanics of Bodies, Mechatronics and Biomechanics, FME BUT, Brno, Czech Republic

Introduction: The classification of Dupuytren's contracture is based on an objective measurement of the angles at individual finger joints using a goniometer. The treatment success is evaluated based on the pre-op and follow-up measurements. The use of telemedicine methods providing good speed and accuracy of the measurements would be beneficial for both the surgeon and the patients. In this context, the possibilities offered by the TrueDepth camera of the iPhone mobile phones from the generation X onwards have aroused our interest.
Aim: To evaluate the possibility of computerized measurement of the angles of individual finger joints using the iPhone TrueDepth camera to on a computer.
Material & Methods: Hege.sh, a paid app on the App Store, was used to create 3D hand models on the iPhone 12 Pro. Preoperative measurements were taken both using a goniometer with an accuracy of 5° and iPhone. The Blender software was used to measure the joint angles of the 3D hand model.
Results: The study group consisted of included 28 patients, one finger from one hand was evaluated in each patient (both metacarpo-falangeal, MCP, and proximal interfalangeal, PIP, joints were evaluated at each finger). Three patients were excluded from the study due to poor quality 3D models. The median difference between the goniometer and 3D model measurements was 1 (IQR -4;9) for MCP joints and 5 (IQR 0;8) for the PIP joints, respectively. The differences using a paired Wilcoxon test were not significant.
Conclusions: Conclusions: The use of the TrueDepth camera of a mobile phone and the subsequent evaluation in a PC confirmed the applicability of this technology. The goal of further research will be to implement the angle measurements directly into a mobile phone application.

A-0459 SUBCAPITAL 5TH METACARPAL PERI-IMPLANT FRACTURE

Diogo Ramalho[1,2,3], Carla Nunes[1,4], Raquel Teixeira[1,5], Catarina Pereira[1,6]
[1]Hospital Cuf Tejo, Lisboa, Portugal; [2]Hospital SAMS, Lisboa, Portugal; [3]Hospital de Cascais Dr José de Almeida, Cascais, Portugal; [4]Hospital Cruz Vermelha, Lisboa, Portugal; [5]Centro Hospitalar de Lisboa Ocidental - Hospital São Francisco Xavier, Lisboa, Portugal; [6]Hospital Professor Doutor Fernando Fonseca, Amadora, Portugal

Introduction: Peri-implant fractures are typically demanding lesions. At the hand, the small dimensions and the need for sufficient stability to allow early mobilization make them particularly challenging. We present the case of a 31year-old male who sustained a 5th metacarpal(5MC) subcapital fracture around an intramedullary Kirschner wire (Kw). He had a previous history of a 5MC fracture treated with intramedullary Kw 15 years prior, one still in place.
Aim: To describe an uncommon and challenging case, the treatment performed and its outcome.
Material & Methods: A 31 year-old male presented to the clinic with the diagnosis of a 5MC fracture, immobilised with a Zimmer splint. He had suffered a previous fracture on the same bone 15 years before, treated with intramedullary Kw, one of which was still in the bone. An attempt of reduction and immobilization with a U metacarpal cast was made but was unsuccessful. A CT scan was performed to better characterize the fracture and plan the surgical treatment.
Under general anesthesia, the fracture site was surgically approached from the ulnar side, to locate the distal end of

the Kw, and then, an attempt was made to remove it, without success. A second surgical ulnar approach was made at the base of the 5MC on the topography of the proximal tip of the Kw. It was located, but still immovable. The proximal tip of the Kw was freed from surrounding bone and then, with great difficulty, was possible to remove it through the distal incision along with some adherent bone. A third surgical approach was made over the extensor tendons of the 5th finger, and the fracture was then reduced and stabilised with an intramedullary Herbert-type fully threaded screw. No angular or rotational deformity were present in flexion, extension or with tenodesis effect. The incisions were sutured and, a surgical dressing and a 4th-5th buddy-taping were put in place. The patient was instructed to begin immediate mobilization keeping the buddy-taping in place, and avoiding any weight, impact or counter-resistance.
Results: At week 6 post-operativelly, the patient had no pain and no limitation of mobility, and radiological evidence of bone healing.
Conclusions: Despite the difficulty, a good result was achieved and we strongly believe that the immediate mobilization allowed by the intramedullary screw technique was essential.

A-0460 IS IT POSSIBLE TO PREDICT TFCC INJURY (PALMER 1B) ACCOMPANYING DISTAL RADIUS FRACTURE DIAGNOSED BY MRI THROUGH RADIOGRAPHIC PARAMETERS?

Sung Jin Kang, Seoung Jun Lee, Ji Nam Kim, Yun Seop Kim
Konkuk university Hospital, Seoul, Korea

Introduction: TFCC injury is one of the common concomitant injury of distal radius fracture. Among TFCC injury accompanying distal radius fracture, Palmer classification type 1B lesions are commonly associated with instability of the DRUJ and require careful evaluation. Therefore, diagnosing and managing TFCC injury(palmer 1B) at the time of initial distal radius fracture can play an important role in the patient's prognosis.
Although arthroscopy is known to be definite diagnostic tool as a method for diagnosing TFCC injury, there is controversy as to whether it should be performed in all patients. And MRI can be used as a non-invasive diagnostic tool and with the development of 3.0T MRI, it has been reported that sensitivity and specificity for diagnosing TFCC are also excellent. but it has the disadvantage of placing a cost burden on patients.
Aim: The purpose of this study was to identify the relationship between TFCC injury accompanying distal radius fracture confirmed by MRI and basic radiographic examination and CT examination performed before fracture surgery.
Material & Methods: 102 wrists of 102 patients with distal radius fracture who were treated for open reduction & internal fixation at our hospital between February 2020 and July 2023 were assessed radiographically (XR, CT, MRI). MRI was used to diagnose TFCC injury and any other concomitant injury. 60 patients had TFCC tears(palmer 1B) and 42 patients did not have TFCC tears(palmer 1B). We measured radial height, ulnar variance, radial inclination, dorsal tilt, DRUJ distance, radial translation, sagittal translation, presence of styloid fracture, fracture classification(AO) through initial X-ray. And DRUJ subluxation is measured by RUR(radioulnar ratio), modified radioulnar joint method through preoperative CT(axial cut). The relationship between radiographic parameter and TFCC injury was evaluated.
Results: Radiographic parameters were compared and analyzed between group with TFCC injury(palmer 1B) and group without TFCC injury(palmer 1B). Statically significant results were not obtained in X-ray parameters. However, A statistically significant value was obtained in the degree of DRUJ subluxation using the modified radioulnar joint method measured by CT(axial cut).
Conclusions: In conclusion, X-ray parameters could not predict TFCC injury(palmer 1B) accompanying with distal radius fracture. But, Presence of marked DRUJ subluxation on CT(axial cut) with distal radius fracture predicted the prescence of

TFCC injury(palmer 1B). We concluded that marked DRUJ subluxation with distal radius fracture is predominant parameter of TFCC injury(palmer 1B).

A-0461 MASQUELET TECHNIQUE - AN USEFUL PROCEDURE TO AVOID FINGER AMPUTATION

Joana Correia Rodrigues, Tiago Canas, Rute Santos Pereira, Cláudio Garcia, João Cruz, João Gonçalves, Renato Soares, António Rebelo
Hospital do Divino Espírito Santo de Ponta Delgada, Ponta Delgada, Açores, Portugal

Introduction: The Masquelet technique, also known as induced membrane technique, is an effective and widely accepted procedure used to treat challenging small bone defects in different anatomical locations. It is characterized by two different operative stages, the first implies the use of a cement spacer and the second the application of bone graft. Although relatively common in the lower extremities, this procedure is still rare in the upper extremities, with some cases described in the literature for hand osteomyelitis, but few for hand trauma.
Aim: Emphasize an effective method of treating segmental bone loss as an alternative to finger amputation.
Material & Methods: Case report: 51 years old male, who presents in the emergency department with a right thumb crush injury, with bone and tendon loss, of the proximal phalanx and proximal third of the distal phalanx. He underwent emergency surgery for cleaning, exploration of the wound, fixation of the distal phalanx to the metacarpal and coverage and closure of the skin and soft tissues. After surgery, he performed treatments in the hyperbaric chamber and wound care with good coverage of the bone defect. Three months later, the patient was proposed for the Masquelet Technique. First stage: surgical debridement, stabilization with two crossed Kirschner wires and placement of a cement spacer impregnated with antibiotic. Second stage (10 weeks later): opening of the induced membrane, bone cement removal, iliac crest autograft application and Kirschner wires replacement.
Results: Follow-up at 3, 6, 12 weeks and 6 months postoperative. The Kirschner wires were removed after 6 weeks and bone union was achieved after 12 weeks. He had wound dehiscence and infection of the iliac wound as a complication, which was treated with oral antibiotics and wound care. Currently, the patient has a Kapandji 7, with no limitations at daily activities.
Conclusions: The Masquelet technique is a reliable and safe option in the management of bone defects in the fingers, which can avoid amputation.

A-0462 STREP GROUP A FLEXOR TENOSYNOVITIS

Katie Frith, Alexander Roszman, Ronit Wollstein
UAB Heersink School of Medicine, Birmingham AL, USA

Introduction: Group A streptococcus is a well-known pathogen causing disease ranging from cellulitis and scarlet fever to necrotizing fasciitis. It is ubiquitous in many settings but in general seems to constitute a bigger health problem in low socioeconomic communities being highly prevalent in developing countries, and among indigenous populations as well as low socioeconomic areas in developed countries. Children, the immunocompromised and the elderly are at the greatest risk of S. pyogenes infections. We describe a case of Strep group A flexor tenosynovitis in a finger. This unusual presentation in an otherwise healthy individual with no known inciting/penetrating event, was difficult to treat due to the paucity of guidance in the literature. We present the case and propose a treatment approach.

Case: A 50 year- old Caucasian female administrator with no previous past medical history presented with rapidly progressing right index finger pain, swelling, and erythema (12 hour history). She denied a history of trauma or penetrating injury to the digit. Her predominant symptom was pain. On examination, she was generally sick and found to have all four Kanavel signs as well as a tiny volar bulla present over her DIP joint flexor crease. She presented with a white blood cell count of 18,000, C reactive protein (CRP) of 44, and tachycardia to 100 beats per minute, raising concern for sepsis. She was treated medically and surgically. Initially medical treatment consisted of empiric wide-spectrum antibiotics and then with Penicillin according to sensitivity. She was treated surgically for the tenosynovitis with a surgical washout but developed significant skin necrosis and continuing erythema. This was treated with systemic antibiotics and the addition of local Bacitracin with a good response.

Conclusions:

• Group A streptococcus was not described as a pathogen in flexor tenosynovitis.

• The existence in a developed country, in a healthy host, and presenting as flexor tenosynovitis may be due to new mutations.

• Despite being treatable and rare in developed countries, it can still be life threatening.

• Since it requires swift identification to avoid potentially life and limb threatening effects, a high index of suspicion should be implemented especially if the patient presents systemically sick.

• We suggest a treatment approach:

a. Urgent medical treatment to prevent mortality and morbidity.

b. Close follow-up locally, hand therapy

c. Use of local antibiotics for the skin as an adjunct to systemic antibiotic treatment

A-0463 ARTHROSCOPIC DORSAL INTERCARPAL LIGAMENT PLICATION IN HIGH GRADE SCAPHOLUNATE INSTABILITY TREATMENT: DESCRIPTION OF THE TECHNIQUE AND PRELIMINARY RESULTS

Ahlam Arnaout[1,2], Christophe Mathoulin[1]

[1]International Wrist Centers -Clinique du Poignet Paris; [2]Institut de la Main-Paris

Introduction: The treatment of scapholunate instability (SLI) is still debated. The crucial role of the dorsal intercarpal ligament (DIC) in high-grade instability is also recognized following recent anatomical studies.

Aim: The objective is to describe the arthroscopic DIC plication procedure (ADICP) in high-grade scapholunate instability treatment and present the preliminary results.

Material & Methods: Patients who underwent the ADICP technique for SLI of grade equivalent or higher than EWAS IIIC, evaluated at a minimum follow-up of one year, were retrospectively included. The EWAS stage was confirmed intraoperatively, and two converging wide dorsal arthroscopic capsulo-ligamentous sutures (ADCLR) were performed. Stabilization of the scapholunate space (SL) by traction on the 2 sutures (DIC plication) was assessed intraoperatively; it was considered complete (C= complete), satisfactory (G= good), or incomplete (F= fair).

Clinical and paraclinical evaluations were carried out postoperatively at 3 months, 6 months and one year.

Results: Twelve patients were included. The average time between surgery and trauma was 8.5 months. Nine SLI grade EWAS IIIC and 3 EWAS IV were observed intraoperatively.

Stabilization of the SL space was judged complete in 10 cases, satisfactory in 1 case and incomplete in 1 case.

At 1 year follow-up , compared to the preoperative evaluation, and on average: the VAS decreased by 69%, the grip strength increased by 24.3%; extension was not significantly modified, and flexion decreased by 16.8%. The Watson

test was positive in 11 cases preoperatively; it was negative in 10 of these cases at final follow-up. Finally, the average Mayo Wrist Score increased by 26.64%.
Discussion: Previously described treatments for SLI are intrusive, often requiring dissection of crucial stabilizing structures, and mid and long-term results are often disappointing. The ADCLR technique and its enlarged modification have shown satisfactory results. Recent anatomical studies have also demonstrated the crucial role of the DIC in high-grade SLI. ADICP is an original alternative technique, which presents the advantages of a minimally invasive arthroscopic procedure allowing the DIC to be effectively tightened and stabilized, while avoiding complications linked to the bone tunnels of ligamentoplasties.
Conclusions: The preliminary results of the ADICP are encouraging. A greater follow-up and a larger series are nevertheless necessary to conclude on its superiority over the other current procedures available for high-grade scapholunate instability treatment.

A-0464 ARTHROSCOPIC DORSAL INTERCARPAL LIGAMENT PLICATION IN HIGH-GRADE SCAPHOLUNATE INSTABILITY TREATMENT: DESCRIPTION OF THE TECHNIQUE AND PRELIMINARY RESULTS

Ahlam Arnaout[1,2], Christophe Mathoulin[1]
[1]International Wrist Centers -Clinique du Poignet Paris; [2]Institut de la Main-Paris

Introduction: The treatment of scapholunate instability (SLI) is still debated. The crucial role of the dorsal intercarpal ligament (DIC) in high-grade instability is also recognized following recent anatomical studies.
Aim: The objective is to describe the arthroscopic DIC plication procedure (ADICP) in high-grade scapholunate instability treatment and present the preliminary results.
Material & Methods: Patients who underwent the ADICP technique for SLI of grade equivalent or higher than EWAS IIIC, evaluated at a minimum follow-up of one year, were retrospectively included. The EWAS stage was confirmed intraoperatively, and two converging wide dorsal arthroscopic capsulo-ligamentous sutures (ADCLR) were performed. Stabilization of the scapholunate space (SL) by traction on the 2 sutures (DIC plication) was assessed intraoperatively; it was judged complete (C= complete), satisfactory (G= good), or incomplete (F= fair).
Clinical and paraclinical evaluations were carried out postoperatively at 3 months, 6 months and one year.
Results: Twelve patients were included. The average time between surgery and trauma was 8.5 months. Nine SLI grade EWAS IIIC and 3 EWAS IV were observed intraoperatively.
Stabilization of the SL space was considered complete in 10 cases, satisfactory in 1 case and incomplete in 1 case.
At 1 year follow-up , compared to the preoperative evaluation, and on average: the VAS decreased by 69%, the grip strength increased by 24.3%; extension was not significantly modified, and flexion decreased by 16.8%. The Watson test was positive in 11 cases preoperatively; it was negative in 10 of these cases at final follow-up. Finally, the average Mayo Wrist Score increased by 26.64%.
Discussion: Previously described treatments for SLI are intrusive, often requiring dissection of crucial stabilizing structures, and mid and long-term results are often disappointing. The ADCLR technique and its enlarged modification have shown satisfactory results. Recent anatomical studies have also demonstrated the crucial role of the DIC in high-grade SLI. ADICP is an original alternative technique, which presents the advantages of a minimally invasive arthroscopic procedure allowing the DIC to be effectively tightened and stabilized, while avoiding complications linked to the bone tunnels of ligamentoplasties.

Conclusions: The preliminary results of the ADICP are encouraging. A greater follow-up and a larger series are nevertheless necessary to conclude on its superiority over the other current procedures available for high-grade scapholunate instability treatment.

A-0465 PREDICTIVE FACTORS FOR CUBITAL TUNNEL SYNDROME DEVELOPED DURING ELBOW REHABILITATION TREATMENT AFTER A SURGERY FOR THE FRACTURES AND LIGAMENT INJURY AROUND THE ELBOW JOINT

Seoung Jun Lee, Sung Jin Kang, Ji Nam Kim, Yun Seop Kim
Konkuk university Hospital, Seoul, Korea

Introduction: Rehabilitation treatment for early joint motion recovery after appropriate treatment for fractures and ligament injuries around the elbow is generally performed. However, in some patients, ulnar nerve symptoms may occur during the rehabilitation, and additional surgical treatment or conservative treatment may be required for the ulnar nerve symptoms.
Aim: In this study, we investigated the predictive factors and natural course of patients who developed ulnar nerve symptoms during rehabilitation after undergoing surgical treatment for fractures and ligament damage around the elbow.
Material & Methods: Among the patients who underwent surgery for injuries around the elbow joint, patients with ulnar nerve symptoms were included. Patients with ulnar nerve symptoms, elbow deformity, or other peripheral neuropathy before surgery were excluded. And iatrogenic injury of ulnar nerve during the operation was also excluded. All patients were diagnosed with cubital tunnel syndrome by electro. The patient's medical records were retrospectively analyzed to investigate the relationship between fracture type, location of ligament damage, heterotopic ossification, sex, age, immobilization period, and occurrence of ulnar nerve symptoms.
Results: In this study, 232 patients were included among patients who underwent surgery for around elbow joint injury at the hospital and at the hospital for 5 years. 13 of 232 patients complained of ulnar nerve symptoms during rehabilitation. The mean age of these 14 patients was 50.8 years, 11 were female and 2 male. We used McGowan grading system to determine the severity of cubital tunnel syndrome. As a result of analyzing the relationship between the occurrence of ulnar symptoms and several factors, statistical significance was found in the immobilization period and gender. We performed ulnar nerve subcutaneous anterior transposition and brisement force on 13 patients, and at the final follow-up, ulnar nerve symptoms disappeared.
Conclusions: In this study, the longer the immobilization period, the higher the likelihood of ulnar nerve symptoms in women. Based on these results, the authors believe that starting joint exercise as soon as possible in case of injury around the elbow joint can reduce the occurrence of ulnar nerve symptoms, and we also think that in the case of women, careful attention to the possibility of ulnar nerve symptom development during the rehabilitation will be need.

A-0466 OUTCOMES OF AUTOLOGOUS NERVE GRAFTING WITH TRANSVENOUS SYSTEMIC ADMINISTRATION OF ADIPOSE-DERIVED STEM CELLS

Soichiro Honda, Mika Akahane, Atsuro Murai, Yuta Nakamura, Akari Mori, Kaoru Tada, Satoru Demura
Department of Orthopedic Surgery, Graduate School of Medical Sciences, Kanazawa University, Japan

Introduction: Although autologous nerve grafts are the gold standard for the treatment of peripheral nerve defects, the results are generally unsatisfactory. To improve the results of autologous nerve grafts, we conceived systemic

administration of adipose-derived stem cells (ADSCs), which have been reported to contribute to nerve regeneration through various mechanisms.
Aim: The aim of this study was to investigate the effect of transvenous systemic administration of ADSCs on autologous nerve graft outcomes.
Material & Methods: Adipose tissue from the inguinal region of Wistar rats was harvested and enzyme-treated, and the cells obtained were cultured. The ADSCs obtained after the third passage were mixed with phosphate buffered saline (PBS) to prepare cell suspensions. We transected 15mm the left sciatic nerve of a female Wister rat (12-week-old), the nerve was inverted and transplanted it to prepare an autologous nerve graft model. After performing the nerve grafts, we randomly injected cell suspensions (ADSCs group) or PBS only (Control group) via the tail vein. Twelve weeks after the transplantation, we measured the muscle wet weight of the tibialis anterior muscle, the sciatic function index, and the autotomy score, and nerve conduction studies were carried out on the sciatic nerve with the two groups. Furthermore, Di-I-labeled ADSCs were administered to the models, and transplanted nerve and dorsal root ganglia were harvested 1 and 4 days after the transplantation to evaluate the distribution of the ADSCs. In addition, nerve grafts were harvested at 1, 2, 4, and 12 weeks after the transplantation, and we evaluated the changes in nerve axons within the nerve grafts over time by toluidine blue staining.
Results: The ADSCs group exhibited significant improvement in the wet weight of the tibialis anterior muscle and in the end latency of compound muscle action potentials compared with the control group. A little number of Di-I-labeled ADSCs were distributed around the nerve grafts, but not in other tissues. By toluidine blue staining, we saw that the demyelination of axons was suppressed by the administration of ADSCs.
Conclusions: Transvenous systemic administration of ADSCs significantly improved the muscle wet weight and terminal latency compared to autologous nerve grafts alone. The results suggest that the use of transvenous systemic administration of ADSCs on autologous nerve grafts may provide better results than a conventional autologous nerve grafts.

A-0467 USING OLFACTORY STEM CELLS TO IMPROVE PERIPHERAL NERVE REGENERATION

Charlotte Jaloux[1,2], Marie Witters[1,2], Maxime Bonnet[2,3], Mostafa Seblani[2,3], Patrick Decherchi[3], François Feron[2], Gaëlle Guiraudie-Capraz[2]

[1]Department of hand surgery and reconstructive surgery of the limbs - La Timone University, Marseille, France; [2]Aix Marseille Univ, CNRS, INP, UMR 7051, Institut de Neuropathophysiologie, Equipe Nasal Olfactory Stemness and Epigenesis (NOSE) Marseille, France; [3]Aix Marseille Univ, CNRS, ISM, UMR 7287, Institut des Sciences du Mouvement: Etienne-Jules Marey, Equipe Plasticité des Systèmes Nerveux et Musculaire (PSNM) Parc Scientifique et Technologique de Luminy, Faculté des Sciences du Sport de Marseille, Marseille, France

INTRODUCTION: Peripheral nerve injuries are common and outcomes are still poor despite improvement in repair technique and understanding. These injuries can result in disability and reduced quality of life for patients. Several studies show that mesenchymal stem cell graft is a good strategy to improve nerve regeneration. Yet, their harvest is often invasive, most often from bone marrow. Olfactory ecto-mesenchymal stem cells (OEMSC) are mesenchymal stem cells, have enhanced mitotic activity, display a strong potential for differentiation into neural lineages and are genetically stable. These cells are easily accessible. They are located in the lamina propria of the nasal olfactory mucosa and their harvest is minimally invasive (no pain, no olfaction impairment). OEMSC have been successfully tested in several animal models of Parkinson's disease, paraplegia, deafness, and amnesia.
AIMS: Assess the efficiency of the addition of olfactory stem cells grafted in a venous conduit in improving peripheral nerve regeneration.

MATERIAL & METHODS: We evaluated the therapeutic potential of vein guides, transplanted immediately or two weeks after a peroneal nerve injury and filled with olfactory ecto-mesenchymal stem cells (OEMSC) in a rat model. Sixty-seven syngeneic rats were randomly allocated to five groups. A 3 mm peroneal nerve loss was bridged, acutely or chronically, with a 1 cm femoral vein with/without OEMSCs. The four groups were compared to unoperated rats (control group) with the same injuries. OEMSCs were purified from male olfactory mucosae and grafted into female hosts. Three months after surgery, nerve repair was analyzed by measuring locomotor function, mechanical muscle properties, muscle mass, axon number, and myelination.
RESULTS: We observed that stem cells significantly:
(i) increase locomotor recovery. The best improvement of the peroneal functional index was observed in the delayed reparation groups with, a difference between the grafted and ungrafted groups appeared at week 4 and remained till week 12.
(ii) partially maintain the contractile phenotype of the target muscle
(iii) increase the number of growing axons. OEMSCs remained in the nerve and did not migrate to other organs.
CONCLUSIONS: We have shown that OEMSCs seem to enhance peripheral nerve recovery. These results along with another in vivo study done in collaboration with our team, on a facial nerve model in rats (Bense F et al. Plast Reconstr Surg. 2020 Dec;146(6):1295–305.) open the way for a phase I/IIa clinical trial based on the autologous engraftment of OEMSCs in patients with a nerve injury, especially those with neglected wounds.
Additionally, our research led us to develop a method of optimization in the purification process of human OEMSCs to validate their production under clinical grade conditions, while respecting the criteria of good manufacturing practices (advanced therapy medicinal product). A phase I/IIA clinical trial assessing the tolerance, feasibility and efficiency of OEMSC grafts in injured sensory peripheral nerves (digital nerves or the sensitive branch of the radial nerve) will begin shortly.

A-0468 CLINICAL TESTS IN THE DIAGNOSIS OF SCAPHOLUNATE LIGAMENT INJURIES

Igor O. Golubev[1], Bella M. Gazimieva[2,3], Maksim E. Sautin[3]
[1]Priorov National Medical Research Center of Traumatology and Orthopedics, Moscow, Russia; [2]Peoples' Friendship University of Russia, Moscow, Russia; [3]European Medical Center, Moscow, Russia

Introduction: Diagnosis of injuries to the scapholunate ligament (SL) of the wrist joint using non-invasive instrumental methods is complicated by frequent false examination results, and therefore assessment of the diagnostic accuracy of existing common clinical symptoms and tests is critical in determining the main diagnostic tool set.
Aim: The aim of the study was to evaluate the diagnostic value of alternative specific tests in the diagnosis of scapholunate lesions.
Material & Methods: The clinical test specificity study included 50 people. In 50 subjects without complaints or known history of injuries, clinical SL-specific tests were performed on 100 wrist joints. The tests included dorsal palpation, Watson test, scaphoid ballottement test and Kleinman test. For all clinical tests, the specificity of the method was calculated.
Results: The specificity for dorsal palpation of the SL region as a diagnostic test was 84.0%, for the Watson test – 96.0%, for scaphoid ballottement test – 98.0%, for Kleinman test – 79.0%. The average specificity of the three clinical tests was 91.0%, for Watson and scaphoid ballottement tests – 97.0%, for Watson and Kleinman tests – 87.5%, for scaphoid ballottement and Kleinman tests – 88.5%.
Conclusions: The combination of clinical diagnostic tests has high specificity. In the algorithm for diagnosing damage to the SL, the primary tactic should include dorsal palpation of the SL region and subsequent implementation of all specific

pathological functional tests. However, preference should be given to the results of the Watson test and the scaphoid ballottement test.

A-0469 MAGNETIC RESONANCE IMAGING IN THE DIAGNOSIS OF THE SCAPHOLUNATE LIGAMENT INJURIES: ACCURACY IN COMPARISON TO DIAGNOSTIC WRIST ARTHROSCOPY

Igor O. Golubev[1], Bella M. Gazimieva[2,3], Maksim E. Sautin[3]
[1]Priorov National Medical Research Center of Traumatology and Orthopedics, Moscow, Russia; [2]Peoples' Friendship University of Russia, Moscow, Russia; [3]European Medical Center, Moscow, Russia

Introduction: Diagnosis of injuries to the scapholunate ligament (SL) of the wrist joint is based on the use of magnetic resonance imaging (MRI). In this regard, assessing the diagnostic accuracy of MRI in comparison with the "gold standard" – wrist arthroscopy – is critically important.
Aim: The aim of the study was to evaluate the accuracy of MRI in diagnosis of the scapholunate ligament lesions in comparison with the findings on diagnostic wrist arthroscopy.
Material & Methods: A study of the accuracy of MRI in diagnosing SL lesions included 75 patients. In 75 patients, 76 wrist joints underwent diagnostic arthroscopic exploration. All patients previously underwent an MRI examination of the joint (or in 1 case, both joints). The results of an MRI examination of the wrist joint were compared to the results of the wrist arthroscopy of the SL - determining the presence and degree of ligament damage according to the IWAS classification. For MRI, in comparison with the results of arthroscopic revision, the sensitivity, specificity, and predictive value of the positive and negative results of the method were calculated.
Results: The sensitivity of MRI in diagnosing SL lesions was 57.0%, specificity – 83.0%, predictive value of a positive result – 67.0%, predictive value of a negative result – 77.0%. The results of MRI studies and the degree of damage to the SL during arthroscopic revision significantly correlate ($R=0.5188$, $p<0.0001$), however, mild degrees of damage according to the IWAS classification remain a "blind spot" in the MRI diagnosis of SL injuries. Injuries of grades 1-3 according to IWAS, confirmed by arthroscopy, were detected on MRI in 30.8% of cases, while grades 4-5 were diagnosed instrumentally in 80.0% of cases. The rate of false negative MRI results was 42.9%.
Conclusions: In the algorithm for diagnosing SL damage, MRI remains a relatively high-accuracy method for diagnosing SL lesions, but not for all degrees of lesions – MRI more often detects grades 4-5 tears according to the IWAS classification and does not exclude false-positive results in the absence of ligament damage during arthroscopic revision, thus confirming the status of arthroscopy as the gold standard for diagnosing SL injuries, especially in lower grades.

A-0470 THE EFFECT OF OBJECT SIZE AND WEIGHT ON INTRINSIC AND EXTRINSIC HAND MUSCLE ACTIVITY DURING PICKING-UP MOVEMENTS WITH CHOPSTICKS: MUSCLE SYNERGY ANALYSIS

Kazuya Kurauchi, Hiroshi Kurumadani, Shota Date, Toru Sunagawa
Graduate School of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan

Introduction: The recent surge in foreign tourists to Asian countries has increased chopstick use. Although the intricate precision required for manipulating chopsticks involves the coordinated activity of various intrinsic and extrinsic hand muscles, research on the coordination of these muscles during chopstick manipulation is still lacking. In a rehabilitation focused on regaining chopstick proficiency, individuals engage in tasks where chopsticks are employed to pick up objects

simulating the sizes and weights of food items. However, it remains unclear how both intrinsic and extrinsic hand muscles adjust to daily variations in food morsel size and weight.
Aim: This study aimed to elucidate muscle coordination in chopstick manipulation and investigate the effects of object width and weight on intrinsic and extrinsic hand muscle activity during the picking-up objects with chopsticks.
Material & Methods: Twenty healthy right-handed adults performed six object-grasping tasks by utilizing chopsticks. Tasks included three object widths (1, 2, and 3 cm) and two weights (10 and 40g), each conducted in 10 trials. Muscle activity of 12 target muscles (8 intrinsic and 4 extrinsic hand muscles) was recorded using surface electromyography. Additionally, chopstick tip movements were measured with a three-dimensional motion capture system to identify opening, closing, and holding movements of the chopsticks. Muscle activity waveforms during opening/closing phases were calculated. Subsequently, muscle synergy analysis was conducted using non-negative matrix factorization on all muscle activity waveforms. Muscle weighting components and time-varying patterns with a variance accounted for above 90% were extracted. Components exceeding 0.4 were considered high contributors to the synergy. Furthermore, muscle activity in each phase were quantified as relative values to maximum voluntary contraction. For statistical analysis, a three-way ANOVA was performed on muscle activity, considering three factors: object weight, width, and phase. The significance level was set at less than 5%.
Results: Five muscle synergies were identified during chopstick movements, intrinsic intermuscular coordination, extrinsic intermuscular coordination, and coordination between intrinsic and extrinsic hand muscles. Object width didn't influence the muscle activity of intrinsic and extrinsic hand muscles. However, object weight had an impact on both intrinsic and extrinsic hand muscles during the closing and holding phases, with a significant increase observed under the 40g condition. When comparing each phase, intrinsic hand muscles exhibited a gradual increase in muscle activity during the opening, closing, and holding phases, regardless of weight. Meanwhile, the flexor digitorum superficialis and extensor digitorum communis showed no significant impact of the phase under the 10g condition but demonstrated a similar increasing trend in muscle activity as intrinsic hand muscles under the 40g condition.
Conclusions: During chopstick manipulation, we identified three intermuscular coordination: intrinsic intermuscular coordination, extrinsic intermuscular coordination, and coordination between intrinsic and extrinsic muscles. Object size didn't affect muscle activity, but object weight influenced both intrinsic and extrinsic muscles, especially during closing and holding. Extrinsic hand muscles exhibited weight-dependent variations, while intrinsic hand muscles consistently activated during holding. Recommendations for chopstick training include encouraging intrinsic hand muscle activity and starting with lightweight objects for individuals with heightened muscle activity.

A-0471 FOUR CORNER FUSION: RETROSPECTIVE ANALYSIS OF THE RESULTS FROM THE LARGEST NATIONAL SERIES TO DATE, USING A RADIOLUCENT DORSAL LOCKING PLATE

Lorena Parra, Marisol Martí, Cristobal Greene, Arturo Verdugo, Alejandro Opazo, Guillermo Droppelman
Clínica MEDS, Santiago, Chile

Introduction: Four-corner arthrodesis is a technique used for the treatment of advanced carpal collapses, commonly caused by scapholunate injuries (SLAC) and non-unions of scaphoid fractures (SNAC), among other etiologies. These conditions often affect young, active patients, where treatment goals include alleviating pain and functional impairment while preserving mobility. Multiple fixation options exist for performing arthrodesis, including the use of Kirschner wires, staples, compression screws, and, more recently, dorsal plates. While initial reports utilizing dorsal plates yielded discouraging results, improvements have been significant with advancements in implant design and surgical techniques,

positioning it as a reliable treatment option.
Since 2006, polyether ether ketone (PEEK) dorsal plates have been available on the market. Being radiolucent, they allow better intraoperative visualization for implant positioning and compression, besides facilitating radiological monitoring of consolidation during follow-up. Despite the growing literature supporting the technique, it has yet to become popular in our country, with only 18 procedures using the radiolucent dorsal plate (Xpode®, Trimmed) performed nationwide between 2019 and 2022, 13 of which were conducted by our team.
Aim: To describe the results obtained in the largest national series conducted to date, evaluating complications, consolidation rates, functionality, range of motion, and patient-reported outcomes, while comparing them to the existing literature for this and other available surgical options.
Material & Methods: A retrospective analysis was conducted on 13 patients who underwent four-corner arthrodesis with the Xpode® plate by one surgical team between 2019 and 2022. The average follow-up was 25.6 months (10-48 months), assessing consolidation through radiographs and CT scans, range of motion (ROM), pain using the visual analog scale (VAS), functionality using the abbreviated version of the Disability of the Arm, Shoulder, and Hand questionnaire (QuickDASH), and the presence and frequency of complications. Statistical analysis was performed using Stata, with categorical variables evaluated using the Chi-square test, and statistical significance set at $p<0.05$.
Results: The consolidation rate was 100%, the average flexion-extension arc was 68.4°, the average VAS pain score was 1, and the average QuickDASH score was 3.55. Complications included one asymptomatic screw fracture and one patient with progressive radiocarpal arthritis with mild discomfort, with no reinterventions during the follow-up period. All patients reported satisfaction with the results, with 69.2% considering them excellent.
Consolidation rates were comparable to those obtained in published literature, and the achieved ROM was superior to that reported for screw arthrodesis (68.1º, Cifras JL, J Wrist Surg. 2021 Oct) (p 0.0015) and equivalent to that of plates (69.8º, Rudnick B, Hand NY. 2014 Sep). High satisfaction rates were obtained among patients, even those experiencing complications. The QuickDASH score of 3.55 was better than that of screw arthrodesis (13, Ozyurekoglu, J Hand Surg 2012, March) (p 0.0077), representing a 1.45 improvement over the last national review (5.3, Melibosky, Rev Iberoam Cir Mano 2021).
Conclusions: Four-corner arthrodesis with a dorsal plate is a technique that allows for high consolidation rates with excellent functionality and patient satisfaction, demonstrating statistically significant improvement compared to the screw technique when comparing with international and national series.

A-0472 MANAGEMENT OF METACARPAL AND PHALANGEAL FRACTURES WITH INTERLOCKING PINS; A RETROSPECTIVE ANALYSIS OF THE RESULTS

Alejandro Opazo, Cristobal Greene, Marisol Marti, Guillermo Droppelman
Clínica MEDS, Santiago, Chile

Introduction: Hand fractures constitute 17% of all fractures in adults, 59% of which correspond to phalanges and 33% to metacarpals. A common treatment option is closed reduction and fixation with percutaneous pins, an option that has a relatively fast learning curve, short surgical times and has lower costs than other forms of osteosynthesis, but it carries the risk of infection, loss of reduction and it requires associated external immobilization. Recent studies propose interlacing the pins to increase stability, resulting in a biomechanically stronger construct similar to an external fixator, potentially reducing complication rates, as observed in certain case series.
Aim: To describe and analyze the outcomes of a series of phalangeal and metacarpal fractures treated with closed

reduction and percutaneous interlaced pins by our team, evaluating consolidation and complication rates, comparing it to the available literature data, both for interlocking and non-interlocking pins, to determine whether it is a safer option in our local setting.

Material & Methods: We conducted a retrospective review of 55 operated cases of phalangeal and metacarpal fractures treated with interlaced percutaneous pins between 2019-2022 at our center, performed by two surgeons. results were compared with those in the literature.

Results: The study included 55 fractures (40 phalanges, 15 metacarpals). In 51 cases (92.7%), consolidation and pin removal were achieved within 4 weeks. Three patients (5.4%) experienced delayed consolidation, with pin removal at 8 weeks (two cases) and at 7 weeks (one case) without further complications. One case had fracture displacement occurred two months after pin removal, with no clinical repercussions. There was only one infection case, on a patient, who continued agricultural work during his immediate post operative period, had a superficial infection associated to pin loosening, but responded well to oral antibiotics, while still resulting in a lower infection rate than reported for non-interlaced pins. No reinterventions were necessary during follow-up.

Conclusions: In this series consolidation rates and times surpassed those in the literature, although one case of infection occurred, the infection rates remained lower than those reported in other series.

The use of interlaced percutaneous pins in metacarpal and phalangeal fractures allows for consolidation rates comparable to the literature, with lower infection rates and without an increase in other complications, making it a viable and safe option for managing this patients.

A-0473 PREDICTIVE FACTORS AND CLINICAL EFFECTS OF DIABETIC HAND: A PROSPECTIVE STUDY WITH 4-YEAR FOLLOW-UP

Madoka Higa[1], Michiro Yamamoto[1], Yayoi Kato[2], Jun Takeuchi[2]

[1]Department of Hand Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan; [2]Sapporo Diabetes and Thyroid Clinic, Sapporo, Japan

Introduction: Diabetes mellitus is considered an etiological factor of hand-related diseases, termed diabetic hand (DH), including limited joint mobility of hand, Dupuytren's contracture, carpal tunnel syndrome, and trigger finger. The purpose of this study is to clarify the clinical impact and course of DH in diabetic patients and the predictive factors for its development.

Materials and method: Japanese adults with diabetes mellitus treated at a single diabetes clinic from January 2019 to March 2019 were prospectively recruited. Patient background (age, gender, BMI, diabetes type, HbA1c, and duration of diabetes), presence or absence of DH at baseline and 4-year follow-up, patient-oriented quality of life assessment (EQ-5D), and hand function assessment (Hand10) were investigated. We examined the effect of DH on EQ-5D and Hand10, the predictors of DH development and factors influencing its progress were examined. Mann-Whitney U test and binomial logistic regression analysis were used for statistical analysis.

Results: Of the 593 subjects, 347 (mean age 56.9 years, 197 males, 150 females, mean BMI 25.8, 29 with type 1 diabetes, 318 with type 2 diabetes, mean HbA1c 7.73%, mean disease duration 9.59 years) could be followed up to 4 years. 85 patients had DH at baseline and 127 patients had DH at the 4-year follow-up, and the results of EQ-5D and Hand10 were significantly worse in the group with DH (at baseline: EQ5D mean 0.816, Hand10 mean 7.61; at 4-year follow-up: EQ-5D mean 0.838 Hand10 mean 7.12) than in the group without DH (at baseline: EQ5D mean 0.913, Hand10 mean 3.67; at 4-year follow up: EQ-5D mean 0.948, Hand10 mean 1.65) at both time points ($p<0.001$). In the analysis by course, 27 patients had improvement in DH over the natural course. As a result of examining the predictive factors for the onset of DH, age

was the only factor, and the cut off value calculated using the ROC curve was 56.0 (AUC 0.716, sensitivity 0.611, specificity 0.754). On the other hand, as a result of examining the factors that naturally improve DH, age was the only factor and the cut off value calculated using the ROC curve was 55.0 (AUC 0.691, sensitivity 0.845, specificity 0.519).
Discussion: While previous reports have suggested a relationship between the onset of DH and HbA1c, in this study, only age was identified as a risk factor. This study focused on patients who could be followed for four years, and as compliance was relatively good, blood glucose control may have been satisfactory, leading to no significant differences. Additionally, diabetes is associated with cellular aging, and since DH reflects hand aging, it is plausible that age became a risk factor. As the presence of DH significantly affects quality of life and hand function, active therapeutic intervention is necessary for elderly DH patients.

A-0474 CLINICAL AND SONOGRAPHIC PREDICTIVE FACTORS FOR INTRA-SUBSTANCE TEAR HEALING IN EPICONDYLITIS

Cristobal Greene, Marisol Martí, Guillermo Droppelman
Clínica MEDS, Santiago, Chile

Introduction: Epicondylitis is a condition that affects 1-3% of the population, being more common in individuals aged 40-50, and slightly more common in males. Several sports hare associated to an increased risk of epicondylitis, such as tennis, lacrosse, padel tennis and hockey. Up to 25% of patients with epicondylitis present intra-substance tears (IST), which are associated with increased pain and a prolonged course if the tear does not heal. These patients are candidates for other treatments such as infiltration with platelet-rich plasma (PRP) infiltration. However, currently, there are no defined predictors for tendon healing
Aim: To determine which clinical and sonographic factors can predict tendon tear healing in patients with epicondylitis, to more adequately design differentiated treatment protocols that allow for early escalation to treatments such as PRP infiltration or surgery in patients who´s tendon tears are less likely to heal.
We hypothesize that patients younger than 55, with a traumatic event or acute onset, with bigger tears, who have presence of hyperemia on ultrasound, who are non-smokers, and have no history of diabetes mellitus (DM), dyslipidemia (DLP), and hypothyroidism, have a higher chance to achieve IST healing without infiltration or surgery.
Material & Methods: We conducted a retrospective review of the medical charts of patients treated for epicondylitis in our center between 2020 and 2021, who had a tear on their initial ultrasound, and who had a follow-up ultrasound. Analyzing injury mechanism and presentation, age, gender, comorbidities, smoking habits and sonographic findings such as hyperemia and tear size.
Statistical analysis conducted with Stata, categorical variables evaluated with Chi-square test, statistical significance with $p < 0.05$
Results: A total of 36 patients were analyzed (72% men). The average age was 48 years.
Hyperemia was significantly more frequent in the group whose tears had healed during follow up (65% and 30%, respectively).
In the group that did not heal, the prevalence of smoking and comorbidities was 50% more frequent ($p < 0.05$).
In this series, the average age and history of trauma were similar between those who healed and those who did not.
Conclusions: In patients with epicondylitis associated to intra-substance tears, comorbidities, lack of hyperemia, and smoking had a statistically significantly higher risk for their tears not to heal.
Although prospective studies with larger cohorts are needed to isolate these factors and attribute individual relative risk to each of them, this study suggest an associated risk to certain factor, which should be considered when choosing among treatment options.

A-0475 WALANT USE IN CHILE; ORIGINS, PROGRESS AND IMPACT OF THE PANDEMIC ON ITS UTILIZATION AND DIVERSIFICATION

Cristobal Greene, Marisol Martí, Daniel Fodor, Guillermo Droppelman
Clinica MEDS, Santiago, Chile

Introduction: The use of Wide Awake Local Anesthesia No Tourniquet (WALANT) techniques have become popular due to an increase in publications endorsing its safety and multiple benefits, including cost reduction, shorter operating times, high patient reported outcomes, and decreased complications, especially in the management of tendon pathology and nerve releases.

Aim: To describe and analyze the current trends in the use of WALANT anesthesia in Chile, and to determine whether the pandemic had an effect on the indications and frequency of its use.

Material & Methods: On September 2023, a survey was electronically sent to members of the Hand Committee of the Chilean Society of Orthopedics and Traumatology (SCHOT), based on a survey that was sent in early 2020, with three additional questions related to the use of WALANT during the pandemic and its subsequent effects. The results of both surveys were then compared.

Results: Knowledge of the technique increased progressively until 2017, with a new surge from 2020. The most common way of learning about it remains through colleagues, increasing from 33.3% to 39.1%. Since the previous survey, there has been no increase observed in teaching WALANT as part of residency training (15.2%). Currently, 86% report they use WALANT (compared to 79.8% previously). Weekly usage increased from 48.1% to 53.3% of cases. Regarding the types of surgeries, there was a widespread increase, with extensor tendon repair added to the most common surgeries. 58.1% of surgeons increased their usage since the pandemic, and 75% consider it a significant cause of this increase.

Conclusions: The use of WALANT has progressively increased, with an exponential growth during the Covid pandemic in 2020. During this pandemic, it allowed surgeries to proceed even when health emergencies limited hospital capacity and the use of general anesthesia, widely regarded as one of the reasons for the current increase and diversification of its usage.

A-0476 COMPARISON OF THE OUTCOMES OF HEADLESS COMPRESSION SCREW AND PERCUTANEOUS K-WIRE FIXATION IN PROXIMAL AND MIDDLE PHALANGEAL FRACTURES

Jing Chen, Hao Yu Bian, Jun Tan
Affiliated Hospital of Nantong University, Nantong, China

Introduction: Headless compression screws (HCS) and percutaneous K-wire fixation are the main two methods for proximal and middle phalangeal fractures. According to our experience, although K-wire fixation is relatively fast, minimally invasive, it carries a risk of pin track infection and delay in postoperative rehabilitation because of the need for immobilization after fixation and dreading and evading in mind. The use of HCS fixation for axially stable phalangeal fractures has been shown to be a satisfactory option.

Purpose: The study aimed to assess early clinical outcomes achieved by HCS in fixation of proximal and middle phalangeal fractures, and to compare them with outcomes of percutaneous K-wire fixation. The hypothesis was that HCS would show better arc of motion and superior early clinical outcomes.

Methods: The inclusion criteria were patients aged > 18 years who presented with extra-articular unstable fractures of the proximal or middle phalanges. The fractures were judged to be unstable from the morphology of the fracture or the severity of the initial displacement. The exclusion criteria were patients with any of the following: total or partial

amputation of fingers, complex fracture associated with severe soft tissue or tendon injury; intra-articular fracture; comminuted, segmental, or sever open fracture. HCS fixation technique has been used since November 2021 in our department. We reviewed 31 cases in 22 patients (45years, range 21–66) who met these criteria between November 2021 and May 2023. Meanwhile, we also retrospectively reviewed 30 cases in 26 patients (45years, range 18–65) who met these criteria between January 2020 and October 2021. These patients all were treated with K-wire fixation. The average follow-up time was 5 months in HCS group and 33 months in K-wire group. The primary objective was to compare the total active motion (TAM) of fingers and Jamar grip strength, and the secondary aim was to observe extension lag, clinical mal-unions or rotational deformities in the 2 groups. Any discomfortable symptoms and complications were recorded. Subjective satisfaction was determined using the Michigan Hand Outcomes questionnaire (MHQ).
Results: At the last follow-up, a mean TAM of 237° (range 100°–285°) was recorded in the fingers treated with HCS, and the Jamar grip strength at the last follow-up was of 27 kg (range 11–40). Patients in the HCS group had better total active motion (TAM), grip strength, and MHQ score than those treated with K-wire fixation ($P < 0.05$). The incidence of complications is higher in the K-wire group including pin track infection (2 cases), pins loosening (1 cases), rotational deformities (1 cases). Migration of any screws was not observed.
Conclusions Compared with K-wire fixation, HCS fixation for proximal and middle phalangeal fractures was superior in terms of the TAM and grip strength and subjective satisfaction.

A-0477 RADIOTHERAPY FOR DUPUYTREN'S DISEASE

Caitlin McEwen[1,2], Hari Kirupananther[1], Joshua Dass[1]
[1]Sir Charles Gardiner Hospital Comprehensive Cancer Centre, Perth, Australia; [2]University of Western Australia, Perth, Australia

Introduction: Duupuytren's disease, characterized by the progressive formation of contractures in the palmar fascia, often leads to impaired hand function, poor cosmesis, and reduced quality of life. Traditionally, this is managed by palmar fasciotomy. However, recently low dose radiotherapy has been offered as a means to slow progression and prevent the need for more invasive management options.
Aim: This study aims to retrospectively review the outcomes of 30 patients treated with radiotherapy for Dupuytren's disease. The primary outcome measurement is incidence of further surgical management. The secondary outcome measurement is acute and late toxicities of treatment, including secondary malginancies.
Material & Methods: Data related to treatment delivery and acute toxicities was collected via retrospective review of WebPAS, clinician letters, medical record entries, and iSoft. Additionally, each participant was called and asked to complete a questionnaire regarding their treatment. This questionnaire utilized the QuickDASH outcome measure to assess function and severity of symptoms prior to and following radiotherapy. It also included questions about the need for additional surgical intervention, the progression of symptoms, and any acute or late side effects of treatment.
Results: This study found that radiotherapy treatment was well tolerated by the participants, with few acute or late side effects. The most common toxicity was Grade 1 erythema during treatment, resolving following treatment. Additionally, the majority of participants treated with radiotherapy reported an improved QuickDASH score following radiotherapy, suggesting improved function and reduced severity of symptoms. Only a small fraction of participants went on to require surgical management following radiotherapy.
Conclusions: This review sheds light on the role of radiotherapy in managing Dupuytren's disease, highlighting its potential in mitigating contracture progression. While our findings demonstrate certain positive outcomes, it is crucial to acknowledge the limitations of radiotherapy, particularly in cases where surgical intervention remains imperative.

This study underscores the complexity of Dupuytren's disease management, emphasizing the importance of a nuanced approach that considers the individual characteristics of each case. Future research should focus on refining patient selection criteria for radiotherapy and identifying factors which may indicate greater likelihood of success with surgical interventions. Ultimately, a comprehensive, patient-centered that considers the unique needs of each patient may offer a more tailored and effective strategy for addressing the diverse manifestations of Dupuytren's disease.

A-0478 COMPUTER-AIDED THREE-DIMENSIONAL ANALYSIS OF CARPAL MALALIGNMENT IN SCAPHOLUNATE ADVANCED COLLAPSE (SLAC) WRISTS

Mikko Alanen, Samuli Aspinen, Theresa Höglund, Robert Sippo, Eero Waris
Helsinki university hospital, Helsinki, Finland

Introduction: Scapholunate dissociation often progresses to a carpal malalignment known as dorsal intercalated segment instability. This, coupled with changes in carpal kinematics, and load distribution leads to a pattern of carpal collapse and osteoarthritis, referred as scapholunate advanced collapse (SLAC). The evaluation of the carpal alignment is crucial for diagnosing carpal instabilities, traditionally relying on manual assessment from native radiographs. Computer-aided CT analysis based on segmentation, numerical modeling, and statistical shape models, offers a highly accurate and reliable quantification of the three-dimensional (3D) carpal alignment and intercarpal relationships.
Aim: The aim of this study was to analyze the 3D carpal alignment and carpal height of SLAC wrists and compare them with those of healthy wrists. Our objective was to determine the critical values of intercarpal angles indicative of SLAC wrists.
Material & Methods: The 3D alignment of carpal bones and carpal height ratio were examined in cone beam CT images of 18 patients with SLAC wrists and compared with those of 121 healthy wrists (Höglund et al. 2023). The analysis was performed using computer-aided CT analysis software (Bonelogic, Disior Ltd), which determined the carpal height ratio and recorded standardized 3D axes for carpal bones. Based on these axes, the software calculated the intercarpal angles the sagittal and coronal planes (Höglund et al. 2023).
Results: In the sagittal plane, the scaphoid was angulated palmarly, while the lunate and triquetrum were angulated dorsally in the SLAC wrists. Consequently, the mean scapholunate, lunotriquetral, and lunocapitate angles were -100 (SD 11), 20 (SD 11) and 7 (SD 12), while in healthy wrists, they were -58 (SD 9), 12 (SD 8), and -17 (SD 11), respectively. The areas under the curve were 0.999, 0.725, and 0.925, with the cut-off values indicative of SLAC being ≤-76 , ≥22 , and ≥-4 , respectively. In the coronal plane, the capitate was tilted ulnarly in SLAC wrists. The carpal height ratio averaged 1.33 (SD 0.09) in SLAC wrists and 1.47 (SD 0.07) in healthy wrists.
Conclusions: In conclusion, SLAC wrists showed changes in carpal alignment in both sagittal and coronal planes. The sagittal scapholunate angle seems to be the most suitable radiographic parameter for defining scapholunate pathology. The identified cut-off values of the radiographic parameters can be valuable when diagnosing carpal instabilities.
References: Höglund TEK, Sippo RMJ, Waris E. Three-dimensional carpal alignment: computer-aided CT analysis of carpal axes and normal ranges. J Hand Surg Eur Vol. 2023, 48: 792–7.

A-0479 OUR CLINICAL OUTCOMES OF ARTHROSCOPIC ILIAC BONE GRAFTING FOR SCAPHOID NONUNION

Masataka Shibayama
Chiba Medical Center, Chiba, Japan

Introduction: There are still many cases of scaphoid fractures that are found in a nonunion state. In recent years, the surgical technique of curettage of the pseudoarthrosis under wrist arthroscopy and percutaneous grafting of autologous bone using a bone marrow biopsy needle has been gaining popularity in Japan.
Aim: To report the outcomes of percutaneous autologous iliac bone transplantation performed by wrist arthroscopic surgery for scaphoid nonunion at our hospital.
Material & Methods: Eleven patients who underwent wrist arthroscopic surgery and autologous iliac bone transplantation at our hospital from 2019 to 2022 and were followed up for at least 6 months after surgery were included in this study. The mean age was 32.1 years, and the mean waiting time for surgery was 176.2 days. All surgeries were performed by a wrist arthroscopic approach to the pseudoarthrosis and curettage of the proximal and distal bone fragments. Good bleeding from both bone marrow was confirmed by the clear view of the wrist arthroscopy, and the curettage area was adequately filled with percutaneously extracted iliac bone. Headless screws were used for internal fixation.
Results: Bone fusion was achieved in 10 of 11 cases. The mean range of motion was 68.0° in palmar flexion and 71.5° in dorsiflexion, and the grip strength relative to the healthy side was 92.0%.
Conclusions: The wrist arthroscopic technique for scaphoid nonunion has many advantages, such as less invasion of soft tissues and detailed confirmation of bleeding from the bone marrow after curettage, which contributes to the decision whether to free or vascularized bone graft. However, there were cases in which bone fusion could not be achieved, and further study is needed in the future.

A-0480 PRIMARY FLEXOR TENDON REPAIR DELAYED UP TO 6 MONTHS: THE RESULTS OF WALANT USE AND EARLY ACTIVE MOTION

Zeynep Emir[1], Sedanur Güngör[1], Egemen Ayhan.[2], Kadir Çevik[2], Yakup Kuzucu[3]
[1]Gazi University Department of Physiotherapy and Rehabilitation, Turkey; [2]University of Health Sciences Turkey Basaksehir Cam and Sakura City Hospital Department of Orthopaedics and Traumatology, Turkey; [3]İstanbul Özel Bölge Hospital, Turkey

Introduction: Primary repair of a flexor tendon is described as the repair performed within the first few days after the injury.
Aim: In this study, we present the results of primary flexor tendon repairs in zones 1 and 2 which are delayed up to 6 months.
Material & Methods: In this retrospective study, patients were enrolled from our patient database from 2018 to 2022 if their flexor tendon was repaired primarily at least 7 days after the initial injury. We included only zone 1 and 2 injuries and excluded thumbs. WALANT is used as the standard method of anesthesia. The repairs were done by a hand surgeon (EA or KC). In the post-operative period, all the patients were treated according to the early active mobilization protocol in a dorsal blocking splint. Assessments are performed at the 6th, 8th and 12th week post-operatively. Total active motion (TAM) was measured and Disabilities of Arm, Shoulder and Hand (DASH) questionnaire was used to evaluate the disability level. Extensor deficit was also noted at the final assessment.
Results: We identified 33 patients from the records. Six patients were excluded (2 of them were injured on the thumb, 2 did not complete the treatment and 2 were not native in our language). A total of 27 patients with 32 fingers were included in the analysis. Mean age was 31.2±9.2 and 17 patients were male (63%). Twenty-six fingers were injured in zone 2 and 6 fingers on zone 1. There were eight second finger, 3 third finger, 10 fourth finger and 11 fifth finger injuries.

Twenty-one fingers had only flexor digitorum profundus (FDP) injury and the others had both flexors injury. The delay between the injury and the surgical repair was 7- 180 days with a mean of 30±34 days. Two patients required fractional lengthening of FDP after intraoperative active motion testing. TAM scores increased by time (201±26°, 223±27° and 246±20°, respectively) and DASH scores decreased (28.1±15.1, 16.1±6.3 and 8.9±10.9, respectively) ($p<0.01$). Extensor deficit was apparent in 25 fingers with a maximum of 20° at the final assessment.
Conclusions: The results of this study showed that primary repair is still possible even within 6 months after the initial injury in patients with delayed flexor tendon injuries. We concluded that WALANT method made the intraoperative active flexion and extension test and tension control possible in a widely awake patient and thus, unnecessary reconstructive procedures were avoided. This result is important to avoid not only donor site morbidity of reconstructive methods but also the negative effects of general anesthesia. It is also thought that patients benefited from early active motion for good results. Extension deficit seen at 3 months would improve by time as tendon healing requires several months. Therefore, further follow-up for extension recovery is recommended.

A-0481 UNDERSTANDING MORPHOLOGICAL VARIETY OF WASSEL TYPE IV RADIAL POLYDACTYLY: PROPOSAL OF THE DUPLICATION RANGE CONCEPT AND ITS ANATOMICAL RATIONALE

Susumu Saito, Aiko Makino, Seita Inoue, Hiroki Yamanaka, Naoki Morimoto
Graduate School of Medicine and Faculty of Medicine, Kyoto University, Kyoto, Japan

Introduction: Reconstructive strategy for Wassel type IV radial polydactyly relies on preoperative deformities. However, decision making is not straightforward due to its morphological diversity. In this study, we proposed the concept of duplication range for comprehensively understanding the morphological diversity of polydactyly of the thumb. The duplication range is the anatomical region constituting of skin and skeletal bifurcation levels.
Aim: Morphological characteristics of Wassel type IV radial polydactyly were characterized based on the duplication range. The anatomical rationale of the concept was presented based on tendon and tendon sheath abnormalities.
Material & Methods: This retrospective study included patients with Wassel type IV radial polydactyly of various levels of bifurcation and various degrees of thumb hypoplasia. Thumb duplications were classified as non-floating and floating types. Numerical levels were defined along the longitudinal axis of the ulnar thumb, at regular 0.5-unit intervals from level 0 (thumb tip) to level 6 (carpometacarpal joint). After stratification, relationships between duplication range and morphological parameters were analyzed quantitatively. Especially for patients with skeletal duplication at around the metacarpophalangeal joint, the flexor pollicis longus tendon and ligamentous tendon sheaths were observed using detailed intraoperative photographs. The transverse fibrous components spanning the radial and ulnar thumbs were defined as abnormal tendon sheaths. The fibrous components at the level of the metacarpophalangeal joint, the proximal part of the proximal phalanx, the distal part of the proximal phalanx, and the interphalangeal joint were defined as A1, Av, Oblique, and A2 pulley, respectively. Aberrant tendon sheaths and locational abnormalities of flexor pollicis longus tendon in the ulnar thumb were characterized for each duplication range subtype.
Results: Forty-one patients with a non-floating type of thumb duplication and ten patients with a floating type of thumb duplication were included for morphological analysis. Interphalangeal joint deviation was associated with skin bifurcation levels 1–2. Metacarpophalangeal joint deviation had a bimodal distribution, with modes at levels 1.5 and 4. Seven patients with a non-floating type of thumb duplication, and five patients with a floating type of thumb duplication were included for anatomical evaluation. In cases with skin bifurcation at levels1.5 and 2, there were transversely-spanning Oblique and A2 pulleys and radial deviation of the flexor pollicis longus tendon at its insertion site. In cases with skin bifurcation

at levels 2.5 and 3, there were transversely-spanning Oblique and Av pulleys and radially-deviated flexor pollicis longus tendon. At the branching point of the flexor pollicis longus tendon, an aberrant limb attaching to the underlying floor was observed. These findings were found in both non-floating and floating types.
Conclusions: The duplication range concept could potentially improve our understanding of morphology variation and underlying anatomical abnormalities in Wassel IV radial polydactyly.

A-0482 OCCULT DORSAL WRIST GANGLION FREQUENCY IN SURGICAL RESIDENTS AND VIOLINISTS. IS THE DORSAL GANGLION A PATHOLOGY?

Igor Golubev[1], Natalia Matveeva[2], Elena Ogorodnik[3]
[1]National Medical Research Center Traumatology&Orthopaedics named after NN Priorov, Moscow, Russia; [2]Moscow Regional Scientific Clinical Institute named after MF Vladimirsky, Moscow, Russia; [3]Peoples` Friendship University named after P.Lumumba, Moscow, Russia

Objective: Dorsal ganglion is a common wrist neoplasm with wide controversy in treatment strategy.
Aim of study was to evaluate occult dorsal wrist ganglion presence in a group of young doctors and musicians, compere it frequency and estimate role of dorsal scapho-lunate distance in occult ganglion cases.
Materials and methods: The wrist joints of 88 people were examined. Among them were 28 medical students, 43 orthopedic surgery residents and 17 professional violinists. There were 51 males and 37 females. Average age of 26.7 (18-52). Single ultrasonography specialist expert in hand pathology inspected both wrist of all. There were noted: ganglion existence, pain, size of ganglion and dorsal scapho-lunate interosseous distance (ligament size).
Results: Among 176 wrist there were visible dorsal ganglion in 10 (5.7%) wrists with seven of them having pain. They were excluded from the group. In 166 remaining wrists, occult dorsal ganglion was found in 40 (24.1%). It was at 33 (42.3%) people with 7 (9.0%) having ganglion on both hands. No one of them had wrist pain.
In violinists' group, there were three cases of visible ganglion. In addition, in remaining 28 musicians' wrists occult ganglion was found in 16 (57.1%). Ganglion was at 12 (85.5%) of violinists. Only two of 17 musician did not have dorsal wrist ganglion.
In student-resident group occult ganglion was found in 24 (16.2%) of wrists. It was in 21 (32.8%) of persons, being on both sides in three of them.
Average ganglion volume was in student-resident group 0.12 ± 0.09 cm3 in violinist group 0.12 ± 0.1. Dorsal scapho-lunate distance in student-resident group was 0.26 ± 0.01 and in musician group 0.24 ± 0.01. In both measured condition difference was not authentic ($p>0.05$).
Conclusion: Occult dorsal wrist ganglion without any complains were found in 24.1% of wrists and 42.3% of examined people. In examined group, visible ganglion was only 20% of all ganglions. In musician, occult ganglions were significantly more often than in student-residents. Dorsal wrist ganglion seem to be the variant of norm for the human.

A-0483 THE IMPACT OF ANTITHROMBOTIC DRUGS ON POSTOPERATIVE BLEEDING IN PATIENTS WHO WERE TREATED USING VOLAR LOCKING PLATE FOR DISTAL RADIUS FRACTURES

Youn Moo Heo[1], Sang Ki Lee[2]
[1]Konyang University College of Medicine, Daejeon, South Korea; [2]Eulji University College of Medicine, Daejeon, South Korea

Introduction: Antithrombotic drugs (ATDs) are increasingly prescribed for various conditions such as ischemic heart disease, atrial fibrillation, deep vein thrombosis, and cerebrovascular thrombosis. However, the temporary discontinuation of

these drugs may be necessary for surgery because of a risk of postoperative complications.
Aim: The purpose of this study is to evaluate whether taking ATDs have an effect on the amount of postoperative bleeding in patients who underwent surgical treatment for distal radius fractures (DRFs), and to determine whether it is necessary to discontinue ATDs.
Material & Methods: The medical records of 632 patients who underwent surgery for DRFs were retrospectively reviewed from January 2018 to December 2022. The patients who were surgically treated using volar locking plate for DRFs and who were able to confirm whether to take ATDs were included. Multiple fractures, other fixation methods, and incomplete medical records were excluded.
A total of 523 patients were enrolled. There were 145 males and 378 females, and their mean age was 65 years. All patients were investigated whether or not they were taking ATDs, the type of drugs, the reason for taking it, and whether they stopped taking it before surgery. The patients were divided as follows; Group I included patients who maintained taking ATDs during surgery, Group II included patients who stopped taking ATDs for a certain period of time before surgery, and Group III included patients who did not take ATDs.
The AO/OTA type for DRFs, the operation-time, the amount of postoperative bleeding (1 day, 2 days, and total) which measured using Jackson-Pratt drain, and postoperative complications such as hematoma, or delayed wound healing were investigated. The amount of postoperative bleeding between the groups were statistically compared.
Results: Of the 523 patients, 30, 48, and 445 were included in Group I, II, and III, respectively. Underlying diseases included ischemic heart disease, cerebral infarction, coronary prophylaxis, and atrial fibrillation. Drugs taken included aspirin, clopidogrel, direct oral anticoagulant, cilostazol, sarpogrelate, and warfarin. There was a difference in the age of patients between the groups, and the mean age of group I was the highest. On postoperative 1 day, the mean amount of bleeding was 11.48 ml, 8.37 ml, and 7.11 ml in group I, II, and III, respectively. On postoperative 2 days, it was 4.15 ml, 2.16 ml, and 2.22 ml. The total mean amount was 15.64 ml, 10.53 ml, and 9.33 ml. The amount of postoperative bleeding was higher in the order of group I, II, and III, but there was no statistical significance. And it was affected by AO/OTA type, but not by operation-time. Postoperative complication was not found.
Conclusions: The maintenance of ATDs did not affect the amount of postoperative bleeding in surgery for the DRFs. There was a difference in actual amount of postoperative bleeding, but the amount itself is not large. Therefore, if there is a high possibility of complications related to underlying diseases by a discontinuation of ATDs, we think it is safer to perform surgery for the DRFs without stopping ATDs.

A-0484 COMPARATIVE ANALYSIS OF SUTURE CHOICE IN OPEN BILATERAL CARPAL TUNNEL SURGERY: A RANDOMISED CONTROLLED TRIAL

Jessica Leary, Timothy Lynskey, Andrew Muller, Chris Frampton
Taranaki Base Hospital, Taranaki, New Zealand

Introduction: Carpal tunnel surgery is the most commonly performed operation on the hand, however debate still remains as to whether absorbable or non-absorbable sutures for wound closure confer better results. This study assessed improvement in carpal tunnel symptoms, wound healing, and patient preference to compare outcomes following closure with two common suture types. The study was performed in patients undergoing bilateral carpal tunnel surgery with a different suture to each hand to allow comparison between identical populations and within the same patient.
Aim: This randomized controlled trial compared the outcomes of absorbable and non-absorbable suture for skin closure in open carpal tunnel decompression.

Material & Methods: Patients diagnosed with bilateral carpal tunnel syndrome were invited to participate in the trial. 81 patients were enrolled and planned for staged, bilateral carpal tunnel decompressions. Patients were asked to elect left or right hand for the first operation and were then computer randomized to a suture order. Each patient received either Prolene or Vicryl Rapide first and the alternative suture to the contralateral side.
Recorded pre-operative data included patient demographics and factors of interest including diabetes, immunosuppression, and previous steroid injections. At the first appointment, a Boston Carpal Tunnel Questionnaire (BCTQ) was completed for each hand. Post-operatively, at 2 weeks the BCTQ, Visual Analogue Score (VAS) for pain and Asepsis Wound Score were recorded. At 6 weeks the BCTQ and VAS were repeated, and a Patient and Observer Scar Assessment Scale (POSAS) was performed. After both operations were completed, patients were asked their preference for left or right suture.
Statistical analysis using a linear mixed model compared changes in the BCTQ, as well as wound scores between sutures. The individual scales were compared using the non-parametric Wilcoxon signed rank test. Patients were also compared back to the population to assess for effect of patient factors such as age, comorbidities, and previous steroid injection.
Results: There was no significant difference between the two suture types in any of the overall recorded assessments. The BCTQ scores improved significantly post-operatively ($p < 0.001$) and improvement was independent of suture type. Assessment of the wound found no difference between absorbable and non-absorbable sutures in regards to healing, pain or appearance between the two sutures. There was also an equal divide in patient preference for absorbable or non-absorbable. Patient factors such as previous steroid injection, diabetes and age over 65 did not affect the outcomes and there was also no overall difference in outcome between the two hands in the same patient.
Conclusions: From the results of our study, patients can be advised there is no difference in the outcome following open carpal tunnel decompression from using either absorbable or non-absorbable suture material for skin closure.

A-0485 A NOVEL MEASUREMENT METHOD IN THE EVALUATION OF 1ST CARPOMETACARPAL JOINT DISLOCATION BY SESAMOID BONES AT 1ST METACARPOPHALANGEAL JOINT

Pin-Jui Chiu, Cheng-En Hsu
Taichung Veterans General Hospital, Taichung, Taiwan

Introduction: Thumb Carpometacarpal (CMC) joint dislocations can lead to significant complications that impact hand function. However, previous reviews indicated that the diagnosis is often overlooked when patients initially present at emergency department. Generalized swelling may obscure the characteristic clinical deformity, and routine radiographs may not clearly depict the displacement. It is recommended that a true lateral radiograph of the hand be obtained when this injury is suspected. Unfortunately, determining the exact angle of the thumb from hand X-rays can be challenging. We aimed to explore precise methods for correcting hand X-rays into accurate Anteroposterior or lateral views, utilizing statistical approaches.
Aim: This study's primary goal is to develop an accurate method for correcting hand X-rays into authentic lateral views. The emphasis lies in determining the angle of the first metacarpal bone in relation to sesamoids, addressing diagnostic challenges prevalent in CMC joint dislocations.
Material & Methods: Previous studies consistently identified the presence of two sesamoid bones at the first metacarpophalangeal joint in nearly 100% of cases. This served as a reliable criterion for determining the orientation of the metacarpal bone.
We measured the distance between the two sesamoids, defined as the shortest distance between the medial cortex of the lateral sesamoid bone and the lateral cortex of the medial sesamoid bone. Additionally, we assessed the diameter

of the medial sesamoid bone and calculated the proportional relationship between the two measurements. To quantify angles on the CT scans, we assigned a value of 0 degrees when the distance between the two sesamoid bones was greatest and 90 degrees when they completely overlapped.
Subsequently, we obtained CT and X-rays of the hands or wrists from 30 patients and measured the distances following the described methodology. On the CT scans, we documented proportional relationship changes between the sesamoids distance and the diameter of the medial sesamoid bone at angles of 0, 18, 36, 54, 72, and 90 degrees.
Following the statistical derivation of equations, we obtained X-ray images of the hands from an additional 30 patients to validate the feasibility of this method.
Results: We conducted a comprehensive statistical analysis of all patients to evaluate the proportional relationship between the distance between the two sesamoids and the diameter of the medial sesamoid bone at various angles.
Our findings revealed that at an angle of 54 degrees, the distance between the sesamoids is approximately half of that observed at a 90-degree angle.
Moreover, we formulated equations related to trigonometric functions to calculate results for other angles using statistical methods. The same results were corroborated during the verification process involving 30 patients. The rotational angle of the metacarpal bone on hand X-rays can be deduced from the distance between the two sesamoids, as indicated by the above-mentioned findings.
Conclusions: The use of the distance relationship between the two sesamoid bones as a preliminary method for determining the correct angle of the metacarpal bone in hand X-rays has proven to be both reliable and traceable. In the future, this innovative and user-friendly approach may assist in diagnosing CMC dislocations and a variety of other clinical applications.

A-0486 RELATIONSHIP BETWEEN GEISSLER'S CLASSIFICATION OF SCAPHOLUNATE JOINT AND SCAPHOLUNATE INTEROSSEOUS LIGAMENT (SLIL) INJURY IN CASES OF DISTAL RADIUS FRACTURES. -BASED ON ARTHROSCOPIC SLIL FINDINGS THROUGH MIDCARPAL RADIOVOLAR PORTAL-

Daisuke Suzuki[1], Hiroshi Ono[1], Shohei Omokawa[2], Ayumu Ishizaki[1,2], Ryotaro Fujitani[3]
[1]Nishi Nara Central Hospital, Nara, Japan; [2]Nara Medical University, Nara, Japan; [3]Shinkai Yao General Hospital, Osaka, Japan

Introduction: Injury to the scapholunate interosseous ligament (SLIL) is associated with distal radius fracture (DRF) and can be a cause of poor outcomes. Neglected SLIL injury can lead to scapholunate dissociation, which is difficult to reduce and requires salvage surgery, but the results are not sufficient. Therefore, early diagnosis of SLIL injuries is important. However, the dorsal aspect of the SLIL, which is the primary stabilizer between the scaphoid and lunate, is difficult to observe directly through conventional arthroscopic portals due to its anatomic characteristics. We have developed the midcarpal radiovolar (MCRV) portal for direct observation of the dorsal SLIL to clearly diagnose injury and to determine the strategy for primary treatment of SLIL ligament injury associated with DRF.
Aim: To establish the relationship between Geissler's classification of scapholunate joint and SLIL injury based on arthroscopic findings through MCRV portal in cases of DRF.
Material & Methods: 254 consecutive DRF cases, which are performed arthroscopic reduction and internal fixation at our hospital, were included. Surgery was performed under general anesthesia, in the supine position, under vertical traction using a traction tower. After internal fixation of DRF, the scapholunate joint instability was evaluated based on Geissler's classification, using the midcarpal radial portal as the viewing portal and the midcarpal ulnar portal as the working portal. The MCRV portal was then created and the dorsal part of the SLIL was observed; the dorsal part of the SLIL was classified as normal, lax, or torn.

Results: SLIL injuries were observed in 56 patients (22%), of which 39 were lax and 17 were torn.
Scapholunate joint instability evaluation according to Geissler's classification was normal in 110 cases, grade 1 in 69 cases, grade 2 in 62 cases, grade 3 in 12 cases, and grade 4 in 6 cases. The percentage of patients with any SLIL injury for each Geissler's classification grade was 6.3% for normal, 17.4% for grade 1, 37.1% for grade 2, 66.7% for grade 3, and 100% for grade 4.
Conclusions:
1) SLIL injury is present in all patients with Geissler classification grade 4.
2) If the Geissler classification is normal, the likelihood of SLIL injury is extremely low.
3) In cases with Geissler's classification of grade 1 to 3, the condition of the dorsal part of the SLIL is variable, and direct observation of the ligament through the MCRV portal is recommended.

A-0487 A COMPLEX METACARPOPHALANGEAL DISLOCATION OF INDEX FINGER IN PEDIATRIC AGE: A CASE REPORT

Takuto Takeda, Tomoko Kobayashi, Shinobu Saito
Tokyo Joto Hospital, Japan

Introduction: Complex Metacarpophalangeal Dislocation(CMPD) is an irreducible dorsal dislocation of the MP joint. It is not obvious which is the best approach dorsally or volarlly at operative surgery.
Case: A case is CMPD of the left index finger in an 8-year-old girl. An X-ray revealed a dorsal dislocation of the left index finger MP joint and a small dorsal avulsion fragment of the metacarpal head. It is difficult to close reduction, 5days after injury, we perform open reduction dorsally. We are easily able to reduce this by releasing entrapped volar plate and we can fix the metacarpal head fragment with screw and K-wire. At 5 months after surgery, the patient demonstrated only 50°of flexion in the MP joint. So the patient was performed MP joint mobilization, and after surgery, she can flex 80°. At 2 years 1 month, the patient demonstrated 72° of flexion (uninjured side: 75°) and 15° of extension (uninjured side: 10°) in the MP joint.
Discussion: We can open reduction by dorsal approach for CMPD. By the dorsal approach, we can reduce and fixate the dorsal avulsion fragment of the metacarpal head, but we invade the extensor mechanism and joint capsule, so we have the possibility of joint mobilization. On the other hand, by the volar approach, we can perform surgery under good exposure of interposed structure, but we have the risk of digital nerve injury and we have the difficulty of fixation of the dorsal avulsion fragment of the metacarpal head. So it is good to approach dorsally or volarlly whether it is a dorsal fragment or nothing. If it is a dorsal fragment we approach dorsally, and if it is not a dorsal fragment we should approach volarlly.
Conclusion: we should choose the approach depending on the dorsal fragment.

A-0488 THE IMMEDIATE EFFECT OF MOBILIZATIONS ON HAND REACTION TIME:A RANDOMIZED SINGLE-BLIND PILOT STUDY

Ömer Faruk ÖZÇELEP
Ahi Evran University School of Physical Therapy and Rehabilitation, Kırşehir, Turkey

Introduction: In the treatment of musculoskeletal problems, manual therapy techniques are often used to restore movement and alleviate pain. The period between the initial muscular response or movement in response to a stimulus is referred to as reaction time. There is growing evidence for the benefit of manual mobilization for limb dysfunction,

including shoulder and elbow pain, but there is little literature on hand mobilization and few research on its influence on hand reaction time in healthy individuals.
Aim: The aim of this study is to show the effect of mobilization applications on hand reaction time in healthy individuals.
Material & Methods: The study comprised 20 healthy participants who completed a voluntary consent form. They were divided into two groups: research and sham mobilization. Participants in the study group had medio-lateral wrist glide, antero-posterior 1st MCP glide, and antero-posterior and medio-lateral glide. Applications were performed to the wrist, first metacarpal, and CMC joints in three sets of six repetitions. The patient in the sham mobilization group remained in the same posture for the same amount of time without gliding. The Nelson Hand Reaction Test was used to assess hand reaction before and after application. A 50 cm ruler was used, and the average of five measurements in cm was recorded and interpreted to sec.
Results:The average age of the participants was 22.75±1.37 and the average body mass index was 23.74±3.87. Hand reaction times decreased significantly in the experimental group compared to post-mobilization (p=0.005), the decrease in reaction times was not significant in the sham mobilization group. (p=0.610)
Conclusions: Mobilizations of wrist and hand joints can be used in healthy individuals to reduce reaction times. Future studies may focus on its usability to reduce reaction times in athletes who use the wrist (such as table tennis athletes).

A-0489 POSTOPERATIVE CARE AFTER TRAPEZIOMETACARPAL TOTAL JOINT ARTHROPLASTY. A SCOPING REVIEW

E.D.J. Bonhof-Jansen[1], S.M. Brink[1], J.H. van Uchelen[2], C.K. van der Sluis[3], D.C. Broekstra[3]
[1]Isala Hand-Wrist Centre Zwolle, the Netherlands; [2]Xpert Clinics Apeldoorn, Velp, Zwolle, the Netherlands; [3]University Medical Center Groningen and University of Groningen, Groningen, the Netherlands

Introduction: Postoperative care after trapeziometacarpal (TMC) total joint arthroplasty (TJA) is scarcely investigated. There seems to be a lack of comparative studies investigating the most efficient and safe way and duration of immobilisation and rehabilitation. However, a lot of heterogeneous information is known about this topic but aggregated evidence does not exist.
Aim: The purpose of this scoping review is to identify and map the available evidence and practice variation regarding immobilisation and rehabilitation protocols used after TMC TJA as well as to identify knowledge gaps.
Material & Methods: PubMed/MEDLINE, Embase, CINAHL, Cochrane and PEDRO were searched using a predefined search strategy. Primary studies which described immobilisation and/or rehabilitation regimes after TMC TJA procedures were included without year, language or level of evidence restrictions. Two reviewers blindly performed data screening and extraction. Level of evidence was assessed by the modified Oxford table. Reporting was done according to the PRISMA extension for scoping reviews checklist (PRISMA-ScR).
Results: Records identified through database searching yielded 3573 hits. Finally, 126 studies were included for quantitative synthesis, in which 21 prosthesis types were described applied in a total of 6494 patients. All publications, except eight, were from European origin. Seven studies could be ranked as level of evidence 1 or 2; this concerned implant types Elektra (n=3), Arpe (n=1), MAIA (n=1) , Moovis (n=1) and Touch (n=1). Eighty percent (80%) of the studies were classified as case series (level 4).
Most common immobilisation type was cast (31%), followed by splint (16%) or compression bandage (12%). Combinations of immobilisation types were described in 20% of the studies, mostly with switch of type when continuous immobilisation was changed to intermittent immobilisation. In 19% of the studies the immobilisation type remained unclear. Median total immobilisation time was 3 weeks (Q1-Q3:2-4). Median continuous immobilisation time was 3 weeks (Q1-Q3:2-3)

and intermittent time 2 weeks (Q1-Q3:0-4).
Three types of rehabilitation could be extracted. Supervised rehabilitation (18%), self-rehabilitation (12%) or functional use (10%) were most common. Individually prescription of aforementioned forms was applied in 14% of the studies and in 45% rehabilitation type remained unclear or was not reported. Median time patients were released to unrestricted activities was 12 weeks (Q1-Q3: 6-12) in 25 studies concerning 11 prosthesis types. Time to unrestricted activities was not reported in 96 (76%) studies.
Conclusions: This scoping review confirmed an absolute evidence gap in primary studies comparing types of immobilisation protocols as well as rehabilitation regimens after TMC TJA. Included studies were mainly of low quality of evidence, containing small samples, wide variation between and within prosthesis types and an inconclusive way of postoperative policy description. As a result, a practical knowledge gap is present as decision making is not covered by research. This may explain the wide practice variation regarding type and duration of immobilisation as well as forms of rehabilitation. High level comparative studies are needed to explore the trade-off between safe and (cost)effective protocols for immobilisation as well as rehabilitation after TMC TJA.

A-0490 COMPARISON OF 3D MANUFACTURED VS. PREFABRICATED BRACES ON THE EFFECTS OF PAIN AND DAILY FUNCTION IN THUMB CARPOMETACARPAL OSTEOARTHRITIS

Van Beek Nathalie, De Schrijver Frédéric, Nelen Jonas, Goeminne Sofie
Department of Orthopaedic Surgery, AZ Herentals, Herentals, Belgium

Introduction: Thumb carpometacarpal (CMC) osteoarthritis (OA) is highly prevalent and causes pain and impaired hand function. The non-operative treatment often includes splinting, however, the differences in effectiveness of varying materials and designs are not clear. With the increase in manufacturing capabilities of 3D printing a market is now also appearing for patient-specific 3D printed splints. These splints offer the advantage of being lightweight, waterproof, and well-ventilated, but they have a high manufacturing cost.
Aim: This study investigates the difference between off-the-shelf prefabricated splints and personalized 3D-printed splints for individuals with thumb CMC OA. We evaluated pain, hand function, strength, patient satisfaction, and adherence to splint usage for both types of splints. A radiographic evaluation using the Eaton grade of CMC OA allowed us to evaluate these effects separately for different degrees of OA.
Material & Methods: In this prospective single center study, 135 patients with an average age of 62.2 years (male = 40, female = 95) were included. Between May 2021 to September 2022, 74 patients used prefab splints and 61 used 3D-printed splints. A Numeric Pain Rating Scale (NRS), Quick-Dash, Functional Index of Hand Osteoarthritis (FIHOA), and grip and pinch strength were assessed before treatment, at 6 weeks, 3 months, 6 months, and 1 year follow-up. The Eaton classification was categorized as low (grade I + II) or high (grade III + IV).
Results: Our findings indicate a long-lasting effect, with improvement across various parameters between the 6-month and 1-year follow-up, particularly for patients with a low Eaton grade. The NRS scores for the 3D splint showed an average improvement of 7.8 points, decreasing from 48.2 to 38.8 for the low-grade group and from 54.2 to 42.6 for the high-grade group. In contrast, patients using prefab braces experienced an average improvement of 1.8 points, with low-grade patients improving from 43.7 to 42.2 and high-grade patients worsening from 40.4 to 45.2.
We found improvement in functional scores for both types of splints at one year for low as well as high grade OA. QuickDASH decreased from 26.5 to 22.7 with a prefab splint in the low grade, from 28 to 25.3 with a prefab splint in the high-grade patients, from 30,7 to 25,3 with a 3D splint in the low grade and from 32 to 25,5 with a 3D splint in the high-grade patients.

When looking at FIHOA, similar improvement was seen, except for the low-grade patients treated with a 3D printed splint. Conclusions: Our 6-month results revealed that low-grade OA patients experienced better pain relief and improved function when compared to patients with high-grade OA, for prefab as well as 3D printed splints. Within each subgroup of OA severity, comparing the results of both braces did not show a discernible difference in effect. However, in the high-grade OA category, only the 3D brace group demonstrated a significant improvement between 6-months and 1-year after starting splinting therapy when compared to the prefab brace. Our findings support splinting therapy in the treatment of CMC OA, especially in low-grade patients.

A-0491 AXIAL TORSION OF THE FOREARM BONES : DESCRIPTION OF A MEASUREMENT TECHNIQUE AND ANATOMICAL CT STUDY

Clément Thirache[1], Tobias Bluechel[2], Andreas Petersik[2], Anne Miquel[3], Alain Sautet[1], Adeline Cambon[1]
[1]Sorbonne Université, Service de chirurgie orthopédique, Hôpital Saint Antoine, Paris, France; [2]Stryker, Freiburg, Allemagne; [3]Sorbonne Université, Service d'imagerie médicale, Hôpital Saint Antoine, Paris, France

Introduction: Malunions of the forearm bones result in a loss of pronosupination and are a surgical challenge as they involve the 3 dimensions. When axis disorders in the sagittal or postero-to anterior plane are easily visible, bone rotation disorders are difficult to assess and are probably insufficiently corrected in current practice. Moreover there is a lack of diagnosis and planification tools.
Aim: Firstly, to develop a simple and reproducible tool for quantifying rotational abnormalities for use in planning surgery for malunion of the forearm, and secondly, to describe normal torsion of the forearm bones, with a specific question : can the healthy side be used as a reference for identification of a malunion and for surgical planning ?
Material & Methods: We described a protocol for scannographic measurement of bone torsion and evaluated it on 30 healthy subjects. CT scan of the whole forearm were required. Landmarks were identified on two sections strictly orthogonal to the diaphyseal axis of each bone, on the two metaphysis.
For the proximal radius, the axis passed through the centre of the diaphysis and the apex of the bicipital tuberosity, while the distal axis passed through the anterior and posterior edges of the ulnar incisure of the radius. For the proximal ulna, the axis connected the edges of the small incisure. Finally, for the distal ulna, the axis passed through the centre of the ulnar head and the tip of the styloid. The torsion of each bone was defined as the angle between the proximal and distal axes. Intra- and inter-observer reproducibility was shown to be excellent for both bones.
Our objective 2 was to describe torsion parameters in the general population.
To do this, we were able to access Stryker's SOMA database, which includes 3D CT scan data from entire skeletons. We chose the landmarks and the measurment was then automated using artificial intelligence on 490 pairs of radii and 451 pairs of ulnas.
Results: The study of the radii showed 39° of inter-individual variability. Moreover, 98% of subjects had a torsion difference between side inferior to 15°. Right-left correlation was good but not excellent. For the ulnas, inter-individual variability was 60°, and 91% of subjects had a torsion difference between side inferior to 15°.
Conclusions: It is possible to measure the rotation of the forearm bones in a simple and reproducible way using a CT scan, and to identify a malunion by comparing with the contralateral side. If there is a torsional disorder, it is possible to use a 3D printed guide but if you cannot afford those expensive guides you will be able to plan on your surgery.

A-0492 IS HYPERSELECTIVE NEURECTOMY FOR UPPER LIMB SPASTICITY EFFECTIVE IN THE LONG TERM?

Sze Ryn Chung[1,2], Paolo Panciera[3], Caroline Leclercq[1]
[1]Institut de la Main, Paris, France; [2]Hand and Reconstructive Microsurgery, Singapore General Hospital; [3]Ospedale Villa Salus, Mestre, VE, Italy

Introduction: The management of upper limb spasticity encompasses several surgical approaches often used in combination: selective neurectomies to reduce spasticity, tendon lengthening, tenotomies, and bone stabilization for muscle or joint contractures, and tendon transfers to enhance weak antagonists. Hyperselective neurectomy (HSN) has proved effective in reducing spasticity, but the question of recurrence remains a concern.
Aim: This study assesses HSN's long-term effectiveness and potential recurrence in treating upper limb spasticity.
Material & Methods: We reviewed a group of patients who underwent HSN for elbow flexors, forearm pronators, and/or wrist flexors with less than 30 months of follow-up. These patients were part of a prospective study of patients who underwent HSN between 2012 and 2019, with an average follow-up of 30 months. Inclusion criteria in the present study was patients with a prior follow-up of less than 30 months. Measurements were made by the same reviewer as in the initial study, and included resting posture, active/passive range of motion, muscle strength, and spasticity (modified Ashworth score and Tardieu scale).
Results: Of the 42 patients in the prospective study, three were lost to follow-up, and 20 had less than 30 months of follow-up. Of these 20 patients, 12 were reviewed for the present study at a mean of 70 months (5.8 years) follow-up. results were categorized into elbow flexor (n=7), forearm prono-supinator (n=5), and wrist flexor (n=1) groups. Comparison between their results at less than 30 months (mean, 21 months) and at an average of 70 months follow-up showed stability in all measurements, whether resting posture, motion, strength, or spasticity, with a slight trend towards improvement of all figures. The inclusion of these new data in the initial prospective study raises the average follow-up of the whole series to 50.3 months (4.2 years). It confirms the stability of results, after a mild, non-significant relapse of spasticity within the first year, already identified in the initial study.
Conclusions: As opposed to some previous literature reports, this study demonstrates the long-term effectiveness of HSN in managing upper limb spasticity, showing significant and sustained improvements in joint positioning, range of motion, and reduction in spasticity without compromising muscle strength.

A-0493 BIOMECHANICAL ANALYSIS OF A COMBINED CENTRAL-DORSAL RECONSTRUCTION FOR CHRONIC SCAPHOLUNATE INTABILITY

Sofie Goeminne[1,2], Orçun Taylan[2], Emiel Salaets[2], Walter Coudyzer[2], Ilse Degreef[2], Darshan Shah[3], Lennart Scheys[2]
[1]Department of Orthopaedic Surgery, AZ Herentals, Herentals, Belgium; [2]Institute for Orthopedic Research and Training (IORT) Department of Development and Regeneration, KU Leuven, Leuven, Belgium; [3]BiOME Lab, Department of Mechanical Engineering, Indian Institute of Technology (IIT) Bombay, Mumbai, India

Introduction: Reconstruction of the scapholunate (SL) complex in chronic cases remains challenging. Current knowledge does not provide consensus on the best reconstructive procedure and biomechanical analysis of current reconstructive techniques is scarce. Previous literature pointed out to the importance of the dorsal fibers of the SL ligament, but solely reconstruction this dorsal subregion might open the volar SL interval through a hinge effect.
Aim: In this cadaveric study we evaluated a reconstructive technique with a combined central and dorsal reconstruction using a 4D CT assessment to evaluate the scapholunate distance (SLD) at the different subregions of the SL interval throughout wrist motion.

Material & Methods: Six fresh-frozen cadaveric wrist specimens were used for this study. Arthroscopy confirmed the absence of ligament lesions. A custom-made wrist motion simulator driven by a small servo motor moved the wrist in the flexion-extension plane. Dead weights were used to balance the wrist based on moment arm calculation in order to exclude a secondary degree of motion as much as possible. Each wrist underwent a 4D CT assessment at 3 different stages: (1) intact wrist, (2) after creation of a complete SL instability and (3) after reconstruction. A combined central-dorsal technique was performed via a pure dorsal approach to the wrist, using a free tendon graft augmented with synthetic tape, fixed at three points. Normalized scapholunate distance range (nSLR) and elongation/shortening of the interval when compared to the neutral wrist position were analyzed, using a robust linear mixed model analysis.
Results: We found a significant decrease in nSLR between the complete SL dissociation and the reconstruction for all regions (p=0,028 dorsal, p=0,048 proximal and p=0,012 volar). Considering this nSLR, the reconstructive state did not differ from the normal wrist. When comparing the dorsal and proximal interval of the ligamentous intact and reconstructed wrist to the SL unstable wrist at the neutral wrist position, a significantly smaller SLD was found ($p<0,02$ in all cases). We found no differences in elongation/shortening in the different positions of the wrist when comparing the 3 specimen states. Boxplots to visualize data spread however, show a larger interquartile range for the instable wrist, when compared to the reconstruction. Possibly the small sample size (inherent to cadaver research) plays a role. Main limitations to this study are related to the nature of cadaver research.
Conclusions: This biomechanical study proves the effect of the proposed reconstructive technique on SLD and supports the possibility of addressing volar SL widening using this technique. We are however concerned about the difference in elasticity between the natural SL complex and reconstruction. This could cause high shear forces over the graft fixation points, possibly enhancing osteolysis, tunnel widening or graft loosening.

A-0495 VOLAR CUT INJURIES REPAIR & REHABILITATION AT GOVERNMENT TERTIARY CARE CENTRE : AN INDIAN PERSPECTIVE

Varnika J.P
[1]Zoi Hospitals, Ameerpet, Hyderabad [2]Gandhi Hospital , Secunderabad

Introduction: The hand is the epicenter of all daily activities. Globally hand injuries account for 5-10% of all emergency injuries and volar side injuries making up 33%. Due to their densely packed nature and different zones containing blood vessels, nerves, and flexor tendons in close proximity these injuries can be highly dangerous and compound in nature. Manual labor comprises 62% of India\'s workforce. As Most of the indian population is in the middle and the lower income group -Time of presentation, affordability of care and compliance to physiotherapy protocols also determines the outcome. Thus, careful stepwise management is essential.
Aim: to analyze the structures involved in compound volar wrist injuries and determine their outcome
Material & Methods: A cross sectional study was conducted on forty patients with volar cut wrist injuries admitted to a government tertiary Centre from September 2017- September 2019; Thirty-six were male while four were female. The age range was between eight to sixty-three years old. In Twenty-four cases (60%) injury was by sharp instrument either accidental or by assault. Neurovascular examinations such as Arterial Doppler, Nerve conduction study and EMG were done post which patients were prepared for surgery where Early primary repair was performed on twenty-eight patients (70%). Tendon repair utilized the modified Kessler core suture technique using prolene 4-0 while an end-to-end repair of cut nerves employed a polyamide suture with a size of 6-0. Vessels underwent repairs using prolene sizes ranging from 6-0/8-0 followed by sequential repair and splinting. Rehabilitation adopted modification of Kleinert\'s regimen as its

program which tracked vascularity, sensation, and functions. Patients were followed up to fourteen months after injury
Results: Twenty-two patients showed excellent to good results demonstrating more than fifty degrees total motion . All arterial repairs\' patency remained intact at final follow-up for all twenty-four cases treated during this study period . Median nerve repairs displayed better outcomes compared to ulnar nerve repairs. Wrist and forearm injury treatments resulted in improved recovery rates as evidenced by thirty one out of forty patients (78%) returning back to work within nine months.
Conclusions: The early multidisciplinary approach coupled with active mobilization of cut flexor tendons in zones II-V using the modified mobilization protocol has given good results, with minimal complications. Even in a government teritiary care centre- Early intervention, affordable physiotherapy protocols can increase compliance amongst patients for rehabilitation and give outcomes comparable to advanced multispeciality centres.

A-0496 MATTI RUSSE FOR THE TREATMENT OF SCAPHOID NON-UNION

Sarah Courtar[1,2], Jan Bernard Sintenie
[1]Elkerliek Hospital, Helmond, The Netherlands; [2]Maastricht University, Maastricht, The Netherlands

Introduction: Scaphoid fractures are common with a non-union rate of 5-15%. Treatment options are widely debated. The most used treatment options involve plate or screw fixation. Due to a rising trend in patients needing secondary surgeries due to complaints related to hardware material, we set out to investigate an alternative approach that avoids these types of complications, namely the Matti Russe method.
Aim: Our goal is to evaluate the rate of successful bone healing and the rate of subsequent interventions.
Material & Methods: In this retrospective study, 27 patients with scaphoid non-union were studied in the Elkerliek Hospital in the Netherlands between 2006 and 2023. Union rate was evaluated based on radiological and clinical assessment. We also aimed to evaluate which factors possible play a role in non-union of the scaphoid fracture after treatment and compare this with results previously published on the volar plate osteosynthesis.
Results: This study consisted of 27 patients with a mean age of 27.44 years (17-62). 26 were male (96.3%) with a mean duration of non-union of 11.3 months (4.90- 43.83). 5 patients (18.5%) had surgery prior to the Matti Russe operation. Successful union was achieved in 24 (88.9%) patients. The 3 patients with persistent non-union were all smokers ($p=0.056$). There was no significant difference in this study population between age($p=0.162$), duration between trauma and operation($p=0.408$), gender($p=0.889$), previous operation ($p=0.474$) or if the dominant hand was injured($p=0.697$).
Conclusions: Treating non-union of the scaphoid remains a complex procedure. Treatment with the Matti Russe methods shows to be an effective treatment without the need for metal implants, therefore avoiding complication with hardware that may possibly lead to a second surgery like hardware removal.

A-0497 SHOULD THE ARTERY BE TRIMMED BEFORE ANASTOMOSIS IN EVERY FINGER REPLANTATION/ REVASCULARIZATION CASE? PROSPECTIVE, SINGLE-CENTER, MULTIDISCIPLINARY STUDY OVER 46 MONTHS

Marine Pichonnat[1,2,3], Alexandre Buffet[1,2,3], Franck Monnien[4], Sébastien Aubry[5], Isabelle Pluvy[1,2,3], François Loisel[1,2,3], Laurent Obert[1,2,3], Séverine Valmary-Degano[6], Ines Regas-Guerzider[1,2,3]

[1]Service d'Orthopédie, de Traumatologie, de Chirurgie Plastique, Reconstructrice et Assistance Main, CHU de Besançon, 3 Boulevard Alexandre Fleming, 25030 Besançon, France; [2]Université de Bourgogne Franche-Comté, Sciences Médicales et Pharmaceutiques, 19 Rue Ambroise Paré, 25030 Besançon, France; [3]Nanomédecine, Imagerie, Thérapeutique-EA 4662, Université de Bourgogne Franche-Comté, Sciences Médicales et Pharmaceutiques, 19 Rue Ambroise Paré, 25030 Besançon, France; [4]Service d'Anatomo-Pathologie, CHU de Besançon, 3 Boulevard Alexandre Fleming, 25030 Besançon, France; [5]Service d'Imagerie Ostéoarticulaire, Radiologie Interventionnelle, CHU de Besançon, 3 Boulevard Alexandre Fleming, 25030 Besançon, France; [6]Service d'Anatomo-Pathologie, CHU de Grenoble, Boulevard de la Chantourne, 38000 Grenoble, France

Introduction: Despite optimal arterial anastomosis, some finger replantations fail. Our objective was to evaluate how the mechanism of injury (MOI) affects the artery's microscopic appearance and the success of anastomosis. We hypothesized that the MOI influences arterial histology and microsurgical success.

Methods: This single-center prospective study enrolled patients who had an acute traumatic arterial injury of the hand and/or wrist. The proximal and distal ends of the artery were trimmed before anastomosis in every case. The arterial margins were analyzed in anatomical pathology. Clinical follow-up along with an ultrasound arterial patency check was carried out at 1 month postoperative.

Results: Between 2018 and 2022, 104 patients were enrolled with a follow-up of 12 months. Macroscopically, 42% of the arterial margins were dilapidated. Histological analysis found damage in 74% of surgical specimens: blast (100%) > laceration by mechanical or power tool (92%; 82%) > amputation by mechanical or power tool (80%; 67%) > laceration by glass (50%) > crush injury (33%).

The arterial margins were more likely to be normal based on the histological analysis when the MOI was laceration by glass ($p<.05$; OR = 3.72) and the patient was 65 years or older ($p<.01$). Risk factors for anastomosis failure were an amputation by power tool ($p<.01$, OR 8.19) and shorter length of arterial resection ($p<.02$). The clinical failure rate was 7.8% and the patency failure rate was 10.4%.

Discussion: Histological arterial lesions correlate with the MOI. Trimming >2 mm from the proximal and distal arterial ends is recommended for all MOI before arterial end-to-end anastomosis. For blast injuries or amputation, we recommend trimming > 4 mm and using a vein bypass graft. This study's findings could lead to a change in surgical practices.

A-0498 3-MONTHS FOLLOW-UP ON RELATIVE MOTION FLEXION SPLINT: THE GOOD, THE BAD AND THE FUTURE

Rossella Pagliaro, Giorgio Eugenio Pajardi, Macarena Vizcay

University Department of Hand Surgery & Rehabilitation, San Giuseppe Hospital, IRCCS MultiMedica Group, Milan, Italy

Introduction: Relative motion is a type of early mobilization based on the concept of muscle that controls multiple tendons, as is the flexor digitorum profundus (FDP), also known as the "quadriga effect." It allows immediate full active composite finger flexion and extension within the confines of the RM orthosis; in this case, the effected finger's metacarpophalangeal joint (MCPJ) is positioned in more flexion compared to the healthy fingers. The position reduces force across the repair site and changes the excursion of the repaired tendon, therefore reducing the risk of rupture.

Aim: In this study, we show our first results utilizing the relative motion flexor splint (RMFS) after flexor tendon repair in zones 1 and 2.

Material & Methods: From February to September 2023, we followed five patients who had flexor tendon injury repaired in zones 1 and 2 in the University Department of Hand Surgery & Rehabilitation Hospital IRCCS Multimedica by a single surgeon (M.V.) and rehabilitated by a single hand therapist (R.P.). All patients who qualified signed a standard consent form. The hand surgeon took the final measurements during each patient's final visit on weeks 8 and 12. results were measured with the TAM calculated using the 1980 formula described by Strickland and Glogovac , qDASH, JAMA and VAS scales.
Results: A total of 5 patients were included; all patients had at least 3 months of follow-up, but one patient missed follow-up after 2 months. (demographics are shown on table 1.) No major complications were reported while the rehabilitation was done. Long follow-up showed that one patient had Dupuytren developed in the same finger three months after the surgery and is being monitored by the surgeon; another patient had a new rupture of the tendon after 5 months and underwent new surgical repair.
Conclusions: We believe RMFS is an innovative treatment for flexor tendon zone 1 and 2 injuries and that, in an appropriate patient, it could be an efficient alternative for simpler and more effective hand therapy. Although RM splints are an excellent addition and are being used more and more for managing extensor tendon injuries, additional research on actual instances with the RMFS remains needed.

A-0499 CRUISING TOWARDS DE QUERVAIN TENDINITIS-FREE TMC JOINT REPLACEMENT: RESPECTING THE FIRST METACARPAL ARCH : A RETROSPECTIVE STUDY

Lynn Decroix[1,2], Bert Vanmierlo[2], Arne Decramer[2], Kjell Van Royen[3], Ilse Degreef[1]
[1]KU Leuven, Belgium [2]AZ Delta, Roeselare, Belgium, [3]OLV Aalst, Belgium

Introduction: Trapeziometacarpal joint replacement is an effective treatment for managing thumb base osteoarthritis. A significant knowledge gap persists in our understanding of achieving precise ligamentous and muscular tension around the prosthesis. Lengthening the thumb during joint replacement has been associated with postoperative complications, including De Quervain tendinitis.This causes a delay in functional recovery.
Purpose: This retrospective study has three primary objectives. First, examining the association between the incidence of De Quervain tendinitis and the degree of thumb lengthening, starting from the first metacarpal arch. Second, proving the first metacarpal arch is a practical radiographic parameter for assessing the optimal physiological tension around the joint perioperatively. Third, examining the possibility of using a unilateral Eaton view to find the arch instead of a hand AP view.
Methods:. In a retrospective study, we analyzed 53 cases (49 patients; 4 bilateral) of primary implanted Touch prosthesis, and their postoperative unilateral Eaton and hand AP views to determine whether the first metacarpal arch was respected, or the thumb was lengthened. We noted the incidence of de Quervain disease during the first year following surgery and its treatment. A point-biserial correlation analysis was used to correlate a binary variable (the occurrence of postoperative De Quervain tendinitis) with a continuous variable (the degree of shortening/lengthening of M1). The correlation was tested for significance using a student's t-test.
Results: De Quervain tendinitis was diagnosed in 14 cases, of which 6 patients needed operative release. Correlation testing revealed a significant association between the degree of M1 lengthening and the occurrence of De Quervain tendinitis, for both radiographic views.
Conclusion: Lengthening of the thumb column leads to more DQ tendinitis post TMC arthroplasty. Surgeons can use the first metacarpal arch perioperatively as a practical tool to respect the normal anatomy and decrease risk of DQ tendinitis. Both unilateral Eaton views and hand AP views are useful. If needed, a cut off of 2 mm lengthening can be advised.

A-0500 POSTOPERATIVE RECOVERY OF CUBITAL TUNNEL SYNDROME IN LATE ELDERLY PATIENTS

Takao Omura[1,2], Kaori Sugiura[2], Michio Sano[3], Keika Nishi[3], Yukihiro Matsuyama[2]
[1]Department of Orthopaedic Surgery, Division of Surgical care, Morimachi, Hamamatsu University School of Medicine, Japan; [2]Department of Orthopaedic Surgery, Hamamatsu University School of Medicine, Japan; [3]Department of Orthopaedic Surgery, Shizuoka City Shizuoka Hospital, Japan

Introduction and Aim: The regenerative capacity of the peripheral nervous system declines with age due to diminished Schwann cell plasticity, leading to slower myelin clearance. In this study, we aimed to identify the effects of aging on the postoperative recovery of patients who underwent ulnar nerve decompression for cubital tunnel syndrome.
Material & Methods: Among the 132 patients who underwent surgical ulnar nerve decompression for cubital tunnel syndrome from 1998 to 2021, we studied 17 patients aged over 75 with a follow-up of more than a year. This group comprised 13 males and 4 females, with an average age of 79.7±0.8 years (elderly group). As controls, 31 patients in their sixties, consisting of 24 males and 7 females with an average age of 65.3±0.5 years, were selected (control group). We compared postoperative recovery and the patients' demographics between the two groups. Recovery was defined as improvement in the McGowan grading one year postoperatively.
Results: According to McGowan's classification, preoperatively, 10 patients in the elderly group were classified as grade II, and 7 cases were classified as grade III, while in the control group, 19 patients were grade II, and 12 cases were grade III, showing no significant difference in preoperative severity. There was no significant difference in motor conduction velocity across the elbow or sensory conduction velocity between the two groups. Cubital tunnel syndrome was attributed to osteoarthritis in 16/17 patients in the elderly group and 26/31 patients in the control group. Consequently, the preoperative elbow extension angle was significantly impaired in the elderly group at -19 degrees compared to -11.9 degrees in the control group (P=0.02). One year postoperatively, 6 patients in the elderly group and 14 patients showed recovery, with no significant difference. However, when classified according to preoperative McGowan's grading, only 1/7 patients in the elderly group vs. 4/12 patients in the control group with McGowan grade III showed recovery, while similar recovery of 5/10 patients in the elderly group and 10/19 patients in the control group with grade II was observed.
Conclusions: Age does not significantly affect recovery after ulnar nerve decompression when the patients undergo surgery at McGowan grade II. This is likely because the nerve has not undergone Wallerian degeneration, and the lesion is mainly demyelination. However, recovery is prolonged in grade III patients due to the pathogenesis of paralysis being Wallerian degeneration, and the recovery is delayed due to diminished Schwann cell plasticity.

A-0501 THE CLINICAL RESULT OF THE WRAPPING TECHNIQUE FOR SPONTANEOUS OR CHRONIC TRAUMATIC EXTENSOR TENDON SUBLUXATION

Jae Hoon Lee[1], Jong Hun Baek[2], Gi Heok Gu[2], Duke Whan Chung[2]
[1]Yeson Hosptial, Bucheon, Kyunggi-do, South Korea; [2]Medial school, Kung Hee University, Seoul, South Korea

Introduction: For the treatment of traumatic subluxation of the extensor tendon, sagittal band repair is recommended in acute cases, and sagittal band reconstruction is recommended in chronic or spontaneous cases. In 2017, a new method for stabilizing the extensor tendon was performed in patients with spontaneous or chronic extensor tendon subluxation and the results were reported. There have been no reports since then on the results of this surgical method.
Aim: The authors will continue to perform this surgical method until 2022 and report the results.
Material & Methods: From October 2009 to December 2022, 24 patients with chronic traumatic subluxation, 24 cases,

spontaneous subluxation, 5 patients, 9 cases, and lupus arthritis, 1 patient, 3 cases, a total of 36 cases were retrospectively analyzed. The surgical method is to incise the sagittal band just radially from the subluxated extensor tendon and separate it from the joint membrane. The subluxated extensor tendon is moved to the center of the metacarpophalangeal joint, and the radial paratenon is sutured to the radial sagittal band. Afterwards, the sagittal band is wrapped around the tendon and then sutured to the remaining sagittal band on the ulnar side of the tendon. After surgery, a single arm splint is performed with the metacarpophalangeal joint in extension, and active joint exercises are started 5 weeks later. There were 23 men and 8 women. There were 24 cases with 3rd fingers, 7 cases with 2nd fingers, 2 cases with 4th fingers, and 3 cases with 5th fingers. The mechanism of injury occurred after being struck with a fist in 13 cases, and 6 cases were indirect injuries. In 5 cases, it occurred after flicking. The average age of the patients was 33.1 (14-70) years, and in traumatic cases, the period from injury to surgery was 7.13 (2-60) months. The average follow-up period after surgery was 14 months (12-38).
Results: At the final follow-up, all metacarpophalangeal joint movements returned to the same range of motion as the normal side, and no joint contractures occurred. The extensor tendon was well located in the center of the metacarpophalangeal joint, and there was no recurrence of subluxation. At the final follow-up, the vas score for pain was 0, and no patient complained of pain.
Conclusions: For the treatment of extensor tendon subluxation, centralization of the extensor tendon and wrapping of the sagittal band are considered simple and effective treatment methods without recurrence.

A-0502 IN-HOUSE VERSUS COMMERCIALLY AVAILABLE 3D PLANNING FOR CORRECTIVE OSTEOTOMY OF THE DISTAL RADIUS: A PAIRED NONINFERIORITY STUDY

Charlotte Stor Swinkels[1,2,3], Katleen Libberecht[1,3], Emilia Gryska[1,3], Peter Axelsson[1,3], Per Fredrikson[1,3], Anders Björkman[1,3]
[1]Department of Hand Surgery, Sahlgrenska University Hospital, Mölndal, Sweden; [2]Department of Medical Physics and Biomedical Engineering, Sahlgrenska University Hospital, Gothenburg, Sweden; [3]Institute of Clinical Sciences, Sahlgrenska Academy at the University of Gothenburg, Sweden

Introduction: Malunited distal radius fractures are commonly treated with a corrective osteotomy to restore anatomy. To improve the accuracy of the correction, the use of virtual planning on 3D models and patient specific surgical instruments (PSI) is becoming increasingly popular in complex skeletal surgery. Currently, there are two ways to use PSIs in clinical practice. The gold standard is to purchase the surgical plan and PSIs from external commercial companies. This approach is hindered by high costs and the need for external transfer of patient data. Additionally, successful virtual 3D planning and guide design strongly relies on cooperation between surgeons and clinical engineers, which can be challenging to establish through web meetings with external partners. An alternative approach is a dedicated, in-house 3D planning unit that can help overcome several of these issues and increase the availability of the technique.
Aim: The purpose of this study was to demonstrate noninferiority of in-house 3D surgical planning and guide design compared with externally purchased planning and guides.
Material & Methods: Sixteen patients with extra-articular distal radius malunions were included in the study. Virtual planning and design of patient specific guides was done for each patient by the hospital team and by an external company independently. Surgery was simulated on 3D printed bone models with both sets of guides. Accuracy was assessed by measuring the 3D transformation between the resulting correction and the planned correction. The dimensional accuracy of the printed guides was assessed before and after sterilisation.
Results: The error in volar tilt and ulnar variance remained within the predefined acceptable noninferiority margins of

5° and 2 mm respectively for both. Noninferiority could be claimed for the in-house guides. The surface comparisons between the virtually designed models and the printed guides before and after sterilization were acceptable.
Conclusions: This study shows that a dedicated in-hospital team can virtually plan corrective osteotomies and design patient-specific surgical guides with similar outcomes, in terms of correction of malunited fractures of the distal radius, as planning and guide design done by a commercial company.

A-0504 WRIST WAR INJURY. FUSIONS AND MOVEMENT PRESERVING PROCEDURES

Tymoshenko Serhii, Kotova Mariia, Lysak Andrii
SI "Institute of Traumatology and Orthopedics of NAMS of Ukraine"

Introduction: In the case of a gunshot or blast, destruction of wrist articular structures results in limited ability to preserve movements within it. Even total wrist fusions pose technical challenges. The peculiarities of modern war wounds, coupled with modern treatment technologies, dictate new principles of reconstruction.
Aim: To investigate the structure of wrist injuries in the wounded and the range of basic interventions. To assess the feasibility of operations preserving mobility in the wrist joint after severe gunshot wounds, and to characterize their effectiveness.
Material & Methods: Among 700 patients with limb gunshot wounds admitted for reconstructive interventions, 120 with hand and wrist wounds were selected. Isolated injuries occurred in 6 cases, while the rest were polystructural (involving defects of the median and ulnar nerves, tendons of the flexors of the hand and fingers). In cases of severe wrist joint destruction, the primary operation was total wrist arthrodesis (13 patients). In 8 injured individuals, procedures preserving wrist movement were feasible. Additionally, the effectiveness of the Darrach procedure in 5 patients and trapezectomy in 3 patients was evaluated.
Results: It was demonstrated that the surgical conditions for performing arthrodesis were suboptimal, necessitating preliminary flap transplantation to address skin defects (7 cases) and bone grafting for defects (13 cases). Clinical and radiological examples of proximal row carpectomy, 4-corner fusions, and a variant of the Graner procedure are provided. The clinical results of effective preservation of wrist movement are demonstrated. Darrach's procedure proved effective in cases of gunshot DRUJ destruction, not requiring additional surgical stabilization due to intense soft tissue scarring. In cases of significant damage to the carpometacarpal joint of the thumb, the trapezectomy procedure did not require ligamentoplasty - mobility improved against a background of sufficient stability, though to a lesser extent than with similar interventions for rhizarthrosis.
Conclusions: The basic operation for severe injuries of the wrist joint is total arthrodesis. However, it is often possible to identify a kinematic link between preserved bones and articular surfaces for movement-preserving surgery.

A-0505 USING WALANT TECHNIQUE IN UPPER LIMB FRACTURE FIXATION OUR LOCAL EXPERIENCE IN SUDAN

Khalid Mohamed
Orthopedic Surgery, Faculty of Medicine, Alzaiem Alazhari University, Khartoum, Sudan

The Wide-awake local anesthesia no tourniquet (WALANT) technique enables surgeries to be performed with the patient fully awake and without a tourniquet, thus allowing the intraoperative assessment of function. This article aimed to describe our local experience using WALANT techniques for different fracture and bone fixation in the upper limb

including midshaft clavicle plating, distal third clavicle tension band wiring, Distal radius (spanning external fixator and CRPP), forearm bone plating, carpometacarpal dislocation reduction and fixation, multiple metacarpal CRPP, Phalangeal fractures fixation and finger tip injuries V-Y and some examples in using WALANT in the lower limb (patella, Ankle, and metatarsals traumatic foot injury's fixation) with its pearls and pitfalls. The authors demonstrate how to prepare a WALANT cocktail using overcoming locally challenges of availability of medications. explain theories behind bone numbness, principles of injection technique , painless injection tips and discussing our post-op analgesia protocol. Accompanying videos demonstrate how to perform the tumescent anesthesia in each type of fracture described. To achieve a pain-free WALANT procedure, it is crucial to administer the subcutaneous anesthetic injection around the incision site and at the periosteum to ensuring complete circumferential coverage of the fractured bone. Prior to incision, the fracture site is manipulated to confirm the patient experiences no pain. As a standard practice in WALANT procedures, a 25-minute interval is observed before surgery initiation, as this is the optimal time interval to achieve maximal vasoconstriction within the limits of tumescent anesthesia. In all operated cases, there was high patient satisfaction and intraoperative assessment of range of motion was successfully performed in shoulder, wrist, hand, ankles, toes, and fingers, in addition to evaluating the fixation stability through active motion and ensuring earlier rehabilitation

A-0506 TREATMENT OF RADIAL SENSORY NEUROMA WITH TARGETED MUSCLE REINNERVATION TO THE EXTENSOR CARPI RADIALIS BREVIS

Leila Felus-Bouzrati, Xavier Mir-Bulló, Lidia Ana Martin-Dominguez, Albert Pardo-Pol, Inés Farré-Galofré, Sergi Alabau-Rodríguez
Institut Català de Traumatologia i Medicina de l'Esport (ICATME) Hospital Universitari Quirón-Dexeus

Introduction: Targeted muscle reinnervation (TMR) involves transferring the distal end of an injured peripheral nerve to an adjacent expendable motor nerve, initially developed to improve control of myoelectric prosthetics for upper extremity amputees. This technique establishes axonal continuity, reducing disorganized axonal sprouting and neuroma formation, and interfaces with denervated motor end plates, providing continuity to efferent and afferent pathways. TMR is reported to be superior to traditional passive methods of neuroma resection and implantation, representing a shift in the surgical management of neuromas.
The objective is to present a surgical technique for the treatment of RSN neuromas with TMR to the expendable distal motor nerve to the extensor carpi radialis brevis (ECRB).
Material & Methods: An 18-year-old woman presented with hyperalgesia in the territory of the sensitive branches of the radial nerve and local cutaneous atrophy of the wrist due to a history of corticosteroid infiltration for De Quervain's tenosynovitis in 2021. In 2022, we performed the opening of the first extensor compartment, excision of atrophic skin and neurolysis of the distal sensory branch of the radial nerve. However, neuropathic pain persisted, requiring daily lidocaine patches. For the second surgery, the TMR technique was used to transfer the RSN nerve to the ECRB distal motor nerve.
Results: After six months of surgery, the patient presents good clinical and functional evolution. The pain has disappeared, and mobility balance and strength have improved.
Conclusions: The radial sensory nerve can be injured during trauma or common procedures leading to neuroma formation with chronic and debilitating pain. Nonsurgical treatments and surgical interventions are frequently ineffective.
Microsurgical reconstruction using TMR technique of the sensory branch of the radial nerve to the distal motor branch of ECRB it is an option to consider in these cases.

A-0507 THE SURGICAL TECHNIQUE OF INTERNAL FIXATION USING SOFT ANCHOR FOR VOLAR PLATE AVULSION FRACTURE OF PROXIMAL INTERPHALANGEAL JOINT

Takahiro Asano, Haruhiko Satonaka, Ryoji Suzumura, Tadashi Tsukamoto, Kakunoshin Yoshida, Takahisa Hara
Ise Municipal General Hospital, Mie, Japan

Introduction: Volar plate avulsion fracture of the proximal interphalangeal (PIP) joint is caused by hyperextension injury and is one of the most common hand injuries. Surgical treatment is recommended in cases with large bone fragments or with unstable PIP joints. We report that surgical techniques and clinical results of open reduction and internal fixation using soft anchor for volar plate avulsion fractures of the PIP joint without postoperative immobilization.
Methods: We retrospectively evaluated 16 cases (11 men and 5 women; mean age, 32 years; range, 13 to 63 years) of volar plate avulsion fracture of the PIP joint patients treated with soft anchor (JuggerKnotTM Soft Anchor Mini 1.0 mm, ZIMMER BIOMET) such as pull-in maneuver. The surgical indications were acute unstable fractures with avulsion fracture involving more than 30% of the joint surface, a bone fragment rotated by more than 90°, or the presence of dorsal subluxation. The mean follow-up period was 14 weeks (range, 5 to 25 weeks).
Under regional anesthesia, the surgical approach was follow; The Brunner incision were designed from the palmophalangeal crease to the distal interphalangeal crease and elevated a skin flap. The flexor tendon sheath was incised between the C1 and C3 pulleys and the flexor tendons were retracted, following the volar plate fracture fragment and the fracture site of middle phalanx could be identified. A soft anchor was inserted obliquely from the fracture site toward dorsal cortex of middle phalanx. The volar plate was sutured with the bone fragment reduced. After we confirmed that there were no instability and extension restriction of the PIP joint, the flexor tendon sheath was repaired and the skin was closed. Postoperatively, active and passive joint motion of the PIP joint was started immediately without immobilization. We examined the range of motion on the PIP joint, bone union, and complications at the final follow-up.
Results: The mean degree of flexion was 93° (84-100°), and the mean degree of extension was -4.5° (-15-0°). The average range of motion was 89° (75-100°). Radiographic bone unions were achieved in all cases. There was no complication, such as residual pain, re-dislocation of the PIP joint, loss of reduction of the fracture, or disfunction of extensor tendon including extension lag due to the anchor exserted on the surface of the dorsal cortex.
Conclusion: It has been previously reported that the stiffness of the PIP joint was remained postoperatively, because postoperative immobilization of the PIP joint had led to a delay of rehabilitation such as a range of motion. In this study, good range of motion on the PIP joint was obtained compared to previous reports because of starting training immediately after surgery. In addition, there was no loss of the reduction of bone fragments or postoperative complication even in early rehabilitation, therefore the force of fixation with soft anchor was considered to be sufficient to fix the fragments of the volar plate avulsion fractures. Our new surgical technique for the volar plate avulsion fractures is one of the useful surgical methods and permits to start postoperative rehabilitation.

A-0508 TREATMENT USING NIGHT-TIME SPLINT FOR OSTEOARTHRITIS OF THE PROXIMAL INTERPHALANGEAL JOINTS

Haruhiko Satonaka, Yoko Nakabayashi, Takahiro Asano, Tadashi Tsukamoto, Ryoji Suzumura , Kakunoshin Yoshida, Takahisa Hara
Department of Orthopaedic Surgery, Ise Municipal General Hospital, 3038 Kusube-cho, Ise, Mie 516-0014, Japan

Osteoarthritis (OA) is the most common joint disease and it most frequently involves joints of the hands. Although the splint as one of the conservative treatments for the hand OA is common intervention, it is not often performed because

of concerns about adherence, continuity and low benefit. To our knowledge, there was less report of treatment using the splinting for the OA of the proximal interphalangeal (PIP) joints. We investigated usefulness of the night-time splinting for symptomatic OA of the proximal PIP joints.

A-0509 INTRAOPERATIVE AND EARLY COMPLICATIONS IN TRAPEZIOMETACARPAL ARTHROPLASTY WITH DUAL MOBILITY - BALL AND SOCKET PROSTHESIS

Eudaldo Gallo[1], Juan María Pardo[1,2], Enrique Peces[1], Belen Pardos[1], Guillermo Rojas[1], Natalia Ruiz Micó[1]
[1]Hospital Universitario General de Villalba, Madrid, Spain; [2]Hospital Universitario Montepríncipe, Madrid, Spain

Introduction: Trapeziometacarpal prostheses are an increasingly performed technique for the treatment of basal thumb osteoarthritis. New designs and the experience with the implantation contribute to the good results found, but complications must be recognized, in order to prevent them and treat them accordingly when they present.
Aim: 1- Describe the intraoperative and postoperative complications (immediate and early - <3 months) observed in our series of trapeziometacarpal prosthesis; 2- Evaluate risk factors for presenting each type of complication; 3- Propose technical details to avoid these complications.
Material & Methods: Descriptive and analytical study. The trapeziometacarpal prostheses implanted in our service since April 2018 are included, with minimum of 3 months follow up. An analysis of the complications presented was carried out retrospectively, grouping them temporarily (intraoperative, immediate postoperative and secondary) and according to the implant used, with special focus in the design of the cup (spherical vs. truncated-conical).
Results: Since April 2018, a total of 125 trapeziometacarpal prostheses have been implanted, in a total of 109 patients, with a mean age of 61.3 years. 50 of them with cup with a truncated conical design and 75 with a spherical design, all of them with double mobility inserts. A total of 4 intraoperative fractures of the trapezius (all in the frustoconical design group), 2 prosthetic dislocations (all in the spherical design group) and 3 stem loosening have been recorded as complications of special relevance in a mean follow-up of 25.3 months (minimum 3 – maximum 66 months).
Conclusions: Knowing the complications that may appear during the intraoperative and immediate postoperative period is crucial to, in first place, try to avoid them and, once they occur, be able to understand the underlying factors to treat them effectively.

A-0510 A NOVEL CLASSIFICATION OF KIENBOCK'S DISEASE BASED ON MAGNETIC RESONANCE IMAGING

Shin Woo Choi[1], Joo-Yul Bae[1], Jae Kwang Kim[2]
[1]Department of Orthopedic Surgery, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung, South Korea; [2]Department of Orthopedic Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, South Korea

Purpose: We devised a classification system for Kienbock's disease using magnetic resonance imaging (MRI). Moreover, we compared it with the modified Lichtman classification and evaluated the inter-observer reliability.
Methods: Eighty-eight patients diagnosed with Kienbock's disease were included. All patients were classified using the modified Lichtman and MRI classifications. MRI staging was based on factors including partial marrow edema, cortical integrity of the lunate, and dorsal subluxation of the scaphoid. The inter-observer reliability was evaluated. We also evaluated for the presence of a displaced coronal fracture of the lunate and investigated its association with the presence of a dorsal subluxation of the scaphoid.

Results: Seven patients were categorized into stage I, 13 into II, 33 into IIIA, 33 into IIIB, and two into IV using the modified Lichtman classification. Six patients were categorized into stage I, 12 into II, 56 into IIIA, ten into IIIB, and four into IV using the MRI classification. The greatest shift between the stages was observed in stages IIIA and IIIB when the results of the two classification systems were compared. The inter-observer reliability of the MRI classification was greater than that of the modified Lichtman classification. Fifteen cases with a displaced coronal fracture of the lunate were identified, and a dorsal subluxation of the scaphoid was significantly more present in these patients.
Conclusion: The MRI classification system is more reliable than is the modified Lichtman classification. MRI classification reflects carpal misalignment with higher fidelity and is more appropriate for classification into stages IIIA and IIIB.

A-0511 OUTPATIENT AMBULATORY PATHWAY FOR HAND BITES IN A TERTIARY CENTRE

Ibrahim Inzarul Haq, Bhagat Manku, Jonothan Jessup, Matthew Jones, Andrew Mahon, Clare Langley, Deepak Samson
University Hospital Coventry and Warwickshire, UK

Introduction: Bite injuries to the hand have the potential to lead to serious infection in addition to the structural damage caused. There are diverse pathogens involved and small, seemingly trivial wounds can progress to cellulitis, abscesses, septic arthritis and osteomyelitis. These conditions need long inpatient admissions and prolonged antibiotic therapy. The importance of early recognition and initiation of treatment cannot be over emphasized.
In 2017, in the absence of daily dedicated hand trauma lists, our standard management for animal bites to the hand called for inpatient admission, intravenous antibiotics for all animal bites followed by surgical debridement in the operating theatre. Following discussion with our microbiology colleagues, we changed our management to a new protocol consisting of thorough wound irrigation under local anaesthetic in the emergency department and oral antibiotics prophylaxis for bites without overt clinical evidence of infection. This protocol was implemented in 2019 and further revised in 2023.
As we have dedicated hand trauma lists 6 days a week, patients were discharged and brought back on the morning of the hand trauma list as a day case procedure, being discharged on the same day except in the instances of a planned second look operation at 48 hours. Bites with clinical evidence of infection such as, spreading erythema, cellulitis or frank pus were admitted and treated with inpatient admission and intravenous antibiotics.
Aim: We set out to evaluate the efficacy of our new bite management protocol with regards to patient safety, inpatient stay, time to surgery and complications.
Material & Methods: All first presentation adult consultations referred to Trauma and Orthopaedics from the emergency department over a 3-month snapshot period were reviewed in 2017. This was repeated after the implementation of the updated hand bite guidelines in 2019 and in 2023. A review of the admission documentation, operation notes and clinic follow-up letters were reviewed retrospectively.
Results: In 2017, 36 patients were identified over 3 months. The average time to surgery was 1.19 days with an average inpatient stay being 2.36 days. There were 2 reoperations and on follow up 2 cases of osteomyelitis.
After the implementation of the new guidelines in 2019, 37 patients were identified over 3 months. The time to surgery was reduced to 0.85 days with an average inpatient stay of 0.53 days. There were no reoperations and no documented cases of osteomyelitis.
In 2023, 63 patients were identified over 3 months. The average time to surgery was 1.03 days to surgery with an average inpatient stay of 0.56 days. 37 surgeries were performed for 33 patients with 32% (20/63) of patients admitted directly from the emergency department. There were no documented cases of osteomyelitis on follow up.
Conclusions: With the implementation of the new departmental guidelines there has been a reduced average inpatient

stay, reduced time to surgery without an increase in documented osteomyelitis. This data suggests that in the setting of regular access to dedicated hand trauma lists, our protocol for ambulatory management of bite injuries, provides a streamlined, safe and cost-effective option.

A-0512 EVALUATION OF DIAGNOSTIC WRIST ARTHROSCOPY IN PATIENTS WITH SUSPECTED SCAPHOLUNATE LIGAMENT INJURY

L van Wijk[1], EPA van der Heijden[1,2], JS Souer[3], SER Hovius[1,3], JW Colaris[4]

[1]Department of Plastic, Reconstructive and Hand Surgery, Radboud Institute for Health Sciences, Radboudumc, Nijmegen, The Netherlands; [2]Department of Plastic, Reconstructive and Hand Surgery, Jeroen Bosch Ziekenhuis, 's-Hertogenbosch, Brabant, The Netherlands; [3]Hand and Wrist Center, Xpert Clinics, Amsterdam, The Netherlands; [4]Department of Orthopaedics and Sports Medicine, Erasmus University Medical Centre, Rotterdam, The Netherlands

Introduction: Diagnostic wrist arthroscopy is widely acknowledged as the golden standard for assessing posttraumatic wrist complaints. This is despite significant concerns for the procedure's invasive nature, high cost, and operator-dependent characteristics. However, to our knowledge, a large clinical study regarding the findings and follow-up treatment of patients who underwent a wrist arthroscopy is lacking.

Aim: This study evaluates the role of diagnostic wrist arthroscopy for suspected scapholunate ligament (SLL) injuries. We will report patient characteristics, arthroscopic findings, and subsequent treatment.

Material & Methods: We conducted a retrospective cohort study of patients who underwent diagnostic wrist arthroscopy due to suspicion of an SLL lesion following trauma. We systematically gathered data on the indication for arthroscopy, arthroscopic findings, and treatment.

Results: This study included 221 patients with a median age of 40.0 years (range 26-51), of whom 52.9% were male. The median duration of complaints was 9 months (range 5-20). Isolated SLL injuries were identified in 58 (26.2%) patients, categorized as Geissler I/II: 24.1%, III: 36.2%, IV: 39.7%. In 95 (43.0%) patients, an SLL lesion was found with additional findings, including SLAC-associated findings (48.4%), lunotriquetral ligament lesions (14.7%), and TFCC lesions (53.7%). Of the 51 (24.6%) patients without SLL pathology, 62.7% had a TFCC lesion. No pathology was discovered during arthroscopy in 17 (7.7%) patients.

Treatment modalities entailed conservative management (26.2%), synovectomy (25.8%), arthroscopic TFCC debridement (22.2%), and open surgery. Subsequent open surgical interventions were performed in 59.7% of the patients. The most performed surgery was the 3LT procedure, executed in 38.0% of all patients (Geissler I/II: 19.5%, III: 58.7%, IV: 71.2%). Other commonly performed procedures were ulna shortening osteotomy (6.8%) and open TFCC reinsertion (5.4%).

Conclusions: Diagnostic wrist arthroscopy in cases of suspected posttraumatic SLL injury is a frequently used tool in clinical decision-making. In addition to the anticipated SLL lesion, diverse coexisting findings were revealed, emphasizing the complexity of correctly diagnosing wrist pathology. More than one-third of the patients had unexpected TFCC lesions. Also, a noteworthy proportion of arthroscopies yielded no findings. Wrist arthroscopy, therefore, is essential in detecting various pathologies, highlighting the importance of assessing the entire wrist rather than limiting the examination to the expected pathological anatomical region alone. Determining the optimal course of treatment for these additional findings remains a challenge, requiring further investigation.

A-0513 EXPLORING THE EFFECTIVENESS OF ONLINE OFF-THE-SHELF VIDEOKINEMATIC FINGER MOTION ANALYSIS FOR ASSESSING FINGER JOINT RANGE OF MOTION

Che-Hsiung Lee[1,2], Meng-Xue Lin[3], Chi-Peng[1], Wei-Lun Luo[4], Jun-En Ding[4], Yu-Te Lin[1], Chih-Sheng Lin[2], Wen-Jiin Tsai[5]
[1]Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, Linkou, Taoyuan, Taiwan; [2]Department of Biological Science & Technology, National Yang Ming Chiao Tung University, Hsinchu, Taiwan; [3]Taipei Municipal Chien Kuo High School, Taipei, Taiwan; [4]Research Center for Information Technology Innovation, Academia Sinica, Taipei, Taiwan; [5]Department of Computer Science, Video Information Processing Lab, National Yang Ming Chiao Tung University, Hsinchu, Taiwan

Introduction: Traditional hand joint angle measurement methods, such as goniometers, can be inconvenient and challenging. especially for patients with limited mobility or dexterity. Aligning the goniometer and accurately measuring the angle can also be time-consuming, potentially causing treatment delays and added patient discomfort.
Aim: This study aims to assess the accuracy and user friendliness of a free online off-the-shelf Videokinematic finger motion analysis tool in measuring hand joint angles compared to the conventional goniometer.
Material & Methods: Four methods (goniometer, protractor, Mediapipe, and MobRecon) were compared for measuring hand joint angles during standardized movements using smartphone recorded videos. Statistical analyses, including Bland-Altman and Cronbach's alpha, were used to evaluate measurement accuracy against the goniometer as the gold standard.
Results: The protractor demonstrated the highest Cronbach's alpha (>0.95), similar to the goniometer, with consistent accuracy across different viewpoints. The accuracy ranking for joints was highest for the proximal interphalangeal joint, followed by the metacarpal joint, and lowest for the distal interphalangeal joint. No significant differences were observed between left and right hands. 48 Both Mediapipe and MobRecon showed acceptable accuracy (Cronbach's alpha > 0.8), with Mediapipe slightly outperforming MobRecon. Thumb movements had the lowest accuracy. Bland-Altman analysis indicated mean differences and limits of agreement for different methodologies.
Conclusions: Online off-the-shelf Videokinematic finger motion analysis tools are valuable for assessing finger joint mobility, offering a relatively quick assessment with acceptable accuracy. However, they have limitations and potential sources of error. Researchers and clinicians should consider these factors when using such tools for joint mobility assessments.

A-0514 VASCULARIZED TOE PROXIMAL INTERPHALANGEAL JOINT TRANSFER IN POSTTRAUMATIC FINGERS: ANALYSIS OF PROGNOSTIC FACTORS FOR SUBOPTIMAL OUTCOMES

Chi-Wei Huang[1], Ming-Huei Lin[1], Che-Hsiung Lee[1,2], Shih-Heng Chen[1,2], Chung-Cheng Hsu[1,2], Cheng-Hung Lin[1,2], Ren-Wen Huang[1,2], Yu-Te Lin[1,2,3]
[1]Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, Linkou Medical Center, Taoyuan, Taiwan; [2]College of Medicine, Chang Gung University, Taoyuan, Taiwan, and; [3]International Master Science Program in Reconstructive Microsurgery, Chang Gung University, College of Medicine, Taoyuan, Taiwan

Introduction: Posttraumatic finger osteoarthritis of the proximal interphalangeal joint (PIPJ) is a difficult problem. Over the past decade, we have reported several methods for improving the outcomes of vascularized toe joint transfer (VJT).
Aim: In this study, we focused on determining poor prognostic factors which lead to a suboptimal outcome.
Material & Methods: A consecutive series of patients with posttraumatic osteoarthritis of the PIPJ who received VJT between January 2008 and January 2021 were enrolled in this study. The senior surgeon (Y.-T.L.) performed the surgery in all cases. In this retrospective study, we reexamine the initial trauma-related soft tissue and bony structure injuries of the recipient finger, to assess the baseline tissue quality before VJT. The injuries were classified into five major categories according to their anatomic region. The functional outcome parameters (including range of motion, percentage of use,

and extensor lag of the transferred PIPJ) were collected. Univariate and multivariate linear regression analyses were performed using the generalized estimated equation model to identify the correlation between the injury category involved and functional outcome.

Results: A total of 59 digits were enrolled. Our results revealed that the fingers with previous vascular injury that received revascularization procedures had relatively suboptimal functional outcomes. These fingers had a significantly lower percentage of use both before ($\beta = -0.222$, $P = 0.006$) and after ($\beta = -0.177$, $P = 0.006$) receiving secondary procedures to improve functional outcome.

Conclusions: Patients with prior revascularization surgery were associated with a poor functional outcome after VJT.

A-0515 THE RELATIONSHIP BETWEEN UPPER LIMB FUNCTION AND GRIP STRENGTH IN RHEUMATOID ARTHRITIS PATIENTS UNDERGOING TOTAL ELBOW ARTHROPLASTY

Yoshihisa Nasu[1], Yoshiyuki Matsuyama[2], Keiichiro Nishida[1], Ryuichi Nakahara[1], Chinatsu Ichikawa[3], Noriyuki Shimizu[3], Shuichi Naniwa[3], Toshifumi Ozaki[4]

[1]Locomotive Pain Center, Okayama University Hospital, Okayama, Japan; [2]Division of Physical Medicine and Rehabilitation, Okayama University Hospital, Okayama, Japan; [3]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama, Japan; [4]Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Faculty of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama, Japan

Introduction: Total elbow arthroplasty (TEA) for rheumatoid arthritis (RA) is an important surgical option that is expected to improve the range of motion (ROM) and pain. However, the condition of adjacent joints affects the overall improvement of upper limb function after TEA. In this study, we focused on hand disorders, which are common in RA cases, and examined their relationship with upper limb function after TEA.

Objective: To investigate factors that affect changes in upper limb function after TEA.

Methods: We conducted a retrospective review of the medical records of 72 RA patients (82 elbows, average age 63.5 years, average disease duration 22.9 years) and evaluated their upper limb function before and one year after undergoing TEA between 2012 and 2019. We investigated age, disease duration, DAS28-CRP, elbow ROM and pain (NRS 0-10) of the elbow joint, and grip strength, and examined the correlation with the pre- and post-operative upper limb function evaluated by Disability of Arm, Shoulder, and Hand (DASH) score. In addition, we examined the correlation of grip strength with the elbow ROM, pain, and the sum of the Larsen score of the 15 joints of the hand (hand LS). Wilcoxon rank sum test and Pearson's correlation coefficient were used for statistical methods, and a P value <0.05 was considered significant.

Results: Significant improvement of elbow ROM was observed in flexion (preoperative; 115°/postoperative;136°), extension (-36°/-23°), forearm pronation (56°/72°), and supination (58°/79°). The mean grip strength also significantly improved from 96mmHg before surgery to 112mmHg after surgery, and the mean DASH score significantly improved from 49.6 ± 20.7 before surgery to 36.9 ± 21.9 after surgery ($p<0.01$). The change in DASH score did not correlate with the improvement of elbow ROM. On the other hand, it showed a significant correlation with the improvement of elbow joint pain ($r=0.42$) and grip strength($r=0.49$).

Furthermore, to explore the factors related to improved grip strength, we evaluated its correlation coefficient with patient background and elbow joint function. The postoperative grip strength was significantly correlated with RA disease duration ($r=-0.40$) and hand LS ($r=-0.53$). In addition, a very weak negative correlation ($r=-0.29$) was observed between improvement in grip strength and the elbow joint pain NRS.

Conclusion: A Large impact of grip strength on the DASH score was observed in TEA cases, and the correlation of hand joint destruction and elbow pain with grip strength was significant. It is necessary to consider joint destruction in the hand when predicting and evaluating function after TEA. Although the results of this study suggest that interventions for decreased grip strength may be beneficial in postoperative therapy for RA patients undergoing TEA, further studies are required for the verification.

A-0516 CLEFT HAND

Schmoranzova Alena, Horackova Daniela, Hellmuth Tomas
Hand and Plastic Institute, Vysoke nad Jizerou, Czech Republic

Introduction: A cleft hand is a serious congenital developmental defect that affects the wearer both medically and socially. reconstruction is performed by an experienced hand surgeon familiar with the full spectrum of hand surgery procedures.
Aim: The goal of the surgery is to create a useful grip and a cosmetically acceptable appearance of the hand .
Material & Methods: We present our 23 small patients in the last 12 years with varying degrees of defects and very good results.
Results: Although it is a severe defect , it is possible to reconstruct the hand so that the grip function of the hand is good .
Conclusions: At the same time we show by example that a child with a cleft hand defect can be successful and happy

A-0517 DECODING DUPUYTREN'S: UNVEILING THE THREE-DIMENSIONAL ANATOMY AND PATHOPHYSIOLOGICAL INSIGHTS THROUGH COMPREHENSIVE APONEUROSIS STUDY

Cesare Tiengo, Ludovico Coldebella, Stefano L'Erario, Francesca Mazzarella, Daniele Brunelli, Franco Bassetto
Department of Neurosciences, Clinic of Plastic, Reconstructive and Aesthetic Surgery of Padua, Padua, Italy

Introduction: Dupuytren's disease is a fibroproliferative disorder affecting the palmar aponeurosis, with a notable predilection for the 4th and 5th rays. Despite its clinical significance, the three-dimensional anatomy, particularly the deep vertical septa, remains inadequately understood. This study seeks to fill this knowledge gap by exploring the microanatomical and histopathological differences between longitudinal and vertical fibers in pathological tissue affected by Dupuytren's disease.
Aim: The primary objective of this study is to enhance our understanding of the three-dimensional anatomy of the palmar aponeurosis, specifically focusing on the deep vertical septa. Additionally, the study aims to compare microanatomical and histopathological distinctions between longitudinal and vertical fibers in pathological tissue affected by Dupuytren's disease, obtained through selective aponevrectomy. By leveraging insights gained from these analyses, the study seeks to contribute to the advancement of our comprehension of the pathophysiological mechanisms in Dupuytren's disease and explore innovative clinical applications.
Material & Methods: Fifteen hands from patients with no medical history were included in the study. Detailed dissections were conducted to identify macroscopic structures, and immunohistochemical analyses provided microscopic insights. Twelve samples, representing various pathological stages of Dupuytren's disease, were obtained during selective aponevrectomy. These samples, containing both longitudinal and vertical fibers, underwent histological and immunoblotting analyses. The study included anatomical examinations, vascularization studies, and inflammatory studies, providing a comprehensive view of the structural and molecular changes associated with Dupuytren's disease progression.

Results: The study reveals a direct anatomical connection between deep vertical and longitudinal septa, elucidating the predilection for the 4th and 5th rays in Dupuytren's disease. An initial acute inflammatory phase precedes visible symptoms, progressing to fibrous dominance and myofibroblastic retraction. The findings confirm the involvement of vertical septa in all disease stages, underscoring the significance of proper staging and surgical timing for optimal outcomes and reduced complications. Notably, the study suggests comprehensive selective aponevrectomy, including excision of implicated deep vertical septa, to minimize recurrences (20-40%).
Conclusions: This study offers valuable insights into the three-dimensional anatomy of the palmar aponeurosis, specifically focusing on the deep vertical septa in Dupuytren's disease. The identified anatomical connection between deep vertical and longitudinal septa provides an explanation for the disease's predilection for specific hand rays. The study reveals a dynamic progression from an initial acute inflammatory phase to fibrous dominance and myofibroblastic retraction, shedding light on the underlying pathophysiological mechanisms. Emphasizing the significance of proper staging and surgical timing, the study recommends a comprehensive approach, including the excision of deep vertical septa, to minimize recurrences in Dupuytren's disease.

A-0518 BENNETT´S FRACTURE: ADVANTAGES AND TECHNIQUE FOR ARTHROSCOPIC ASSISTED REDUCTION AND INTERNAL FIXATION (AARIF)

Eudaldo Gallo[1], Enrique Peces[1], Juan María Pardo[1,2], Belén Pardos[1], Carlos Ruiz[1], Natalia Ruiz Micó[1]
[1]Hospital Universitario General de Villalba, Madrid, Spain; [2]Hospital Universitario Montepríncipe, Madrid, Spain

Introduction: Bennett's Fracture Dislocation is a well described lesion with solid and known biomechanical characteristics. Surgical treatment is indicated in majority of cases, aiming for anatomic reduction and stable fixation to restore thumb functionality and prevent postraumatic osteoarthritis.
Aim: 1- Enumerate the advantages of arthroscopic assistance in Bennet´s Fracture.
2- Describe surgical technique, from the pre-surgical check list (material, placement, layout of the operating room), arthroscopic setup and portal placement.
3- Show practical details used during surgery that help the surgeon both in the reduction and synthesis of the fracture.
Material & Methods: Descriptive study of a series of cases. We included patients in which we performed Arthroscopic Assisted Reduction and Internal Fixation (AARIF) for the treatment of Bennet´s Fracture Dislocations. We retrospectively describe intraoperative (tourniquet time, implant, associated lesions) and postoperative data (inmovilization time, EVA, ROM (Kapandji Score), QuickDASH and complications for minimum follow up of 6 months.
Results: 5 patients were treated using this technique. Tourniquete time was 65,8 minutes (58-75min) and cannulated screw was used in all of them. No associated lesiones were found after arthroscopic examination. Mean EVA 0,04 (0-2); Kapandji Score 9,8 (9-10), QuickDASH 1,36% (0-6,81%); No complications were recorded for a minimum of 6 months follow up (min 6 – max 34 months).
Conclusions: The use of arthroscopy in intra-articular fractures of the base of the 1st metacarpal is a useful technique for controlling the anatomical reduction of the fracture, verifying the stability of our final synthesis and diagnosing possible associated injuries.

A-0519 CORRECTIVE OSTEOTOMY FOR MALUNITED DISTAL RADIUS FRACTURE USING THE AUGMENTED REALITY (AR) OSTEOTOMY GUIDE

Masaru Munemori, Akira Kodama, Shogo Iwaguro, Kazushi Yokomachi, Yuta Hayashi, Rikuo Shinomiya, Yuko Nakashima, Nobuo Adachi
Hiroshima University, Hiroshima, Japan

Introduction: Malunion of the distal radius can result in functional limitations. Corrective osteotomy is employed to address symptomatic malunion. Different methodologies for corrective osteotomy in the treatment of distal radius malunions have been documented. Recently, we have utilized an available augmented reality (AR) device (HoloLens; Microsoft) as a guidance tool for osteotomy. In this report, we delineate the methodology and effectiveness of this approach.
Aim: To evaluate the precision of corrective osteotomy by projecting an osteotomy guide onto the surgical field using augmented reality (AR), specifically for cases involving malunion of the distal radius.
Material & Methods: Six cases (age range: 17-65 years, mean age: 48 years) with postoperative follow-ups exceeding six months underwent corrective osteotomy for malunion of the distal radius. Initial 3D simulations were conducted utilizing medical computer-aided design (CAD) software (3-matic; Materialise) based on preoperative CT data. The osteotomy angle of the radius was determined to align with the distal radial articular surface of the healthy side, comparing it with the left-right inverted model of the healthy side. Subsequently, the 3D data was transferred to a goggle-type AR device (HoloLens; Microsoft), and the osteotomy plane was projected onto the surgical field for the execution of corrective osteotomy. Autologous iliac bone grafts were used to fill the resulting bone defect, secured with a volar locking plate. Evaluation comprised a comparison of preoperative simulations with postoperative CT 3D images, assessing differences in osteotomy position (distance from the lunate fossa to the osteotomy surface), osteotomy angle, and correction angle.
Results: The mean difference in distance from the lunate fossa to the osteotomy surface was $3.3 \pm 0.8°$. The mean difference between the planned and actual osteotomy angles was $3.3 \pm 1.4°$ in the frontal view and $8.6 \pm 5.4°$ in the lateral view. The difference between the planned and actual corrected angles was $4.0 \pm 2.9°$ for frontal images and $9.5 \pm 4.3°$ for lateral images.
Conclusions: The projection of the osteotomy surface onto the surgical field through AR facilitated precise osteotomy, aligning with preoperative simulations. This method offers advantages over alternative osteotomy guides, with minimal operating costs and no requirement for sterilization during surgery. Challenges include the device's limitation on the surgeon's field of view and the necessity for the surgeon to possess proficiency in setting up AR images.

A-0520 THE AMYLOID POSITIVITY RATE IN SURGICAL CASES OF CARPAL TUNNEL SYNDROME IN SOUTHERN JAPAN

Arisa Okubo
Akeno Central Hospital, Oita, Japan

Introduction: In systemic ATTR amyloidosis, carpal tunnel syndrome is considered a red flag symptom that may precede cardiac symptoms, emphasizing the importance of considering this condition in patients with a history of carpal tunnel syndrome. We hereby present a report on the amyloid detection rate in surgical cases of carpal tunnel syndrome at our institution located in the southern region of Japan.
Methods: From April 2021 to August 2023, cases of carpal tunnel syndrome that underwent surgery in our department at our institution were selected. The flexor retinaculum and tenosynovial tissues were sent to an external pathology laboratory for histopathological analysis to examine the presence of amyloid deposition. Cases with a confirmed diagnosis

of amyloidosis were excluded. In instances of amyloid positivity, subtype analysis was conducted at Kumamoto University Amyloidosis Center, and genetic testing was performed according to the patient's preference in suspected cases of ATTR amyloidosis. Cases for which subtype analysis results were obtained were assessed for gender, age, subtype, results of genetic testing if ATTR amyloidosis was present, and the initiation of medical therapy.
Results: The study included 90 cases, with an equal distribution of 45 male and 45 female patients. The average age was 71.9 years. The overall rate of positive amyloid detection was 75.5% (78 out of 90 cases), with rates of 84.4% (38 out of 45) in males and 66.7% (30 out of 45) in females. Among those testing positive for amyloid, the subtypes identified were: 61 cases of ATTR, 1 case of ATTR+β2MG, 1 case of AL, 2 cases of β2MG, 1 case of age-related EFEMP1, and 2 cases of unknown subtype. Within the 62 cases of ATTR, there were 1 genetic type, 53 wild type, and genetic mutation testing was not performed in 8 cases. Treatment for systemic amyloidosis was initiated in 7.8% of the cases, including 1 case of hereditary ATTR amyloidosis, 5 cases of wild-type ATTR amyloidosis, and 1 case of AL amyloidosis.
Conclusions: In 6.7% of cases diagnosed at our institution, systemic ATTR amyloidosis was identified and treatment was initiated, with one case also requiring treatment for hereditary ATTR amyloidosis. The CACTuS study from Denmark reported that 8.5% of patients undergoing bilateral carpal tunnel surgery were diagnosed with ATTRwt. As cardiac symptoms reportedly appear 5 to 10 years after the onset of carpal tunnel syndrome, there is a potential increase in patients needing internal medical treatment in the future. Hence, it is considered essential to suspect this condition and confirm the presence of amyloid deposition when performing carpal tunnel syndrome surgery.

A-0521 NOVEL OXIDIXED POLYVYNYL ALCOHOL-CARBON NANOTUBE NERVE CONDUITS FOR PERIPHERAL NERVE INJURY OF THE UPPER LIMB

Stefano L'Erario, Francesco Messana, Elena Stocco, Andrea Porzionato, Cesare Tiengo, Franco Bassetto
Department of Neurosciences, Clinic of Plastic, Reconstructive and Aesthetic surgery of Padua, Padua, Italy

Introduction: Peripheral nerve injuries (PNIs) are exceedingly common among upper limb trauma and can significantly affect patients' quality of life. When direct nerve repair is not feasible, currently available surgical options, such as autografts and nerve conduits (NCs), do not always yield satisfactory results.
Aim: This work, comprising both clinical and preclinical investigations, aims to achieve two primary goals: (i) compare the outcomes associated with the treatment of nerve gaps with autografts and NCs; (ii) examine the efficacy of an innovative electroconductive NC made from oxidized polyvinyl alcohol (OxPVA) and carbon nanotubes (CNT) through in vitro and in vivo studies.
Material & Methods: This retrospective clinical study assessed a group of 15 patients who had undergone surgery for severe upper limb peripheral nerve injuries (PNI) at the Unit of Plastic Surgery of Padua University Hospital. These cases were treated with autologous nerve grafts or commercially available nerve conduits (NCs). The clinical evaluation included the use of the Disability of the Arm, Shoulder, and Hand (DASH) score, WEST monofilament test, and 2-point discrimination test. The findings indicate that while NCs are a valid option for treating PNI, they still do not match the effectiveness of autografts in cases involving large gaps or proximal lesions, suggesting significant opportunities for improvement in current surgical procedures.
Given these findings, our preclinical research explored innovative approaches to nerve conduits using a combination of OxPVA and multiwalled carbon nanotubes (0.1 wt.%), creating nanocomposite electroconductive hydrogels. The OxPVA ± CNT scaffolds underwent examinations for their ultrastructure, electroconductivity, in vitro cytotoxicity, and in vivo biocompatibility. These conduits were then manufactured for implantation in an animal model of nerve injury (Sprague

Dawley rat with a 5 mm gap in the sciatic nerve). Four experimental groups were compared (reverse autograft/Reaxon®/ OxPVA/OxPVA+CNT), and after a 6-week period, the effectiveness of these conduits was assessed through histological, immunohistochemical analyses, and morphometric studies.
Results: Based on the in vitro findings, any potential toxicity associated with carbon nanotubes (CNTs) was ruled out. Furthermore, the addition of CNTs to OxPVA resulted in a rougher surface and exhibited enhanced superficial electrical conductivity. Following a 14-day subcutaneous implantation, there was no evidence of a thick fibrotic capsule formation, highlighting the material's biocompatibility. The surgical procedure was well-tolerated by the animals, and during dissection, all conduits remained clearly identifiable, with no signs of dislocation or neuromas. Moreover, axonal regeneration was observed in the OxPVA+CNTs conduits, demonstrating their efficiency and supported by morphometric analyses.
Conclusions: Both sections of this research emphasize that nerve conduits (NCs) represent a viable reconstructive option comparable to autografts in some selected cases. Additionally, the integration of electroconductive carbon nanotubes (CNTs) into OxPVA may present an attractive approach to enhance the results associated with tubular devices.

A-0522 THE INFLUENCE OF SOCIOECONOMIC FACTORS ON PEDIATRIC HANDINJURIES IN STOCKHOLM

Nina Rydman[1,2], Maria Wilcke[1,2], Hans Pettersson[1], Tobias Laurell[1,2]
[1]Department of Hand Surgery, Södersjukhuset, Stockholm, Sweden; [2]Department of clinical science and education Södersjukhuset, Karolinska Institutet, Stockholm, Sweden

Introduction: Previous national and international studies have shown that children living in economically and socially deprived areas are at higher risk for injuries, both intentional and unintentional.
Aim: The primary aim of this descriptive registry study was to investigate whether socio-economic and demographic characteristics influence the incidence of pediatric hand and forearm injuries in Stockholm.
Material & Methods: Data was collected from the Stockholm region's own health care register, the VAL database. The VAL database contains data from every inpatient and outpatient facility in the region. Population statistics were obtained from Region Stockholm. All children aged 0-18 with an ICD 10 diagnosis of upper limb injury during 2014-2019 were included. From VAL we got area of residence, age, gender and cause of injury.
The smallest geographical unit in VAL is the basearea (BA), consisting of a certain number of blocks or properties. There are 1390 BAs in the Stockholm region. In the register, the population in each BA is described as living under better, average or worse economic and social conditions. The variable is based on similarities in socioeconomic and demographic characteristics such as household income and level of education of adults. Rate ratios and incidences of injuries were calculated.
Results: During 2014-2019,170248 events with at least one upper limb diagnosis were reported in the Stockholm region for our studied age group. The number of individuals seeking care was 90689. 56,9% were boys, at mean age 10,6, and 43,1% were girls at mean age 9,6. The mean annual incidence was 29 cases per 1000 person years.
Conclusions: Incidences of injuries and their causes associated with socioeconomic and demographic factors will be presented and discussed.

A-0523 SYNOVIAL HEMANGIONA OF THE FLEXOR SHEATH RING FINGER OF THE HAND. A RARE CASE REPORT

Lidia Ana Martín-Domínguez, Xavier Mir-Bulló, Albert Pardo Pol, Ines Farré Galofré, Sergi Alabau-Rodríguez
Hospital Universitario Dexeus - ICATMA

Introduction: Synovial hemangiomas (SH) are benign vascular tumors characterized by dilated blood vessels and endothelial lined spaces. While they commonly occur in the skin and soft tissues, their manifestation in the digital region is rare. Synovial hemangiomas affect intraarticular spaces, bursal spaces or tendon sheaths, accounting 0.07% of all soft tissue tumors and 0.8% of all hemangiomas. They are found most frequently in the knee (60%), followed by the elbow (30%), and are usually present in children or adolescents, but are rarely present in the fingers.

Aim: The aim of this report is to present a comprehensive case study focusing on a rare SH affecting digital region in a 43 years old female. This report details clinical presentation, diagnostic evaluation trough imaging studies, the decision-making process for surgical intervention, intraoperative procedures, histopathological findings confirming the diagnosis, postoperative outcomes and the importance of considering vascular tumors in differential diagnosis of digital masses.

Material & Methods: This case report aims to present a detailed account of a synovial hemangioma affecting ring finger of right hand in a 43-year-old female.

The patient presented painless, slowly growing mass on her ring finger, which gradually enlarging over a period of one year. Physical examination revealed a bluish, compressible, non-pulsatile mass located in the subcutaneous tissue surrounding the metacarpophalangeal joint. Imaging studies, including plain radiography, ultrasound and MRI, were performed revealing a not well-circumscribed lesion with internal vascular channels suggestive of a vascular malformation. Given the patient's symptoms and the progressive nature of the lesion, surgical excision was planned. Intraoperatively, meticulous dissection was using an anterior approach in metacarpophalangeal joint level of the ring finger, performed to separate the lesion from the surrounding tissues, preserving neurovascular structures. It was decided to perform just an anterior approach to attempt resection of the majority of the tumor while preserving the extensor tendon to prevent subsequent stiffness. It was decided not to undertake any osseous procedures until obtaining the results of the pathological anatomy. Histopathological examination confirmed the diagnosis of cavernous hemangioma, demonstrating dilated vascular spaces lined by endothelial cells, consistent with the initial clinical suspicion.

Results: Postoperatively, the patient experienced gradual resolution of symptoms with temporal hypoesthesia of the radial border of the finger, and -5 º extension limited. Follow-up at one year revealed residual synovial hemangioma previously known in the dorsal region including the extensor apparatus. However, the patient reported improved function and aesthetics of the affected digit.

Conclusions: This case underscores the importance of considering vascular tumors such a SH in the differential diagnosis of digital masses, particularly in cases presenting with characteristic clinical and radiological findings. Furthermore, it highlights the significance of a multidisciplinary approach involving clinical evaluation, imaging modalities, and histopathological examination for accurate diagnosis and appropriate management.

In conclusion, while SH of the digital region are infrequent, they should be considered in the differential diagnosis of soft tissue masses in this area. Timely recognition, accurate diagnosis, and surgical intervention, when indicated, can lead to successful outcomes and improved quality of life for affected individuals.

A-0524 USEFULNESS OF MULTIPLE BIOABSORBABLE MG SCREWS/K-WIRES FOR COMMINUTED RADIAL HEAD FRACTURES

Soo Min Cha[1], In Ho Ga[1], Yong Hwan Kim[1], Jae Hoon Yang[2]
[1]Chungnam National University School of Medicine, Daejeon, South Korea; [2]Centum Hospital, Daejeon, South Korea

Introduction: There have been recent reports on "fixation using bioabsorbable material" in orthopedic trauma. In particular, bioabsorbable K-wires or pins offer some definitive benefits in terms of the need for removal after bony union, soft tissue dehiscence, tendon injury, and even unintended articular damage compared with traditional K-wires and pins used in hand/foot surgeries.
Aim: We hypothesized that multiple absorbable screws/K-wires would be effective for native head preservation in comminuted radial head fracture fixation (com-RHFs).
Material & Methods: Seventeen patients who met the inclusion criteria between 2018 and 2020 were included. Radiologic findings indicating proper union and clinical outcomes such as the range of elbow motion, visual analog scale score, and Mayo Elbow Performance Score were assessed prospectively after surgery and at least 3 years of follow-up.
Results: The mean follow-up period was 4.6 years. Eleven, one, three, and two patients presented with isolated com-RHFs, type 2 (accompanied injury of medial collateral ligament), type 4 ("terrible triad") fractures, and type 5 posterior olecranon fracture-dislocations, respectively. Union was achieved after a mean of 9 weeks postoperatively. The head and shaft angles did not differ significantly from the contralateral normal values ($p = 0.778$ and 0.872, coronal and sagittal, respectively). At the final follow-up, the mean flexion-extension/pronation-supination arcs were $126.47 \pm 4.92°/135.59 \pm 10.13°$, and thus were significantly different from those on the contralateral side ($p < 0.001$, both), however the arcs were functional ranges for ordinary daily life. Also, functional status was satisfactory in all individuals. The arthritis grade and extent of heterotrophic ossification were satisfactory in all cases, and there were no serious complications requiring revision surgery.
Conclusions: Absorbable screw/K-wire fixation for com-RHFs is an option before radial head arthroplasty associated with a low complication rate and no need for revision.

A-0525 TRAPEZIECTOMY WITH SUTURE VERSUS SUTURE BUTTON SUSPENSIONPLASTY FOR THUMB CARPOMETACARPAL JOINT OSTEOARTHRITIS

Lilah Fones[1], Calista Stevens[2], Alexis Kasper[1], Jonas Matzon[1], Asif M. Ilyas[1,3]
[1]Rothman Orthopaedic Institute, Thomas Jefferson University, Philadelphia, PA, USA; [2]University of Connecticut School of Medicine, Farmington, CT, USA; [3]Drexel University College of Medicine, Philadelphia, PA, USA

Introduction: Symptomatic thumb carpometacarpal (CMC) joint osteoarthritis is often treated with trapeziectomy. This study's primary objective is to compare two techniques for suspensionplasty following trapeziectomy for CMC arthritis, the suture button and suture suspensionplasty technique, relative to clinical and radiographic outcomes.
Aim: The aim was to evaluate the clinical and radiographic outcomes of trapeziectomy with suture versus suture button suspensionplasty.
Material & Methods: Data was collected on 101 patients at a minimum of 1 year post-operatively following trapeziectomy with suture suspensionplasty and suture button suspensionplasty for symptomatic Easton stage III-IV CMC osteoarthritis. Outcomes were measured using the Quick Disabilities of the Arm, Shoulder, and Hand (qDASH) questionnaire, Visual Analogue Scale (VAS) for pain, radiographic analysis of subsidence, and physical examination of lateral pinch strength and thumb opposition.

Results: Radiographs demonstrated 42% of trapezial space was maintained in the suture suspensionplasty group relative to 50% of trapezial space maintained in the suture button suspensionplasty group (p=0.006). Median post-operative qDash scores were to 3.41 [1st quartile (Q1) 0; 3rd quartile (Q3) 15.9] and 0 [Q1 0; Q3 10] in the suture and suture button groups (p=0.036), both of which are similar to normative values in the population. Median post-operative VAS scores were 0 [Q1 0; Q3 0] in both groups (p=0.502). Post-operative thumb opposition was no different between groups (p=0.563). Post-operative pinch strength was 5.89 kg (standard deviation (SD) 1.79) and 5.77 kg (SD 3.15) in the suture and suture button groups, respectively (p=0.895).
Conclusions: At a minimum of one year post-operatively, patients that underwent trapeziectomy with suture button suspensionplasty had improved subsidence and qDASH scores, but similar thumb range of motion and strength. Though statistically different, these differences likely do not represent a meaningful clinical difference between techniques.

A-0526 CORRECTIVE OSTEOTOMY AFTER GRADUAL LENGTHENING OF THE FOREARM IN CHILDREN/ADOLESCENTS

Soo Min Cha[1], In Ho Ga[1], Young Hwan Kim[1], Jae Hoon Yang[2]
[1]Chungnam National University School of Medicine, Daejeon, South Korea; [2]Centum Hospital, Daejeon, South Korea

Introduction: Even though the majority of GL through DO yielded satisfactory outcomes, we have experienced a few unpredictable or unintentional outcomes since 2000. In these cases, we performed delayed corrective osteotomy (DCO) using plates/screws in the adolescent stage, considering the corresponding lengths between the radius/ulna, normal range of curvature, and ulnar variances (UVs) at the DRUJ.
Aim: We experienced a few unpredictable or unintentional outcomes after gradual lengthening (GL) through distractive osteogenesis (DO) in several etiologies. For deformed forearm bones, we performed an additional delayed corrective osteotomy (DCO). Here, we report the outcomes of two groups according to whether DCO was performed or not due to unexpected outcomes.
Material & Methods: Among children/adolescents treated with GL between 2000 and 2015, we further inspected patients who had unpredictable or unintentional outcomes after GL (Group 1). The patients with satisfactory outcomes were designated as Group 2. Basic demographic data; radiologic findings; and clinical status, were evaluated at the final follow-up.
Results: Among 33 patients, 4 patients (12%) with unexpected outcomes were classified as Group 1 (5 lengthenings), and the other 29 patients were classified as Group 2. In comparison of parameters through DO, the mean latent periods, external fixator index, lengthened amount, and healing index were 6.20/6.28 days, 36.24/33.30 days/cm, 26.60/22.31 mm, and 46.40/43.34 days/cm, in Group 1/2 respectively, without statistical significance. In DCO for 3 patients, the mean age at DCO was 13.7 years old, and the mean time since GL was 35.7 months. At final follow-up, the mean bowing angle, distances between the dorsal surfaces of the radius and ulna, and ulnar variances were 4.30/13.79, 1.73/1.76 mm, and -1.00/-0.24 mm, in Group 1/2 respectively, without statistical significance except for the bowing angle. The final ranges of motion arcs were at least good levels without statistical significance in both groups. Additionally, the final VAS and DASH scores were all satisfactory, at 0.75 and 1.80/0.48 and 1.05 in Groups 1/2, respectively.
Conclusions: GL of the forearm has been acknowledged as a useful option in several etiologies presenting with a malformed skeleton. Additionally, for uncommon and unpredictable outcomes after GL, a DCO would be a recommended solution. After the DCO, final outcomes are expected to be as satisfactory as the initial predicted outcomes.

A-0527 NERVE TRANSFER WITH TRICEPS BRANCH TO AXILLARY NERVE FOR ISOLATED AXILLARY NERVE INJURY

Hrønn Olafsdottir, Rasmus Thorkildsen, Lars Eldar Myrseth, Magne Røkkum
Hand -and micosurgical department, Rikshospitalet, OUS, Oslo, Norway

Introduction: Axillary nerve injuries, though infrequent, predominantly result from shoulder injuries, with occurrences also noted in brachial plexus injuries. Isolated axillary nerve injuries manifest with symptoms ranging from diminished sensitivity in the lateral shoulder to complete paralysis of the deltoid and teres minor muscles, severely impacting shoulder function. While spontaneous improvement is common, if no recovery transpires within 3-6 months, surgical intervention becomes a consideration.

Historically, nerve grafting served as the conventional approach for axillary nerve reconstruction. However, nerve transfer from motor branches of the triceps, innervated by the radial nerve, to the axillary nerve has been increasingly employed. We have been using this method since 2011. This follow-up study aims to reexamine patients and assess their clinical function.

Aim: To reexamine patients and assess their clinical function.

Material & Methods: Our study encompassed patients who underwent surgery for isolated axillary nerve injury with nerve transfer from the triceps branch of the radial nerve to the axillary nerve. Data, including age at surgery, time from injury to operation, additional injuries, and body mass index (BMI), were extracted from hospital records. Follow-up examinations were conducted to assess shoulder function and range of movement.

Since 2011, 16 patients, comprising 10 men and 6 women, underwent nerve transfer surgery. Thirteen patients were reexamined, while three were unavailable for clinical assessment due to various reasons. Among those reexamined, four had associated shoulder dislocation, four had dislocation with humerus fracture, six had iatrogenic injury, 1 had humerus fractures, and 1 had a scapula fracture. The median age at surgery was 50 years, with a median time from injury to nerve transfer at 11 months and a median follow-up of 3 years.

Results: Preoperatively, active shoulder abduction measured a median of 30°, increasing significantly to 76° postoperatively. Muscle strength (BMRC) improved from a median of 3 preoperatively to grade 4 postoperatively. The ratio of active to passive shoulder abduction had a median of 70% in the follow-up examination.

Muscle strength measured via a dynamometer showed a median value of 49% in abduction when comparing the affected side to the healthy side. Elbow extension and triceps function exhibited a median value of 74%, considering donor morbidity. Multiple regression analysis revealed a significantly negative impact of age (coefficient -0.67, $p=0.029$) and the time interval from injury to operation (coefficient -0.83, $p=0.039$) on abduction strength. BMI did not exhibit a significant effect.

Conclusions: In conclusion, nerve transfer proves to be a beneficial intervention for isolated axillary nerve injuries. All patients achieved robust strength in postoperative shoulder abduction, rated at grade 4 or higher. The median abduction strength, relative to the healthy side, was 49%. Improved abduction range, with a median value of 78 degrees post-op compared to 30 degrees preoperatively, was observed.

Triceps strength, measured both with the BMRC scale and a dynamometer, was reduced, which could be expected but has not been reported in previous publications.

Notably, patient self-assessment placed the group near the normal range boundary.

A-0528 FINGERTIP RECONSTRUCTION WITH AN INNERVATED DIGITAL ARTERY PERFORATOR FLAP

Hirohisa Yagi, Yoshitaka Tanaka, Kato Tomoya, Kotaro Okamoto, Hiroyuki Gotani
Osaka Ekisaikai hospital, Osaka, Japan

Aim: The purpose of this study was to evaluate postoperative results of the Innervated Digital Artery Perforator flaps (IDAP flaps), which combines the conventional digital artery perforator flap with ablation of the digital artery and nerve bundle, for reconstruction of the fingertip amputation.
Material & Methods: 53 fingers of 48 patients underwent fingertip reconstruction using IDAP flap in our clinic since 2016. There were 41 male and 7 female patients, with an average age of 44 (18-72) years. Of the cases in which IDAP flap was performed on multiple fingers, there were 3 cases of two fingers and 1 case of three fingers, and the injured fingers were 15 fingers of the index finger, 14 fingers of the middle finger, 21 fingers of the ring finger, and 3 fingers of the little finger. In 41 cases, it was used for initial surgery for amputated fingers, in 6 cases it was used for reconstruction for necrosis after replantation, and in one case it was used for osteomyelitis and skin necrosis after gonorrhea. The surgery involves designing a spindle-shaped flap on the side of the finger from the wound edge to the proximal middle phalanx so as not to extend beyond the PIP joint, attaching the digital artery and nerve bundle, and then elevating it like an antegrade island flap. In all cases, the flap was rotated 180° at the perforator to cover the fingertip. The average follow-up period was 11.5 (4-27) weeks, and we evaluated the flap size, postoperative complications, postoperative DIP and PIP joint range of motion, Semmes-Weinstein monofilament test (S-W t) and static 2-point discrimination (s2PD) at the final observation.
Results: Partial necrosis of the flap was observed in one case in which a perforator on the ulnar side of the little finger and the others survived. The average transverse diameter of the flap was 15 (10-20) mm, and the average longitudinal diameter was 27 (15-35) mm. Postoperative flap congestion occurred in 19 fingers, and 13 fingers required exsanguination with a medical leech. The average arc of the DIP joint after surgery was 49.2°. And limited range of motion of the PIP joint was observed in 12 fingers, but there were no cases in which extension or flexion was limited by more than 30°. At the final observation, the SW-t records ranged from 2.83 to 4.31, and the mean s2PD of 6.8 (5-15) mm. Claw nail deformity was observed in 12 fingers. Additional surgeries were performed on 9 fingers: skin flap fat removal and scar formation in 7 fingers, distal phalanx lengthening in one finger, and nail correction in one finger.
Conclusions: Fingertip reconstruction using IDAP flap is considered to be a useful method with low risk of flap necrosis and complications.

A-0529 EVALUATION OF FUNCTIONAL RECOVERY IN THE INTRINSIC AND FLEXOR MUSCLES AFTER NERVE TRANSFER FOR ULNAR NERVE LESION. A NEW MEASUREMENT METHOD: THE CHA METHOD

Soo Min Cha[1], In Ho Ga[1], Young Hwan Kim[1], Jae Hoon Yang[2]
[1]Chungnam National University School of Medicine, Daejeon, South Korea; [2]Centum Hospital, Daejeon, South Korea

Introduction: Many studies reported effective recovery after this procedure, with various degrees of restoration of intrinsic muscles/flexors in ulnar-side digits. However, these studies measured
outcomes using a variety of parameters. Although there may be definitive improvementin motor function, clinical differences after surgery are not accurately categorized by existing comprehensive
scales such as Disabilities of the Arm, Shoulder and Hand (DASH) scores and the British Medical Research Council (BMRC) scale.
Aim: ''Supercharge'' end-to-side (SETS) nerve transfer for lesions of the proximal ulnar nerve is a recognized novel option,

but improvement in motor function after surgery has not been properly evaluated. We therefore propose a modified method for quantitative evaluation of improvement in the intrinsic hand strength.
Material & Methods: We screened 216 patients with proximal ulnar nerve lesions who presented to our outpatient department from 2012 to 2020. Of these, 101 met our inclusion/exclusion criteria and were evaluated just before surgery. We used a novel method to measure finger abduction (''2nd-abd''), adduction (''5th-add''), and ring and little finger flexion strength (''4,5 grip''), and analyzed correlations with established pinch strength data.
Results: The male:female sex ratio was 86:15, and the ratio dominant to nondominant arm
involvement was 68:33. All strength measurements were analyzed as percentage affected to contralateral normal side. On Pearson correlation analysis, the strength ratios for ''4,5 grip'', ''2nd-abd'', and ''5th-add'', but not ''5 fingers (total) grip'', showed significant positive correlation with key and oppositional pinch strength (all $p < 0.001$). Additionally, linear regression analysis showed identical results for each strength correlation with key/oppositional pinch, except for ''5 fingers total) grip'' (all, $p < 0.001$).
Conclusions: SETS is a reasonable alternative for lesions of the proximal ulnar nerve. The measurement method we propose is feasible for specific assessment of intrinsic muscle strength, which improves after surgery.

A-0530 A CASE OF SIMULTANEOUS PRESENTATION OF SPONTANEOUS POSTERIOR INTEROSSEOUS NERVE PALSY AND SPONTANEOUS ANTERIOR INTEROSSEOUS NERVE PALSY

Takuya Kameda, Yuki Fushimi, Shunsuke Sato, Nobuyuki Sasaki, Yoshihiro Matsumoto
Department of Orthopaedic Surgery, Fukushima Medical University, School of Medicine

Purpose: Spontaneous posterior interosseous nerve palsy (sPIN) and spontaneous anterior interosseous nerve palsy (sAIN) are rare conditions characterized by an hourglass-like fascicular constriction, but their detailed pathogenesis is unknown. There are no previous reports of these two conditions co-occurring.
Case Report: The subject is a 58-year-old man who suffered a hand injury from a grinder one month prior, resulting in tendon suturing for extensor pollicis longus (EPL) and extensor digitorum communis II (EDC II) tears in another hospital. Days after the procedure, he experienced pain around his left elbow and lost the ability to extend all fingers, leading to a referral to our department. Examination revealed scars extending from the thumb base to the dorsum of the hand, and muscle testing showed EPL, EDC II-V weakness, and a drop finger condition. There was no tenodesis effect in the thumb and index finger. In the flexor group, he had manual muscle testing (MMT) 3 in flexor pollicis longus (FPL) and flexor digitorum profundus (FDP) II. He reported no numbness or paresthesia. Echocardiography revealed hourglass-shaped constriction in the posterior interosseous nerve and the deep fiber bundle of the median nerve. Needle electromyography showed denervation in muscles innervated by these nerves. X-rays and CT scans revealed fractures in the trapezium and the base of the second metacarpal. Based on these findings, re-tearing of EPL, extensor indicis proprius (EIP), and EDC II, or tendon adhesion was suspected. We planned tendon repair or tenolysis and osteosynthesis. sPIN and sAIN were also supposed, and conservative treatment was initially chosen. Surgery revealed re-tearing of the EPL, EIP, and EDC II; re-suturing and pinning were performed. Three months post-paralysis, there was no improvement in muscle strength, and electromyography and echocardiography findings were unchanged, leading to interfascicular neurolysis for sPIN and sAIN. The surgery revealed an apparent hourglass-like constriction in the posterior interosseous nerve and multiple constrictions in the anterior interosseous nerve. Four months post-surgery, the patient improved muscle strength: MMT improved to 5- in the EDC. The patient's DASH score improved from 75 to 37.5, and the Hand 20 score improved from 86.5 to 53.
Discussion: sPIN and sAIN are characterized by sudden onset of motor paralysis, often preceded by viral infection, stress,

or trauma. Severe elbow pain is expected before and after paralysis onset, with few cases involving sensory disturbance. Spontaneous recovery is relatively standard, but interfascicular neurolysis can be effective in refractory patients. The exact pathogenesis is unknown, but nerve fiber degeneration and constriction as pathological findings have been reported. Neuralgic amyotrophy (NA), a multifocal inflammatory neuropathy, shares many characteristics with monofocal neuropathy of sPIN and sAIN. Recent articles show that high-resolution imaging has revealed hourglass-like constriction in NA. In the present case, the novel simultaneous observation of hourglass-like constriction in sPIN and sAIN supports the hypothesis that NA and sPIN/sAIN may be identical.

A-0531 THE EFFICACY OF CARBOXYMETHYLCELLULOSE-POLYETHYLENE OXIDE GEL IN ZONE II FLEXOR TENDON INJURY: FROM URGENCY TO REVISION SURGERY

Franco Bassetto, Francesco Messana, Cesare Tiengo, Diego Faccio, Stefano L'Erario, Filippo Andrea Giovanni Perozzo
Department of Neurosciences, Clinic of Plastic, Reconstructive and Aesthetic surgery of Padua, Padua, Italy

Introduction: In the realm of flexor tendon surgery, addressing injuries within Zone II poses a formidable challenge. This critical area, situated within the finger's pulley system, is notorious for having the worst functional outcomes due to the increased risk of adhesion development.
Aim: We hypothesized that carboxymethylcellulose (CMC) and Polyethylene Oxide (PEO) Gel adhesion barrier (Dynavisc®) is effective in reducing post-surgical scar formation in both emergency settings and after tenolysis in secondary revision surgery.
Material & Methods: We analyzed two cohorts of case-control patients. The first group was composed of 20 consecutive cases of primary tendon repair, 10 of those treated with anti-adherence gel applied into the flexor tendon sheath and on the epitenon, and 10 standard tenorraphy. The second group studied thirty-one patients experiencing stiff finger following flexor tendon repairs in zone 2 that were treated with topical anti-adhesion gel administration after tenolysis (18 Dynavisc®-treated group) or without (13 controls). Functional outcomes were evaluated for early and late complications at 30, 60, and 180 days after surgery by testing Total Active Motion (TAM) and by Quick-DASH questionnaire.
Results: In comparison to the control groups, the Dynavisc®-treated group had a higher rate of progressive improvement in TAM value across all examinations, with superior TAM values at T(90) and T(180). Patients who received Dynavisc in primary surgery required fewer tenolysis procedures than the control group. No complications in the use of the product were found.
Conclusions: Our study provides compelling evidence supporting the efficacy of Carboxymethylcellulose (CMC) and Polyethylene Oxide (PEO) adhesion barrier in addressing Zone II flexor tendon injuries. The observed superior Total Active Motion (TAM) values at key time points, particularly at T(90) and T(180), underscore the positive impact of Dynavisc® on functional outcomes. The Dynavisc®-treated group exhibited a notable trend of progressive improvement, signaling its potential to enhance post-surgical recovery. Furthermore, our investigation revealed a significant reduction in the necessity for tenolysis procedures, pointing toward the potential preventive role of Dynavisc® in adhesion development and its contribution to minimizing the need for subsequent surgical interventions.

A-0532 1-YEAR RESULTS AFTER FUNCTIONAL IMPROVEMENT PROCEDURES ON THE WRIST IN PATIENTS WITH WRIST FLEXION SPASTICITY

Julia J. Glaser, Ursula Trinler, Anna Pennekamp, Leila Harhaus, Mirjam Thielen
Abteilung für Hand-, Plastische und Rekonstruktive Chirurgie, Schwerbrandverletztenzentrum, Abteilung für Handchirurgie, Periphere Nervenchirurgie, Rehabilitation, BG Klinik Ludwigshafen

Introduction: Wrist flexion spasticity leads to significant functional occupational deficits as well as limitations in the activities of daily life, accompanied by pain episodes and nursing problems. Spasticity can be reduced by using a combined nerve (hyperselective neurectomy, HSN) and tendon surgery (transposition, lengthening), leading to an improved position of the affected joints. If the patient has voluntary motor skills, in addition to a pain reduction and optimization of the nursing component, functional improvement is also possible. If a paresis of wrist extensors is present in addition to flexion spasticity, tendon transposition (e.g. by repositioning M. flexor carpi ulnaris (FCU) to the M. extensor carpi radialis brevis (ECRB)) is indicated to improve position and functionality of the affected wrist. To quantify functional improvement, 3D motion analysis can be applied.
Aim: The aim of this study is to demonstrate a reduction of flexion spasticity in affected patients using 3D motion analysis of the upper extremity as part of a prospective study.
Material & Methods: Eight consecutive patients with wrist flexion spasticity (cerebral palsy = 5, traumatic brain injury = 2, stroke = 1) were prospectively included, all of whom underwent hyperselective neurectomy of the M. flexor carpi ulnaris and/or M. flexor carpi radialis. In addition, all patients received tendon surgery, such as transposition of the FCU to ECRB (n=4), a lengthening of the FCU/FCR/FPL/FDS/FDP (n=2) or a HSN of the FDS/FDP (n=2). Spasticity testing was carried out 1 day preoperatively (n=8), 6 (n=6 so far) and 12 (n=4 so far) months postoperatively using instrumental marker-based 3D motion analysis (calculation of joint angles of the wrist). For this purpose, the wrist flexors are passively stretched (wrist extension with the hand as a fist) at two different speeds (slow (LV), fast (HV)), guided by metronome. The flexion spasticity is also documented on the modified Ashworth scale (MAS) and the modified Tardieu scale (MTS).
Results: The maximum in passive wrist extension achieved preoperatively was -30°± 50° in LV and -29° ± 54° in HV. 12 months postoperatively, the achieved wrist extension in LV was 42° ± 28° and 52° ± 4° in HV. On the MAS scale, wrist flexion spasticity was reduced from preoperatively 3.1 ± 2.1 to 12 months postoperatively 0.8 ± 1.5, on the MTS scale from preoperatively 1.4 ± 1.1 to 12months postoperatively 0 ± 0. The recorded catch angle, which is provoked by passive stretching of the spastic wrist flexors, was no longer incited 12 months postoperatively.
Conclusions: Combined nerve and tendon surgical interventions is improving wrist function and therefore, ADL as well as the nursing situation. Furthermore, 3D motion analysis is shown to be a useful objective tool to quantify movement at the wrist in patients with spasticity.

A-0533 SURVIVAL AFTER RESECTION OF MALIGNANT PERIPHERAL NERVE SHEATH TUMOURS: INTRODUCING A SUBTYPE-SPECIFIC PROGNOSTIC MODEL

I. Acem[1,2], E.W. Steyerberg[3], M. Spreafico[4], D. Grünhagen[1], D. Callegaro[5], R.J. Spinner[6], C.A. Pendleton[6], J.H. Coert[7], R. Miceli[8], M.A.J. van de Sande[2], A.Gronchi[5], C. Verhoef[1], E. Martin[7]

[1]Department of Surgical Oncology and Gastrointestinal Surgery, Erasmus MC Cancer Institute, Rotterdam, the Netherlands; [2]Department of Orthopaedic Oncology, Leiden University Medical Centre, Leiden, The Netherlands; [3]Department of Clinical Biostatistics and Medical Decision Making, Leiden University Medical Centre, Leiden, The Netherlands; [4]Mathematical Institute Leiden University, Leiden, The Netherlands; [5]Department of Surgery, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy; [6]Department of Neurologic Surgery, Mayo Clinic, Rochester Minnesota; [7]Department of Reconstructive Surgery, University Medical Centre Utrecht, Utrecht, The Netherlands; [8]Department of Clinical Epidemiology and Trial Organization, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy

Introduction: Malignant peripheral nerve sheath tumors (MPNSTs) are rare and aggressive soft tissue sarcomas (STS) that are generally resected with wide margins, perioperative radiotherapy, and in some cases additional chemotherapy. Postoperative functional deficits are common, yet reconstructions are rarely performed. Ameliorating risk stratification preoperatively may result in more patient-tailored approaches. Sarculator and PERSARC are two well performing prediction tools for survival in STS patients. These tools, however, do not include subtype specific predictors, such as neurofibromatosis type 1 (NF1) and triton status relevant to MPNST.

Aim: This study aimed to assess the performance of Sarculator and PERSARC in a cohort of MPNST patients and aimed to create an MPNST-specific prediction model including subtype-specific predictors for overall survival (OS).

Material & Methods: This is a retrospective multicentre cohort study of patients with MPNST from eleven sarcoma centres. All patients diagnosed with primary MPNST who underwent macroscopically complete surgical resection from 2000-2019 were included in this study. A multivariable Cox proportional hazard model for OS was estimated with pre-specified predictors (age, grade, size, NF1 status, triton status, depth, tumour location and surgical margin). Model performance was assessed by examining discrimination (C-index) and calibration (calibration plots and observed-expected statistic; O/E-statistic). Internal-external cross-validation by different regions was performed to evaluate the generalizability of the model. A decision curve was plotted to evaluate the clinical usefulness of the model.

Results: A total of 507 patients with primary MPNSTs were included in this study. The discriminative ability (C-index) was 0.60 (95%CI 0,51-0,67) for both Sarculator and PERSARC. The MPNST-specific model had a C-index of 0.73 (95%CI 0.69-0.77). Internal-external cross validation showed good discrimination and calibration, with a pooled C-index of 0.69 (95%CI 0.65-0.73) and a pooled O/E-statistic of 0.95 (95%CI 0.88-1.01) at 5-year.

Conclusions: The MPNST-specific MONACO model is the first model to incorporate MPNST-specific predictors in a prediction tool for OS. This model can be used to predict 3-, 5-, and 10-year OS in patients with primary MPNST who underwent macroscopically complete surgical resection. The MONACO model may inform patients and physicians on prognosis and support them in shared decision-making.

A-0534 COMPARING FULLY THREADED VERSUS CLASSICAL PARTIALLY THREADED HEADLESS COMPRESSION SCREWS FOR EXTRA-ARTICULAR DIAPHYSEAL FRACTURES OF THE PROXIMAL PHALANX. A BIOMECHANICAL STUDY

Bruno Vandekerckhove[1,2], Bert Vanmierlo[2,3], Arne Decraemer[2], Shanna Zielinski[3], Joris Duerinckx[3,4], Bert Op't Eijnde[3], Jean Goubau[2,5]

[1]AZ Delta Roeselare, Roeselare, Belgium; [2]UZ Brussel, Brussels, Belgium; [3]UHasselt, Hasselt, Belgium; [4]ZOL Genk, Genk, Belgium; [5]AZ Maria Middelares, Ghent, Belgium

Introduction: Recent articles show that intramedullary headless screw fixation of unstable proximal phalangeal fractures is a minimally invasive procedure with very few complications. Rapid healing and recovery are obtained. Despite these findings, reports on implant type and stability are lacking.

Aim: In this study two fixation methods for extra-articular diaphyseal proximal phalanx (P1) fractures were compared: classical partially threaded headless compression screws (PTHCS or Herbert screw) and fully threaded headless compression screws (FTHCS). A biomechanical analysis was conducted using a human cadaveric transverse P1 fracture model. Failure force and stiffness of both constructs were evaluated.

Material & Methods: Twenty-six paired cadaver proximal phalanges were prepared and a saw blade was used to model proximal transverse diaphyseal fractures (15 mm of the base of P1). Subsequently, one phalanx of each pair was fixed using a FTHCS (diameter = 2.5mm; length = 30mm) and the other one with a PTHCS with the same dimensions. All screws were predrilled and applied in an antegrade direction. Finally, a three-point bending test was carried out, measuring failure force and stiffness of the constructs.

Results: The mean maximal failure force was 155.2 N in the FTHCS group and 101.8 N in the PTHCS group ($p = 0.0303$). Mean stiffness was 145.19 N/mm in the FTHCS group, and 98.57 N/mm in the PTHCS group ($p = 0.0446$)

Conclusions: For unstable extra-articular proximal diaphyseal fractures of the proximal phalanx, FTHCS provide significantly stronger fixation than PTHCS, when applied in an antegrade direction

A-0535 EFFICACY OF CARPAL TUNNEL DECOMPRESSION IN CRPS PATIENTS POST-WRIST TRAUMA: A CASE SERIES

Michiel Cromheecke, Cyrielle Lavigogne, Jorne Dufour, Pieter-Bastiaan De Keyzer, Jean Goubau

AZ Maria MIddelares, Ghent, Belgium

Introduction: Complex Regional Pain Syndrome (CRPS) diagnosis and treatment are widely debated. Dr. F. Del Piñal's 2022 study suggests carpal tunnel release as a potential treatment for CRPS, offering a pathway to patient improvement.

Aim: This study evaluates the clinical and symptomatic outcomes of carpal tunnel decompression in CRPS patients, through an analysis of 22 cases.

Material & Methods: Patients diagnosed with CRPS or meeting the Budapest criteria post-wrist trauma underwent carpal tunnel decompression. This study investigates the post-surgical impact on CRPS symptoms.

Results: All patients experienced a reduction in CRPS-related symptoms following the surgical release of the median nerve. Notable improvements were observed in mobility, pain reduction, swelling, and paresthesia within a short post-operative period.

Conclusions: Carpal tunnel decompression shows promise as a surgical intervention for upper limb CRPS following trauma. This approach may offer significant symptomatic relief and functional improvement in affected patients.

A-0536 COMPARISON BETWEEN OUTCOMES OF CARPAL TUNNEL RELEASE AND OPPONENSPLASTY FOR SEVERE CARPAL TUNNEL SYNDROME

Toru Sasaki[1], Kazuya Tsukamoto[1], Koji Fujita[2]
[1]Department of Orthopaedic and Spinal Surgery, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University (TMDU), Japan; [2]Division of Medical Design Innovations, Open Innovation Center, Institute of Research Innovation, Tokyo Medical and Dental University (TMDU), Japan

Introduction: In cases of severe carpal tunnel syndrome (CTS) with significant thumb opposition dysfunction, there are two surgical approaches: one involving only carpal tunnel release and the other combining carpal tunnel release with opponensplasty for thumb opposition reconstruction. There is ongoing debate regarding the indications for opponensplasty, and a consensus has not been reached. We aimed to assess the application of opponensplasty in cases of severe CTS with prominent atrophy of the abductor pollicis brevis muscle and undetectable median nerve conduction velocity. When patients expressed a desire, we concurrently performed opponensplasty in addition to carpal tunnel release, assuming that this combination would lead to early functional recovery in severe CTS.
Aim: We report a comparative study between carpal tunnel release alone and combined treatment with opponensplasty for severe CTS.
Material & Methods: The study included 42 cases of preoperative abductor pollicis brevis compound muscle action potential (APB-CMAP) undetectability, with a follow-up of over one year after surgery at our institution. The subjects were divided into two groups: the carpal tunnel release only (OCTR) group with 31 cases (age range 39-90, mean 71.8) and the opponensplasty group with 11 cases (age range 52-85, mean 65.5). In opponensplasty, we performed a tendon transfer from the palmaris longus (PL) to the rerouted extensor pollicis brevis (EPB) tendon with pulley reconstruction using a portion of the PL tendon simultaneously with the carpal tunnel release (Kimori method). We measured Disabilities of the Arm, Shoulder, and Hand (DASH), grip strength, pulp pinch (PP), and lateral pinch (LP) at preoperative, 6 months postoperative, and 12 months postoperative intervals for all cases. Improvement rates (ΔDASH, ΔGrip, ΔPP, ΔLP) at 6 and 12 months postoperatively were calculated, and t-tests were used to compare the OCTR and opponensplasty groups.
Results: There were no significant differences between the two groups in terms of age at surgery, preoperative DASH, grip strength, PP, or LP. At 6 months postoperative, ΔDASH was significantly higher in the opponensplasty group ($P<0.0066$). At 12 months postoperative, there was a trend towards higher ΔDASH, ΔGrip, ΔPP, and ΔLP in the opponensplasty group, but no significant differences were observed between the two groups.
Conclusions: In cases of severe CTS with prominent atrophy of the abductor pollicis brevis muscle and undetectable median nerve conduction velocity, we considered opponensplasty as an indication, and when patients desired, we concurrently performed opponensplasty. At 6 months postoperative, the improvement rate in DASH was significantly higher in the opponensplasty group, but at 12 months, there was no significant difference between the two groups. Previous studies have reported early functional recovery with opponensplasty, and Kimori method also demonstrates the possibility of early functional recovery in severe CTS.

A-0538 OUTCOMES FOR THE INTERNAL JOINT STABILIZER OF THE ELBOW AT OUR INSTITUTION

Laura Rey-Fernández, Marta Cuenca Llavall, Albert Pons Riverola, Antonio Nuñez Muñoz, Jordi Saus Sarrias
Department of Orthopaedic and Traumatology, Althaia, Xarxa Assistencial Universitaria de Manresa

Introduction: Surgical procedures for complex elbow instability require staged management. First, fixation of bony structures (radial head and coronoid) is performed, if possible. Then, ligamentous structures are evaluated: lateral collateral

ligament is repaired, and then medial collateral ligament is addressed if instability is still present. Sometimes (highly comminuted, unreconstructable coronoid fractures, and delayed treatment of fracture-dislocations) instability may persist. In these cases, hinged or static external fixation of the elbow is indicated. Dynamic external fixators are often associated with complications, such as pin site infection, broken and loose pins, iatrogenic fracture, wound complications, and nerve injury.

Internal Joint Stabilizer of the Elbow (IJS-E; Skeletal Dynamics, Miami, FL, USA) was developed in 2016 as an internal fixator to stabilize the elbow, allowing the healing of soft tissues and immediate postoperative range of motion. There is scarce data on demographics and functional outcomes with the use of IJS-E.

Aim: A retrospective review of patients in whom the IJS-E was implanted from April 2023 to November 2023 was conducted at our institution.

Material & Methods: Surgical procedure

Patients were positioned in the supine position. A lateral approach to the elbow was used. Standardized management was employed: any fracture present was stabilized, followed by soft tissue repair. Then, IJS- E placement was performed. The center of rotation of the capitellum was marked under fluoroscopy with a sterile pen. A guide wire was advanced to the medial cortex of the distal humerus, parallel to the elbow joint. A cannulated drill was used to drill the distal humerus. The plate of the IJS-E was positioned on the posterior aspect of the olecranon. The elbow joint was then reduced and the IJS- E device was locked by tightening the screws. Maintenance of concentric elbow reduction was verified fluoroscopically. Patients were placed on a cast for two weeks and then early physical therapy was initiated.

Results: IJS-E devices were used in the setting of three traumatic acute elbow instability cases and one inveterate dislocation case. All procedures were performed by one orthopaedic surgeon specializing in upper limb surgery. All 4 patients had the IJS-E implanted during their index procedure.

All patients were female with an average age of 61 (51-76) years. Mean follow-up was eight months. Average range of motion was 117º of flexion and -35º degrees of extension (110-45º). Pronation-supination motion was complete. Mean DASH and Mayo Elbow performance scores were 10 (2'5-18'3) and 81'7 (65-100), respectively. One patient required open contracture release and removal of the device five months after index surgery for persistent stiffness. This same patient had ulnar neuropathy after the removal surgery.

No patients had persistent instability. There were no postoperative infections. No radiologic signs of hardware loosening were noted.

Conclusions: IJS device is a useful instrument for the upper limb surgeon to use in challenging elbow instability cases, as it restores stability to the elbow and provides immediate postoperative range of motion, without immediate postoperative complications. This device has eliminated the use of dynamic external fixators at our institution.

A-0539 CARPAL DISLOCATIONS AND FRACTURE-DISLOCATIONS: CLINICAL OUTCOMES OF 43 CASES

Caruso Giancarlo, Francioni Elena, Martini Laura, Sargenti Silvia, Zampetti Pier Giuseppe, Vitali Andrea
SOSD Chirurgia della Mano Presidio Ospedaliero Piero Palagi ASL Toscana Centro Firenze, Italy

Introduction: Carpal dislocations and fractures-dislocations are complex injuries that involves both ligaments and bones of the wrist. Actually, the treatment is always surgical, in order to relocate carpal bones in their correct position and to repair or reconstruct ligamentous structures. Open surgical reduction with a combined (volar and dorsal) approach achieves good results and decreases the risk of secondary instability and post-traumatic arthritis. Nevertheless, many patients develop post-traumatic arthritis but they still report acceptable functional outcome with marginal pain.

Aim: The aim of our study is to evaluate clinical outcomes of 43 cases of carpal dislocations or fractures-dislocations treated in our department.
Material & Methods: We treated 43 patients with carpal dislocation or facture-dislocation operated between 2006 and 2022. 20 cases were trans-scaphoid, 4 trans-stiloid, 2 trans-scapho-trans-stiloid perilunate fracture dislocations, 16 were perilunate dislocation and 1 case trans-scapho-trans triquetro perilunate fracture dislocation. All cases were diagnosed acutely except 4 cases in which the dislocation was not diagnosed in the ER (emergency room) and patients arrived in our office after 15,19,23 and 30 days after trauma, respectively. In 3 cases patients complained of paresthesia in the median nerve territory. 38 patients were treated with an open approach while 5 patients were treated with closed reduction and percutaneous fixation
Results: At the follow up (average 19 months), 20 patients reported excellent results(Mayo Wrist score >90) , 14 patients good results(Mayo Wrist score between 80 and 89), 9 patients fair results (Mayo Wrist score <79). No major complications were reported. Post-traumatic arthritis has been detected on x-rays in 9 patients. However, most patients didn't report any clinical consequence.
Conclusions: In conclusion, carpal dislocations and fracture dislocations are complex injuries that have to be diagnosed and treated as soon as possible, especially if associated to neurological symptoms. Despite the diffusion of arthroscopic techniques, the open approach represents the gold standard in order to repair both osseous and ligamentous structures. In some patients, even though the risk to develop arthritis after trauma is high, the condition doesn't need to be treated because is often asymptomatic.

A-0540 3D VERSUS MEMORABLE PLASTIC IN CMC JOINT STABILIZATION ORTHOSIS

Enver Güven, Ali Koray Özgün, Serap Alsancak
Ankara University Faculty of Health Sciences Department of Prosthetics&Orthotics, Ankara, Turkey

Introduction: Carpometacarpal osteoarthritis (CMC OA) is a highly common chronic condition that causes pain, limits hand function, and reduces quality of life. An estimated 22% of the general population aged 50 years and older has symptomatic thumb CMC Osteoarthritis (Buhler et al., 2019). Surgical intervention may reduce symptoms but is generally considered a last option. Splinting is a biomechanical intervention that aims to provide external support to the CMC joint, reduce pain, prevent contracture, and maintain hand function. Generally, the application is made with memorable plastic materials. Nowadays, splints are also produced with 3D printers, but they have not reached sufficient application and prevalence.
Aim: The aim of our study is to reveal the effect of the splint produced with 3D printers in terms of functionality and satisfaction and to compare it with memorable plastic splints.
Material & Methods: The study was conducted on 6 (3 female, 3 male) healthy university students. CMC joint splints were made from 3 different materials for each individual. Once 3 splints were produced, individuals used each for 2 hours. At the end of this process, the QUEBEC Assistive Technology User Satisfaction Evaluation survey was conducted. Jebsen Hand Function Test was performed to evaluate function. Splints were designed as metagrip splints to rest the CMC joint and limit joint movement (Colditz, 2000). Splints were made for each individual's dominant extremity. 1st Splint was made of memorable plastic material in such a way that the CMC joint was in opposition and extension. 3D scanning was performed for the 2nd and 3rd Splint (with the Structure (Mark1- ST01) 3D scanner placed on the iPad (5th Generation). After the scanning data was received, it was transferred to the computer in stl format and from there to the Mashmixer program and the same design was made on the software. Produced with Creality CR10-max printer. PLA in the 2nd splint and TPU in the 3rd splint were used as the printing material.

Results: According to the average results of QUEBEC, TPU splint was 4.60, PLA splint was 3.98, and Memorable plastic splint was 4.48. According to the Jebsen Hand Function Test results, the TPU splint was completed in a shorter time than the other 2 splints in many sections. The results of PLA splint and Memorable plastic splint were similar to each other.
Conclusions: According to the results, TPU splint has slightly better results than other splints in terms of functionality and satisfaction. PLA splint received the lowest score in terms of satisfaction. Splints produced with 3D printers generally had similar results to memorable plastic splints. It is noteworthy that the TPU splint achieved the best results in satisfaction and functionality. Further studies need to be investigated in terms of the flexibility of the TPU material as well as the production technique of CMC joint stabilization orthosis.

A-0541 3D VERSUS MEMORABLE PLASTIC RELATIVE MOTION SPLINT: MP JOINT STABILIZATION

Ali Koray Özgün, Enver Güven, Serap Alsancak
Ankara University Faculty of Health Sciences Department of Prosthetics&Orthotics, Ankara, Turkey

Introduction: The global increase in the use of Relative Motion Flexion (RMF) splints in the treatment of flexor tendon repairs is remarkable (Steven et al., 2020). The early active motion protocol, among the methods used following tendon repair, is increasingly becoming more prevalent, with the RMF splint notably standing out as one of the most utilized in recent years in this process. Generally, the application is made with memorable plastic materials. Nowadays, splints are also produced with 3D printers, but they have not reached sufficient application and prevalence.
Aim: The aim of our study is to reveal the effect of splint produced with 3D printers on stabilization and to compare them with memorable plastic splints.
Material & Methods: The study was carried out on 6 healthy university students, 3 women and 3 men. Three different RMF splints were applied to the dominant hand of each individual. In all splints, the third finger was splinted so that the MP joint was 30° flexed compared to the others. Orficast was used as memorable plastic material for the 1st splint. The scanning process of other splints was taken with a Structure (Mark1-ST01) 3D scanner placed on an iPad (5th Generation) tablet. The scan data was transferred to mashmixer software in stl format and designed. This splint created on the software was 3D printed with a Creality CR10-max 3D printer. For the 2nd splint, TPU was used in the 3D printer. PLA was used for the 3rd splint. After the splint was put on the individual, finger extension was requested. And the range of motion of the 3rd finger MP joint was measured and recorded with a universal goniometer. Individuals used each of the splints for 2 hours. At the end of this process, the QUEBEC Assistive Technology User Satisfaction Evaluation survey was conducted.
Results: According to the average results of QUEBEC, TPU splint was 4,64, PLA splint was 4,50, and memorable plastic splint was 4,60. ROM measurement results; TPU was 27,50°, PLA was 30,16°, memorable plastic was 29,16°.
Conclusions:According to the results, TPU splint has slightly better results than other splints in terms of satisfaction. PLA splint was the one that best provided 30° extension limitation. The lowest angle average in providing 30° extension limitation was in the TPU splint. Increasing the flexion angle during the design phase for the TPU splint may be a way to provide extension limitation. For stabilization, the extension limiting properties of the three splints are close to each other. Production with a 3D printer takes more time than memorable plastic. However, 3D production costs are lower. Further studies need to be investigated in terms of the flexibility of the TPU material as well as the production technique of RMF splint.

A-0542 AN INTEGRATIVE FRAMEWORK TO AID THE IMMERSION OF STAFF GRADE OCCUPATIONAL THERAPISTS INTO A HAND THERAPY DEPARTMENT

Laura Burke, Mary Naughton
Beaumont Hospital, Dublin, Ireland

Introduction: The contemporary management of disease and dysfunction of the hand is complex, with a multidisciplinary approach adopted where feasible to facilitate enhanced clinical outcomes for such patients. Rehabilitation through a robust and personalised occupational therapy (OT) program is among the most valuable means of restoring hand function following trauma and after the onset of acquired or chronic diseases. Importantly, providing hand therapy to this patient cohort is complex, given the intrinsic anatomical and functional properties of the hand, thus getting the appropriate balance of ensuring adequate experienced oversight and learning opportunities for staff grade occupational therapists may be challenging.
Aim: To provide an integrated framework learning manual to aid the immersion of staff grade occupational therapists working in a high-volume hand therapy outpatients department in an Irish Hospital.
Material & Methods: - Outline the goals of hand therapy in each of the domains offered to patients attending our unit (i.e.: orthopaedic, plastic, traumatic injury, post-operative therapy, chronic disease, acquired disease, etc.).
- Outline the competencies expected – KSAB (knowledge, skill, abilities, and behaviour).
- Skill acquisition using the Dreyfus model of skill acquisition.
- Evidence based practice and knowledge acquisition through didactic and journal club sessions.
- Weekly supervision with a senior hand therapist involving monthly learning plans, continuous feedback, protected time to discuss caseload with senior, and caseload discussion.
- Scheduled hand therapy clinical professional development (CPD) including access to hand therapy courses and academic conferences.
Results: Qualitative feedback from the staff grade occupational therapists demonstrates satisfaction with the immersion program into hand therapy. Examples of the feedback from the trainees includes 'excellent gradual exposure to new skills and knowledge' and 'never being allowed to feel out of their depth'. Qualitative feedback from the senior occupational therapists illustrates an overall 'smoother integration' of their trainees into the department and 'significantly enhanced' clinical acumen and skills following adherence with the program.
Conclusions: This framework demonstrates a better learning environment for staff grade occupational therapists' integration into a hand therapy unit, with qualitative data suggesting both trainees and trainers are satisfied with the program. Frameworks such as will hopefully ensure the staff grade occupational therapists will be adequately prepared for a future in hand therapy.

A-0543 OUTCOMES OF ENDOSCOPIC CARPAL TUNNEL DECOMPRESSION: INSIGHTS FROM OUR INSTITUTIONAL EXPERIENCE

Abdulrazak Abdulsalam, Feiran Wu
Birmingham Hand Centre, Queen Elizabeth Hospital Birmingham, United Kingdom

Introduction: Carpal Tunnel Syndrome (CTS) remains the most prevalent nerve entrapment syndrome affecting the upper extremity to date. This condition often results in distressing symptoms such as pain, numbness, and tingling sensation in the hand, significantly affecting daily activities and diminishing overall quality of life. Open carpal tunnel release (OCTR) has

historically been the gold standard of treatment, but it is not without complications. These include persistent weakness, tenderness of the scar, and pillar pain in the thenar or hypothenar area. Even when completely successful, the length of perioperative disability and the extended recovery interval after OCTR may be expensive for both patients and employers. In efforts to reduce scar discomfort after surgery for CTS, Endoscopic carpal tunnel decompression (ECTD) has gained popularity as a minimally invasive alternative to traditional open surgery. This technique utilizes an endoscope, a slender tube equipped with a camera, to visualize and release the transverse carpal ligament, thereby decompressing the median nerve. The benefits are small skin wound away from the palm, which can offer reduced pillar pain, shortened recovery time, and improved patient satisfaction compared to a traditional open release.

Aim: This study aims to present our institutional experience of starting an ECTD service, focusing on its impact on symptom improvement and scar pain severity.

Material & Methods: A prospective review of our first consecutive 50 patients who underwent ECTD for CTS was conducted. Demographic details, neuropathy status and comorbidities including diabetes were documented. Surgery was performed under local or regional anaesthesia using the Arthrex centreline device for all patients. The Boston Carpal Tunnel Syndrome Questionnaire (BCTQ), ranging from 0 to 55, was utilized to quantify symptom severity pre-operatively and at 6 weeks post-operatively. Scar pain was assessed using a 10-point Likert scale at 6 weeks post-operatively. The net promotor score was used to judge patient satisfaction with this technique.

Results: The median preoperative average BCTQ was 36, indicating significant symptom severity. At the 6-week follow-up, the median BCTQ significantly decreased to 16, demonstrating a substantial improvement in functional status. The median scar pain was 2.25 at 6 weeks postoperatively, reflecting minimal discomfort. The median net promotor score was 84, demonstrating high satisfaction with this technique. Among the patients, only six were diabetic, and none had preexisting neuropathy.

Conclusions: Our findings suggest that ECTD is associated with significant functional improvement, as evidenced by the significant reduction in BCTQ. Scar pain levels were low, indicating a favorable postoperative experience. ECTD appears to be a reliable and effective option for CTS, offering favorable functional outcomes, minimal scar-related discomfort, and high patient satisfaction.

A-0544 COMPUTER-AIDED MEASUREMENT OF TRIQUETRAL ANGLES

Robert Sippo[1], Theresa Höglund[1], Eero Waris[1,2]

[1]Department of Hand Surgery, Helsinki University Hospital and University of Helsinki, Helsinki, Finland; [2]Mehiläinen Helsinki Hospital, Helsinki, Finland

Introduction: Lunotriquetral (LT) injuries are rare and not as widely studied as scapholunate injuries. LT dissociation can lead to volar intercalated segment instability (VISI), characterized by the flexion of the lunate relative to the radius and compensatory extension of the capitate relative to the lunate as seen in a lateral view radiograph. A similar posture can also be seen in midcarpal instability and in asymptomatic wrists. Correctly identifying LT dissociation, in which the triquetrum extends relative to the lunate is dependent on assessing the LT angle. However, measuring the angle reliably in radiographs is very difficult. Knowledge of normal triquetral angles in the population is also limited.

Aim: To employ a computer-aided analysis software utilizing cone-beam CT segmentation and mathematic modeling (Bonelogic, Disior ltd.) to measure radiotriquetral (RT) and LT angles in asymptomatic volunteers to establish a normal database for triquetral angles, and to compare the software measurements with those made by hand surgeons.

Material & Methods: 121 asymptomatic wrists of volunteers aged 20 – 60 were imaged with cone-beam CT. Two alternate

triquetral axes were defined in the software and used to calculate the RT and LT angles. The first axis T(geometric) was based on a line plotted through the mathematic center points of slices along the bone's greatest length. The second axis T(articular) was based on a mean of lines plotted perpendicular to the central area of the distal articular surface. 30 of the wrist scans were digitally reformatted into lateral projections only showing the measured bones to enable more consistent manual measurements and the same angles were measured by six hand surgeons. The hand surgeons used both the traditional triquetral axial axis as described by Reagan et al. (1984) and a new tangential axis based on a tilted lateral projection visualizing the distal articular surface of the triquetrum.

Results: When projected onto a sagittal plane corresponding to a true lateral radiograph, both axis variants produced an axis resembling the triquetral axis described by Reagan et al. For the whole study population, the mean RT and LT angles using T(geometric) were 25° (SD 11°, range -2° to 53°) and 22° (SD 8°, range 4°-51°) respectively. The mean RT and LT angles using T(articular) were 12° (SD 8°, range -11° to 27°) and 10° (SD 8°, range -11° to 33°) respectively. In the 30 wrists measured both by the software and the hand surgeons, the software RT(geometric) and LT(geometric) angles were similar to the manual measurements using the axial axis, and software RT(articular) and LT(articular) were similar to the manual measurements using the tangential axis. Angle differences were statistically significant but small (difference in means 2° - 5°, t-test $p<0.05$ for all angles).

Conclusions: This study provides the to-date largest population sample for triquetral angles. Deviating from these normal values suggests lunotriquetral pathology. The values measured by the software were similar to values acquired by hand surgeons. Incorporating computer-aided analysis in wrist diagnostics may help to identify injuries and pathology that have traditionally been difficult to assess.

A-0545 FLEXOR DIGITORUM SUPERFICIALIS OPPONENSPLASTY FOR RECONSTRUCTION OF HYPOPLASTIC THUMBS IN CHILDREN WITH RADIAL LONGITUDINAL DEFICIENCY

Ida Neergård Sletten[1], Jarkko Jokihaara[2,3], Anne Birgit Stavenes[1], Mona Irene Winge[1]

[1]Division of Orthopaedic Surgery, Oslo University Hospital, Oslo, Norway; [2]Department of Hand Surgery, Tampere University Hospital, Tampere, Finland; [3]Faculty of Medicine and Health Technology, Tampere University, Tampere, Finland

Introduction: Previous studies have reported good outcomes after flexor digitorum superficialis (FDS) opponensplasty for the reconstruction of hypoplastic thumbs in children with radial longitudinal deficiency. Still, there is an ongoing debate about whether multidirectional thumb metacarpophalangeal joint (MCPJ) instability is best treated with ligament reconstruction or joint fusion.

Aim: We have used the FDS-ring for opponensplasty and ligament reconstruction in all hypoplastic thumb reconstructions since 2009, and the primary aim of this study was to investigate if the MCPJs had been adequately stabilised.

Material & Methods: We included a consecutive cohort of all Manske type II and IIIa hypoplastic thumbs reconstructed during 2009-2020 with an FDS opponensplasty where the terminal tendon slips had been used for MCPJ ligament reconstruction with a minimum follow-up time of one year and a minimum patient age at five years at follow-up examination. Twenty-five hands in 22 patients were identified, and 23 hands were examined at follow-up (92%). Multidirectional thumb MCPJ instability was noted in 15 of the hands preoperatively. We investigated thumb joint stability, tightness in the first web space, thumb joint range of motion (ROM), grip and thumb strength, Patient-Reported Outcomes Information System (PROMIS) domains, visual analogue scale assessments of thumb function and appearance, and the Thumb Grasp and Pinch Assessment functional test.

Results: There were no complications, but four hands had a secondary first web release before the follow-up due to recurring

tightness. All 22 reconstructed ulnar collateral ligaments were stable at follow-up. Seven out of 16 reconstructed radial collateral ligaments had persistent laxity, but none of the patients had any complaint related to this finding. Eight first webs were determined as tight at follow-up. PROMIS upper extremity score was median 37 (interquartile range; 28-42), indicating a moderately reduced function. ROM and strength were comparable to previous reports after opponensplasty in reconstructed thumbs.
Conclusions: We found satisfactory MCPJ stability and good ROM and strength after FDS opponensplasty but a high recurrence of tightness in the first web. We recommend the procedure for uni- and multi-directionally instable MCPJs, also in thumbs with some intact opposition and palmar abduction, to enhance strength.

A-0546 THUMB RECONSTRUCTION WITH A FREE "WRAP-AROUND" FLAP FROM THE BIG TOE

Eleni Karagergou[1], Eirini Nikolaidou[1], Paschalia Athanasiadou[2], Panagiota Stampou[1], Theodora Ligomenou[1], Panos Thanos[2], Panagiotis Givissis[2]
[1]Department of Plastic, Reconstructive and Hand Surgery & Burns ICU, General Hospital of Thessaloniki "G. Papanikolaou", Greece; [2]Papanikolaou Hand Centre, 1st Department of Orthopedics, Aristotle University of Thessaloniki, Greece

Introduction: Reconstruction following thumb amputation is used to restore thumb length, mobility, sensation and appearance which are all required for the maximum of hand function.
Aim: The aim of this study is to present a traumatic thumb amputation reconstructed by using a free "wrap–around" flap from the big toe along with iliac bone graft for skeletal support.
Material & Methods: A 70 year old male patient sustained a work–related left thumb crush injury which, due to delayed referral, resulted in necrosis distal to the metacarpophalangeal joint (MCPJ). Amputation at the level of MCPJ was deemed necessary and a single–stage reconstruction was planned. For length and bone stability, a specially formed iliac bone graft was harvested and a free "wrap-around" flap from the great toe was used for skin and soft tissue coverage around the bone. Donor site closure was achieved with skin grafts and a cross–finger flap from the second toe.
Results: The postoperative course was uneventful. Due to partial skin graft loss at the donor site, the great toe was regrafted three weeks later. After one year of follow-up, the patient has an excellent functional and aesthetic outcome, with good power in thumb opposition and normal 2-point discrimination.
Conclusions: The "wrap–around" flap from the great toe offers a satisfactory reconstructive option for amputations distal to the MCPJ, while a bone graft is required for skeletal stability. Preservation of toe length is one of the major advantages of this technique, along with the excellent outcome to the reconstructed thumb.

A-0547 SCAPHOID RECONSTRUCTION USING A NON-VASCULARISED BONE GRAFT WITH AND WITHOUT ADDITIONAL INTRAOPERATIVE SHOCKWAVE THERAPY (ESWT) - RESULTS OF A PROSPECTIVE STUDY

Marion Mühldorfer-Fodor[1], Matthias Wagner[2], Tanja Kottmann[3], Jörg van Schoonhoven[1], Karl-Josef Prommersberger[1,4], Jakob Richard Schnegg[1,5]
[1]Clinic for Hand Surgery, Rhön Klinikum Campus Bad Neustadt, Germany; [2]Clinic for Diagnostic Radiology, Rhön Klinikum Campus Bad Neustadt, Germany; [3]Clinical Research Organisation (CRO) Hamm, Germany; [4]Department of Elective Hand Surgery, St. Josef Hospital Schweinfurt, Germany; [5]Department of Hand and Plastic Surgery, Cantonal Hospital Winterthur, Switzerland

Introduction: High-energy focused shockwave treatment (ESWT) stimulates bone healing through stimulation of neo-angiogenesis and activation of osteocytes.

Aim: To compare the outcomes of scaphoid reconstruction using a non-vascularised bone graft for nonunion, with or without additional intraoperative ESWT.
Material & Methods: Patients with scaphoid nonunion undergoing scaphoid reconstruction with a non-vascularised bone graft were included. Following patient randomization, the intervention group received intraoperative ESWT, while the control group did not. Patients were clinically and radiologically evaluated at 6 weeks postoperatively, additionally at 12 and 18 weeks, and if necessary, at 24 weeks, using CT scans. The intervention and control groups were compared for healing rates 24 weeks postoperatively and the percentage of scaphoid bridging at 12, 18, and 24 weeks postoperatively.
Results: 93 patients, 46 in the intervention group and 47 in the control group, completed the study protocol. At 24 weeks postoperatively, 37 patients (80%) in the intervention group and 31 patients (66%) in the control group were healed.
The healing rate for proximal scaphoid nonunions with ESWT was 77%, compared to 76% in the control group, and for middle third nonunions, it was 82% with ESWT versus 57% without. All distal third nonunions healed.
The percentage of scaphoid bridging among healed cases proximal to the bone block was similar in both groups, while distal to the bone block, it was significantly higher 12 weeks postoperatively with ESWT. Subsequently, the values converged largely.
Conclusions: A single intraoperative ESWT improves the healing rate of scaphoid reconstruction using a non-vascularised bone graft and accelerates bone healing in the first 12 postoperative weeks. However, this effect is primarily evident in defects in the middle third of the scaphoid and distal to the bone graft.

A-0548 COMPARATIVE ANALYSIS OF UNICORTICAL AND BICORTICAL PLATE AND SCREW FIXATION FOR DISPLACED METACARPAL FRACTURES IN ADULTS: A PROSPECTIVE MULTI-CENTRE RANDOMIZED CONTROLLED TRIAL

Abdulrazak Abdulsalam, Mark Foster, Rajive Jose, Feiran Wu
Birmingham Hand Centre, Queen Elizabeth Hospital Birmingham, United Kingdom

Introduction: Metacarpal fractures are highly prevalent, constituting 40% of all hand injuries. The use of plates in fixing these fractures allows for early and aggressive post-operative hand therapy, minimizing post-operative stiffness. Traditional practice involves bicortical fixation, where screws engage both dorsal and palmar cortices, but poses risks of iatrogenic injuries to flexor tendons or neurovascular bundles due to over-drilling or using excessively long screws. Recent biomechanical studies suggest that unicortical fixation, where only the near cortex is drilled and engaged by the screw, provides comparable outcomes in terms of stiffness, load to failure, and failure mechanisms.
Aim: To compare the fracture union rate and patient reported outcomes between unicortical and bicortical plate and screw fixation for adults with displaced metacarpal fractures.
Material & Methods: This prospective, pragmatic, multi-centre, randomized controlled trial (RCT) included 201 adult patients with diaphyseal metacarpal fractures. Patients were randomly assigned in a 1:1 distribution to either unicortical or bicortical fixation using a straight 2.0 mm low profile plate with two screws engaging the distal fragment and two screws the proximal fragment. The primary outcome included fracture union rates. Secondary outcomes encompassed peri and postoperative complications; independently assessed finger range of motion; Disabilities of the Arm, Shoulder and Hand (DASH) Outcome Measure, and a visual analogue scale (VAS) for pain, function, movement and satisfaction.
Results: Of the 201 enrolled adult patients (101 in the unicortical group and 100 in the bicortical group), demographic characteristics were comparably similar. At 6 weeks post-op, 94% in the unicortical group and 95% in the bicortical group had radiological signs of fracture union, with no statistically significant difference ($p < 0.05$). At six-months, the union rate increased to 98% in the unicortical fixations and 99% in the bicortical group ($p < 0.05$). Functional outcomes showed

a median DASH score of 8 for unicortical fixations and 11 for bicortical fixations ($p < 0.05$). There were similar results for VAS ($p < 0.05$) between the two groups at 6 months. Post-operative complications occurred in 3% of the unicortical group (metalwork removal - 1% and distal screw loosening - 2%) and 1% in the bicortical group (distal screw loosening), although this was not statistically significant.

Conclusions: This study indicates that both unicortical and bicortical metacarpal plate and screw fixation yield comparable outcomes in terms of union rate, functional outcomes, and post-operative complications. While unicortical fixation has potential benefits in reducing iatrogenic injuries, individualized fracture characteristics should guide fixation choices.

A-0549 THE EFFECT OF CT SLICE THICKNESS ON THE ACCURACY OF VIRTUAL RADIUS MODELS AND SURGICAL GUIDES

Emilia Gryska[1,2], Per Fredrikson[1,2], Katleen Libberecht[1,2], Peter Axelsson[1,2], Anders Björkman[1,2]

[1]Department of Hand Surgery, Sahlgrenska University Hospital, Mölndal, Sweden; [2]Institute of Clinical Sciences, Sahlgrenska Academy at the University of Gothenburg, Sweden

Introduction: The accuracy of 3D virtual surgical planning of corrective radius osteotomy relies on the quality of computed tomography (CT) images. Currently, CTs of submillimetre slice thickness are the gold standard. Therefore, existing CT images are not used -- new images with the required parameters must be acquired for 3D planning.

Aim: We aimed to assess whether CTs with slice thickness larger than the gold standard are sufficiently accurate to be used in 3D virtual planning and guide design for corrective radius osteotomy.

Material & Methods: CTs of six patients who underwent 3D-planned corrective radius osteotomy at our department with in-house designed surgical guides were used. The images had a resolution of 0.353 x 0.353 x 0.625mm.

From the original CTs, we created new images of slice thickness 2, 3, and 4 times larger than the original 0.625mm. Each image was segmented using Mimics, Materialise software to create virtual models of the radius. The models were saved in a stereolithography format, which approximates its shape with a mesh of triangles. The radius models created from respective larger-thickness images (rad_x2, rad_x3, rad_x4) were compared to the reference model (rad_ref) created from the original CT.

Each radius model was then imported into a computer-aided design software 3-matic, Materialise. A guide base matching the surface of respective radius models (guide_x2, guide_x3, guide_x4) similar to the guide used in the surgery was created.

We first conducted a part-to-part analysis. Each larger-slice-thickness model was compared to its reference (rad_ref-to-rad_x2-4 and guide_ref-to-guide_x2-4) by calculating the distance between the nearest nodes of the respective meshes. For each larger-slice-thickness model, we extracted Hausdorff distance (HDF) and the percentage of nodes within 0.1mm and 0.5 mm from the reference mesh.

In the second part, we virtually analysed how well guide_x2-4 fit to rad_ref by calculating HDF, and the percentage of nodes in the guide within 0.1mm and 0.5mm to the radius mesh.

Results: The part-to-part analysis for radius models showed the average HDF of 1.35 ± 0.48mm, 1.79 ± 0.41mm and 3 ± 0.21mm for rad_x2, rad_x3, and rad_x4. The percentage of nodes within 0.1mm decreased from 88.6% for rad_x2 through 79.2%, to 72.8% for rad_x4. The percentages of nodes within 0.5mm in the same order were 99.2%, 97.05%, and 95%.

For the guide_x2-4, the analysis showed HDF of 0.43 ± 0.2mm, 0.73 ± 0.61mm and 0.53 ± 0.21mm. The percentage of nodes within 0.1mm for respective guides were 97.6%, 93.4%, and 87.4%. For all guide_x2-4, more than 99% of the nodes were within 0.5mm from the reference.

The guide-to-radius analysis for guide_x2 showed HDF of 0.38±0.2mm and 97% of nodes within 0.1mm; for guide_x3: HDF of 0.46±0.15mm, and 89.0% of nodes within 0.1mm; for guide_x4: HDF of 0.48±0.1mm and 81.1% of nodes within 0.1mm. For all guide models, the percentage of nodes within 0.5mm exceeded 99.8%.
Conclusions: Compared to a printing error of 0.3-0.5mm, our results suggest that lower-resolution images could be used for 3D virtual surgical planning and guide design. Further tests on physical models are necessary to corroborate the virtual analysis and establish the largest possible slice thickness.

A-0550 JOINT ARTHROPLASTY REPLACING JOINT FUSION: A NOVEL APPROACH FOR FAILED THUMB TRAPEZIOMETACARPAL JOINT FUSION

Naeem Yusuf, Jessica PJ Larwood, Alethea MY Tan, Samuel G Coulson-Woodley, Patrick KY Goon
East and North Hertfordshire NHS Foundation Trust, UK

Background: Trapeziometacarpal (TMC) joint arthrodesis is a well described surgical option for osteoarthritis (OA) of the first carpometacarpal joint (CMCJ) particularly in younger patients with a higher functional demand of hand that requires greater stability and strength. Non-union is a known complication of this procedure. The use of implant arthroplasty as a salvage technique for failed TMC arthrodesis is not commonly reported in the literature. Here, we present a case study from our unit utilising implant arthroplasty as a successful salvage technique for failed TMC arthrodesis and a review of the literature describing similar salvage techniques.
Case study: A 38-year-old right hand dominant male mechanic with bilateral first CMCJ OA underwent bilateral arthrodesis, with the right side done first followed by the left. The right TMC was successfully fused. Unfortunately, the left TMC arthrodesis was complicated by a failed fusion and established non-union. An implant arthroplasty was carefully considered and performed. Post-operatively, the patient reported lasting pain relief and restoration of thumb function aiding return to work.
Conclusion: Anecdotally, this case study supports the use of implant arthroplasty as a valuable salvage option for failed TMC arthrodesis. At the time of the management of this case, there was no available literature describing this salvage technique. A recent literature search revealed one other case study which mirrored our experience.

A-0551 THREE-DIMENSIONALLY PLANNED, PATIENT-SPECIFIC CUSTOM-PRINTED SURGICAL GUIDES AND OSTEOTOMY PLATES FOR CORRECTIVE OSTEOTOMIES OF DISTAL RADIUS MALUNION

Abdulrazak Abdulsalam, Feiran Wu
Birmingham Hand Centre, Queen Elizabeth Hospital Birmingham, United Kingdom

Introduction: Distal radius fractures rank among the most common fractures in the adult population. Late complications associated with this injury encompass compression neuropathy, post-traumatic arthritis, and malunion. Malunions can lead to pain, osteoarthritis, as well as reduced range of motion and functional impairment. Distal radius osteotomy is frequently the preferred surgical treatment aimed at restoring the normal anatomical relationship in the distal radioulnar and radiocarpal joint.
Research indicates that, during surgery, it is crucial to accurately and consistently replicate the plan to achieve favourable postoperative outcomes. However, correction using standard instrumentation and off-the-shelf plates has been reported to carry complication rates as high as 50%. Recently, virtual 3-Dimensional (3D) pre-operative planning, along with the

utilization of custom-made 3D-printed patient-specific surgical guides and corrective plates for distal radius osteotomy, have been found to improve osteotomy alignment, post-operative function, and clinical outcomes, all with limited adverse events.
Aim: We evaluated the post-operative clinical and patient reported outcomes of patients who underwent 3-D planned corrective osteotomies of the distal radius, employing custom-printed patient-specific surgical guides and osteotomy plates in severe distal radius malunions following trauma. We aimed to determine the feasibility and effectiveness of this methodology.
Material & Methods: Four patients with distal radius malunion following trauma underwent pre-operative alignment planning using CT scans. Patient-specific guides and plates were designed, 3D-printed, and sterilized for use in corrective osteotomy surgery. Volar opening-wedge osteotomy and a custom volar osteotomy plate were performed for all patients under regional anaesthesia. Patients were followed up for a minimum of 6 months. Patient demographics, pre and post-operative Patient-Rated Wrist Evaluation (PRWE) score, wrist range of movement, surgical time, adverse events, and time to fracture union were collected.
Results: The application of the patient-specific osteotomy correction was successful in all patients. There were three females and one male with a mean age of 64 years. The mean surgical time was 83 minutes, and the follow-up duration was 12 months. The average Patient-Rated Wrist Evaluation (PRWE) score improved from 84 to 20. The median time to union was 3.5 months. The flexion-extension arc improved from 78 to 110 degrees, while the pronation-supination arc improved from 73 to 135 degrees. In one patient, one distal screw was found to be proud of the dorsal cortex post-operatively, but she declined screw removal due to the excellent functioning of her wrist.
Conclusions: Three-dimensionally planned, custom-printed patient-specific surgical guides and surgical plates offer a reliable method of correcting complex malunions of the distal radius. All patients in our cohort experienced significant functional improvement and increased wrist motion. This technique presents a viable method of treating such injuries.

A-0552 ANCONEUS-TRICEPS LATERAL FLAP FOR THE TREATMENT OF COMPLEX ARTICULAR FRACTURES OF THE DISTAL HUMERUS

Federico Martinelli, Guglielmo De Luise, Andrea Celli
Hesperia Hospital, Modena, Italy

Introduction: The surgical treatment of complex fractures of the distal humerus is always a challenge, various surgical approaches were described during time which mostly involved olecranon osteotomy or a paratricipital approach.
Aim: We describe the use of the anconeus-triceps lateral flap approach, which has proved valuable exposure in patients with distal humeral fractures, and its preliminary results at a minimum follow up of 24 months.
Material & Methods: In 2015 was firstly described the anconeus-triceps lateral flap approach for total elbow arthroplasty and in 2016 the first results on a case series were published.
Ten consecutive patients with distal humeral fractures (AO C2 and C3) underwent open reduction and internal fixation (ORIF) using double plates through this new triceps approach which preserves the olecranon and the insertion of the medial portion of the triceps proper tendon.
The standard follow up for these patients was a clinical and radiographic control at 1, 3, 6 and 12 months.
Clinical outcomes were analysed using the Mayo Elbow Performance Score (MEPS) and the bone healing process.
Results: At minimum follow up of 24 months, 7 cases recovered a functional arc of motion with satisfaction of the patients and return to normal working and daily activities. No major complications strictly related to the surgical approach were observed in this series.

Conclusions: These preliminary data suggest that the use of this approach with preservation of the insertion of the triceps proper tendon at the medial portion allows an adequate exposure of the distal part of humerus and an early active rehabilitation.
This triceps approach is a viable option for ORIF of distal humerus fractures which require an adequate bone exposure with the possibility to convert in total or hemiarthroplasty if necessary.

A-0553 CLINICAL OUTCOMES OF THE SIDE TO SIDE RUNNING SUTURE TECHNIQUE IN EXTENSOR INDICIS PROPRIUS TO EXTENSOR POLLICIS LONGUS TENDON TRANSFER AFTER EXTENSOR POLLICIS LONGUS RUPTURE

Tsiampa Vasiliki, Chrysoula Argyrou, Roi Passadh, Ioannis Ayfantis, Emmanouel Fandridis
Hand, Upper Limb Microsurgery Clinic, KAT General Hospital, Athens, Greece

Introduction: The extensor indicis proprius to extensor pollicis longus tendon transfer is one of the most successful operations for the reconstruction of extensor pollicis longus rupture .The side to side running crossing suture technique has been proven to be biomechanically superior in comparison with the Pulvertaft suture technique.
Aim: The aim of this study iis the presentation of clinical experience of the use of the side to side running crossing suture technique in the extensor indicis proprius to extensor pollicis longus tendon transfer.
Material & Methods: During the period 2020 to 2022 ,12 patients (7 men and 5 women), were treated from the same hand surgeon with the side to side running crossing suture technique in the extensor indicis proprius to extensor pollicis longus tendon transfer for extensor pollicis longus rupture. The rupture aitiology was internal fixation for distal radius fractures in 5 patients (41,7%), conservative treatment with cast in 4 patients (33,3%) and rheumatoid arthritis in 3 patients (25%). Postoperatively the cast was removed in 3 weeks ,followed with kinesiotherapy.
Results:The mean age of the patients was 52 years old (48-79) and in 58.3% surgery conserned the dominant upper limb. The mean postoperative follow up was 1,5 year (6 months to 3 years). No rupture was noticed in any patient.. The quick DASH score was high with mean 14,2±9,3. All patients were satisfied from the result and returned to their former activity of daily living.
Conclusions: The results of this study prove that the use of the side to side running crossing suture technique in the extensor indicis proprius to extensor pollicis longus tendon transfer permits early mobilization and very satisfactive functional rehabilitation.

A-0554 A REVIEW AND UPDATE ON THE MANAGEMENT OF TRIANGULAR FIBROCARTILAGE COMPLEX INJURIES IN PROFESSIONAL ATHLETES

Valerio Pace[1], Giuseppe Mosillo[2], Luca Braghiroli[2], Giulia Cenci[3], Giacomo Placella[4]
[1]AOSP Terni, Italy; [2]Hand Unit, AOSP Terni, Italy; [3]University of Perugia, Italy; [4]IRCCS San Raffaele Milan, Italy

Introduction: The triangular fibrocartilage (TFCC) is a small load-bearing disc-shaped structure located at the level of the distal part of the ulna, in close relation to the ulnar styloid and the ulnar margin of the distal radius. It is called together with the dorsal and volar distal radio-ulnar ligaments, meniscal homolog, ulno-carpal ligaments and extensor carpi ulnaris tendon sheath.
The function of the TFCC is to act as a stabilizer for the ulnar aspect of the wrist. The TFCC is at risk for either acute traumatic or chronic degenerative injury. One can intuitively understand that athletes are at greater risk of acute traumatic injuries to the TFCC rather than degenerative problems.

The diagnostic and therapeutic process could vary between the common population and the professional athletes.
Aim: Our aim was to provide an update on the management of TFCC injuries of professional athletes as a detailed specific knowledge of the pathology is needed.
Material & Methods: A review on published papers on the diagnosis and management of TFCC injuries in professional athletes was performed. Pubmed, Medline, Cochrane and Embase database were utilized. All Authors independently performed the review and all included articles were scrutinized.
Results: Conservative measures are often used as first line treatment when possible. Peripheral lesions are treated with an arthroscopic repair, whilst central lesions are treated with an arthroscopic debridement. Further procedures (such as Wafer procedure, ulnar osteotomies, etc. . .) have specific indications and great implications with regards to the rehabilitation time and long term consequences for the athletes.
Competitive levels are very often achieved by athletes surgically treated for a TFCC injury. Only a small percentage does not reach satisfactory levels, and this happens more commonly for those undergoing repair procedures or procedures related to radial/ulnar instability and neutral or positive ulnar variance.
Conclusions: TFCC injuries are common in amateur and professional sports. This is mainly caused by acute or chronic repetitive assail loads on the wrist, particularly on the ulnar side. This is even worse if axial loads are associated to rotations or radial/ulnar deviations.
In order to treat professional athletes who sustained a TFCC injury, a detailed specific knowledge of the pathology is needed in all his aspects. Moreover the clinician should fully understand the specific and unique environment and needs of the athletes, their priorities and goals, the type of sport, the time of the season, the positioned played.
An early diagnosis and appropriate management with the quickest possible recovery time are the uppermost goals for both the athlete and the surgeon. A compromise between conservative vs surgical indications, athletes' needs and expectation and financial implications should be achieved. Arthroscopic procedures should be timely planned when indicated as they could allow early diagnosis and treatment at the same time.
Conservative measures are often used as first line treatment when possible. Peripheral lesions are treated with an arthroscopic repair, whilst central lesions are treated with an arthroscopic debridement. Further procedures (such as Wafer procedure, ulnar osteotomies, etc. . .) have specific indications and great implications with regards to the rehabilitation time and long term consequences.

A-0555 SURGICALLY TREATED NEUROMA PATIENTS HAVE A HIGHER RISK OF OPIOID AND NEUROPATHIC PAIN MEDICATION CONSUMPTION COMPARED TO PATIENTS WITH NON-SURGICALLY TREATED NEUROMA OR NERVE INJURIES WITHOUT NEUROMA FORMATION

Emma Dahlin[1,2,3], Raquel Perez[1,4], Malin Zimmerman[1,3,5], Juan Merlo[4,6], Erika Nyman[2,7], Lars B. Dahlin[1,2,5]
[1]Department of Translational Medicine – Hand Surgery, Lund University, Skåne University Hospital, Malmö, Sweden; [2]Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden; [3]Department of Orthopedics, Helsingborg hospital, Helsingborg, Sweden; [4]Unit for Social Epidemiology, Department of Clinical Sciences (Malmö) Faculty of Medicine, Lund University, Malmö, Sweden; [5]Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden; [6]Center for Primary Health Research, Region Skåne, Malmö, Sweden; [7]Department of Hand Surgery, Plastic Surgery and Burns, Linköping University Hospital, Linköping, Sweden

Introduction: After a nerve injury, a neuroma may develop and cause severe problems, with pain being the most prominent symptom. Few studies describe the use of medications to treat pain in patients with non-surgically or surgically treated neuroma.

Aim: Our aim was to study the use of opioids and neuropathic pain medication [gabapentinoid drugs (i.e. gabapentin and pregabalin), a tricyclic drug (amitriptyline), and SNRI (duloxetine; venlafaxine)] in patients treated for neuroma compared to patients treated for nerve injuries without neuroma formation in upper limb and to the general population.
Material & Methods: From a Swedish database consisting of data from five national registers, 5,709,584 individuals (age 25-80 years), after exclusion of people who died, emigrated, missing information of the country of birth, a previous ICD-10 T-diagnose, a previous nerve injury and a previous overuse of the defined medications, were used to identify patients with the diagnoses of sequelae of nerve injury of upper limb or neuroma of amputation stump in upper limb without or with related surgeries (applicable ICD-10 codes; defined surgical codes performed within 6 months from the diagnosis of defined neuroma; NCSP) between 2011-2014. The data was linked to find prescriptions of opioids and medications used to treat neuropathic pain (i.e., gabapentin, pregabalin, amitriptyline, duloxetine and venlafaxine). Demographic and socioeconomic characteristics of the population and the use of opioid and neuropathic pain medication (from 120 days post-surgery; i.e., washout period from surgery) were portrayed. Statistical analyses focused on logistic regression models, adjusted for age, sex, income, and country of birth, to investigate the use of opioid and neuropathic pain medication. The Odds Ratio (OR; 95% confidence interval (CI)) for the use was calculated. The absolute risk (AR) and absolute risk difference (ARD; 95% CI) were also determined to see if the association between patients and overuse of medication is affected by socioeconomic factors. The consumption of the medications was counted at year 1 after diagnosis or the surgery.
Results: Among the 5,709,584 individuals, patients had non-surgically (n=728) or surgically (n=97) treated neuroma, or surgically (n=43,418) or non-surgically (n=2,930) treated nerve injuries. In relation to the healthy population, OR increased among the non-surgically [2.24 (1.60—3.16)] and surgically [2.42 (2.23—2.62)] treated nerve injuries and particularly among the non-surgically [4.58 (2.83—7.42)] and the surgically ([9.79 (3.97—24.16)] treated neuroma patients. Higher ARDs were seen among non-surgically and surgically treated neuroma patients related to sex, age, income and country of birth, but the ARDs among patients surgically treated for neuroma were to a larger extent widespread (i.e., larger CI) since a low prevalence of the condition.
Conclusions: The use of opioids and neuropathic pain medication is higher among patients with neuroma, particularly in surgically treated patients. The influence of demographic and socioeconomic factors on use of medication for neuroma may be limited.

A-0556 OPEN HAND FRACTURES: DOES DELAY TO SURGERY IMPACT OUTCOME?

Moe Takenoshita[1], Sarah Tucker[1], Madeleine Berry[2]
[1]Oxford University Hospitals NHS Foundation Trust, UK; [2]Sheffield Teaching Hospitals NHS Foundation Trust, UK

Introduction: The British Society for Surgery of the Hand recommends surgery within 24 hours of injury for open hand fractures. However, the impact of surgical delay on outcomes remains unclear. Delays to surgery beyond 24 hours have demonstrated no significant increase in the risk of complications in a growing number of studies. This study investigated the association between time to surgery and the number and type of complications in open hand fractures at two specialised Hand Surgery Units in the United Kingdom (UK).
Aim: To audit time to surgery for open hand fractures and joint trauma at two Hand Surgery Units in the UK. To assess whether there are any differences in number and type of complications between cases which were operated within and after 24 hours and 48 hours from time of injury.
Material & Methods: Retrospective analysis of open hand fractures and open joints referred to two specialised dedicated Hand Surgery Units in the UK from 01/12/2021 to 31/03/2023. Cases were identified from RedCap database and electronic

health records were reviewed to assess time to surgery and post-operative complications. Chi square test was performed to compare complications between cases that underwent definitive surgery within and after 24 and 48 hours from injury. Results: 179 cases were included in the study. 51 (28%) cases had definitive surgery within 24 hours of injury. 123 (69%) were operated within 48 hours. Complications were observed in 29 cases, 11 of which had definitive surgical management within 24 hours, and 17 within 48 hours. Infections were the most common complications (10.6% of all cases), followed by functional complications (5.6%), non-union (2.2%), and wound breakdown (1.1%). There was no statistically significant difference in any or all of the complications between those that were operated within or after 24 hours post injury (p=0.26). Similarly, there were no statistically significant differences in complications between groups that had been operated within or after 48 hours (p=0.066). However, the data suggests that there is a trend towards increased complications with increased delay. Clinically significant increases in complications were seen at the 48 hour threshold: 8 cases of complications were observed in the >48 hour group compared to the calculated expected value of 4.7 in a sample size of 56.

Conclusions: There is no statistically significant association between delay to surgery and complications, including infection, wound breakdown, delayed or non-union and functional complications. Our study adds to the growing body of evidence to suggest that surgery could be delayed by at least 24 hours with no significant repercussions on outcome. Rather, other components of care, such as time to antibiotic administration, may be a more significant determinant of outcome. However, clinically significant differences in complications were observed with greater delays to surgery, indicating that waiting more than 48 hours may result in an increased rate of complication. Larger sample sizes would be needed to evaluate whether this trend is statistically significant, and its impact on clinical outcomes.

A-0557 ESTABLISHING THE PSYCHOLOGICAL IMPACT OF CONGENITAL UPPER LIMB DIFFERENCES ON PARENTS AND FAMILIES

Robert Miller[1,2], Alexandra Mackenzie[1], Ted Welman[1], Sue Bodger[1], Maxim Horwitz[1]
[1]Chelsea and Westminster Hospital, London, U.K; [2]Surgical Psychology and Performance Group

INTRODUCTION: Congenital upper limb differences (CULDs) can present with a range of anomalies. Treatment options and outcomes are diverse, with patients achieving a 'normal' hand post treatment, to cases with a lifelong limb difference despite treatment. Furthermore, they are routinely visible during social interactions and visible anomalies are associated with a variety of psychosocial difficulties which may cause them to experience lower self-esteem, anxiety and depression. Children co-construct the psychological meaning of visible and functional differences with their parents, and negative parental behaviors can lead the child to develop negative beliefs about their appearance. However, studies exploring the psychological challenges faced by the parents of children with CULDs are lacking. AIM: The primary aim was to report the psychological experiences of parents caring for children with a CULD and compare this to population norms. The secondary aims was to explore contributing factors to parental experiences, access to psychological support and parental coping strategies. The tertiary aim was to compare parents who themselves have a CULD with parents that do not. MATERIAL & METHODS: A prospective mixed methods design was used. Data recorded included demographics, a validated wellbeing and family impact measure, a unique score of emotions experienced and exploratory questions. A validated severity score was used to grade CULDs for each patient. Descriptive and statistical comparisons were performed with thematic analysis of free text answers. results 114 responses were returned. Mean parental age was 37.7 years, 69% of responses were from mothers, 4% were single parents and 13% of parents had a CULD. Wellbeing scores were significantly lower than populations norms. This held true for maternal but not paternal subgroups. Family impact scores

were significantly lower than population norms but there was no significant difference between mothers and fathers. Mothers experienced significantly more negative emotions than fathers. There was no significant different between parents with and without a CULD for any measures. 68% felt there should be improved access to psychological support for families. CONCLUSIONS: Parents of children with CULD have unique psychological experiences and needs. They may benefit from specialist psychological support, that is currently not routinely funded or available. Further research is needed to help target this support efficiently in a cost-effective way and elucidate the impact parents' psychological experiences may have on their child.

A-0558 EVALUATION OF THE SEMMES-WEINSTEIN MONOFILAMENT TEST IN DIFFERENT CONDITIONS IN HEALTHY INDIVIDUALS

Özge Buket Arslan[1], Gamze Yıldırım Kabasakaloğlu[2], Çiğdem Öksüz[1]
[1]Department of Occupational Therapy, Faculty of Health Sciences, Hacettepe University, Ankara, Turkey; [2]Warrington and Halton Teaching Hospital, Warrington, UK

Introduction: It is recommended that the Semmes-Weinstein Monofilament Test (SWMT) be applied in a quiet environment, with the patient's eyes open with a file or screen so that the test cannot be seen. However, in clinical practice, it may be possible that these factors are not considered or controlled with different procedures when performing the test.
Aim: Our study aims to compare the values of the SWMT applied to healthy subjects in different conditions.
Material & Methods: 70 individuals (37 females, 33 males) between 18-65 years of age were included in the study. The monofilaments were applied three times in a row to the designated point at a 90-degree angle, with an interval of 1.5 seconds, and the individuals were asked to indicate to the tester when touch was felt. The assessments were repeated at room temperature (20-22 °C) in three different scenarios: eyes open (EO), eyes closed (EC), and noisy environment (NE). EO and EC evaluations were performed in a quiet environment. In the test performed in a noisy environment, the eyes of the individuals were left open, but the hand was out of sight by the test protocol. An average of 76 decibels/second of noise was generated to provide a noisy environment. The test was applied to three points on the dominant and non-dominant hands: the palmar surface of the distal phalanx of the thumb, index, and little fingers. The differences between EO-EC and EO (quiet environment)-NE test results were examined during the statistical analysis.
Results: The mean age of the individuals was 28,99 $\pm$ 10,51 (minimum 18, maximum 59). All individuals were right-hand dominant. SWMT median values were 2.83 on all tested distal phalanx palmar surfaces in both the dominant and non-dominant hands. There was a difference between the EC (interquartile range, 25th-75th percentile: 2.44-2.83) and EO (interquartile range, 25th-75th percentile: 2.83-2.83) test results on the thumb of the dominant hand ($p<0.05$). There were no differences in SWMT results applied under different conditions on the surfaces of the index and little fingers of the dominant and the non-dominant hand ($p>0.05$).
Conclusions: Based on the Semmes-Weinstein Monofilament Test results, we concluded that healthy individuals performed better on the thumb fingertip with their eyes closed. This may be due to cross-modal activation of the visual cortex, which causes the individual to become sensitive to sensory discrimination while eyes are closed. We think it is necessary to establish a standardized procedure for visual input when evaluating the tactile sense of the hand.

A-0559 PATIENT-REPORTED FUNCTION, QUALITY OF LIFE AND PROSTHESIS WEAR: A NATIONAL COHORT STUDY OF ADULTS WITH CONGENITAL TRANSVERSE REDUCTION DEFICIENCY AT OR ABOVE THE WRIST LEVEL

Ida Neergård Sletten[1], Kari Klungsøyr[2,3], Andrew Garratt[4], Jarkko Jokihaara[5,6]

[1]Division of Orthopaedic Surgery, Oslo University Hospital, Oslo, Norway; [2]Division of Mental and Physical Health, Norwegian Institute of Public Health, Bergen, Norway; [3]Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway; [4]Division for Health Services, Norwegian Institute of Public Health, Oslo, Norway; [5]Department of Hand Surgery, Tampere University Hospital, Tampere, Finland; [6]Faculty of Medicine and Health Technology, Tampere University, Tampere, Finland

Introduction: Several studies have reported prosthesis wear rates in children with transverse reduction deficiency at and above the wrist (TRDAW). Fewer studies have assessed their health, and little is known about their adulthood. Norwegian patients with TRDAW are routinely offered free-of-cost passive forearm prostheses from infancy, myoelectric prostheses from 3-4 years, and activity-specific grip devices at all ages.

Aim: To assess patient-reported disability associated with unilateral TRDAW in adults >16 years born in Norway between 1970-2006 compared to the general population, and to assess prosthesis benefits as adult prosthesis wear rates as well as by comparing patient-reported outcomes in adult wearers and non-wearers.

Material & Methods: Persons with TRDAW were identified within the Medical Birth Registry of Norway and the CULA (congenital upper limb anomalies) North Oslo Registry. Participants completed the short version of the Disabilities of the Arm, Shoulder and Hand Outcome Measure (QuickDASH), the 5-level EQ-5D, the RAND 36-Item Short Form Health Survey (RAND-36), and a study-specific single-item questionnaire on arm function, appearance, pain, and prosthesis wear. Quick-DASH, EQ-5D-5L and RAND-36 scores were compared with Norwegian general population reference data and between adult prosthesis wearers and non-wearers.

Results: Fifty-eight (38%) of 154 eligible participants responded. Their patient-reported outcome measure scores did not differ from the general population. They reported overall arm function as a median of 8 (interquartile range; 7-10) and appearance as a median of 7 (interquartile range; 4-10) on numeric rating scales, no pain either at rest or in activity, and 88% reported never needing any assistance. All had been offered prostheses, and 56 (97%) had been fitted at a median age of 1 year (IQR 0-2.8). Thirty-seven (64%) were still prosthesis wearers, of whom 25 were daily wearers, while 21 (36%) were non-wearers or using grip devices only. Prosthesis wearers had higher RAND-36 assessed vitality levels and greater satisfaction with arm appearance. There were no score differences in upper extremity function or other health-related quality of life items.

Conclusions: The high proportion of prosthesis wearers might indicate that a large subgroup perceived functional and/or aesthetic benefits from their prostheses. However, it might also reflect that they had been advised to wear prostheses since childhood and that all prostheses had been free of charge. However, normal self-reported upper extremity function compared to the general population, with no difference between prosthesis wearers and non-wearers, suggests that prosthesis rejection during childhood or adolescence is not associated with worse functional outcomes later in adulthood.

A-0560 PARTIAL CARPAL ARTHRODESIS OFR TYPE 3 SCHAPHOID NON-UNION ADVANCED COLLAPSE (SNAC): LONG-TERMI RESULTS AND ADVANTAGES OF THE TECHNIQUE

Valerio Pace[1], Giuseppe Mosillo[2], Luca Braghiroli[2], Giulia Cenci[3], Giacomo Placella[4]

[1]AOSP Terni, Italy; [2]Hand Unit, AOSP Terni, Italy; [3]University of Perugia, Italy; [4]IRCCS San Raffaele Milan, Italy

Introduction: The SNAC wrist (Scaphoid nonunion advanced collapse) is one of the complications following scaphoid fractures treated conservatively and one of the causes of wrist arthritis that the hand surgeon has to face most frequently.

Scaphoid fractures are a very common pattern of injury whose mechanism is usually associated with a fall onto an outstretched hand. When conservative therapy fails, the patient has to undergo surgery (7, 8). There are multiple options for the treatment of SNAC wrist. The treatment of choice varies depending on personal preference of the surgeon as well as the stage of osteoarthritis.

Aim: The aim of our study is to report our experience of a significant number of surgical treated patients with SNAC wrist after conservative management failure and compare it to the data present in the published literature.

Material & Methods: In the set time frame of 10 years we treated 18 SNAC wrist cases. All patients were treated via dorsal incision with partial carpal arthrodesis and total scaphoidectomy, associated with denervation of the posterior interosseous nerves. Plaster cast for 3 weeks. Criteria for the evaluation of patients: visual analog pain scale (VAS), average time of radiographic fusion of wrist bones, Active Range of Wrist Motion (WAROM), subjective Mayo Wrist Score (MWS) and The Short Form (36) Health Survey (SF-36), return to the main tasks and complications. The evaluation endpoint was set at 10 years.

Results: Average operating time was 49 minutes (range 41-66). The average time of arthrodesis consolidation occurred in 69 days (37-96 days). The VAS at the 10-years follow-up returned almost identical to the pre-injury values

The average pre-injury WAROM levels (measured on the healthy limb) were: flexion 82.7 degrees, extension 83.5 degrees; abduction 13.4 degrees and adduction 43.7 degrees. At 12 months from the trauma, the levels were: flexion of 33.8 degrees, extension of 34.1 degrees; abduction of 3.4 degrees and adduction 22.8 degrees. At the 10-years follow-up after surgery, the average WAROM levels were: flexion 79.3 degrees, extension 81.2 degrees; abduction 11.8 degrees and adduction 40.6 degrees. MWS and the SF-36 scores could be compared to pre-trauma. Return to the normal daily activities occurred in 12.5 from surgery. No complications.

Conclusions: The partial carpal arthrodesis is a safe and effective procedure for the treatment of SNAC wrist cases. Our results show a progressive and significant improvement in ROM, VAS and great satisfaction from the patient. In our opinion, in all the cases where this procedure is indicated, the partial carpal arthrodesis associated with total scaphoidectomy is certainly an interesting, effective and feasible technique which permits to achieve more than satisfactory functional and clinical results on the long run if performed by experienced surgeons.

A-0561 DIFFERENCES IN OPIOID CONSUMPTION BETWEEN SURGICALLY AND NON-SURGICALLY TREATED DISTAL RADIUS FRACTURES – AN OBSERVATIONAL REGISTRY STUDY ON 30,694 FRACTURES

Anna-Karin Svensson[1,2], Raquel Perez[2,4], Lars B Dahlin[2,3], Juan Merlo[4,5], Malin Zimmerman[1,2]

[1]Department of Orthopedics, Helsingborg Hospital, Helsingborg, Sweden; [2]Department of Translational Medicine – Hand Surgery, Lund University, Sweden; [3]Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden; [4]Unit for Social Epidemiology, Faculty of Medicine, Lund University, Malmö, Sweden; [5]Centre for Primary Health Care Research, Region Skåne, Malmö, Sweden

Introduction: Distal radius fractures are common. It is debated when surgical and non-surgical treatment should be advised. Treatment choice today largely depends on fracture and patient characteristics as well as the patient's functional demands, where non-surgical treatment is reserved for non-displaced fractures and patients with low functional demands, as long-term results do not differ between surgical and non-surgical treatment in this population. However, the long-term impact of treatment choice on pain levels is poorly known.

Aim: To study if there is a difference in opioid prescriptions between surgical and non-surgical treatment in distal radius fractures.

Material & Methods: We collected data on all distal radius fractures in Sweden between 2011 and 2013 for people above 18 years from a linkage database based on six national registers. Individuals with a previous distal radius fracture were excluded. Included individuals were followed for two years, and opioid prescriptions during these two years were recorded. A logistic regression analysis was performed to analyze potential differences in opioid prescriptions between the surgically and non-surgically treated groups.
Results: In total, 30,694 individuals with unilateral distal radius fractures were included in the study. A majority were women (n=23,091 (75%)). Among the fractures, 26,344 (86%) were non-surgically treated, and 4,350 (14%) were surgically treated. In the regression analysis, surgery had a protective effect on opioid prescription during the second year [odds ratio 0.57 (0.51-0.63))] but was a risk factor during the first year after fracture [OR 2.35 (2.17-2.55)]. Among the individuals who had three or more opioid prescriptions during the second year after surgery, more than 50% had a high opioid consumption before their distal radius fracture.
Conclusions: Patients with surgically treated distal radius fractures are prescribed more opioids than patients who are non-surgically treated during the first year after the fracture. During the second year after the fracture, patients who were non-surgically treated were prescribed more opioids than patients who were surgically treated. Non-surgically treated distal radius fractures might be associated with more long-term pain than previously recognized.

A-0562 METACARPAL HEAD FRACTURES - A SINGLE CENTRE REVIEW OF EPIDEMIOLOGY, INTERVENTIONS AND OUTCOMES AND THE INTRODUCTION OF A NEW CLASSIFICATION SYSTEM

Jasmeet Jhaj, Priyanka Kissoonsingh, Rajive Jose, Dominic Power
The Birmingham Hand Unit - Queen Elizabeth Hospital

Introduction: Metacarpal head fractures are rare injuries comprising 4-5% of all metacarpal fractures. There is a lack of evidence to determine the optimum management for these injuries. We present our single centre retrospective case series review looking at the epidemiology, interventions, outcomes of these injuries and we propose a new classification system to help aid in their management.
Methods: This was a retrospective study conducted at the regional hand surgery department of a tertiary care hospital. A total of 41 patients with metacarpal head fractures were included in the study from the period of 1st January 2016 to 31st December 2021. The data collected included patient demographics, epidemiology of injury, fracture configuration, management, clinical and radiographic outcomes and patient reported outcome measures up to 12 months follow up. From this data we propose a new classification system with the aim of helping clinicians in the management of this rare injury.
Conclusions: We present the results of our series along with a new classification system.

A-0563 AMPUTATIONS IN MALIGNANT PERIPHERAL NERVE SHEATH TUMORS: A MULTICENTER COHORT STUDY

Christianne Y.M.N. Jansma[1,2], Dirk J. Grünhagen[2], Cornelis Verhoef[2], J. Henk Coert[1], Enrico Martin[1]
[1]Department of Plastic and Reconstructive Surgery, University Medical Center Utrecht, Utrecht, The Netherlands; [2]Department of Surgical Oncology and Gastrointestinal Surgery, Erasmus MC Cancer Institute, Rotterdam, The Netherlands

Introduction: Malignant peripheral nerve sheath tumors (MPNST) are aggressive soft tissue sarcomas (STS). The primary treatment for localized disease is limb salvage surgery (LSS), aiming to maximize local control, reduce morbidity, and preserve function in the extremities. Nevertheless, MPNSTs exhibit one of the highest recurrence rates among all types

of STS. Due to the advancing capabilities of reconstructive surgeons to reconstruct major defects, including nerves, the preservation of a functional limb should be strived for. However, amputations remain prevalent, as they are often deemed surgically simpler and are believed to reduce the risk of recurrence by ensuring wide margins. However, this approach comes at the expense of patient function, with the potential for significant morbidity and a negative impact on overall quality of life. Despite undergoing amputation, recurrences are still observed in some patients. The current literature lacks a comprehensive overview of patient characteristics and potential risk factors.

Aim: This study aims to characterize patients who undergo amputations, assess local control after amputation, identify patients at an increased risk of recurrence following amputations, and evaluate potential differences in the occurrence of recurrences between amputations and LSS in MPNST patients across nine sarcoma centers in The Netherlands and the Mayo Clinic.

Material & Methods: Surgically treated (R0 or R1) primary extremity MPNSTs from 1988 to 2019 within the MONACO multicenter cohort were included. Cox regression was employed to analyze LR1 risk factors after amputation. Additionally, the location of the recurrence was evaluated (i.e., along the nerve or at the site of the original tumor).

Results: A total of 255 patients with extremity MPNSTs were included, of whom 39 patients (15.8%) underwent amputation. Among these patients, 27 (69.2%) received amputation as the initial treatment, and in 12 (30.8%) of them, amputation was employed as a treatment for their recurrence. Among patients with amputation as the initial treatment, 5 patients (7.0%) developed a LR compared to 66 (93.0%) patients without an amputation. In patients who underwent amputation for their recurrence, 6 (54.5%) developed a second LR. Interestingly, 20.0% of the recurrences developed proximal in the stump along the initial nerve. On univariate analyses, Neurofibromatosis type 1, tumor size, surgical margin, and tumor grade were not statistically significantly associated with the development of an LR in patients with amputation as the initial treatment versus patients with only LSS.

Conclusions: Amputations are still being performed in patients with extremity MPNSTs.

However, despite amputations, patients still develop recurrences, with a significant impact on functional loss and quality of life.

A-0564 LOCAL RECURRENCE IN MALIGNANT PERIPHERAL NERVE SHEATH TUMORS: A MULTICENTER COHORT STUDY

Christianne YMN Jansma[1,2], Ibtissam Acem[2], J Henk Coert[1], Dirk J Grünhagen[2], Cornelis Verhoef[2], Enrico Martin[1], MONACO Collaborators†

[1]Department of Plastic and Reconstructive Surgery, University Medical Center Utrecht, Utrecht, The Netherlands; [2]Department of Surgical Oncology and Gastrointestinal Surgery, Erasmus MC Cancer Institute, Rotterdam, The Netherlands

Introduction: Malignant Peripheral Nerve Sheath Tumors (MPNSTs) are rare and aggressive malignant soft-tissue sarcomas (STS), compromising 5-10% of all STS cases. Approximately 40% of MPNST cases are associated with neurofibromatosis type 1 (NF1). High-grade MPNSTs have a high rate of local recurrence (LR), making them the most recurrent tumors among all STS types. The development of recurrences in MPNST patients is associated with a morbid event that decreases functional outcomes, particularly since many patients have already undergone surgery and radiotherapy as part of multimodality treatment. Therefore, it is crucial to prevent LRs as much as possible. Due to the rarity of MPNSTs, risk factors, optimal LR treatment, and its impact on overall survival (OS) vary in current literature.

Aim: The aim of this project is to identify risk factors associated with recurrence, and the treatment of recurrences, as well as their impact on OS in MPNST patients across nine sarcoma centers in The Netherlands and the Mayo Clinic.

Material & Methods: Surgically treated primary MPNSTs between 1988 to 2019 in the MONACO multicenter cohort were

included. Multivariate Cox regression analyses were performed to identify factors associated for development of LR and OS after LR. Treatment of LR was evaluated.
Results: A total of 507 patients were included, of which 142 developed a first LR (28%). High-grade (HR 2.63; 95% CI, 1.15-5.99), microscopically positive margins (R1) (HR 2.19; 95% CI, 1.51-3.16), and large tumor size (HR 2.14; 95% CI, 1.21-3.78) were independent risk factors for the development of a LR. Radiotherapy (HR 0.62; 95% CI, 0.43-0.89) on the other hand, reduced the risk. Patients with a LR had significantly worse OS. In patients with a LR, synchronous metastasis was associated with poor OS (HR 1.79; 95% CI 1.02-3.14) while surgically treated LRs had a better OS (HR 0.38; 95% CI 0.22-0.64). Most LRs (64.9%) were treated surgically without additional therapy. Radiotherapy combined with surgery was administered in 11.3% of patients with a LR.
Conclusions: Large, high-grade MPNSTs with R1 resections are at increased risk of developing a LR, while the use of radiotherapy decreases this risk. Surgically treated recurrences may provide improved survival in highly selected cases.

A-0566 PREOPERATIVE CLASSIFICATION OF NERVE SHEATH TUMORS USING RADIOMICS BASED MACHINE LEARNING

Christianne Y.M.N. Jansma[1,2], Ibtissam Acem[1], Xinyi Wan[3], Douwe Spaanderman[3], Jan-Jaap Visser[3], David Hanff[3], W. Taal[4], J. Henk Coert[2], Cornelis Verhoef[1], Stefan Klein[3], Enrico Martin[2], Martijn P.A. Starmans[3]
[1]Department of Surgical Oncology and Gastrointestinal Surgery, Erasmus MC Cancer Institute, Rotterdam, The Netherlands; [2]Department of Plastic and Reconstructive Surgery, University Medical Center Utrecht, Utrecht, The Netherlands; [3]Department of Radiology and Nuclear Medicine, Erasmus MC, Rotterdam, The Netherlands; [4]Department of Neurology, Erasmus MC Cancer Institute, Rotterdam, The Netherlands

Introduction: Malignant peripheral nerve sheath tumors (MPNSTs) are aggressive soft tissue sarcomas occurring in neurofibromatosis type 1 (NF1) patients. High-grade MPNSTs carry a high risk of metastasis and recurrence, making early recognition and surgical resection crucial for improved survival. The resection of high-grade MPNSTs often leads to postoperative complications, while neurofibromas can be adequately resected with minimal nerve damage. Therefore, preoperative differentiation between benign peripheral nerve sheath tumors (BPNSTs) and MPNSTs is important. However, current imaging tools may not always provide sufficient diagnostic accuracy, leading to the need for biopsies and associated burdens. Clear distinguishing features in magnetic resonance imaging (MRI) are not yet known. Radiomics provides a potential new tool in the diagnostic armamentarium, which may reduce the need for biopsies.
Aim: This study aims to develop a radiomics model that utilizes quantitative imaging features and machine learning to differentiate BPNSTs from MPNSTs based on T1- and T2-weighted MRI sequences.
Material & Methods: We collected T1- and T2-weighted MRI sequences from BPNST and MPNST patients at our tertiary referral center for sarcoma. Lesions were manually and semi-automatically segmented on the MRI sequence where the tumor was best visible. Segmentations were warped to the other sequences using image registration. For each lesion, on each sequence, 564 radiomics features were extracted. For classification, the WORC algorithm was used, which includes a large set of commonly used radiomics methods and uses automated machine learning to determine their optimal combination based on the training set. Evaluation was performed using a 100x random-split cross-validation with 20% of the data for testing. Performance was compared to manual scoring by two radiologists who had access to the scans of the complete MRI sessions.
Results: A total of 35 MPNSTs and 74 BPNSTs were included. The radiomics models had a mean test area under the curve (AUC) of 0.71 on T1-weighted MRI, 0.68 on T1-weighted MRI with interactive segmentations. The two radiologists had AUCs of 0.75 and 0.60.

Conclusions: Radiomics based machine learning using T1- and T2 weighted MRI sequences can provide a valid tool for improved clinical decision-making in the management of these tumors. Further validation and refinement of the radiomics model are warranted to enhance its diagnostic accuracy and clinical utility.

A-0567 THE ROLE OF RADIOTHERAPY IN MALIGNANT PERIPHERAL NERVE SHEATH TUMORS: A MULTICENTER COHORT STUDY

Christianne Y.M.N. Jansma[1,2], J. Henk Coert[1], Dirk J. Grünhagen[2], Cornelis Verhoef[2], Enrico Martin[1], W. Taal[3]
[1]Department of Plastic and Reconstructive Surgery, University Medical Center Utrecht, Utrecht, The Netherlands; [2]Department of Surgical Oncology and Gastrointestinal Surgery, Erasmus MC Cancer Institute, Rotterdam, The Netherlands; [3]Department of Neurology, Erasmus MC Cancer Institute, Rotterdam, The Netherlands

Introduction: Malignant Peripheral Nerve Sheath Tumors (MPNSTs) are rare and aggressive malignant soft-tissue sarcomas (STS), with 40% associated with neurofibromatosis type 1 (NF1). Surgical excision is the primary treatment for localized disease, but MPNSTs have a high likelihood of local recurrence (LR). Radiotherapy (RT) is increasingly used to improve local control in STS without affecting survival. However, its use is controversial due to the potential for higher major wound complications and increased risk of secondary malignancies in NF1 patients, as MPNSTs commonly arise from plexiform neurofibromas.
Aim: This study aims to evaluate the use of RT in these rare tumors and tries to understand its impact in local control, especially in the NF1 setting.
Material & Methods: Surgically treated primary MPNSTs from 1988 to 2019 in the MONACO multicenter cohort were included. Demographic and treatment differences, specifically the use of RT, between NF1 and non-NF1 cases were analyzed. Univariate and multivariable logistic regression analyses identified factors associated with RT utilization. Multivariate Cox regression analyses identified factors associated with LR in NF1 patients.
Results: A total of 516 patients (32.6% NF1) were included, with 149 (28.9%) developing LRs. RT was administered to 54.5% of patients (56.0% in NF1). Among them, 26.0% received neoadjuvant RT, and 79.2% adjuvant RT. Treatment modalities were similar between patients with and without NF1. Multivariable regression analysis showed high-grade tumor as the only independent factor associated with RT utilization. RT use in NF1 did not alter after correcting for tumor-, patient- and surgical factors. RT did not impact overall survival in sporadic and NF1-associated MPNST. In NF1 patients, a microscopically positive margin (R1) (HR 2.2; 95% CI, 1.21-3.91) was the only independent risk factor for LR development. After adjusting for tumor-, patient-, and surgical-related factors, the use of RT was not associated with lower rates of LR, in contrast to the sporadic population.
Conclusions: RT is commonly used in MPNST treatment regardless of its origin in NF1. While it may affect LR rate in sporadic patients, its impact in NF1 patients is less clear. Further studies are needed to evaluate its role and indications in NF1 associated MPNST.

A-0568 OUTCOMES AND COMPLICATIONS FOLLOWING OPEN REDUCTION INTERNAL FIXATION OF PEDIATRIC AND ADOLESCENT DISTAL RADIUS FRACTURES

Anisha Pancholi, Julia L. Conroy, Catherine C. May, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Distal radius fractures are one of the most common fractures in the pediatric and adolescent populations. The majority of these fractures are treated nonoperatively with immobilization, however, fractures with substantial displacement and/or angulation warrant further operative intervention. While closed reduction and percutaneous pinning (CRPP) is the initial operative procedure attempted in the vast majority of cases, at times a closed reduction is not possible and therefore an open reduction with internal fixation is performed. Literature surrounding outcomes and complications of pediatric distal radius fractures treated with open reduction and internal fixation (ORIF) is limited.
Aim: The purpose of this study is to assess outcomes and complications of pediatric distal radius fractures after ORIF.
Material & Methods: A retrospective chart review was conducted to identify pediatric and adolescent patients 0-17 years of age who underwent treatment for a distal radius fracture with an open reduction and internal fixation (ORIF). Data collected included patient demographics, mechanism of injury, concomitant injuries, fracture location (extraphyseal/extra articular vs. physeal or intraarticular), type of hardware used for fixation, immobilization type, length of immobilization, and complications. Simple statistical analysis was conducted.
Results: 36 patients with an average age of 9.3 years were identified. The most common mechanisms of injury were fall on an outstretched hand (37.0%) and a fall off of a bike or scooter (37.0%). The majority of fractures were classified as extraphyseal (91.4%), and thus were extra-articular in nature. 12 patients (35.2%) had a concomitant distal ulna fracture. Fixation was most commonly performed with Kirschner wires (30.5%, n=11) followed by plate and screw fixation (22.2%, n=8). Additional hardware utilized for fixation included Steinmann pins and flexible intramedullary nails. The duration until pin/intramedullary flexible nail removal was 61.9 days and the average length of post operative immobilization was 68.0 days. There were no recorded complications associated with patients that underwent ORIF and no reported cases of premature physeal closure.
Conclusions: Pediatric distal radius fractures with substantial displacement and/or angulation which warrant operative treatment and are unsuccessful with closed reduction techniques can be safely treated with open reduction and internal fixation (ORIF). Excellent outcomes and minimal complications can be expected. ORIF of pediatric and adolescent extraphyseal distal radial fractures is not associated with premature physeal closure.

A-0569 THE ROLE OF PATIENTS COMPLIANCE IN HEALING COMPLICATED CAT BITES

Anca Bordianu[1,2], Irina Zaharia[1]
[1]"Bagdasar-Arseni" Clinical Emergency Hospital, Bucharest, Romania; [2]"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

Introduction: A common presentation at the emergency department, domestic cat bites are often treated successfully with wound care management at home. However, a small number of cases reach a doctor after 24-48 hours, with infected wounds, associating hand edema, forearm lymphangitis, and moderate impairment of the functions.
Aim: The authors would like to outline the importance of early diagnosis and treatment of cat bites, as well as means of improving patients compliance.
Material & Methods: The paper analyses the evolution of three patients with complicated wounds. The subjects are middle

age females, bitten by their own cats, referring to the emergency room one day after the incident. Furthermore, one of them has type 1 diabetes mellitus, with adequate glycemic control. All patients needed hospitalization and surgery. Bacterial wound cultures were taken in the admission day. Patients were followed up for up to 1 month.
Results: The evolution of the wounds was favorable, with complete remission of the inflammation in 6 days. The mean number of hospital days was 4. Moreover, two bacterial wound cultures were negative and one positive for methicillin-sensitive Staphylococcus aureus. Intravenous antibiotic therapy (association of two antibiotics) and nonsteroidal anti-inflammatory drugs were administered for 3-5 days, continued with oral medication at home. Despite a successful functional and esthetic result postoperatively, one case needed a palmaris longus tendon graft and reconstruction of the extensor hood, caused by her reduced compliance to treatment.
Conclusions: Any cat bite should be evaluated in the first 24 hours by a qualified personnel in order to establish the potential risks and the correct management. Neglected wounds often conduct to infection which, left untreated, can easily spread to tendon, joint and bone. Patients compliance is of utmost importance, hence a good doctor-patient communication can improve the outcome.

A-0570 PEDIATRIC DISTAL HUMERUS MEDIAL CONDYLE FRACTURES: EPIDEMIOLOGY, OUTCOMES, AND COMPLICATIONS

Isabella Marsh, Julia L. Conroy, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Medial condyle fractures are a very rare injury in the pediatric population, accounting for only 1-2% of all pediatric elbow fractures. Anatomic reduction is crucial to restore the articular surface and epiphysis of the distal humerus. There is currently no consensus on the most favorable treatment method for distal humerus medial condyle fractures. Additionally, outcomes and complications of these fractures are not well studied.
Aim: The purpose of this study is to examine the epidemiology, treatment, and subsequent outcomes and complications of pediatric distal humerus medial condyle fractures.
Material & Methods: A retrospective chart review was performed of pediatric and adolescent patients 0-17 years of age who sustained a medial condyle distal humerus fracture. Data collected included patient demographics, mechanism of injury, treatment, outcomes, and complications. Simple statistical analysis was conducted.
Results: Eight patients with an average age of 7.8 years were identified. Of these patients, 75% (n=6) were female. The most common mechanism of injury was a fall on an outstretched hand (FOOSH) (n=6), all of which were females, with the remaining mechanisms being football and a fall off a skateboard. 50% (4/8) of patients underwent nonoperative treatment and were immobilized with a long arm cast with the remaining 50% (4/8) of patients undergoing operative treatment with open reduction and internal fixation (ORIF). Postoperatively, patients were immobilized with either a long arm cast (n=2) or a posterior splint with sidebars (n=2). The average duration of postoperative immobilization was 42.5 days and the average time until hardware removal was 34 days. Three patients experienced complications including one treated non-operatively who fell again sustaining a refracture. Regarding the two patients who experienced complications following operative treatment, one patient went on to fracture nonunion, which required an additional ORIF revision utilizing a screw to compress the fracture, and 1 patient experienced an infection requiring irrigation and debridement and a hardware revision.
Conclusions: Medial condyle distal humerus fractures are a rare injury in the pediatric population. These fractures have a high complication rate, with 50% (4/8) of the patients in this series experiencing complications. Multicenter studies are likely needed to have high numbers of these injuries to learn more about the epidemiology, treatment and complications.

A-0571 EVALUATION OF THE RESULTS OF SURGICAL TREATMENT OF HAND FLEXOR TENDON INJURIES AMONG CHILDREN

Szymon Grochans[1], Ireneusz Walaszek[1,2], Kaja Giżewska-Kacprzak[1]
[1]Department of Pediatric and Oncological Surgery, Urology and Hand Surgery, Pomeranian Medical University, Szczecin, Poland;
[2]Department of Orthopedic Traumatology and Musculoskeletal Oncology, Pomeranian Medical University, Szczecin, Poland

Introduction: Hand injuries are one of the most common causes of emergency department admissions, including pediatric patients. The outcome of treatment is influenced by, among others, the surgeon's experience, the technique used, and the extent of associated tissue damage. Children represent a special group of patients due to the smaller size of the injured structures, incomplete growth, and the need to adapt the rehabilitation protocol.
Aim: The aim of this study was to evaluate and analyze the clinical parameters of the objective results of the surgical treatment of flexor tendon injuries of the upper limb in children.
Material & Methods: A retrospective analysis of the medical records of children who underwent surgery for flexor tendon injuries between 2019 and 2023 was performed.
Inclusion criteria were flexor tendon injuries, further subdivided into
I. Isolated flexor tendon injuries of the upper extremity
II. Associated nerve and vessel injuries
III. Associated bone injuries
Range of motion was assessed using a goniometer with comparison to the contralateral side.
Injuries with extensive soft tissue loss and extensor injuries were excluded from the study.
Results: Fifty-three patients were included in the analysis: 38 (72%) boys and 15 (28%) girls aged between 22 months and 17 years. The mean age of the patients on the day of surgery was 11 years.
The largest group of subjects were patients with incisional wounds - 88% (47). 66% (35) of the patients had a nerve or artery injury. 74% (39) were treated within 2 weeks of injury, with most treated on day one. Suturing was performed using a modified Strickland suture with a continuous lock. A long-term absorbable monofilament suture was used in all patients. Postoperative physiotherapy was adapted to age and local conditions.
In the case of stagnant lesions and the inability to perform a direct anastomosis, a two-stage
anastomosis, a two-stage reconstruction was performed using a Hunter prosthesis and a tendon graft in the second stage. Each group required further treatment (e.g. surgical scar plication, tenolysis, arthrolysis):
I. 1 patient
II. 4 patients
III. 1 patient
The mean range of motion compared to the unaffected limb, measured in 34 of 53 patients, was 97.5%.
Conclusions: Tendon reconstruction is an effective surgical treatment for hand injuries in this age group. Concomitant damage to other structures (nerves, vessels, bone) did not lead to a worse outcome but did result in a higher rate of secondary surgeries.

A-0572 CLINICAL SIGNIFICANCE OF HAND FLEXOR TENDON RUPTURE: EMPHASIZING THE CRUCIAL ROLE OF EARLY REHABILITATION

Irene Amigo Fernandez, Victor Quiles Fenollar, Naimah Koulaimah Gabriel, Guillem Salva Coll
University Hospital Son Espases, Majorca, Spain

Introduction: Hand flexor tendon ruptures represent a significant clinical challenge with profound implications for patients' functional outcomes. The intricate anatomy and biomechanical importance of flexor tendons in hand function underscore the critical need for a thorough understanding of the clinical relevance of their rupture. This study explores the pivotal role that an early rehabilitation plays in mitigating the long-term consequences of flexor tendon injuries. The primary aim of this study is to compare the outcomes of patients undergoing two distinct rehabilitation protocols. The first protocol involves a traditional approach where active mobilization is delayed, while the second protocol introduces a novel strategy emphasizing early initiation of active mobilization.
Objective: This study seeks to evaluate the efficacy of the two rehabilitation protocols, with a specific focus on range of motion and overall patient satisfaction.
Materials and method: A retrospective study of 14 patients with hand flexor tendon ruptures treated at our center from 1st January 2022 – 1st August 2023, with a mean follow-up of 9 months ± 1.2months, was conducted. Twelve patients underwent surgery in 2022, following the flexor protocol in which mobilization commenced on the second postoperative week, while two patients were operated on in 2023, adhering to the new protocol where mobilization was initiated on the 4th postoperative day. A review of the medical records was performed and all patients were clinically evaluated. Functional assessment was based on the results of the QuickDASH scale, loss of flexion and finger clench strength. Data were analyzed according to the rehabilitation protocol, taking into consideration the timing and nature of interventions.
Results: The mean age was 46 ± 10.18 years, 78.57% male (11 cases). Twelve patients underwent surgery in 2022, following the flexor protocol in which mobilization was delayed. During 2023, two patients underwent surgery, adhering to the new protocol where mobilization was initiated on the 4th postoperative day. In all 14 cases, a 4-strand suture was employed for suturing the tendon. Among patients who adhered to the delayed mobilization protocol, compared to the unaffected finger, the mean loss of flexion was 23.10 ± 10.68%, mean loss using the three-point pinch dynamometer 29.93 ± 9.70% and the mean score for the QuickDASH scale was 10.25 ± 3.09. In patients who followed the early mobilization protocol, the mean loss of flexion was 10.50 ± 7.86%, mean loss using the three-point pinch dynamometer 18.96 ± 7.63% and the mean score for the QuickDASH scale was 3.50 ± 0.06.
Conclusions: The findings of this study suggest that those patients following the protocol with an early mobilization displayed promising improvements in functional recovery and range of motion compared to those adhering to the traditional protocol with a delayed mobilization approach. However, it is crucial to acknowledge the limitation of our study, which stems from the relatively small sample size of patients following the early mobilization protocol. As of now, only two cases have followed the new protocol, emphasizing the need for further research with a larger cohort to validate and generalize these initial observations.

A-0573 PRESENTATION OF A SURGICAL APPROACH TO RADIAL LONGITUDINAL DEFICIENCY WITH A CASE SERIES

Natasha Morrissey, Andrew Gaffey, Andrea Jester
Birmingham Children's Hospital, UK

Introduction: Radial longitudinal deficiency (RLD) is a preaxial hypoplasia with a range of deformities classified by Bayne and Klug (1987), adjusted by Goldfarb (2005). In types III and IV there is hypoplasia or absence of the radius which leads

to radial deviation of the wrist with volar displacement. In addition, the ulna is shortened and bowed.
There are various techniques aimed at improving alignment of the arm, including centralization, radialisation, ulnarisation, soft tissue distraction, soft tissue release, soft tissue rebalancing, and microvascular joint transfer.
The aims of surgery have been debated, with the functional advantages of the straight wrist balanced against stiffness of the wrist or fingers. All described surgeries have issues with recurrence of radial deviation.
The purpose of this technique is to provide an improved functional unit through avoiding notching, shortening the ulna, ulna stripping therefore giving no risk to ulnar physis, avoiding ulnocarpal fixation, or the need for soft tissue local flaps
Aim: To give information about the steps of the surgical technique used in one centre along with a case series
Material & Methods: A technique using soft tissue distraction with a circular frame and soft tissue rebalancing at a second sitting is presented with steps and photographic illustrations.
Conclusions: We must assess all surgical techniques in an environment where there is a realisation that first we must do no harm. There must be a frank conversation with children and their carers about the options of supporting non surgical treatment and the aims and outcomes of surgical interventions. We advocate a technique that does not affect ulnar growth, affect bony stock, or stiffen the wrist or fingers while providing a functional upper limb.

A-0574 ASSESSMENT OF DIFFERENCES REGARDING THE MANAGEMENT OF PEDIATRIC SUPRACONDYLAR HUMERUS FRACTURES BETWEEN HAND AND PEDIATRIC ORTHOPAEDIC SURGEONS

Cameron Amini, Catherine C. May, Julia L. Conroy, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Supracondylar fractures of the humerus are a common injury in the pediatric population and are managed by various surgeons. Pediatric orthopaedics surgeons are not available at every hospital, thus adult hand surgeons may also provide the treatment of these fractures.
Aim: The purpose of this study was to determine if any differences exist in the management and complications of pediatric supracondylar humerus fractures between pediatric orthopaedic surgeons and hand surgeons.
Material & Methods: A retrospective chart review was performed to identify patients treated surgically for supracondylar humerus fractures over a 13-year period. Data collected included patient demographics, Gartland classification, preoperative nerve deficit, preoperative vascular injury if present, closed versus open reduction, operative time, complications, and physical therapy referral. Two groups of patients were established based on the treating physician: pediatric orthopaedic attending surgeons (PO) and adult hand attending surgeons (AH). Simple statistical analysis was performed.
Results: A total of 509 patients were identified; 367 patients were treated by a PO and 125 patients by an AH. AH opted to utilize open reduction and internal fixation significantly more often than PO, with a rate of 22.4% (n=28) versus 3.2% (n=12) ($p<0.001$). Average operative times (AH: 63.3 minutes vs. PO: 37.2 minutes) and Gartland classification also differed between PO and AH surgeons. AH more frequently encountered Gartland Type III fractures (55.6%) followed by Gartland type II fractures (38.8%), whereas PO surgeons more frequently encountered Gartland Type II fractures (53.5%) followed by Gartland type III fractures (38.0%). PO, however, treated more Gartland type IV fractures compared to AH (8.5% vs. 2.3%). There were no differences in the complication rate, rate of preoperative nerve deficit, rate of preoperative concomitant vascular injury, or referrals to physical therapy.
Conclusions: Adult hand surgeons and pediatric orthopaedic surgeons treating pediatric supracondylar humerus fractures have similar patient outcomes and low complication rates. Differences exist regarding the management of these patients including the potential for substantially higher health care costs when these fractures are treated by hand surgeons due to the increased use of open reduction techniques and longer operative times.

A-0575 LONG TERM OUTCOMES OF ULNAR HEAD ARTHROPLASTY

Shruti Raut, Sumedh Talwalkar, Ian A Trail
Wrightington Hospital, UK

Introduction: Degenerative, inflammatory, post-traumatic and congenital conditions affect the distal radio-ulnar joint and can result in arthritic change. Various treatment options exist for arthritis of the distal radio-ulnar joint, one of which is the ulnar head arthroplasty.

Aim: To determine the long-term survivorship and clinical outcomes of ulnar head arthroplasty

Material & Methods: We retrospectively evaluated 74 consecutive patients who underwent 79 ulnar head replacements at our centre from January 1999-December 2010. All procedures were performed by 2 senior surgeons at our unit, or surgeons directly trained by them. Patients' notes and imaging were reviewed for demographics, case histories and the status of the implant at last follow-up. Pain and function were assessed using the Patient-Related Wrist Examination (PRWE) score. Patients were contacted via telephone, invited to participate in outcome scoring and asked 3 specific questions to ascertain their perception of a successful outcome at a mean of 15-years post-operatively:

1) Would they have the surgery again if in a similar position?

2) Would they recommend the surgery to friends/family?

3) Were they satisfied with the overall outcome of their surgery?

Failure of the implant was defined as revision or removal of the implant for any reason.

Results: Mean age at the time of surgery was 50 years (range 24-76). Nine patients had died. Nine implants had been revised. Ten patients had undergone subsequent non-revision wrist surgery. We have previously published outcome data at a mean of 7-years post-operatively. Clinical assessment for 47 and then 19 surviving implants was available at mean follow-up of 7- and 15-years respectively. Mean PRWE scores for the surviving implants were 52 and 42.9 at a mean of 7 and 15 years respectively.

Of the patients in whom the implants had survived at 15 years, all answered "yes" to the above 3 questions except for one, who was not satisfied overall.

Thirty-nine patients were untraceable at a mean of 15 years post-surgery.

Conclusions: Ulnar head arthroplasty has good long-term survival and acceptable overall patient satisfaction, even at a mean of 15 years post-operatively.

A-0576 PREVALENCE, INFANT OUTCOMES AND PARENTAL RISK FACTORS: A POPULATION-BASED STUDY OF CONGENITAL TRANSVERSE REDUCTION DEFICIENCY AT OR ABOVE THE WRIST LEVEL

Ida Neergård Sletten[1], Jarkko Jokihaara[2,3], Kari Klungsøyr[4,5]
[1]Division of Orthopaedic Surgery, Oslo University Hospital, Oslo, Norway; [2]Department of Hand Surgery, Tampere University Hospital, Tampere, Finland; [3]Faculty of Medicine and Health Technology, Tampere University, Tampere, Finland; [4]Division of Mental and Physical Health, Norwegian Institute of Public Health, Bergen, Norway; [5]Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway

Introduction: One of the most common limb reduction defect subtypes is transverse reduction deficiency at and above the wrist (TRDAW). The malformation is believed to be caused by a disruption in a fetal limb bud signalling center called the apical ectodermal ridge, and several studies have suggested a fetal vascular aetiology. Few studies of upper limb reduction defects have focused specifically on TRDAW, which has a different etiology than longitudinal reduction deficiencies.

Aim: We aimed primarily to report a 50-year Norwegian TRDAW prevalence, describe parental, pregnancy, and delivery data, and report infant outcomes, including associated congenital anomalies. Secondarily, we aimed to identify potential risk factors for TRDAW.
Material & Methods: We identified 202 persons living in Norway with TRDAW, born in Norway between 1970 and 2019 from the Medical Birth Registry of Norway (MBRN) and the CULA (congenital upper limb anomalies) North Oslo Registry. We contacted them to give them the opportunity to refuse their birth data from being included in the study. We calculated yearly and overall prevalence rates and compared MBRN parental, pregnancy, birth, and infant data for participants with the background population of comparable individuals (2 741 216 persons without TRDAW born in the same interval, living in Norway in 2019). For maternal smoking and folate intake, we had data for 20 years.
Results: No persons refused study inclusion. We calculated an overall Norwegian TRDAW prevalence of 0.74/10 000, varying between 0-1.6/10,000 per year. The sex ratio was 1:1. Among newborns with TRDAW, the risk of being small for gestational age was doubled and having an Apgar score <7 was almost four times as high as in the rest of the newborn population. The risk of being transferred to the neonatal intensive care unit after delivery was three-fold. Nine (4.5%) had other congenital anomalies, compared to 25 583 (0.9%) in the remaining population, most frequently in the lower limbs. We could not identify significant risk factors for TRDAW other than an association with twin pregnancy, but our study was probably underpowered for analyses of maternal smoking and folate intake.
Conclusions: We have found a TRDAW prevalence consistent with prevalences from other Nordic countries. Newborns with TRDAW had more associated anomalies than the rest of the population but less than one-tenth than in all limb reduction defect cases in Norway between 1999-2016 and at a lower rate than in previous studies of transverse reduction defects that have included deficiencies at the hand level. We recommend larger population-based studies from multiple countries to investigate TRDAW risk factors further.

A-0577 VARIATION IN PROCEDURE LENGTH OF CLOSED REDUCTION AND PERCUTANEOUS PINNING OF SUPRACONDYLAR HUMERUS FRACTURES AT COMMUNITY HOSPITALS COMPARED TO AN ACADEMIC MEDICAL CENTER

Anna Christou, Julia L. Conroy, Catherine C. May, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Supracondylar humerus fractures are the most common pediatric elbow fracture requiring operative intervention.
Aim: The purpose of this study is to examine the factors leading to varying lengths of time it takes to perform a closed reduction and percutaneous pinning (CRPP) procedure for pediatric supracondylar humerus fractures at community hospitals compared to an academic medical center.
Material & Methods: A retrospective chart review was conducted to identify patients less than 18 years who sustained a supracondylar humerus fracture and underwent closed reduction and percutaneous pinning. Data collected included patient demographics, surgeon, number of pins utilized, size of pins utilized, post-operative immobilization, time under anesthesia, length of overall procedure, and complications from the procedure. Simple statistical analysis was conducted.
Results: Three hundred ninety-two patients with an average age of 6.5 years (SD:2.6 years) were identified. Among the community hospitals (CH), Gartland type II (88.4%, N=76) fractures were the predominant fracture type observed whereas Gartland type III (69.3%, N=95) fractures were most common at the academic medical center (AMC). Comparing the duration of cases involving Gartland type II fractures, the average duration at the AMC (30.3 minutes, SD:8.2 minutes) was significantly longer than at the CH (23.2 minutes, SD: 10.8 minutes) (p=0.00097). Additionally, the AMC utilized 3

to 4 pins during the procedure whereas the CH utilized 2 to 3 pins. There was no significant difference in the size of pins utilized or post-operative immobilization between sites. Seven (1.8%) patients experienced complications. Three of these patients received care at the CH of which 2 patients experienced pyogenic granulomas at their pin sites and 1 patient experienced septic arthritis with osteomyelitis which resolved following irrigation and debridement. Of the 4 patients who received care at the AMC, 2 experienced mild infection, 1 experienced nascent malunion, and 1 experienced anterior interosseous nerve syndrome which improved.
Conclusions: The average duration of CRPP procedures for pediatric supracondylar humerus fractures was significantly longer at the academic medical center compared to community hospitals.This may be attributable to academic medical centers treating a higher rate of complex fractures compared to community hospitals. Further research is warranted to better understand the factors that lead to this discrepancy.

A-0578 QUESTIONNAIRE TO THE UPPER LIMB DIFFERENCES IN CHILDREN'S FAMILY AS A TOOL TO BUILD A STRONG SUPPORT FOR THE FAMILIES

S. Minoia, S. Longhi, E.M. Mancon, A. Viano, G. E. Pajardi
S. Giuseppe Hospital - Multimedica Group, Milan, Italy

Introduction: When a family gets to a Hand Surgery and Rehabilitation department at first the feelings can be or may have been overwhelming and troubled. Considering that we, as health workers, want to guarantee the best for the little patient and the best for them is the best for the whole family and caregivers, we decided to start understanding better the single experiences of the families. Knowing more about their experiences and expectations could be a good start to build a positive and supportive environment.
Aim: Improve listening and ensure support to the families of children with upper limb differences
Material & Methods: After looking for literature suggestions and inspiration though PubMed and other sources and after previous studies of our department, in Milan, we developed a questionnaire that is completely anonymous with both "closed" and "open" questions, 16 in total. We decided to make it through the Google Form, and we started to assess it to the families of little children with upper limb differences that were attending our "Hand Camp" in September '23 in Milan. We have 37 complete answers so far.
Some of the results confirm what we discovered during the previous years and some confirm the literature as well. Most of the families (67%) were not aware about the condition of their children before the birth; the majority of the families (more than 50%) have been addressed to a specific center (hand department). Still: some families needed more information, psychological and human support at the moment of the diagnosis/birth/adoption. Relation with peers, functional results and surgeries are the three bigger topics that worry our families more.
Conclusions: In conclusion, being aware of this situation we are starting to modify the structure of visits and rehabilitation, we are guaranteeing visits within the 1st month of age for the baby when is asked by another hospital to avoid families to be "lost". We try to follow from a rehabilitative point of view the little children for about a month here in Milan after surgery, but after that period of time they need to go on with therapy. This is the reason why we are trying to invest on the time we spend for lesson/courses and practical workshops for the therapists that can be a good guidance and support ones the family go back home. We are also working to keep our "Hand Camp" ready to change for future needs of both families and patients.

A-0579 THE EFFECT OF ARM SWING ON TOURNIQUET JUMP BIOMECHANICS: PILOT STUDY

Burcu Semin Akel[1,2], Ayşenaz Kaya[1], Öyküm Kaygusuz[1], Kübra Önerge[1,3], Halenur Evrendilek[1,4], Şevket Nadir[2]
[1]Istanbul Kultur University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Istanbul, Turkiye; [2]Istanbul Kultur University, Motion Analysis Center, Istanbul, Turkiye; [3]Hacettepe University, Graduate School of Health Sciences, Physical Therapy and Rehabilitation Division, Ankara, Turkiye; [4]Istanbul University - Cerrahpasa, Institue of Graduate Studies, Division of Physiotherapy and Rehabilitation, Istanbul, Türkiye

Introduction: Upper extremity flexibility, position or movement has an effect on lower extremity related sport performance. For example, the use of arm swing in countermovement jumps has shown to enhance jump performance by increasing takeoff velocity and jump height. However, the effect of upper extremity swing in sports that require jumping on one leg, such as tourniquet shooting, is unclear.
Aim: The purpose of the study is to examine the impact of arm swing on the biomechanics of tourniquet one-leg jumping in healthy individuals aged 18-30 years.
Material & Methods: Six healthy young adults (2 males, mean age 22.34 $\pm$ 1.37 years, mean height 168.50 $\pm$ 7.87 cm, mean weight 62.08 $\pm$ 8.67 kg) volunteered for the study. Participants executed maximal height jumps on their dominant leg using a tourniquet jump technique, initially without arm involvement (T1) and subsequently with an arm swing (T2). Jumps were analyzed using a 3D motion analysis system (VICON, Vantage 5) and 2 force plates (AMTI). The jump phases (take-off, flight, and landing) were assessed, and jump height was calculated based on flight duration using a formula described in the literature.The results were statistically compared with Paired t-test.
Results: Jump height significantly increased with arm swing (T2: 17.25 $\pm$ 9.34 cm, T1: 15.44 $\pm$ 8.01 cm, $p < 0.001$). Additionally, flight duration was longer in T2 compared to T1 (T2: 361.49 $\pm$ 101.82 ms, T1: 331.39 $\pm$ 90.53 ms, $p < 0.001$). However, the contact duration of the take-off phase did not significantly differ between T1 (250.56 $\pm$ 339.85 ms) and T2 (259.72 $\pm$ 50.40 ms, $p = 0.179$).
Conclusions: Incorporating arm swing in tourniquet jumping resulted in increased jump height and prolonged flight duration among healthy individuals. These findings highlight the potential impact of modifying jump technique, specifically including arm swing, in enhancing tourniquet jump performance and overall sportive abilities. Exercises to ease the upper extremity flexibility may increase the jumping performance. The research team is currently expanding participant numbers for further investigation.

A-0580 THE INTERRATER RELIABILITY OF THE DIAGNOSTIC HOOK- AND TRAMPOLINE-TESTS IN THE ARTHROSCOPIC DEFINITION OF THE FOVEAL TFCC INJURY

Robert Gvozdenovic[1,2], Signe Juhl Dynesen[1]
[1]Herlev/Gentofte Hospital, Department of Orthopaedic Surgery, Hand Surgery Unit, Hellerup, Denmark; [2]University of Copenhagen, Faculty of Health and Medical Sciences, Institute of Clinical Medicine, Copenhagen, Denmark

Introduction: Wrist arthroscopy is the gold standard for identifying TFCC injury. The specificity and sensitivity of the Hook- and Trampoline tests to assess TFCC injuries are well documented. However, the inter-rater reliability of these tests has only been investigated in cadaver studies or in studies where surgeons evaluated the results of the tests by observing videos of the tests performed by experts.
Aim: This study aimed to evaluate the inter-rater reliability of the Hook- and Trampoline-test in vivo, during live surgery on a basis of daily Hand Surgery Clinic setting.

Material & Methods: From December 2022 to November 2023, 45 consecutive patients scheduled for diagnostic wrist arthroscopy were included after giving written consent for the study. The patients included 23 women and 22 men, ranging from 19 to 66 years of age. Four different hand surgeons were used as observers, three of surgeons' expert level III, and one of surgeons' expert level IV, according to Tang & Giddins. The diagnostic wrist arthroscopy using 3/4 and 6R arthroscopic portals proceeded as normal until the responsible operating surgeon (Observer 1) performed the Hook- and Trampoline test of the TFCC. Afterwards, one of the other participating surgeons (Observer 2), blinded for the indication of the diagnostic procedure, was invited to perform the same testing during the ongoing surgical procedure using the same arthroscopic probe. A minimum of 3 and a maximum of 10 minutes were used for these purposes. Any communication between surgeons was not allowed, and both surgeons, unaware of each other findings independently reported their assessments in binary answers (positive/negative). The surgical procedure again proceeded as normal after Observer 2 departed the operating room. The trampoline test was only performed on the latest 35 patients. Some of the agreement could be derived by chance, therefore, a statistical Cohen's kappa was calculated and evaluated according to the scale proposed by Landis and Koch.
Results: Of the 45 wrists included, the surgeons agreed on 35 of the findings (78%) of the Hook test and disagreed on 10. Of the 35 Trampoline tests performed, the surgeons agreed on 24 (69%) and disagreed on 11. To avoid the possibility of chance agreement, we calculated a Kappa value of 0.54 for the Hook test and 0.35 for the Trampoline test, corresponding to a moderate agreement level for the Hook test and a fair agreement level for the Trampoline test, according to Landis & Koch.
Conclusions: Despite the reports of high accuracy, sensitivity, and specificity, the arthroscopic Hook test is less reliable among observers when evaluated in vivo and live surgery settings. The findings of moderate reliability of this important diagnostic tool involving the tactile component of different surgeons correspond more to a real clinical situation in defining foveal TFCC lesions in patients. However, the trampoline test seems more reliable during live surgery compared to studies using videos.

A-0581 OUTCOMES OF PEDIATRIC UPPER EXTREMITY PROXIMAL PHALANX FRACTURES FOLLOWING A CLOSED REDUCTION AND PERCUTANEOUS PINNING

Mary C. Sleet, Catherine C. May, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Upper extremity proximal phalanx fractures are very common in the pediatric and adolescent populations. Despite the high prevalence of these injuries, there is sparse literature regarding their treatment and outcomes.
Aim: The purpose of this study is to assess the outcomes of closed reduction and percutaneous pinning (CRPP) of upper extremity proximal phalanx fractures in the pediatric and adolescent populations.
Material & Methods: A retrospective review was performed to identify all pediatric and adolescent patients who had an upper extremity proximal phalanx fracture treated with a CRPP over a 10-year period. Patient demographics, mechanism of injury, time from injury to clinical evaluation and surgical intervention, operative technique, length of immobilization, final range of motion, and complications were recorded. Simple statistical analysis was performed.
Results: 41 patients with an average age of 9.6 years (Range: 1-17 years) were identified. The most common mechanisms of injury were sports (N=18, 44%) and falls (N=14, 34%). The majority of patients (N=22, 54%) presented with small finger fractures, followed by ring (N=7, 17%), long (N=15, 12%), thumb (N=5, 12%) and index (N=2, 5%) finger fractures. Fracture subtypes included Salter-Harris fractures (N=15, 37%), phalangeal neck fractures (N=12, 29%) and other fractures (N=14, 34%), such as shaft and unicondylar fractures.

The average time from injury to the initial evaluation was 6 days (Range: 1-15). The average time from initial evaluation to surgery was 4 days (Range: 0-27). Intraoperatively, one to three Kirshner-wires were used to achieve fracture stabilization, most often two (N=30, 73%). The K- wires used were either 0.045" (N=38, 93%) or 0.035" (N=3, 7%). The average length of immobilization and time to removal of hardware was 31 days (Range: 15-77). The average time from surgery to return to activity was 68 days (Range: 26-155). Six (14.6%) patients had complications including loss of range of motion and/or stiffness (N=5) and one pyogenic granuloma. Of the patients with loss of range of motion and/or stiffness, all five patients were referred to therapy. Four of the five patients were ultimately lost to follow-up and one patient regained full motion with therapy. No physeal arrests occurred and no patients lost alignment following the procedure. There were no patients that required a return to the OR.
Conclusions: Pediatric upper extremity proximal phalanx fractures that cannot be adequately treated with closed means alone can be successfully managed with a closed reduction and percutaneous pinning with minimal complications expected. The most common complication of a CRPP of an upper extremity proximal phalanx fracture is loss of range of motion. Further research is warranted to determine if the stiffness resolves with therapy/use or remains permanent in nature.

A-0582 OUTCOMES FOLLOWING ORIF OF PEDIATRIC DISTAL RADIUS FRACTURES WITH PLATE AND SCREW FIXATION

Dennis Morozov, Catherine C. May, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Distal radius fractures are extremely common in the pediatric and adolescent populations. While the majority of these fractures may be treated nonoperatively, operative intervention may be necessary for significantly displaced and/or angulated fractures. Operative intervention most commonly consists of a closed reduction and percutaneous pinning, however, occasionally plate and screw fixation is warranted. There is currently limited knowledge surrounding the outcomes of performing an open reduction and internal fixation with the use of plate and screws on pediatric patients with open physes.
Aim: Therefore, the purpose of this study is to assess the epidemiology, outcomes, and complications of pediatric distal radius fractures treated with an open reduction and internal fixation (ORIF) using plate and screw fixation.
Material & Methods: A retrospective review was performed to identify all pediatric and adolescent patients treated with an ORIF of a distal radius fracture using a plate and screws over a 9-year period. Patient demographics, mechanisms of injury, fracture classification, treatment characteristics, outcomes, and complications were recorded. Simple statistics were performed.
Results: 12 ORIF procedures were performed on 11 unique patients with an average age of 11.5 years (Range: 8-14 years). 7 (63.6%) were male. The most common cause of injury was a fall on an outstretched hand (FOOSH) (N=5). The majority of fractures (N=9, 81.8%) were classified as extraphyseal. The average time from injury to surgery was 15.3 days (range 1-48; SD 13.9). The average length of postoperative immobilization was 32.5 days (range 13-89; SD 19.4). The average time to return to activity was 82.3 days (range 55-131; SD 32.3). Two complications were reported, including stiffness (N=1), which resolved with therapy, and painful hardware (N=1), which resolved with NSAIDs. There was no evidence of premature physeal closure in any of the patients. No patients required removal of their hardware.
Conclusions: Open reduction and internal fixation using plate and screw fixation can be safely performed to restore anatomical alignment of pediatric and adolescent distal radius fractures when necessary. ORIF with plate and screw fixation of the pediatric distal radius does not cause premature physeal closure.

A-0583 ULTRASOUND-GUIDED PERCUTANEOUS TECHNIQUE FOR TRIGGER FINGER RELEASE: OUTCOME AND SAFETY EVALUATION

Michiel Cromheecke[1], Pieter-Bastiaan De Keyzer[1], Pascal Louis[2], Olivier Mares[3], Jean Goubau[1], Jean-Michel Cognet[2]
[1]AZ Maria MIddelares, Ghent, Belgium; [2]SOS Mains Champagne Ardenne/Medipole, Bezannes; [3]Orthopedic Surgery Unit, CHU Caremeaux, Nîmes, France

Introduction: Ultrasound surgery, a rapidly growing field, is gaining significant attention within the hand surgery community for its minimally invasive approach. Building upon our previously established technique using an ultrasound-guided percutaneous method with a minimally invasive surgical knife for trigger finger release, this study expands our research to a larger patient cohort, reflecting the increasing interest and application of such innovative techniques in hand surgery.
Aim: To evaluate the effectiveness and safety of this minimally invasive technique in a larger patient population and to document the incidence of complications
Material & Methods: A retrospective analysis of 248 trigger finger releases in 203 patients, average age of 62.8 years, was conducted. Assessments for residual triggering and postoperative complications were made at 6 weeks and 3 months.
Results: None of the patients reported residual triggering. Major complications such as tendon rupture, bowstringing, or neurovascular issues, were absent. There was conversion to open surgery in one patient. 18 patients encountered minor complications such as residual pain, extension deficit, or incomplete flexion. These were treated with additional infiltration in 11 cases, extension splinting in 3 cases and physiotherapy 4 cases.
Conclusions: This study reinforces the safety and high efficacy of this minimally invasive ultrasound-guided percutaneous technique for trigger finger release in a larger patient sample.

A-0584 DOES TIME UNTIL SURGERY AFFECTS FUNCTIONAL OUTCOMES AFTER DISTAL RADIUS FRACTURE? A RETROSPECTIVE ANALYSIS AT A SINGLE CENTER

Joana Páscoa Pinheiro[1], Miguel Alves Botton[2]
[1]North Lisbon University Hospital Centre - CHULN, Portugal; [2]Hospital Cuf Descobertas, Portugal

Introduction: Surgical treatment for distal radius fractures (DRFs) varies based on timing of presentation, surgeons' availability and patients' preference. It is still debatable whether time-to-surgery for DRFs affects patients' functional outcomes.
Aim: This study aims to help hand surgeons to clarify the impact of surgical timing in DRFs on patients' functional outcomes and possible complications.
Material & Methods: Between 2020 and 2022, 229 adult patients with closed, isolated DRFs were surgically treated. Among them, 89 patients were included in the study. Demographics, type of fracture (AO classification), time until surgery and complications were collected frompatient's database. Post operative functional outcomes including VAS at rest and VAS performing daily life activities, DASH and PRWE scores were collected.
Considering that there is no consensus regarding the results and optimal timing of surgery for DRFs, we established a threshold of 7 days based on the recent work by Grier et al., who reported early complications rates to double at 7 days after injury. Patients were distributed in two groups: group A surgically treated until day 7th and group B after the 8th day (including).
Patients treated six or more weeks after injury and with a follow-up of less than 6 months were excluded from the study.

All surgeries were performed by the senior author with a volar locking plate.
Statistics were performed using SPSS 23.0 with a level of significance of <.005.
Results: Forty-nine patients with a mean age of 48,2 years old were included in group A and 40 patients with a mean age of 50,4 years in group B. Mean time to surgery in group A was 3,98 ± 2,35 days and in group B 22,64 ± 24,20 days. Regarding fracture classification in group A vs B, 29 vs 25 presented an articular fracture, 12 vs 8 a partial-articular fracture and 8 vs 7 an extra-articular fracture, respectively.
In group A 30 patients reported having their nondominant wrist affected, with a VAS score at rest of 1,52; VAS score performing activities of 2,55, PRWE score of 25,72 and DASH score of 17,78. In group B 24 patients reported having their nondominant wrist affected, with a VAS score at rest of 2,27, VAS score performing activities of 3,54, PRWE score of 35,57 and DASH score of 28,45.
No differences were found with regards to age, gender, AO classification or dominant wrist affected. We found significant differences between groups regarding VAS at rest and performing activities and DASH score, p<0.005. Although inferior in group A, the difference between PREW was not statistically significant p=.006.
Conclusions: Early surgery in the first seven days after injury seems to have a better result regarding pain score and functional outcomes in patients with distal radius fractures.

A-0585 IMPACT OF EXPOSURE BY HAND-HELD VIBRATING TOOLS ON PATIENT-REPORTED OUTCOME MEASURES AFTER OPEN CARPAL TUNNEL RELEASE – A RETROSPECTIVE COHORT STUDY WITH MATCHED CONTROLS

Malin Zimmerman[1,2], Lisa Åselius[2], Erik Dahlin[2,3], Gert S Andersson[4], Lars B Dahlin[2,5,6]
[1]Department of Orthopedics, Helsingborg Hospital, Helsingborg, Sweden; [2]Department of Translational Medicine – Hand Surgery, Lund University, Lund, Sweden; [3]Department of Orthopedics, Centrallasarettet, Växjö, Sweden; [4]Dept. of Clinical Sciences Lund, Clinical Neurophysiology, Lund University and Skåne University Hospital; [5]Department of Hand Surgery, Lund University, Skåne University Hospital, Malmö, Sweden; [6]Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden

Introduction: Vibration exposure is a known risk factor for carpal tunnel syndrome (CTS).
Aim: We aimed to investigate whether vibration exposure affects patient-reported outcomes following open carpal tunnel release.
Material & Methods: From a population surgically treated for CTS (n=962), we identified patients who reported vibration exposure, had undergone preoperative electrophysiology testing, and answered the QuickDASH questionnaire both before and 12 months after surgery (n=23). We then matched controls from the original study population on age, sex, diabetes status, type of diabetes, and smoking (n=23).
Results: The majority of the included patients were men (17/23 in each group), with a mean age of 61. Preoperative electrophysiology results were worse among vibration-exposed individuals (sensory conduction velocity in the median nerve at wrist level was median 27 [interquartile range 20-34] m/s in vibration-exposed vs. 32 [28-35] in non-exposed. QuickDASH scores did not differ between the two groups (preoperative QuickDASH was median 45 [IQR 30-61] in vibration-exposed individuals and 43 [25-64], p=0.68, in non-exposed, and postoperative QuickDASH was 20 [2-45] in vibration-exposed individuals and 14 [5-34], p=0.87, in non-exposed individuals).
Conclusions: When controlling for known confounders, vibration-exposed individuals can expect the same symptom relief following open carpal tunnel release as non-exposed individuals. Individual assessment and treatment are warranted if there is a history of vibration exposure.

A-0586 TRANSSCAPHOPERILUNATE DISLOCATION WITH TRIQUTRUM FRACTURE

Hazem Alhasan, M. Sharaby, M. Alnahdi, A. Abdulhadi
Dammam Medical Complex, Dammam, Saudi Arbia

Introduction: Lunate and perilunate dislocation is on of the rare but serious injuries of the carpal bones associated with delayed complications and instability. In this report, a case of transscaphoperilunate dislocation with triqutral fracture is presented

Aim: The double approach might be needed particularly in patients with late presentation and difficult reduction

Material & Methods: On initial presentation, the patient had 4 w duration since the original injury, with failure of reduction with carpal tunnel like symptoms as well as swelling. Surgical reduction was done using double approach both volar and dorsal with release of the carpal tunnel and repair of the radioscapholunate ligament. K wires were applied for stabilization of the radiolunate, scapholunate, scaphotriqutral as well as the scaphoid fixation. K wires were removed after 6 w with no evidence of wound contimation, with night splint and start of physiotherpay

Results: On 3 m follow up; the pt ROM was 50 dorsiflexion – 70 palmer flexion, with no sensory deficit and acceptable hand grip strength. X ray revealed appropriate alignment of the carpal bones with good evidence of healing of the scaphoid. No evidence of AVN was detected till that date

Conclusions: This type of carpal injuries is included in shear type mechanisms of hand and wrist injuries and necessitate early identification and management to avoid the possible complications including stiffness, AVN and nonunion. The double approach might be needed particularly in patients with late presentation and difficult reduction

A-0587 ISOLATED DORSAL DISLOCATION OF THE DISTAL RADIOULNAR JOINT: A SYSTEMATIC REVIEW

Thomas Cash, James Kennedy, Daniel Brown
Liverpool University Hospitals NHS Foundation Trust, Liverpool, UK

Introduction: Dislocation of the distal radioulnar joint (DRUJ) was first described in 1777. It represents a spectrum of injuries and is commonly associated with distal radial fractures. Isolated dislocations of the DRUJ are less common and can occur in either a volar or dorsal direction. By convention, DRUJ dislocation is described as the ulna head position relative to the distal radius. This is a misnomer, as the ulnar is fixed and it is the radius which dislocates.

Aim: It is a common and widely quoted assumption that dorsal DRUJ dislocations occur more frequently than volar. Following a recent case in our unit, we reviewed several core orthopaedic hand and wrist textbooks and could not find a citation to back up this assumption. We therefore conducted a systematic review to clarify the distribution.

Methods: We performed a systematic review of isolated traumatic dorsal DRUJ dislocations following PRISMA guidelines. The inclusion criteria was acute (defined as less than 6 weeks) isolated DRUJ dorsal dislocation. Exclusion criteria included age <16 years and other associated injuries/fractures.

The literature search was conducted through our institution's library service utilising PubMed, EMBASE, EMCARE, Medline and CINAHL. The resulting literature was de-duplicated and independently screened for eligibility by TC/JK at levels of title, abstract and full text. Arbitration was conducted by DB.

Full text manuscripts were obtained and data was extracted for age, hand dominance, side of injury, occupation, time since injury, management and final outcome. Translation was conducted when appropriate. Reverse citation screening was also undertaken.

Results: 17 cases of isolated dorsal DRUJ dislocation were identified from 13 papers published between 1946 and 2022.

The mean age was 31 years (range 17-73). The modal mechanism was fall on outstretched hand (7 cases), followed by road traffic accident (4 cases). 7 patients were treated with closed reduction alone, 2 patients underwent closed reduction and k-wire stabilisation, 2 patients had open reduction alone and the remaining patients received another surgical technique. A good subjective final result was reported in nearly all cases.
This is considerably less than 99 cases of isolated volar DRUJ dislocation from 59 papers in a recently published systematic review from our unit (O'Malley et al 2022).
Conclusion: Although it is widely accepted that dorsal DRUJ dislocations are more common, volar injuries are more frequently described in the published literature. This may be a true observation or may represent a lack of reporting of dorsal injuries due to the perception they are more common. A prospective collaborative multicentre study would help evaluate the true incidence of these rare injuries.
Based on the results of our review we recommend a stepwise approach to management, commencing with attempted closed reduction. If reduction cannot be maintained with cast immobilisation in supination or in the presence of gross instability, we advocate temporary k-wire fixation. We do not advocate primary ligament reconstruction, reserving this procedure for failed reduction and for symptomatic non-arthritic chronic dislocations.

A-0588 MANAGEMENT OF THE NEGLECTED ELBOW DISLOCATION

N. Metaxiotis, E. Athanaselis, V. Akrivos, E. Konstantinou, A. Sourmenidi, N. Stefanou, S Varitimidis
Department of Orthopedics, University Hospital of Larissa, Larissa, Greece

Introduction: neglected posterior dislocation of the elbow refers to a non- diagnosed traumatic elbow dislocation which has been left untreated for 3 weeks or more. Elbow is deformed with decreased and painful ROM.
Apart from plain radiographs, a CT scan or/and MRI are advised pre- operatively. Fibrosis and soft tissue contractures, ligament rupture, potential nerve damage, and myositis ossificans make treatment challenging. A painless, stable, and flexible elbow with a congruent joint space is the aim of surgical treatment.
Aim: we present a small series of 3 patients with neglected elbow dislocation that were treated operatively and their clinical and radiological outcomes.
Material & Methods: from 2009 to 2023, three patients with neglected traumatic elbow dislocation were surgically treated. Two women and one man with an average age of 40.6 years (27-55) had an elbow dislocation of their dominant upper limb. The mechanism of injury of the two female patients was fall from height and due to multiple injuries, dislocated elbow was neglected. The third patient was treated initially for terrible triad of the elbow but was not followed up closely and presented two months post-op with a dislocated elbow (ulno-humeral joint) and a dislocated radial head prosthesis. The average time since injury was 5.6 weeks (4-8).
Results: the patients were treated using medial and extended lateral approach to the elbow. Open reduction, arthrolysis, and repair or reconstruction of ligaments with tendon grafts was performed. A hinged external fixator was finally applied for stabilization. A program of progressive elbow mobilization was followed before and after fixator removal at 6 weeks. Patients were re-examined at 3 months, where radiographically good joint concentricity and elbow stability in valgus and varus stress were checked. ROM in the two female patients was 10 degrees extension, 120 degrees flexion with 90 degrees pronation and 90 degrees supination, while the third patient had a ROM from 45 to 90 degrees with 20 degrees pronation and 25 degrees supination. Elbow was fully functional in two female patients. The third patient had a compromised function but denied any further intervention.
Conclusions: operative treatment is required for restoring joint anatomy and function in case of a neglected elbow

dislocation if it is diagnosed within 6-12 weeks. Surgical procedure is complex and demanding but it can offer a satisfying outcome.

A-0589 THE USE OF ULTRASOUND COMPARED TO CLINICAL EXAMINATION IN THE DIAGNOSIS OF COMPLETE UCL TEAR OF THE THUMB

M Ridwanul Hassan, Sravan Devathi, Pavandeep Virdee Kaur, Gemma Smith
University Hospitals Birmingham, United Kingdom

Introduction: Injury to the ulnar collateral ligament (UCL) of thumb is quite common following excess valgus stress or hyperextension at the metacarpophalangeal joint (MCPJ), impacting the stability and essential function of the thumb in opposition. Proper diagnosis of UCL injuries is crucial, influencing the choice between surgical intervention for complete tears and conservative management for incomplete tears. Clinical examination is a common diagnostic tool, relying on the observation of MCPJ laxity and the absence of an endpoint during valgus stress testing. Imaging modalities include the use of ultrasound to identify a "stener lesion" where the proximal end of the ligament is found overlying the adductor aponeurosis; MRI can also be used to visualise the ligament. The current guidelines recommend the use of clinical examination to guide management but has found limited evidence to support the use of ultrasound or MRI.
Aim: To compare the sensitivity and specificity of clinical examination and ultrasound scan for the diagnosis of complete UCL tear of the thumb
Materials and Methods: A retrospective cohort study was undertaken at the Queen Elizabeth Hospital Birmingham over a period of 8 years from January 2016 to June 2023. Case notes were analysed for 258 patients who had UCL injury to the thumb. Patients who had a complete UCL tear on intraoperative findings were identified and their notes were analysed to establish the pre-operative clinical examination findings and results of ultrasound imaging. Sensitivity, specificity, positive predictive values, and negative predictive values were calculated for both clinical examination and ultrasound imaging.
Results: 75 patients had surgical exploration following clinical examination or US imaging. 54 patients had a complete tear identified during surgery and 16 had incomplete tears. 13 patients had to excluded due to unclear documentation of examination findings. 41 patients with complete tears and 16 patients with incomplete tears were included in the study. 12 of these patients had ultrasound imaging of their UCL. The True Positive, false positive, False negative and True negative values for clinical examination and US were 24,3,17,6 and 8,2,2,0 respectively. The sensitivity, specificity, PPV and NPV for clinical examination compared to US was 0.58 vs 0.80, 0.66 vs 1.00, 0.88 vs 0.80, 0.26 vs 0.00 respectively.
Conclusion: Ultrasound imaging of UCL injuries to the thumb has a higher sensitivity, specificity and PPV for the diagnosis complete tears compared to clinical examination. Further prospective studies with larger cohorts and controls are warranted to validate and further refine the role of ultrasound in the diagnostic pathway for thumb UCL injuries.

A-0590 SUPRACONDYLAR HUMERAL FRACTURES IN CHILDREN. 20-YEAR EXPERIENCE IN A LEVEL I TRAUMA CENTER

Athanaselis E., Metaxiotis N.,Koskiniotis A., Mylonas Th., Stefanou N., Rigopoulos N., Dailiana Z., Varitimidis S
Department of Orthopedics, University Hospital of Larissa, Larissa, Greece

Introduction: Supracondylar humeral fractures constitute 7% of all fractures in children. They are classified according to Gartland classification. Treatment aims to restore the anatomy of the distal part of the humerus preventing deformities and functional disorders.

Aim: We present our approach in operative treatment of humeral supracondylar fractures in children and its clinical and imaging results.
Material & Methods: Between 2001 and 2021, 131 children with supracondylar humerus fractures with a mean age of 6.5 years (18 months-14 years) were treated operatively. 81 were boys (61%) and 52 were girls (39%). According to Gartland classification 22 patients (16.6%) were of type I, 56 of type II, 53 of type III and IV. There was one open fracture (Gustilo II) with transection of the brachial artery which was treated with end-to-end repair. Pink pulseless hand was recorded in 13 patients pre-operatively. The patients were divided into two groups according to the way of reduction (open or closed). K-w fixation was performed percutaneously in 20 patients (15%) after closed reduction and in 111 patients (85%) after open reduction by lateral (and medial if needed) approach to the distal humerus.
Results: Average follow-up time was 5.4 years (1-14 years). All patients underwent clinical and radiological examination recording elbow ROM, function and deformity. Fracture healing was completed at 4-6 weeks. Average operative time was 50 min (37-75) for the open reduction group while for the closed reduction group the average time was 42 min (15-70). Average radiation exposure time was 60 sec (10-120) for the closed reduction group while for the open reduction group average time was 20 sec (7-45). Vascularization of the limb was restored in all cases. In one patient of the open reduction group a valgus deformity (28°) without functional deficit was recorded. There were 2 cases with radial nerve (PIN) palsy and 2 cases with median nerve (AIN) palsy in the closed reduction group. All recovered within 6 months post-op. There was no significant difference in the functional results between the 2 groups. ROM was in average 142° flexion (130-152°), -5° extension (-3 to -14°), 77° pronation (73-87°), 91° supination (78-102°), average DASH score was 0.7 (0-5) and MEPS score 100 for the open reduction group. For the closed reduction group ROM was in average 139° flexion (129-153°), -3° extension (-2 to -11°), 79° pronation (74-89°), 89° supination (80-100°), average DASH score was 0.9 (0-6) and MEPS score 100. No infections or vascular complications were recorded postoperatively.
Conclusions: Open reduction and fixation with K-w provides very satisfactory outcome in type II and III supracondylar fractures of the humerus in children. The results are comparable with those of closed reduction without the radiation burden for patient and surgeon. Complications are rare and related to nerve palsies which recover spontaneously.

A-0592 RECTUS MUSCLE NECROSIS FOLLOWING ANTEROLATERAL THIGH FLAP HARVEST- A WORD OF CAUTION (CASE REPORT)

M RIdwanul Hassan, Rajive Jose, Mehitab Adel
University Hospitals Birmingham, United Kingdom

Introduction: The anterolateral thigh (ALT) flap is commonly used for the reconstruction of injuries with extensive soft tissue defects. In our practice, it serves as the default choice for large defects in the upper and lower limbs. While complications associated with free flap surgery, such as flap loss and donor site issues, are well-recognized, we encountered a rare complication involving necrosis of the entire rectus femoris muscle following flap harvest. This unusual occurrence, resulting from the division of the muscular branch to the rectus femoris muscle, has been documented only three times in the literature.
Case Report: We present the case of a 40-year-old man transferred to our hospital following a severe road traffic injury to his right upper limb. He sustained a multiplanar avulsion of the soft tissues of the forearm with loss of skin, flexor muscles, both arteries and both median and ulnar nerves over a large segment. He had multiple debridements and succesful revascularisation of the forearm at the referring hospital. He underwent reconstruction of the forearm using nerve grafts, nerve transfers, tendon transfers and an anterolateral thigh flap from the left thigh. A unique aspect of this

case was the decision to harvest the flap using perforators to both ALT and tensor fasciae latae (TFL) flaps, supplying the upper thigh skin. During pedicle exploration, a musculocutaneous perforator to the flap was identified from the mid-thigh, with a decision to extend the pedicle by dissecting proximally. Subsequently, an unexpected large muscular branch to the rectus femoris muscle was divided to achieve a longer pedicle. Postoperatively, the patient developed signs of sepsis, and examination revealed necrosis of the rectus femoris muscle, leading to debridement and closure with a split skin graft.
Discussion: The rectus femoris muscle's type 2 classification according to Mathes and Nahai suggests its reliance on a dominant pedicle, making it vulnerable when divided. Previous reports by Koshima and Marruccia underscore the potential risk of muscle necrosis if the muscular branch is divided without assessing perfusion. While ALT flap procedures are common, reports of this specific complication are surprisingly sparse. Kimata et al. reported 14 cases of branch division without issues, emphasizing the importance of distal pedicle harvesting and, when necessary, careful evaluation of muscle perfusion.
Conclusion: This case highlights a rare but serious complication in ALT flap harvest—rectus femoris muscle necrosis due to the division of its muscular branch. Surgeons must be aware of this potential complication, especially in cases where a single dominant pedicle is proximal. The presentation emphasizes the importance of pre-dividing assessment using vessel clamps to avoid this complication. Increased awareness and preventive strategies, such as vessel clamp application, can mitigate the risk of rectus femoris muscle necrosis, contributing to improved outcomes in reconstructive surgery involving ALT flaps. This presentation aims to enhance awareness among surgeons about this specific complication and advocate for preventive measures to ensure optimal patient outcomes.

A-0593 ENHANCING THE SAFETY OF STEROID INJECTIONS IN CARPAL TUNNEL SYNDROME: AN MRI-BASED ANALYSIS FOR PRECISE MEDIAN NERVE LOCALIZATION

Rajan Choudhary, Shahd Nour, Janak Bechar
Queen Elizabeth Hospital Birmingham, Birmingham, UK

Introduction: Carpal Tunnel Syndrome (CTS) is a prevalent condition and when mild can be managed with steroid injections in the outpatient setting. Despite its commonality, this treatment carries inherent risks, notably the potential damage to the median nerve. This study aims to mitigate these risks by using MRI images to establish a more reliable method for median nerve localization, thereby enhancing the safety and efficacy of steroid injections for CTS.
The standard procedure for administering steroid injections in CTS patients relies on palpable landmarks to approximate the median nerve's location. However, the variability in wrist anatomy makes these landmarks unreliable, posing a risk of direct injury to the nerve. Symptoms of such injury include acute electric shock-like pain, which occurs when the needle is inadvertently advanced into the nerve.
Aim: This project aims to address this challenge by analyzing MRI wrist images from a cohort of patients, with a specific focus on the median nerve's spatial relationship with adjacent tendons and arteries.
Material & Methods: Our approach involves a bespoke Python program designed to analyze these MRI images. The software calculates the distances between various wrist structures, including the median nerve, tendons, and arteries. This analysis is expected to yield a more accurate and patient-specific understanding of the median nerve's anatomical positioning. By doing so, we aim to establish a safer, more reliable landmark for guiding steroid injections, thereby reducing the risk of nerve damage.
Results: To date, we have obtained MRI images from over 100 patients , providing us with a robust dataset for analysis. This dataset is crucial for our objective to identify a consistently safe pathway for steroid injections in CTS treatment. Preliminary results have shown promise in revealing the median nerve's varied positioning relative to palpable anatomical

landmarks. This finding underscores the need for a more personalized approach to injection administration.
Conclusions: The project's ultimate goal is to leverage these insights to develop a set of guidelines or a protocol that can be easily implemented in clinical practice. This protocol would utilize MRI-based measurements to guide the safe administration of steroid injections, thereby minimizing the risk of median nerve injury. In conclusion, our study aims to revolutionize the current practice by providing a scientifically-backed, MRI-based roadmap for safer steroid injections in CTS treatment. The anticipated outcome is a significant reduction in iatrogenic median nerve injuries, paving the way for more effective and safe management of Carpal Tunnel Syndrome.

A-0594 "THE ELEPHANT ON THE SCAN" ULNAR NERVE COMPRESSION BY ANOMALOUS SUPERFICIAL MUSCLE – CASE REPORT

Marina Ibrahim, James Henderson
Southmead Hospital, Bristol, UK

Introduction: Causes of ulnar nerve compression in Guyon's canal may include ganglion cysts, arteriovenous malformations, fibrous bands, carpal bone tumours or pseudotumors. Aberrant abductor digiti mini, flexor digit mini and accessory palmaris longus muscle. This is an usual case of ulnar nerve compression by an anomalous muscle.
Aim: Interpretation of MRI imaging of the wrist.
Methods: Case report of an unusual cause of ulnar nerve palsy.
Results: A healthy 60-year-old right-handed non-smoker, presented with a 4-month history of severe progressive weakness of his left hand affecting dexterity and ability to use fork and gear stick.
On examination, a marked ulnar nerve palsy was identified, with weakness and wasting of the ulnar nerve (UN) innervated musculature, and reduced sensation in the UN dermatome.
Nerve conduction studies localised the site of nerve injury to the wrist.
A magnetic resonance scan (MRI) was reported by a consultant radiologist as showing a ganglion arising from the pisotriquetral joint causing ulnar nerve compression.
Intraoperatively however it was immediately apparent that an enormous anomalous muscle (possibly a variant of palmaris longus) was the cause of the nerve compression. The muscle was excised to allow exploration of guyons canal. No ganglion was identified at the pisotriquetral joint.
The MRI scan was checked again in theatre and the muscle was obvious to see as a cause of UN compression. We presented the history and showed the scan at the hand radiology MDT, and four hand surgeons and a second consultant radiologist with a specialist musculoskeletal interest all failed to notice the anomaly!
The patient regained full strength and muscle bulk in the hand after four months.
Conclusions: This case confirms that excision of the aberrant muscle can lead to full resolution of symptoms. We are unsure why the history of symptoms was so short, given that the muscle must have been present since birth. The muscle was surprisingly large, and perhaps had undergone recent hypertrophy.

A-0595 HIGH RESOLUTION ULTRASOUND (HRUS) IN PEDIATRIC NERVE COMPRESSION SYNDROME - A CASE SERIES

L. Mailänder[1], N. Ventura[1], M. Scala[2], S. Kargl[1]
[1]Clinic for Pediatric Surgery, Kepleruniklinikum Linz, Austria; [2]Institute for Radiology, Kepleruniklinikum Linz, Austria

Introduction: In children peripheral nerve lesions of the upper limb are rare and diagnosis may be challenging. Impaired or lost motor function is the leading symptom whereas sensory abnormalities or deficits may be difficult to detect. The gold standard of diagnosis of peripheral nerve lesions are nerve conduction velocity (NCV) test and magnetic-resonance imaging (MRI). In contrast ultrasound examination of peripheral nerves is cheap and available. We evaluate the role of HRUS in diagnosis of posttraumatic pediatric nerve lesions due to nerve compression.
Methods: We highlight the role of HRUS in 18 cases of posttraumatic pediatric nerve compression syndromes due to operative stabilized forearm fractures (n=5), Monteggia fractures (n=2), anterior interosseous nerve (AIN) injury following elbow fracture (n=3), operative stabilized supracondylar humerus fracture (n= 7) and operative stabilized proximal humerus fracture (n=1). AIN (n=3), ulnar (n= 11) and radial (n=4) nerve were affected.
Results: In all 18 patients, neurological symptoms were found in thorough clinical examination leading to HRUS performed by an experienced pediatric radiologist. HRUS clearly demonstrated morphologic features of nerve compression including localized scarring, prestenotic bulging, visualization of compression and intranerval alterations. Signs of nerve compression were found at the clinically suspected anatomic location in all patients. Immediately after surgical nerve decompression HRUS proved nerve decompression and ceasing of nerve bulging. Certain morphological aspects (e.g. nerval hypoechogenicity) persisted longer than the neurological deficit.
Conclusion: HRUS is a cheap, readily available and non invasive diagnostic tool and allows a dynamic and clear detection of exact location and morphological changes of nerve compression after pediatric forearm injuries. We recommend HRUS to be used as a standard tool in evaluation of posttraumatic peripheral nerve compression in children.

A-0596 DIAGNOSTIC AND THERAPEUTIC PROCEEDING IN PEDIATRIC PATIENTS WITH CLOSED DISTAL FINGER EXTENSOR TENDON INJURY IN THE HAND

Maximilian Sliwinski[1], Ireneusz Walaszek[1,2], Kaja Gizewska-Kacprzak[1]
[1]Department of Pediatric and Oncological Surgery, Urology and Hand Surgery, Pomeranian Medical University, Szczecin, Poland; [2]Department of Orthopedic Traumatology and Musculoskeletal Oncology, Pomeranian Medical University, Szczecin, Poland

Introduction: Closed injuries of the extensor apparatus of the distal interphalangeal joint (DIPJ) of the finger in children are the result of injuries related to excessive flexion or hyperextension of the joint. This results in a detachment of the extensor tendon attachment at the base of the distal phalanx or an avulsion fracture, in which a bony fragment breaks off along with the apparatus attachment. The clinical picture is characterized by a deficit in extension of the DIPJ, with preserved flexion of the joint.
Aim: The aim of the study is to analyze the diagnostic procedure and the effects of treatment of closed injuries of the distal attachment of the extensor apparatus of the fingers in children.
Material & Methods: A retrospective analysis was performed regarding the surgical and conservative treatment of injuries to the distal attachment of the extensor apparatus in children admitted ambulatory or stationary. The Doyle classification was used to categorize injuries. The criteria for surgical treatment included volar subluxation of the distal phalanx, extension deficit >20 degrees, avulsion fracture involving >40% of the articular surface, and a gap between the bony fragment and the base of the distal phalanx >2 mm.

Results: Between 2019 and 2023 - 61 children were treated for injuries of the distal attachment of finger extensors. 36 children were treated surgically: 31 avulsion fractures which were treated with an Ishiguro extension block or a compression plate (1 patient). In the remaining 5 patients open reconstruction of the attachment of the extensor apparatus with temporary DIP arthrodesis was performed. 25 patients were treated conservatively with immobilization of the DIP joint. Using the Crawford criteria to assess the effect of surgical treatment, 6 patients received a very good result, 25 a good result, and 5 a satisfactory result. In the group of patients treated conservatively, 7 received a very good result, 13 a good result, and 4 a satisfactory result. One patient received an unsatisfactory result and was qualified for secondary treatment.
Conclusions: Using clear qualification criteria for surgical and conservative treatment of closed injuries of the distal attachment of the extensor apparatus of the finger a good final effect can be achieved. The Ishiguro extension block is a safe and effective method of treating selected avulsion fractures of the base of the distal phalanx.

A-0597 COMPARING ANTEGRADE VERSUS RETROGRADE INTRAMEDULLARY SCREW FIXATION FOR EXTRA-ARTICULAR DIAPHYSEAL FRACTURES OF THE PROXIMAL PHALANX. A BIOMECHANICAL STUDY

Bert Vanmierlo[1,2], Bruno Vandekerckhove[1,3], Arne Decramer[1,4], Shanna Zielinski[2], Bert Op 't Eijnde[2], Jean Goubau[3,5], Joris Duerinckx[2,6]

[1]AZ Delta, Roeselare, Belgium; [2]UHasselt, Belgium; [3]UZ Brussel, Belgium; [4]KULeuven, Belgium; [5]Maria Middelares, Gent, Belgium; [6]ZOL, Genk, Belgium

Introduction: Recent literature highlights the efficacy and minimally invasive nature of intramedullary headless compression screw (IMHCS) fixation in managing unstable proximal phalangeal fractures, emphasizing minimal complications, rapid recovery, and early motion restoration. Despite these advantages, reports on fixation direction and stability in this context are scarce.
Aim: This study aimed to assess the failure force and stability of transverse extra-articular diaphyseal proximal phalanx (P1) fractures, comparing two fixation techniques: antegrade versus retrograde screw insertion.
Material & Methods: A biomechanical analysis employed a cadaveric human transverse P1 fracture model. Twenty proximal phalanges from five pairs of cadaver hands were used, with a transverse proximal cut made 15mm from the base of P1. Ten were fixed with an antegrade technique, and ten with a retrograde technique, using identical fully threaded headless compression screws (2.5mm diameter, 30mm length). A three-point bending test assessed failure force and stiffness.
Results: results demonstrated a significant difference ($p < 0.05$, $p = 0.0039$) in mean failure force between antegrade (108.89 N) and retrograde (34.03 N) groups. Mean stiffness was 89.68 N/mm for antegrade and 71.62 N/mm for retrograde ($p < 0.05$, $p = 0.1602$).
Conclusions: IMHCS fixation stands out as a minimally invasive technique with favorable biomechanical properties for addressing proximal phalangeal fractures. The retrograde approach exhibits notable drawbacks, such as a relatively smaller distal than proximal articular surface of P1, the necessity to navigate the screw through the delicate central slip of the extensor apparatus, and the inherent difficulty in achieving a stable bone-screw construct due to the broader proximal metaphyseal medullary canal. Antegrade screw insertion, on the other hand, presents distinct advantages by ensuring a secure placement of the screw head into the robust subchondral bone at the proximal articular surface, thereby facilitating the creation of a more resilient and stable construct.
Consequently, our analysis leads us to affirm that the antegrade method demonstrates biomechanical superiority over the retrograde method in addressing extra-articular proximal diaphyseal fractures of the proximal phalanx, providing a markedly stronger fixation.

A-0598 LET THEM EAT CAKE

Sarya Uca[1], Akshara Sharma[2], Rajive Jose[2]
[1]Turkey Ministry of Health, Ankara, Turkey; [2]Queen Elizabeth Hospital, University Hospitals Birmingham NHS Trust, Birmingham, UK

Introduction: There are several facts which are misrepresented in literature over the years. The famous quote, which is the title of this abstract is attributed to Marie Antoinette, though there is no historical evidence that she ever said those words. 1 The true author of that statement was the writer Rousseau who lived in Geneva and never visited France. Medical literature likewise is rife with similar misrepresentations of facts. Hand surgery is no exception.
Methodology: We have looked at four such misrepresentations and traced back to the original source. These include the classic hand incisions described by Bruner, the anatomy of Dupuytren's disease described by Mcfarlane in his classic paper, and the eponymous tests known as the Bouvier test and Finkelstein test.
Results: Reading of the original papers on these topics revealed that the current understanding of these pathologies, procedures and tests are different to what the authors described. Bruner described his incision on the finger as being placed volar to the neurovascular bundles and cautioned against placing them too laterally so as not to risk injury to neurovascular bundles. 2 Many of the later descriptions have shown them as being placed from mid-lateral to mid-lateral. 3 McFarlane described the fascial anatomy of Dupuytren's disease and stated that Clelland's ligaments are involved in the disease. 4 However subsequently several sources have misquoted it as them not being involved. 5 Bouvier described his manoeuvre as a description of his patient's symptoms and is different from the current elaborate test being used. 6 Finkelstein's test as used was described by Eichhoff though Finkelstein described a similar test for De Quervain's tenosynovitis. 7
Conclusion: Textbooks often taken as sacrosanct can sometimes perpetuate these mistakes, and it is important to read and propagate the source articles to get a clear understanding of many of these conditions.
References:

1. Fraser, Antonia (2002). Marie Antoinette: The Journey. Anchor. pp. xviii, 160. ISBN 978-0385489492.
2. Bruner JM. Surgical exposure of flexor tendons in the hand. Ann R Coll Surg Engl. 1973 Aug;53(2):84-94.
3. https://www.thieme-connect.de/products/ebooks/lookinside/10.1055/b-0038-161071
4. McFarlane RM. The anatomy of Dupuytren's disease. Bull Hosp Jt Dis Orthop Inst. 1984 Fall;44(2):318-37.
5. https://www.orthobullets.com/hand/6058/dupuytrens-disease
6. https://mail.issh.org/pdf/monthly_updates/2020-bouviers-maneuver.pdf
7. Wu F, Rajpura A, Sandher D. Finkelstein's Test Is Superior to Eichhoff's Test in the Investigation of de Quervain's Disease. J Hand Microsurg. 2018 Aug;10(2):116-118.

A-0599 A CRITICAL ANALYSIS OF CERVICAL SPINE MALPOSITIONING DURING HAND SURGERY

Jordan Earl Wilkinson[1], Maud van den Hurk[2], Róisin Dolan[2]
[1]St Vincent's University Hospital, Dublin, Ireland; [2]Beaumont Hospital, Dublin, Ireland

Introduction: Surgeons perform procedures that require maintenance of sustained postures for prolonged periods of time. Hand surgeons may be at increased risk of sustained end-of-range postures, particularly cervical spine flexion. This can lead to strain on the musculoskeletal structures of the neck. Recent evidence suggests a higher incidence of neck dysfunction in hand surgeons, leading to an associated morbidity.
Aim: To analyse the cervical spine position of consultant and trainee hand surgeons during common hand procedures.

Material & Methods: We examined hand surgeons of all experience levels during 40 common hand surgery procedures. We recorded real-time goniometric measurements of neck flexion using the "UPRIGHT GO 2" device and accompanying smartphone app. Each participating surgeon also completed the Standardised Nordic Questionnaire for musculoskeletal pain with specific reference to neck pain.
Results: During a total of 40 procedures, consultant hand surgeons spent 60% of operative time in positions of cervical flexion exceeding 45-degrees, while trainee hand surgeons spent 71% of operative time in similar positions. These figures are put into perspective by the questionnaire results that showed 70% of the participating surgeons experienced non-trauma related neck pain. Among these, one-third experienced neck pain or discomfort in the previous 7 days. Notably, all respondents endorsed the potential role for biofeedback posture devices in surgical training, and indicated a willingness to use such devices during hand surgeries.
Conclusions: These positions of significant flexion may contribute to cervical spine dysfunction in hand surgeons and presents an opportunity to intervene at an early career stage to attenuate what could become irreversible dysfunction.

A-0600 PLIND INJURIES – 14 CASES TREATED ARTHROSCOPICALLY

Carla Ricardo Nunes[1,2], Raquel Teixeira[1,3], Catarina Pereira[1,4], Diogo Ramalho[1,5,6]
[1]Hospital Cuf Tejo, Lisboa, Portugal; [2]Hospital Cruz Vermelha, Lisboa, Portugal; [3]Centro Hospitalar de Lisboa Ocidental - Hospital São Francisco Xavier, Lisboa, Portugal; [4]Hospital Professor Doutor Fernando Fonseca, Amadora, Portugal; [5]Hospital SAMS, Lisboa, Portugal; [6]Hospital de Cascais Dr. José de Almeida, Cascais, Portugal

Introduction: Perilunate injuries not dislocated are part of the spectrum of perilunate injuries. These result from high-energy trauma and may present as ligamentous injuries only or may include carpal fractures. Such lesions can be easily overlooked due to the absence of dislocation.
Aim: We present a series of cases followed over a period of 7 years with over 6 months of follow-up.
Material & Methods: From 2016 to 2023 we have treated 14 cases of PLIND injury. The patients were 12 males and 2 females, aged 36.5 years (16-59). There were 10 left and 4 right wrists and only 3 dominant limbs. Nine were non-manual workers. The mechanism was fall from own height (4 cases), motor vehicle accident (3 cases), violent twisting (3 cases), fall from height (2 cases), fall while running (2 cases). Thirteen patients had a CT scan, only one had an MRI. Twelve were greater arc injuries (7 trans-scapho-perilunate, 2 trans-radio-perilunate, 1 trans-scapho-capitate-triquetral, 1 trans-scapho-triquetral, 1 trans-ulnar-perilunate), 1 lesser arc and 1 intra-lunate arc. Only 4 were diagnosed preoperatively as PLIND injuries.
Results: The timing of surgery was early in 1 case (5 days), delayed in 9 (mean 24.3 days), and chronic in 4 (3.1 months). All 12 greater arc lesions were treated arthroscopically, of which 3 required a volar portal, 2 a dorsal distal radius approach and 2 dorsal mini-open approach. Only one required median nerve release. Eleven healed within 12.7 weeks. One trans-scaphoid lesion did not heal and was re-operated at 3.5 months and healed. The ulnar styloid fracture did not heal and became asymptomatic. The resulting range of motion was 55 flexion, 56.5 extension, supination 89.3, 90 pronation. Eleven patients regained strength and 3 did not. Twelve returned to work without restrictions and 2 with modifications. The lesser arc injury was also treated arthroscopically, the wrist became stable with full range of motion and strength and returned to work without restrictions. The intra-lunate injury was treated arthroscopically in combination with a mini-open. The patient developed lunate avascular necrosis without collapse and a CRPS. There was stiffness, loss of strength and the patient was unable to return to the same job.
Conclusions: These injuries are rare and are often overlooked or underestimated. Despite the delay in diagnosis and treatment, the outcome can be favourable. Arthroscopy plays a crucial role in the final assessment and diagnosis of these lesions, allowing for less invasive treatment.

A-0601 'SEE AND TREAT' MODEL FOR HAND TRAUMA SERVICE DELIVERY

Akshara Sharma[1], Sarya Uca[2], Rajive Jose[1]
[1]Queen Elizabeth Hospital, University Hospitals Birmingham NHS Foundation Trust, UK; [2]Turkey Ministry of Health, Ankara, Turkey

Introduction: During the COVID-19 pandemic, we devised a service for hand trauma wherein patients were seen in an acute hand trauma clinic and treated in an adjacent procedure room. The outcome and complication rates of this procedure room were assessed and found to be satisfactory. The patient satisfaction with the procedure room was very good. We therefore continued this model with modifications post-covid to reduce theatre burden and it has been incorporated into our hand trauma pathway. The current hand trauma procedures performed in the procedure room are delivered by junior doctors in Hand surgery with consultant supervision. We are presenting the outcome data for the past three months with additional data on patient satisfaction.

Aims: We evaluated the case volume, mix, and treatment practices using the 'see and treat' model.

We analyse the outcomes, complications, and patient satisfaction to make recommendations for improving the service for patients and trainees.

Methodology: This retrospective single-centre study, conducted from August to November 2023, focused on hand injuries seen in the acute hand trauma clinic of a Regional Major Trauma Centre. Electronic patient records and the theatre book were utilized for data collection, encompassing patient demographics, injury details, operative parameters, complications, follow-up duration, and surgeon grades. Comparative analysis with COVID-era data facilitated trend identification. Additionally, we assessed hospital costs and the carbon footprint. Data is presented as number and percentage. We will perform Mann-Whitney analysis ($P<0.05$ significant).

Preliminary results We included 221 patients with complete data. Preliminary analysis shows a proportion (20.81%) of patients sought treatment from outside the city, highlighting the regional importance of our service. The majority of patients were male (67.87%) and below the age of 40 (54.75%). The average duration of surgery was less than 60 minutes in 87.5% of patients. 72.39% of patients were followed up for less than 6 weeks and 82.80 % of patients did not experience post-operative complications. 62.44% of patients were operated within 24 hours from the injury date. With procedural overlap, the procedures performed were terminalisation, repair of structures, nail bed repair, exploration, debridement, drainage, extensor tendon repair, foreign body removal, and open fracture management.

Financially, using this model, the hospital's cost saving was £119,340 for 221 patients, covering hand operation expenses, day care beds, instruments, sutures, and disposables. This model demonstrates a reduction in patient visits, translating to patients' time and cost savings and a potential decrease in the hospital's carbon footprint.

Conclusion: This quality improvement project is pivotal in evaluating the 'see and treat' model, emphasizing its effectiveness in enhancing clinical practice, patient care, and outcomes for hand injuries. Moreover, the model proves to be an invaluable training opportunity for junior doctors. Recommendations for further improvements, including the re-use of single-use instruments to reduce the carbon footprint, underscore the sustainability and adaptability of this cost-effective hand trauma service delivery model. We propose the potential replication of this cost-effective model of the Hand trauma service delivery by hand units globally, providing a framework for training surgeons and improving hand trauma care universally.

A-0602 TELEMEDICINE TO TRIAGE MINOR HAND BURN REFERRALS TO A TERTIARY CENTRE

Matthew Wyman, Nyo Paing Win, Mohammad Umair Anwar, Sharmila Jivan
Pinderfields Hospital, Mid Yorkshire NHS Teaching Trust, Wakefield, United Kingdom

Aims: Hand burns are a common presentation to Emergency Departments (ED) and can range from minor burns which heal without consequence to debilitating injuries that cause permanent loss of function. As such, the United Kingdom National Network for Burn Care recommend that all hand burns are at least discussed with burns services. Our burns centre provides the highest level of burns care in the region for a population of five million people across a geographical area of up to 120km. With large numbers of hand burns referrals, it is of interest to investigate current methods of triage and to identify which injuries can safely be managed locally without assessment by burns services.
Methods: Referrals of isolated hand burn injuries in adults and children to our centre over six months between October 2022 and April 2023 were retrospectively reviewed. Photographs of burns were reviewed by a specialty doctor at the time of referral using a telemedicine system, and were triaged either for face-to-face review (F2F), or for local follow-up (LFU). Outcomes included rates of admission, surgery, infection, scar clinic referral, and median time taken to heal.
Results: A total of 194 referrals of isolated hand burns comprising 24% of all burn referrals were received. Adults accounted for 118 (61%) and children for 76 referrals (39%). Eight adults (7%) and 3 children (4%) had bilateral injuries. Forty-six patients (24%) were triaged for LFU; the remaining 148 were seen FTF (76%).
Amongst children, contact burns were most prevalent (44/76, 58%) followed by scalds (23/76, 30%). Amongst adults, scald and contact injuries were equally prevalent (37% and 36% respectively). Nineteen burns in adults (16%) and 9 burns in children (12%) were full thickness.
Of the 46 LFU patients, none required re-referral to the burns service, suffered complications, or required surgery. Of 82 adult referrals and 66 child F2F referrals, 25 adults (30%) and 42 children (64%) healed within 2 weeks with simple dressings only and did not require admission, scar clinic referral, surgery, or treatment for infection, and could have therefore been managed by their local ED.
Complication rates among the 148 F2F patients included 16 who developed infection (11%), 9 requiring admission (6%), 21 requiring specialist dressings management (14%), 9 requiring surgery (6%), and 18 requiring scar clinic referral (12%). Five of 66 children were referred with safeguarding concerns (8%). A median of 3 outpatient appointments were required (range 1-9), and median time to heal was 8 days (range 0-56). This increased significantly to 20 days for full-thickness injuries (range 2-56, p=0.018 [Mann-Whitney U]).
Conclusions: At our centre annually, around 100 referrals with minor hand burns are safely triaged using a telemedicine system without face-to-face review. Of the patients seen F2F, 45% heal without complications within 2 weeks using simple dressing, accounting for another 130 patients per year. Assuming that adequate protocols and criteria are established, we anticipate that many hand burns can be managed in local EDs, thereby ensuring that burns service resources are reserved for more severe and complex injuries.

A-0603 HAND FIREWORK-RELATED INJURIES – TERTIARY CENTER EXPERIENCE IN COHORT OF 102 CHILDREN

Djordje Kravljanac, Radoje Simic
Institute for Mother and Child Healthcare of Serbia, Belgrade, Serbia

Introduction: The children commonly sustain major or minor hand injuries due to fireworks, and some of them result in permanent disability. Various studies highlight the devastating effects of firework-related trauma to the hand and the complexity of the injuries.

Aim: The evaluation of the firework-related injury patterns, types of hand injuries, management approach, and the outcome. Material & Methods: A retrospective study included all children with hand firework-related injuries treated in our hospital in the period from 2012 to 2022. Depending on the severity of the injury, the patients were treated in outpatient Clinics or they were hospitalized. Children were reviewed for demographics, manner of injuries, management procedures, and patient outcomes.
Results: The study included 102 children (91 boys and 11 girls) with hand firework-related injuries. The mean age was 11,3 (range 1–17) years. The most of injuries happened while a lighted firecracker was held in the hand. The thumb, index, and middle fingers of the right hand were predominantly affected. Twelve patients (12,12%) had injuries to bilateral hands. Superficial dermal burns and lacerations were the most common types of injury. Eighty-one children were treated as outpatients in the emergency room, while 20.6% of the cases required admission to the hospital. A total of 42,8% of admitted patients required surgery. The performed procedures were: partial or whole finger amputation and wound reconstruction in eight children and necrectomy and skin grafting in one patient. The longtime functional deformities had eleven patients (10,7%).
Conclusions: Hand injuries by fireworks occur every year, especially around New Year's Eve. The severity of firework-related injury can range from superficial burns to devastating loss of hands and digits. Most of the patients might be treated in outpatient clinics, while some of them require surgical reconstruction and even secondary operative procedures. It is important to increase society's awareness of the devastating effects of fireworks. Preventive measures significantly reduce morbidity in terms of firework-related injuries.

A-0604 PERCUTANEOUS CANNULATED BICORTICAL SCREWS IN THE MANAGEMENT OF PHALANGEAL FRACTURES : SYSTEMATIC REVIEW AND A SINGLE CENTRE'S EXPERIENCE

Hannah Bridgwater, Samuel Coulson, Kirsten Taylor, Patrick Goon
East and North Herts NHS Trust, UK

Introduction: Hand fractures are a common presentation to the emergency department and account for 10% of all fractures requiring admission in England. Several techniques exist for the operative management of hand fractures. One increasingly popular technique is utilising percutaneous cannulated bicortical screws (PCBS), thus not in the traditional intramedullary manner. Aim: To conduct a systematic review of the current literature to assess patient outcomes of PCBS in the surgical management of phalangeal fractures and to compare our centre's experience against the published evidence base. Material & Methods: We performed a PRISMA-compliant scoping systematic review to identify all published papers using PCBS. There was no limit on publication date, language or type. EMBASE and MEDLINE databases were searched. In our series, between December 2022 and November 2023, patients with proximal or middle phalangeal fractures undergoing PCBS were identified via both a contemporaneous prospective database and retrospective collection from theatre implant logbook. All patients were treated in a single centre under regional or local anaesthetic, with active range of movement (ROM) beginning immediately. For each patient, ROM was measured at each follow up interval and any complications reported. Assessment was performed by hand therapists, with a final review with a hand surgeon at 6-8 weeks. results From our initial literature search, 517 papers were identified including 10 systematic reviews and six original articles. Screening and full-text review was undertaken blinded and in parallel by three of the senior specialist trainee authors. Five articles were included.The current evidence base for this technique is descriptive at best and case series level. The literature reports PCBS use in unicondylar proximal phalangeal fractures and advises PCBS cause less irritation to collateral ligaments and reduces risk of tendon and joint adhesions. In our series, nine patients were identified

who were treated with PCBS. There were five middle and four proximal phalanx fractures. Mean age was 35.8 at time of surgery. The mean ROM at first follow up was 0/73.4, -9.4/70.4 and -8/36.7 for extension/flexion of MCPJ, PIPJ and DIPJ respectively. Seven patients had a second follow up and a mean ROM of 9.7/80.3, -13.3/77.3 and -12/35.7. There were no recorded post-operative infections or cases of non-union. There was one case of ongoing stiffness at six months post-operatively. ROM is comparable to that of published data. In one series of 25 mixed fractures of the hand, PIPJ had an average ROM of 5-85 at follow up. All achieved union by six weeks and none required screw removal. Conclusions We have demonstrated the benefits of using PCBS in the correctly selected patient. All patients in our series were mobilised immediately post operatively and we have shown early mobilisation does not increase risk of non-union or implant failure. Our data shows an improvement in MCP and DIPJ ROM from first to second follow up and ROM is comparable to that of published data. PCBS can be an advantageous surgical technique in the fixation of hand fractures due to minimal soft tissue dissection and early mobilisation.

A-0605 A NEW TEST TO DIAGNOSE EARLY-STAGE TRIGGER FINGER AND TREATMENT ALGORITHM

Silvia Pietramala, Camillo Fulchignoni, Alessio Greco, Lorenzo Rocchi, Gianfranco Merendi
Hand Surgery and Orthopaedics Unit, Department of Orthopaedics and Traumatology, Fondazione Policlinico Universitario A. Gemelli, Rome, Italy

Introduction: Trigger finger is a widely known pathology with a lifetime risk of almost 3%. Despite that, there is no consensus about grading or standardized treatment, especially in the early stages when snapping is not evident. For this reason, we have been using a simple and effective test for the past two years, the M-test, to identify those patients classified as pre-triggering but already showing mechanical alteration and so are eligible for more aggressive treatment.
Aim: create a new classification based on a simple clinical test that is easy to use and reproducible and to introduce a standardized treatment algorithm to uniform results worldwide.
Material & Methods: From June 2021 to June 2022 we collected 95 patients affected by trigger finger Green grade 1. Every patient underwent an evocative test created in our center, M-test. Patients were divided into two groups according to the negative (Group A) or positivity to the test. Demographic data were collected along with the recurrence rate and time of recurrence.
Results: (M-test was positive in 40% of patients affected by stenosing tenosynovitis classified as Green grade 1. Despite the recurrency rate being similar in the two groups (67% vs 70%) the recurrence time was shorter in Group B (9.2 vs 6.3 months).
Conclusions: M-test is a reliable and easy-to-use clinical test that could help identify a group of patients in which the clinic is not suggestive. The positivity of the test in the early stages (snapping not appreciable during the visit) could mean that even in early stages mechanical alteration already occurs. For this reason, we developed a M-odified Green Classification based on our test and a treatment algorithm that could help improve the prognosis and also the costs.

A-0606 IS WALANT NECESSARY FOR OUTPATIENT HAND SURGERY?

Camillo Fulchignoni, Silvia Pietramala, Alessio Greco, Lorenzo Rocchi
Hand Surgery and Orthopaedics Unit, Department of Orthopaedics and Traumatology, Fondazione Policlinico Universitario A. Gemelli, Rome, Italy

Introduction: Wide Awake Local Anesthesia (WALANT) is an alternative to general or regional anesthesia that became popular among hand surgeons for being ideal for tendon repair in which the cooperation of the patients is crucial, avoiding

the use of the tourniquet, also giving more comfort to the patients. On the other hand, the learning curve is long for the surgeon and the injection must take place at least 30 minutes before starting the procedure, increasing the time needed to perform each surgery. Considering people undergoing carpal tunnel release are mostly elderly and admitted to an outpatient service without the presence of an anesthesiologist, we cannot properly estimate the risk of adverse events
Material & Methods: From February 2023 to November 2023 we selected 284 patients who underwent outpatients hand surgery (carpal tunnel release and trigger finger). Each patients was administered local anesthesia with lidocaine and a tourniquet at the arm was applied for the whole lenght of the surgery. Demographic data were collected as well as the length of the surgery, the type of the surgery and the pain and discomfort felt by the patients during the transient ischemia (evaluted with VAS).
Results: Average length of the surgery was 12 minutes. The most common surgery performed was carpal tunnel release. The mean value, according to VAS, was of 3.2. Furthermore, we noted that the VAS was higher in older patients and longer surgeries. In only 3 cases, the tourniquet had to be released before end of surgery because of patient discomfort.
Conclusions: Despite WALANT being helpful and crucial to perform some hand surgeries, such as post-traumatic tenolysis or tendon repairs, the benefits don't justify, in our opinion, its use in short outpatient hand surgery. A limitation of our study is the lack of a control group to validate the effective disadvantage in terms of time and underestimated complications.

A-0607 IS IT NECESSARY TO BURY K-WIRES IN METACARPAL FRACTURE SYNTHESIS?

Alessio Greco, Silvia Pietramala, Lorenzo Rocchi, Camillo Fulchignoni
Hand Surgery and Orthopaedics Unit, Department of Orthopaedics and Traumatology, Fondazione Policlinico Universitario A. Gemelli, Rome, Italy

Introduction: As already disclosed in the literature, K-wires are a reliable technique for unstable displaced metacarpal fractures. Whether percutaneous pinning or plate fixation is more appropriate for metacarpal fractures is still open to debate. Most surgeons utilizing K-wires bury them under the skin as exposed K-wires are reported to be associated with discomfort by the patients, limitation in the Dialy Life activities, and infections. In our center, metacarpal fractures are usually treated with exposed K-wire fixation.
Aim: We report our experience supporting this technique as reliable and well tolerated by the patients, as well as decreasing the costs of the operating room and the need to further hospitalizations.
Material & Methods: we analyzed the data of patients who underwent fracture fixation with exposed K-wire for metacarpal fracture from February to September 2023. We collected demographic data for each patient along with the time between the first surgery and the removal of the hardware, the presence of infection, comorbidities and the quick DASH score collected at four weeks from the surgery.
Results: 98 patients were finally included. 70% of patients were male, and the average age was 38,4 years old. The most involved digit was the fifth of the right hand (33.3%). The average time between the osteosynthesis and the wire(s) removal was 36,2 days. We registered 6 cases (6%) of minor soft tissue infection and 1 case of intolerance due to the patient\'s unknown allergy to nickel. 5 cases were resolved with antibiotics, whereas the other patient with infection and the patient with an allergy had to undergo anticipated hardware removal and were immobilized in plaster. The average quick DASH was 22,44.
Conclusions: Exposed K-wires are a reliable technique for the fixation of metacarpal fractures with a short learning curve. Leaving the wire outside the skin allows an easy removal of the wire if an infection occurs. Despite the patient having to keep a bandage for the whole period of healing, ADL are not compromised with little or no pain. Once the fracture is

healed the removal of the hardware is performed as an outpatient procedure, decreasing the number of hospitalizations and the costs for the structure.

A-0608 RECURRENCE OF A METASTATIC GIANT CELL TUMOR OF THE FOREARM: A CUSTOM-MADE APPROACH

Camillo Fulchignoni,, Silvia Pietramala, Alessio Greco, Lorenzo Rocchi, Giulio Maccauro
Hand Surgery and Orthopaedics Unit, Department of Orthopaedics and Traumatology, Fondazione Policlinico Universitario A. Gemelli, Rome, Italy

Introduction: Giant cell tumor is a benign but locally aggressive tumor with a high rate of recurrence and the possibility of distant metastasis. The distal radius is the third most common location. Currently the therapeutic strategies for the treatment of tumor recurrence are resection with free margins with simultaneous arthrodesis, external fixation or use of bone substitutes. The case presented is an example of aggressive GCT already subjected to resection of the distal radius treated with a custom-made forearm prosthesis.
Materials & Methods: A 36-year-old patient was diagnosed with a giant cell tumor of the distal radius approximately 10 years ago. In recent years, she underwent 3 different curettage on the lesion, followed by resection with free margins of the distal radius with ulnocarpal arthrodesis. She developed lung metastasis and simultaneously underwent treatment with Denosumab. In 2022, she presented with a new recurrence of the tumor at the ulnocarpal level. We therefore decided to proceed with a new resection and replacement with a custom-made arthrodesizing carpal prosthesis.
Results: At the 6-months follow-up the patient presents preserved ROM of the long fingers, VAS 0. She is independent in daily life activities. She currently has no relapses.
Conclusions: This case shows how the use of custom-made prostheses designed using a 3D printer allows new solutions in patients in whom until now radical and destructive interventions have been proposed.

A-0609 OUTCOMES OF LIPOSUCTION IN PATIENTS WITH ADVANCED UPPER EXTREMITY LYMPHEDEMA WITH REGARD TO THE DIFFERENCE IN TIME REQUIRED FOR INDOCYANINE GREEN TO REACH THE AXILLA A RETROSPECTIVE COHORT STUDY IN A SINGLE CENTER

Joo Hyoung Kim[1,2]
[1]*Department of Plastic and Reconstructive Surgery, Pusan National University, School of Medicine, Busan, South Korea;*
[2]*Biomedical Research Institute, Pusan National University Hospital, Busan, South Korea*

Introduction: Lymphedema is a disease characterized by lymphatic stasis arising
from lymphatic damage or dysfunction, which eventually weakens the patient through fat accumulation, fibrosis, and fluid collection. Failure to treat lymphedema at an early stage results in a gradual decline in the patient's quality of life.
Aim: This study aimed to compare and analyze the prognosis after lipectomy with respect to the difference in time required for indocyanine green (ICG) to reach the axilla in patients with advanced unilateral upper extremity lymphedema.
Material & Methods: The study population
was divided into 2 groups, according to the time required by ICG to reach the axilla after injection, that is, <1 hour (<1 hour; n = 9) and over 1 hour (>1 hour; n = 8). The patient's arm volume was examined before surgery and up to 12 months after surgery.
Results: The volume difference between the 2 groups was compared using the excess volume ratio. Statistically significant differences were not observed before surgery (P = .847) and 1 month (P = .336), 3 months (P = .630), and 6 months after

surgery (P = .124) between the excess volume ratio values of the < 1 hour and > 1 hour groups. A statistically significant difference was confirmed 12 months after surgery (P = .034).
Conclusions: The difference in the time when ICG reached the axilla in patients with lymphedema was associated with prognosis after lipectomy. The difference in time could possibly be used as a variable to classify the progress of lymphedema in the future.

A-0610 RESURFACING CAPITATE PYROCARBON IMPLANT (RCPI) AFTER PROXIMAL ROW CARPECTOMY. UP TO 20 YEARS FOLLOW-UP ON OVER 100 PATIENTS

Lorenzo Rocchi[1], Camillo Fulchignoni[1], Silvia Pietramala[1], Alessio Greco[1], Augusto Marcuzzi[2]
[1]Hand Surgery and Orthopaedics Unit, Department of Orthopaedics and Traumatology, Fondazione Policlinico Universitario A. Gemelli, Rome, Italy; [2]Modena University Hospital, Department of Hand Surgery, Modena, Italy

Introduction: Proximal row carpectomy is a widespread and safe technique, which has good results, to treat various painful and degenerative conditions of the wrist when the proximal pole of the capitate and the lunate fossa of the radius are preserved. Since the beginning of this century, the use of pyrocarbon prostheses such as RCPI has made it possible to treat even the most advanced cases by resection of the proximal row in which the degeneration of the articular surfaces is more extensive. The original technique consists of resection of the proximal pole of the capitate leading, as with simple resection of the carpal row, to incomplete recovery of strength.
Materials & Methods: This two-centers retrospective study includes all patients treated with proximal row carpectomy and RCPI since 2004 in both centers of Authors. Measured outcomes were grip strength, active range of motion, hand function (DASH, PRWE), pain (VAS), time to return to work, complications, and overall patient satisfaction.
Results: Overall, patients obtained excellent results in terms of grip strength, active range of motion, hand function, and overall patient satisfaction. A few complications and their solutions are discussed. Furthermore, the authors propose and discuss a RCPI implantation technique without resection of the proximal pole they started using in recent years to maintain carpal height (and strength) as much as possible.
Conclusion: RCPI is a reliable implant, able to guarantee stregnt and ROM recovery. Furthermore, modifications of the original techniques might improve results.

A-0611 TREATMENT OF EXTENSIVE SOFT TISSUE INJURIES OF THE HAND WITH PEDICLED FLAPS IN CHILDREN UNDER 3 YEARS OF AGE

Kaja Gizewska-Kacprzak[1], Maximilian Sliwinski[1], Szymon Grochans[1], Ireneusz Walaszek[1,2]
[1]Department of Pediatric and Oncological Surgery, Urology and Hand Surgery, Pomeranian Medical University, Szczecin, Poland; [2]Department of Orthopedic Traumatology and Musculoskeletal Oncology, Pomeranian Medical University, Szczecin, Poland

Introduction: The treatment of injuries with significant loss of soft tissue requires specialized surgical treatment. The use of vascularized flaps is well-documented in reconstructive surgery. However, there are limited reports regarding the implementation of these techniques in severe limb trauma in the youngest children.
Aim: The study aims to analyze the treatment protocol for severe upper limb trauma in children under 3 years of age who sustained a multi-tissue injury with a coverage defect that required flap reconstruction.
Material & Methods: A retrospective analysis of patients under 3 years of age with soft tissue trauma of the hand treated with vascularized flap reconstruction between 2018-2023. In the study, the history of the injury was summed up, as

surgery timing, and selected treatment modalities with technical details about the severity of the injury. Short and long-term follow-ups included video materials.
Results: 8 children required flap reconstruction in severe limb trauma as an alternative to amputation. 4 patients were eligible for the presented study.
The study group included 1 girl and 3 boys. Age at the time of the injury ranged between 20-34 months. Three of the children suffered injuries from meat grinding or vegetable chopping machines. Defects included tissue loss of the palmar side of the hand and fingers with avulsive damage to the flexors with the opening of the medullary cavities of the phalanges and metacarpal bones. One boy sustained amputation of fingers with soft tissue loss at the first ray aspect due to falling under a grass mowing machine. All of the children were treated with wound debridement and reconstructive surgery within 48 hours as they were referred from distant centers.
Reverse pedicled radial forearm flaps with temporary finger syndactyly to increase the recipient area were done. In severe cases, axial K-wires positioned the fingers, as only dorsal phalanges were left. Silicone prostheses for future flexor reconstruction were placed. Children underwent staged separation of the fingers. Within 6-9 months, the flexors were reconstructed with tendons harvested from the lower extremities - plantaris, gracilis, and semitendinosus. The follow-up ranged from 6 months to 6 years to observe growth in X-rays. The movement in MCP joints allows function with an evident limit of the range of motion in IP joints if destroyed during the initial trauma. All children could join their age groups in kindergarten.
Conclusions: The youngest patients with severe limb injuries can be treated with pedicled flaps. Surgery can be performed secondary after initial wound care, which allows the patient's transport to a reference center. Reconstruction techniques limit the indications for amputation and secure the environment for growth. Long-term follow-up is essential to control further growth. The youngest children are at risk of severe hand trauma by meat grinding and chopping machines. Safety measures such as no exposure to sharp home appliances should limit the number of traumas in this age group. Pediatric hand surgeons can play a role in promoting the best standards of reconstructive treatment in the youngest limb trauma victims.

A-0612 CHRONIC WRIST PAIN IN MARTIAL ARTS ATHLETES: AN ANALYSIS OF 119 ATHLETES

Silvia Pietramala, Ivo Lopez, Alessio Greco, Lorenzo Rocchi, Camillo Fulchignoni
Hand Surgery and Orthopaedics Unit, Department of Orthopaedics and Traumatology, Fondazione Policlinico Universitario A. Gemelli, Rome, Italy

Introduction: Wrist and hand injuries are common in martial arts, especially in defensive positions, but they are substantially less common than injuries reported in sports like soccer or volleyball, probably because they are underreported. Often underestimated and neglected, these injuries can result in chronic pain and limitation of activity. One of the biggest problems in this cohort of patients is the need to be able to combat fast and the lack of specialized surgical advice made by professional hand surgeons.
Aim: the aim of this study is to conduct a survey among martial arts athletes to report the rate of hand and wrist injury and chronic wrist pain as well as analyze how these conditions have an impact on the athlete activity and if they are somehow related to the type of training or defensive pad/bands used. We also wanted to estimate the rate athletes addressed to a specialist, and the role of the hand surgeon and therapist.
Materials and methods: a brief survey was designed to obtain information concerning upper extremity injuries and chronic wrist pain in martial arts athletes. The survey was then uploaded to Google Forms, where a link was created for distribution.

The survey consisted of 35 questions, which were divided into four groups: Demographics (age, weight, height, gender, comorbidities, occupation, type of MA, level of experience), information about the training (n° of sessions per week, type of hand protections), Pain Definition (time of onset, severity, how the pain influences the training, diagnostic exams) Injury Definition (anatomical area, number of injuries, time off from sport, treatment, etc.), role of hand surgeon and therapist.
Results: A total of 119 participants responded to the survey. Males represented 92,43% of respondents, and the mean age was 28 years old. The most represented martial arts were boxe (38.5%), followed by kickboxing (27.4%) and Brazilian jiu-jitsu (17.4%). The number of amateurs and professionals was similar (54,3% vs 45,7%). Overall, all the participants stated they used some sort of protection (pads, bands, or boxing gloves), and 95.5% of patients reported having wrist pain on different occasions (e.g., during or after training). However, only 11.8% of patients received a specific diagnosis; only 4.5% were addressed to a hand surgeon, while 16% consulted a hand therapist. 24% of participants had to end the training because of pain.
Conclusions: wrist pain and hand and wrist injuries are a concrete reality in martial arts. Despite that, most athletes don't receive a proper diagnosis and keep training, risking developing more serious injuries. The role of hand surgeons and hand therapists in this particular category of patients is to understand the type of trauma that creates a personalized treatment for the athlete, which could let them return to training as soon as possible. Despite the use of adequate protection and hand and wrist stretching, injuries are still very frequent, and appropriate treatment and rehabilitation processes should also be suggested by trainers.

A-0614 TREATMENT STRATEGY AND RESULTS OF SEYMOUR FRACTURES OF THE DISTAL PHALANX

Elvira Mateos-Álvarez, Belén García-Medrano, David César Noriega-González
Clinical University Hospital of Valladolid, Spain

Introduction: Seymour fractures are epiphyseal, open, displaced fractures of the distal phalanx accompanied by a laceration of the overlying nail bed that intervenes at the fracture site and prevents reduction. Fortunately, these injuries are rare, with potentially devastating consequences of inadequate diagnosis or treatment. The proximity of the growth plate means that these fractures can lead to soft tissue infections or osteomyelitis, and secondarily lead to growth arrest or nail or finger deformities. Although there is currently no consensus on the optimal treatment of these fractures, the most standardised approach is extensive debridement followed by percutaneous needle fixation as described below. Evaluation and treatment by a surgeon experienced in hand pathology is recommended.
Aim: The aim of our paper is to describe the management and evaluate the outcome of a patient with a Seymour fracture to emphasise early diagnosis to minimise complications and morbidity.
Material & Methods: We present the case of an 8-year-old patient diagnosed late with a Seymour fracture with inadequate initial management. Physical examination revealed a hammerhead deformity. X-rays showed a displaced fracture of the distal phalanx with involvement of the physis. The patient required surgery in which the nail matrix interposed in the fracture site was removed. Profuse lavage with copious amounts of physiological saline and thorough debridement was performed across the nail bed lesion. Under scopic control, reduction and osteosynthesis was performed with two 0.9 mm K-wires retrograde to the base of the distal phalanx. The nail bed was repaired, and the nail was reinserted into the eponychial plate, serving as a splint and protecting the synthesis.
Results: Initially the patient is immobilised with a splint for 5 weeks. During the first week the patient receives antibiotic treatment with Amoxicillin-Clavulanic acid. After the immobilisation is removed, rehabilitation is started, aimed at achieving full mobility and functionality of the finger. Our patient achieved clinical and radiological consolidation without

deformity or development of infection. He has full mobility and carries out school and sporting activities appropriate to his age without perceiving any limitations.
Conclusions: Seymour fractures are rare injuries that occur in skeletally immature individuals. Their innocuous appearance explains why they go unnoticed in a high percentage of patients. Their complexity is due to the associated soft tissue component and the potential risk of infection, which will determine the prognosis. Early assessment and treatment is the most effective strategy to minimise the risk of complications. Although there is no standardised protocol, what has shown the best results is thorough lavage, thorough debridement, antibiotic therapy and osteosynthesis with Kirschner wires after removal of the nail bed interposed in the physis.

A-0615 RETROGRADE INTRAMEDULLARY HEADLESS SCREW FIXATION FOR METACARPAL FRACTURES

Elvira Mateos-Álvarez, Belén García-Medrano, David César Noriega-González
Clinical University Hospital of Valladolid, Spain

Introduction: Metacarpal fractures are very frequently hand injuries. Surgical treatment should be considered in those fractures that are displaced, unstable, or in patients with high functional demand. Recently, the use of headless intramedullary screws has increased. Advantages include early recovery of range of motion, limited dissection, and reduced complications when compared to other types of osteosynthesis.
Aim: The purpose of this study is to evaluate the clinical and radiographic
Results: obtained with retrograde intramedullary screw fixation in metacarpal fractures treated at our center, as well as to describe its indications and possible complications.
Material & Methods: We performed a retrospective review of all patients with metacarpal fractures treated surgically with retrograde headless intramedullary screws at our department in 2022. Their demographics, mechanism of injury, fracture pattern and preoperative radiographs were recorded. Indications for surgery included rotational disturbances, angular deformity and shortening greater than 5 mm. The following postoperative clinical parameters were collected and analysed: finger alignment and rotation, joint balance, grip strength and DASH questionnaire score at last follow-up in both the injured and contralateral hand. Pain was measured using the visual analogue scale (VAS). Radiological follow-up was performed using plain radiographs to check fracture reduction and healing. Complications (infection, loss of fixation, implant failure, malrotation, non-union, malunion or need for reoperation) were recorded.
Results: We obtained a total of 15 patients (17 metacarpals) (12 males and 3 females). The mean age was 37 years (range 18-80 years). In 91,6% of cases the affected hand was the dominant hand. All fractures were closed and extra-articular, 2 were located at the level of the neck and 15 at the level of the diaphysis. All surgeries were performed by the same surgeon. Percutaneous reduction was performed, and it was only necessary to open the fracture site in one patient. The patients were all immobilised with a splint for 10 days. They then started a supervised rehabilitation.
At one-year follow-up, joint balance was complete. The mean postoperative grip strength of the injured hand was 38kg and of the uninjured hand 40kg. The mean score on the DASH questionnaire was 14%. The mean score on the VAS scale was 3. No complications were recorded postoperatively or during follow-up. No rotational alterations of the injured finger occurred in any case. Radiological consolidation was achieved in all patients at 3 months and no degenerative changes were observed in any patient during follow-up. There were no cases of mobilisation or intolerance to osteosynthesis material. All patients were able to return to their previous level of activity without any perceived limitations.
Conclusions: Intramedullary screw fixation in metacarpal fractures is a therapeutic modality that has been shown to be safe and effective. It offers a stable synthesis while avoiding the need for prolonged immobilisation or more extensive fixation techniques. This contributes to good clinical outcomes and an early return to work and leisure activities.

A-0617 MANAGEMENT OF LARGE TRAUMATIC RADIAL NERVE DEFECTS AT THE ELBOW LEVEL BY DIRECT NEURORRHAPHY IN ELBOW FLEXION AND SUBSEQUENT GRADUAL EXTENSION: TWO CASE REPORTS

Tanja Herrler, Kathrin Rellensmann, Benjamin Ramsayer, Markus Tauber, Nils Baas
Berufsgenossenschaftliche Unfallklinik Murnau, Germany

Introduction: Primary nerve repair is associated with improved nerve regeneration. Traumatic segmental injury of major peripheral nerves in the upper limb often result in large nerve gaps usually requiring nerve graft interposition to enable tension-less repair for optimal outcome. Additional soft tissue damage may delay nerve reconstruction until wound conditions are favorable. In some cases disrupted nerve ends can be directly sutured without tension despite considerable gap size by elbow flexion and subsequent gradual extension. This approach has been rarely reported, but exists for gap sizes of up to 4 cm.

Aim: To achieve early repair of large nerve defects in severely damaged soft tissue conditions with a single neurorrhaphy site and without sacrifice of autologous nerves and associated donor site morbidity.

Material and Methods: We retrospectively analyzed the cases of 2 patients with complex trauma of the upper limb and extensive nerve loss. Due to concomitant injuries and severely affected soft tissue conditions the harvest of required nerve autografts for reconstruction seemed unacceptable in the light of uncertain functional outcome. Because of additional traumatic bone injury the elbow was immobilized in 90° flexion. In this position the nerve stumps were approximated without tension and epineural sutures using Vicryl applied to allow for early reinnervation. After 3 weeks, elbow extension was weekly increased by 10° using an elbow orthosis.

Results: A 14 and 16 year old male patient sustained complex traumatic injury of the upper limb caused by a hop harvester machine and motor cycle accident, respectively. Both patients suffered segmental loss of the radial nerve, i.e. deep branch and main nerve, in proximity to the elbow with complete loss of wrist and finger extensor function. Concomitant injuries were surgically addressed as necessary. These included massive soft tissue destruction, brachial artery dissection with peripheral ischemia and imminent limb loss, luxation fracture of the elbow with radial head destruction, fractures of the distal radius and carpal bones in the first patient. In the 2nd case complete radial nerve rupture was associated with 3rd degree open fracture of the distal humeral shaft and triceps avulsion fracture.

The resulting nerve gaps measured approximately 6 cm and were treated by direct tension-less neurorrhaphy in elbow flexion within a week after injury. Subsequent gradual extension was performed as described above. An elbow extension deficit of 5° and 20° persisted owing to the concomitant osseous injury. Postoperatively, first signs of reinnervation were seen after 5 to 7 months. Meaningful recovery of radial nerve motor function with regained wrist and finger extension (M4/5) was present within 2 years after surgery.

Conclusions: While nerve autografts remain the treatment of choice for the reconstruction of large nerve defects, additional factors such as severe damage of soft tissue and functional structures must be individually considered for clinical decision making and surgical strategy to achieve optimal functional outcomes. The cases presented herein show successful reinnervation after direct neurorrhaphy in elbow flexion to overcome large trauma-induced nerve defects, thus avoiding additional donor site morbidity and providing an early starting point for nerve regeneration.

A-0618 WIDE-AWAKE LOCAL ANESTHESIA NO TOURNIQUET AND GENERAL ANESTHESIA IN PEDIATRIC TRIGGER THUMB TENOSYNOVECTOMY: A RETROSPECTIVE COHORT STUDY & COST-ANALYSIS

Xiya Ma[1], Marion Sylvain[2,3], Charlotte Jaloux[4], Emilie Bougie[1,2,5]

[1]Division of plastic & reconstructive surgery, University of Montreal, Montreal, Quebec, Canada; [2]Centre de recherche du CHU Sainte-Justine, Montreal, Quebec, Canada; [3]Faculty of Medicine, McGillUniversity, Montreal, Quebec, Canada; [4]Département de chirurgie de la main et reconstruction des membres, Hôpital de la Timone, APHM, Marseille, France; [5]Division of plastic & reconstructive surgery, Department of Surgery, CHU, Sainte-Justine, Montreal, Quebec, Canada

Introduction: Wide-Awake Local Anesthesia No Tourniquet, known as WALANT is now widely known in hand surgery to decrease operative times and improve patient experience. While this approach has gained popularity in the adult population for hand surgery, it remains unexplored for the pediatric population.

Aim: The primary objective of our study was to compare surgical outcomes of WALANT and general anesthesia (GA) in children undergoing open tenosynovotomy for pediatric trigger thumb. The secondary objective was to assess the cost-efficiency of the WALANT technique compared to GA.

Material & Methods: We conducted a retrospective cohort study comparing all patients undergoing unilateral thumb tenosynovotomy under WALANT or GA operated by a single surgeon at our tertiary pediatric care institution over a period of three years. Data on demographics, duration of the anesthesia and surgery, resources employed, and clinical outcomes were collected. Descriptive statistics were compiled using Microsoft Excel, and statistics were generated using GraphPad Prism 10.

Results: A total of 35 patients were included, with a total of 22 WALANT thumbs and 17 GA thumbs. The mean age of the WALANT group (6.91 years old) was significantly higher than the GA group (3.81 years, $p<0.0001$), although gender ($p=0.25$) and family history ($p>0.999$) were not significantly different between the groups. One LA had to be aborted due to patient anxiety but was successfully performed 3 months later. Rates of complete trigger thumb resolution were comparable between the two groups ($p>0.999$). The need for post-operative hand therapy was also not significantly different ($p>0.999$). Compared to the GA group, the WALANT group had significantly lower total anesthesia time ($p<0.0001$), total surgical intervention time ($p=0.003$) and total time in room ($p<0.0001$). No patient presented with subsequent recurrence in the same thumb. Most patients and their families were satisfied with the procedure performed under WALANT. True cost of a tenosynovectomy for PTT under WALANT was 354.33$CAD. The total cost obtained by adding the cost of failure of 8.54$CAD was 362.87$/procedure. The true cost of a tenosynovectomy for PTT under GA was 5307.98$CAD in addition to the opportunity cost (1769.20$CAD) totalised 7077.18$/procedure. Using WALANT compared to GA for pediatric trigger thumb tenosynovectomies saves 6714.31$CAD/case, meaning 1 GA case costs close to 20 WALANT cases.

Conclusions: In our study, tenosynovotomy for pediatric trigger thumb performed with WALANT and general anesthesia yield similar surgical outcomes, although WALANT involves significantly less anesthesia and surgical time than GA. In the treatment of pediatric trigger thumb, WALANT appears to be an effective and safe alternative to GA that is well accepted by patients and their families.

A-0619 WHAT IS THE COST OF HAND SURGERY ?

Dean E Boyce[1], Natalie Blessley-Redgrave[1], Keely Flower[2], Amanda Willacott[3]

[1]Welsh Centre for Plastic Surgery & Burns, UK; [2]NHS Wales Executive, UK; [3]Welsh Value in Health Centre, UK

Introduction: The cost of delivering health care, including hand surgery continues to come under scrutiny. In the UK, access to operating theatres has remained constrained since the COVID Pandemic, necessitating changes in hand surgery practice.

Based on best evidence, The British Society for Surgery of the Hand (BSSH) guidance on 'Out of Theatres Operating' has recommended that procedures including carpal tunnel release (CTR), trigger finger release, single flexor and extensor repair, mucous cyst excision and isolated Dupytrens Disease may be performed in a Treatment Room as opposed to a standard Operating Theatre setting without compromising outcome.

Aim:

1. To discover the financial cost of carpal tunnel release surgery within a national health system.
2. To assess reduction in costs and resource requirement for selected hand surgery ('BSSH') procedures performed in a Treatment Room when compared to a standard Operating Theatre setting.

Material & Methods:

1. The cost of CTR was assessed within each Welsh Health Board using Patient Level Information and Costing Systems (PLICS), both before (2019/20) and after the COVID-19 Pandemic (2020/21).
2. The precise cost and resource requirement for each 'BSSH' hand procedure was assessed by Time Derived Activity Based Costing (TDABC) in both Operating Theatre and Treatment Room settings.

Results: In Wales, 'BSSH' procedures compromise 48% of the total hand surgery workload. CTR comprised 56% of these procedures, with 3581 CTR being performed in a single year.

PLICS analysis demonstrated that the cost of a single CTR within Wales varied between regional Health Boards, and has doubled since the Pandemic (£877-£1657 in 2019/20 and £1871-£3009 in 2021/22.)

TDABC demonstrated that the specific cost of CTR in a traditional Operating Theatre was £298.64, using 337 minutes of person hours. The cost in a treatment room setting was £141.64 using 116 mins of person hours. The cost saving if all CTR in Wales were performed in a Treatment Room setting would be £565,798 (based solely on TDABC.)

The cost savings if all 'BSSH' procedures were all performed in a Treatment Room setting was £1,161,539.

Perhaps more importantly, 13,190 person hours and 1194 Operating Theatre hours (149 days) would be released for more appropriate use.

Conclusions:

1. Using PLICS analysis, the cost of CTR varies considerably within individual Welsh Health Boards.
2. The cost of CTR in Wales has doubled since the COVID-19 Pandemic. The reasons for this remain unclear.
3. Performing 'BSSH' procedures in Wales within a Treatment Room setting would save £1,161,539 in a single year. More importantly, it would release 13,190 person hours and 149 full days of standard Operating Theatre allocation. For a health system which has been compromised since the COVID-19 Pandemic, this would represent a significant resource gain.

A-0620 UNSTABLE SCAPHOID NONUNIONS: COMPARISON BETWEEN DORSAL AND VOLAR DISTAL RADIUS VASCULARIZED BONE GRAFTS

Davide Smarrelli, Dimitrios Chasiouras
Humanitas, Bergamo, Italy

Introduction: Vascular bone grafts (VBGs) offer hand surgeons good option in the management of scaphoid nonunion.

Aim: outcome of dorsal -volar VBGs

Material & Methods: On between 2008-2023, 112 patients were treated with (VBG) from distal radius both dorsal (1-2 ICSSR, 2-3 ICSSR, 3-4 ECSSR) and volar (PRCA , PQ, PISIFORM, PERIOSTAL VBG).

We focused only patients with unstable nonunion both mobile both sclerotic with ischemic proximal pole, excluding avascular proximal pole necrosis and previous surgery: 78 patients were included into two groups: group A treated with

dorsal grafts, group B with palmar grafts.
On between 2008 and 2022, were reviewed 26 patients treated with 1-2 and 3-4 ICSSR VBG and 52 patients with VBG from distal volar radius with PRCA, PQ performed Osteosynthesis was obtained by Kirschner wires or headless compression screws. After surgery wrists were embraced for at least 8weeks up to radiological healing.
Xrays were routinely performed after 8, 12, 16 weeks and when required 20-24 weeks and furtherly once a year.
After complete bone graft healing, full mobilization was achieved.
Clinical outcome was evaluated by clinical examination, patient's satisfaction grade using: preop and post op MAYO WRIST SCORE, VAS, ROM evaluation.
Results: In group A, we had 5 failures; one required APSI arthroplasty; two, being clinically painless and with complete ROM, have been once a year radiologically and clinically monitored. One patients submitted new VBG with pisiform, another one submitted four corner arthrodesis; 3 patient required more than 6 months for radiological healing.
In group B, we observed 3 failures, requiring furtherly one proximal row carpectomy, new VBG using pisiform and one APSI arthroplasty. 3 cases didn't show radiological bone union but were clinically silent in order of pain with improvement of ROM; four cases required more than 6 months for radiological healing.
We had one infection in volar group. 2 mild infection in both groups spontaneously recovered. All related to K-wires .
In group A 15 grafts were fixed by K-wires and 11 with screw; in group B, 18 grafts were fixed with K-wires, the others all with cannulated screw.
Radiological mean healing after 3 months, within a range from 2 and 10 months, with shorter time obtained by screw fixation, within 8-12 weeks from surgery.
The choice of fixation showed better and faster healing with screw fixation, with statistically difference ($p<0,05$).
Mean MWS in group A was from 46 points to 70, while in group B was from 46 points to 78.
Clinical healing was of on between 2 to 8 months in order to pain relief, swelling of soft tissue, scar recovery and back to normal activity with high rate of satisfaction by the patient reported better in group B.
ROM recovery was better in group B, with a mean difference of 30° related to extension and 20 ° of flexion
Conclusions: We obtained better results in order of clinical healing and ROM with volar bone grafts. Even more challenging and more technically difficult, we prefer to perform palmar bone grafts. Furthermore, we observe quicker healing with screw fixation.

A-0621 PHYSIOTHERAPY OUT OF THE POCKET - EFFECTIVENESS OF HOME EXERCISES USING AN AI-BASED SMARTPHONE APP FOR THE FOLLOW-UP TREATMENT OF HAND INJURIES - A RANDOMIZED, CONTROLLED AND OPEN STUDY

Simon Bauknecht, Martin Mentzel, Richard-Tobias Moeller
Clinic for Trauma, Hand, Plastic and Reconstructive Surgery, University Hospital, Ulm, Germany

Introduction: Injuries to the hand, such as fractures or tendon injuries, often lead to considerable functional limitations without adequate aftercare. A successful treatment of hand injuries - whether surgical or conservative - requires intensive rehabilitation. In times of staff shortages and busy daily routine, it is often difficult for many patients to obtain timely or sufficient appointments with a hand therapist. Several studies have already demonstrated the potential of home exercises. Ideally, patients can exercise their hand function under controlled conditions at regular intervals and from any location. The Hand Therapy App uses the integrated smartphone camera to capture finger movements and determine the range of motion. Furthermore, the integrated AI then automatically adjusts the type and intensity of treatment to the patient's

therapy progress and symptoms. A "hand therapist" for your pocket, so to speak.
Aim: The aim of the study is to investigate the effectiveness of an additional smartphone-based hand therapy app compared to standard therapy with hand therapy alone.
Material & Methods: This is a prospective randomized open study. To assess the effectiveness of the hand therapy app compared to standard therapy with physiotherapy, the change in finger mobility (range of motion = ROM) is measured at the start of therapy and after 2, 6 and 12 weeks. A total of 112 patients (mean age = 36.9 years ± 15.5, male: n = 82; female n = 30) between 18-65 years with metacarpal and finger fractures, as well as flexor and extensor tendon injuries that required surgical treatment with tendon sutures, took part. The control group (CG) received 18 units of hand therapy during this time. The intervention group (IG) received the digital hand therapy app in addition to standard care with 18 sessions of hand therapy fweeks in addition to the standard care with 18 sessions of hand therapy.
Results: Using independent t-tests, significantly better finger mobility (ROM) was observed in the intervention group (IG) compared to the control group (CG) after 2 and 6 weeks (p=0.02). When analyzing the minimum clinically important improvement (MCID), significantly more patients in the intervention group (50%) achieved an MCID of 40 degrees than patients in the control group (26%). After 6 weeks, the difference was also significant (IG: 79%, CG: 54%). In the control group, nearly full ROM was observed in metacarpal and finger fractures after 6 weeks, whereas in the control group, movement deficits could still be quantified after 12 weeks.
Conclusions: Regular hand therapy is essential for the complete restoration of free hand function. The effectiveness of home exercises using an AI-based smartphone app compared to sole hand therapy has been proven. After just 2 weeks, there was a significant improvement in finger mobility compared to hand therapy alone. The integration of digital hand therapy approaches into the aftercare regime has been shown to be safe and feasible in this study. Rehabilitation is significantly accelerated and the time to return to work is considerably shortened as a result. It's a new way to reduce long-term functional limitations.

A-0623 THE DEVELOPMENT OF A SPECIFIC WARMING-UP PROGRAM FOR PERCUSSIONISTS THROUGH A MULTIDISCIPLINARY APPROACH

Liese-Lotte Bekaert[1], Stijn Vangheluwe[2], Chiel-Jan Bekaert[3], Gerrit Nulens[1], Maarten Van Nuffel[3,4]
[1]Royal Conservatory of Liège, Liège, Belgium; [2]Praktijk voor kinesitherapie, Dadizele, Belgium; [3]Faculty of Medicine, Catholic University Leuven, Belgium; [4]Hand Unit, Orthopedic Department, University Hospitals Leuven, Belgium

Introduction: Playing a percussion instrument puts a lot of strain on the hands, mainly due to the combination of repetitive movement and vibration, leading to frequent problems such as tendinitis, carpal tunnel syndrome and focal dystonia. Although warming-up has proven effective regarding Playing Related Musculoskeletal Disorders, limited percussion-specific warming-up programs are known.
Aim: Preventing pain and injuries and enhancing playing performance by developing an effective Warming-up Program for high- achieving percussionists.
Material & Methods: 2-Stick/2-Mallet movements and muscle performances were anatomically analyzed and interpreted along intensity. Sport-specific Warming-up programs were analyzed and adapted for percussionists by combining the expertise of a professional percussionist, a hand therapist, and a hand surgeon.
Results: A 20-minutes 2-Stick/2-Mallet Warming-up Program for percussionists was developed and presented in a booklet with clear instructions for users.
Conclusions: Providing access to a specific Warming-up Program might encourage the percussionist to engage in warming-

up before practice, thus reducing Playing Related Musculoskeletal Disorders. Demonstrating the clinical efficacy of this program will be the next step in our research.

A-0624 EXTENSOR CARPI RADIALIS LONGUS FLAP FOR TOTAL WRIST ARTHRODESIS WITH DORSAL PLATE

Pilar Saralegui, Ignacio Rellán, Agustin Donndorff, Gerardo Gallucci, Jorge Boretto, Pablo De Carli
Hospital Italiano de Buenos Aires, Argentina

Introduction: Total wrist arthrodesis is the fusion of the radiocarpal joint. Post-traumatic injuries, rheumatoid arthritis (RA) or salvage of previous failed treatments are the most common indications. Although fixation with a plate has evolved and shown some benefits as regards consolidation, it may affect the extensor apparatus due to the friction mechanism on the plate.

Aim: The main objective of this study is to describe a surgical gesture of dorsal plate coverage with the Extensor Carpi Radialis Longus (ECRL). Secondarily, we aim to analyze its complications and the rate of osteosynthesis removal.

Material & Methods: A retrospective cohort study was carried out between 2004 and 2023. Inclusion criteria: patients treated by total wrist arthrodesis with specific dorsal arthrodesis plate and covering flap. Patients without follow-up or radiographic record in the electronic medical record (EMR) were excluded.

When covering the plate with the ECRL, its distal insertion is maintained. Subsequently, the ECRL is opened in a book sheet and sutured to the periosteum, providing coverage of the plate in its distal portion over the metacarpal.

Data were collected from EMR and postoperative complications, implant removal and average follow-up time were analyzed as variables.

A total of 17 patients met the inclusion criteria during the period studied. The mean age was 43 years (SD 14.4), of which 8 patients (47.1%) were male and 9 (52.9%) female.

We reviewed patient records to find out why arthrodesis had been indicated. We noted that in 10 cases (58.8%) the cause was osteoarthritis or pseudoarthrosis, in 5 cases (29.4%) it was RA and in 2 cases (11.8%) it was due to neurological conditions (brachial plexus palsy or cerebral palsy).

A descriptive statistical analysis was performed reporting continuous variables as mean and standard deviation (SD) and categorical variables were reported as n and percentage (%).

Results: The mean follow-up was 38.94 months (SD 53.3). We observed that 4 patients (23.5%) presented complications, including 2 cases of foreign body sensation due to the osteosynthesis material, 1 case of distal screw rupture and 1 case of extensor tendon tendinitis. Subsequently, we evaluated the extraction rate, observing that 3 patients (17.6%) presented intolerance that required osteosynthesis removal.

Conclusions: The ECRL flap has several advantages. It is simple and easily reproducible. It can be performed by the same dorsal approach and involves zero functional morbidity.

Reviewing the literature we observed a variable rate of 34 to 65% of arthrodesis plate removal, that compared with our results, our series showed a lower rate of osteosynthesis removal. However, in order to validate this observation, it is necessary to perform a thorough comparative research, ideally randomized and with sufficient power to statistically compare the results.

A-0625 CAPFLEX PIP JOINT ARTHROPLASTY TO TREAT JOINT ANKYLOSIS: EXPANDING INDICATIONS

Lauren Uppal
Guy's & St Thomas' Hospitals, London

Severe arthritis causing auto fusion of a joint is often thought to be a contraindication to arthroplasty. A PIP joint fixed in extension causes significant weakness of grip strength due to the quadriga effect. This causes difficulty in performing simple daily tasks. A joint fusion in a more functional position continues to cause a weakness of grip strength of small and medium sized objects, as the FDP tendons still do not glide together as a unit of four.
A series of 20 Capflex PIP joint replacements were reviewed from 2018 - 2023. 6 of these patients had severe joint destruction causing ankylosis. These patients have improved range of motion of the joint from 0° (auto fused), to an average of 0 - 80°. Patients rapidly achieve flexion with full active and passive flexion starting within the first week after surgery. We have found high patient satisfaction. The intra-operative surgical technique with the volar approach, including before and after clinical photos, imaging and videos of outcomes will be presented.
The Capflex PIP joint implant using the volar approach is recommended in carefully selected cases, even in severe joint destruction with auto fusion.

A-0626 DELAYED DISTAL RADIOULNAR JOINT INSTABILITY FOLLOWING PAEDIATRIC FOREARM FRACTURES: A SYSTEMATIC REVIEW

B Moral, I Galley, SS Malik, SBM MacLean
Tauranga Hospital, Te Whatu Ora, New Zealand Aotearoa, New Zealand

Introduction: Forearm fractures make up estimated 20% of paediatric forearm fractures. Instability of the distal radioulnar joint (DRUJ) is a complication most often seen acutely with fractures of the distal radius and ulna however there is some evidence associating delayed presentation of instability to previous forearm fractures in children.
Aim: Our aim was to review the presence of delayed DRUJ instability and related factors contributing to instability, following metaphyseal or diaphyseal forearm fractures sustained in childhood.
Material & Methods: In alignment with the PRISMA guidelines we conducted a systematic review using the PubMed database. Papers which reported cases of delayed DRUJ instability in the context of metaphyseal or diaphyseal forearm fractures in children <18 years of age at time of fracture were included.
Results: 20 papers reported 85 cases fitting the inclusion criteria. Limited supination was seen in 73/85 (86%) cases and pronation in 74/85 (87%). 64/85 (75%) had deficits in both supination and pronation. 69% of cases had both bone fractures and 74% had a concurrent malunion at the time of symptom onset. In the 53 cases where initial management had been defined, 41/53 (77%) of cases initially had non operative management. The onset of instability ranged from 6 weeks to 32 years. Symptomatic instability and malunion was treated with corrective osteotomies. Open, closed and oblique wedge osteotomies were utilised and varied between single or both bone. 50% of our cases were treated with CT guided 3D customised operative guides for corrective osteotomy. 15/54 patients required soft tissue release at the DRUJ concurrently. In all cases there was improvement in instability post osteotomy.
Conclusions: DRUJ instability can be observed following metaphyseal and diaphyseal fractures in children. Careful review of radiographs prior to discharge is recommended. If there is clinical concern about DRUJ instability or limited rotational movements, dedicated wrist radiographs and advanced imaging is recommended. Computed-aided design guides based on fine slice CT scanning, using the contralateral arm as a 'template' can provide clinical improvement in patients, even

in the chronic setting, although concurrent soft tissue releases may be required. There is a clear lack of research limiting the ability to assess the relationships between initial intervention, DRUJ instability and malunion morphologies.

A-0627 KILOH-NEVIN SYNDROME: A CASE REPORT

María Candelaria Torre, Hernan Blanchetiere, María Eugenia Oyhamburu, Ana Laura Douglas Price, Matías Urlacher, Nicolás Gabriel Cuestas
Hospital General de Agudos Dr. Juan A. Fernández, Buenos Aires, Argentina

Introduction: Kiloh-Nevin syndrome is a rare entity that represents less than 1% of all nerve palsies of the upper extremity. It arises from the compression of the anterior interosseous nerve, a median nerve branch, at the level of the forearm.
Aim: The aim of this study is to report an unusual case of a young patient with Kiloh Nevin Syndrome.
Material & Methods: An observational, descriptive, case report type study was carried out.
Female, pastry chef, 26 years old with flexion paralysis of the thumb interphalangeal joint and index distal interphalangeal joint of the dominant hand, for 6 months.
MR showed focal thickening of the anterior interosseous nerve adjacent to the beginning of the flexor pollicis longus muscle.
9 months after onset symptoms, nerve decompression was performed and evidenced that the compression was at the level of the proximal flexor digitorum superficialis fibrous arch.
Results: At 24 hours postoperative control, the patient was able to flex the distal interphalangeal joint of the index finger and thumb, and was able to make the "Ok" sign. (M3 strength Daniels scale).
After 2 months of rehabilitation she achieved M4/5 strength in the index-thumb clamp, (not symmetrical compared to contralateral one).
Conclusions: Kiloh-Nevin syndrome is frequently treated conservatively. Furthermore, it is estimated that patients under 45 years old respond to non-surgical therapy without variation within 18 months from the onset symptoms.
After 12 months or in presence of associated tumor pathology, surgical treatment is usually indicated.
Although literature shows that young adult patients resolve spontaneously, it can take up to a year to start the recovery process. Decompressive surgery may be a possibility to consider for young patients who are not willing to wait for spontaneous resolution.

A-0628 POSTOPERATIVE SUBLUXATION OF ELBOW JOINT DISLOCATION

Wan-Sun Choi[1], Chang-Hun Lee[2], Kwang-Hyun Lee[2], Joo-Hak Kim[3], Young Seok Lee[2]
[1]Department of Orthopaedic Surgery, Ajou School of Medicine, South Korea; [2]Department of Orthopaedic Surgery, Hanyang College of Medicine, South Korea; [3]Department of Orthopaedic Surgery, Myoungji Hospital, South Korea

Introduction: Subluxation of the elbow joint may be found during follow-up after ligament repair for a very unstable elbow dislocation, such as a terrible triad.
Aim: We investigated the effect of isometric exercise of the muscles around the elbow joint to the postoperative subluxation of elbow joint on recovery of congruency.
Material & Methods: Among the patients who underwent ligament repair after terrible triad injury, 12 patients with subluxation during follow-up were enrolled. Radiologic changes in the elbow joint were observed when these patients regularly performed isometric exercise while wearing long arm splint.

Results: Congruency was recovered on simple radiograph after an average of 19.2 days after isometric exercise. At the final follow-up, DASH score was 10.1 points, MEPS was 87.1 points, VAS was 3 points, and ROM was 120.4 degrees.
Conclusions: Even if subluxation of the elbow joint occurs after ligament repair of a very unstable elbow dislocation, congruency can be restored through isometric muscle exercises.

A-0629 SENESCENT CELL INVOLVEMENT IN TENDON SHEATH OF TRIGGER FINGER

Michiro Yamamoto[1], Madoka Higa[1], Keiichiro Nishikawa[1], Takahiko Nakano[2]
[1]Nagoya University, Nagoya, Japan; [2]Kariya Toyota General Hospital, Kariya, Japan

Introduction: Cellular Senescence is caused by factors including DNA damage, oxidative stress, and telomere shortening. Although senescent cells have stopped dividing, they remain viable, do not undergo apoptosis, accumulate in tissues, and induce chronic inflammation and fibrosis by secreting various cytokines called senescence-associated secretory phenotype (SASP). Senescent cells can also be triggered by mechanical stress. The precise etiology of trigger finger has yet to be clarified, but attention has been focused on the mismatch between a tight flexor tendon sheath and enlarged flexor tendon, with overuse commonly attributed as the cause. The potential involvement of senescent cells within the tendon sheath remains unexplored.
Aim: We investigated the relationship between the localization of senescent cells in the tendon sheath and clinical symptoms.
Material & Methods: We performed trigger finger releases by resecting the first annular pulley in 49 patients (mean age 61 years; 28 female, 21 male) between 2012 and 2021. The excised tendon sheaths were stained with SA-β-gal, a biomarker of senescence cell, and the number of senescent cells in the inner and outer layers of the tendon sheaths were counted. A control specimen was obtained from the tendon sheath of a young patient with thumb rigidus upon which the same staining process was performed. We investigated the relationship between patient characteristics and the localization of senescent cells. Statistical analysis was performed using SPSS.
Results: Senescent cells were observed in all specimens of trigger finger following the SA-β-gal immunostaining. However, staining did not develop for the thumb rigidus tendon sheath control specimen. In the trigger finger specimens, 37 cases of senescent cells (76%) were found more in the inner layer, and 9 (18%) were found more in the outer layer. In 3, there was no difference between inner and outer layers. A mild correlation was observed between the expression of senescent cells and of TGF-β. The group with a greater number of senescent cells in the inner layer was older (62 vs. 57 years), had a longer period of illness (20 vs. 16 months), and had a worse score on Hand20, a patient-reported outcome measure used to assess upper limb disability Hand20 (31 vs. 24, scored from 0 to 100, with higher values representing poorer function), but no significant differences were identified.
Conclusions: We observed great accumulation of senescence cells in all tendon sheaths of adult trigger fingers, but not in that of the thumb rigidus control. More senescent cells are expressed in the inner layer of the tendon sheath than in the outer layer, and mechanical stress is thought to be the cause of the increase in senescent cells in the tendon sheath. A correlation with TGF-β, a typical senescence-associated secretary phenotype (SASP) was observed, suggesting that senescent cells are involved in the onset of trigger finger.

A-0630 AXILLARY ARTERY THROMBOSIS ASSOCIATED WITH ANTERIOR SHOULDER FRACTURE-DISLOCATION: A CASE REPORT

María Candelaria Torre, Hernan Esteban Blanchetiere, María Eugenia Oyhamburu, Ana Laura Douglas Price, Matías Urlacher, Nicolás Gabriel Cuestas
Hospital General de Agudos Juan A. Fernández, Buenos Aires, Argentina

Introduction: Introduction: Axillary artery injury is often unrecognized at patient's initial presentation, because peripheral pulses depend on collateral irrigation, so this situation can place the hand at necrosis risk and amputation if there is prolonged ischemia. Vascular injury in shoulder dislocation is described mainly in association with penetrating injuries, while blunt trauma only accounts for 6% of cases.
Accurate physical examination in combination with an ultrasound doppler or angiography can establish the diagnosis of axillary artery injury.
Aim: To report a case of a young patient with axillary artery injury with humeral anterior fracture-dislocation.
Material & Methods: 37-year-old male patient with pain, functional impotence, and left shoulder deformity lasting 4 hours after trauma (fall from own height). Physical examination revealed shoulder swelling, upper limb coldness, asymmetric pulse and paresthesia. X-ray showed left proximal humerus fracture-dislocation. At the operating room, the cardiovascular surgery team carried out the angiography that showed an axillary artery thrombosis. Then it was performed the proximal humerus open reduction and osteodesis, and after fixation they performed the thromboembolectomy. Immediately post op, the patient reported hypoesthesia in the ulnar region, positive Froment and Wartemberg´s sign.
The definitive proximal humerus open reduction and internal fixation was performed on the 14th day.
Results: At 12 months postoperatively, the patient showed shoulder 110° flexion, 90° abduction, 30° external rotation, and 30° internal rotation. All neurological and vascular symptoms were recovered.
Conclusions: Axillary artery injury is a rare complication in humeral anterior fracture-dislocation and the presence of peripheral pulses is not enough to rule out the condition. It should be suspected in older patients due to arterial rigidity and in young patients after major trauma. The absence of peripheral pulse is not always present and must be suspected despite this sign.

A-0631 POSTOPERATIVE ULNAR NEUROPATHY USING ULNAR NERVE NO DISSECTION AND NO MOBILIZATION TECHNIQUE FOR THE SURGICAL TREATMENT OF THE DISTAL HUMERUS FRACTURE

Park Sangeun, Lee Woojin
Daejeon St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea

Introduction: In general, ulnar nerve management during the surgical treatment of the distal humerus fracture can be divided into two groups. One is the anterior transposition and the other is in situ management without transposition. Comparative studies between two types of ulnar nerve management in the surgical treatment of the distal humerus have been reported and several studies report no benefit of anterior transposition over no transposition. However, both methods still report postoperative ulnar neuropathy after surgical treatment of the distal humerus fracture.
Aim: To introduce ulnar nerve no dissection and no mobilization (NDNM) technique in the surgical treatment of the distal humerus fracture and report the results about postoperative ulnar neuropathy
Material & Methods: A total of 15 patients with distal humerus fractures underwent open reduction and internal fixation with dual plating and ulnar nerve NDNM technique between 2021 and 2022 were retrospectively reviewed. All patients

had no preoperative ulnar nerve symptoms. Postoperatively, the rate of ulnar nerve neuropathy and the severity using McGowan classification were investigated
Results: The fracture type using AO/OTA classification of all patients was 13-A2 low transcondylar. The average age of patients was 66 years. In all patients, para-tricipital triceps sparing approaches and parallel plating were used. For the NDNM of the ulnar nerve, ulnar nerve was palpated and reflected with the medial triceps without dissection. Medial window was created along the medial intermuscular septum. In case of difficulty in palpating ulnar nerve., ulnar nerve was identified through small incision at the cubital tunnel. Ulnar nerve was mobilized with the medial triceps throughout the procedure. In all patients, no postoperative ulnar neuropathies were noted.
Conclusions: NDNM technique of the ulnar nerve during the surgical treatment of the low transcondylar distal humerus fractures with the para-tricipital triceps sparing approach and parallel plating resulted in no postoperative ulnar neuropathies.

A-0632 SURGICAL TREATMENT OF THE ACUTE DISTAL RADIUS FRACTURE ON OLD MALUNITED FRACTURE

Park Sangeun, Lee Woojin
Daejeon St. Mary's Hospital, The Catholic University of Korea, Seoul, Korea

Introduction: As the lifespan increases, seeing patients presenting with acute distal radius fracture on old malunited fracture after conservative treatment is not rare. Most of them are highly adaptive to their previous deformity. However, it not hard to expect there might be considerable reduction in quality of daily life. Addressing those patients with surgical treatment impose dilemma on surgeon because in general, they are highly elderly and don't want surgical treatment. Moreover, it is challenging to address both previous malunion and acute new fracture to create clinically acceptable alignment
Aim: To present clinical and radiological outcome of those fractures treated with surgical treatment.
Material & Methods: Between 2020 and 2022, 46 patients presented with acute distal radius fracture on old malunited fracture to our hospital and 16 of them were treated surgically with volar locking plate and their medical records were retrospectively reviewed. Data collected included age, sex, type of fracture, pre and postoperative radiologic parameters, duration of union defined as the time from injury until callus was evident on the radiograph, complications and clinical outcomes at the last follow-up. Over-correction through new fracture plane were made to address old malunion simultaneously and allograft chips was inserted into the gap created.
Results: 14 of 16 patients were female. The mean age at the time of injury were 78 ±10.4 years. Average follow-up was 12.5 ± 4.1months. Most of patients did not recall when they injured their wrists previously. New fracture type using AO/OTA classification were A3 in 4, C2 in 10 and C3 in 2 patients. Postoperatively mean radiologic parameters including radial length, radial inclination, dorsal tilt and ulnar variance were significantly improved from 5.3mm, 10.5°, 12.5° and 6.5mm to 8.2mm, 15.3°, 4.3° volar tilt, and 3.2mm respectively($P<0.05$). Union duration ranged from 7 to 12 weeks with the mean 8.6 ± 1.5. There were no complications related to surgery. At last follow-up, the average Mayo wrist score was 87.5 ± 7.9 (excellent 5, good 8, fair 3). In particular, all patients were satisfied with their improved wrist shapes.
Conclusions: Acute distal radius fracture on old malunited fracture is not rare due to increased lifespan. The decision to perform surgery is dependent on both patient's and surgeon's perspective about the injury. This study showed improved clinical, radiological outcome and patient's satisfaction after surgical treatment although it's a small number. We suppose that surgical treatment to address both secondary fracture and old malunion is a considerable option in these injuries.

A-0633 A CASE OF POSTOPERATIVE INFECTION FOLLOWING OPEN FRACTURE OF THE FIRST PROXIMAL PHALANX TREATED WITH CONTINUOUS LOCAL ANTIBIOTIC PERFUSION (CLAP)

Kinshiro Nabeshima, Yusuke Matsuura, Takahiro Yamazaki, Yosuke Ito, Kenji Kubota, Ryutaro Iwasaki, Takashi Nomoto, Yukari Matsuzawa, Tatsuki Kobayashi, Seiji Otori
Department of Orthopedic Surgery, Graduate School of Medicine, Chiba University

Background: The primary goal in treating open fractures is to prevent infection. Standard treatment involves surgical debridement and systemic antibiotics. However, in some cases, infection control remains elusive despite appropriate treatment, leading to amputation. Recent reports highlight the efficacy of Continuous Local Antibiotic Perfusion (CLAP) in managing fracture-related infections. Here, we report successful infection control in a postoperative infection following an open fracture of the first proximal phalanx using CLAP, followed by a satisfactory outcome through arthrodesis of the interphalangeal (IP) joint.
Case: A 61-year-old male, injured his right thumb in a farming accident involving machinery. He sustained an open fracture of the first proximal phalanx, initially treated at another hospital with surgical debridement and open reduction with internal fixation (K-wire fixation). Despite immediate systemic antibiotic administration, the patient developed a refractory postoperative infection. He was referred to our institution 4 weeks post-injury. We performed additional surgical debridement and initiated CLAP for infection control. Intraoperative observations revealed a missing dorsal shaft bone fragment and fragile articular fragments (2-part) due to the infection. An epidural tube was inserted both into the IP joint and dorsally into the shaft, along with a drain from the open wound, complemented by Negative Pressure Wound Therapy (NPWT). Gentamicin at 1200 µg/ml was continuously infused at 2 ml/h through each tube. The local infection was controlled after 2 weeks of CLAP. Systemic antibiotics were continued for 8 weeks postoperatively. Four months post-injury, IP joint arthrodesis was performed. The articular fragments were removed to mitigate infection recurrence risk, and an autologous bone graft from the iliac crest was used. A plate was placed on the palmar side for stability. The patient regained sufficient functionality 2 months post-arthrodesis and successfully resumed work.
Discussion/Conclusion: Open fractures with soil contamination, as in this case, have a high risk of infection, even with appropriate initial treatment. Here, CLAP, initiated 4 weeks post-injury, controlled the infection in 2 weeks. The initial surgery had removed the free dorsal shaft fragment, and the infection weakened the articular fragments, preventing osteosynthesis. Thumb IP joint arthrodesis was ultimately performed, resulting in satisfactory postoperative function. There are indications that early CLAP implementation might reduce infection incidence in high-risk cases. In this patient, preserving joint function might have been more feasible had the free fragment been saved and CLAP applied during initial treatment. CLAP proves to be a valuable option in the treatment of open fractures.

A-0634 QUANTITATIVE EVALUATION OF THE FINGER MOVEMENT DYSFUNCTION IN POST-OPERATIVE PATIENT WITH CERVICAL MYELOPATHY USING GYRO SENSOR

Shota Date[1], Yasushi Fujiwara[2], Kiyotaka Yamada[3], Hiroshi Kurumadani[1], Toru Sunagawa[1]
[1]Graduate School of Biomedical & Health Sciences, Hiroshima University, Hiroshima, Japan; [2]Department of Orthopedic Surgery, Hiroshima City Asa Citizens Hospital, Hiroshima, Japan; [3]Department of Orthopaedic Surgery, JA Hiroshima General Hospital, Hiroshima, Japan

INTRODUCTION: Patients with cervical myelopathy (CM) are known to experience motor dysfunctions in the upper extremity. Particularly, the abnormal finger movement, termed myelopathy hand, is one of the representative clinical signs of the

CM. Previous studies have reported that the characteristics of myelopathy hand include slowness of finger movement and an inability to grip and release rapidly. However, no studies have clarified quantitively how finger movement in patients with CM changes due to the surgery for cervical spinal cord decompression.
AIM: The purpose of this study was to quantify the changes of finger movements in patients with CM before and after surgery using gyro sensors.
MATERIALS & METHODES: Fifteen patients with CM (CM group) and twenty-two age-matched healthy adults (control group) participated in this experiment. Gyro sensors were attached to the nails of the index and little fingers, and the participants performed the grip and release movements for 30 seconds. Measurements were taken at three time points: before, 1-month after, and 3-month after surgical operation in the CM group, and once in the control group. The angular velocity during the movement was measured by the gyro sensors, and the number of cycles, switching time-delay between grip and release movements, and mean angular velocity were calculated. Each parameter was compared between the CM and control groups and between time points (pre-operative, post-1-month, post-3-month operative periods) within the CM group.
RESULTS: The pre-operative CM had significantly lower number of cycles, longer switching time-delays, and slower mean angular velocities than the control group. The number of cycles at the post-3-month was significantly increased from the pre-operatively, with no significant difference compared to the control group. Similarly, the switching time-delay at the post-3-month was significantly shorter from the pre-operatively and was not significantly different from that in the control group. However, the mean angular velocity at the post-3-month did not show a significant difference compared to the pre- or post-1-month operative periods and remained significantly slower than that in the control group.
CONCLUSIONS: In post-operative patients with CM, the increased number of cycles and the shortened switching time-delays were observed. These results indicate that the changes within the first 3 months after the cervical decompression in patients with CM involve the ability to rapidly switch between the grip and release movements. It was suggested that gyro sensors could have the potential for quantitatively evaluating the temporal changes in hand motor function before and after surgery.

A-0635 MINIMALLY INVASIVE SURGERY REDUCES EARLY POSTOPERATIVE PAIN IN DISTAL RADIUS FRACTURES: A PROSPECTIVE COMPARATIVE STUDY WITH STANDARD VOLAR LOCKING PLATE FIXATION

Shunji Okita, Junya Imatani, Shinji Narazaki
Okayama Saiseikai General Hospital, Okayama, Japan

Introduction: In the surgical treatment for distal radius fractures, the standard volar locking plate (VLP) fixation cut and separates the pronator quadratus (PQ) longitudinally. We perform a minimally invasive surgery (MIS) using a specifically designed extra-short volar locking plate to preserve the PQ.
Aim: We prospectively compared early postoperative pain between MIS and standard VLP fixation for distal radius fractures.
Material & Methods: Between April 1, 2022, and July 31, 2023, 107 cases (111 limbs) underwent VLP fixation for distal radius fractures. Out of these, 45 cases (45 limbs), meeting the criteria for MIS, were randomly assigned to either the MIS group or the standard VLP group (Standard group). This was a non-blinded, randomized comparative trial. The study included 20 cases (20 limbs) in the MIS group and 25 cases (25 limbs) in the Standard group. According to the AO classification, the MIS group included 13 type A, 1 type B, and 6 type C fractures, while the Standard group included 13 type A, 4 type B, and 8 type C fractures. The primary outcome measure was the assessment of pain using the Numerical Rating Scale (NRS) from postoperative day 1 (POD1) to postoperative day 7 (POD7). Secondary outcome measures included patient

demographics, radiographic assessments, and functional evaluations using the Quick Disabilities of the Arm, Shoulder, and Hand (quick DASH) and Mayo Wrist Score.
Results: On POD1 NRS pain scores for the MIS group and the Standard group were 7.67 and 8.00 (p=0.222), on POD2 were 4.50 and 6.03 (p=0.005), on POD3 were 3.83 and 5.35 (p=0.003), on POD4 were 3.28 and 4.26 (p=0.036), on POD5 were 2.44 and 3.61 (p=0.016), on POD6 were 1.83 and 2.58 (p=0.036), and on POD7 were 1.39 and 1.68 (p=0.186), respectively. Postoperative functional evaluations using quick DASH and Mayo Wrist Score showed no significant differences between the MIS group and the Standard group.
Conclusions:From postoperative day 2 to day 6, the MIS group showed significantly lower NRS pain scores compared to the Standard group. The preservation of the PQ and minimized surgical invasion contributed to reducing early postoperative pain in the MIS group. MIS for distal radius fractures results in less early postoperative pain compared to standard VLP fixation.

A-0636 CORRELATION OF ULTRASOUND (US) WITH CLINICAL OUTCOME IN INTRINSIC MUSCLE REGENERATION AFTER LONGSTANDING ULNAR NERVE PALSY

Esther Vögelin[1], Rémy Liechti[2]
[1]Inselspital, University of Bern, Switzerland [2]Inselspital, University of Bern, Switzerland

Introduction: There is little information about sonographic evaluation of muscle regeneration after nerve palsy. The intrinsic muscles are small, well accessible using US especially the first dorsal interosseous muscle or the hypothenar muscles. After longstanding ulnar nerve palsy at the elbow level, the intrinsic muscle are atrophied. With nerve regeneration, the muscles should increase their volume and may improve the sonographic appearance.
Aim: To evaluate ulnar nerve innervated intrinsic muscles by US after longstanding ulnar nerve palsy .
Material & Methods: We have retrospectively analyzed the US images of 11 patients (median age: 64 years, range 11-80) who suffered from a longstanding muscle atrophy of the intrinsic muscles of their involved hand with massive clinical and sonographic intrinsic muscle waste but no complete fatty degeneration. They all were surgically treated with ulnar nerve decompression and anterior transposition in combination with a supercharge end-to-side anterior interosseous nerve transfer to the motor branch of the ulnar nerve in the forearm. US finding were correlated with clinical improvement postoperatively over time. US criterias included measurements of the height or width of the first interosseous muscle and the abductor digiti minimi muscle in 2 planes correlated to the clinical change of pinch- and 3pod grip, as well as muscle function of the intrinsic muscles using the British Medical Research Classification (MRC) classification (M0-M5). The structure and the volume increase of the muscles were compared with the non-operated side.
Results: Five of 11 patients improved clinical markedly between 6 and 18 months. The clinical improvement with increase of grip and muscle strength of the intrinsic muscles correlated with a sonographic increase of muscle height and mass as well as improved morphologic structure.
Conclusions: Five of 11 patients improved clinical markedly between 6 and 18 months. The clinical improvement with increase of grip and muscle strength of the intrinsic muscles correlated with a sonographic increase of muscle height and mass as well as improved morphologic structure.

A-0637 THE HOOK TEST IS NOT PATHOGNOMONIC FOR FOVEAL DETACHMENT OF THE TRIANGULAR FIBROCARTILAGE

Jeff Ecker[1,2,3,4,5], Karolina Pavleski[1,2], Courtney Andrijich[1,2]
[1]Jeff Ecker Clinic, Bethesda Hospital, Claremont, WA, Australia; [2]Wrist + Hand Institute, Claremont, WA, Australia; [3]Hand and Upper Limb Centre, Claremont, WA, Australia; [4]Curtin University, Bentley, WA, Australia; [5]The University of Western Australia, Crawley, WA, Australia

Purpose: Using dry arthroscopic techniques, the primary author observed that many patients with painful distal radioulnar joint (DRUJ) instability and a positive hook test had an intact foveal insertion. This study was performed to determine whether a positive hook test is a reliable index of a tear of the foveal insertion. The hook test is performed using a probe to elevate the TFCC off the ulna head towards the articular surface of the lunate. In this study the hook test was considered positive if the TFCC could be elevated to bridge >80% of the space between the TFCC and the articular surface of the lunate.
Patients and Methods: A retrospective study was performed using the medical records and arthroscopic videos of 113 patients who had clinical signs of DRUJ instability and underwent arthroscopic surgery performed by the primary author in 2020. It was documented whether the hook test was positive or negative, whether the foveal insertion was intact, abnormal or absent, and whether there were peripheral (dorsal or volar) tears of the TFCC. Sensitivity and specificity were calculated using arthroscopic findings as the reference standard.
Results: The sensitivity of the hook test was found to be 100%, and the specificity was 7.0%. The positive predictive value for foveal pathology was found to be 12.3% and the negative predictive value 100%. The diagnostic accuracy of the hook test in determining the presence of foveal tears was found to be 17.7%. The diagnostic accuracy of the hook test in determining the presence of a TFCC abnormality was 99.1%.
Conclusions: A positive hook test is indicative of a tear of the TFCC but it is not pathognomonic for a tear of the foveal insertion. To reliably assess the foveal insertion it must be visualised and probed using dry arthroscopic techniques.

A-0638 ENDOSCOPIC SUPRARETINACULAR CARPAL TUNNEL RELEASE

Jeff Ecker[1,2,3,4,5]
[1]Jeff Ecker Clinic, Bethesda Hospital, Claremont, WA, Australia; [2]Wrist + Hand Institute, Claremont, WA, Australia; [3]Hand and Upper Limb Centre, Claremont, WA, Australia; [4]Curtin University, Bentley, WA, Australia; [5]The University of Western Australia, Crawley, WA, Australia

The choice of open versus endoscopic carpal tunnel release continues to be controversial. The technique of endoscopic supraretinacular carpal tunnel release will be demonstrated including pit-falls and complications. Recommendations of when to consider endoscopic versus open carpal tunnel release will be made.

A-0639 SINGLE TUNNEL TRANS-OSSEOUS REFIXATION OF TFCC

Jane C Messina, Simone Gallizzi, Valeria Vismara, Pietro Randelli
First Orthoapedic Clinic, Universisty of Milan. ASST Gaetano Pini- CTO Orthopaedic Instiute, Milan, Italy

Introduction: Instability of distal radio-ulnar joint (DRUJ) is caused by a foveal detachment of TFCC which is the primary stabilizer of this joint. Arthroscopic techniques of TFCC repair have been widely used in the recent years. In order to perform foveal refixation principal used methods are: different types of anchor sutures, or double tunnel technique. These techniques may have complications related to implant mobilization or incompetence, difficulty in creating a double

tunnel as bone in distal ulna may be softened. For this reason Chen has proposed a single tunnel technique footprint foveal repair with four resorbable threads that has the advantage of one single tunnel, increase of refixation area, retentioning or repair of radio-ulnar ligaments.
Aim: the aim of this study is to present the results of a modified Chen's technique with the use of two threads instead of four in order to simplify the technique and reduce operating times, and compare them to the original technique
Materials and Method: We have treated 8 patients with this modified Chen's technique, mean age 41yo(16-64), (4 Males, 4females, 5 cases dominant wrist. Patients were affected by foveal detachment of TFCC (Atzei class II or III) diagnosed under arthroscopy. Six patients were evaluated with a mean follow up 9.5months (6-14 months). Two patients operated recently are still under study. All patients had pre-operative pain and limitation of work and sports activities expecially under load. Pre-operatively all patients had ballottment test positive (mean 2,1/3), mean VAS was 7.25 0.9, mean Mayo 49.44 12, mean DASH 39.72 20.1, mean PRWE 62.7 23, mean Grip 15 Kg
Results: Data were compared to pre-operative evaluation. Mean Mayo score obtained was 92.5 6.45 $p< 0.01$, mean DASH 4.16 1.6 $p< 0.01$, PRWE 9.9 8.2 $p< 0.01$, mean VAS 0.75 0.9 $p< 0.01$. All functional scores were statistically significant. Ballottment test was negative in all patients (0/3) compared to pre-op ($p<0.01$). Mean Grip raised to 28Kg ($p<0.08$). Comparing the results of the original technique to the modified technique the results were similar. In fact Chen's results were: Mayo 95 (90-100) compared to modified technique 92 6.45; Chen's DASH 10(9-15) compared to modified technique 4.16 1.6.
Conclusion: The advantage of this simplified technique are: the creation of a single ulnar tunnel, the use of a two resobable thread for the refixation of TFCC, no residual material in the joint, retensioning or repair of radio-ulnar ligaments in addition to refixation, reduction of operating time. From our preliminary results TFCC foveal refixation can be performed by modified Chen's technique with excellent results, similar to the original technique. A wider study with a longer follow up is needed to give definitive results.

A-0640 ABNORMALITIES OF THE MEDIAN NERVE

Jeff Ecker[1,2,3,4,5]

[1]Jeff Ecker Clinic, Bethesda Hospital, Claremont, WA, Australia; [2]Wrist + Hand Institute, Claremont, WA, Australia; [3]Hand and Upper Limb Centre, Claremont, WA, Australia; [4]Curtin University, Bentley, WA, Australia; [5]The University of Western Australia, Crawley, WA, Australia

Presenting abnormalities of the median nerve identified by the author such as ulnarly dragged motor branches.

A-0641 SCAPHOLUNATE INSTABILITY: ARTHROSCOPIC DORSAL CAPSULODESIS

Jeff Ecker[1,2,3,4,5]

[1]Jeff Ecker Clinic, Bethesda Hospital, Claremont, WA, Australia; [2]Wrist + Hand Institute, Claremont, WA, Australia; [3]Hand and Upper Limb Centre, Claremont, WA, Australia; [4]Curtin University, Bentley, WA, Australia; [5]The University of Western Australia, Crawley, WA, Australia

Presenting the surgical technique that the author uses to treat scapholunate instability; arthroscopic dorsal scaphotriquteral capsulodesis.

A-0642 STABILITY RESTORATION BY DORSORADIAL LIGAMENT RECONSTRUCTION VERSUS IMPLICATION FOR TRAPEZIOMETACARPAL INSTABILITY: A COMPARATIVE BIOMECHANICAL STUDY

Sang-Hee Kim[1], Jae-Yong Cho[2], Won-Taek Oh[2], Il-Hyun Koh[2], Yun-Rak Choi[2]

[1]Department of Orthopaedic Surgery, Catholic Kwandong University College of Medicine, International St. Mary's Hospital, Incheon, South Korea; [2]Department of Orthopedic Surgery, Yonsei University College of Medicine, South Korea

Introduction: The trapeziometacarpal joint (TM joint) is a complex structure that relies on surrounding ligaments to maintain its double saddle articulation, allowing for various thumb movements. Instability in the TM joint can lead to pain and cartilage damage, and is associated with the development of osteoarthritis. Previous research has shown that the dorsoradial ligament is the primary stabilizer of the TM joint, and ligament reconstruction has been attempted to prevent the progression of arthritis. Various surgical methods have been proposed, including capsulodesis and dorsoradial ligament implication.

Aim: We are utilizing a modified surgical technique for reconstructing the dorsoradial ligament, and in our study, we evaluated its biomechanical efficacy in comparison to dorsoradial capsulodesis using a cadaveric model.

Material & Methods: Six fresh frozen cadavers were used to evaluate the biomechanical efficacy of dorsoradial capsulodesis versus dorsoradial ligament reconstruction using APL tendon. The rotational test was performed by removing the dorsoradial ligament and taking photographs at the point of maximal laxity in each supination and pronation. The angles between the Kirschner wires were measured to compare joint instability before and after the procedure. Dorsoradial capsulodesis was performed in one group, while dorsoradial ligament reconstruction was performed in the other group. After procedure, rotational test was repeated. The load to failure of the TM joint was tested using each specimen.

Results: The arc values increased after cutting the dorsoradial ligament and decreased after the procedure in each specimen. After procedure, arc of motion was showed $48.3 \pm 3.4^{\circ}$ in capulodesis group and $33.5 \pm 3.1^{\circ}$ in reconstruction group, and difference between two group was significant ($p = 0.001$). In compression test, load to failure is 294.7 ± 56.3 N in capsulodesis group and 537.2 ± 93.7 N in reconstruction group. Difference between two group was significant ($p=0.005$).

Conclusions: Our cadaveric study suggests that dorsoradial ligament reconstruction using a distally based slip of the APL tendon may be a promising option for treating TM joint instability. The procedure resulted in improved stability compared to dorsoradial capsulodesis in both rotational and compression tests.

A-0643 NEW CONCEPTS IN SCAPHOID NON-UNION

Jeff Ecker[1,2,3,4,5]

[1]Jeff Ecker Clinic, Bethesda Hospital, Claremont, WA, Australia; [2]Wrist + Hand Institute, Claremont, WA, Australia; [3]Hand and Upper Limb Centre, Claremont, WA, Australia; [4]Curtin University, Bentley, WA, Australia; [5]The University of Western Australia, Crawley, WA, Australia

Presenting current techniques in the treatment of scaphoid non-union, such as arthroscopic bone graft.

A-0644 TO AMPUTATE OR NOT? TWO CASES OF EXTREME DIGITAL SALVAGE AFTER RESECTION OF GIANT CELL TUMORS WITH DESTRUCTIVE GROWTH PATTERN

Crinu Baesu, Jan Plock, Florian Früh
Cantonal Hospital of Aarau, Aarau, Switzerland

Giant cell tumors of tendon sheath (GCTTS), also known as pigmented villonodular tenosynovitis, are the second most common soft tissue tumors after ganglion cysts. They can be divided into masses with localized or diffuse growth pattern. We herein report 2 cases, one with GCTTS recurrence in a 54-year-old male patient, and another one with a GCTTC in a 77-year old female patient.

The male patient suffered from a left middle finger GCTTS recurrence. Radiographs and magnetic resonance (MR) imaging revealed involvement of the ulnar neurovascular bundle, the flexor and extensor tendons as well as a destruction of the distal interphalangeal (DIP) joint. The patient was an active sportsman and wished for digital preservation. Hence, radical excision with en-bloc resection of the DIP joint was performed, resulting in a sub-circumferential 4x3 cm defect. The joint was fused using a cannulated compression screw and the soft tissue defect was reconstructed with a retrograde-arterialized free venous flap from the ipsilateral forearm. One arterialized inflow vein and two outflow veins (1 dorsal and 1 palmar) were included in the flap. The further clinical course was uneventful with no radiographic or MR signs of recurrence at 6-months. Histopathology revealed a GCTTS without signs of malignant transformation. At 4. Month after surgery, the patient was able to return to all previous recreational activities.

The female patient suffered from a left index finger GCTTS. Radiographs and MR imaging revealed involvement of the ulnar neurovascular bundle, the flexor and extensor tendons as well as a destruction of the DIP joint. The patient opted for digital preservation. Hence, radical excision with en-bloc resection of the DIP joint was performed, resulting in a sub-circumferential 3x3 cm defect. The joint was fused using a cannulated compression screw, the digital nerve was reconstructed using a terminal branch of the medial antebrachial cutaneous nerve and the soft tissue defect was reconstructed with a retrograde-arterialized free venous flap from the ipsilateral forearm. One arterialized inflow vein and one dorsal outflow vein were included in the flap. The further clinical course was uneventful with no evidence of recurrence at 6-months.

Taken together, massive GCTTS in fingers with destructive growth are a challenging clinical problem. In our cases, both patients opted for digital preservation with microvascular tissue transfer. Free venous flaps from the forearm are an excellent reconstructive option for extensive digital defects because they can be tailored to almost any defect geometry. Furthermore, depending on the forearm anatomy, they can also serve for concomitant digital nerve reconstruction using terminal branches of the lateral or medial antebrachial cutaneous nerves. However, amputation should always be discussed with patients suffering from massive GCTTS. Compared with microvascular reconstruction, digital amputation may offer a faster recovery without the risks of microvascular complications.

A-0646 PURE DISLOCATION OF ULNAR FOUR CMC JOINTS: A RARE ABERRANT CASE

Hafiz Muhammad Irfan Yaseen, Manish Gupta
University Hospitals, Birmingham NHS Trust, UK

Introduction: Carpometacarpal (CMC) Joint injuries represent less than 1% of all hand injuries but can have a severe incapacitating effect on the functional status of the hand. The few cases reported in literature are all associated with a concomitant fracture to the carpus or metacarpals. We present a very rare case of pure dislocation of all four Ulnar CMC joints.

Case Description: A 21-year old strongly built male had an injury to his dominant left hand after punching a wall. Clinical examination revealed swelling, deformity over the dorsum and reduced range of movements. AP X-rays showed an overlap of the metacarpals at the CMC joints. Lateral views identified a dorsal dislocation of the ulnar four CMC joints without any obvious accompanying fractures. Retrospective history and examination did not reveal any evidence of hypermobility in the contralateral hand or in any other joints in the upper and lower limbs. A CT scan was performed which confirmed the injury to be a pure dislocation with no associated fractures.

He had closed reduction of joints and stabilization with percutaneous K wires 2 days after injury. The index, middle and small finger CMC joints were transfixed; ring finger metacarpus was secured with a transverse wire to the adjacent metacarpus and splinted with plaster.

Full mobilization was commenced with therapists at 6 weeks after removal of splint and K wires. The patient was allowed to ease back into activities of daily living with gradual progression to full activities as per his comfort. He made a complete and uneventful recovery.

Discussion: Carpometacarpal joints are inherently stable with static and dynamic constraints. Their bony architecture with multiple articular facets provides them with intrinsic natural stability. The volar, dorsal and inter-metacarpal ligaments strengthen these further against subluxations and dislocations. The long flexors, extensors and intrinsic muscles provide additional dynamic stability to these joints. A very high-energy trauma with severe axial load is required to injure them as seen in Road Traffic Accidents, fall from significant heights and punching. Pure dislocation involving all four joints is very rare, especially in the absence of any hypermobility syndromes. The few cases reported in literature are all associated with concomitant fractures.

Radiographic assessment including PA, oblique and true lateral views is necessary for diagnosis. The lateral view helps in classifying these injuries as dorsal (commonest), volar and divergent. CT scans are vital in identifying any occult fractures of the carpus. The radiographs and scans confirmed our patient's injury to be of the more common dorsal variant.

Treatment options described in literature are closed reduction and splintage/k-wiring or open reduction and internal fixation. We were able to achieve satisfactory reduction with closed manipulation in our patient. We chose percutaneous K wires for internal fixation so as to allow the ligamentous injuries to heal and prevent re-dislocation.

In summary, this is a very rare presentation, which was identified early and treated appropriately to provide an optimal outcome for a potentially disabling injury.

Keywords: carpometacarpal dislocation, ligamentous injury, pure dislocation,

A-0647 ISOLATED TRAPEZIUM FRACTURE FIXATION USING A MEMORY STAPLE: A NOVEL TECHNIQUE

Manish Gupta, Hafiz Muhammad Irfan Yaseen
University Hospitals Birmingham NHS Trust, UK

Introduction: Trapezium fractures are rare accounting for 1-5% of all carpal bone fractures. These injuries are often missed and require a high index of suspicion for diagnosis. Undisplaced fractures heal very well with conservative treatment. However, displaced fractures often require open reduction to restore the articular congruity. Various methods of internal fixation have been described with varying rates of success. We describe a case of displaced isolated trapezium fracture that was treated with open reduction and fixation using a BME SPEED Memory Staple (Depuy Synthes)

Case Description: A 22-year male presented with a 2-week history of injury to his dominant right thumb sustained in a rugby tackle. This had been treated with a "manipulation & splint" on the field by the team physiotherapists. Examination showed tenderness over thumb base with reduced and painful movements. Radiographs identified a displaced trapezium

fracture with disruption of the articular surfaces at the carpometacarpal and scapho-trapezial joints. CT scans confirmed the radiographic findings and helped to further delineate the anatomy of the fracture.
Open reduction was performed through a dorso-radial approach between the tendons of the 1st dorsal compartment. Capsulotomy was done at the CMC and ST joints to enable adequate mobilization of the fragments under direct vision. The fracture was reduced and held with a temporary K wire. Intra-operative images were obtained to confirm satisfactory reduction. A template was used to determine the width of the implant. The accompanying drill guide was deployed and 2.0mm drill holes made on either side of the fracture plane. Depth gauge was utilized to assess the final size of the implant. A BME SPEED Memory Staple (Depuy Synthes) of size 13X12 was chosen and inserted across the fracture using the tamping device provided. Congruity of the articular surfaces was confirmed on direct vision and intraoperative images. Stability of thumb CMC joint was confirmed with passive movements. Closure was done in layers and a plaster splint applied for rest and comfort. The plaster splint was discarded in 2 weeks when active mobilization was started with therapists. The patient was allowed light activities of daily living at this stage. Check Xrays at 2 and 6 weeks confirmed the stability of the fixation. The patient was allowed to return to full activity after radiological healing of the fracture.
Discussion: The memory staples are Continuous Compression Implants that have been shown to produce better compression as compared to lag screws and compression plates in biomechanical studies. A recent systematic review (Dunn et al 2017) showed that these were highly successful in treatment of scaphoid fractures. The advantages of these implants include technical ease, simple and quick application, continuous compression particularly with Nitinol metal memory, allowance for fixation of proximal or distal fragments too small to accept a screw, low risk of articular penetration, and early active movement. These implants are now regularly used in inter-carpal arthrodesis procedures with good outcomes. To our knowledge, this is the only description for its use in a trapezium fracture.
Keywords: Trapezium fracture, memory staple,

A-0648 RESULTS OF SURGICAL TREATMENT OF MEDIAL EPICONDYLITIS

Sota Saeki, Atsuhiko Murayama, Katsuhiro Tokutake, Masaomi Saeki, Yasunobu Nakagawa, Hidemasa Yoneda, Katsuyuki Iwatsuki, Michiro Yamamoto
Nagoya University Hospital, Nagoya, Japan

Introduction: Most cases of medial epicondylitis of the humerus respond to conservative treatment, but intractable cases are treated surgically. Various reports have been published on the surgical method of medial epicondylitis of the humerus, and no conclusion has been reached.
Aim: In this study, we investigated the treatment outcome of intractable medial epicondylitis treated surgically in our hospital and related institutions by focusing on whether or not the medial epicondyle was resected.
Material & Methods: The subjects were 18 elbows of 17 patients with medial epicondylitis who underwent surgical treatment in our hospital and related institutions between 2015 and 2023 because conservative treatment was not effective. The mean age was 51 years (27 -75 years), 14 males and 3 females, 8 right and 8 left, and 1 bilateral. Partial resection of the medial epicondyle and resection of the origin of the flexor pronator group were performed in 11 elbows, partial resection only in 2 elbows, curettage of the medial epicondyle and resection of the origin of the flexor pronator group in 3 elbows, and resection of the origin of the flexor pronator group in 2 elbows. Neurolysis of the ulnar nerve was performed at 15 elbows, and subcutaneous anterior transfer was performed at 3 elbows. The patients were divided into 13 elbows in the resection group and 5 elbows in the non-resection group according to whether partial resection of the medial epicondyle was performed, and the postoperative treatment outcomes were compared.

Results: The Numeric Rating Scale before surgery and at the final examination improved from an average of 4.4 to 1.5 in the resection group and from 5.4 to 2.6 in the non-resection group. The Mayo Elbow Performance Score at last observation was 86 points in the resected group and 86 points in the non-resected group, which was not significantly different. Excluding bilateral cases, the postoperative grip strength healthy side ratio was 100% in the resection group and 88% in the non-resection group. One patient in the non-resected group who had not undergone curettage of the medial epicondyle had a recurrence of symptoms 6 months after surgery. In addition, the most painful cases in the resection group were those in which only partial resection of the medial epicondyle was performed without resection of the lesion at the origin of the flexor pronator muscle group. The mean follow-up period was 9.5 months (4 -26 months).
Conclusions: The results of surgical treatment of medial epicondylitis in our hospital and related institutions were relatively good regardless of the resection of the medial epicondyle. The combination of excision or curettage of the medial epicondyle and excision of the lesion at the origin of the flexor pronator muscle group seemed to lead to good postoperative results.

A-0650 QUANTITATIVE MEASUREMENT OF THE CROSS-SECTIONAL CONFIGURATION OF THE FLEXOR TENDONS USING ULTRASOUND IN PATIENTS WITH PEDIATRIC TRIGGER FINGER

Ji Sup Hwang, Jihyeung Kim, Changhyon Lee, Wan Kee Hong, Dong Uk Jin, Hyun Sik Gong, Kee Jeong Bae, Yohan Lee
Seoul National University College of Medicine, Seoul Republic of Korea

Introduction: Pediatric trigger finger (PTF) is a rare disorder of unknown etiology. Although sonographic examination has verified developmental size mismatch between the flexor tendon and pulley system in pediatric trigger thumb, this has not been studied in PTF.
Aim: In this study, we evaluated cross-sectional configurations of the flexor tendons and area under the A1 pulley in children with PTF.
Material & Methods: We retrospectively reviewed 19 trigger fingers of 16 children (10 boys and 6 girls) with unilateral PTF. We measured the cross-sectional configuration of the flexor tendons using ultrasound at the level of the greatest anteroposterior (AP) diameter of the flexor tendon proximal to the A1 pulley, and under the A1 pulley. For the measured AP diameter, radioulnar (RU) diameter, and cross-sectional area (CSA), we defined the AP ratio, RU ratio, and CSA ratio as the ratios between values measured at the two different levels. The measurements were repeated on the corresponding contralateral normal fingers, and paired t-tests were performed to compare the values.
Results: The average AP diameter, RU diameter, and CSA of the flexor tendons were 9%, 25%, and 37% larger than the measurements under the A1 pulley in the trigger finger, respectively. Compared to the contralateral normal fingers, the RU ratio and the CSA ratio were significantly larger in the PTFs.
Conclusions: Flexor tendons of PTFs were enlarged at the level proximal to the A1 pulley. This suggests that PTF and pediatric trigger thumb might share a common etiology and have similar natural history.

A-0651 APPROPRIATE NEEDLE PENETRATION DEPTH FOR THE INTRADELTOID MUSCLE IN VACCINE ADMINISTRATION

Chaiwat Chuaychoosakoon[1], Prapakorn Klabklay[1], Pattira Boonsri[2], Teeranan Laohawiriyakamol[2]
[1]Department of Orthopedics, Faculty of Medicine, Prince of Songkla University; [2]Department of Radiology, Faculty of Medicine, Prince of Songkla University

Introduction: Vaccination is a highly effective strategy for preventing infectious diseases. Precise vaccine administration requires attention to various factors, including choosing the right needle length. Intramuscular vaccines have shown

optimal efficacy when administered in the deltoid muscle. A shorter needle can lead to subcutaneous administration, reducing vaccine efficacy and antibody titers compared to intramuscular injections, while a too-long needle can risk inadvertent injection into the subdeltoid bursa, potentially causing bursitis. For the injection site, a distance of either 2 or 3 fingerbreadths below the mid-acromion process is commonly recommended but using 3 fingerbreadths may pose a risk of iatrogenic axillary nerve injury. To date, there are no studies which have comprehensively evaluated the thickness of the subcutaneous fat pad and the distance from the skin to the subdeltoid fascia to provide guidance for determining the optimal needle penetration depth for intradeltoid muscle vaccination at the landmark of 2 fingerbreadths below the mid-acromion process.

Aim: The objective of this study was to determine the appropriate needle penetration depth for a deltoid muscle vaccination to prevent injection-related injuries.

Material & Methods: This was a retrospective study using axial proton density-weighted images of MRI shoulders. MRI images that passed through the most anterolateral aspect of the acromion process were chosen as the coronal images. To identify the indicated site for an injection, a line of 2 fingerbreadths (39.19 mm) in length was drawn vertically downward along the skin surface, just below the inferior aspect of the acromion process. Axial proton density-weighted images at the level of the injection site were utilized for the measurements carried out in this study. The thickness of the subcutaneous fat pad and deltoid muscle measurements were obtained at designated distances from the center of the humeral head. Each measurement was independently performed three times by an experienced musculoskeletal radiologist to ensure the accuracy and reliability of the findings.

Results: There were 509 MRI shoulder images of 222 males and 287 females (265 of right shoulders and 244 of left shoulders). The average BMI and age were 24.54 $\pm$ 3.54 kg/m2 and 64.81 $\pm$ 10.20 years, respectively. Using a needle penetration depth of 12.7 mm (0.5 inches) achieved 100% of injections into the deltoid muscle. There was a positive correlation between BMI and the thickness of the deltoid subcutaneous fat pad and skin to the subdeltoid fascia. Conversely, a negative correlation was observed between BMI and deltoid muscle thickness.

Conclusions: We recommend advancing the entire length of a 0.5-inch needle perpendicular to the skin at 2 fingerbreadths below the acromion process for adult intradeltoid vaccinations. This approach ensures optimal vaccine delivery and minimizes the risk of injection-related injuries.

A-0652 PERIPHERAL NERVE VEIN WRAPPING: MULTICENTRIC STUDY

Pierfrancesco Pugliese, Graziano Accardo, Alice Clemente, Alessandro Crosio, Francesca Toia, Pierluigi Tos
AOUP Paolo Giaccone, Palermo, Italy; CTO G. Pini, Milan, Italy

Introduction: Peripheral nerve reconstruction is of often affected by poor results because of neuroma formation, scar tissue and axonal sprouting. Neurorraphy protection is important to reduce those risks. Despite nowadays there is not a perfect barrier to protect neurorraphy site, autologous tissue represent the best technique and veins are an easy alternative with a low donor site morbidity.

Aim: We analysed results using vein wrapping in patients with traumatic lesion of upper limb peripheral nerve to highlight nerve adherence in the surrounding scar tissue and correlated symptoms.

Material & Methods: We performed a multicentric study trating 34 nervs of 28 patients undergone to peripheral nerve reconstruction between September 2018 and July 2023. Mean age was 41 yo.

65% smokers and 35% affected by diabetes.

Were included traumatic lesion of peripheral nerve of the upper limb, sensitive, motor o mixed, acute and chronic, treated with direct suture or graft.

In 88,2 % we used veins from the same limb. Mean f-up was of 9 months.
Patients were clinically evaluated by Semmes Weinstein monofilament, Tinel sign progression, and presence of paresthesia, dysesthesia pain at rest or during movement.
Results: None of the patients showed symptoms due to neuroma formation or functional limitation.
Protective sensation recovery was achieved in 70% of cases.
23,5% of patients suffered of paresthesia and dysesthesia in 14,7%, pain at rest in 14,7% or during movement in 23,5%.
We did not find any problem in the donor site.
Conclusions: Nerve protection with autologous vein graft is a easy technique with a negligible donor site morbidity. Despite functional results are not directly correlates, in case of complex trauma involving peripheral nerves creating perineural scars, aoutologous protection, associated to a proper surgical technique, is a further protective element for axonal growing. This procedure is not time consuming because the graft come from the same surgical field, is cheap, reproducible and can be always applicable in any case of peripheral nerve reconstruction.

A-0653 EFFECT OF SCAPULAR DYSKINESIS ON SHOULDER ACTIVE MOVEMENT AND FUNCTION IN CHILDREN WITH BRACHIAL PLEXUS BIRTH PALSY

Esra Merve Çakıryılmaz[1], Tüzün Fırat[2]
[1]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Yüksek İhtisas University, Ankara, Turkey; [2]Faculty of Physical Therapy and Rehabilitation, Hacettepe University, Ankara, Turkey

Introduction: Scapular dyskinesis is one of the structural changes seen in Brachial Plexus Birth Palsy (BPBP) . Its effects on shoulder movements and function are not fully known.
Aim: Scapular dyskinesis is frequently seen in children with BPBP due to both muscle denervation and glenohumeral joint limitations. The aim of our study was to investigate the effect of scapular dyskinesis on shoulder active movement and upper extremity function in children with BPBP.
Material & Methods: Seventy-eight children with BPBP between 2-10 years old, mean age 5,48±1,76 years old were included to the study. One child was in Group 1, 24 children was in Group 2a, 22 children was in Group 2b, 4 children was in Group 3 and 27 was in Group 4 according to Modified Narakas Classification. Scapular Dyskinesis (SD) was evaluated with Kibler's Scapular Dyskinesis Classification during 6 movements of Modified Mallet Mallet Scale (MMS). Participation and functional levels were assessed with using Pediatric Outcomes Data Collection Instrument (PODCI) Upper Extremity Score, and Pediatric Evaluation of Disability Inventory (PEDI), respectively. Correlation analyses were performed between SD and each MMS movements. Also, correlation between sum of SD scores and PODCI and PEDI scores were analysed.
Results: MMS scores of all children were given as median and minimum-maximum: abduction 4, 2-5; global external rotation 4, 1-3; hand to neck 3, 1-4; hand to spine 2, 2-4; hand to mouth 3, 1-4 and internal rotation 3, 2-4. Correlations between SD-MMS scores were as follows: Hand to Spine ($p<0.001$, $r=0.444$), Hand to Mouth ($p=0.003$, $r=0.337$), Hand to Belly ($p=0.023$, $r=-0.258$). There was no correlation between sum of SD scores and PODCI scores. Correlation between sum of SD and PEDI self-care task ($p=0.012$, $r=0.288$).
Conclusions: According to the MMS, as SD increases hand to spine and hand to mouth increases, but hand to belly decreases. However, from a functional point of view, it is seen that it has a supportive effect on self-care tasks. It seems SD has a compensatory function on rotational movements including hand to spine and hand to mouth. It can be concluded that SD does not have a negative effect on function and has a supportive role in self-care activities.
Keywords: Brachial Plexus Birth Palsy, Scapular Dyskinesis, Upper Extremity Function

A-0654 PRELIMINARY RESULTS OF THE ACCURACY OF CT-RSA MIGRATION MEASUREMENTS OF THE CAPFLEX PIP PROSTHESIS: AN ANATOMIC SPECIMEN STUDY

R. Oomen[1], L.A. Koster[2], B.L. Kaptein[2], I.F. Blom[1,3], G.A. Kraan[1], N.M.C. Mathijssen[1]
[1]Reinier Haga Orthopedisch Centrum, Zoetermeer, The Netherlands; [2]Leids Universitair Medisch Centrum, department of orthopaedics, Leiden, The Netherlands; [3]Reinier de Graaf Gasthuis, department of radiology, Delft, The Netherlands

Introduction: The gold standard for measuring migration of small prostheses, like the CapFlex proximal interphalangeal (PIP) prosthesis, is Model-based Roentgenstereometric Analysis (MBRSA). MBRSA requires bone markers, a calibrated stereo roentgen image, 3D prosthesis models, and uses projection matching to measure implant migration. However, rotations in small joints are not accurately measurable with MBRSA. Computed Tomography based RSA (CT-RSA) is an upcoming method to measure migration. This method does not require bone-markers, and therefore avoiding the difficulties of marker distribution in a small bone. However, the accuracy of CT-RSA has not yet been validated for migration analysis in small joints.
Aim: The primary objective is to assess the accuracy of migration measurements of the CapFlex PIP prosthesis using CT-RSA.
Material & Methods: An anatomic specimen of the proximal and intermediate phalanges with an implanted CapFlex-PIP prosthetic was placed in a micromanipulator. The proximal phalanx was translated in the longitudinal-axis till 2.5 mm and rotated around the longitudinal axis till 5.0° in 10 manipulations each. Manipulations were applied for translations and rotations separately. At each position, a CT-scan was made. All scans were analyzed with V3MA software (RSAcore, LUMC, Leiden, The Netherlands) to analyze translations and rotations of the components compared to the opposing bone. Bland-Altman analysis was done to calculate mean differences and 95% limits of agreement.
Results: Mean differences between the applied and measured translations of the proximal and distal component along the longitudinal-axis were 0.011 mm [95%LOA -0.065 mm to 0.043 mm] and -0.036 mm [95%LOA -0.074 mm to 0.001 mm], respectively. The mean differences for the rotations of the proximal and distal component along the longitudinal-axis were -0.035° [95%LOA -0.418° to 0.347°] and 0.107° [95%LOA -0.196° to 0.411°], respectively.
Conclusions: Preliminary results show that V3MA is an accurate method to determine longitudinal translation and rotation in a small joint such as the PIP. Wider 95% limits of agreement for the rotations show that analysis of rotations are less accurate than translations. Further optimization might improve this accuracy.

A-0656 THE BRIDGING PLATE FIXATION WITH LOCKING STRUT PLATE FOR ULNAR CARPOMETACARPAL JOINT FRACTURE-DISLOCATIONS

Tae Yeong Chang, Yeongyoon Koh, In Cheul Choi, Jong Woong Park
Department of Orthopedic Surgery, College of Medicine, Korea University, SEOUL, KOREA

Introduction and Aim: There are various treatments for ulnar CMCJ (4th and 5th CMCJ) fracture dislocations. This study aims to describe a surgical technique in which a bridging plate fixation with strut locking plate was used for the treatment of ulnar carpometacarpal joint fracture-dislocations and to assess its clinical and radiologic outcomes.
Material & Methods: A total of 10 patients (10 male; mean age, 34 years) with ulnar carpometacarpal joint fracture-dislocations who were treated by open reduction and internal fixation with the use of the dorsal bridging technique with locking strut plate from 2018 to 2022 were retrospectively reviewed. A short arm splint was recommended for 2 weeks after the operation. Mayo Disabilities of Arm Shoulder and Hand (DASH) scores and Grip strength were collected for the injured hands.

Surgical Technique: We exposed the joint and fracture site through the hamate fracture fragment (Fig 1 a). After refreshing the fracture site and joint, the hamate fragment was fixed temporarily with a 0.9-size Kirschner wire (K-wire) (Fig 1 b). The plate (Synthes Compact Hand Set, Strut plate, USA) was then positioned over the joint capsule of the 4th or 5th metacarpal base and hamate bone. We were able to insert at least 3 screws on the hamate and at least 2 screws on the 4th or 5th metacarpal base (Fig 1 c). We recommended the patient return to tolerable daily activities such as simple desk jobs after 2 weeks. We recommended implant removal approximately 3 months after the 1st surgery.
Results: The average Mayo DASH scores were 16.57±8.05 at 3 months (before 2nd operation), and 3.89 ± 1.69 at 12 months. The Grip power and ROM of the Metacarpal joint were improved in all patients over the study period and most patients showed normal range of Grip power and ROM at their last follow-up visits. All patients returned to Daily Activity Living and their respective desk jobs at around 4 weeks (3~5weeks) after the procedure.
Conclusions: Using bridging plate fixation with a locking strut plate may be an effective alternative treatment for patients with ulnar carpometacarpal joint fracture-dislocations; especially for patients who require prompt return to daily activity living.

A-0657 IS EARLY ACTIVE MOBILIZATION AFTER OPEN TFCC REPAIR NON-INFERIOR TO LATE ACTIVE MOBILIZATION? A PROPENSITY SCORE MATCHING STUDY

Sebastiaan T. Peters[1,2,3], Joris S. Teunissen[1,4], J. Sebastiaan Souer[5], Hand-Wrist Study Group[1], & Robbert M. Wouters[1]
[1]Rehabilitation Medicine and Plastic, Reconstructive and Hand Surgery, Erasmus MC, University Medical Center Rotterdam, Rotterdam, The Netherlands; [2]Center for Hand Therapy, Xpert Handtherapie, Utrecht, The Netherlands; [3]Physical Therapy Sciences, program in Clinical Health Sciences, University Medical Center Utrecht, Utrecht, The Netherlands; [4]Department of Plastic, Reconstructive, and Hand Surgery, Radboud University Medical, Center, Radboud Institute for Health Sciences, Nijmegen, The Netherlands; [5]Hand and Wrist Center, Xpert Clinics, Eindhoven, The Netherlands

Introduction: Following surgical repair of the triangular fibrocartilage complex (TFCC), a rehabilitation program is usually advised. Early active mobilization, including early range of motion exercises, may theoretically promote stronger ligament healing with fewer limitations during immobilization, more convenience during early rehabilitation, and a faster return to work than late active mobilization. However, no evidence for early active mobilization on these outcomes is available, and in theory, early active mobilization might also lead to worse pain and hand function outcomes.
Aim: The aim of this study was to investigate whether an early active mobilization protocol after open TFCC repair is non-inferior to late active mobilization in terms of pain and hand function 3 months postoperatively.
Material & Methods: This was a prospective, multicenter cohort study with propensity score matching. We compared early active mobilization (active rotation within the first week) with late active mobilization (active rotation after 6 weeks), using routinely collected data between 2017 and 2022. Patients in both groups wore a long wrist orthosis 24 hours a day for 6 weeks. The Patient Rated Wrist/Hand Evaluation (PRWHE) total score at 3 months was the primary outcome. Secondary outcomes were the PRWHE at 12 months; the Patient-Specific Function Scale, grip strength, and active range of motion at 3 and 12 months; and return to work and complications within the first year. Noninferiority was considered if one bound of the 95% CI lies outside the noninferiority margin but an effect size of 0 lies within the other bound.
Results: Of the 197 eligible patients, we matched and included 104 patients. PRWHE scores at three months for the early active group were non-inferior to the late active group. Furthermore, non-inferiority was found in all secondary outcomes. Additionally, no differences were found in return to work and complication rate.
Conclusions: We found non-inferiority of an early active mobilization compared to late active mobilization following

TFCC repair in terms of pain and hand function, and complication rates were also similar. Our study confirms that early active mobilization following TFCC repair is safe, which may have several benefits for patient comfort and early return to activity. A future randomized clinical trial may confirm these findings.

A-0658 THE NATURAL HISTORY OF NON-OPERATIVELY TREATED TRAUMATIC TFCC TEARS: A SYSTEMATIC REVIEW

Seung Il Choi[1], Simon MacLean[1], Shahbaz Malik[2]
[1]Tauranga Hospital, Tauranga, New Zealand; [2]Worcestershire Acute Hospital, Worcester, England, UK

Introduction: TFCC tears are a heterogeneous group, and the natural history of TFCC injury is poorly documented. Extensive research exists on clinical outcomes following operative management of TFCC tears, however, we identified a lack of data regarding the outcomes of non-operatively managed TFCC tears.
Aim: The aim of this systematic review was to identify patient outcomes with non-operatively managed TFCC tears to improve our knowledge on the natural history of the injury.
Material & Methods: A literature search was performed using PRISMA guidelines and registered on the PROSPERO database. The search utilised Medline, Embase and PubMed databases and appropriate studies were selected for analysis. The MINORS tool was utilised for objective study validity. Outcome data included; functional scores, range of motion (ROM), grip strength, return to work, and splinting protocols for different tear types.
Results: A total of 427 wrists were included in our systematic review, across 8 studies. Mean age ranged from 30 – 60 years, with 54% males. Mean follow-up 12 months to 7 years.
Functional outcome scores (DASH, G&W, MMWS, PRWE), were fair to excellent across the group as a whole.
Mean ROM values at mean final follow up of 20.7 months were a total flexion-extension arc of 122 degrees +/- 23 degrees (95% confidence interval), or a mean value of 100% of the contralateral side.
Grip strength mean values at mean final follow up 20.34 months were 88.47% of the contralateral side, or 34kg of grip strength.
It was also noted that the majority (90%) of patient's were able to return usual employment within a year, whilst 7.8% had to change their occupation.
A number of splinting regimes used included full above elbow, sugartong type and below elbow for various lengths of time varying from 2 weeks to 9 weeks. The position in which to splint the forearm also varied from neutral to full supination. There was limited consensus amongst studies regarding methods of non-operative management regarding length and method of immobilisation.
Type IB tears were specifically focused on in one study, which allowed for specific conclusions to be drawn regarding this type of injury, with non-operatively managed patients having no statistically significant difference in PROMs, range of motion, grip strength or DRUJ instability.
The crossover of patients from non-operative to operative management was recorded in several studies Overall, the rate ranged from 10.5% to 38.2%, with the overall crossover being 25.1%.
Conclusions: Whilst there was extensive data regarding traumatic TFCC tears amongst the studies, the heterogeneity of non-operative treatment protocols and the lack of specific diagnoses made drawing further conclusions difficult. This systematic review suggests that non-operative management of TFCC tears with a short period of above elbow immobilisation is a valid treatment strategy in the context of TFCC tears where there is no DRUJ instability. Foveal involvement on MRI with a clinically stable wrist may not require surgery. More research is needed in this area, and prospective randomized controlled studies are needed to define optimal management for this heterogeneous group of injuries.

A-0659 FAILED CARPAL TUNNEL DECOMPRESSION SURGERY; A MAGNETIC RESONANCE IMAGING AND CLINICAL ANALYSIS

Sabina Barbur, Tahlia Kerridge, Simon MacLean
Tauranga Hospital, Bay of Plenty, New Zealand

Persistent or worsening symptoms following carpal tunnel surgery may be caused by both patient and surgical factors. Previous MRI analysis of failed carpal tunnel decompression (CTD) surgery has shown no standardised group of measurements that reflect surgical failure or prognostic recovery. No previous study has correlated both MRI and clinical findings. The aim of this study was to assess MRI findings on high-resolution 3-T imaging and to correlate this with patient demographics and clinical findings at follow up.

An observational retrospective analysis of 67 patients were assessed at both clinical follow-up and using 3-Tesla MRI after CTD. Two principal cohorts were identified; (A) patients who had no benefit from the surgery with either unchanged or worsening symptoms and (B) patients who had resolution of their symptoms following surgery with later recurrence of symptoms. Image analysis included nerve calibre at three levels (proximal to distal), integrity of flexor retinaculum (FR), nerve position relative to the flexor retinaculum line, space occupying lesions in the carpal tunnel, fascicle oedema and flexor tenosynovitis. Clinical data included demographics and comorbidities, sensory and motor examination, nerve provocation testing, nerve conduction studies, and operating surgeon experience.

Results: results were analysed within the respective groups. Group A (n=39), Group B (n=28). Within group A, the FR was released fully in 46%, partially in 41% and not released or had already reconstituted/scar tissue formed in 13% of patients, Within Group B, the FR was fully released in 14%, partially released in 36% and intact in 50%. Group A / Group B was found to have an average nerve ratio of 0.46/0.48 proximally, 0.43/0.47 within the middle of the tunnel and 0.41/0.45 distally. 21% of Group A had tenosynovitis compared to 10% in Group B. 49% of Group A had a high nerve signal compared with 54% of Group B. 62% of Group A were considered to have a complete release radiologically when assessing the displacement of the nerve volarly with respect to the line drawn between the hook of the hamate and tubercule of the trapezium compared with 46% in Group B. 25% of Group A were active smokers compared to 35% in Group B. Diabetes was identified in 21% of Group A compared to 29% of Group B.

Conclusion: We have identified a number of important MRI findings in a cohort of patients presenting with either recurrence of symptoms or failure to improve after CTD surgery. Over half of the patients with persistent or worsening symptoms have MRI findings illustrating that the FR is not fully released and that the nerve ratio is consistently lower at all points compared to those that have recurrence after a period of symptom free time. All patients with recurrence will have a low nerve ratio, and are more likely to develop a high nerve signal on MRI. In addition, these patients have demographic parameters which may contribute to symptomatology – with a higher proportion of smoking and diabetes when compared to those that did not improve following their initial CTD.

A-0660 A NOVEL METHOD FOR DETECTING ISCHEMIA AFTER REPLANTATION

Ole-Gunnar Olsen[1], Rasmus Thorkildsen[1], Andreas Lødrup[1], Johanne Korslund[1], Tor Inge Tønnessen[1,2], Espen Lindholm[2], Magne Røkkum[1]
[1]Oslo University Hospital Rikshospitalet, Oslo, Norway; [2]Sensocure AS, Skoppum, Norway

Introduction: Postoperative ischemia after replantation surgery is common, and early recognition is crucial to guide reoperation before irreversible damage occurs. To date, the established means of detecting ischemia is intermittent

assessment of clinical status and skin surface temperature. The lack of a reliable objective indicator of ischemia in this setting may contribute to an often delayed detection of deteriorating postoperative ischemia resulting in a poorer prognosis. The IscAlert system uses a 1 mm diameter subcutaneous sensor to continuously record pCO2 and temperature, a sensitive indicator of ischemia.
Aim: The study aims to investigate if the biosensor IscAlert, is a reliable indicator of ischemia in replated extremities.
Material & Methods: The study is an open, interventional, prospective, descriptive, single-center study, including 60 patients (80 replanted extremities). Sensors are inserted subcutaneously in the replanted extremity with a control sensor in non injured tissue continuously measure pCO2 and temperature. A reoperation is considered if the sensor measures an increase of pC02 > 1 KPa/h or a decrease in internal temperature of > 1 degree C/h. Standard clinical status and skin surface temperature monitoring of circulation is performed according to hospital's protocol. The primary endpoint is the pC02-change in extremity replantations during the implantation period of maximum 10 days.
Results: The study is ongoing with 21 included patients and 23 replanted extremities. The sensor does detect ischemia in replanted extremities by a significant increase in pC02, in many cases prior to recognition of clinical signs of ischemia. There have been technical difficulties with the sensor, particularly in finger replantations in need of leech therapy. One patient has complained of numbness in the pulp of their control finger.
Conclusions: The sensor may be a useful assistive device in monitoring circulation in replanted extremities. More patients need to be included before drawing conclusion about its utility, reoperation thresholds, and possible benefits.

A-0661 A NEW MODE FOR FOLLOW-UP TO EVALUATE THE FUNCTIONAL OUTCOME AFTER FLEXOR TENDON REPAIR

Jing Chen, Hao Yu Bian, Jun Tan
Affiliated Hospital of Nantong University, Nantong, China

Introduction: Many patients refuse to come for postoperative follow-up examinations because of economic burden and time cost after flexor tendon repair. Surgeons cannot evaluate the functional outcome. The reliability of photography in patients for assessing range of motion (ROM) of fingers has been investigated. It is mandatory that the photographer is instructed in taking the pictures correctly. In the previous study, measurements based on photographs taken by the surgeons were not compared with photographs taken by the patients. This follow-up mode needs to be tested by having the patient, family member or acquaintance take pictures and comparing them with goniometric measurements.
Objective: The purpose of this study was to assess if this new follow-up mode (family member or acquaintance of patients take picture, surgeons check and measure) is as reliable and valid as traditional mode (measurement using goniometry face to face) for measuring interphalangeal (IP) joints ROM and to determine whether it can be used for evaluating the functional outcomes after flexor tendon repair.
Methods: We conducted a retrospective review of the patients who underwent flexor tendon repairs of zone 1 and zone 2 including 26 fingers in 24 patients (6 women and 18 men) with a mean age of 38 years (range, 18-61) from January 2022 to May 2023. Firstly, family member or acquaintance of patients were asked to watch an instructional video describing how to take photographs of their digits in terminal flexion and extension. The key point is that the camera should be parallel to the longitudinal axis of the injured fingers. Then, he/she took photos and sent them to surgeon. Surgeon checked these photos. If the photo is not qualified, it needs to be retaken until surgeons approves it. Then, surgeon measured the angles of finger flexion and extension in digital photos using analytic software (DP group). Secondly, another surgeon used a manual goniometer (MG group) to measure the patients' IP joints ROM of injured finger, including the full active flexion and extension. The differences in active ROM between the MG and the DP were compared using the Student

t-test. Reliability and correlation between the two data sets were calculated using Pearson's correlation coefficient and the interclass correlation coefficient (ICC).
Results: There were no repair ruptures, and no fingers needed tenolysis. The mean ROM of the IP joints was 153+/-29 degrees and 150+/-31 degrees in MG group and DP group, respectively. The mean extension deficits were 11° (SD 13 °) and 13° (SD 9 °), respectively. No significant difference was found (P=0.66). According to the Tang criteria, the total number of excellent and good results were equivalent for the three measurements. Pearson coefficient was 0.88.
Conclusions: The new follow-up mode after flexor tendon repair are a valid and reliable method to evaluate the functional outcomes of flexor tendon repair. Patients don't need to come to the hospital if surgeons teach patients how to take photos correctly and carefully check the photos.

A-0662 SEMI-OCCLUSIVE DRESSING FOR REPAIRING FINGERTIP SOFT TISSUE DEFECTS: A CLINICAL STUDY ON EPITHELIALIZATION RATE AND SHORT-TERM FUNCTIONAL RECOVERY

Yang Fan Zhang, Qing Zhong Chen, Jing Chen
Affiliated Hospital of Nantong University, Nantong, China

Purpose: This study delves into the epithelialization rate and functional recovery of fingertip soft tissue defects through the application of a simplified semi-occlusive moist dressing method for fingertip repair during a short period.
Methods: In the period from June 2023 to August 2023, we utilized a self-designed and simplified IV3000 dressing for semi-occlusive moist dressing in the restoration of 20 cases with fingertip soft tissue defects. Continuous monitoring of the epithelialization rate in the defect area occurred at two-week intervals. Short-term follow-ups (3-4 months post-healing) were conducted to evaluate fingertip sensation, joint mobility, postoperative complications, and cold intolerance.
Results: All wounds exhibited successful healing, showcasing a markedly higher epithelialization rate in the initial two weeks compared to subsequent weeks ($p < 0.05$). The fingertip and pulp's S-2PD achieved an average of 7.8mm. Short-term fingertip sensation achieved S+ grade uniformly. Distal interphalangeal (DIP) joint mobility showed no significant differences compared to the contralateral side, and the total active motion of the injured fingers reached a good or excellent level. Notably, five patients developed hook nail deformities, and two cases experienced extension lag deformities. Cold intolerance of the fingertips did not manifest.
Conclusion: The identified variations in epithelialization rates under the Semi-occlusive dressing bear profound implications for guiding subsequent clinical interventions. Based on the promising outcomes from short-term follow-ups, we assert that semi-occlusive dressing changes, particularly in cases of fingertip amputations, yield favorable clinical results. The approach is user-friendly, cost-effective, and holds potential for broad implementation in primary healthcare settings.

A-0663 INCIDENCE AND PREDICTORS OF FLEXOR TENDON INJURIES IN PATIENTS WITH DISTAL RADIUS FRACTURES TREATED WITH VOLAR PLATE FIXATION: A SYSTEMATIC REVIEW AND META-ANALYSIS

Emilio Baixauli, Alejandro Blasco, Emilio Baixauli-Gutiérrez, Gonzalo Mariscal, Carmen García
Department of Orthopedic Surgery and Traumatology, La Fe University and Polytechnic Hospital, Valencia, Spain

Introduction: Distal radius fractures are the most common fractures of the musculoskeletal system, and volar plate treatment has shown benefits compared to other treatments. However, flexor tendon damage remains a common challenge with volar plates owing to various risk factors.

Aim: This study aimed to determine the incidence of flexor tendon injuries and identify associated risk factors in patients with distal radius fractures treated with a volar plate.
Material & Methods: A systematic search was conducted in PubMed, EMBASE, Scopus, and Cochrane Collaboration Library. The study quality was assessed using the MINORS criteria. Data on the incidence of flexor tendon injuries and the demographic, radiological, and surgical risk factors were extracted. Statistical analysis was performed using Review Manager 5.4 software and odds ratios (OR) and mean differences (MD) with 95% confidence intervals were calculated. Random effects were used when heterogeneity was observed.
Results: Eleven studies with a pool 7572 patients were included. The incidence of flexor tendon injuries was 9.91% and the incidence of tendon rupture was 2.81%. Identified risk factors included Soong grade 2 (OR 4.15, 95% CI 1.28 to 13.48), plate–to– critical line distance (PCLD) >2 mm (OR 23.88, 95% CI 6.77 to 84.23), lower volar tilt (MD -3.30, 95% CI -5.85 to -0.74), lower radial tilt (MD -4.57, 95% CI -7.84 to -1.30), lower radial height (MD -1.34, 95% CI -2.64 to -0.03) and greater carpal translation (MD 2.23, 95% CI 0.57 to 3.89).
Conclusions: The overall incidence of flexor tendon injuries was 9.91% following volar plate fixation for distal radius fractures. Several factors have been identified to contribute to a higher risk of such injuries, including Soong grade 2, PCLD >2 mm, reduced volar tilt, decreased radial inclination, diminished radial height, and increased carpal translation.

A-0665 MUSCLE-RIB FLAP TRANSFER FOR RECONSTRUCTION OF COMPOSITE UPPER LIMB DEFECTS

Alexandru Valentin Georgescu, Octavian Olariu
Rehabilitation Clinical Hospital, Cluj Napoca, Romania

Introduction: Direct traumatic open fractures or their complications, as osteomyelitis and nonunion, represent the main etiology of bone defects. If soft tissue defects are also present, the management of these lesions becomes more challenging. The most used flaps in these cases are the vascularized fibula osteoseptocutaneous flap, the vascularized iliac osteocutaneous flap, and the vascularized muscular-rib flap.
Aim: We previously reported about the advantages and the few complications by using the muscle-rib flap, and about the advantages of all-in-one reconstruction in complex injuries of the limbs involving both bone and soft tisuue defects by using these flaps.
Material & Methods: The study refers to 32 patients operated for acute or sequelar traumatic composite bone and soft tissue defects in upper limb, between March 1997 and March 2023, 8 females and 24 males, with an average age of 30,5 years (range, 5 to 66 years). The etiology of the defects was an acute trauma in 17 cases, and a posttraumatic complication in 15 cases. The average length of the bone defect was 5,2 cm (range, 3 to 8 cm), and the surface of soft tissue defect ranged between 6 and 475 cm2. The flap used was the SA-R in 14 cases, the LD-R in 11 cases, and the LD-SA-R in the remaining 7 cases; from these, 23 were free flaps, and 9 pedicled flaps.
Results:The average follow-up in our 32 patients was 23,1 months (range, 12 to 48 months). We had complete flap survival in all the cases. In only one case we registered a superficial wound infection, which was solved conservatively. Regarding the long term results, we registered a rate of primary bone union of 100%, with an average time of 6,6 months.
Conclusions: The vascularized rib(s) as part of a composite flap represents a good indication especially in bone defects associated with large soft tissue defects

A-0666 ORIGINAL SURGICAL TREATMENT FOR THE TRAUMATIC MALLET FINGER: THE DEEPITHELIALIZED SKIN FLAP

Alexandru Valentin Georgescu, Octavian Olariu
Rehabilitation Clinical Hospital, Cluj Napoca, Romania

Introduction: Mallet finger deformity is one of the most frequent pathological entities after extensor tendons injuries, which appears as result of the disruption of extensor tendon continuity over the distal interphalangeal joint. Despite the fact that a lot of methods were used in managing this deformity, the treatment of mallet finger is still a much debated subject.
Aim: Introducing a new surgical method for mallet finger injury.
Material & Methods: We present a new surgical method by using a dorsal deepithelia-lised flap reinserted through the bone. The procedure consists in performing an intra-dermal incision that delimitates a flap on the dorsal aspect of the second phalanx, the distal end of the flap coinciding to the DIP joint; the width of the flap is of 3-5 mm. The flap is de-epithelialized and raised superficial to the tendon. At the level of extensor insertion a hole of 1-1.5 mm is done. A 4/0 steel thread is passed through the distal end of the flap and is then passed through the intra-osseous hole and knotted palmary in a tie-over manner. The extensor tendon is sutured with 4/0 absorbable threads to the flap. The skin is closed over the flap. Postoperatively we immobilise only the DIP joint. The Kirschner wire is removed after three weeks, the steel thread after four weeks and the immobilization after five weeks. We used this method in 97 cases.
Results: The patients regain 95-100% of DIP stability and mobility, with only an extension deficit of 0 to 10 degrees in a few cases.
Conclusions: This simple and effective method avoids a prolonged and uncertain immobilization and has a significantly high rate of success. The method uses local resources and avoids the rejection phenomenon related to allograft materials. The distal trans-osseous reinsertion and centro-medular wiring are important technical adjuvant and improve the final results.

A-0667 THE EFFECTIVENESS OF THE BLOCK OF THE RADIAL NERVE AT THE SUPRACONDYLAR LEVEL FOR THE CONTROL OF PAIN AFTER DISTAL RADIAL FRACTURE SURGERY

Chul-Hyung Lee, Chul-U Kim, Hyun-Duck Choi, Jae-Beom Bae
Daejeon Sun Hospital, South Korea

Introduction: Ultrasound-guided brachial plexus block is commonly used when performing regional anesthesia. This method has a few side effects compared to those of general anesthesia. Furthermore, it has an analgesic effect immediately after surgery, which reduces the use of narcotics (Lee et al., 2012; Mirza and Brown, 2011). Egol et al. (2012) reported better clinical results in distal radial fracture (DRF) surgery under regional anesthesia. Based on the literature report that the radial nerve plays a major role of pain sensation in distal radioulnar region (periosteum, joint capsule) (Frenkel et al., 2011; Minniti et al., 2007; Van de Pol et al., 2006), we hypothesized that the single radial nerve block has the effectiveness for controlling pain after DRF surgery and planned a single radial nerve block in the distal upper arm for the purpose of pain control after DRF surgery.
Aim: The purpose of this study was to evaluate the effectiveness of the ultrasound-guided supracondylar radial nerve block for postoperative pain control after distal radial fracture surgery under ultrasound guided axillary brachial plexus block.
Material & Methods: Sixty two wrists were randomized to either performing ultrasound guided supracondylar radial nerve block or not immediately after distal radial fracture surgery. The visual analogue scale, total amount of patient controlled analgesia consumption, incidences of additional analgesic requirement were assessed.
Results: The group who received ultrasound-guided supracondylar radial nerve block showed significantly better results

in terms of visual analogue scale at 24, 36, and 48 hours, patient controlled analgesia consumption at 12, and 24 hours after surgery, and use of additional analgesics during the first three days after surgery.
Conclusions: Ultrasound-guided supracondylar radial nerve block is effective in controlling acute postoperative pain and may be considered as one of the methods to control postoperative pain.

A-0668 CHOOSING THE FLAP IN COMPLEX INJURIES OF THE HAND

Alexandru Valentin Georgescu, Octavian Olariu
Rehabilitation Clinical Hospital, Cluj Napoca, Romania

Introduction: Introduction: Coverage of complex tissue loss in the hand after severe traumas by crushing or avulsion is very challenging. These defects involve generally all the anatomical structures. The difficulties in repairing such a compromise hand are primarily related to the necessity to obtain an as good as possible functionality. The key of obtaining a good functional rehabilitation is to perform, whenever is possible, both the reconstruction and coverage as an all-in-one procedure.
Aim: To demonstrate that both free and local flaps, used especially as perforator flaps, are very useful in solving complex injuries of the upper extremity.
Material & Methods: We take into account the cases with very complex injuries involving all the structures of the hand. In 70% of our cases we used local or regional perforator flaps, and in 30% of cases free flaps. In case of need to cover soft tissue defects over repaired fractures, vessels, nerves and tendon lesions, we prefer to use-whenever is possible-local or regional perforator flaps; if the skin defect is to big, a free flap is preferred. For composite skin and bone defects we use generally composite flaps including bone. For amputations or devascularized segments with skin defects, a free flow-through flap is used. For amputations of different segments, and especially of the thumb accompanied by skin defects, we cover the defect with a free flow-through-flap which is used in mean time to revascularize one or more toe transfers.
Results: All the hands treated by this protocol survived. The failure rate of the flaps was comparable with the one in the literature. By using local/regional perforator flaps we experienced no complete necrosis, but only a transitory venous congestion (20%) followed by a superficial necrosis in 5% of cases. We lost 2 free flaps out of 45 (4.4%). We obtained a satisfactory functional rehabilitation of the reconstructed hand in 10% of cases, a good one in 40% of cases, and a very good one in the remaining 50%.
Conclusions: In complex injuries of the hand the modality of reconstruction is up to the team experience. The use of local/regional perforator flaps has a very good indication in small and medium skin defects, and only in the purpose of coverage. The use of free flaps remain the gold standard in solving big composite defects. The emergency all-in-one reconstruction and the beginning of kinetotherapy as soon as possible after surgery are the key stone of a good functional recovery.

A-0669 SYNDACTYLY CORRECTION: TO GRAFT OR NOT TO GRAFT. A CASE SERIES STUDY

Roberta Sartore, Federica Ceretta, Elisa Sartore, Massimo Corain
Hand Surgery and Microsurgery Unit, University Hosptial, Verona, Italy

Introduction: Syndactyly is a congenital anomaly characterised by the union of two adjacent fingers resulting from abnormalities in the apoptotic phase of limb development. Over the years, numerous authors have proposed various types of local flaps to treat the various forms of syndactyly.

Aim: In this study, the results of syndactyly surgical corrections performed with or without ipsilateral wrist skin graft are analysed, with the aim of assessing the actual need for a skin graft and correlating this need to the age of the operated patient, the different skin phenotypes and the severity of the syndactyly.
Material & Methods: From June 2017 to June 2022, 45 children, a total of 60 hands, aged 8 months to 7 years, average age at surgery of approximately 2 years, were operated in our OU. Until the end of 2020, the surgical technique always involved the use of full-thickness skin graft taken from the volar-ulnar region of the ipsilateral wrist, for a total of 30 hands operated with graft (group A). From 2020 to the end of 2022, it was decided to no longer perform any skin grafts and to adjust grafts to individual needs and/or to have residual dehiscences healed by second intention, for a total of 30 hands (group B). All patients underwent the same surgical incisions by the Senior Surgeons. All patients continuously maintained the packed dressing for a total of 3 weeks, at the end of which an outpatient evaluation was performed. We then assessed the clinical evolution of the scars, both cosmetic and functional, using the parameters of the Vancouver scale weighted with subjective parental ratings (Patient and observer scar assessment scale) and any complications and/or recurrences, correlating with the patient's age at the time of surgery. As for group A with a minimum follow-up of 3 years and an average of 4 years. As for group B with a minimum follow-up of 1 year and a mean of 1.5 years. The results of the two different surgical techniques were then compared.
Results: All treated patients healed within 3 weeks, in group A 3 revision surgeries were necessary in the short term, in group B 2 scars had to be revised due to the appearance of hypergranuloplastic fundus. The distant result of syndactyly corrections without grafts performed in our OU does not seem to entail either a delay in healing time or the occurrence of early secondary complications requiring a second surgery, thus obtaining elastic commissures and non-retracting scars already from the primary treatment.
Conclusions: The evaluation of our results, in order to avoid scar retraction and consequent deformities, underlines the need for a correct planning and execution of the first surgery, mainly assessing the age of the first surgery, the type of incision and the skin phenotype. According to the results of the present study, the use of skin autografts should be reserved only for the few cases of excessive local dehiscence, or scar inextensibility of the skin.

A-0670 "FRAGMENT – SPECIFIC" FIXATION OF DISTAL RADIUS FRACTURES: A CASE SERIES

Trantos I.A, Syngouna S, Stylianopoulou L, Zampeli F, Kanellos P, Fandridis E
Hand, Upper Limb & Microsurgery Department, KAT Hospital, Athens Greece

Introduction: Effective open reduction and internal fixation of unstable, comminuted, intra-articular distal radius fractures cannot always be achieved with the use of anatomical "T" plates. Fragment – specific fixation of such fractures utilizing low-profile implants can provide a satisfactory anatomic reduction and a stable fixation.
Aim: We present a case series of patient treated with fragment-specific osteosynthesis for displaced intra-articular fractures of distal radius. The goal of the study is to provide useful data concerning the effectiveness of this surgical technique
Material & Methods: 24 patients (20 male, 4 female) with a mean age of 41.2 years (range 18-74 years) were treated with fragment-specific fixation in the period 2017-2023. Radial styloid fractures were treated in 10 patients, fractures of the volar side of the lunate facet in 9 patients, fractures of the ulnar column of the radius in 9 patients and fractures of the dorsal wall of the radius in 4 patients. It has to be noted, that in 2 patients the internal fixation of a concomitant fracture of the distal ulna was also required. The patients have been evaluated with postoperative radiographic imaging, quickDASH questionnaire and Mayo wrist score.
Results: The mean follow-up period was 29 months (range 1-74 months). In 21 patients, exclusively fragment-specific

implants were used and in 3 cases they were combined with a volar-sided "T" plate. In the immediate postoperative period, anatomic reduction was achieved in 20 cases and a displacement of 1-2 mm was observed in 4 patients. The mean quickDASH score was 4.17 (0-25) and Mayo wrist score 85.83% (70-100%). No cases of non-union or postoperative infection were documented. In one case, there was late loss of reduction and in another case median nerve entrapment at the level of carpal tunnel. In two cases, the implants from the radial styloid area had to be removed after fracture union. Conclusions: The technique presented can lead to satisfactory fracture reduction and postoperative clinical results, when implemented in comminuted intra-articular distal radius fractures, where the "traditional" technique and implants may be ineffective.

A-0671 COMPARISON OF SCAPHOCAPITATE ARTHRODESIS WITH AND WITHOUT LUNATUM EXCISION FOR THE TREATMENT OF KIENBÖCK'S DISEASE

Muhammet Okkan[1], Anıl Arıkan[2]

[1]Mersin University Department of Hand Surgery, Mersin, Turkey; [2]Mersin University Department of Orthopaedics and Traumatology, Mersin, Turkey

Introduction: Kienböck's disease is avascular necrosis of the lunate and causes wrist pain, wrist limitation, carpal instability and collapse. Scaphocapitate fusion is a surgical treatment option for advanced Kienböck's disease. Excision of the lunate remains controversial.

Aim: In this study, it was aimed to evaluate the the effect of lunate excision on the results surgical treatment results of scaphocapitate arthrodesis in Lichtman classification stage 3b and 3c Kienböck disease.

Material & Methods: 17 patients who had undergone scaphocapitate arthrodesis were included in the study. The mean age of the patients was 37,7 years. Lunatum was excised in 8 patients (Group 1) and preserved in 9 patients (Group 2). Fixation was performed with a single screw in 3 patients and with two screws in 14 patients. The mean follow-up time was 60,3 (34-114) months. Grip and key pinch strengths and wrist range of motion of both hands were recorded at the final follow-up visit. Quick Disabilities of the Arm, Shoulder and Hand (QDASH) score and VAS scales for the operated side were also evaluated and recorded. Bony union, proximal migration of the capitatum and joint degeneration were evaluated via plain radiographs.

Results: Postoperatively, mean VAS score was 2.56 and mean QDASH score was 12.7 in Group 1 patients, while mean VAS score was 2.78 and mean QDASH score was 14 in Group 2 patients ($p>0.05$). In Group 1, mean wrist flexion was 31.4°, extension was 29.7°, radial deviation was 9.6°, ulnar deviation was 22.6°, while in Group 2, mean wrist flexion was 25.8°, extension was 34.7°, radial deviation was 11.4°, ulnar deviation was 27.2° ($p>0.05$). The mean grip strength was 18.9 kg and pinch strength was 4.9 kg in Group 1, while the mean grip strength was 16.1 kg and pinch strength was 5.1 kg in Group 2 ($p>0.05$). There was no significant difference between the statistical analyses. Radiographically, union had occurred in all patients, there was no proximal migration of the capitatum, and no signs of joint degeneration were detected.

Conclusions: Lunatum excision has no significant effect on functional and radiological results in the surgical treatment of scaphocapitate arthrodesis in stage 3b Kienböck's disease.

A-0672 POSTOPERATIVE OUTCOME OF DISTAL RADIUS FRACTURE WITH THE ULNAR STYLOID FRACTURE - STUDY CASES OF WITHOUT TFCC ULNAR FOVEAL TEAR

Ayumu Ishizaki[1], Daisuke Suzuki[1], Hiroshi Ono[1], Ryotaro Fujitani[2], Shohei Omokawa[3], Yasuhito Tanaka[3]
[1]Nishi Nara Central Hospital, Nara, Japan; [2]Ishinkai Yao General Hospital, Yao, Japan; [3]Nara Medical University, Kashihara, Japan

Introduction: The treatment of ulnar styloid fracture associated with distal radius fracture (DRF) is controversial. This is due to the fact that we focus only the ulnar styloid fracture and not on the TFCC ulnar foveal tear. It is not clear whether ulnar styloid fracture should be treated in the case of the DRF without TFCC ulnar foveal tear. We evaluate the ulnar fovea of TFCC arthroscopically in all operated cases of DRF. Therefore, it is possible to study the postoperative outcome of DRF with ulnar styloid fracture without TFCC ulnar foveal tear.
Aim: The aim of this study is to evaluate the effect of ulnar styloid fracture without TFCC ulnar foveal tear on the postoperative outcome of DRF, and establish the treatment strategy for the ulnar styloid fracture.
Material & Methods: We included 90 cases who had been treated at our hospital with open reduction and internal fixation using a volar locking plate for DRF and had normal TFCC fovea on arthroscopic assessment. The ulnar styloid fracture was diagnosed by preoperative X-ray or CT. All ulnar styloid fractures were not treated. The patients were classified into three groups: ulnar styloid tip fracture group, ulnar styloid base fracture group, and no fracture group. The range of motion of the wrist joint, grip strength compared to healthy side, patient based outcome (qDASH, PRWE), DRUJ instability, and tenderness at the ulnar styloid were compared between three groups at the last follow-up.
Results: The mean follow-up period for the 90 DRF cases without TFCC ulnar foveal tear was 11.9 months. Twenty-one of the 90 cases were in the tip group, 34 in the base group, and 35 in the no fracture group. There were no significant differences in patient characteristics (age, gender, and follow-up period) between the three groups. There were no significant differences in any of the outcomes at the last follow-up between the three groups.
Conclusions: The presence of the ulnar styloid fracture and the type of ulnar styloid fracture did not affect the postoperative outcome of DRF without TFCC foveal tear. The ulnar styloid fracture itself does not need internal fixation when the TFCC ulnar foveal insertion is intact.

A-0673 INFLUENCE OF EACH PHALANGEAL JOINT MOTION ON THE EVALUATION METHOD OF THUMB PRONATION ANGLE (T-R ANGLE) DURING THUMB OPPOSITION

Shinji Taniguchi[1,2], Yusuke Matsuura[2], Takahiro Yamazaki[2], Tatsuya Takehara[3], Ayae Yamada[3], Yuki Shiko[4], Koichi Nakagawa[1], Seiji Ohtori[2]
[1]Department of Orthopaedic Surgery, Toho University School of Medicine (Sakura) Chiba, Japan; [2]Department of Orthopaedic Surgery, Graduate School of Medicine Chiba University, Chiba, Japan; [3]Department of Rehabilitation, Chiba University Hospital, Chiba, Japan; [4]Clinical Research Center, Graduate School of Medicine Chiba University, Chiba, Japan

Introduction: The thumb pronation during thumb opposition is difficult to evaluate in a clinical setting because it is a three-dimensional motion. Last year, we reported the nail tip angle of thumb–ring finger opposition (T-R angle) as a new evaluation method of the thumb pronation angle during thumb opposition at this conference. However, we did not examine whether motions other than the thumb pronation motion affected the evaluation.
Aim: The aim of this study was to determine whether the T-R angle can be used to evaluate purely the thumb pronation without being affected by motions other than the thumb pronation.
Material & Methods: Between October 2021 and March 2022, 600 hands of 300 healthy volunteers were included in this

study. The participants were divided into six age groups with 50 participants each: group 1, 20–39 years old; group 2, 40–49 years old; group 3, 50–59 years old; group 4, 60–69 years old; group 5, 70–79 years old; and group 6, ≥80 years old). The exclusion criteria were as follows: pain, deformity, paralysis, sensory disturbance, contracture, a history of hand and finger trauma, and inability to follow the indicated motions. The examiner demonstrated and explained the procedure, and the participants were asked to perform one maximum thumb–ring finger opposition. Measurements were taken at the position where the thumb and ring finger apexes touched. The angle of the palmar abduction of the thumb, flexion angles of the metacarpophalangeal joints (MPj), interphalangeal joints (IPj) of the thumb and MPj, proximal interphalangeal joints (PIPj), and distal interphalangeal joints (DIPj) of the ring finger were measured using a goniometer when performing thumb–ring finger opposition.
Results: This study included 600 hands of 300 healthy volunteers (150 men and 150 women) with a mean (SD) age of 58.7 (18.6) years. In the correlation analysis between the T-R angle and angle of each joint of the thumb and ring finger, only the flexion angle of the thumb MPj showed a weak negative correlation ($\rho = -0.23$, $p < 0.001$) and no other correlation.
Conclusions: A weak negative correlation was observed only for the flexion of the MPj of the thumb in correlation with the range of motion of each finger joint, but the correlation coefficient was low, indicating no influence. This result proves that this evaluation method can evaluate thumb pronation motion alone without being affected by other motions.

A-0674 ARTHROSCOPIC TREATMENT OF SCAPHOID NONUNION - TEN YEARS' EXPERIENCE

Rui Viegas, Lucas Armada, André Castanheira, Diogo Gaspar, José Caldeira
Hospital Beatriz Ângelo, Lisbon, Portugal

Introduction: Scaphoid nonunion leads to progressive carpal misalignment and consequent radiocarpal and midcarpal arthritis. Treating this condition aims to achieve bone healing and to prevent arthritis by correcting carpal misalignment. Arthroscopic techniques have been advanced as an alternative to the conventional open surgery, with the advantages of minimal surgical trauma to the scaphoid blood supply and wrist ligaments.
Aim: The purpose of this study is to assess bone healing and functional outcomes of arthroscopically assisted reduction, bone grafting and percutaneous internal fixation with headless screw in patients with scaphoid nonunion.
Material & Methods: From May 2013 to June 2023, a consecutive series of 32 patients with scaphoid nonunion were treated with arthroscopically assisted reduction, bone grafting and percutaneous internal fixation with headless screw. Data on demographic variables, mechanism of injury, time interval from injury to surgery, fracture location, surgery duration, bone healing, functional outcomes and complications were recorded. The mean follow-up was 35,7 months (range 4-126 months).
Results: Thirty two patients underwent arthroscopically assisted reduction, bone grafting and percutaneous internal fixation with headless screw. Thirty one of them were male and one female, with a mean age of 27,1 years (range 13-52 years).
The mechanism of lesion was sports related in 58%, fall from height in 21%, motorcycle accident in 16%, and unknown in 5%. Scaphoid fracture was located in the waist in 72% and in the proximal third in 28%.
Eleven patients received previous treatment for the acute scaphoid fracture – 9 were treated with plaster immobilization and 2 underwent percutaneous screw fixation.
The mean time interval from injury to surgery was 22 months (range 2-111 months) and the mean duration of the procedure was 120 min (range 63–210 min).
Cancellous bone graft was collected from the distal radius in 37% and from the iliac crest in 63%. Visual analogue scale (preoperative 6,6; postoperative 1,7) and PRWE score (preoperative 45; postoperative 21) significantly improve. Comparing

with contralateral side, grip strength achieved 89%, wrist flexion 89% and wrist extension 78%.
Thirteen (44%) patients didn't achieve complete bone healing on x-ray but only three patients required further treatment – 2 vascularized bone grafts and 1 four-corner fusion. We also report two patients that needed implant removal and one patient underwent arthroscopic arthrolysis.
Conclusions: Arthroscopically assisted reduction, bone grafting and percutaneous internal fixation with headless screw provides good clinical and functional outcomes in the treatment of scaphoid nonunion.

A-0675 CAN WE CORRECT HYPEREXTENSION OF THE MCP JOINT WITH THUMB CMC IMPLANT ARTHROPLASTY?

Vanessa Reischenböck, Jenny Imhof, Miriam Marks, Stephan Schindele, Daniel B. Herren
Schulthess Klinik, Zurich, Switzerland

Aim: The primary objective was to examine whether thumb carpometacarpal (CMC) implant arthroplasty can correct hyperextension in the thumb metacarpophalangeal (MCP) joint. As a secondary outcome, clinical outcomes one-year post-surgery were compared between patients with and without MCP hyperextension.
Material & Methods: Patients treated with a thumb CMC implant arthroplasty (Touch®, KeriMedical, Switzerland) who were prospectively documented in a registry and had complete baseline and 1-year follow-up data were included. Hand function was assessed with the brief Michigan Hand Outcomes Questionnaire (brief MHQ, score 0-100). Key pinch strength was assessed with a pinch gauge and range of motion of the MCP joint with a goniometer. Differences between baseline and follow-up were analysed with the Wilcoxon signed-rank test. The outcomes of patients with a preoperative MCP extension of $> 20°$ (hyperextension group) were compared to the outcomes of patients with $\leq 20°$ using the Wilcoxon rank-sum test.
Results: We included 172 patients of whom 41 had a preoperative MCP hyperextension of $> 20°$. In the hyperextension group, MCP extension was corrected from preoperative mean 33° (95% confidence interval CI: 31-35) to 10° (CI: 6-13) at 1 year ($p \leq 0.001$). Patients in the control group had a preoperative MCP extension of 10° (CI: 9-12) which was reduced to 5° (CI: 4-7) at 1 year ($p \leq 0.001$). Patients with preoperative MCP hyperextension had lower key pinch strength at 1 year compared to the control group (5.9 kg (CI: 5.3-6.6) vs. 7.0 kg (CI: 6.7-7.5), $p \leq 0.01$). The brief MHQ did not differ between the groups (85 (CI: 82-88) vs. 87 (CI: 82-92), $p=0.7$). Complications appeared in 29 patients of whom 7 had preoperative MCP hyperextension. No significant association between hyperextension and complications was observed ($p=1.0$).
In our registry, there are 8 patients who dropped out of the data collection, because they underwent revision surgery. Only one of them had a preoperative MCP hyperextension, indicating that there is no association between preoperative MCP hyperextension and revision surgery.
Conclusions: Thumb CMC implant arthroplasty can correct preoperative MCP hyperextension, and preoperative MCP hyperextension does not appear to increase complications. Therefore, we recommend using implant arthroplasty also in patients with hyperextension of the MCP joint.

A-0676 COMPLICATIONS AFTER THUMB CMC IMPLANT ARTHROPLASTY: OUR 5-YEAR EXPERIENCE

Vanessa Reischenböck, Miriam Marks, Stephan Schindele, Daniel B. Herren
Schulthess Klinik, Zurich, Switzerland

Aim: The aim was to provide a comprehensive assessment of complications and revision surgeries up to 5 years after thumb carpometacarpal (CMC) dual-mobility implant arthroplasty.

Material & Methods: All patients with osteoarthritis of the thumb CMC joint who underwent primary implant arthroplasty (Touch®, KeriMedical) between June 2018 and April 2023 were prospectively documented in a registry and included in this analysis. Intra- and postoperative complications and its treatment strategies were documented. Clinical (key pinch, grip strength) and patient-reported outcomes (pain, brief Michigan Hand Outcomes Questionnaire) before surgery and at 2-year follow-up were compared between patients with and without complications using an independent t-test. Implant survival up to 5 years was estimated using the Kaplan-Meier method.
Results: A total of 281 patients with a mean age of 64 (±9) years were included. Thirty-three complications (12%) occurred and 8 implants (2.8%) required revision, resulting in an estimated 5-year survival rate of 96% (95% confidence interval: 92%-98%). Reasons for revision were symptomatic implant loosening, dislocation, or migration. In 4 cases the components were changed and in the other 4 cases a resection arthroplasty was performed. The most frequent other complications were de Quervain tenosynovitis (n=12) and trigger thumb (n=6), which were treated with either steroid injections or soft tissue surgery. There were also 3 cases of intraoperative trapezium fractures that were successfully fixed with a suture cerclage. There were no differences in the 2-year outcomes between patients with and without complications (p>1).
Conclusions: Thumb CMC dual-mobility implant arthroplasty shows high implant survival and soft-tissue complications can usually be resolved with an injection or minor surgery. The reasons for revision were mainly iatrogenic, i.e. implant placement was not optimal in our first cases or we tried to implant a prosthesis despite a small or insufficient trapezium. Therefore, we recommend good training of the surgeon and careful indication.

A-0677 PREDICTION OF INSTABILITY IN DISPLACED DISTAL RADIUS FRACTURES

Barbara Galleguillos Galindo[1,2], Oliver Rojas Bustamante[3], Jorge Fernández Segovia[4], Axel Michelena Villegas[4], Felipe Arriagada Ramos[4], Javier Richard Cajas[4], Gabriel Carrasco Penna[2,5]
[1]Hospital Mutual de Seguridad, Santiago, Chile; [2]Universidad de Chile, Santiago, Chile; [3]FONASA, Santiago, Chile; [4]Hospital Militar, Santiago, Chile; [5]Clínica Santa María, Santiago, Chile

Introduction: instability criteria described by Lafontaine lack the weighting between their different variables, nor do they consider the magnitude of the displacement of each of them. On the other hand, Mackenney proposed a predictive model of displacement in orthopedically treated distal radius fractures (DRF), but he didn't report its diagnostic accuracy. Finally, none of these models consider the importance of the volar cortex of the distal radius as a predictor of instability in these fractures.
Aim: to establish a predictive statistical model of instability in displaced distal radius fractures, reporting its diagnostic accuracy and quantifying the way in which each variable modifies the risk of displacement of these fractures.
Material & Methods: cohort study, exposure was defined as the initial radiological parameters of the DRF and as outcome the reduction loss during the follow-up period. Sample: patients older than 15 years with displaced DRF. Inclusion criteria: patients with displaced DRF diagnosed by an antero-posterior and lateral wrist radiograph. Exclusion criteria: those who did not have a post-reduction control radiograph and another one with a follow-up period of at least 7 days, patients with insufficient reduction, surgical intervention prior to the first follow-up radiograph, open physis, previous wrist deformities, radiocarpal dislocation and/or a distal ulna fracture. The variables analyzed were sex, age, radial height and inclination, ulnar variance, volar tilt, teardrop angle (TDA), cortical and metaphyseal comminution, step – off or gap at the articular surface, fracture pattern with shearing feature, ulnar styloid fracture, radiological signs of distal radioulnar joint incongruity and reduction loss during the follow-up period. Statistical analysis was performed using mixed logistic regression models using the "R" statistical program.

Results: 154 patients with DRF fulfilled the established criteria. The average of follow-up and age were 68 days and 59 years respectively. One hundred and seven (70%) were female. The statistically significant predictors of instability were ulnar variance (p:0.003), articular step – off (p:0.007), teardrop angle (p:0.008) and a multiplicative interaction between articular step off and ulnar variance (p: 0.008). The adjusted statistical model was X = 0,92 + (3,67 x articular step -off) - (0,29 x ulnar variance) + (0,59 x articular step - off x ulnar variance) – (0.408 x teardrop angle), being the probability of displacement of (%) = ([ex] × 100) / (1 + ex). Using a cut-off point of 39% a diagnostic accuracy of 71.5%, a sensitivity of 72.0% and a specificity of 71.2% were obtained. The risk of displacement of each variable were (OR; 95% CI): ulnar variance (0.74; 0.61 -0.90), teardrop angle (0.95; 0.93 -0.98), articular step – off (39.35; 2.50 -617.56), articular step - off x ulnar variance (1.81; 1.08 -3.03).
Conclusion: our proposed model can be the basis of a weighting for a new score. Furthermore, it incorporates the state of the volar cortex of the radius (measured through the teardrop angle) as a statistically significant predictor of instability in displaced distal radius fractures.
Keywords: distal radius fractures, instability, predictive statistical model.

A-0678 COMPARATIVE ANALYSIS OF ULTRASOUND AND SURGICAL FINDINGS IN ANATOMICAL VARIATIONS OF DE QUERVAIN'S DISEASE

Young Seok Lee, Chang Hun Lee
Department of Orthopaedic Surgery, College of Medicine, Hanyang University, Seoul, South Korea

Introduction: This study aimed to compare ultrasound and surgical findings of anatomical variations in de Quervain's disease.
Material & Methods: The study group comprised 74 wrists from patients with unilateral de Quervain's disease. These patients were assessed using ultrasonography and underwent surgery for extensor retinacular release. The presence of an intracompartment septum, multiple slips of abductor pollicis longus (APL), and selective stenosis were confirmed by both ultrasound and surgical findings. Two orthopedic surgeons evaluated the ultrasound findings at 4-week intervals, assessing intra- and inter-observer reliability as measured by the Kappa coefficient.
Results: Of the 74 participants (43 women and 31 men) included in this study, 60.8% had a complete septum, 31.1% had an incomplete septum, and 8.1% had no septum. A total of 70.3% had multi-slip in the APL, and 66.2% had stenosis in the extensor pollicis brevis (EPB). The sensitivity and specificity of surgical and ultrasonographic findings were high across all parameters. Intraobserver reliability was almost perfect and interobserver reliability showed good consistency.
Conclusions: This study demonstrates that ultrasonography can reliably identify anatomical variations in de Quervain's disease. The high sensitivity and specificity of surgical and ultrasonographic findings, coupled with substantial intra- and interobserver reliability, underscores the utility of ultrasound in preoperative assessment and planning.

A-0680 SUPRACLAVICULAR GRAFTING OR DISTAL NERVE TRANSFER IN NONCOMPLETE ADULT TRAUMATIC BRACHIAL PLEXUS INJURIES: WHAT IS THE BEST TREATMENT STRATEGY?

Justus Groen, Willem Pondaag, Martijn Malessy
Leiden Nerve Center, Leiden University Medical Center, The Netherlands

Introduction: Noncomplete adult traumatic brachial plexus injuries (NC-ATBPI) encompasses both upper trunk and extended upper trunk lesions. There is no consensus on the best surgical treatment strategy for this patient group. The

generally preferred technique to reanimate biceps function is distal fascicular nerve transfer (DFNT). However, there are potential advantages of grafting over DFNT, like additional reinnervation of coracobrachialis, brachioradialis, recovery of sensation and possibly pain reduction. Additionally, the risks of decreasing hand function related to the use of ulnar and median nerve fascicles are avoided.

Aim: The aim of this study is to fine-tune the reconstruction algorithm for NC-ATBPI. Therefore we compare the result of grafting and DFNT for reanimation of elbow flexion and assess the different factors influencing this outcome.

Material & Methods: We performed a retrospective chart review of patients with either a C5-C6/C5- C6-C7/C5-C6-C7-C8 lesion type, surgically treated between 1-1-2009 and 31-12-2020. In all patients, the reanimation of biceps brachialis muscle function was the primary target of surgery via supraclavicular nerve grafting or DFNT (single or double Oberlin transfer or other DFNT). The results of biceps force was assessed using the Medical Research Council motor grading scale. To evaluate impact on outcome of patient related factors and surgical strategy we modeled age, delay and reconstruction strategy (grafting vs transfer) as well as the severity of the nerve lesion with biceps outcome.

Results: We found 79 patients with NC-ATBPI: C5/C6 lesion in 26, a C5/C6/C7 lesion in 28 and a C5/ C6/C7/C8 in 25 patients. In 21 patients supraclavicular grafting and in 58 a DFNT was performed. No complications Clavien-Dindo grade II or higher were encountered. In a multivariate analysis shorter delay, younger age and DFNT as a reconstruction strategy are associated with favorable outcome. These factors together explain 41% of the variance in biceps outcome.

Conclusions: Based on above, our strategy in NC-ATBPI is to perform early (<3m) supraclavicular exploration. If one viable proximal stump is available we perform nerve grafting to reinnervate shoulder function (targeting suprascapular nerve and posterior division of upper trunk or posterior cord) in combination with a DFNT for elbow flexion. If two proximal stumps are available, we would aim to reinnervate both elbow flexors and shoulder musculature by supraclavicular grafting, provided that delay is short, short nerve grafts are needed and the patient is under 50yo. In patients referred late or at higher age, we perform DFNT for biceps recovery.

A-0681 CHALLENGES IN DIAGNOSING SOFT TISSUE AND BONE TUMOURS OF THE HAND IN CHILDREN, AN ANALYSIS OF BARRIERS TO DIAGNOSIS AND A PROPOSAL FOR AN EVIDENCE BASED PROTOCOL FOR MANAGEMENT

Natasha Morrissey, Christina Lipede, Ramesh Vidyadharan, Kanwal Yousuf, Andrea Jester
Birmingham Children's Hospital, UK

While there are standardised protocols of how to manage individual tumour diagnoses with well recognised algorithms for sarcoma for example, there is little guidance for practitioners on timescales and appropriate pathways to get to these diagnoses. Management decisions can be made problematic by inconclusive radiological interpretation and conflicting histological determinations.

We present a case series that presented difficulties in diagnosis and delay to treatment, as well as cases where prompt decision making in the face of uncertainty improved time to diagnosis. Factors associated with both scenarios are analysed and a protocol is proposed.

Key learning points:

Ultrasound and MRI must be interpreted clearly

There can be no ambiguity when diagnosing vascular malformations especially , as malignancy can be similar in appearance

If there is uncertainty even after MDT discussion a biopsy should not be delayed

Tru Cut or incisional biopsy can be employed

Do not be ashamed to ask for a second opinion

The proposed protocol includes recommendations for timing and investigations for hand ganglia, management of vascular malformations, what should be achieved at the first clinic visit and time scales for subsequent investigations. It details criteria for use of MRI, the aims of the second clinic visit and MDT discussion, who should carry out the biopsy and what kind of biopsy. Finally, there is guidance for surgery, the post operative visit to clinic, review of histology and need for further surgery or other treatment.
To conclude, streamlined pathways of care with no delays and clear radiological and histological criteria are essential in the care of paediatric hand tumours.

A-0682 PROPELLER PERFORATOR FOREARM FLAPS IN THE ORTHOPLASTIC SURGERY OF THE UPPER EXTREMITY: EXPERIENCE OF THE REGIONAL CENTER OF TRAUMA AND ORTHOPEDIC SURGERY

A. Aristov
Scientific Research Institute – Ochapovsky Regional Clinic Hospital N1 Krasnodar, Russia

Introduction: The forearm is a popular donor site in the reconstructive surgery of the upper extremity. It's well-known for its radial flap, which could be called a "workhorse" and the ulnar flap. But in original way they compromise the blood supply through the one of major arteries: radial or ulnar. The perforator forearm flaps do not require to sacrifice the major vessel and mostly don't need to use the microscope. It makes them proper at the trauma centers for the upper limb reconstructions.
Aim: To analyze the experience of clinical application of propeller perforator forearm flaps in the reconstructive surgery of the upper extremity in the regional center of Trauma and Orthopedic surgery.
Material & Methods: 159 patients were operated in the Krasnodar regional center of trauma and Orthopedic surgery from 2017 to 2022 with island flaps for upper extremity soft tissue defects. Male – 123 (77%); Female – 36 (33%). Age: from 9 to 82 years. The perforator forearm flaps were 15% among all flaps. Radial perforator flap – 6 (4%). Ulnar perforator flap – 4 (2%). Adiposal perforator ulnar forearm Becker flap – 4 (2%). Posterior interosseus perforator flap – 1 (0,5%). Total amount of the forearm perforator flaps was 15. After acute trauma were 3 patients, 5 patients with poorly treated injury, 3 patients with tumors and 4 with median nerve problems at the level of carpal tunnel.
Results: In all patients the soft-tissue envelop has been restored. There was none case necrosis and septic inflammation. All patients passed through reconstructive surgery to the acceptable function of their hands.
Conclusions: Propeller perforator forearm flaps seem to be the method of choice for the plastic reconstruction of the small soft tissue defects on the distal part of upper extremity except fingers. This technic does not require special microsurgical skills and instrumentation, and could be recommended for general application at the centers of trauma and orthopedic surgery.

A-0683 EPIDEMIOLOGY OF MULTISTRUCTURAL WRIST AND ANTIBRACHIAL INJURIES IN A TERTIARY HAND DEPARTMENT

Leivaditis D, Syngouna S, Tetsios G, Kanellos P, Giannoulis F, Fandridis E
Hand, Upper Limb & Microsurgery Department, KAT Hospital, Athens Greece

Introduction: Multistructural volar wrist lacerations are frequent traumatic injuries of the upper limb, require demanding hand surgical/ microsurgical techniques as well as special post-operative monitoring and rehabilitation. They are often

accompanied by severe functional deficits.
Aim: The purpose of the study is to assess the epidemiology of these injuries and their possible prognostic factors, as well as to evaluate their severity and their rehabilitation.
Material & Methods: From 2020 to 2022, 52 patients, with a mean age of 46 y.o (16-70), were treated for injuries of the volar surface of the wrist and antibrachium (zones V to VIII). All patients were treated surgically with anatomic repair of all the lacerated structures.). The following parameters were measured: age, sensitivity to cold and arterial supply of the hand with the modified Allen test. Injuries were also classified based on the number and type of injured structures, the time interval between injury and surgery and the mechanism of injury. Recovery at follow-up was assessed based on H. Noaman's system.
Grip and pinch strength ratio (injured/non-injured hand measurement) were also evaluated and patients completed the quick DASH score questionnaire.
Results: 29 patients (26 men), with a mean age of 41 y.o (16-70) were re-examined with a mean follow up of 25.4 months (12-56). All patients were right-handed and 55.6% of them injured their dominant upper limb. Regarding the mechanism of injury, in 17 cases the injury was caused by a fine cutting instrument (glass, blade) and in 12 by a harsh cutting one (chainsaw, cutting wheel). The most frequently injured structures were the ulnar nerve in 16 cases, the ulnar artery in 11, and the flexor carpi ulnaris tendon in 16. According to Noaman's classification, tendon function, opposition of the thumb and intrinsic muscle function were excellent in 85.2%, 88.9% and 59.3% of the patients respectively. However, in 66.7% of the patients the discriminative touch was rated as fair. Patients with 5 or less injured structures and/or dominant hand injury and/or no sensitive to cold had statistically important correlation with better pinch and grip strength ratio, qDASH score and negative modified allen test. Non-smokers had also better qDASH score.
Conclusions: In conclusion, the results in the sensation and mobility of the upper limb are excellent, with the only exception being the moderate recovery of discriminating touch, which, however, does not have a significant influence on the patients' daily life. Patients with dominant hand injury, 5 or less injured structures, no reported sensitivity to cold and no smoking habits had better functional outcomes.

A-0684 ULTRASOUND-GUIDED PERCUTANEOUS RELEASE USING DOUBLE-GUIDED TENDON SHEATH INCISION DEVICE

Hideo HASEGAWA, Yasuaki NAKANISHI, Naoki MINAMI, Takamasa SHIMIZU, Kenji KAWAMURA, Shohei OMOKAWA, Yasuhito TANAKA
Orthopaedic surgery department, Nara Medical University, Nara, Japan

Introduction: Trigger finger is a common disorder encountered in hand surgery. Typical trigger finger is associated with thickening of the A1 pulley and tendon. When steroid injections as a conservative treatment are not effective, surgical intervention should be considered for the patient. Although a 1-2 cm skin incision is commonly used, we have performed a less invasive ultrasound-guided percutaneous release with a double guided releaser.
Aim: The purpose of this study was to report the results of ultrasound-guided percutaneous release using a special device.
Material & Methods: The study included 109 patients (53 males, 56 females; mean age 64 years, range 45-92 years) with 152 trigger fingers who underwent ultrasound-guided release at Nara Medical University Hospital and affiliated institutions. The affected fingers were 22 thumbs, 31 index fingers, 49 middle fingers, 40 ring fingers, and 8 little fingers. Based on the Quinnell grading system, there were 33 grade I fingers, 53 grade II fingers, 46 grade III fingers, and 20 grade IV fingers. The surgery was performed using a double-guided tendon sheath incision device (Robert Reed & Co.) under local anesthesia with patients in the supine position. 2 mm skin incisions were made proximal to and just above the metacarpophalangeal

joint. A dissector was inserted through the proximal incision and a sheath guide was inserted into the synovial tendon sheath proximal to the A1 pulley, with ultrasound confirmation. With the guide block outside the body, the A1 pulley was incised using an 18G needle tip inserted through the distal incision. Ultrasound was used to confirm complete pulley release. Surgical tape and a bulky bandage were applied for 2 days to prevent subcutaneous bleeding. Patients were allowed to bathe after bandage removal.
Results: In all 152 fingers, surgery was completed by the percutaneous technique, with intraoperative confirmation of improved flexor tendon gliding. In 2 fingers, the trigger finger resolved postoperatively but recurred after 6 months.
Discussion: The percutaneous technique was less invasive than conventional open release and allowed earlier return to work. The device protected the tendon substance and neurovascular bundle, without nerve injury.
Conclusions: Ultrasound-guided double-guided tendon sheath incision is a minimally invasive and safe technique for trigger finger release.

A-0685 FINGER SUBAMPUTATION: FLEXOR TENDON CONTINUITY AS NEGATIVE PROGNOSTIC FACTOR

Pierfrancesco Pugliese, Mariangela Vulpetti, Greta Tondini, Francesca Toia
AOUP Paolo Giaccone - Palermo (IT)

Introduction: Finger subamputations with vascular impairment represent an emergency situation.
Soft tissue sparing are associated to a favourable prognostic factor because of the presence of some vein drainage. Despite clinical and radiological potential positive elements the outcome sometimes is poor and there is not a direct correlation between lesions and results.
Aim: We want to highlight the correlation between some anatomical elements and prognosis
Material & Methods: We retrospectly analysed 25 patients treated between May 2018 and May 2023 because of finger subamputation. Traumatic mechanism was 9 time a cut, 7 crush and 9 avulsions. Among those 9 presented just flexor tendon (flexor digitorum profondus or flexor pollicis longus) as healthy tissue. We included all patients with finger ischaemia undergone to at least one attempt of revascularization. Patients with no vascular impairment, meaning continuity of one collateral vessel, or treated with primary amputation and mangled hand were excluded.
Results: Global success rate was of 52%. In a subgroup representend by just flexor digitorum profondus or flexor pollicis longus continuity we lost 71% of fingers. If flexor tendon continuity was associated to dislocation or just minimal joint irregularity the success rate was 0%.
Conclusions: Subamputation with vascular impairment assocciated to continuity of flexor digitorum profundus or flexor pollicis longus showed to have a bad prognosis, and the association with a dislocation or minimal joint irregularity get it worst.
This is due to the traumatic mechanism that is probably mainly an avulsion. A longitudinal traction produces a joint tear but not a flexor interruption. This peculiar combination is to be highlighted because represents a peculiar situation often associated with surgical failure and in the current literature is not evidenced in any classification of fingers trauma.

A-0686 HIGH-PRESSURE INJECTION INJURIES TO THE HAND: A RARE BUT URGENT CONDITION

Chatzipanagiotou G. , Tsoutsi N., Tetsios G., Tsiampa V., Syngouna S., Fandridis E
Hand, Upper Limb & Microsurgery Department, KAT Hospital, Athens Greece

Introduction: High-pressure injection injuries, though uncommon, may have devastating consequences such as amputation (48%) and diminished function of the hand. Initial presentation may be deceptively benign.
Aim: The goal of this study was to assess the long-term outcome in nine cases treated in our department.
Material & Methods: Nine patients, male laborers with an average age of 43 years (25-66) included in this study during 2017-2022. The non-dominant hand was injured in 77%, and injury location was in 4 four patients in the palm and 5 in the index finger. The substance involved was industrial paint in 7 patients and high pressure water injection in 2 patients. The reported delay from injury to treatment was 12 hours (4-24). All patients treated with surgical decompression and debridement, followed by broad spectrum parental antibiotics. Rare concomitant injuries were found in one case with laceration of median nerve and tendon of flexor carpi radialis.
Results: Mean follow up was 15 months (7-26) and average of operations needed 1,7 (1-4). The amputation rate was 22% (2 patients). Six patents returned to their pre-injury employment and the most frequent complaints were cold intolerance (33%) and paresthesias (22%). The mean qDash score found to be 13,8% and the mean VAS score was 3.
Conclusions: This study confirms the fact that high-pressure injection injuries to the hand are a significant problem, though the amputation rate that we found was encouraging comparing to the bibliography. Still, the sample is too small to statistically prove correlations between events at the time of injury and the outcome.

A-0687 A SURVEY ON DIAGNOSTIC WORKUP AND TREATMENT OF THUMB ULNAR COLLATERAL LIGAMENT INJURIES

V. van der Lucht[1]*, I. Legerstee[2,3]*, A. Luan[2], M. van der Oest[3], K. Eberlin[2], N. Chen[2], J. Zuidam[3], M. van Heijl[1,4]
[1]Diakonesssenhuis Utrecht, the Netherlands; [2]Massachusetts General Hospital, Boston, Massachusetts; [3]Erasmus University Medical Center, Rotterdam, the Netherlands; [4]University Medical Center Utrecht, the Netherlands

Introduction: Thumb ulnar collateral ligament (UCL) injuries can be categorized as a ligament sprain, a partial ligament tear, a full-thickness ligament tear with or without the presence of a Stener lesion, and ligament discontinuity with avulsion fractures. Although thumb UCL injuries are common in plastic, orthopedic, and trauma patient care, the ideal diagnostic work-up and treatment plan remains debatable as high-quality evidence is limited.
Aim: The aim of this survey study is to gain insight into the diagnostic work-up and treatment plan that hand surgeons of different regions in the world use for various types of thumb UCL injuries.
Material & Methods: This will be a survey-based study that includes trauma, plastic, and orthopedic surgeons who treat thumb UCL injuries. The questionnaire, covering demographic information, diagnostic practices, and treatment preferences, will be distributed through email and social media channels of hand surgery societies. The questionnaire will encompass inquiries about topics open to debate, including the reliable diagnosis of full-thickness tears and Stener lesions, the nonoperative management of full-thickness UCL tears, and determining in which post-injury timeframe primary repair is still feasible.
Results: Although results are not currently available, the responses will be collected during the upcoming months and will be prepared for presentation before the conference takes place. The results of this survey will contribute to valuable insights into global trends in thumb UCL injury management.
Conclusions: This study addresses a gap in the literature and sheds light on the current landscape of diagnostic and

treatment strategies for thumb UCL injuries among hand surgeons globally. The findings will contribute to a collective understanding and potentially support the development of new protocols in the management of UCL injury.

A-0688 RELIABILITY FOR THE CT SCAN ASSESSMENT OF UNION AFTER SURGERY FOR SCAPHOID FRACTURES AND NONUNION

Morten Kjær[1], Dimitar Ivanov Radev[2], Robert Gvozdenovic[1]
[1]Department of Hand Surgery, Herlev-Gentofte University Hospital of Copenhagen, Denmark; [2]Department of Radiology, Bispebjerg and Frederiksberg Hospital, Copenhagen, Denmark

Introduction: Assessment of scaphoid union is often with some uncertainty and disagreement between observers. Union is defined as signs of consolidation on 3/4 views with X-Ray. Overlining leads to misinterpretation, and bone bridging cannot be detected. CT scans are increasingly used to evaluate union. CT scans allow 3-dimensional assessment of the trabecular architecture. Reliability for the CT scan assessment of union for scaphoid fractures and non-union after operative intervention is limited.
Aim: We hypothesized that inter- and intraobserver reliability of the CT-scan assessment of union after operative treatment for scaphoid fracture and nonunion between observers are substantial with superior agreement in fracture cases.
Material & Methods: Retrospective, level 3. An institutional search identified 230 patients with operative intervention. We randomly selected 60 sets of CT scans (30 fractures and 30 nonunion), according to the sample size calculation. Inclusion criteria are age >18 years, operative intervention for scaphoid fractures and non-union with CT scan 6-26 weeks postoperatively. Exclusion criteria are concomitant injury to the hand and earlier treatment for scaphoid non-union. Three observers evaluated the anonymized CT scans in two occasions 6 weeks apart in a random order. Observers were asked to classify the scaphoid >/< 50% bone bridging, and with no healing/partial healing/full healing.
Results: Interobserver agreement in no/partial/full healing was overall substantial (k=0.62), substantial (k=0.69) for fracture cases and moderate for nonunion cases (k=0.50). Overall interobserver agreement for >/<50% healing was moderate (k=0.48) and moderate for both fractures and nonunion cases. In no/partial/full healing for cases with CT scans above 12 weeks postoperative agreement was substantial (k=0.71) vs. moderate (k=0.41) in cases below. Interobserver agreement was overall moderate-substantial, and better in cases with CT scans > 12 weeks postoperative vs. below.
Conclusions: CT scan as a measurement of union is moderately to substantially reliable between observers in scaphoid fractures and nonunion after operative intervention, investigated on 60 patients. Agreement is better in the assessment of no/partial union/full union for scaphoid fractures compared to nonunion cases. Inter- and intrarater agreement is improved when CT scans are above 12 weeks postoperative.

A-0689 IMMEDIATE EFFECTS OF DART THROWING MOTION TAPING ON PROPRIOCEPTION: A CROSSOVER PILOT STUDY

Tugba Ulusoy, Cigdem Ayhan Kuru
Faculty of Physiotherapy and Rehabilitation, Orthopedic Physiotherapy and Rehabilitation Department, Hacettepe University, Ankara, Turkey

Introduction: The dart-throwing motion (DTM), the physiological axis for hand movements, is an oblique motion from radial extension to ulnar flexion. As the DTM is believed to refine proprioceptive feedback and optimize dynamic wrist stability, rehabilitative approaches are used in the early rehabilitation phase to promote the DTM pattern. Kinesio Taping

(KT) is a widely used technique for injury prevention, treating various musculoskeletal conditions and enhancing athletic performance. In early rehabilitation, KT has been suggested as a useful adjunct treatment to restore normal muscle and joint function, relieve pain, maintain normal tissue biomechanics, and restore tissue hemostasis.
Aim: To investigate the effectiveness of the KT application to the extensor carpi radialis longus/brevis and flexor carpi ulnaris to facilitate DTM motion to improve wrist proprioception and motor performance.
Material & Methods: This study has a prospective crossover design. Twenty-four healthy female young adults (age: 22.67±2.18 years; BMI: 22.58±3.04 kg/m2) were included in the study. Participants were randomly assigned to either KT or placebo taping at a specific time interval. We assessed proprioception using a validated goniometric platform, grip strength using a JAMAR dynamometer, performance with the nine-hole peg test (NHPT), and range of motion (ROM) with a goniometer. The KT was performed using the facilitation technique with a 50-75% tension on the extensor carpi radialis brevis and longus and on the flexor carpi ulnaris. The examinations were performed at the beginning and after 45 minutes of taping.
Results: In the KT group, a significant improvement in proprioception (wrist flexion, extension, radial and ulnar deviation, $p=0.005$, $d=0.621$; $p<0.001$, $d=0.678$; $p<0.001$, $d=1.117$; $p<0.001$, $d=0.764$) and motor performance (grip strength: $p=0.003$, $d=0.297$; NHPT: $p<0.001$, $d=0.663$), while only an improvement in range of motion was observed in the placebo group (DTM ulnar flexion, radial extension, $p=0.039$, $d=0.248$; $p=0.017$, $d=0.261$). There were no significant differences between the groups in the above-mentioned outcomes ($p>0.05$).
Conclusion: The investigated Kinesio Taping application did not lead to better results than placebo taping; however, it led to a higher motor performance in terms of a better joint position sense and fine motor skills.

A-0690 EXPLORING THE CAUSAL RELATIONSHIP BETWEEN PSYCHOSOCIAL FACTORS, PAIN, STRENGTH AND FUNCTIONAL STATUS IN PATIENTS WITH TRAPEZIOMETACARPAL OSTEOARTHRITIS: A STRUCTURAL EQUATION MODEL

Feray Karademir[1], Egemen Ayhan[2], Kadir Çevik[2], Kimiya Hajighorbani[1], Tüzün Firat[1]
[1]Hacettepe University, Physical Therapy and Rehabilitation Faculty, Ankara, Turkey; [2]Başakşehir Çam ve Sakura City Hospital, Department of Hand Surgery, İstanbul, Turkey

Introduction: While previous studies have elucidated the correlations among radiological findings, pain, functional status, and psychosocial factors in patients with Trapeziometacarpal Osteoarthritis (TMCOA), none have comprehensively addressed all these factors and clarified any causal relationships.
Aim: The objective of this study was to investigate the relationships between the patients' characteristics, disease stages, pain descriptors, grip and pinch strength, functional status, and psychosocial factors in patients with TMCOA.
Material & Methods: In this retrospective study, the medical records of 89 patients diagnosed with primary TMCOA, whose radiological images were available and patient files were kept complete, were included in the study. The following data were recorded from patient files: age, gender, affected side, medical history, pain descriptors (intensity, duration, frequency), Kapandji score and palmar abduction angle, grip and pinch strengths, three sub-scores of the Michigan Hand Outcome Questionnaire including hand function, activities of daily living (ADL), and satisfaction, and three sub-scores of the Short-Form (36) Health Survey including vitality, general health, and mental health. Additionally, radiological staging was performed by 2 hand surgeons according to the Eaton-Littler classification. Confirmatory Factor Analysis (CFA) within the statistical technique of Structural Equation Modeling (SEM) was used to simultaneously test multiple hypothesized relationships. The analyses were conducted using the lavaan and lavaanPlot packages within the R programming package. A first draft model was created according to the literature and clinical experience. Then, the best model was determined

through the backward elimination method. Among the variables found to be statistically insignificant, age, gender, affected side, disease stage, duration, grip strength, and range of motion were excluded from the first model.
Results: The estimated final model was found to be an acceptable model (RMSEA = 0.021, GFI= 0.983, CFI = 0.995, AGFI = 0.968, and TLI = 0.984). All variables considered except the pain intensity variable had a positive and statistically significant effect on patients with TMCOA. Functional status has an effect on the psychosocial variable; and also a direct effect on the pain and an indirect effect on the psychosocial variable. There was a bidirectional relationship between pinch strength and psychosocial variables. ADL and physical function variables, defining the endogenous variable of functional status, had almost equal effect (0.82 for ADL, 0.89 for physical function) in defining functional status. Similarly, the impacts of satisfaction, vitality, and mental health, defining the psychosocial factors, on psychosocial factors were almost equal, with estimate coefficients of 0.65 for satisfaction, 0.59 for vitality, and 0.51 for mental health. However, the effect of general health status on psychosocial factors is lower than other factors, with an estimation coefficient of 0.31.
Conclusions: Functional status has an effect on psychosocial factors and pain in patients with TMCOA. Psychosocial factors also have an effect on pain and pinch force. We recommend prioritizing conservative methodologies that include interventions such as adaptive equipment, taping, and orthotics to optimize hand function, rather than focusing on pain relief and strength-enhancing approaches.

A-0691 BONE UNION RATE OF THUMB CARPOMETACARPAL ARTHRODESIS WITH LOCKING PLATE

Yuki Fushimi, Takuya Kameda, Nobuyuki Sasaki, Shunsuke Sato, Yoshihiro Matsumoto
Department of Orthopaedic Surgery, Fukushima Medical University, School of Medicine, Fukushima, Japan

Introduction: Thumb carpometacarpal (CM) joint osteoarthritis is a relatively common degenerative joint disease, and CM arthrodesis is an effective treatment method for pain relief and restoration of pinch strength. Recently, a technique using a locking plate has been reported to achieve high initial stability and bone union rates.
Aim: This study aimed to investigate the bone union rate and complications of thumb CM arthrodesis using a locking plate in our institution.
Material & Methods: The subjects were 17 cases (19 hands) that underwent thumb CM arthrodesis using a locking plate (Variax Hand Plating System, Stryker, USA) in our facility. The patients included eight males and nine females with an average age of 69. Five hands were classified as Eaton stage 2 and 14 as stage 3. Ten hands underwent iliac bone grafting, and three underwent cancellous bone grafting.
Results: The bone union was achieved in 17 hands, resulting in a bone union rate of 89.5%. The average duration until the bone union was four months (2-6 months). The two cases without the bone union, both in male patients, experienced plate breakage, occurring approximately one month postoperatively. A 69-year-old man with plate breakage, complicated by wound infection, underwent revision surgery with fixation using Kirschner wires, and the bone union was observed 10 months later. The other case, which underwent fixation with a new plate, did not achieve bone union at the final observation point after 2.5 years. Other four cases experienced complications, including postoperative wound infection, intra-articular screw penetration, donor site fracture, and plate breakage, each occurring in one case.
Conclusions: Except for the two cases with early postoperative plate breakage, all cases achieved bone union, suggesting the utility of firm fixation using a locking plate in thumb CM arthrodesis. However, plate strength may not be sufficient in all cases, and regarding postoperative hand use restrictions, thorough patient education is essential. Extending the postoperative external fixation period should be considered for patients who are not cooperative.

A-0692 ROTATIONAL DISPLACEMENT OF DISTAL RADIAL FRACTURES IN ADULTS

Grey Giddins, Sassi Sassi
Royal United Hospital, Bath, UK

Introduction: Angular and length parameters are well established in assessment of distal radial fracture malalignment. Rotational malalignment is rarely reported.
Aim: The aims of this study were to establish the radiographic features of distal radial fracture malrotation on distal radial models and then assess the prevalence of distal radial malalignment in a series of extra-articular fracture in adults.rnMethods:rnBone models - We cut distal radial models and simulated pronation and supination malrotation in different positions of dorsal angulation. rnX-ray analysis - We reviewed 160 distal radius fractures in 158 adults assessing any malrotation following fracture and following fracture reduction, if performed. We recorded demographic data.
Results: Bone models - Malrotation was more obvious on lateral than postero-anterior images and more obvious into pronation than supination. Standard radiographs are centred on the distal radius but the malrotation occurs primarily in the shaft of the distal radius so standard lateral radiographs in particular minimise evidence of malrotation.
X-rays - Following the fracture, i.e. on the initial presentation radiographs, we noted malrotation in 58 (36%); 53 (33%) were into supination and five (3%) into pronation. Eleven were not manipulated. Of the remainder 45 (of 149) (30%) were malrotated following manipulation; 35 (24%) were into supination and nine (6%) into pronation. Malrotation was no more frequent if there was an ulnar styloid fracture.
Conclusions: Distal radial fracture malrotation is common but not appreciated probably because the parameters have not been described and standard radiographs minimise the effect of malrotation. Malrotation may be important in the outcome of distal radius fractures and the treatment of fracture malunions. As it has not been looked for its significance is not clear, but any malalignment of the united may contribute to an adverse outcome.

A-0693 SAFETY PROFILE OF PHRENIC NERVE TRANSFER IN TRAUMATIC BRACHIAL PLEXUS INJURIES: IS THE MORBIDITY ACCEPTABLE?

Shane Carr, Stefanie Croughan, Matthew Murphy, Dr Alessandro N Franciosi, Prof Sean Gaine, Darragh Hynes, Roisin T Dolan,Mr Kevin J Cronin
Department of Plastic & Reconstructive Surgery, Mater Misericordiae University Hospital, Dublin, Ireland

Introduction: Whilst successful restoration of brachial plexus motor function using the phrenic nerve donor has been described, the potential impact on respiratory health from this procedure remains debated.
Aim: We aimed to assess the respiratory consequences of phrenic to suprascapular nerve transfer by evaluating both patient-reported outcome measures (PROMs) and objective postoperative outcomes in a retrospective cohort study.
Material & Methods: Twenty-four patients who underwent phrenic nerve transfer over a 15-year period (2005-2020) were identified in a prospectively maintained National Brachial Plexus Database at the Mater Misericordiae University Hospital. Patients were contacted and invited to complete the modified Medical Respiratory Council Dyspnoea Scale (mMRC), a "recalled" pre-operative mMRC, London Chest Activity of Daily Living (LCADL) Questionnaire, pulmonary function testing (spirometry, lung volumes and sniff maximal inspiratory pressures) and chest radiograph (CXR) to assess for evidence of diaphragm dysfunction.
Results: In total, baseline demographic data was available for 23 patients, with outcomes for symptoms, CXR and PFTs in 21, 17 and 13 individuals respectively. Median age at surgery was 29 years [IQR: 23.5 – 36.5 years], with right phrenic

transfer performed in 11/23 (48%) of the population. One (4.3%) patient had a pre-existing diagnosis of asthma, whilst 15/23 were never-smokers. The median time from phrenic nerve transfer to follow up of outcome was 66 months [IQR: 28.25 - 88] for self-reported outcomes, 43 months [IQR 9 - 88] for CXR and 68 months for pulmonary function [IQR 48 - 96]. The mean recalled pre-operative and postoperative mMRC dyspnoea scales were 1.05 (+/- 0.22) and 1.25 (+/- 0.64) respectively ($p = 0.10$ for difference by paired two-tailed t test). 17/21 (85%) of individuals reported no impact on day-to-day life attributable to dyspnoea, with two (10%) reporting minimal impact from dyspnoea and one (5%) reporting moderate impact. The mean estimated rate of annual LRTI was 0.35 (+/-0.81) per annum, with a mean 5-year chest-related hospitalisation rate of 0.10 (+/- 0.45) per patient. Ipsilateral diaphragm elevation on post-operative follow up CXR was seen in 13/17 (76.5% of individuals. A generalised trend towards restrictive lung function was seen in those who underwent PFTs, with FVCpp (73.14%), TLCpp (71.24%), FRC (65.64%) and SniffMaxpp (72.3%) all below the lower limit of normal. Lung volumes graded by TLCpp were found to be normal in 5/13 (38.5%), mildly restrictive in 6/13 (23%), moderately or severely restricted in 2/13 (15.4%).

Conclusions: These results suggest that while phrenic nerve transfer is associated with radiographic and physiological evidence of altered pulmonary mechanics, the subjective impact on patient respiratory health and their short-term healthcare utilisation requirements is minimal. We recommend that phrenic nerve transfer is avoided in patients with reduced lung compliance such as a history of restrictive lung disease, obesity and smoking or concomitant pulmonary contusions, rib fractures and prolonged intubations associated with the initial injury.

A-0694 SKIER'S THUMB REPAIR WITHOUT TRANSECTION OF THE ABDUCTOR APONEUROSIS

Yannick Goubau[1], Wim Vanhove[2]

[1]ASZ Ziekenhuis (AZORG) Aalst, Belgium; [2]University Hospital Ghent, Belgium

An injury to the ulnar collateral ligament (UCL) of the metacarpophalangeal (MCP) joint of thumb is a common injury, widely referred to as a skier's thumb. The rupture usually occurs at the distal insertion. When the torn ligament displaces proximally, the aponeurosis of the adductor pollicis muscle can lie in the defect. Without anatomical reposition, the ligament cannot heal, and chronic instability will follow. In the classical technique, the adductor aponeurosis must be cut to repair the ligament to its insertion on the first phalanx, after which the aponeurosis is sutured back. We describe a technique to repair the UCL without transection of the adductor aponeurosis.

A-0695 MAJOR NERVE TRUNK INJURIES IN THE UPPER LIMB – OUTCOME OF SURGICAL REPAIR IN RELATION TO THE LEVEL OF INJURY AND PRESENCE OF SECONDARY PROCEDURES

Erika Nyman[1,2], Hanna Tuvhag[2], Lars B Dahlin[2,3,4]

[1]Department of Hand Surgery, Plastic Surgery and Burns, Linköping University Hospital, Linköping, Sweden; [2]Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden; [3]Department of Translational Medicine – Hand Surgery, Lund University, Skåne University Hospital, Malmö, Sweden; [4]Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden

Introduction: Injuries to the peripheral nerves of the upper limb often mean a functional loss with remaining symptoms in long term. Patients might still have a severe lasting disability after the initial surgery and require reoperation with for example tendon transfer(s) or arthrodesis; sometimes done at the time of primary surgery. Nerve transfers in an early or late phase of nerve recovery are also used to improve function.

Aim: Our aim was to evaluate the surgical results of an injury to one of the three major nerve trunks in the upper limb (median, ulnar, and radial nerve) focusing on the outcome in relation to injury level and injured nerve regarding disability and remaining symptoms. In addition, we wanted to assess additional primary and secondary surgical procedures. We hypothesised that more proximal injuries have a worse outcome than distal ones.
Material & Methods: Patients (age >13 years) having surgery for a median, ulnar, or radial nerve injury 2010-2022 were identified in the Swedish Health Care Quality Registry for Hand Surgery, HAKIR (hakir.se) (n=1151). Data on complementing surgical procedures and disability and perceived symptoms pre-injury and at 3 and 12 months were collected.
Results: The median age for all patients was 36 [27] years of whom 71% were male. Injury at wrist level was most common (n=689, 60%) followed by forearm (n=370, 32%), and upper arm (n=73, 6%). Late sequel of an earlier nerve injury was the cause of surgery in 19 (2%) cases. The worst outcome at 12 months, measured with QuickDASH, was seen in patients with multiple nerve injuries at the upper arm/forearm and at wrist levels (50 [55] and 36 [37], respectively). Median and ulnar nerve injuries scored around 30 on QuickDASH at 12 months independent of level of injury. At 12 months, cold sensitivity was the most prominent symptom among patients with median and ulnar nerve injuries followed by numbness/tingling, weakness, and pain on load. Radial nerve injuries had fewer residual problems overall. Additional primary surgery with tendon transfer(s) or arthrodesis was rare (overall 2%). Secondary surgical procedures consisted mainly of nerve grafting (11/19, 58%) and tendon transfers (5/19, 26%). No data on nerve transfers was obtained as this surgical procedure does not have a specific surgical code.
Conclusions: We conclude that, despite modern microsurgical repair and advanced rehabilitation protocols, patients with median and ulnar nerve injuries are still left with severe disability and symptoms in long term. There might be a greater need for additional surgical procedures at the time of initial nerve repair or late due to sequel, as well as developing and implementing new techniques for augmenting nerve regeneration. Cold sensitivity is a great problem that still needs to be addressed.

A-0696 HEMANGIOMA OCCURRING WITHIN THE LUMBRICAL MUSCLE: A CASE REPORT

Yasumasa Nishiura[1], Akira Ikumi[2], Yasukazu Totoki[2]
[1]Tsuchiura Clinical Education and Training Center, Tsukuba University Hospital, Tsuchiura. Japan; [2]Department of Orthopaedic Surgery, Faculty of Medicine, University of Tsukuba, Tsukuba, Japan

We report a rare case of a hemangioma that occurred within the lumbrical muscle that was accompanied by pain.
A male of sixteen-year-old high school student started feeling pain in his left palm while playing basketball five months ago. He gradually felt more pain when receiving a basketball. He attended an outpatient clinic and was referred to our hospital. A soft bulge was found on the radial side of the thenar eminence of his left palm. Tenderness was observed in that area. There were no problems with the finger movement. The mass appeared on the radial volar side of flexor tendons of index finger as a dark on T1-weighted and bright on T2-weighted MRI.
Surgery was performed under axillary block. The tumor appeared just under aponeurosis palmaris and bled easily. It was within the first lumbrical muscle and was integrated with the muscle. A thick feeder vessel from the superficial palmer arch was found and ligated. The tumor was removed along with the entire muscle.
Pathological examination findings revealed an intermuscular hemangioma. There was no problem with the movement of the index finger after surgery.
There has been no recurrence macroscopically 4 years after the surgery.

A-0697 RADIAL NERVE PALSY SCALE (RAPS): A NOVEL APPROACH TO CLASSIFYING RADIAL NERVE INJURY AND RECOVERY

Chane Kulenkampff, Christie Brennan, Samuel George
Queen Elizabeth Hospital, Birmingham, UK

Introduction: The Radial nerve is commonly injured in orthopaedic trauma due to its vulnerable position in relation to the humerus. Late referral or intervention limits treatment options for these patients. Previous classification systems concentrate on severity but do not give an indication of recovery which guides management decisions.
Aim: The aim of this study was to develop a novel approach to classify these injuries into functional anatomical levels that indicate the chronology of recovery and can be used to guide management throughout the patient's journey up to discharge. We present a case series of radial nerve injuries and propose the RAdial nerve Palsy Scale (RAPS).
Material & Methods: A retrospective review of patients with radial nerve injuries presenting to a single tertiary peripheral nerve injury service between January 2019 and August 2022 was performed looking at mechanism of injury and the chronology of recovery as well as intervention offered. A review of the current literature was undertaken for comparison.
Results: 27 patients with a median age of 51 years (range 17-85 yrs) were included. The injury levels were supraclavicular in one patient, infraclavicular in five patients, humeral in eight patients and at the posterior interosseous nerve (PIN) in six patients. Mechanism was traction in eight patients, five transections, five crush, one compression and one neuritis. A predictable pattern of recovery was seen on average at 3-monthly time points, depending on mechanism and level of injury. High transection injuries showed resolution of wrist drop at 9-months, with antigravity extensor pollicis longus (EPL) function returning at 15-months, while traction injuries at the same level showed resolution of wrist drop by 3-months and antigravity EPL function within 12-months on average. A full table of results will be presented along with the proposed classification system to guide management.
Conclusions: The sequence of radial nerve recovery follows a predictable clinical recovery trajectory. From our series and the corresponding literature, the classification level proposed corresponded well to a 3 monthly time interval to next level of recovery, depending on severity. The RAPS follows five levels relating to the functional anatomical level of recovery. Differentiating clinical features help distinguish between levels of the classification. In summary, a level-five radial nerve injury is a very high injury affecting triceps function and loss of cutaneous sensation in the forearm and 1st webspace with no distal function. Level four has intact triceps with a wrist drop. Level-three is a posterior Interosseus nerve (PIN) injury with radially deviated wrist extension while level two sees some recovery of finger extension with centralising wrist extension. A level one injury is isolated weakness/paralysis of the EPL and the extensor indicis proprius muscles.
We propose the RAPS as a tool to identify both the level and severity of radial nerve injury and provide a means to monitor recovery as the patient evolves from a level five to a level one during treatment. This will provide clinicians with a prognostic indicator allowing for better documentation and communication between clinicians, patients, and the multidisciplinary team.

A-0699 SAGITTAL EVALUATION OF MRI IN DORSAL AND FOVEAL TEAR OF TFCC

Chang-Hun Lee[1], Keong Yoon Kim[1], Yongng Seok Lee[1], Wan Sun Choi[2], Joo-Hak Kime[1], Kwang-Hyun Lee[1]
[1]Hanyang University College of Medicine, South Korea; [2]Ajou University College of Medicine, South Korea

Introduction: The Palmer classification allows us to categorize traumatic TFCC injuries and determine the treatment method accordingly. For this purpose, we mainly analyze coronal images of MRI, but it is difficult to identify dorsal TFCC

tears that is not included in the Palmer classification on the evaluation of coronal images. It is important to diagnose dorsal TFCC tears that progress and extend to TFCC foveal tears because they can cause DRUJ instability in addition to pain. However, there has been no study to evaluate the sagittal images of wrist MRI for the diagnosis of TFCC tears until now.
Aim: The purpose of this study is to identify dorsal TFCC tear and TFCC foveal tear by sagittal evaluation of MRI.
Material & Methods: A retrospective study of 63 patients who underwent arthroscopic surgery for TFCC tears from June 2019 to March 2023 was performed. The preoperative MRI coronal and sagittal images were analyzed for Palmer classification and Atzei classification, and the presence of TFCC dorsal tear sign and TFCC volar displacement sign were evaluated. The presence of TFCC dorsal tear and TFCC foveal tear was confirmed by the hook test performed at the time of arthroscopic surgery.
Results: All 63 patients were positive in the hook test during arthroscopic evulation, but preoperative MRI evaluation showed Palmer classification 1A in 3, 1B in 25, and 1D in 1, and Atzei classification 1 in 3, 2 in 11, and 3 in 11. Of the 63 patients, 48 had a TFCC volar displacement sign and 27 had a TFCC dorsal tear sign. Of the 25 patients with Palmer classification 1B, 20 had a TFCC volar displacement sign and 13 had a TFCC dorsal tear sign. There were 38 patients with no Palmer classification, of which 25 had a TFCC volar displacement sign and 14 had a TFCC dorsal tear sign.
Conclusions: In patients with TFCC injury, MRI sagittal evaluation was effective in identifying dorsal TFCC tears, and TFCC volar displacement sign was a good way to identify TFCC foveal tears that are not identified on coronal images.

A-0700 OUTCOMES OF PAEDIATRIC MALLET FRACTURES USING THE ISHIGURO TECHNIQUE

Izegaegbe Obadan[1], Shweta Agarwal[1], Natasha Morrissey[2], Kanwal Yousaf[1], Ramesh Vidyadharan[1], Christina Lipede[1], Andrea Jester[1]
[1]Birmingham Children's Hospital (Birmingham Women's and Children's NHS Foundation Trust) UK; [2]University Hospitals Birmingham NHS Foundation Trust, UK

Introduction: A bony mallet finger injury refers to the avulsion of the extensor tendon from the distal phalanx with the attachment of a bony fragment to the tendon. They occur more commonly in active children especially those involved in ball sports. It is due to sudden eccentric axial loading to a contracting extensor tendon. Issues of concern in the paediatric population include open/gradually closing physis and difficulty complying with
splints. Failure or inadequate treatment of these fractures can result in extensor lag, osteoarthritis, swan-neck deformity, and persistent stiffness.
Indications for the Ishiguro technique include mallet fractures with a dorsal fragment involving at least a third of the articular surface and/or subluxation of the distal phalanx and avulsion fractures with tendon injury at the fracture site. The technique involves maximum flexion of the DIPJ and PIPJ, passing the extension block pin into the middle phalanx under fluoroscopy, reducing the fracture and hyperextending the DIPJ, and then immobilizing the DIPJ by passing a K-wire through the radial or ulnar aspect of the distal phalanx without passing it through the tip of the distal phalanx. The technique has the advantage of being relatively simple and closed, no k-wire is introduced into the fragment reducing the risk of breakage. However the technique has been criticized as the axial wire breaches the DIPJ joint cartilage and distal phalanx epiphysis and has the potential to cause growth disturbance and joint stiffness.
Aim: To present the outcomes of using the Ishiguro technique over 10 years in a dedicated paediatric hand surgery unit along with surgical tips and tricks, incidence of joint stiffness, growth disturbance or other complications.
We compared the outcomes between patients with a closed and open physis. The outcomes of the patients with closed physes can be compared to the general adult population but the outcomes of those with open physes are of particular interest.

Material & Methods: Data was collected retrospectively from patients treated with this method seen over a period of 10 years (2014-2023) at the Birmingham Children's Hospital.
Demographic data, surgical technique, post op rehabilitation, complications and clinical outcomes will be presented.
Results: Conclusions: The Ishiguro technique is a safe and effective method of managing bony mallet fractures with large fragments and joint subluxation in the paediatric population. Meticulous technique with a strict limit on numbers of passes of the wires and post operative hand therapy is essential to good outcomes.

A-0701 ASSESSING THE SEVERITY OF CTS DURING PHYSICAL EXAMINATION? THE CORRELATION BETWEEN 2PD AND ELECTROPHYSIOLOGIC EXAMINATION

Luca Hergár[1,2], Péter Sallai[3,4], Barbara Sebők[5,6], Dániel Gusztáv Oroszi[7], Judit Réka Hetthéssy[6,8]
[1]Semmelweis University, Department of Orthopaedics, Budapest, Hungary; [2]Semmelweis University, Centre for Translational Medicine, Budapest, Hungary; [3]St. Pantaleon Hospital, Department of Traumatology, Dunaújváros, Hungary; [4]Saska-Med Bt. Outpatient Clinic for Orthopedics, Traumatology and Hand Surgery, Hungary; [5]Dr. Manninger Jenő Trauma Centre Budapest, Budapest, Hungary; [6]Semmelweis University School of PhD Studies Workgroup for Science Management, Budapest, Hungary; [7]Semmelweis University, Faculty of Medicine, Budapest, Hungary; [8]Hand Clinic, Budapest, Hungary

Introduction: Making the clinical decision of operative versus conservative treatment for Carpal Tunnel Syndrome (CTS) still poses grey areas in everyday hand surgical practice.
Most studies conclude that data from all available diagnostic moduli (physical examination, subjective and objective symptoms, ENG, neural ultrasound) must be weighed when making treatment decisions for patients suffering from CTS. However, the results of the electrophysiologic examination regarding severity are a mainstay regarding surgical indication.
Aim: The goal of our study was to determine the correlation of two-point discrimination (2PD) values measured on the 3rd digital nerve compared to severity of CTS based on ENG.
Our aim was to determine the role that 2PD values may play in establishing a treatment regime for the CTS patient.
Material & Methods: Prospective data collection was performed between April 2015 and April 2019 at the Department of Orthopedics Semmelweis University and following the COVID-19 pandemic, at the Hand Clinic Practice Budapest, and the Szent Pantaleon Hospital from November 2022 to October 2023.
Inclusion criteria were patients who later underwent surgical treatment for Carpal Tunnel Syndrome between 2015 and 2019, and all patients presenting with CTS symptoms, who had ENG performed between November 2022 and October 2023. 2PD measurements were performed on the 3rd digital nerve using the Two-Point DisCriminator R and all patients underwent ENG examination as a part of the diagnostic procedure. Correlation between variables was tested with Chi-Square tests, or when applicable, Pearson or Spearman correlation. Two-point discrimination values were correlated with the results of the electroneurographic severity by numeric value and by category (normal, elongated, severe).
Data was also analyzed in a binary logistic regression model.
Results: 237 patients were included to our study. Spearman correlation revealed a significant correlation between 2PD and ENG ($p=0.01$, $R=0.185$), and between the age of patients and ENG ($p=0.01$, $R=0.24$). Chi-Square tests did not reveal correlation between patient variables.
The binary logistic regression model showed that the odds ratio for having severe CTS was 1.33 for male patients compared to female patients. When the dominant hand was affected by CTS, patients who were lefthanded had 1.29 times higher odds for severe CTS compared to righthanded patients.

Conclusions: Based on our data there a significant correlation can be found between two-point discrimination values and ENG values. We suggest the use of 2PD measurement during physical examination to screen patients with potentially severe CTS.

A-0703 EXTENSOR POLLICIS LONGUS ENTRAPMENT ON COMPUTED TOMOGRAPHY IN ACUTE DISTAL RADIUS FRACTURE MAY BE A PREDICTOR OF TENDON RUPTURE

Charlotte L. E. Laane[1,2]*, Jad S. Husseini[3]*, Ambrose J. Huang[3], Rene Balza Romero[3], Mark Stam[1], Mathieu M.E. Wijffels[2], Abhiram R. Bhashyam[1,4], Neal C. Chen[1,4]

[1]Division of Hand Surgery, Dept of Orthopaedic Surgery, Massachusetts General Hospital; [2]Erasmus MC, University Medical Centre Rotterdam, Trauma Research Unit, Dept of Surgery; [3]Division of Musculoskeletal Imaging and Intervention, Department of Radiology, Masasachusetts General Hospital; [4]Harvard Medical School, Boston, MA

Introduction: Although it is a less common finding, it is hypothesized that Extensor pollicis longus (EPL) entrapment in Lister's tubercle might be associated with EPL rupture in displaced distal radius fractures.
Aim: The purpose of this study was to evaluate preoperative Computed Tomography (CT) scans of operatively treated distal radius fractures to characterize the incidence of EPL damage or EPL entrapment at the time of injury.
Material & Methods: This retrospective study included adults with operatively treated distal radius fractures and a preoperative CT within two weeks of injury between January 1st 2017 and July 31st 2018. The cohort consisted of 96 wrists in 95 patients. The median age was 54 (IQR 38-64), 68% (65/95) were female, and median follow-up was 56 months (IQR 22-61).
Results: The fracture involved Lister's tubercle in 75 % (72/96) of fractures. Of these 72 fractures with Lister's tubercle involvement, 11 had an EPL tendon entrapped by fracture fragments (11/72, 15%). Two patients had an EPL rupture and three patients developed EPL tenosynovitis clinically. All five patients with EPL rupture or EPL tenosynovitis had fracture involvement of Lister's tubercle. Of the 11 patients with EPL entrapment, one developed an EPL rupture and one developed EPL tenosynovitis (18%, 2/11).
Conclusions: EPL injury is common when distal radius fractures involve Lister's tubercle, especially when the tendon is entrapped in the comminution. When a CT scan is obtained for the treatment of distal radius fractures, attention to the EPL and its relation to Lister's tubercle may be helpful to characterize the risk of late rupture.

A-0704 DOES THE PRESENCE OF CARPAL TUNNEL SYNDROME INCREASE THE PROBABILITY OF TRIGGER FINGER? A SYSTEMATIC REVIEW AND META-ANALYSIS

Judit Réka Hetthéssy[1,2], Luca Hergár[3,4], Barbara Sebők[2,5], Péter Sallai[6,7]

[1]Hand Clinic, Budapest, Hungary; [2]Semmelweis University School of PhD Studies Workgroup for Science Management, Budapest, Hungary; [3]Semmelweis University, Department of Orthopaedics, Budapest, Hungary; [4]Semmelweis University, Centre for Translational Medicine, Budapest, Hungary; [5]Dr. Manninger Jenő Trauma Centre Budapest, Budapest, Hungary; [6]St. Pantaleon Hospital, Department of Traumatology, Dunaújváros, Hungary; [7]Saska-Med Bt.. Outpatient Clinic for Orthopedics, Traumatology and Hand Surgery, Hungary

Introduction: Carpal tunnel syndrome (CTS) and trigger finger (TF) have similar risk factors, and occur in a similar population (age >40, female sex etc.) There are some reviews available investigating the theory of correlation between the two diseases. However, we found that a larger scale meta-analysis addressing the role of CTS as a potential risk factor for the occurrence of TF was lacking.

Aim: to analyze if CTS increases the risk of TF and to assess if the presence of CTS alters which fingers are affected by TF.
Material & Methods: The systematic search for our meta-analysis was executed on the 7th of January 2023 using MEDLINE, Embase, and CENTRAL. Studies investigating the coexistence of CTS and TF were eligible for inclusion.
Results: The result of the systematic search was 796 articles. Twenty-six studies were eligible for inclusion following duplication removal, title and abstract selection, and full text screening. The studies reported 66 862 cases. Patients with CTS were operated in 21 675 cases, 437 patients (2%) had TF before the operation and for 2 177 cases (10%) TF developed after the carpal tunnel release (CTR). Altogether, 10.3% of the CTS cases had or developed TF during the study period. The location of the TF was disclosed in 1137 cases and was presented most commonly at the thumb (32.4%) and the middle finger (29.1%).
Conclusions: Based on our results the CTS and specially CTR raises the incidence of TF. However, the distribution of TF was not affected significantly by CTS.
CTS and TF are the two of the most common diagnoses in elective hand surgery, therefore awareness of the fact that CTS and CTR raise the risk of the occurrence for TF leads to an impactful influence on the examining physicians day-to-day management of CTS patients regarding taking patient history and physical examination (i.e. routinely assessing for clinical signs and symptoms of TF for all CTS patients) and education of patients presenting with CTS regarding TF (symptoms, precautions, early action etc.) Our analysis did not reveal a significant shift in the distribution of TF in terms of effected finger in CTS patients compared to those who had TF only, so vigilance regarding distribution of TF does not need to be altered. Awareness of the relationship between CTS and TF also helps not to miss signs and symptoms of TF, as the attention of both the patient and the treating physician may be focused on the signs and diagnosis of CTS symptoms, and it also allows for early detection of TF, establishing a wider opportunity for conservative treatment.

A-0706 HIGH SELECTIVE DENERVATION OF SPASTIC UPPER LIMB

Margarita Kateva, Kalin Angelov, Nikola Simeonov, Iliyana Marcheva, Elena Kandilarova
Hand surgery and reconstructive surgery clinic, UMHAT "Sofiamed", Sofia, Bulgaria

IntroductioIntroduction: Surgical procedures for the spastic upper extremity due to stroke, traumatic brain injury, and cerebral palsy aim to correct the common deformities of elbow flexion, forearm pronation, wrist and finger flexion, ulnar deviation, and thumb-in-palm deformity. Surgery is crucial in terms of care of the spastic upper limb. Different surgical techniques have been described to address each of the common deformities and underlying causes, including muscle spasticity, joint contracture, and paralysis. Partial neurectomy of motor nerves has been shown to reduce spasticity in the target muscles. After appropriate evaluation, as well as determining the goals of surgery, deformity correction can be achieved through single-event, multi-level surgery. Surgery includes a combination of soft tissue lengthening, tendon transfer, joint stabilization procedures and selective denervation of spastic muscles.
Methods: The inclusion criteria of the patients in our series were spastic upper limb secondary to stroke, traumatic brain injury, and cerebral palsy. Recorded measurements were patient's age at surgery, gender,etiology of the spasticity, associated procedures during the selective neurotomy such as tendon transfer. The results were studied by passive and active range of movement in the affected joint; the first follow-up occurred between 1 and 6 months, and at the last follow up at around 12 months to study the durability of the results based on several criteria: spontaneous position, range of motion, muscle tone, spasticity according to functional evaluation (House scale).
Results: The results were collected as we recorded passive and active range of motion straight after surgery, two weeks post op and 1-6 months postoperatively as the early follow up. Passive range of motion restored first just in the days

after surgery, active range of motion restored at least two weeks post op. At 12 months post op passive and active range of motion remains restored.
Conclusion: The management of spasticity is multidisciplinary and involves physical therapists, occupational therapists, physiatrists and surgeons. Selective neurectomy is performed to decrease muscle tone.
In all of our cases, spasticity is reduced with improvements in the functional Housescore and these results are stable at the last follow up. But still further studies need to be done to evaluate late follow up at long terms post op.

A-0707 THE EFFECTIVENESS OF FULL-THICKNESS SKIN GRAFT AND LOCAL FLAP IN THE FINGERTIP AMPUTATION WITHOUT AN AMPUTEE

Ji-Won Lee, Ho-Hyoung Lee, Sung-Ho Lee, Eui-sun Yoon
Cheju Halla General Hospital, Jeju, Korea

Introduction: In general, surgical management of fingertip amputation without an amputee can be complex. Of all the various surgical management options, the full-thickness skin graft and local flap were adopted in this study.
Aim: We investigated the clinical characteristics and functional outcomes of fingertip amputation.
Material & Methods: Between March 2022 and April 2023, we reviewedthe medical records of 53 patients retrospectively. 35 patients(group 1, 66%)) treated with full-thickness skin graft and 18 patients(group 2, 34%)) treated with local flap were investigated. Both groups were assessed for functional outcomes& complications. Finger tip amputation was classified as dorsal oblique, volar oblique or transverse type.
Results: The main cause of fingertip amputation was the use of a bypass pruner. The mean age of group 1 and group 2 was 54.6±15.3 yrs and 52.3±12.4 yrs, respectively. The median follow-up of group 1 and group 2 was 12.3±10.3weeks and 19.0±14.6 weeks. In both groups, the main type of amputation location was the dorsal oblique type. As for the functional outcome, the mean of the distal interphalangeal joint flexion and Quick-DASH score was 63.4±15.4degrees and 28.3±9.5% in group 1 and 55.6±18.5 degrees and 29.4±10.5% in group2, which were not statistically significant differences ($p>0.05$). The estimated mean amputee size was 1.37±0.2cm2 and 1.72±0.2 cm2, respectively, which was a statistically significant difference ($p<0.05$). The complications of surgery included neurologic symptoms and joint contracture, which were 14(40%) and 3(8.6%) cases in group 1, 3(16.7%), and 7(38.9%) cases in group 2.
Conclusions: Full-thickness skin graft and local flap procedures are useful treatment options for fingertip amputation without
amputee, improving finger range of motion and decreasing joint contracture.

A-0708 UN USUAL COMPLICATION OF THE TFCC SURGERY MANAGEMENT BY ARTHROSCOPY APPROACH

Martín Caloia[1,2], Sergio E Ronconi[1,2], Franco Casen[1], Mariana Muñoz[1]
[1]Hospital Universitario Austral, Buenos Aires, Argentina; [2]Sanatorio Mater dei, Ciudad de Buenos Aires, Argentina

Introduction: Septic arthritis of the wrist is an entity of low incidence, but it carries significant morbidity. Even less common is the one that occurs after surgery. There are no reliable laboratory parameters to confirm the diagnosis, so it must be based on a correct history, physical examination and the presence of joint effusion, confirmed by positive crops. Treatment is based on the administration of antibiotics, initially broad-spectrum, in addition to surgical debridement.
Aim: To present the clinical and imaging results of the arthroscopic treatment of septic arthritis of the wrist following open

TFCC repair. Present a rare complication, but with catastrophic results in the event of a misdiagnosis or late diagnosis.
Material & Methods: Case Report
A 36-year-old patient with a history of right infrapatellar amputation and right wrist contusion (in the context of polytrauma) with residual distal radioulnar instability; he consulted for pain on the ulnar side of the right wrist, having previously performed (3 months prior to the consultation) open surgical repair of triangular fibrocartilage in another center. On physical examination, the patient had previous eutrophic surgical wounds, with no signs of phlogosis, mild regional edema, pain on pronosupination, and painful complete ROM. Vasculonervous Status retained. X-ray and MRI were requested, showing bone sequestration and edema at the level of the distal ulna + joint effusion at that level, in addition to peri-anchor osteolysis. Laboratory was performed with inflammatory parameters within normal values. Due to the findings previously described, with the suspicion of septic arthritis, it was decided to conduct a wrist arthroscopy with extensive debridement, removal of material and sampling for crops.
Results: The patient progressed favorably, with improvement in pain and mobility, positive crops for SAMS, and antibiotic treatment with cefazolin was treated for 14 days followed by Oral antibiotics for 6 months.
Conclusions: The actual incidence of septic arthritis of the wrist is not yet clearly established; Different series establish its incidence between 1 and 5% of osteoarticular infections of the upper limb. The literature is scarce with respect to that which occurs as a complication of a previous surgical procedure. Unlike larger joints, there is no consensus on the cell count in joint fluid considered pathognomonic for wrist Septic arthritis or laboratory parameters of high sensitivity and specificity, so the diagnosis of this pathology is based on the examination of the patient, confirmed in the operative act, followed by microbiological isolation. Despite its low incidence, this pathology can present high morbidity as well as functional sequelae in the case of late diagnosis or inadequate management.
Our patient presented excellent clinical and imaging results after arthroscopic treatment, with recovery of optimal range of motion, without pain; and with reossification of the distal ulna, after removal of the TFCC anchor material.
Arthroscopic treatment has shown excellent results, making it an excellent alternative for the treatment of this strange but very aggressive pathology.

A-0709 LONG TERM CHANGES OF BONE DENSITY REDUCTION OCCURS STRONGLY IN DISTAL RADIUS COMPARED WITH SCAPHOID

Ryutaro Iwasaki[1], Yusuke Matsuura[1], Takahiro Yamazaki[1], Shinji Taniguchi[1], Atsushi Hojo[2], Takashi Nomoto[1], Yukari Matsuzawa[1], Aya Kanazuka[1]
[1]Chiba University Hospital, Japan; [2]Niigata Hand Surgery Foundation, Japan

Introduction: It is well known that scaphoid fractures are common in young patients and distal radius fractures are common in elderly patients. It is reported that the fact derives from the deference of bone density in scaphoid and distal radius. But there are no objective reports which proves this fact.
We presumed that bone density in distal radius is more influenced by age, compared to scaphoid. And that this explains the reason of why scaphoid fractures are more common in young patients and distal radius fractures are more common in elderly patients.
Aim: The aim of this study is to evaluate long term changes in bone density of distal radius and scaphoid by using quantitative CT.
Material & Methods: Between April 2012 and April 2022, a total of 1343 patients who underwent CT scan of hand, wrist and forearm were extracted from the database of Chiba University Hospital. Patients with distal radial fracture, scaphoid

fracture, rheumatoid arthritis, infection, osteoarthritis, lack of calibration phantom were excluded. 102 patients remained and we analyzed the CT data by using MECHANICAL FINDER. Cortical bone and bone marrow were separately analyzed in both Distal radial and scaphoid. In addition, distal radius was divided in subchondral bone and distal radius and distal metaphysis. Multiple regression analysis was used.
Results: Distal radius bone density/scaphoid bone density showed negative correlation (correlation coefficient r=0.6863).
Conclusions: Discussion:
This study indicates that bone density in distal radius is more influenced by age, compared to scaphoid. In young patients whose bone density of distal radius is maintained, external force to the wrist causes scaphoid fracture. On the other hand in elderly patients whose bone density of distal radius is declined, distal radius fracture occurs.
Conclusion: Bone density in distal radius is more influenced by age, compared to scaphoid. This can be one reason of why scaphoid fractures are more common in young patients and distal radius fractures are more common in elderly patients.

A-0710 RETROGRADE FIXATION OF THE HOOK OF HAMATE FRACTURE USING CARPAL TUNNEL APPROACH.: IS THIS PROCEDURE RELIABLE?

Seung Jin Lee[1], Soo Joong Choi[2]
[1]Kandong Sacred Heart Hospital, Seoul, South Korea; [2]Chuncheon Sacred Heart Hospital, Chuncheon, South Korea

Introduction: Hook of hamate fracture usually treated by excision and seemed to leave no functional deficit.
But, according to dart arrow motion of natural wrist range of motion, hook of hamate play important role of fulcrum in ulnar deviation of flexor tendons. So, we tried to restore normal anatomic structure and osteosynthesis of the fracture if the fractured site is at base.
Aim: Clinical trial of new method
Material & Methods: 4 Patients with basilar part of the hook of hamate fracture, aged 20-60 years (all men) were treated by open reduction by carpal tunnel approach, and guide wire was inserted from volar to dorsal and headless canulated screw was inserted from dorsal to volar direction. And the position of screw was confirmed by fluoroscopy and direct vision at volar side.
Associated rupture of the flexor tendon was reconstructed by tendon graft..
Results: All the fracture healed without any complication, and we achieved near normal grip power. All the patients returned to their preinjury level of functioning.
Conclusions: Using carpal tunnel approach and retrograde headless screw fixation is a reliable and safe option of treatment in basilar hook of hamate fracture.

A-0711 RESULTS AND COMPLICATIONS OF TWO-STAGE FLEXOR RECONSTRUCTION IN FINGERS

D. Horáčková, E. Šulcová, A. Schmoranzová, T. Hellmuth, L. Smrčková, L. Fialová, V. Tyle, R. Lhotský
Hand and Plastic Surgery Institute Vysoke nad Jizerou, Czech Republic

Introduction: Two-stage tendon reconstruction has been a well-established method since 1965 when James Hunter introduced it. Silicone implant tendon reconstruction differs in technical details such as the method of distal insertion, proximal suture and the selection of the appropriate graft.
Aim: The aim of our study was to evaluate the results of the operative technique of two-stage reconstruction used at our

department, to determine the percentage of complications and to compare them with other techniques used.
Material & Methods: This retrospective study includes a series of 42 fingers in 38 patients who underwent two-stage flexor reconstruction between January 1, 2015 and January 31, 2020. The patient population consisted of 12 females and 26 males with a mean age of 49 years. The average follow up was 10 months. Distal insertion was performed by pullout suture around the bone by non absorbable monofilament 3-0 through middle third of the nail plate tied over the rubber bolus. We fixed the graft proximally to the adjacent deep flexor side to side . We used PL and FDS as a graft in 83% of cases.
Results: Patients who had tendon graft rupture (1 finger) or failure due to infection (2 fingers) and where arthrodesis or amputation was performed in the DIP joint (5 fingers) were excluded from the outcome measurements, as were patients with arthrodesis of the PIP joint (2 fingers) and amputation in the PIP joint due to rigidity (1 finger).
The final ROM in the 31-finger set (30 patients) was 116 degrees TAM (total active motion PIP + DIP), with a mean ROM of 79 degrees in the PIP joint and 37 degrees in the DIP joint. Based on the four-level Strickland classification, we rate the results as excellent, good and fair in 80.7% of cases and poor in 19.3%.
Conclusions: Our results after two-stage flexor reconstruction are comparable to those of other published studies. In agreement with the literature, we observed a similar percentage of complications (16%). The percentage of complications is relatively high, however, the two-phase flexion reconstruction method is considered the gold standard with no alternative solution. Intensive research continues , e.g. distal insertion of a plantaris graft with an attached bone fragment or improvement of graft properties. None of these techniques have yet found wider use in practice.

A-0712 TF AND CTS AND COMMON CONTRIBUTING RISK FACTORS - HOW DO THEY RELATE?

Péter Sallai[1,2], Luca Hergár[3,4], Barbara Sebők[5,6], Judit Réka Hetthéssy[6,7]
[1]St. Pantaleon Hospital, Department of Traumatology, Dunaújváros, Hungary; [2]Saska-Med Bt. Outpatient Clinic for Orthopedics, Traumatology and Hand Surgery; [3]Semmelweis University, Department of Orthopaedics; [4]Semmelweis University, Centre for Translational Medicine; [5]Dr. Manninger Jenő Trauma Centre Budapest; [6]Semmelweis University School of PhD Studies Workgroup for Science Management; [7]Hand Clinic, Budapest, Hungary

Introduction: Trigger finger (TF) and Carpal Tunnel Syndrome (CTS) are two of the most common elective hand surgical problems patients present with, and they also effect similar populations, as they have similar risk factors. There are some reviews available investigating the theory of correlation between the two diseases. However, we found that a larger scale meta-analysis addressing the relationships between TF and the occurrence of CTS was lacking, as well as information regarding how the common risk factors of CTS effect the development of TF.
Aim: to analyze if TF increases the risk of developing CTS, and to assess if the presence of known risk factors for CTS alter the incidence of TF.
Material & Methods: The systematic search for our meta-analysis was executed on the 7th of January 2023 using MEDLINE, Embase, and CENTRAL. Studies investigating the coexistence of CTS and TF were eligible for inclusion. To compare the effect of common risk factors of CTS on the development of TF, Fisher exact test was applied.
Results: The result of the systematic search was 796 articles. Twenty-six studies were eligible for inclusion following duplication removal, title and abstract selection, and full text screening. The studies reported 61 223 cases, 69.4% female and 30.6% male. The primary disease was CTS in 41 300 cases. Of them, 13.3 % had diabetes (DM), 4.2% had rheumatoid arthritis (RA), 5.9 % had thyroid dysfunction (TD) and 10.3% had or developed TF during the study period. Of patients with TF as primary disease (19 923 cases) 18.6% had DM, 1.3% had RA, 4.2% had TD and 4.7% had CTS.
Amongst patients with CTS, DM and female sex proved to be a significant risk factor ($p=0.028$ and $p=0.00001$) for higher

TF incidence. RA and TD did not have a significant impact on TF development.
Conclusions: Based on our analysis of the data the presence of TF does not increase the risk of the development of CTS, however TF is much more common in CTS patients than in the general population. Female patients and patients suffering from DM are the most likely to develop TF within the CTS patient group. The clinical significance of this possible correlation may be put to good use in day-to-day practice, as it guides the physician during physical examination of a TF patient regarding the level of suspicion regarding CTS. We suggest that questions regarding tingling of the fingers and looking for the basic clinical symptoms of CTS (i.e. Tinel and Phalen sign) should be part of routine examination of TF patients. If the clinical setting allows, measuring two-point discrimination and education regarding symptoms of tingling may also be beneficial.

A-0713 RECONSTRUCTION OF THE THUMB BASAL JOINT BY 4 LIGAMENT RECONSTRUCTION

Soo Joong Choi[1], Ki Tae Kim[2], Seung Jin Lee[3]
[1]Chuncheon Sacred Heart Hospital, Chuncheon, South Korea; [2]Hallym University Sacred Heart Hospital, Anyang, South Korea; [3]Kangdong Sacred Heart Hospital, Seoul, South Korea

Introduction: Unstable thumb basal joint result in severe functional deficit of thumb use and grip activity.
Numerous methods of stabilization of the joint have been developed.
In 2006 Kagan Ozer suggested a new surgical method of 4 major ligament reconstruction using ECRB tendon in treatment of traumatic dislocation of basal joint.
We modified Ozer's method as using ECRL because of convenience of the procedure and applied to various condition of the basal joint instability and reporting the clinical results.
Aim: Clinical trial of new method
Material & Methods: 2 holes in Metacarpal base and one hole in trapezium were made, and using a half slip of ECRL tendon; 4 major ligaments around thumb basal joint (dorsoradial, intermetacarpal, anterior oblique and dorsal oblique ligament.) were reconstructed.
By this method we treated 4 patients: 2 men and 2 women : mean age 47 years(range,13 to 67 years).The etiologies were one chronic dislocation of basal joint, two basal joint osteoarthritis and one unstable joint due to congenital hypoplastic thumb.
For basal joint osteoarthritis, after debridement of the articular surface, harvested and folded tensor fascia lata was inserted to the joint space, before tightening of the 4 ligament reconstruction.
Results: All the patient restored stable basal joint and good grip power .
Conclusions: Modified Ozer's 4 ligament reconstruction method can be used not only for reconstruction of unstable thumb basal joint, but also in osteoarthritis cases.

A-0714 THE POSITIVE EFFECTS OF BOTULINUM TOXIN IN THE MANAGEMENT OF UPPER LIMB NEUROPATHIC PAIN

Theodora Papavasiliou, Oliver Bloom, Molola Oyewole, David Pang, Lauren Uppal
Guy's & St Thomas' Hospitals, London, UK

Introduction: Botulinum toxin, recognised for its dual impact on the vascular and nervous systems, directly inhibits pain neurotransmitters and suppresses sympathetic stimulation, particularly heightened in chronic pain states. This pioneering study investigates the effectiveness of botulinum toxin in managing neuropathic pain in the upper limb.

Material & Methods: From 2017 to 2023, 29 patients with upper limb neuropathic pain underwent botulinum toxin nerve blocks after failed conservative management with the pain management team and hand therapy departments. Previous unsuccessful neurolysis and nerve wraps, were noted three patients. Neuropathic pain aetiologies comprised trauma in 17 patients, and postoperative CRPS following routine elective hand surgery in 12 patients. Quick-DASH and Brief Pain Index scores were collected pre- and postoperatively. Percutaneous injection of 50 iu of toxin was performed in five patients and direct application of the toxin during surgery, which involved decompression, neurolysis, and nerve wraps, was performed in 24 patients.
Results: Early postoperative reports indicated a reduction in neuropathic pain, attesting to the rapid blockade of pain neurotransmitters. Quick-DASH scores exhibited improvement at two and six weeks post-injection, with the majority experiencing a decrease in pain levels. Notably, 25/29 patients received a single dose, resulting in sustained pain relief during long-term follow-up, up to six years after the procedure. Four patients received a repeat dose, further enhancing pain relief. Patients were able to reduce or discontinue pain medication, and overall patient feedback was positive, with no significant adverse outcomes linked to Botulinum toxin injection.
Conclusions: This study establishes the safety and efficacy of botulinum toxin as an adjunctive therapy for managing neuropathic pain in the upper limb, demonstrating a prolonged therapeutic effect. Notably, its cost-effectiveness and superior side effect profile, when compared to extended use of oral medications such as gabapentin and amitriptyline, highlight its potential as a favourable treatment modality. Furthermore, superior outcomes were observed compared to neurolysis and nerve wrap interventions alone. Based on these affirmative findings, botulinum toxin has been officially incorporated into the Joint Medicines Formulary as an approved off-label treatment for neuropathic pain in the upper limb. Botulinum toxin may switch off central pain sensitisation pathways by blocking the peripheral nervous system signals.

A-0715 INVESTIGATION OF E-HEALTH LITERACY LEVELS OF INDIVIDUALS WITH HAND INJURY

Ilkem Ceren Sigirtmac[1], Ozge Buket Arslan[2], Ceren Ayvali[2], Cigdem Oksuz[2]
[1]Cankiri Karatekin University, Faculty of Health Sciences, Department of Occupational Therapy, Cankiri, Turkey; [2]Hacettepe University, Faculty of Health Sciences, Department of Occupational Therapy, Ankara, Turkey

Introduction: Health literacy involves understanding health information, effective communication, and accurate advice application. E-health literacy arises from electronic access to health information, emphasizing its significance.
Aim: Our study aimed to assess the e-health literacy levels of individuals with hand injuries.
Material & Methods: Data were collected through a sociodemographic form, E-Health Literacy Scale (E-HLS), evaluating technology use in health information access. Comprising ten items, including two on internet usage and eight on internet attitudes, responses were recorded on a five-point Likert scale. A higher score indicates superior e-health literacy. Turkish validity and reliability of E-HLS are established. Data were collected via Google Forms.
Results: A total of 69 individuals (54% male; 46% female), with hand injuries participated aged 12-65 with a mean of 36.31(SD: 13.87) years. Of the participants, 55% (n=38) believe that internet is useful when making decisions about their health, 58%(n=40) consider it important to access health resources online. Mean E-HLS score was 28.36(SD:6.12).
Conclusions: Our study exhibited a moderate level of e-health literacy among individuals with hand injuries. A significant majority considered the internet a valuable resource for accessing health-related information and making informed health decisions. It's crucial to remember that in this digital age with increased access to health information, e-health literacy remains an important issue.

A-0716 COMPLICATIONS FOLLOWING ULTRASOUND-GUIDED CARPAL TUNNEL RELEASE – A CASE REPORT SERIES

Magdalena Köhl[1], Ulrike Seeher[2], Peter Kaiser[2], Gernot Schmidle[2], Robert Zimmermann[1], Stephan Sigl[1]
[1]Department of Plastic, Reconstructive and Aesthetic Surgery, Medical University of Innsbruck, Innsbruck, Austria; [2]Department of Orthopedic and Trauma Surgery, Medical University of Innsbruck, Innsbruck, Austria

Introduction: Besides conservative treatment for carpal tunnel syndrom, surgery can lead to a relief of symptoms and pain by transecting the transverse carpal ligament. The most common techniques are via an open incision (OCTR) or an endoscopic release (ECTR). A transection with ultrasound guidance (UCTR) is becoming more and more popular. Although carpal tunnel release shows a very high clinical success rate, severe surgical complications such as neurovascular lesions can occur. It seems that the risk of injury in published papers using UCTR is very low. However, in our daily clinical practice, the authors have observed several relevant complications leading to unsatisfied patients and a bad outcome. Therefore, the aim of this case report series was to present patients who had suffered from complications following UCTR.
Patients & Methods: In a retrospective data analysis data of patients who had undergone an open revision surgery at the Department of Orthopedic and Trauma Surgery and Department of Plastic, Reconstructive and Aesthetic Surgery of the Medical University of Innsbruck, between February 2021 and December 2023 were examined. Patients had reported persistent symptoms, worsening or even appearance of new symptoms after UCTR. The complications, ultrasound findings, surgical techniques, electromyogram and/or nerve conduction velocity and symptoms documented in the outpatient record were surveyed.
Results: A total of 14 patients (12 female, 2 male) had undergone revision OCTR following UCTR. Mean age at time of revision OCTR was 62 years. Intraoperatively, in 10 patients an incomplete release of the transverse carpal ligament was discovered. Five patients presented with major complications (e.g. massive hematoma with compartment syndrome, nerve lesions). One patient required a nerve graft as the median nerve itself had been harmed at several levels throughout UCTR using a hook knife. In another patient with worsening of the symptoms after UCTR using a thread, the median nerve was found in a separate sheath withing its complete course.
Conclusion: Innovations in medicine are the foundation for development of new methods and techniques. Several studies describe UCTR as a safe technique with similar results compared to OCTR. The decision which method for carpal tunnel release should be used strongly depend on the doctor's experience as well as the patient's preference. Based on our case report series, we would like to draw attention and raise awareness to complications which can be severe and might occur during UCTR. Trained physicians who are skilled in using ultrasound and surgery should rather only conduct UCTR in order to reduce complication rate.

A-0717 A DEEP DIVE INTO MODIFIED MALLET SCORING SYSTEM: ITEM DISCRIMINATION AND FACTOR ANALYSIS RESULTS

Merve Sarıipek[1], Esra Merve Çakıryılmaz[2], Salih Bardakcı[1], Tüzün Fırat[1]
[1]Hacettepe University, Faculty of Physical Therapy and Rehabilitation, Ankara, Türkiye; [2]Yüksek İhtisas University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Ankara, Türkiye

Introduction: The Modified Mallet Scoring System (MMSS) is an observational assessment tool widely used in clinics to evaluate arm movements in children with Brachial Plexus Birth Palsy (BBBP). In practice, the MMSS is used widely but it is observed that this scoring is not sufficiently addressed statistically on the basis of item and item total correlations.
Aim: Aim of this study was to analyze statistically each item that makes up the MMSS and its contribution to the total score.

Material & Methods: The data collection process was based on the observation by single researcher. Item reliability analyses were performed on the data. Item means and standard deviation (SD) were used, item discrimination tests such as item-total correlations and the significance of the difference between the upper and lower groups of 27% were performed, and Cronbach's alpha internal consistency coefficient was examined. The contribution of each item to assessment of the arm movements and the ability of 6 items to develop this assessment together were examined by exploratory factor analyses.
Results: Ninety-three children, 52 girls (55.9%) and 41 boys (44.1%) were included in the study. The mean age of the children was 6.23±2.11 years. After analysis of the item total correlations for item discrimination the highest correlation was found in the Hand to Neck movement, Hand to Belly, Hand to Back, Hand to Mouth, Global Abduction, and Global External Rotation (ER) movements, respectively. After 'Cronbach's alpha if item deleted' outputs were checked, it was found that the least contribution to the overall MMSS structure was provided by Global ER and the highest contribution was provided by Hand to Belly. In this measurement, the standardized Cronbach's alpha internal consistency coefficient obtained for the 6-item structure was at the level of 0,860, while it decreased to 0,854 when Global ER was removed. The Independent Samples T Test was performed for the discrimination of the upper and lower groups of 27%. It was found that the most discriminative items were Hand to Neck, Hand to Back, Hand to Mouth, Hand to Belly, Global Abduction and Global ER, respectively. Factor analysis showed statistical significance for all 6 items in the arm movement score using this method.
When factor analyzed according to 6 movements, total variance was found as 59%. Hand to Neck provided the biggest contribution to the factor structure, followed by Hand to Belly, Hand to Back, Hand to Mouth, Global Abduction and Global ER, respectively. Global ER was the item with the least contribution and discrimination among all items, and when global ER was removed the total variance of the 5-item structure increased to 63.38%.
Conclusions: According to factor analysis and item discrimination analyses, Global ER has the least effect on MMSS scores, while Hand to Neck has the highest effect. When the global ER is removed from the MMSS, the structural stability of the scoring increases. The global ER parameter is not a reliable item for clinical decision-making. Instead, the Hand to Neck parameter provides more reliable data for external rotation movement.

A-0718 CLOSED REDUCTION AND MULTIPLE KIRSCHNER WIRE FIXATION FOR THE OBLIQUE METACARPAL SHAFT FRACTURES

Ki Tae Kim[1], Soo Joong Choi[2]
[1]Hallym University sacred Heart Hospital, Anyang, South Korea; [2]Chuncheon Sacred Heart Hospital, Chuncheon, South Korea

Introduction: Oblique fractures of metacarpal bone (MC) are usually the result of torsional forces and can cause rotational malalignment. Malrotation is poorly tolerated and is difficult to assess on plain radiographs. If malrotation is present with composite digital flexion, open reduction should be considered. However, open reduction and internal fixation can lead to tendon adhesion or stiffness, leaving visible scars on the dorsum of the hand. We have performed closed reduction and multiple Kirschner wire fixation for oblique MC shaft fractures and have achieved good results. We report our fixation technique and its results.
Aim: Clinical trial
Material & Methods: A total of 6 consecutive patients who received closed reduction and multiple Kirschner wire fixation for oblique MC shaft fractures were retrospectively reviewed. After finishing routine drap, 3 to 5 pounds of finger traction was applied. After manual reduction was performed, fracture site was temporarily fixed with a towel clip, and then the AP and both oblique views were checked through the C-arm to confirm whether the reduction was successful. Additionally,

parallel relationship of the finger nails was checked. If the fracture site was well reduced on C-arm and there was no problem with the parallel relationship of the nails, it was judged that the rotational anignment was well reduced and Kirschner wire fixation was performed. First, retrograde intramedullary fixation was performed using 1.4 mm Kirschner wire. Second, interfragmentary fixation was performed using 0.9 mm Kirschner wire. Third, transmetacarpal fixation was performed using 1.2 mm Kirschner wire distal to the fracture site. After finishing the fixation, we checked the rotation alignment using the tenodesis effect and then compressed musculotendinous junction of forearm flexors to check if the rotation alignment was appropriate. Short arm splint was applied to enable free movement of the metacarpophalangeal joint, and active range of motion was allowed immediately after surgery. Kirschner wires were removed between 4 to 6 weeks after surgery in the outpatient clinic.
Results: There were 3 males and the mean age was 43.5 years (range, 33 – 56 years). One injured the fifth metacarpal bone and the others injured fourth. There was no rotational malalignment complication. Full range of motion was recovered (mean 10.7 weeks (range, 8 – 16 weeks)) and radiological union was obtained (mean 8.7 weeks (range, 6 – 12 weeks)) in all patients. Mean satisfaction for surgery was 9.7 points (range, 9 – 10 points) at final follow up.
Conclusions: Closed reduction and multiple Kirschner wire fixation can be used as an alternative technique to oblique metacarpal shaft fracture treatment, if satisfactory reduction can be achieved through finger traction and appropriate manual reduction.

A-0719 DOES WRIST TAPING IN JOCKEYS AFFECT PAIN AND REACTION SPEED?

Begüm Özdemir[1], İmge Nas[1,2], Burcu Semin Akel[1]
[1]Istanbul Kultur University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Turkey; [2]Istanbul Medipol University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation, Turkey

Introduction: Upper extremity injuries in jockeys (horse riders) constitute 29.2% of all injuries. During riding, upper extremity is expected to move in harmony with the horse's movements while maintaining its stability. Wrist pain occurs due to static and rhythmic wrist movements specific to this sport. However, there is not any study investigating the effect of any conservative technique for pain and performance in jockeys.
Aim: The aim of this study is to investigate the acute effect of kinesiotaping on wrist pain and reaction speed in jockeys. As reaction time is assumed to be an important indicator of good performance, within ths aim, the effect of taping on performance will be shown.
Material & Methods: Twenty four professional male jockeys between the ages of 25-45 years (mean age 34.16±5.56 years) participated in the study. Demographics of the participants were recorded. Wrist joint pain level in resting and activity were evaluated with the visual analog scale. Reaction speed was evaluated with the Nelson Hand Reaction Test. Kinesiotaping was applied from ulnar side of the jockeys' wrist aiming to have an effect on TFCC and flexor carpı ulnaris. The correcton and muscle fascilitation techniques were used. The assessments were done before taping and after 2 hours of horseback training with taping application. Wilcoxon signed rank test was used to analyze the results.
Results: The avarage pain intensity of the participants was 5.83±2.16; this pain decreased significantly after kinesiotaping ($p=0.001$). The avarage reaction speed was found to be 1.61± 0.18 and no significant change was present in reaction speed scores after taping ($p>0.05$).
Conclusions: Taping applied to jockeys provided an instant relief in wrist pain, however it did not have any effect on reaction speed. It is known that taping improves the sense of proprioception by stimulating mechanoreceptors and supports joint stability. Horse riding, which provides a vibration effect on the wrist after taping, may have also have a

similar effect. Therefore, it is assumed that taping did not effect the performance. According to the results of our study, wrist kinesiotaping in jockeys can be preferred as a preventive method for reducing pain.

A-0720 EARLY CLINICAL RESULTS OF DIRECT EXTENSOR TENDON REPAIR WITH K-WIRE FIXATION IN ACUTE CLOSED TENDINOUS MALLET FINGER

Jl-won Lee, Eui-sun Yoon
Cheju Halla General Hospital, Jeju, Korea

Introduction: Most of the treatment of acute tendinous mallet finger is splinting. However, in many cases, conservative treatment of acute tendinous mallet finger is not achieved due to poor patient compliance.
Aim: Therefore, surgical treatment was performed on the acute tendinous mallet finger in this study to confirm the clinical results.
Material & Methods: The 20 patients with acute tendinous mallet fingers between 30 and 67 were enrolled. The patients underwent surgery within 7 days of injury. In a patient with an acute tendinous mallet finger, an H-shaped incision was made centering on the distal interphalangeal joint to detach the soft tissue. After confirming the rupture of the extensor tendon, a K-wire was inserted obliquely into the joint direction under the C-arm guide to repair the distal interphalangeal joint. It was fixed in a hyperextended state. Then, the extensor tendons were sutured using Vicryl and Prolene. Then, an aluminum finger splint was applied, and the extension delay and range of motion were measured during the outpatient follow-up.
Results: The mean of the initial extension lag was 43 degrees. The mean of K-wire fixation and splinting was 7.6 weeks. The average follow-up period and VAS score were 6 months and 2, respectively. In the final follow-up period, the mean extension lag of the DIP joint was 5 degrees. Also, the active flexion of the DIP joint was 59.5 degrees. The K-wire was removed at an average of 7.6 weeks. There were dorsal skin maceration and irritation on the DIP joint in 2 patients. They were treated with oral antibiotics and NSAIDs. And it didn't require K-wire removal. Other complications like pin loosening, breakage, and infection did not occur.
Conclusions: An extension lag of about 10 degrees is common in conservative treatment using only splinting. In previous studies, there were few studies comparing splint fixation and surgical treatment using K-wires, and only fixation using K-wires was used without incision and suturing of the extensor tendons. In this study, K-wire fixation and extensor tendon suture were performed, and the results were studied. As a result, it was confirmed that not only the splint fixation but also the extension lag was less than the fixation surgery using only K-wire, and the limitation of the range of joint motion was also less. Adjuvant treatment using a splint cannot expect complete compliance, but surgical treatment can prevent flexion of the distal interphalangeal joint regardless of the patient's compliance. Therefore, surgical treatment of the acute tendinous mallet finger is better than conservative treatment.

A-0721 THE EFFECT OF HYPERMOBILITY ON REACTION TIME, PROPRIOCEPTION, AND PAIN IN MUSICIANS

Burcu Semin Akel, Edanur Altınbaş, Mahmut Kahraman
İstanbul Kültür University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, İstanbul, Turkey

Introduction: Hypermobility is known to be common in musicians. It is believed to increase performance skills however there are studies mentioning the adverse effect of hypermobility in musculoskeletal system. Proprioception is assumed

as a vital sense of music playing. There are limited studies showing the effect of hypermobility on proprioception which both can effect musical performance.
Aim: This study aimed to understand the effect of hypermobility on proprioception, reaction time and pain in musicians.
Material & Methods: Twenty musicians (mean age of 20.42±4.3 years) were included in the study, with 11 playing the piano, 4 playing the cello, and 5 playing the violin. Musicians with any disease affecting the upper extremity use were excluded from the study. Demographics of the participants were recorded. Joint hypermobility was assessed with the Beighton hypermobility test. Upper extremity pain was evaluated by using the Visual Analog Scale (VAS). Proprioception assessment was conducted with the manuel aiming test at three different shoulder angles, with eyes open and closed. Reaction time of the musicians was assessed by using the serial reaction task test. The effect of hypermobility on reaction time, proprioception, and pain in musicians was analyzed using the SPSS v.23 program. The results were compared between musician with hypermobility and without hyperobility by Mann Whitney U test.
Results: Nine of the participants had hypermobility. Reaction speed ($p=0.208$) and pain ($p=0.135$) was not significantly differed according to hypermobility. Proprioception was significantly differed according to hypermobility ($p<0.05$).
Conclusions: The most remarkable result of our study is hypermobility has an effect on proprioception which means it effects sensorymotor control. Pain was present regardless of hypermobility. It was surprising that raction time was similar between groups, it may be because musical training increases reaction speed in every musician. Clinicans must be aware of proprioceptive loss working with hypermobile musicians.

A-0722 MACRODACTYLY, IS THERE ANYTHING NEW?

Roberta Sartore, Federica Ceretta, Fabio Zoccatelli, Massimo Corain
Hand Surgery and Microsurgery Unit, University Hosptial, Verona, Italy

Introduction: Macrodactyly is an overgrowth condition that results from a somatic mutation along the PIK3CA pathway and belongs in the PROS (PIK3CA related overgrowth syndrome). Its clnical manifestations can vary widely among patients from minimal involvement of one or two fingers to the so-called macrodystrophic lipomatosis.
Aim: The purpose of this review is to propose guidelines in the pharmacological and surgical treatment of patients with macrodactyly based on the latest scientific evidence.
Material & Methods: In the present study, we evaluated the current treatment for patients with macrodactyly by performing a systematic review of the last 10 years of literature . We included randomized controlled trials, cohort studies, cross-sectional studies, case control studies, and case series with more than 10 patients.
Results: We included 12 studies analyzing the surgical treatment of macrodactyly, only 2 were a prospective cohort studies. 9 reported on surgical treatment and 3 reported pharmacologic treatment using PI3K/mammalian target of rapamycin (mTOR) pathway. Side effects were reported for both surgical and pharmacological treatment.
Conclusions: Close cooperation between several clinicians is mandatory to achieve the best possibile result in these difficult-to-manage cases. Correlation of gentic, clinical and histopathological findings is indispensable for correct disease classification and thus a more accurate combining treatment.

A-0723 EFFECT OF LATERAL CONDYLE SWELLING ON ELBOW VARUS/VALGUS DEFORMITY AFTER PEDIATRIC HUMERAL LATERAL CONDYLE FRACTURE SURGERY

Keika Nishi[1], Michio Sano[1], Takao Omura[2], Hiroaki Ogihara[3], Tomokazu Sawada[1], Takato Oishi[4], Kaori Sugiura[2], Yukihiro Matsuyama[2]

[1]Shizuoka City Shizuoka Hospital; [2]Hamamatsu University School of Medicine; [3]Japanese Red Cross Hamamatsu Hospital; [4]Iwata City Hospital

Introduction: Overgrowth of the lateral condyle has been reported to occur after surgery for pediatric lateral humeral condyle fractures. Overgrowth of the lateral condyle may cause varus deformity, but there are no reports focusing on lateral condyle overgrowth and varus deformity.

Aim: We investigated the relationship between lateral condyle protrusion and elbow varus deformity in cases of pediatric humeral lateral condyle fracture receiving surgical treatment.

Material & Methods: Twenty seven patients who were diagnosed with lateral humeral condyle fractures and underwent surgical treatment at Hamamatsu University School and affiliated hospitals from 2011 to 2023 were studied. The patients consisted of 21 boys and 6 girls, with an average age of 4.5 (2-11) years. We examined the fracture type based on the Wadsworth classification, the presence or absence of lateral condyle overgrowth, and the presence or absence of elbow varus/valgus deformity. The morphology of the condyle was determined according to the report by Inoue et al. Specifically, the lateral condyle width and length were measured, and the ratio of lateral condyle width/length was calculated as an index of lateral condyle protrusion. We also measured Baumann angle as an index of varus/valgus.

Results: According to Wadsworth classification, 4 cases were classified as type I, 15 cases of type II, and 8 cases were type III. Bone union was achieved in all 27 cases. In terms of lateral condyle protrusion, the ratio of lateral condyle width/length was 1.20 on the unaffected side and 1.27 on the affected side, suggesting a tendency for protrusion on the affected side; however, no significant difference was observed. Also, there was no significant difference in the lateral condyle width/length based on Wadsworth classification. Out of 27 cases, 11 cases presented protrusion of the lateral condyle with the lateral condyle width/length ration between the unaffected and the affected side exceeded 1.1. In these cases, the Baumann angle average was 14.1°, which showed no significant difference in comparison with cases without protrusion.

Conclusions: Previous reports have shown that lateral condyle overgrowth occurs in 13 to 77% of cases of lateral condyle fracture surgery. In our cases, protrusion of the lateral condyle was observed in approximately 40%. However, no varus deformity occurred due to protrusion of the lateral condyle requiring no additional surgical treatment, and elbow joint function was unaffected.

A-0724 PERI-ARTERIAL PERIPHERAL SYMPATHECTOMY FOR CHRONIC DIGITAL ISCHEMIA LESIONS

Martin Caloia[1,2], Hugo Caloia[1,2], Sergio E. Ronconi[1,2], Diego Gonzalez Scotti[1], Maria Emilia Serur[1], Geronimo Chamorro[1], Alejandro Meritano[1], Julian Mojica[1], Agustina Laboranti[1], Juan Tanus[1]

[1]Hospital Universitario Austral, Buenos Aires, Argentina; [2]Sanatorio Mater Dei, Ciudad Autonoma de Buenos Aires, Argentina

Introduction: Chronic digital ischemic pathology currently lacks solid evidence in the literature to support a specific treatment modality. Depending on the degree of ischemia, patient presentations range from numbness and pain to ulceration and gangrene, typically with secondary Raynaud's syndrome. Surgical options for those unresponsive to medical treatment are limited due to their complexity. Endoscopic cervical sympathectomy has a place but may be associated with postoperative compensatory hyperhidrosis. Peripheral or digital sympathectomy, introduced by Flatt in 1980, is

technically less demanding with fewer complications than central or cervical sympathectomy.
Aim: To evaluate the effects of peri-arterial peripheral sympathectomy in patients with refractory chronic distal ischemia compared to cervical sympathectomy outcomes. A secondary objective is to demonstrate that this procedure yields equivalent or better clinical and functional results than cervical sympathectomy while being technically simpler.
Material & Methods: Retrospective, descriptive, and analytical study of 14 patients treated between 2005 and 2021 with peri-arterial peripheral sympathectomy. Inclusion criteria: Patients with cold intolerance, pain, and ulcerations who do not respond adequately to medical treatment. Exclusion criteria: Patients lacking a minimum one-year postoperative follow-up. The procedure involves plexual echo-assisted anesthesia and the use of a hemostatic cuff at 50 mmHg above the patient's systolic blood pressure. An anterior, longitudinal approach is made over the radial and ulnar arteries at the distal forearm, with 1 to 2 cm of circumferential adventitia resected. The procedure is then repeated on the intermetacarpal arteries of the affected fingers before bifurcation, requiring microsurgical magnification of 3.0x or higher.
Results: Eleven females and three males, average age 48 (28-63), were treated, with the index, middle, and ring fingers most affected. Sympathectomy was performed on 2 or more fingers in 70% of cases. Improvement and/or reduction in the number of ulcerated lesions were observed in 11 out of 14 cases, with a noticeable decrease in pain in all cases from the first postoperative day.
Conclusions: Peri-arterial peripheral sympathectomy improves or halts chronic digital ischemia lesions when combined with appropriate medical treatment. In comparison to cervical or central sympathectomy, it reports fewer adverse effects and is technically simpler. Despite the limited sample and lack of a control group, it is considered a preferable choice for treating these conditions.

A-0725 UNDERSTANDING THE MECHANISMS OF DISTAL RADIAL FRACTURES FROM ASSESSMENT OF FRACTURE DIRECTION AND DISPLACEMENT AND THE RELATIONSHIP TO THE DISTAL RADIO-ULNAR JOINT

Grey Giddins, Sassi Sassi
Royal United Hospital, Bath, UK

Introduction: There are many classifications of distal radial fractures. These consider the fracture relative to the anatomy of the distal radius. The fracture directions have not been reported.
Aim: To assess fracture direction in extra-articular distal radius fractures and relationship to the DRUJ/ulnar styloid
Methods: Reviewed 160 consecutive wrist fracture radiographs of extra-articular fractures. including post-injury, post-reduction and other radiographs. Measured the fracture lines using PACS system. Because of "measurement error" so we chose a cut-off ≥100 on the PA radiographs and ≥ 50 on the laterals.; within those boundaries the fracture lines were considered "transverse". Otherwise they were distal radial to proximal ulnar or distal ulnar to proximal radial on the PA and volar distal to dorsal proximal or dorsal distal to volar proximal on laterals
We assessed radial shift of the distal fracture fragment; no appreciable ulnar shift was noted.
We recorded patient demographics, any ulnar styloid fracture and the level of the ulnar side of the fracture in relationship to the DRUJ
Results: PA radiographs - the fracture line was ulnar to radial in 17 (11 %), transverse in 118 (74%) and radial to ulnar in 25 (16%).
Lateral: the fracture line was distal volar to proximal dorsal in 141 (88%), transverse in 2 and distal dorsal to proximal volar in 17 (11%).
Radial shift was seen in 12 (7.5%) following an ulnar to radial fractures in 6, and transverse fracture lines in 6 but none with a radial to ulnar fracture

Ulnar styloid fracture fragment in 93 (58%), an ulnar head/neck fracture in 7, no fracture in 59 (37%). Ulnar styloid fractures were not associated with the fracture alignment on lateral or PA radiographs
For ulnar to radial fractures the fracture line started at the proximal end of the DRUJ in 15 of 17 cases (88%). For radial to ulnar fractures the fracture line started (ended) a mean of 2.5, (range 0-12) mm proximal to the DRUJ ($p < 0.01$). In transverse fractures the fracture line started at the base of the DRUJ in 63 (53%) and proximally in 55 (47%).
In ulnar to radial fractures 2 (12%) ran dorsal to volar and in radial to ulnar 5 (20%) and transverse fractures 14 (12%) (NS). There was no obvious association with age and fracture direction.
Discussion: There are distinct patterns of force transmission in distal radial fractures. For ulnar sided the fracture forces run through the DRUJ then radially and proximally across the distal radius. This can be associated with radial shift. In radial falls the forces run radial distal to ulnar proximally ending a little proximal (c. 2mm) to the DRUJ.
Most fracture lines were transverse. Acknowledging measurement error we anticipated that in around half of the fractures would be at the level of the proximal end of the DRUJ and about half more proximal, as occurred (53:47%).
This study further confirms the insignificance of ulnar styloid fractures.
Understanding the biomechanics of these fractures may help predict collapse of distal radius fractures.

A-0726 ARTHROSCOPIC FINDINGS IN DISTAL RADIUS FRACTURES WITH VOLAR RIM COMMITMENT

Martín Caloia[1,2], Hugo Caloia[1,2], Sergio E Ronconi[1,2], Diego Gonzalez Scotti[1], María Emilia Serur[1], Gerónimo Chamorro[1], Alejandro Meritano[1], Agustina Laboranti[1], Julián Mojica[1], Juan Tanus[1]
[1]Hospital Universitario Austral, Buenos Aires, Argentina; [2]Sanatorio Mater Dei, Ciudad Autónoma de Buenos Aires, Argentina

SUMMARY
Objective/Hypothesis: Distal radius fractures with volar rim involvement are relatively uncommon, but they present a large number of associated injuries and greater postoperative failures. The objective of this work is to present the arthroscopic findings and functional results of a series of patients with this type of fracture who were treated with osteosynthesis and arthroscopic assistance.
Materials and methods: Retrospective evaluation of 55 patients who presented a distal radius fracture with involvement of the volar margin and arthroscopic evaluation. Inclusion criteria: patients with partial or complete articular fracture (types B3 – C of the AO classification), evaluated with tomography (Hintrintger classification), who presented involvement of the volar margin of the radius with a tendency to volarulnar translation of the carpus, treated by osteosynthesis with arthroscopic assistance.Exclusion criteria: patients under 18 years of age, rheumatic pathology or previous wrist surgery, patients without arthroscopic assistance. An arthroscopic evaluation of the associated and clinical injuries was performed using the VAS scale, Quick DASH and range of motion at one year of follow-up.
Results: In the period from January 2018 to May 2022, 547 cases of distal radius fractures were surgically treated, of which 70 presented involvement of the volar margin of the radius. 55 patients met the inclusion criteria (30 women/25 men) with a mean age of 53 years. The mechanism of action was a fall from height in 23 patients, a road accident in 15, a sports accident in 12, and a fall from a height in 5 patients. Osteosynthesis was performed with a traditional volar radius plate in 32 cases. 23 patients required additional fixation (spring wire technique, additional screws, microfragment plates, specific fragment plates, scapholunate joint detensors). According to the arthroscopic findings, 26 patients had isolated lesions of the triangular fibrocartilage complex (1B stable: 24, 1B unstable: 1, 1D: 1), 9 patients had isolated lesions of the scapholunate ligament (grade I – II: 6, grade III: 1, Grade IV: 2), 5 patients isolated radiocarpal ligament injuries (3 short radiolunate, 2 long radiolunate) and 15 patients combined injuries. At one year of follow-up, the EVA scale presented an

average of 1.1/10 and the DASH scale 6.5%. The average range of motion was 81° for extension, 80° for flexion, 85° for pronation, 85° for supination, 12° for radial inclination, and 37° for ulnar inclination. The fist strength compared to the contralateral was 89%. In five patients, the osteosynthesis material was removed due to pain or tendon friction; one patient had a rupture of the extensor pollicis longus and was treated by removing the osteosynthesis and tendon transfer. Two patients complicated with complex regional pain syndrome.
Final considerations: In the series of patients evaluated, a large number of associated injuries were found. Arthroscopic assistance allows a more precise reduction of the fracture, the evaluation of post-fixation stability and the diagnosis and direct treatment of these injuries, adapting the correct immobilization time and obtaining highly satisfactory clinical radiological results.

A-0727 THE QUALITY OF EXTENSOR OF THE RECIPIENT FINGER DOES AFFECT THE OUTCOMES OF THE VASCULARIZED PIP JOINT TRANSFERS

Yu-Te Lin, Che-Hsiung Lee, Shwu-Huei Lien, Shih-Heng Chen, Cheng-Hung Lin, Chung-chen Hsu
Chang Gung Memorial Hospital, Linkou, Taiwan

Introduction: In the past decade, we have proposed a customized technique for the vascularized PIP joint transfers (VJT). In order to predict the results before the surgery, our latest study analyzed the prognostic factor for the VJT. We did not find the extensor tendon injury but the preceding revascularization in the trauma as a poor prognostic factor. Nonetheless, extensor lag was considered the main deficit of the VJT. In our series, we used to customize our extensor reconstruction according to finding at the exploration of the recipient extensor during the VJT, in which the recipient extensor was classified into 4 conditions. In this study, we aimed at comparing the results between the 4 conditions.
Materials and Methods: We classified the recipient extensor as followings,
Condition 1: Central slip and one lateral band were destructed, and no intrinsic function could be regained;
Condition 2: Central slip was the only structure destroyed;
Condition 3: Extensor distal to zone 3 was destructed;
Condition 4: The central slip and the lateral band(s) were in-continuity, but the tendons lost their elasticity and fused together.
For the condition 1, centralization of the remaining lateral band was performed. For the condition 2 to 4, the necessity of central slip reconstruction depended on the types of toe extensors.
From 2009 to 2023, 68 cases with good compliance to the postoperative rehabilitation for at least 6 months were included.
Results: The average outcomes of these 4 conditions were between 17 to 20 degrees for the extensor lag and between 73 to 82 degrees for the flexion of PIP joints. The average arc of motion was between 53 to 64 degrees. Comparing to native range of motion of the donor toes, the percentage of use from condition 1 to 4 was 73%, 88%, 81%, and 73%. The condition 1 and 4 were obviously worse than the condition 2 and 3.
Conclusions: To improve the results of the VJT, we should consider to convert the extensor tendon of condition 1 and 4 to condition 3. Further study is required.

A-0728 TEN-YEAR RESULTS OF A RANDOMIZED, CONTROLLED TRIAL OF COLLAGENASE TREATMENT COMPARED WITH NEEDLE FASCIOTOMY FOR DUPUYTREN'S CONTRACTURE

Martin Byström[1], Allan Ibsen-Sörensen[2], Joakim Strömberg[3]
[1]Department of Hand Surgery, Sahlgrenska University Hospital, Gothenburg, Sweden; [2]Department of Orthopaedics, Sahlgrenska University Hospital, Göteborg, Sweden; [3]Department of Orthopedics and General Surgery, Alingsås lasarett, Sweden

Introduction: Percutaneous needle fasciotomy (PNF) and injection with Collagenase clostridium histolyticum (CCH) are two minimally invasive treatments for Dupuytren's contracture. This study reports the 10-year results of a randomized controlled trial (RCT) comparing PNF with CCH.
Aim: To compare the remaining treatment effect and recurrence rate between patients treated with either PNF or CCH.
Material & Methods: A randomized controlled trial included patients with a contracture of the metacarpophalangeal (MCP) joint of ≥ 20 ° to be treated with either PNF or CCH. The primary outcome was a contracture of 5° or less. The secondary outcome was recurrence, defined as a loss of extension of ≥ 20 compared with the postoperative results at 1 week or the need for a second operation.
Results: 71 patients in the PNF group and 701 in the NF group were treated successfully at the start of the trial. At the 10-year follow-up, 51 patients were available for clinical examination. The medical records of 45 patients with repeated surgery because of recurrence were reviewed. There was a loss to follow-up of 60 patients, 21 were dead and the remaining were not available because of other medical conditions, a long way to travel to the clinic, or declined further follow-up. 5 (10 %) patients in the PNF group and 10 (20%) in the CCH group had an extension deficit of 5° or less (primary outcome). 17 (20 %) patients in the PNF group and 35 (42%) in the CCH group had a recurrence of the contracture
Conclusions: Both PNF and CCh seem to have acceptable recurrence rates in long-term follow-up.

A-0729 PERIPHERAL NERVE GUNSHOT INJURY. AN UPDATE

Andrii Lysak, Serhii Strafun, Sergii Tymoshenko, Vasyl Gaiovych, Anna Kyrpychova
SI "Institute of Traumatology and Orthopedics of the NAMS of Ukraine," Kyiv, Ukraine

Aim: To determine the features of peripheral nerve gunshot injuries, evaluate treatment results, and modify the treatment algorithm.
Methods: We performed a retrospective analysis of peripheral nerve gunshot lesions in 324 patients treated in our department. All patients were treated by our treatment algorithm. We evaluated the treatment results in 3, 6, 9, and 12 months after neurolysis and 6, 9, 12 and more - after peripheral nerve suture or grafting.
Results: Shrapnel causes significantly more injury to surrounding tissues. About 44,75% of gunshot nerve injuries were without an anatomical defect. At the time of reconstruction, the average size of the primary nerve defect was 5,28 ± 2,55 cm (5,03 ± 2,56 cm for upper limb, and 6,09 ± 2,38 cm for lower), and depended on the energy of projectile. Nerve sutures did not provide any effective recovery. The nerves of the lower limb recovered worse than the nerves of the upper.
Discussion: The optimal period for peripheral nerve reconstruction after a gunshot injury is determined to be from 3 weeks to 3 months from the moment of injury. Before starting the reconstruction of peripheral nerves, the following conditions must be fulfilled: 1) Eradication of infection; 2) Closure of the tissue defect with full-layer flaps (abdominal or groin flap, perforator or island flaps); 3) Achievement of final bone stability. The greatest number of complications from the nerve side was observed when tissue defects were closed with split-thickness skin grafts.
Conclusion: Optimum time for the recovery of peripheral nerves is a relatively small window, and the conditions are assumed

for the closure of tissue defects and osteosynthesis - early, active surgical management of such patients is recommended, with minimizing the time between reconstructions. In the presence of proximal lesions, distal neurotization significantly improved treatment results. In case of damage to the peroneal and radial nerves, tendon transpositions gave a better and faster functional result.

A-0732 ASSOCIATING CARPAL TUNNEL SYNDROME, DE QUERVAIN TENOSYNOVITIS OR TRIGGER FINGER – A COINCIDENCE?

Anca Bordianu[1,2], Irina Zaharia[1]
[1]"Bagdasar-Arseni" Clinical Emergency Hospital, Bucharest, Romania; [2]"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

Introduction: Carpal tunnel syndrome (CTS) of an idiopathic etiology is mentioned in literature as the most common nerve entrapment in the upper limbs. It is most frequently encountered in women. Furthermore, the electromyography (EMG) often discovers a bilateral disease. It is not uncommon that affected patients associate other conditions such as de Quervain tenosynovitis (DQT) or trigger finger (TF).
Aim: In this study, the authors intended to raise awareness of the frequency of de Quervain's tenosynovitis or trigger finger in patients with idiopathic carpal tunnel syndrome (ICTS).
Material & Methods: We evaluated 60 patients, confirmed preoperatively, through EMG, with median nerve compression at the carpal tunnel. All subjects are females, aged 40-80 (mean age of 62), performing manual labour for more than 15 years. 55 patients had bilateral disease and ten associated either DQT or FT, diagnosed clinically.
Results: Firstly, all patients complained of fingers numbness and pain in the median nerve territory. Two weeks after the carpal tunnel decompression, three subjects described pain over the radial styloid, on movement, as well as tenderness over the first dorsal extensor compartment. In addition to a positive Finkelstein's test exemplified in four patients, one case had a positive test bilaterally. On the other hand, seven subjects were concerned about the morning finger stiffness and locking in a bent position, while straightening it suddenly with a clicking sensation. Symptoms occurred 18-30 days postoperatively (mean of 22 days). The most affected finger was the thumb (4 cases), followed by two cases of ring finger and one middle finger, respectively. Nevertheless, all subjects had good functional and aesthetic outcomes.
Conclusions: The EMG evaluation preoperatory is important for identifying an occult median nerve entrapment at the contralateral hand. Moreover, surgeons might be aware of the two other less frequent conditions which can be expressed clinically after the surgery. Early diagnosis leads to a reduction in the severity of symptoms, accompanied by an improvement in patients quality of life.

A-0733 PREDICTION OF FOREARM ROTATION IN SYMPTOMATIC MALUNIONS USING A 3D KINEMATIC MODEL

Derek F.R. van Loon[1], Eline van Es[1], Joost Colaris[1], DirkJan H.E.J. Veeger[2], Denise Eygendaal[1]
[1]Erasmus MC, University Medical Center Rotterdam, Department of Orthopaedics and Sports Medicine; [2]Delft University of Technology, Delft, Netherlands, Department of Biomechanical Engineering

Introduction: Fractures of the forearm are the most common among children, making up 40% of all fractures. Many of these fractures will correct by growth, even in the case of large angulations. However, the cases which do not show enough remodeling might end up as a malunion. These malunions can, besides pain and esthetical loss, result in a

limitation of rotational function. Standard care in these cases is a corrective osteotomy to restore the shape and function of the forearm. However, an osteotomy is a complex intervention requiring much pre-operative planning for optimal results and a long rehabilitation period for the patient. Recent research has suggested that not only bone impingement, but also central band tightness could be the underlying reason of impaired rotational function. This finding suggests a less invasive release of the central band of the interosseous membrane could restore function in some cases. A way to identify the patient-specific reason for the limitation is by simulating rotation of the forearm. This simulation could predict whether a release of the central band is sufficient, or a corrective osteotomy is necessary to restore rotation of the forearm in malunited paediatric forearm fractures.

Aim: Primary aim is to create a three-dimensional patient-specific kinematic model that can predict if a patient has a limitation (<50°) in pronation, supination, or both. Secondary aim is to predict the range of pronation, supination, and total range of motion.

Material & Methods: From CT scans of 15 patients with a rotational limitation due to a diaphyseal malunion, 3D models were retrieved. Landmark detection, kinematic modelling, position calculation, bone impingement recognition, and central band length were all done automatically using Python code. Central band origin and insertion were based on previous anatomical studies. Rotation could be blocked due to overlapping 3D models, indicating bone impingement, or an increase of central band length by more than 3.5% of its length in the neutral position. Active pronation and supination were measured with a goniometer. The mean difference between model prediction and range of motion in patients is calculated.

Results: Of 15 patients, correct predictions versus total number of patients with an isolated loss of pronation, supination, or both respectively are 2/3, 4/6 and 3/6, with two errors in prediction of pronation and one in supination for the last group. Sensitivity for loss in pronation is 78%, and for supination 92%. Of the four predictions in pronation, two had a prediction of 5° above or below 50°. All pronation loss was due to bone impingement, while all supination loss was due to tightness of the central band. The mean error in the prediction of pronation, supination, and full range of motion is 2° (SD: 22°), 4° (SD: 16°), and 2° (SD: 26°), respectively.

Conclusions: Individualized modelling of the forearm can help in recognizing the underlying reason for an impaired rotational function. This could form the foundation for patient-specific treatment that is as less invasive as possible.

A-0734 REPLICATION OF COMPLEX MOVEMENT PATTERNS OF THE WRIST: A CADAVERIC STUDY OF THE MOTEC TOTAL WRIST ARTHROPLASTY

Joanna Glanville[1], James Kennedy[2], Karl Bates[1], Sebastian Fichera[1], Daniel Brown[1,2]
[1]University of Liverpool, UK; [2]Liverpool University Hospitals NHS Foundation Trust, UK

Introduction: Although flexion/extension and radioulnar deviation are the most quoted ranges of movement in the wrist it is the composite (out-of-plane) movements of dart-thrower's motion and circumduction that are most useful for normal function. Total wrist arthroplasty (TWA) is a motion preserving option for the treatment of end-stage arthritis of the wrist. As well as relieving pain it aims to maintain a functional range of movement (ROM). Condyloid articulations are most common in the design of prostheses for total wrist replacement operations. In contrast, the Motec wrist prosthesis replaces the joint with a ball and socket articulation. It does not attempt to recreate the anatomical structure of the wrist, but instead seeks to mimic its gross motion.

Aim: Primary: To analyse the active range of in-plane and out-of-plane movements of the normal wrist and to assess how well these are replicated following implantation of a Motec TWA utilising an active wrist motion simulator with biplanar videofluroscopy.

Secondary: To analyse how efficiently the MOTEC TWA replicates this movement by analysing the tendon forces that are required to generate this ROM.
Methods: Fourteen cadaveric wrists were studied pre- and post-implantation of a Motec TWA, using the standard manufacturer's technique by the senior surgeon (Tang 5).
A programmable computer controlled active wrist motion simulator was used to reproduce wrist movement through flexor carpi ulnaris (FCU), flexor carpi radialis (FCR), extensor carpi ulnaris (ECU) and extensor carpi radialis brevis and longus (ECRB & ECRL). Biplanar x-ray videoradiography and x-ray reconstruction of roving morphology (XROMM) tracked movement through implanted tantalum beads. Controlled displacement patterns were performed pre- and post-implantation simulating flexion, extension, radio-ulnar deviation, dart thrower's motion and circumduction. Tendon forces were recorded with transducers. Maximum tendon forces and wrist angles were compared pre-and post-implantation using paired-samples T-tests. Ethical approval for the study was granted by our University Research Ethics Committee.
Results: The MOTEC wrist replacement accurately follows the motion profile of the anatomic wrist in the 4 motion paths studied. It also can replicate the range of movement for the majority of movements. Tendon forces to generate these movements are the same or lower than the anatomic wrist.
Conclusion: These results support the clinical literature that the MOTEC wrist replacement preserves functional range of in-plane and out-of-plane motions, and also demonstrates that the wrist replacement does not increase effort required through the arc or in individual planes of movement. Overall our results suggest that a ball and socket style articulation can be an appropriate replacement for the wrist joint.

A-0736 THUMB CARPOMETACARPAL JOINT OSTEOARTHRITIS: ARTHROSCOPIC HEMITRAPEZIECTOMY AND SUTURE BUTTON SUSPENSIONPLASTY USING A PLACEMENT GUIDE

Martín Caloia[1,2], Hugo Caloia[1,2], Sergio E Ronconi[1,2], Alejandro Meritano[1], Gerónimo Chamorro[1], Agustina Laboranti[1]
[1]Hospital Universitario Austral, Buenos Aires, Argentina; [2]Sanatorio Mater Dei, Ciudad Autónoma de Buenos Aires, Argentina

Introduction: Thumb carpometacarpal joint osteoarthritis (CMC-I) is a common degenerative condition in the hand. Over the years, have been published a vast array of options of surgical procedures. However, there is no current consensus on which is the best technique.
Aim: The aim of this article is to report the clinical-radiological outcomes of group of
patients with painful carpometacarpal joint osteoarthritis, preoperative Eaton- Littler stages II-III, treated by arthroscopic hemitrapeziectomy and suture button suspensionplasty to prevent first metacarpal joint migration and lateral subluxation due to instability, using a guide placement.
Materials and Methods: There were 43 thumbs that were evaluated in this retrospective study of arthroscopic hemitrapeziectomy and suture button suspensionplasty at an average of 27,3 month follow-up. Average age was 52,3 years. There were 20 women and 22 men. Conservative treatment has previously failed,
We recorded demographic data, pre- post operative visual analog scale (VAS), Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH) questionnaire scores, as well as pinch strength. Badias's arthroscopic classification was used to collect arthroscopic findings
Thumb range of motion was evaluated by Kapandji score, and instability through the shake hands test.
Operative time and postoperative complications were documented. Immobilization protocol: two weeks of immobilization by using a removable splint and three months of rehabilitation therapy.
Results: According to the arthroscopic classification 83 percent of the cases were graded as Badia stage III and 17% stage II.

The suture button used was: in 23 cases 1.1 m mini TightRope (Arthrex, Naples, FL, USA), and Microlink (Conmed, NY, USA) in 19 cases. The Kapandji score was 7.6 preoperative versus 9.2 postoperative. The mean preoperative VAS values was 8.2 compared with 1.9 postoperatively. The mean preoperative QuickDASH value was 23.4 and postoperative 5.5. The average pre-postoperative grip strength was 66.2 vs 75.1. The average pre-postoperative lateral grip strength was 11.2 - 20.2.
Fifteen complications were noted: two cases of dorsal radial nerve neuritis, eight radial sensory branch neuroma, one case of complex regional pain syndrome, two medial impingement and two revision surgery to remove the suture button (Microlink, Conmed, NY, USA).
Conclusions: Arthroscopic hemitrapeziectomy and suture button suspensionplasty is an effective, minimally invasive procedure for treatment of symptomatic stages II- III through IV thumb CMC arthritis, demonstrating pain relief and a reliable rate of return to activity. Our results show that the use of placement guide before hemitrapezectomy avoids over-tightening the suture button and it provides greater stability by achieving a transverse trajectory, parallel to the intermetacarpal ligament.

A-0737 WRIST ARTHROSCOPY IN CHILDREN AND ADOLESCENTS. WHY AND HOW FAR?

Laura M. Pérez-López[1,2,3], Aritz Ortega-Centol[1,2], David Moreno-Romo[2,4]
[1]Paediatric Upper Limb Surgery Unit, Hospital Sant Joan de Déu Barcelona, Spain; (2) Research Institute Sant Joan de Déu, Barcelona, Spain; [3]Paediatric Orthopaedic Surgery and Traumatology, Clinica Diagonal, Fiatc, Barcelona, Spain; [4]Lower Limb Arthroscopy Unit, Hospital Sant Joan de Déu Barcelona, Spain

Introduction: Wrist arthroscopy (WA) offers significant advantages compared to classic open surgical techniques:
1. less invasive technique
2. technologically advanced, what optimizes results 3. minor surgical wounds
Implementation of WA is a challenging but also relevant aim as new surgical techniques may improve precision at diagnosis, more precise surgeries and lower invasive surgeries.
Aim: Authors want to elucidate the usability of WA at children and adolescents as a secure and non-aggressive technique.
Material & Methods: Patients were operated from 2011 to 2023.
Present and future applications for WA in children and adolescents include:
1. radioulnar instabilities, also associated to Galeazzi fracture dislocations
2. Madelung disease
3. Synovial cysts
4. Synovectomy at rheumatoid diseases
5. Acute and chronic Scaphoid fractures
6. Kienböck disease
7. Exploratory and diagnostic wrist pain including radioulnar alterations, ligament lesions, ulnar impaction syndromes, carpal instabilities
8. Other such as tumors
Results: The first WA at our children's hospital was done at 2011.
Present paediatric upper limb surgery unit has operated 18 patients.
Scaphoid fractures, diagnostic procedures, ligament lesions and synovial cysts are the most common operated pathologies.
Conclusions: WA is an alternative and useful surgical technique at children and adolescents.
Its implementation might be progressive and developed with the help of a surgeon who has already achieved fluent

skills at arthroscopy, mostly surgeons focused on adult hand pathology as they use this technique much more commonly than younger patients's surgeons do.
New indications will appear as WA is more and more developed.
WA may provide new future knowledge about some wrist conditions.

A-0738 TRAPEZIOMETACARPAL DISLOCATIONS IN THE PAEDIATRIC AGE GROUP: IS THERE A BETTER TREATMENT?. CASE SERIES AND SYSTEMATIC REVIEW OF THE LITERATURE

Laura M. Pérez-López[1,2,3], Pablo Diaz[1], Diego Gutiérrez-de la Iglesia[4]
[1]Paediatric Upper Limb Surgery Unit Hospital Sant Joan de Déu Barcelona Spain; [2]Research Institute Sant Joan de Déu Barcelona Spain; [3]Paediatric Orthopaedic Surgery and Traumatology Clinica Diagonal Fiatc Barcelona Spain; [4]Trueta University Hospital Girona Spain

Introduction: Dislocations of the trapeziometacarpal joint (TMC) are rare in the paediatric and adolescent age group. Only a few isolated cases are reported in the literature, and the therapeutic guidance that can be found in books is minimal and without firm conclusions. In our centre, we have experience of four patients treated with this unusual lesion.
Aim: The collection of these patients allows us to assess the evolution according to variables such as treatment, age and patient activity. Likewise, the use of a validated functional scale for the upper extremity such as the DASH rapid scale can provide more information on the response according to these variables. Thus, despite the clear limitation of the small number of patients, we believe it is appropriate and necessary to study these patients to try to better understand this injury and its evolution according to treatment, a subject that still lacks solid certainty.
Material & Methods: This study is a case report of four patients with traumatic closed dislocation of the trapeziometacarpal joint (TMC), treated in our centre between January 2016 and May 2023.
The evolution was assessed by thumb mobility, strength, possible discomfort and functionality using the quickDASH scale.
Results: Three patients were primarily reduced with local anaesthesia and Kalinox™ (nitrous oxide + oxygen) support in the same emergency unit.
- the first patient, a 13 year old adolescent girl, was treated with acute closed reduction and plaster cast. The clinical, radiological and functional evolution by quickDASH scale was very favourable.
- the second patient is a 14-year-old adolescent who required a new reduction manoeuvre three days after the injury due to insufficient reduction. Subsequent evolution was optimal.
- the third patient is a 9 year old hyperlax girl with three episodes of TMC redislocation, and bilateral deferred ligamentoplasty was indicated. The clinical and radiological evolution has been correct, but not the functional evolution, presenting current discomfort.
The fourth patient, a 12-year-old boy, was referred from another centre in a subacute phase, and underwent closed reduction and containment with percutaneous needles. The clinical, radiological and functional evolution has been favourable with no current symptoms.
The total follow-up was 6 years after the injury for the three initial patients, and one year for the fourth.
Conclusions: Closed reduction can lead to reluxation at immediate follow-up, although there are also good results in our series and reported in the literature.
Closed reduction and fixation with pins produced very favourable clinical, radiological and functional results.
Open reduction and ligamentous reconstruction provides favourable results, but with significantly inferior functional results. Thus, it would seem unnecessary in light of the good results of closed techniques.

A-0740 DESTRUCTIVE MOLD OSTEOMYELITIS OF THE WRIST DUE TO SCEDOSPORIUM APIOSPERMUM IN AN IMMUNOCOMPROMISED PATIENT - A CHALLENGING BALANCE BETWEEN RECONSTRUCTION AND AMPUTATION

Camilla Bo[1], Anna Conen[2], Regula Marti[3], Harald Seeger[4], Jan Plock[1], Holger Klein[1], Florian Früh[1]
[1]Department of Plastic Surgery and Hand Surgery, Cantonal Hospital Aarau, Switzerland; [2]Department of Infectious Diseases and Hospital Hygiene, Cantonal Hospital Aarau, Switzerland; [3]Department of Vascular Surgery, Cantonal Hospital Aarau, Switzerland; [4]Department of Nephrology, Cantonal Hospital Baden, Switzerland

Fungal infections are a rare but important cause of osteomyelitis associated with high morbidity. The most common etiological agent is Candida spp., followed by Aspergillus spp., with the spine being most frequently involved. The mold Scedosporium apiospermum is found worldwide and in soil, sewage, and polluted waters. Previously considered exceedingly rare in human infections, S. apiospermum is increasingly reported, especially in immunocompromised hosts. We herein report a S. apiospermum wrist osteomyelitis in a 68-year-old immunocompromised male patient.

The aim of this case report is to highlight a devastating course of a rare mold osteomyelitis of the wrist and to share challenges in the diagnostic and therapeutic approach.

The patient presented in early 2023 in a regional hospital with a painful redness and swelling of the left wrist. His past medical history included a combined kidney-pancreas transplant, and he was under immunosuppressive medication. Magnetic resonance imaging showed a severe wrist arthritis and suspected carpal bone osteomyelitis. Repetitive joint aspirations could not detect any microorganisms but no further diagnostic with surgical biopsies was performed during the first six months after onset of symptoms. After referral to our hand surgery center, a proximal row carpectomy with histological and microbiological work-up was performed and a cement spacer loaded with vancomycin and gentamicin was implanted. Histology confirmed a chronic destructive osteomyelitis, and microbiology detected S. apiospermum. Antifungal treatment with oral voriconazole was started. Subsequently, six debridements were necessary to obtain a histological and microbiological in sano resection with loss of the carpus, the bases of the metacarpal bones as well as the distal radius and ulnar head, leaving the patient with an extensive 11 cm defect and external fixation.

Possible treatment options were discussed with the recommendation of a transradial forearm amputation, but the patient insisted on preservation of the upper extremity. Of note, the patient's situation was complicated by severe upper extremity arteriosclerosis as well as an anatomical variant on the right lower leg with a peronea magna artery supplying the foot. Despite these risk factors, the patient still opted for bone reconstruction. We then performed a radio-metacarpal reconstruction using a free osteocutaneous triangular fibula flap and the vascular surgeons revascularized the foot with a basilica graft.

The postoperative course was complicated by a congested skin island, which was addressed using leach therapy. Unfortunately, and despite routine antibiotic prophylaxis with ciprofloxacin, leaching caused a devastating soft tissue infection with subsequent necrosis of the fibula flap, where multidrug resistant Aeromonas spp. and Morganella morganii were isolated. Finally, the forearm was amputated nine days following reconstruction with an uneventful further course. Antifungal treatment was stopped three months later.

Destructive fungal osteomyelitis in immunocompromised hosts is a challenging infection with limited surgical options concerning reconstruction, especially in chronically ill patients. However, eradication of mold infections is only possible by a concerted surgical and antimicrobial treatment approach. Compared with potentially complicated microvascular reconstructions, an amputation can be the straight-forward and potentially life-saving treatment strategy for fungal osteomyelitis.

A-0741 CASE REPORT OF AN INFRACLAVICULAR BRACHIAL PLEXUS INJURY ASSOCIATED WITH AXILLARY ARTERY RUPTURE AND FLOATING SHOULDER – THE CHALLENGE OF "BLIND" EXPLORATION AND RECONSTRUCTION IN A POLYTRAUMA PATIENT

Adrian Fellmann, Richard Glaab, Bernadette Bachofen, Jan Plock, Fabrizio Fiumedinisi, Florian Früh
Kantonsspital Aarau, Switzerland

Introduction: Traumatic injuries of the infraclavicular plexus can be classified into neurapraxia, axonotmesis or neurotmesis, requiring individualized therapeutic interventions. Early surgical exploration is recommended for injuries resulting from high-energy trauma. In polytraumatized and intubated patients, however, exploration and reconstruction of these injuries is a particular challenge due to non-reliable preoperative clinical and imaging assessment.
Case Presentation: A 21-year-old male was referred to our tertiary care facility following a high speed motor vehicle accident, resulting in a polytrauma. Initial assessment revealed blunt abdominal and chest trauma as well as a floating shoulder with a right axillary artery rupture and a suspected brachial plexus injury. Emergency treatment for the right upper extremity consisted of revascularization with a carotido-brachial bypass and forearm fasciotomies. Subsequently, the patient underwent multiple abdominal surgeries and treatment of the upper extremity injury was delayed due to critical condition.
The patient remained intubated and sedated until definitive treatment. This was associated with a challenging preoperative decision-making. Clinical examination only revealed weak long finger flexion with an otherwise paralyzed extremity. Additional magnetic resonance scans of the cervical spine as well as of the brachial plexus showed intact C5-Th1 roots but analyzing the retro/infraclavicular plexus was not feasible due to massive edema and hematoma.
Eleven days after admission, an interdisciplinary surgery with peripheral nerve surgeons, vascular surgeons and trauma surgeons was performed. The supra- and infraclavicular brachial plexus was dissected, revealing axillary nerve, musculocutaneous nerve, and ulnar nerve injuries with nerve defects > 7 cm. After stabilization of humeral and clavicular fractures, axillary artery reconstruction with a greater saphenous vein graft was completed. Finally, the musculocutaneous and ulnar nerves were reconstructed using medial antebrachial cutaneous and sural nerve cable grafts. The distal stump of the axillary nerve could not be visualized with the patient in supine position and dorsal exploration was postponed. Four days later, a multi-fragmentary scapular fracture was stabilized through a dorsal approach with concomitant exploration of the axillary nerve. The anterior division exhibited complete avulsion while the posterior division was intact. Consequently, a Somsak nerve transfer was used to re-innervate the deltoid muscle. The patient currently is in early rehabilitation, recovering from his multiple injuries.
Conclusions: Our reported case highlights the decision-making in polytraumatized patients, suffering from brachial plexus injuries that must be addressed in the early phase of hospitalization. Because preoperative clinical and imaging assessment may be non-conclusive, peripheral nerve surgeons dealing with these cases should be able to adjust their reconstructive strategy to the intraoperative extent of nerve damage.

A-0742 ONE YEAR RESULTS AND COMPARISON OF TWO DOUBLE MOBILITY PROSTHESES FOR TRAPEZIOMETACARPAL ARTHRITIS

Eva Winand, Moritz Scholtes, Sebastian Hediger
cantonal hospital Frauenfeld, Frauenfeld, Switzerlnd

Objective: To analyse our short term clinical and radiographic results (including the cup position) for double mobility prostheses for trapeziometacarpal arthritis using two different implant systems and hence also focusing on possible

differences between the two systems.
Methods: Patients treated with a double mobility implant for trapeziometacarpal arthritis were prospectively included in a registry since February 2021. The implant type used, either MAÏA™, or TOUCH®, depended on the location where the operation was performed (our clinic performs operations equally at two locations). We recorded data preoperatively, at 6 weeks, 3 months and 1 year postoperatively. Patient reported outcome was assessed using the bMHQ. Pain was rated at rest and during daily activities. Key pinch strength and thumb mobility using the Kapandji score were measured. In the radiographic assessment we focused on cup position (i.e. eccentricity – defined as the cup breaching or touching the cortex of the trapezium) and in the short term on signs of cup loosening. Further, we recorded complications and revisions.
Results: Until submission of the abstract, we have 59 prostheses in our registry, of which 23 were considered for this analysis because a completed one year follow-up was available. 21 patients were included, two patients received bilateral implants. More women than men were operated on (14 women, 7 men). Mean age was 61.2 years (50-82). No revisions had to be performed so far, resulting in a survival rate of 100%. We encountered one case of De Quervain's tenosynovitis and one trigger thumb, both treated with additional surgery. At one year, 23 implants in 21 patients were available for follow-up (9 MAÏA™, 14 TOUCH®). Overall, the bMHQ score increased from mean 47.5 (CI: 40.1-53.8) preoperatively to 87 (CI: 80.3-93.7). Pain at rest decreased from 8 (CI: 7.7-8.3) to 0. Pain during daily activities decreased from 8 (CI: 7.7-8.3) to 0.5 (CI: 0.5-0.8). Key pinch strength increased from 4.4kg (CI: 2.8-5.2) to 6.8kg (CI: 4.8-7.2). Thumb mobility showed a slight improvement. No differences in the respective results between the two implants could be detected. Radiological analysis showed no case of cup loosening until final follow up. Eccentric cup position occurred in eight cases (equally allotted between the two implants) but without detectable implications on clinical outcome.
Conclusions: Our results, despite a small patient number, using two double mobility implants for treating trapeziometacarpal arthritis are very promising and comparable to the current literature. No detectable differences in the clinical or radiological analysis between the two implants could be documented.

A-0743 FUNCTIONAL AND AESTHETIC PRESERVATION IN EARLY STAGE SUBUNGUAL MELANOMA OF THE THUMB: BRUNELLI FLAP RECONSTRUCTION FOLLOWING NON-AMPUTATIVE WIDE EXCISION

Inga Swantje Besmens, Efe Akyildiz, Michael Wirth, Olga Politikou, Maurizio Calcagni
Department of Plastic Surgery and Hand Surgery, University Hospital Zurich

Subungual melanoma at an early stage presents a challenge in treatment decisions, particularly in preserving digital function while ensuring oncological control. Conservative approaches involving non-amputative wide excision of the nail unit followed by skin grafting have emerged as favorable alternatives to amputation for preserving the affected digit. However, delayed healing of skin grafts, particularly over the bony surface of the distal phalanx, poses a significant concern, leading to prolonged limitations in hand usage, notably when involving the thumb.
The dorsoulnar flap of the thumb, known as the Brunelli flap, offers a reconstructive option for addressing distal dorsal and palmar defects. This study investigates the efficacy of utilizing the Brunelli flap subsequent to non-amputative wide excision of the nail unit in six patients with early-stage subungual melanoma on the thumb.
Following flap procedures, a brief period of minor congestion was managed conservatively by positioning the hand above heart level, demonstrating uneventful flap healing subsequently. Notably, no local recurrence of excised melanoma was observed. Preservation of function in the interphalangeal (IP) and metacarpophalangeal (MCP) joints was achieved, while the aesthetic outcome, despite the absence of a nail plate, was satisfactory.
Our findings highlight the potential of the Brunelli flap in expediting healing following nail unit excision, yielding

favorable functional and aesthetic outcomes. This approach presents a viable alternative in the management of early-stage subungual melanoma, allowing for both oncological control and preservation of digital function and appearance.

A-0744 DETECTION OF ISCHEMIA BY A BIOSENSOR MEASURING TISSUE CARBON DIOXIDE TENSION

Johanne Korslund[1,3], Rasmus D Thorkildsen[1], Espen Lindholm[2], Runar Stray-Amundsen[4], Tor I Tønnessen[1,3], Magne Røkkum[1,3]
[1]Oslo University Hospital, Norway; [2]Vestfold Hospital Trust, Norway; [3]University of Oslo, Norway

Introduction: IscAlert™ is a biomedical sensor system that measures partial gas pressure of carbon dioxide and temperature in tissue local to sensor placement.
Aim: The present study was designed to examine the feasibility and safety of the IscAlert™ device in patients scheduled for limb (arm/leg) surgery with tourniquet.
Material & Methods: We performed an observational, prospective, cohort study at a single center in a regional hospital in Norway. The primary endpoint was to evaluate the ability of the biosensor to measure partial gas pressure of carbon dioxide levels in ischemic and non-ischemic limb musculature and subcutaneous tissue and to assess the safety/efficacy using the device.
Results: Fifty patients were included in this study from May 2020 to June 2022. The mean difference between the partial gas pressure of carbon dioxide levels in ischemia and non-ischemia limbs was 4.360 kPa, 95%CI [3.666; 5.054], $p<0.001$. Combining intramuscular and subcutaneous tissue, the mean total difference between the partial gas pressure of carbon dioxide levels in ischemic and non-ischemic limb was 3.918 kPa; 95%CI [3.438; 4.398], $p<0.001$. The mean difference between the temperature levels in intramuscular and subcutaneous tissue in ischemic and non-ischemic limb was 2.481oC; 95%CI [2.040; 2.923], $p<0.001$ and 2.613oC; 95%CI [2.054; 3.174], $p<0.001$ respectively. Four patients experienced minor bleeding (less than 6 ml) during insertion of the sensors. No other bleeding was reported during the study period. None of the subjects experienced any kind of clinical infections/inflammations or pain (Numeric Rating Scale score 0) at the insertion sites during the entire study period. None serious adverse events related to the study procedure or device were noted.
Conclusions: The device provides a safe and dependable way to continuously and instantly track partial gas pressure of carbon dioxide levels in muscular and subcutaneous tissues, thereby offering a means to monitor ischemia.

A-0745 I WAS NEVER TAUGHT HOW TO TREAT GANGSTERS - CONSIDERING EPIGENETICS TO BRIDGE THE GAP BETWEEN THE HEALTH CARE PROVIDER AND PATIENT FOR OPTIMIZING HEALTH OUTCOMES

Hannarie le Roux
Groote Schuur Hospital, Cape Town, South Africa

Introduction: Cape Town is essentially two cities. On the one side there is beauty beyond imagination with the slopes of Table Mountain, any tourist's dream. And on the other side, the mountain cast a dark shadow over some of the most dangerous neighborhoods in the world. Our patient load is comprised of both these worlds. Very different clients, very different backgrounds, so do they warrant a different approach in therapy? Should we as therapists and doctors reconsider how much information we present to patients and how we deliver it? When uncomfortable contextual factors, stereotypes and assumptions are all lying on the table, but the main objective remains the hand?
Aim: The treatment of gangsters in a hand clinic poses a unique set of challenges rooted in complex life experiences, including trauma and exposure to adversity. By adopting a client-centred lens, therapists can unlock innovative strategies

to address the individual needs of patients, fostering a collaborative and trusting therapeutic alliance, but does it look the same when you consider all the factors on the table. This session will encourage participants to rethink conventional client-centred models, examining whether adjustments are needed to better serve individuals with varied backgrounds. In addition, the presentation will delve into the emerging field of epigenetics, emphasizing its potential impact on hand therapy outcomes. Understanding how epigenetic factors shape a patient's response to treatment enables therapists to tailor interventions with greater precision, acknowledging the interplay between genetic predispositions and environmental influences that contribute to rehabilitation success. This discussion will extend beyond gangster populations, challenging attendees to consider how epigenetic considerations can reshape their approach to client-centred care for all patients.
Practice implications: By the end of this session, attendees will gain a fresh perspective on client-centred hand therapy, informed by insights from treating gangster populations and incorporating epigenetic research. The presentation aims to inspire a paradigm shift in hand therapy, emphasizing the importance of tailoring approaches and hand therapy protocols to individual epigenetic and sociocultural contexts to improve overall patient compliance and outcomes. It also encourages a dynamic conversation about how being client-centred might differ from conventional wisdom and invites therapists to reflect on how they can adapt their practice to truly meet the diverse needs of all patients, regardless of their background.
Conclusions: When we "travel between these two cities", we discover that adapting to our patients is paramount, regardless of their backgrounds. The true measure of our intervention lies not only in the improvement of hand function, but in our ability to understand, connect, and position ourselves to navigate diverse landscapes.
It is crucial that we have a better understanding of the individual we are treating, and it is our approach and how we position ourselves towards the individual that will ultimately determine the outcomes of our intervention.

A-0746 RESULTS OF A DUO-MOBILE TRAPEZIOMETACARPAL JOINT PROSTHESIS WITH A MEAN FOLLOW-UP OF 1.5 YEARS

Benjamin Panzram[1], Pia-Elena Frey[1], Maximilian Franzen[1], Yusuf Naseri[1], Florian Falkner[2], Leila Harhaus[2]
[1]Department of Orthopedics, University Hospital Heidelberg, Germany; [2]Department of Hand, Plastic and Reconstructive Surgery, Burn Care Centre, BG Trauma Center Ludwigshafen, Germany

Introduction: The implantation of a TMC joint prosthesis with a dual-mobility design is a proven therapeutic option for the treatment of advanced arthritis with very good clinical results in the short-term follow-up and significantly reduced dislocation and loosening rates.
Aim: The aim of this study is to report on the clinical-functional results of the TOUCH® dual-mobility prosthesis with a mean follow-up of 1.5 years.
Methods: This prospective, monocentric study included 58 patients with 68 prostheses who were operated by 1 surgeon between 08/2019 and 03/2023. Patients with primary TMC joint arthritis Eaton/Littler stages II+III were eligible. Complications, radiological results (thumb length according to M1/M2 ratio (see Ledoux 2017), hyperextension >15°, signs of loosening), range of motion (ROM, Kapandji), grip strength (JAMAR dynamometer), pain (VAS 1-10) and functional scores (qDASH, MHQ) were recorded.
Results: The mean follow-up was 19 months (range 5-49 months). 44 women and 14 men underwent surgery, the mean age at surgery was 58.8 years (range 46-77 years). 89 % of the patients were right-handed. One patient underwent secondary trapeziectomy due to cup dislocation after 2 years. One wound revision was performed after a healing disorder in a diabetic patient (2 weeks postop.). In one case the first extensor compartment was split due to a de Quervain's tenosynovitis (11 months postop.). No further complications such as infection, dislocation or material failure were

observed, resulting in a survival rate according to Kaplan-Meier (with the endpoint of revision surgery) of 94.1% after the mean follow-up period of 19 months.
The functional scores showed a significant improvement in hand function after 12 months from pre- to postoperative (mean qDASH 48 vs. 18, $p < 0.05$; mean MHQ 57 vs. 78; $p < 0.05$), as well as a significant improvement in pain (VAS 7 vs. 2; $p < 0.01$) and a tendency towards improvement in the Kapandji score (8.6 vs. 9.5; $p < 0,01$). The mean postop. metacarpal I trapezium length (M1) improved significantly from 55 mm to 62 mm ($p < 0.05$) and the M1/M2 ratio showed a restoration of thumb length (0.70 vs. 0.78; $p < 0.05$). A relevant preop. hyperextension >15° was present in 23 thumbs (22°, range 15°-38°) and showed correction to a mean of 5.9° post-surgery (range 0-20, $p < 0.0001$). The measurement of grip strength was comparable (15.7 kg vs 17.3 kg; $p =$ ns).
Conclusions: The short-term results with a mean follow-up of 1.5 years after implantation of the TOUCH® dual-mobility prosthesis for TMC joint arthritis show a significant improvement in hand function and pain as well as correction of thumb length and hyperextension in the metacarpophalangeal joint of the thumb. With a very low complication and revision rate, arthroplasty appears to be a reliable and safe treatment method.

A-0747 DUAL MOBILITY THUMB CARPOMETACARPAL ARTHROPLASTY. FUNCTIONAL AND RADIOLOGICAL RESULTS OF 1 YEAR FOLLOW-UP

Efstratios Athanaselis[1], Filippos Zigras[1], Efstathios Konstantinou[1], Nikolaos Stefanou[1], Konstantinos Ditsios[2], Zoe Dailiana[1], Sokratis Varitimidis[1]
[1]Orthopaedic Department, University Hospital of Larissa, Greece; [2]Orthopaedic Department, General Hospital of Thessaloniki "G Gennimatas", Greece

Introduction: Dual mobility is the main distinctive feature of the newer generation arthroplasties of the carpometacarpal joint of the thumb, such as TOUCH by KeriMedical.
Aim: The purpose of this study is to evaluate the short-term clinical and radiological results of this prosthesis.
Material & Methods: Twenty symptomatic patients with radiological findings of at least stage II arthritis, who underwent this procedure from June 2022 to May 2023, were prospectively studied. Their mean age is 71 years (51-78). The patients were evaluated radiologically and clinically at 0, 6, 12 weeks, and 6, 12 months postoperatively through questionnaires (VAS score, QuickDASH, Nelson score) and functional tests (thumb range of motion, Grip strength, Key and Tip pinch strength as well as Kapandji score). results Mobilization of the thumb begins 7-10 days postoperatively without significant difficulty for the patient. At 6 weeks postoperatively, excellent functional results and significant pain relief were observed. At six months postoperatively, the VAS score decreased from 7.8 to 0.33 mm ($p<0.001$) and the Kapandji opposition score increased from 7.6 to 9.14 ($p=0.02$). QuickDASH and Nelson scores improved from 67.73 and 30.06 to 5.68 ($p<0.001$) and 96 ($p<0.001$), respectively. Grip strength increased from 22.66 to 50.5 pounds ($p=0.02$), key pinch strength from 7.26 to 13.5 pounds ($p<0.001$), and Tip pinch strength from 4 to 9 pounds ($p<0.001$). Thumb range of motion improved. A total of 4 complications were observed (2 trigger thumb, and 2 de Quervain syndrome cases), while no dislocation or loosening of the prosthesis materials has been recorded so far.
Conclusions: This specific prosthesis allows rapid recovery and pain relief. The functional outcome is excellent, and the arthroplasty appears stable 1 year post-operatively. However, a longer follow-up is required to assess its sustainability.

A-0749 RECONSTRUCTION OF HYPOPLASTIC THUMBS (BLAUTH III B AND IV) WITH TRANSFER OF THE NON-VASCULARIZED LONGITUDINAL METATARSAL HALF AND TRANSFER OF THE FLEXOR DIGITORUM SUPERFICIALIS OF THE 4TH FINGER OR THE ABDUCTOR DIGIT MINIMI

Filippo Pantaleoni[1], Mario Lando[1], Davide Gravina[1], Danilo Donati[2], Roberto Adani[1]
[1]Department of Hand Surgery and Microsurgery, AOU Policlinico di Modena, Italy; [2]Department of Hand and Upper Limb rehabilitation, AOU Policlinico di Modena, Italy

Introduction: Hypoplasia of the thumb belongs to the group of longitudinal radial defects of the upper limb. It has an incidence of 1/100,000 live births and is bilateral in 60% of cases. The most commonly used classification is the modified Blauth classification.

While pollicization of the 2nd finger is the surgical treatment of choice in Blauth V° hypoplasia, in IIIB° and IV° hypoplasia, where the thumb is present but without function, the most commonly used surgical treatment is pollicization with removal of the existing thumb, a sacrifice that raises socio-cultural issues that limit its acceptance by parents.

Reconstructive methods have been proposed to secure the hypoplastic thumb, such as the transfer of an avascular phalanx or metatarsal or a foot joint, methods that are not without donor site morbidity.

In 2011, Chow introduced a two-stage reconstruction technique:

First time: reconstruction of the first metacarpal with free mid-longitudinal graft of the 3rd or 4th metatarsal of the contralateral foot and plastic opening of the first commissure.

Second time: Opponense-plasty and reconstruction of the radial collateral ligament and the ulnar collateral ligament of the metacarpophalangeal joint of the thumb by transfer of the flexor digitorum superficialis of the 4th finger or the abductor digit minimi according to Huber.

Aim: The aim of this work is to evaluate the results of patients with Blauth IIIB/IV hypoplasia treated with Chow's two-stage technique compared to the gold standard (politicization) to assess whether it is indeed a valid alternative.

Material & Methods: Five patients aged 3 to 6 years (mean 3.75 years) were treated with this technique between 2017 and 2022. Of these, 4 were Blauth IIIB cases and 1 was Blauth IV. Patients were re-evaluated monthly for the first 3 months and then biannually (mean follow-up 32 months): Opposition, metacarpophalangeal stability in varo-valgus stress, strength, aesthetic and radiographic appearance of the thumb during growth.

Results: Full opposition was recovered in all patients. Strength was reduced by 25% compared to the contralateral hand, and functional recovery was good.On the X-ray there was evidence of complete bone graft fusion with signs of gradual growth, although less than on the contralateral side, the cosmetic result was good. The results are comparable to those reported in the literature for pollicization.The only complication reported was a fracture of the 3rd metatarsal, treated with prolonged immobilization, which resolved without sequelae.

Conclusions: Although pollicization remains the gold standard in Blauth type IIIB/IV thumb hypoplasia, this technique may be a viable alternative in select patients where parents do not accept a 4-finger hand. This technique has shown encouraging results with good functional and cosmetic outcomes and a reduced number of adverse events.

A-0750 ESTABLISHING THE RELIABILITY AND REPRODUCIBILITY OF ULTRASOUND FOR MEASURING PEDIATRIC MEDIAN NERVE SIZE: A PROSPECTIVE STUDY OF TYPICALLY DEVELOPED, HEALTHY PEDIATRIC PATIENTS AGED 2-10 YEARS-OLD

Sophie Hollenberg[1], Gretchen Maughan[2], Nikolas Kazmers[2], Douglas Hutchinson[2], Brittany Garcia[2]
[1]University of Arkansas for Medical Sciences; [2]University of Utah

Introduction: Limited literature exists regarding the typical anatomic size of median nerves in the pediatric population. Although electromyography (EMG) and nerve conduction studies (NCS) have been considered the gold standard to diagnose carpal tunnel syndrome, in children they have been found to have high false negative rates. Additionally, nerve studies are invasive to perform in children and often require anesthesia. Another diagnostic option is the use of ultrasound. Ultrasound has become a popular way to diagnose carpal tunnel syndrome in adult patients with good sensitivity and specificity compared to historical reference standards. However, it is unknown if ultrasound is a reliable study to measure peripheral nerve sizes in children, and no cut-off values for "normal" nerve size exist for pediatric patients.
Aim: The purpose of this study was to determine the reliability of ultrasound for measuring median nerve cross-sectional area (CSA) in typically developed pediatric patients aged 2-10 years old. A secondary aim was to establish normal pediatric median nerve size as a factor of age and to determine whether demographic variables correlated with nerve size.
Material & Methods: Healthy, pediatric patients aged 2-10 years-old were prospectively recruited from an orthopaedic surgery clinic at a tertiary, academic medical center. Demographic data was gathered including age, sex, race, body mass index and hand dominance. Median nerve cross sectional area and diameter were measured at the level of the distal wrist crease. Mean nerve CSA and diameters for 2 year age categories were calculated. Pearson's rank correlation coefficient was used to determine the correlation between patient demographics and nerve CSA. Inter and intra-rater reliability for ultrasonographers was calculated.
Results: There were 120 wrists measured in 96 patients with a mean age of 7.3 years and an average median nerve CSA of 4.7 mm2 +/- 0.97. Interclass reliability between ultrasonographers reached "good" criteria with an ICC value of 0.88. Intraclass reliability met "excellent" criteria for each of the two independent researchers both with values >0.95. We found a moderately positive correlation for median nerve CSA vs age with an R value of 0.65 ($p < 0.001$). There was also a moderately positive correlation between height and weight with median nerve CSA and a poor correlation with BMI.
Conclusions: Ultrasound evaluation of median nerve size at the wrist in pediatric patients is a reliable and reproducible technique. The measurements obtained provide a baseline for evaluating patients with concerns for median nerve pathology. Ultrasound may be used as a diagnostic adjunct in the pediatric patient population for diagnosing carpal tunnel syndrome.

A-0751 THE ISHIGURO TECHNIQUE ACHIEVES STATISTICALLY SIGNIFICANT RESULTS IN CHILDREN COMPARED WITH ADULTS

Davide Gravina, Andrea Leti Acciaro, Filippo Pantaleoni, Roberto Adani
Department of Hand Surgery and Microsurgery, AOU Policlinico di Modena

Introduction: Mallet bone finger accounts for 1.9% of phalangeal fractures in the pediatric population. This injury appears to be the result of a Salter-Harris type 2 lesion involving the epiphysis. Appropriate treatment is required to limit the risk of long-term complications such as stiffness, deformity and osteoarthritis of the distal interphalangeal joint. There are several treatment options, but conservative treatment remains the first choice in complex or minimally degenerated

cases. The choice of treatment in complex cases is controversial.
Analysis of the literature shows that there is no high level of evidence to support the superiority of surgery over the use of orthoses in patients with bone mallet finger, particularly in the pediatric population. There is no consensus on the choice of optimal treatment because of the lack of studies in the pediatric population.
The Ishiguro technique is easy to perform, minimally invasive and K-wire treatment seems to guarantee better results with regard to the extensor gap in bony mallet finger as described in the literature. A retrospective cohort study of pediatric patients with long-term follow-up (mean 12 years) was performed to evaluate the efficacy of the technique in children. Both preoperative and postoperative predictive factors were examined.
Aim: The aim of the study is to assess the potential superiority of the Ishiguro technique in paediatric bony mallet fingers compared to conservative treatment by evaluating long-term outcomes in a large cohort of patients.
Material & Methods: 95 pediatric patients underwent K-wire synthesis using the Ishiguro technique between 2002 and 2012. 84 patients were included with a mean follow-up of 12 years. The main clinical and radiographic criteria were assessed according to the Crawford criteria, range of motion at the distal interphalangeal joint, loss of extension and pain were assessed using the VAS scale.
Results: Complete fracture healing and pain reduction was achieved in all treated patients. No differences in growth of the fractured finger or nail deformities were observed. 82% of patients had good or excellent results. 15 patients had fair results.
Conclusions: Despite the results described in the literature regarding surgical versus conservative treatment in mallet bone finger do not show statistically significant results in favor of either procedure, these studies concern adults and there are no specific series of children. In contrast, Ishiguro's technique in children shows in this retrospective study of a single, large pediatric population, statistically significant and valid results. Ishiguro's technique is effective in children in terms of the results of bone mallet finger treatment. Good or excellent results were considered in the absence of residual deformity or damage to the epiphysis. A strong and significant correlation was found between cases with a poorer outcome and delayed treatment or excessive flexion of the synthesis angle. The study highlights the superiority of surgical treatment in the pediatric population, as confirmed by Peng et al.

A-0752 OUTCOMES AFTER FLEXOR TENDON SURGERY IN THE CAPITAL REGION OF DENMARK

Benedicte Heegaard, Rasmus Wejnold Jørgensen
Hand Clinic, Department of Orthopedic surgery, Herlev-Gentofte University Hospital of Copenhagen, Denmark

Background: The management of flexor tendon injuries in the hand is a well-known challenge worldwide, however, the exact outcomes and postoperative complications in Denmark have not yet been reviewed.
Aim: To report outcomes and incidence of postoperative complications in patients undergoing surgery after traumatic flexor tendon injuries in the hand. Secondly, to investigate if trauma in zone II of the hand is associated with a poor outcome.
Materials and Methods: We retrospectively reviewed patients who had been surgically treated for flexor tendon injuries of the hand in two hospitals in Denmark in the period of 2010-2020. Demographic information, trauma type and postoperative complications were recorded. Major postoperative complications included re- rupture, surgical tenolysis and admission due to infection. Minor complications included infection treated with oral antibiotics and decrease in mobility.
Results: In total, 336 patients (mean age 35 years, 64% male) were reviewed. 37% patients had trauma in zone I, 50% had trauma in zone II, and 13% had trauma in the other zones of the hand. The median time from trauma to surgery was 3 days. The median time from surgery to the last visit at the hospital was 103 days with an average of 13 contacts to the hospital after surgery. Twenty-six (8%) patients experienced re-rupture, 22 (7%) underwent surgical tenolysis due to

adhesions, and 8 patients (2%) were admitted and revised due to infection. At the final visit, 26% had a flexion deficit of > 2 cm and/or extension deficit of >15 degrees. Traumas in zone II of the hand were associated with a higher incidence of major complications (p=0.020) and a worse function (p=0.042) at the final visit compared to traumas in the other zones. Interpretation / Conclusion: Following traumatic flexor tendon injuries, 17% of patients experience a major postoperative complication and 26% had a remarkable flexion deficit and/or extension deficit at the final visit. Patients with zone II experience a poorer outcome and more complications compared to patients with traumas in other zones.

A-0753 THE MISHAP TRIAL: MANAGING INJURIES - A STUDY OF HAND APPEARANCE AND PSYCHOSOCIAL DYSFUNCTION

Iulia Marinescu[1], Eimear Phoenix[2,3], Ellen Geary[2], Lylas Aljohmani[2], Diarmuid McLaughlin[4], Jordan Wilkinson[2], Colin Morrison[2], Paul D'Alton[4,5], Roisin Dolan[2,3]

[1]School of Medicine, University College Dublin, Dublin, Ireland; [2]Department of Plastic and Reconstructive Surgery, St Vincent's University Hospital, Dublin, Ireland; [3]Royal College of Surgeons in Ireland, Dublin, Ireland; [4]School of Psychology, University College Dublin, Dublin, Ireland; [5]Department of Psychology, St Vincent's University Hospital, Dublin, Ireland

Introduction: Over 24 million hand injuries occur globally every year. Hands play a pivotal role in daily function, self-expression and human interaction. Patients who suffer hand injuries are affected by chronic pain, functional impairment and loss of income, which causes significant psychological distress. Despite existing literature on the psychosocial impact of hand injuries, integrated psychological support is not established practice in hand trauma management.

Aim: This study aimed to investigate the functional and psychosocial impact of hand injuries and their association with injury severity, to inform future research on the role of psychological interventions in hand trauma care.

Material & Methods: A single-centre, prospective, observational study was conducted over a six-month period in St.Vincent's University Hospital, Dublin, Ireland. Patients with traumatic hand injuries were assessed for inclusion. Patient-reported outcome measures were collected at two and six weeks postoperatively through a questionnaire comprising six validated scales. The Disabilities of the Arm, Shoulder and Hand (DASH) scale provided information on functional impairment. The Hospital Anxiety and Depression Scale (HADS) was used to measure psychological dysfunction. The Derriford Appearance Scale-24 (DAS-24) was used to quantify appearance anxiety. The Short Form-36 (SF-36) was included to measure quality of life. The Conor-Davidson Resilience Scale-25 (CD-RISC-25) informed on levels of resilience among participants and the Post Traumatic Growth Inventory-Short Form (PTGI-SF) assessed the perception of positive outcomes as a result of trauma. The hand injury severity score (HISS) and demographic data were obtained from medical records. Paired samples t-test and correlation analyses were performed to analyse data.

Results: Data was collected from 62 patients at baseline and 44 (71%) at follow-up. The mean age was 44 (range 20-72) with a male preponderance (89%). The mean HISS was 38 (range 2-204), with 21% scoring severe injuries. The patient's dominant hand was affected in 50% of cases and 50% of injuries occurred at the workplace. Seven participants (11%) reported pre-existing psychiatric illnesses. HADS, DASH, SF-36 and CD-RISC-25 scores were less favourable than the general population means reported in the literature. Ten and fourteen percent of participants had above-average DAS-24 scores at baseline and follow-up, respectively. HADS, DASH and SF-36 scores significantly improved at follow-up. However, 10 (22%) and 8 (18%) participants still met the criteria for anxiety and depression, respectively, at the second time point. At both time points, HADS scores were significantly correlated with DAS-24 (r1=.417, p1=0.007, r2=.734, p2<.001), SF-36 (r1=-.416, p1=0.006; r2=-.663 p2<.001), DASH (r1=.316, p1=0.044; r2=.435 p2=.004), and CD-RISC-25 (r1=-.347, p1=0.028; r2=-.443 p2=.004). Scale scores were not significantly correlated with HISS.

Conclusions: Our patient cohort demonstrated higher-than-average psychological distress and functional disability, regardless of injury severity. Although scores improved over time, integrating psychological interventions into the multidisciplinary management approach could potentially expedite the overall recovery from hand trauma.

A-0754 RECONSTRUCTION OF BRACHIAL PLEXUS LESIONS IN THE ELDERLY – A CASE SERIES

Christian Smolle, Judith C. Geißler, Severine Kerbl, Werner Girsch
Division of Plastic, Aesthetic and Reconstructive Surgery, Department of Surgery, Medical University of Graz, Austria

Introduction: Brachial plexus injuries in adults are usually associated with high energy impacts to the shoulder and/or supraclavicular region. While there is encouraging data available about brachial plexus reconstruction in children and young adults, knowledge about the reconstruction in elderly is comparably scarce.
Aim: The aim of this case series was to assess outcome of brachial plexus reconstruction in elderly patients.
Material & Methods: The clinical data of patients 50 year of age or older operated because of traumatic brachial plexus lesions between June 2018 and October 2022 was collected in retrospective manner. The collected data included age, gender, type of lesion, time from trauma to surgery, surgical procedure, shoulder stability at presentation and at last follow up and mean upper extremity muscular strength (MMS) at presentation and at last follow up. Postoperative complications were documented as well. Due to the small sample size, statistic testing was merely descriptive.
Results: Eight patients, all male, with a mean age of 64 years at the time of surgery were included. There were 5 upper brachial plexus injuries, one patient with isolated axillary nerve injury, one with a pan-plexus injury and one with an infraclavicular plexus lesion. Overall MMS at presentation was 2.4 (SD 1.3) and 3/8 patients had shoulder stability. Mean time from trauma to surgery was 5.2 (SD 1.3) months, and surgery included nerve transfer in 3, primary reconstruction with fascicular transfer in 2 and neurolysis and fascicular transfer, neurolysis and tendon transfer, and primary reconstruction with muscle transfer in one patient each. Mean time to last follow up was 7 months. At last follow up, all but one patient had regained shoulder stability (7/8) and overall MMS was 3.0 (SD 1.4). There were no postoperative complications but one wound infection.
Conclusions: In all reviewed patients the primary aim was to regain shoulder stability, biceps function and a sensate hand. All but one patient had regained shoulder stability. At the time of the retrospective review follow up times were too short to observe complete regeneration potential. To conclude, brachial plexus reconstruction can be carried out safely in the elderly with acceptable outcome. Future studies should increasingly focus on outcome after brachial plexus reconstruction in the elderly.

A-0755 ANALYSIS OF TRAPEZIOMETACARPAL PROSTHESIS CUP POSITION WITH RESPECT TO THE TRAPEZIAL ANATOMY

Kjell Van Royen[1,2], Sebastiaan Bogaert[1], Chul Ki Goorens[3], Bert Vanmierlo[4], Joris Duerinckx[5], Jean Goubau[1,6]
[1]UZ Brussel, Brussels, Belgium; [2]OLVZ Aalst, Aalst, Belgium; [3]RZ Tienen, Tienen, Belgium, AZ Delta, Roeselare, Belgium; [5]ZOL, Genk, Belgium; [6]AZ Maria Middelares, Gent, Belgium

Introduction: Trapeziometacarpal joint prosthesis is becoming increasingly popular in the treatment of trapeziometacarpal joint osteoarthritis and the introduction of dual mobility designs has decreased the short-term complications. However, revisions due to incorrect cup placement are still a reason for concern.

Aim: To analyze trapezial anatomy with regard to cup placement. We hypothesize that some trapeziums have a larger articulation with the trapezoid and that those trapeziums are more prone to cup perforation in the trapezo-trapezoid joint (TTJ).
Material & Methods: We included 95 reconstructed peritrapezial radiographs. We identified the virtual distal articular surface after removal of the trapezial horns and measured the length of the distal articular surface (DAST), length of the proximal articular surface (PAST), height of the second metacarpal facet and height of the trapezium. We defined the angle between the most ulnar point of the PAST and most ulnar point of the DAST as the STT angle and calculated this angle for every subject. We positioned a virtual conical cup with a height of 5mm and a depth of 9mm in the center of the distal articular surface. The most ulnar position of the cup was defined at the distal and proximal diameter and when this exceeded the most ulnar point of the PAST by more than 1 mm, it was considered at risk for perforation.
Results: Mean length for the DAST was 16,6 mm, mean length for the PAST was 10,6 mm, mean height for the second metacarpal facet was 3,8 mm and mean trapezial height was 9,2 mm. Mean STT angle was 33°. Eighteen subjects had a second metacarpal facet larger than 5 mm. Seventy-seven subjects had a second metacarpal facet smaller than 5 mm. The most ulnar position of the cup exceeds the ulnar border of the PAST for STT angles above 25° at the distal cup diameter and exceeds the ulnar border of the PAST for STT angles above 35° at the proximal cup diameter.
Conclusions: Measuring the STT angle and the height of the second metacarpal facet of the trapezium can be useful in preoperative templating of a trapeziometacarpal total joint prosthesis. When the second metacarpal facet is larger than 5 mm, no risk of cup perforation in the TTJ is present. However, when the second metacarpal facet is smaller than 5 mm, the STT angle can be used to calculate the risk of cup perforation in the TTJ. A type 1 trapezium has an STT angle under 35° and has a low risk of perforation when a cup is positioned central in the trapezium. A type 2 trapezium has an STT angle of 35° or above and has a higher risk of perforation when a cup is positioned central in the trapezium. We propose to position the cup more radial in a type 2 trapezium to avoid perforation of the TTJ.

A-0756 A SIMPLE VERTICAL DORSAL CAPSULODESIS TECHNIQUE

Jaak Warlop, Eline Stroobants, Ilse Degreef
UZ Leuven, Leuven, Belgium

Introduction: The surgical treatment of (pre)dynamic scapholunate ligament injuries is focused on regaining stability without losing motion due to arthrofibrosis in open ligamentous reconstruction techniques. Arthroscopic capsulodesis can be technically challenging. Here, we present a simple technique for arthroscopic capsulodesis, which we have introduced at our institution well over ten years ago, with a vertical dorsal capsular fixation to the dorsal scapholunate interosseous ligament (DSLIL).
Aim: A retrospective cohort outcome study was performed between November 2010 and November 2023 evaluating the postoperative results of a simple vertical dorsal capsulodesis technique.
Material & Methods: Patient data were extracted and reviewed for clinical, functional and radiographic follow-up parameters. Postoperative complications, salvage procedures and scapholunate advanced collapse were analyzed. Patients will be invited to our hospital for a final check up.
Results: The retrospective cohort study yielded 44 patients with a mean postoperative follow-up period of 5 years. In 3 patients (7%) a salvage procedure was noted, consisting of wrist denervation and in one patient (2%) a revision capsulodesis was performed. The final clinical, functional and radiographic parameters are pending and definite results will be available for presentation in June.

Conclusions: Scapholunate ligament injuries are difficult to treat pathology with varying outcomes. The simple vertical dorsal capsulodesis can provide an easy solution for dynamic and reducible static scapholunate ligament injuries if sufficient DSLIL is available. Detailed postoperative information will be reported on clinical outcome and medium to long term follow-up in a series of 44 patients treated with this novel minimal invasive technique.

A-0757 OVERCOMING SURGICAL CHALLENGES: VASCULARIZED THUMB METACARPAL PERIOSTEAL FLAP IN RECALCITRANT SCAPHOID NONUNION CASES

Rui Cró Freitas[1], Rui Viegas[2], Diogo Gaspar[2], José Caldeira[2]
[1]Centro Hospitalar Lisboa Norte, Portugal; [2]Hospital Beatriz Ângelo, Portugal

Introduction: Proximal pole scaphoid nonunion, particularly following failed surgical interventions, presents a longstanding challenge in hand surgery. The vascularized thumb metacarpal periosteal flap (VTMPF) technique emerges as an innovative approach, offering a solution that deviates from traditional grafting methods.
Aim: The aim of this study was to assess the effectiveness of the VTMPF in treating scaphoid nonunion, focusing on patients with a history of unsuccessful prior surgical attempts.
Material and Methods: A retrospective analysis was conducted on three male patients, aged 16, 20, and 28, with histories of unsuccessful surgical treatments for scaphoid nonunion and dorsal intercalated segment instability (DISI). They underwent the VTMPF procedure, employing a volar approach supplemented by iliac crest bone grafting. The outcomes were range of motion (ROM), pain levels, grip strength, and radiographic evidence of union.
Results: One patient required a subsequent medial femoral condyle vascularised corticoperiosteal graft due to the initial VTMPF failure. At a mean follow-up of 15 months postoperatively, all patients exhibited complete fracture healing. Compared to the contralateral normal side, patients demonstrated significant gains in wrist motion, with increases in flexion and extension ranging from 64% to 100%. No pain was reported, and grip strength was assessed as good post-surgery.
Conclusions: VTMPF has shown to be a promising approach for the treatment of scaphoid nonunion, providing generally good outcomes in previously unsuccessful cases. The observed improvements in bone healing and wrist functionality at the one-year follow-up are encouraging. Its ability to promote healing effectively, coupled with the fact that it does not require microsurgical techniques, makes it a valuable alternative to other salvage methods. The necessity of an alternative approach in one case, however, underlines the complexities involved in treating scaphoid nonunion. Although this study is based on a small sample, the results suggest that VTMPF could significantly advance the management of scaphoid nonunion.

A-0758 ULTRASOUND PATHOANATOMY OF LACERTUS SYNDROME

Alessandro Crosio[1], Lucia Verga[2], Alice Clemente[3], Francesco Locatelli[3], Martina Macrì[3], Mauro Magnani[3], Simona Odella[3], Letizia Marenghi[3], Fabiana Zura Puntaroni[3], Pierluigi Tos[3]
[1]Hand Surgery Department, City of Health and Science, Turin, Italy; [2]Radiology Department, ASST Gaetano Pini – CTO, Milan, Italy; [3]Hand Surgery and Reconstructive Microsurgery, ASST Gaetano Pini – CTO, Milan, Italy

Introduction: Proximal compression of the median nerve caused by lacertus fibrosus is currently described as the most common cause of pathology at this level. Other less common sites of median nerve compression at the proximal third of the forearm are the pronator heads and superficial flexor fascia. Identification and diagnosis of the site and cause of

compression are primarily clinical. Instrumentally, both electrophysiology and imaging do not, to date, present characteristic features to confirm compression at this site.
Aim: The aim of this study is to identify an ultrasound characterisation of median nerve compression at the proximal middle third of the forearm, focusing the attention on the pathological findings at the lacertus fibrosus. Furthermore, a correlation between ultrasound aspect and clinical outcomes after median nerve release are reported.
Material & Methods: patients who came to our attention for compressive high median nerve symptoms were included. They presented paresthesia in the median territory and/or FLP, FP second, FCR hyposthenia and pain on compression of the proximal margin of the lacertus fibrosus and/or pain on the course of the superficial flexor muscles and/or positive scratch collapse test at the elbow crease over the median nerve. These patients were referred for ultrasound evaluation performed by one of the authors (a radiologist with experience in peripheral nerve injuries). The study was performed through a 18-22 MHz frequency linear probe, evaluating the median nerve bilaterally from its origin to the terminal branches in the palm. Patients with positive clinical evaluation and positive ultrasound findings of proximal median nerve compression underwent surgical treatment if indicated. Then follow up visits were planned after 1, 3 and 6 months from surgery recording muscle strength, sensory function, DASH and PREE score.
Results: Twelve patients were included in the study. Echographically, the affected side presents a constant picture of a hyperechogenic band attached to the median nerve with a significantly greater thickness than the contralateral side (approx. 2 mm thicker). The more medial fascicles of the affected median nerve are slightly hyperechogenic compared to the healthy side with a modestly increased thickness (1-2 mm) of the epineurium. In one patient a compression of the median nerve by the FDS fascia was identified. After lacertus section a reduction of DASH and PREE was noted, the muscle strength increased and especially the patients noted a subjective amelioration in management of small objects.
Conclusions: This study showed the presence of a thickening of the lacertus associated to clinical symptoms that induces ultrasonographic changes on the affected median nerve. Furthermore, through this technique is possible to identify other causes of proximal median nerve compression. Our findings proposed an instrumental picture of lacertus syndrome that corroborates the clinical diagnosis, which is also important from a medical-legal point of view. The ultrasound study should be performed by experienced physician in the field with dedicated high frequency transducers and should be proposed to all patients affected by proximal median nerve compression symptoms. Further studies including a larger sample could strengthen our results.

A-0759 A THREE-DIMENSIONAL APPROACH TO REFINING AO CLASSIFICATION FOR DISTAL RADIUS FRACTURES: 3D SEGMENTATION AND FRAGMENT NAMING

Verstreken Andreas[1,2], Vanhees Matthias[1,2,3], Verstreken Frederik[1,2,3], Jozef Michielsen[1,2], Costers Helena[1]
[1]Medical and Healthcare Science, University of Antwerp, Antwerp, Belgium; [2]Orthopedic Department, University Hospital Antwerp, Antwerp, Belgium; [3]Department of Orthopedic Surgery, AZ Monica, Antwerp, Belgium

Introduction: Distal radius fractures (DRFs) are common injuries in adults. These types of fractures require a detailed understanding of the fracture pattern and proper pre-operative planning to achieve optimal recovery of function. While plain radiographic images can help identify fractures, they often fail to show the rotation and propagation of the fracture accurately. This is where three-dimensional imaging becomes essential, particularly for complex intra-articular or multifragmentary fractures.
Aim: To provide an easy, user-friendly, and complete designation for all individual fracture fragments in distal radius fractures. With this, we aim to reduce time during fracture segmentation and reduction and facilitate communication among professionals.

Material and methods: We start from a previously described name-tagging and apply it to the AO classification. We are optimizing a system to accurately and clearly describe multiple fragments near each other. We looked for a fracture for each type, described in the AO classification, already segmented in our database of 200 segmented distal radius fractures.
Results: Firstly, it is essential to distinguish between two groups, which is the initial and most straightforward distinction. Is the radial shaft in contact with the articular surface or not? If so, the radial shaft is assigned code M0; if there is no connection, it is coded as M1. When further examining the AO Classification, for example, the 2R3C1.2 fracture. We define the fracture parts as radial (R) and ulnar (U). Subsequently, we outline the fracture's characteristics concerning its dorsal (D) and volar (V) components. When we consider more complex fractures, such as 2R3C2.2, we observe a D fragment and multiple distinct volar fragments. The most distal piece is referred to as distal volar (dV), while the more proximal pieces are termed proximal volar (pV). This involves identifying five different fragments, and to differentiate between them, we begin counting from 1 to 5, starting from the Distal Radio-Ulnar Joint (DRUJ). As described above, there is a distinction between a distal (d) and a proximal (p) fragment. In certain cases, such as the 2R3C3.3 fracture, there is a d and a p fragment, but also a middle (m) fragment.
Conclusion: The AO classification distinguishes between extra-articular, partial, and complete articular fractures of the distal radius. As mentioned, all fractures can be subdivided into these, but when discussing fractures among themselves, it is sometimes difficult to understand which fracture fragment is being discussed. Also, when we want to process these fracture fragments in 3D, there is a need for a universal naming convention for the different fragments to make processing easier and save time during segmentation and reduction. Selecting each separate fragment until the desired object can be edited during segmentation is unnecessary, and our fragment naming is far less color-dependent.

A-0761 NOVEL APPLICATION OF FISH SKIN FOR THE PREVENTION OF ADHESIONS AFTER FLEXOR TENDON REPAIR IN THE HAND

Kamran Shayesteh
Duke LifePoint Hospitals, Conemaugh Memorial Medical Center, Duquesne University College of Osteopathic Medicine, Johnstown, Pennsylvania, USA

Introduction: Adhesions after primary flexor tendon repair in the hand can be a difficult and relatively common problem requiring further surgery (i.e. tenolysis). Inflammation at the anastomosis site of the tendon repair can cause adhesions and scarring to surrounding soft tissues, limiting the flexor tendon excursion. Tenolysis after flexor tendon repair is not only expensive, but will invariably delay return to work leading to further loss of wages and productivity. Fish skin has inherent anti-inflammatory qualities that may potentially mitigate adhesion formation, and thereby decrease the rate of tenolysis. The Fish Skin is intended to decrease inflammation at the surgical site, and not intended as any type of tensile strength in the tendon repair.
Aim: To demonstrate that the novel use of Fish Skin to wrap and protect the flexor tendon repair site will lead to less adhesion formation and thereby decrease the rate of tenolysis.
Material & Methods: Fish Skin was used intra-operatively to wrap the primary flexor tendon repair.
Results: The two patients who underwent primary flexor tendon repair and wrap with Fish Skin did not require tenolysis. They both went on to have near full range of motion after hand therapy, and returned to full duty work within 8 weeks of the index surgery.
Conclusions: The use of Fish Skin (Kerecis) to wrap the primary flexor tendon repair in the hand will prevent adhesion formation and therefore lead to lower rates of tenolysis. More robust research in the form of controlled, randomized

trials is needed to further define the efficacy of Fish Skin in the prevention of adhesion formation in the hand after flexor tendon repair.

A-0762 NEW DIAGNOSTIC-BASED SYSTEMATIC CLASSIFICATION FOR SKIER`S THUMB INJURIES: A REVISION THAT IS NEEDED

Alina Strohmaier, Christian Wirtz, Leonhard Krafft, Mathias Haefeli
Clinic for Hand Surgery, Cantonal Hospital Graubünden, Loëstrasse 170, 7000 Chur, Switzerland

Introduction: Acute lesions of the ulnar collateral ligament of the first MCP joint are common sport injuries. They can be described as ligamentous (with or without Stener lesion) or osseus (with or without dislocation), as stable or unstable. All these characteristics can exist in different combinations. The most common used classifications are from Hintermann et al. (1993) who defined five types following Louis et al. (1986) according to bone lesions and joint instability, and a classification grading instability into three grades (Patel et al. 2010). However, none of these classifications considers all types and combinations. Also, there is still a wide variability in different authors' definition of dislocation of bony fragments, joint instability, and clinical evidence of a complete ligamentous tear. We are still lacking a classification of skier`s thumb injuries which we can easily use in daily routine and that simplifies treatment decisions especially in cases with no absolute treatment indications. Therefore, we developed a new systematic classification based on a routine diagnostic algorithm and tested its applicability in a retrospective study.
Aim: To review the existing classifications of acute ulnar collateral ligament injuries of the first metacarpal joint and develop a new classification system based on routine diagnostics to define all different combinations/types for a more systematic approach in classification and treatment decision-making.
Material & Methods: We retrospectively included patients with acute skier`s thumb injuries who underwent conservative or operative treatment between 2018 and 2023 in our clinic. Patients were included when there was sufficient information about joint stability, X-ray diagnostics and information about the ligament configuration from ultrasound, MRI or the surgery report. We characterized the stability according to established criteria in the literature. Bone lesions were identified in ap/lat radiographs of the thumb. Dislocation criteria were defined in a preliminary observer trial. The configuration of the ligament (e.g. Stener lesion) was identified either with ultrasound or MRI in conservative treatment or with information from the surgery report. The treatment given as well as a 3 month follow-up was documented.
Results: From 2018 till 2023 200 patients with acute skiers`s thumb injuries treated in our clinic for hand surgery met the inclusion criteria. All of them were clinically assessed for MCP-joint stability and had X-ray diagnostics to evaluate bone lesions. 65% had an ultrasound, 10% an MRI. 70% were treated surgically. The classification could reliably be applied on every injury with the predefined criteria for dislocation in bone lesions of the preliminary observer trial. The treatment given, mostly matched the treatment recommendations of the literature as there are absolute and relative indications either for splint therapy or operative therapy.
Conclusions: This new systematic and diagnostic-based classification addresses all characteristics and combinations of skier`s thumb injuries and enables clear treatment decisions and enriches the didactic on this topic.

A-0763 INTRA-OPERATOR AND INTER-OPERATOR VARIABILITY IN DISTAL RADIUS THREE-DIMENSIONAL FRACTURE SEGMENTATION

Verstreken Andreas[1,2], Vanhees Matthias[1,2,3], Verstreken Frederik[1,2,3], Femke Danckaerts[4], Jozef Michielsen[1,2]
[1]Medical and Healthcare Science, University of Antwerp,Antwerp, Belgium ; [2]Orthopedic Department, University Hospital Antwerp, Antwerp, Belgium; [3]Department of Orthopedic Surgery, AZ Monica, Antwerp, Belgium; [4]IMEC - Vision Lab, Department of Physics, University of Antwerp, Belgium

Introduction: Three-dimensional (3D) bone segmentation and surgical planning are becoming increasingly popular in orthopedic practices. It can be used to improve the outcome of surgical procedures, such as treating fractures, arthroplasties, bone tumor surgery, or corrective osteotomies {Fadero, 2014 #2}. Specifically for bone fractures, segmentation can help improve visualization and interpretation of fracture patterns and fragment displacement. However, it is not always clear where the fracture line runs precisely, and it is therefore operator dependent, influenced by knowledge of fracture patterns and experience in segmentation. Errors in fracture segmentation will lead to in-precise, non-anatomical representation of fracture models, causing problems later on with other applications, such as surgical guide design and fracture reduction and fixation.

Aim: Our study aims to examine the intra- and inter-operator differences in 3D fracture segmentation and evaluate the effect of training and experience. This information will be used to improve training modules and to refine the accuracy of automatic segmentation of fractures.

Material and method: We investigated how segmentation differs between five individuals; 2 were orthopedic residents with clinical experience in treating distal radius fractures and a specific interest in 3D technology. The other three were medical students who followed a 4 hours training course in 3D fracture segmentation. Computer tomographic DICOM images of 10 distal radius fracture cases were loaded into Mimics software (®Materialise, Belgium). All fracture fragments of the affected radius with a volume of at least 25 mm3 were individually segmented. Each segmentation was assessed using specific computer software that can evaluate the accuracy of the segmentation process (Jaccuard index, accuracy, precision, recall, dice, and number of identified fragments).

Results: The intra-operator Jaccard score was (68.85±6.30)%, while the inter-operator Jaccard score was (63.46±9.13)%. Also for accuracy, (97.27±0.87)% versus (96.63±1.10)%, precision, (83.85±4.83)% versus (80.63±6.25)%, and Dice score, (81.40±4.47)% versus (77.26±6.84)%, the intra-operator score was significantly higher. A slight decrease in the inter-operator difference of segmentation was noticed from the first to the last segmentation, which was not observed in the segmentations of the same operator.

Conclusion: Our results show some differences between segmentations, even between segmentations of the same person. If we look at the Jaccard index or the equality coefficient, we see a 10% difference between the intra- and inter-operator errors. This means that the segmentations of the same operator are the most identical. We see a similar value if we look at the automatic segmentation of distal radius fractures. However, the computer makes different, less expected, errors than we do, which makes them difficult to compare. Since there are differences between the segmentation in several areas, we cannot expect the computer to reach 100% in this.

A-0765 THE USE OF THE ISHIGURO TECHNIQUE FOR THE TREATMENT OF MALLET FINGER FRACTURES

Joana Correia Rodrigues, João Gonçalves, Tiago Canas, Rute Santos Pereira, Cláudio Garcia, João Cruz, Renato Soares, António Rebelo
Hospital do Divino Espírito Santo de Ponta Delgada, Ponta Delgada, Açores, Portugal

Introduction: Mallet Finger Fracture is an avulsion fracture at the insertion of the extensor digitorum tendon that results in a flexion deformity of distal interphalangeal joint. The most common cause is sports injury, but it can also occur at work or home. Various surgical techniques for Mallet Finger have been described. Ishiguro's is an indirect extension block technique and perhaps one of the most popular methods of treating Mallet Finger.
Aim: Characterize the surgical and clinical outcomes in patients with Mallet Finger Fractures treated with the Ishiguro Technique in our center.
Material & Methods: Retrospective study of all Mallet Finger Fractures cases treated surgically with the Ishiguro Technique between 2011 and 2022. Demographic data, dominant hand, Doyle classification, time to surgery, surgery time, pin removal, immobilization, healing time, Crawford criteria and complications were recorded. Exclusion criteria: comminuted fractures, open fractures, time to surgery of more than 6 weeks and a loss of follow-up.
Results: A total of 28 patients were included (19 males and 9 females) with a mean age of 29 years (14-72 years). The majority of fractures occurred in the dominant hand (60.7%, n: 17). Doyle classification: 18 cases IV B, 9 cases IV C and 1 case IV A. The mean time to surgery was 6 days (0-42 days) and the operative time was 19 minutes (5-41 minutes). The mean pin extraction time was 4.7 weeks (3-6 weeks) and the mean immobilization time was 5.23 weeks (4-10 weeks). The mean healing time was 6.7 weeks (4-10 weeks). Mean follow-up was 16 months (6-73 months). Crawford criteria: Excellent 57.2% (N=16); Good 21.4% (N=6); Fair 17.8% (N=5); Poor 3.6% (N=1). The complication rate was 7.1%: 1 case of superficial infection and 1 case of traumatic rupture of the extensor digitorum tendon.
Conclusions: The Ishiguro Technique is a simple, less invasive and reproducible surgical procedure with a shorter operative time compared to open reduction. In our study, this technique showed good functional and radiological results in the short and long term.

A-0766 DYNAMIC EXTERNAL FIXATOR IN PROXIMAL INTERPHALANGEAL FRACTURES - A RETROSPECTIVE STUDY

Joana Correia Rodrigues, João Gonçalves, Tiago Canas, Rute Santos Pereira, Cláudio Garcia, João Cruz, Renato Soares, António Rebelo
Hospital do Divino Espírito Santo de Ponta Delgada, Ponta Delgada, Açores, Portugal

Introduction: Without early recognition and treatment, proximal interphalangeal (PIP) fractures can be a focus of stiffness, instability, arthritis, pain, and consequent range of motion (ROM) limitation, leading to significant impact on activities of daily living. Several treatment modalities have been described, but there is no consensus on the most appropriate treatment for the different types and degrees of injury.
Aim: To characterize the surgical and clinical outcomes of patients with PIP fractures treated with a Dynamic External Fixator (DEF) in our center.
Material & Methods: Retrospective study of all proximal interphalangeal (PIP) fracture cases treated with a Dynamic External Fixator (DEF) between 2018 and 2022. Demographic data, dominant hand, time to surgery, operative time, pin removal, bony union, ROM of the metacarpophalangeal (MCP), proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints, Quick Arm, Shoulder and Hand Deficiency Score (QDASH), Visual Analogue Scale (VAS) and complications were collected.

Results: A total of 8 patients and 9 fractures were included (5 males and 3 females) with a mean age of 52.9 years (30 to 83 years). The majority of fractures occurred in the dominant hand (77.8%, n: 7). The mean time to surgery was 37.3 hours (3-96 hours) and the operative time was 51.4 minutes (16-100 minutes). Mean healing time was 11 weeks (6-16 weeks). The mean ROM (MCP 0.6-87.8°; PIP 6.7-63.9°; DIP 2.2-57.8°). The mean QDASH score was 12.05 and the mean VAS was 0.4. Complications included 1 case of pseudoarthrosis and 1 case of DEF detachment.
Conclusions: The Dynamic External Fixator (DEF) technique is a fast, simple and economical method for the treatment of proximal interphalangeal (PIP) fractures, capable of achieving good range of motion and functional results.

A-0767 IS ANTIBIOTIC PROPHYLAXIS IN HAND SURGERY NECESSARY?

Anja Hunziker[1], Andrea Frey[1,2], Ilja Kaech[1], Dirk J. Schaefer[1], Alexandre Kaempfen[1]
[1]Plastic, Reconstructive, Aesthetic and Hand Surgery, University Hospital Basel, Basel, Switzerland; [2]Hand Surgery, Orthopaedic Department, Cantonal Hospital Baselland, Basel, Switzerland

Introduction: Prevention of Surgical Site Infections (SSIs) in hand surgery is important to reach sustainable results of surgery. Preoperative prophylactic antibiotics are used in adherence to predominantly national guidelines to prevent SSIs, especially when hardware is implanted. However, several studies related to elective soft tissue hand surgery seem to indicate that preoperative use of antibiotics does not reduce the occurrence of SSIs.
Aim: There is only scarce evidence on preoperative antibiotics in operative hand fracture management, therefore we sought to evaluate their effectiveness on SSIs reduction in this specific setting.
Material & Methods: Between 2016 and 2019, we performed a single-center, retrospective analysis in which 550 patients were enrolled into an antibiotic or a control group based on the operating room where they received treatment (main theater with anesthesia and prophylaxis (P) or minor local anesthesia operating theater without prophylaxis (NP)). To address the study question whether antibiotic prophylaxis is associated with reduced risk of wound infection after traumatic hand surgery, we applied propensity modelling to achieve balanced treatment groups, with respect to risk factors for infection and calculated the odds ratio of prophylaxis and infection. We included age, female sex, smoking, diabetes, metabolic disease, inflammatory disease, substance abuse, cardiovascular disease, hepatopathy, renal disease, polytrauma, open fracture, being a manual worker and occupational accident as risk factors for SSIs.
Results: The propensity model showed that probability to receive antibiotics is comparable in both treatment groups. We did not find any association of antibiotic prophylaxis and infection. The odds ratio was 1.34, indicating that infection frequency was slightly higher in patients who had received prophylaxis. No subgroup was more prone to get an infection. Statistics were robust even after weighing for risk factors.
Conclusions: According to our data, the effectiveness of prophylactic antibiotics in reducing the risk of SSIs is highly debatable. There is currently no RCT on antibiotic prophylaxis in hand surgery, and the already low infection rate would require a large sample size to generate higher statistical power. We plan to further analyse and categorize the patients into subgroups based on the used operation method to reduce bias by indication. Further analysis will be presented at the conference. Based on our data, there should be the possibility to ethically justify an RCT with a control group without antibiotic prophylaxis to further support the non-prophylaxis approach in hand surgery.

A-0768 COMPATIBILITY OF DISTAL RADIUS VOLAR LOCKING PLATE WITH VARIOUS VOLAR CORTICAL ANGLES WITHIN A POPULATION

Verstreken Andreas[1,2], Vanhees Matthias[1,2,3], Verstreken Frederik[1,2,3], Femke Danckaers[4], Jozef Michielsen[1,2]
[1]Medical and Healthcare Science, University of Antwerp, Antwerp, Belgium; [2]Orthopedic Department, University Hospital Antwerp, Antwerp, Belgium; [3]Department of Orthopedic Surgery, AZ Monica, Antwerp, Belgium; [4]IMEC - Vision Lab, Department of Physics, University of Antwerp, Belgium

Introduction: Distal radius fractures are one of the most common fractures in orthopedics. In our population, the morphology of the radius varies greatly, differing not only in length or width but also in bowing and, more specifically, in the volar cortical angle (VCA). To investigate this correctly, we made a statistical shape model (SSM) of the radius. The differences between the VCA and the angulation of the distal radius locking plates have been investigated(Evans et al., 2014), but a compatibility study has never been published. With a loss in volar tilt and a smaller VCA, there is more risk of contact between the plate and the flexor pollicis longus (FPL). Finally, plate compatibility is also vital for accurately correcting the volar tilt.

Aim: This study compares the compatibility of the commercially available distal radius volar (DVR) locking plates (Acumed, Arthrex, Biomet, and Synthes) with the VCA within our SSM. What is the level of conformity of a plate to a surface with a strongly curved volar cortical angle, and which plate for a gentler surface. To achieve a patient-centered approach that prioritizes precise correction of the original morphology, explicitly addressing the volar tilt, enabling more individualized and effective treatment strategies.

Material and Methods: We created an SSM with 43 radii; the model can obtain a different morphology depending on the different parameters of the modes. For the mode altering the VCA, this is mainly the VCA that differs from a standard deviation (SD) of -3 to +3, i.e., from a large VCA to a smaller VCA. The plates were scanned using an Artec Micro (3D accuracy, Up to 10 microns (0.01 mm). Afterward, an Orthopaedic Resident, an experienced hand surgeon, and the computer fitted the plates as best as possible. The computer was assisted by applying specific landmarks, not going beyond the Watershed line, and centering the plate over the diaphysis.

Results: We optimized the DVR plates for our population's average radius shape and extreme shapes, plus and minus three standard deviations for modes 1, 2, 3, and 4. The modes represent a change in the morphology of the radius. In the first mode, there is a difference in size, and the fourth mode is the most interesting for volar cortex analysis as the VCA goes from small to large in this mode. This is from a standard deviation of -3 to +3, thus covering 99.9% of the possible radius shapes in the population.

Conclusion: From the results, we can see that different bone shapes require different types of plates. We gave each plate a score based on the plate position and the distance from the plate to the bone without allowing the plate to pass through the bone. The lower the score, the better the position of the plate. For the mode in which the radius is most different from VCA, we see that the Arthrex plate fits best for a small VCA instead of the Biomed Zimmer crosslock plate, which fits best for a large VCA.

A-0769 A SYSTEMATIC REVIEW OF LONG-TERM OUTCOMES FOLLOWING PARSONAGE TURNER SYNDROME AND AN EVIDENCE-BASED ALGORITHM TO OPTIMISE PATIENT MANAGEMENT

Rinad Al Hinai[1], Jake McDonnell[2], Roisin Dolan[2]
[1]St Vincents University Hospital, Dublin, Ireland. [2]Royal College of Surgeons in Ireland, Dublin, Ireland

Introduction: Parsonage Turner Syndrome is a peripheral neuropathy that manifests as a sudden onset of pain followed by muscle weakness and atrophy. It commonly affects nerves of the brachial plexus. The incidence has been reported as 1.64 cases per 100,000 population.
Aim: This systematic review aims to analyse the long-term outcomes reported in adult patients presenting with parsonage turner syndrome (PTS) and to design an evidence-based algorithm to optimise management of PTS.
Material & Methods: A comprehensive literature search was performed by a medical librarian using the MEDLINE, PubMed and the Cochrane Library Articles that met the eligibility criteria of articles assessing incidence, management and outcomes of patients presenting with PTS. Analysis was conducted on the time to presentation, functional deficits at presentation, interventions and long-term functional outcomes. All relevant information was collected by two independent reviewers.
Results: The systematic review identified 25 studies involving 950 patients with parsonage turner syndrome. The average age of patients was 43.8 years, with a F:M ratio of 0.6:1. The average duration of symptoms prior to presentation ranged between 1 to 24 months. management was outlined in 400/950 patients (42%). Of those, 348(87%) patients were managed conservatively with corticosteroids, IV immunoglobulin, pain management and physiotherapy. In 248/348 (71%) of the patients conservatively managed, more than 50% showed no improvement. (20% showed worsening of symptoms, and 33% no changes) 52/400 (13%) patients required further surgical interventions. This included neurolysis, decompression, nerve transfers and diaphragmatic plication. Symptom duration prior to surgical intervention ranged from 6 to 28 months. Of those reported, motor recovery was achieved from 1 day-13 months (2.9 months on average) after surgical intervention. Overall long-term outcomes were reported at 5-25 months in 50% of patients with 60% reporting residual neuropathic pain and 70% reporting incomplete return of motor function.
Conclusions: Lack of early recognition of PTS and prompt referral to nerve specialists remains a problem. Whilst surgical intervention (nerve transfers) are now supported for incomplete recovery at three months, long term outcomes following surgical interventions are underreported. We have devised an evidence-based algorithm to optimise patient management following this rare entity.

A-0770 THE ULNAR NERVE AND ITS MANAGEMENT IN COMPLEX ELBOW DISLOCATIONS

Carlotta Faccenda, Elisa Dutto, Paolo Titolo, Elisabetta Mijno, Bruno Battiston
Department of Orthopaedic and Traumatology, Hand and Microsurgery Unit, Orthopaedic and Trauma Centre, AOU Città Della Salute E Della Scienza Di Torino, Turin, Italy

Introduction: The distinctive anatomy of the ulnar nerve makes it susceptible to complex elbow dislocations. Depending on the type of injury, the nerve treatment and its consequences from a clinical perspective may differ. Unfortunately, in the contemporary literature, information regarding ulnar nerve management and the incidence of neuropathy in complex elbow dislocations is poor and fragmentary.
Aim: The aim of our study was to determine the incidence of ulnar nerve pain and its association with anteposition.
Material & Methods: In this study, 44 patients undergoing surgery for complex elbow dislocation were retrospectively evaluated. The mean follow-up was 29 months. Patients were subdivided by disorder (transolecranon fracture-dislocation,

Terrible Triad, Monteggia-like lesions and Injuries not belonging to the previous categories), and it was evaluated whether the ulnar nerve was released from the cubital tunnel and underwent transposition. In addition, the study evaluated how many patients had ulnar suffering in the postoperative period and its durability overtime
Results: Patients who underwent ulnar nerve transposition surgery at the same time as complex elbow dislocation showed a higher incidence of neuropathy. In these patients, the symptoms were also less intense but more prolonged.
Conclusions: Management of the ulnar nerve in complex elbow dislocations does not
have defined guidelines in the literature. This study suggests that a systematic transposition of the ulnar nerve should be avoided, however further studies and with larger populations are needed.

A-0771 PERCUTANEOUS WRIST DENERVATION, DESCRIBING A NEW TECHNIQUE

Marta Marti-Puente, Anna Escolà-Benet, Francisco Duca-Rezzulini, Joaquim Rodriguez-Miralles, Xavier Solernou-Soler
Hospital Universitari General de Catalunya, Sant Cugat del Valles, Spain

Introduction: wrist denervation is a procedure that has been offered usually to treat chronic wrist pain. It is considered a palliative procedure usually considered to address chronic wrist pain when reconstructive procedures are not feasible or desirable.
Traditionally, it has been performed surgically in the operating room. During this procedure the surgeon cut tiny branches of the sensory nerves to the wrist and hand, such as anterior interosseous nerve (AIN), posterior interosseous nerve (PIN) or terminal sensory branches from the ulnar and radial nerve that deepens towards the joint.
Rigonni M et al described in 2021 a new technique using pulsed radiofrequency guided through US. We describe now, another technique were Thermic and pulsed radiofrequency are combined to denervate the painful wrist including during the procedure subcutaneous dissection with saline solution.
Case: A 46 years old woman who has been treated in the past with a bowers osteotomy on the distal ulnar due to radio ulnar distal joint arthropaty. Even with the surgical procedure done, the patient complaint ulnar sided wrist pain.
A percutaneus wrist denervation was offered. The procedure is done as an outpatient procedure. PIN and AIN are localized using US guidance. Sensory and motor neuro-stimulation through an electrode is done to ensure that not motor branches are affected. Thermal radio frequency is done over those two nerves. Then, the tip of the electrode is placed in the area of the radioulnar distal joint and pulse radio frequency is applied. Finally, Saline solution is infiltrated over de fascial plane dissecting the overlying subcutaneous tissue and skin on the ulnar side of the wrist.

A-0772 COMPUTER-ASSISTED 3D MODELLING OF PHALANGES AND THEIR BILATERAL ASYMMETRY

Lea Estermann, Jana Betschart, Andreas Schweizer
Department of Hand Surgery, Balgrist University Hospital, Zurich, Switzerland

Introduction: Computer-aided 3D analyses of bones, especially in the context of preoperative planning for corrective osteotomies in malunited fractures, rely on the assumption that bilateral extremities exhibit a symmetrical mirror image when projected onto each other. A 1978 anatomical study highlighting significant differences in torsion among metacarpals in bilateral comparisons further emphasizes the complexity of bone symmetry. No studies are available for phalanges.
Aim: Analysing the bilateral asymmetry of phalanges
Material & Methods: Three-dimensional bone models of all phalanges of 20 healthy participants (40 hands) were created

from computed tomography data. The left phalanx was mirrored and coarsely aligned to the proximal third of the contralateral bone. Then, an osteotomy was simulated in the middle of the left mirrored phalanx. Further, an automated alignment of the distal part was applied to the right bone model. The difference before and after automated alignment was calculated. For every single phalanx of each individual, the difference between left and right were assessed with respect to the axis of rotation, ulnoradial deviation, flexion-extension and length of the bone.
Results: The average absolute left to right difference was low, but there are significant differences of supination with a mean of 1.1° (SD 1.1, max. 9.4°), extension with a mean of 1.8° (SD 1.9, max. 12.3°), ulnoradial deviation with a mean of 0.9° (SD 1°, max. 11.1°) and translation with a mean of 0.2mm (SD 0.3mm, max 1.5mm). The inter-reader reliability was good with a high intraclass correlation coefficient and no significant standard errors of measurement were found.
Conclusions: The contralateral anatomy may serve as a reliable reconstruction template if analysed with 3D algorithms.

A-0773 SONOGRAPHICALLY CONTROLLED MINI-INVASIVE A1 PULLEY RELEASE USING A NEW GUIDE INSTRUMENT – A CASE SERIES OF 154 PROCEDURES IN 110 PATIENTS

Nora Schlimme, Damian Sutter, Esther Vögelin
University Hospital Bern, Switzerland

Introduction: With mini-invasive pulley release becoming more popular, safety and reliability of this procedure remain a concern. Therefore, proper instrumentation is crucial. Visualization of the surgical steps by sonography has repeatedly been shown to be beneficial regarding outcome and patient satisfaction. We present the results of implementing sonographically guided mini-invasive A1 pulley release using a newly designed guide instrument and a commercial hook knife.
Material & Methods: We have retrospectively analyzed the data of all patients, who underwent a sonographically guided A1 pulley release in our clinic. 154 procedures were performed in 110 patients between November 2019 and May 2023 (37 patients with a release of 2-4 A1-pulleys per surgery).
Results: Complications include one case of inadvertent skin laceration, one case of postoperative infection and one CRPS. Intraoperative conversion to open release was performed in 6 cases due to an unfavorable position of the hook knife or persistent trigger finger intraoperatively. Postoperative recurrence of a trigger finger due to incomplete pulley release was noted in 2 cases, in one of which the issue was resolved by a second sonographically guided pulley release. The second underwent open pulley release the same day revealing an intact A1 pulley. 9 patients showed prolonged swelling between 6 weeks to a maximum of 6 months. 4 reported a late return of occasional triggering. Apart from one patient there were no scar complaints. 85% of the patients returned to strenuous activities within two weeks and after 6 month all our patients were asymptomatic. No injuries to nerves, vessels or tendons occurred. In the postoperative sonography, increased fluid in the flexor tendon sheath was observed in 22.7% of the releases up to 6 weeks and in 11% up to 3 months. However, the vast majority of patients were asymptomatic despite the presence of this sonographic finding.
Conclusions: Given a success and complication rate comparable to the results of the open pulley release reported in the literature, this minimally invasive technique offers a safe alternative with lower scar formation.

A-0774 EYE DOMINANCE IN INDIVIDUALS WITH UNILATERAL CONGENITAL UPPER LIMB TRANSVERSE DEFICIENCIES AND INSIGHTS INTO LATERALITY

Samuel Brown[1,2], Wee Lam[2], Geoffrey Hooper[2]
[1]University of Edinburgh, Edinburgh; [2]St John's Hospital, Livingston

Introduction: Laterality, encompassing hand and eye dominance, has been a longstanding subject of scientific inquiry. Right-hand dominance is prevalent, but left-hand dominance occurs in approximately 9.26% of the population. There may be a relationship between hand and eye dominance, and it has been suggested that eye dominance may offer insights into underlying laterality. Unilateral congenital upper limb transverse deficiencies (UCULTDs) involve partial or complete upper limb absence and affect approximately 1 in 20,000 live births. The pattern of eye dominance in patients with UCULTDs could shed light on the development of laterality.
Aim: The aim of this study was to explore the pattern of eye dominance in individuals with UCULTDs.
Material & Methods: A prospective cohort study involving 81 patients with UCULTDs was conducted in a clinical setting using the Porta test for eye dominance. Demographic data, limb deficiency details, and eye dominance were recorded. Statistical analyses, including binomial tests and logistic regression, were used to explore the relationships between eye dominance, limb deficiency laterality, age, sex and anatomical location.
Results: A total of 81 patients were included, with a median age of 25 (IQR , 20; range, 6-71). Laterality of limb absence was 27:54 (Left: Right). Most patients (71.60%) had forearm deficiencies, and overall, 38.27% were left-eye dominant. 81.48% of left-hand dominant (absent right hand) patients were left eye dominant and 83.33% of right-hand dominant (absent left hand) patients were right eye dominant. Patients were more likely to be right eye dominant than left eye dominant (OR 22.39, 95% CI:7.02 to 85.80; $p<0.001$). Contralateral eye dominance was more prevalent in patients with UCULTD than in the general population ($p<0.05$). Most left-handers with UCULTD had left-eye dominance (81.48%; $p<0.05$; 95% CI: 61.92% to 93.70%), in contrast to the general population (57.14%). Most right-handers with UCULTD had right-eye dominance (83.33%; $p<0.05$; 95% CI: 70.71% to 92.08%), in contrast to the general population (65.57%).
Conclusions: Exploring eye dominance in UCULTDs has shown distinctive laterality patterns, suggesting a complex interplay between genetic factor and limb development. These findings challenge existing theories, and pave the way for future research on the genetic and environmental factors that influence eye dominance in the context of congenital limb abnormalities.

A-0775 ARTHRODESIS OF THE PIP JOINT WITHOUT POSTOPERATIVE IMMOBILIZATION? RESULTS OF BIOMECHANICS STUDIES OF PRIMARY STABILITY

Michael Millrose[1,2], Hans-Christoph Vonderlind[3], Andreas Thannheimer[1], Till Ittermann[4], Hermann-Josef Bail[2], Andreas Eisenschenk[4]
[1]Garmisch-Partenkirchen Medical Centre, Garmisch-Partenkirchen, Germany; [2]Paracelsus Medical University, Nuremberg, Germany; [3]HELIOS Hospital Schwerin - University Campus of MSH Medical School Hamburg, Schwerin, Germany; [4]University of Greifswald, Greifswald, Germany

Introduction: Osteoarthritis of the proximal interphalangeal joint of the finger often leads to global hand function detriment. Different techniques for arthrodesis of the proximal interphalangeal joint have been described. A recent systematic review, the first of its kind, by the first author of the presented study, showed that all these procedures lead to union in a reasonable percentage and time.

Aim: These biomechanical studied aim to analyze and compare the primary stability of different techniques of arthrodesis to render postoperative immobilization unnecessary.
Material & Methods: Arthrodeses of different fusion angles in formalin-fixed human cadaver specimen as well as composite cylinders were tested with different techniques and implants in four-point bending for stability in extension as well as flexion.
Results: In the biomechanics study with composite bone equivalent tension band, cerclage or compression screw fusion showed the best compromise in flexion / extension stability. The biomechanics study with the cadaver joints crossed compression wires showed the highest primary stability.
Conclusions: The biomechanical studies of the primary stability of the proximal interphalangeal joint of the finger with different fusion techniques showed that all the used techniques beside the plates could withstand the force which are applied during activities of daily living. Based on the results the cerclage, tension band and compression screw might be able to provide enough stability of withstanding the forces of unencumbered activities of daily living and warrant further clinical studies. The arthrodesis of the PIP joint using plates should be limited to special indications and need an immobilization for the whole consolidation period.

A-0776 NON-BIOLOGICAL RECONSTRUCTION OF THE ULNAR COLLATERAL LIGAMENT OF THE THUMB METACARPOPHALANGEAL JOINT: A RETROSPECTIVE CASE-CONTROL STUDY

Sergi Barrera-Ochoa[1], Julio Adrian Martínez-Garza[1], Rita Pereira-Cavaca[3], Jos Mere-Prieto[1], Gerardo Mendez-Sanchez[1], Francisco Soldado[2]
[1]Hand, Elbow and Microsurgery Unit, Institut de la Ma, Hospital General de Catalunya, Spain; [2]Hospital HM Nens, Barcelona, Spain; [3]Centro Hospitalar e Universitário de Coimbra, Portugal

Introduction: The UCL of the first metacarpophalangeal joint (MCPJ) is among the most injured ligaments on the hand.The resultant instability can provoke pain, weakness in grasping, pinching, and, ultimately, MCPJ osteoarthritis. Non-biological augmentation with suture tape has recently been introduced as a new idea in ligament repair; the concept of an internal brace to the BLR to accelerate restoration and patients' return to everyday activities and sports.
Aim: This retrospective analysis compares post-operative results of non-biological ligament reconstruction (NBLR) for chronic injuries involving the first metacarpophalangeal joint (MCPJ) and ulnar collateral ligament (UCL).
Material & Methods: Eighteen patients with this metacarpophalangeal joint injury underwent static non-biological ligament reconstruction (n=18) and were included in this retrospective case-control analysis. Preoperative, post-operative, and contralateral thumb measurements (clinical, radiological, and subjective outcome questionnaires) were compared over 38 months of follow-up.
Results: The average post-operative ranges of motion of the first metacarpophalangeal were 0-57,5º, and for the interphalangeal joint was 0–71° for non-biological ligament reconstruction. The average grip strength was 103,3%, and the pinch strength was 88,7%, relative to the unaffected hand. The subjects demonstrated stability with a tense endpoint comparable to the contralateral MCPJ. The average Quick Disabilities of the Arm, Shoulder, and Hand (Quick DASH) score among all patients was 11,9 for the disability/symptom module, 0 for the sports module, and 16,5 for the work module. Four patients declared immobility, and no wound issues or other complications were registered.
Conclusions: Non-biological ligament reconstruction of the first metacarpophalangeal UCL generates acceptable short-term outcomes, allowing faster recovery and reincorporation into daily activities, compared to biological repairs.

A-0777 CUP CENTRALIZATION IN TRAPEZIOMETACARPAL TOTAL JOINT ARTHROPLASTY: DOES IT MATTER?

Micaela Gonçalves, Diogo Tomaz, Maria Clara Correia, João Lobo, Daniela Linhares, Isabel Pinto, Rui Matos, Vítor Vidinha, Pedro Negrão
[1]*Centro Hospitalar Universitário de São João, Portugal;* [2]*Hospital CUF Porto, Portugal*

Introduction: In recent years, total trapeziometacarpal arthroplasty has been showing good clinical outcomes compared to trapeziectomy with ligamentoplasty.
A faster recovery has been observed, with an implant survival rate of around 88–95% at 10 years.
To reduce the risk of complications, including dislocation, component loosening, and early wear, proper implant placement is considered important.
It is generally agreed upon that the cup needs to be positioned in the middle of the trapezium to stabilize the implant and avoid trapezium fracture during impaction; nevertheless, suboptimal centering has been estimated to occur in 20% of cases. However, there is still a lack of knowledge regarding the real impact of an off-centered cup on outcomes.
Aim: This study aimed to assess the differences in long-term results between centered and off-centered cups.
Material & Methods: A retrospective study of clinical and radiographic outcomes of 73 prostheses in 58 patients, performed between 2009 and 2022, was conducted with an average follow-up time of 7 years. The group of included patients was clinically and radiologically evaluated in 2016 and subsequently in 2023.
Measurements were obtained of the trapezium, and it was defined as a non-centered cup if the difference between each side measurements was more than 4 mm on the anterior-posterior (AP) or more than 3mm in the medio-lateral.
Subsequently, a comparison between this definition and the surgeon's subjective opinion after X-ray analysis was conducted.
Results: According to the established radiographic criteria, in 60% of cases, the cups were centered, while in 40%, they were off-centered.
On the other hand, the surgeon, after subjective radiographic analysis, considered that only approximately 20% of the cups were off-centered.
No statistically significant differences in clinical outcomes (DASH, VAS, pinch, and grip) were found between the two groups, with a mean follow-up time of 7 years.
Also, there were no statistically significant differences in the radiography results either, with no variations in osteolysis, subsidence, unsealing, or revision.
Conclusions: In the long term, the position of the cup—centered versus off-centered—doesn't seem to significantly influence clinical or radiographic outcomes. However, further studies are needed to understand the actual implications of cup positioning on outcomes and implant survival.

A-0778 FINGER RAY RESECTION – INDICATION, TECHNIQUE AND OUR RESULTS

Ákos Mátrai, Daniel Koczka, Zoltán Sándor, Csaba Rajki, Ingrid Soltész
Markusovszky Teaching Hospital Traumatology, Szombathely, Hungary

Aim: The purpose of our study is to present the outcomes of finger ray resections performed for various reasons, as examined in a retrospective analysis.
Material & Methods: From January 2019 to December 2022, we conducted finger ray resections on 11 patients, consisting of 7 men and 4 women whose ages ranged from 28 to 71 years, with an average age of 53.8 years. The reasons for the

resections included tumor presence in two patients, infection in five patients, one case of a hematological disorder, and one case involved a patient with multiple surgeries for Dupuytren's contracture. In all cases, we carried out only the finger ray resection without any finger transposition. The fingers involved were 5 index fingers, 3 middle fingers, and 3 ring fingers. Primary surgical procedures were performed in seven instances. We assessed postoperative pain, the Disability of Arm, Shoulder and Hand (DASH) score, and the visual analog scale (VAS) for aesthetics. The average monitoring period was 22.45 months, ranging from 10 to 35 months.
Results: Patients treated for tumors demonstrated better functional outcomes. The average DASH score among the patients was 19.4, with a range from 7.5 to 36.6. The mean VAS score for aesthetics was 8.44, with scores ranging between 6 and 9. There was only one case reported of a scissoring effect. Grip strength post-surgery was found to be 15-20% less compared to the unaffected hand.
Conclusions: The reason for the small size of our patient group is that not all individuals were eligible for finger ray resection based on various criteria pertaining to either the patient or the decision of the surgical team. Based on patient feedback, the most significant improvements noted were enhanced aesthetics and reduced finger gapping, leading to better functional outcomes.

A-0779 PRODUCTION OF RELATIVE MOTION ORTHOSIS WITH UNIVERSAL DESIGN USING 3D PRINTER

Fatih Süleyman OKUMUŞ[1],Çiğdem ÖKSÜZ[1], İlkem Ceren SIĞIRTMAÇ[2], Özge Buket ARSLAN[1], Deran OSKAY[3]
[1]Hacettepe University, Ankara, Türkiye; [2]Çankırı Karatekin University, Çankırı, Türkiye; [3]Gazi University, Ankara, Türkiye

Introduction: The fundamental requirements of an orthosis are simplicity, lightness, durability, and ease of use. For this purpose, the key features to be considered in orthosis design should include weight, adaptability, functional usability, durability, cost, and material selection/appropriateness. Due to its ability to meet the mentioned requirements, the relative motion orthosis is frequently used by clinicians in the therapy process. Relative motion orthosis is widely used, especially in cases of stiffness in the proximal interphalangeal joint, flexor, and extensor tendon injuries, and boutonniere deformities, mainly because it is relatively small, lightweight, and can be quickly produced compared to other static orthoses.
The thermoplastic fabric material is highly functional, as it can be easily shaped at low temperatures. However, the use of imported raw materials and limited customization options slow down the production process and increase production costs. The increasing cost hinders the accessibility of orthoses for patients, and in some countries where the raw material supply is challenging, production becomes nearly impossible. All these clinical reasons may leadus to strive to produce orthoses that are both easier to manufacture and obtain, andmore cost-effective.
Aim: The aim of this study is to design a relative motion orthosis suitable for 3D printing using 3D modeling methods, with a universal design. With this design, the goal is to develop an alternative production method for relative motion orthosis, which has high production costs, especially in countries that rely on imported products.
Material & Methods: In our study, the production of the relative motion orthosis with a 3D printer was performed in five stages. The first stage involves the conceptualization of the orthosis, the second stage includes designing and preparing the orthosis for printing using computer-aided graphic design applications, the third stage involves the actual production of the orthosis with a 3D printer under specific conditions, the fourth stage is the evaluation of the produced orthosis by a focus group, and finally, the fifth stage is the production of the final orthoses.
Results: Several prototypes were produced for the design in a computer environment and manufactured with a 3D printer. Throughout the process, various problems were encountered, and changes were made, either in the design or production method, to reach the final orthoses. In total, four prototypes and two final orthoses were produced during

this process. After the design phase and engaging in focus group discussions, two distinct final orthoses were developed. Conclusions: As a result of our study, we produced low-cost relative motion orthoses compared to traditional thermoplastic production. An increase in the number of studies comparing orthoses production with 3D printing technology to conventional low-temperature thermoplastic orthoses will contribute to a better understanding of these two methods. Such studies may reveal the advantages and disadvantages of different design and production processes. Future research should include standardized functional assessments and specific evaluations of orthotic use based on patient-reported outcomes.

A-0780 ENDOPROSTHETICS OF THE ELBOW JOINT FOR BONE TUMORS

Volodymyr Protsenko[1], Yevhen Solonitsyn[1], Andriy Kukharuk[2]
[1]Institute of Traumatology and Orthopedics of NAMS of Ukraine, Kyiv, Ukraine; [2]Bogomolets National Medical University, Kyiv, Ukraine

Introduction: Malignant bone tumors account for less than 0.2% of all malignant tumors. Treatment of malignant bone tumors is complex. The surgical method of treating bone tumors is the main method in the treatment of this pathology. One of the types of surgical treatment for bone tumors is individual endoprosthetics, which allows saving not only a supporting-capable functioning limb, but also the life of the patient.
Aim: To show the effectiveness of elbow arthroplasty for bone tumors.
Material & Methods: Endoprosthetics of the elbow joint for bone tumors was performed in 14 patients. Morphologically we encountered: giant cell tumor – 6 cases, metastatic tumors – 6, chondrosarcoma – 2. Endoprostheses were used: "Inmed" (Ukraine) and "Link" (Germany). The functional outcome of the operated limb was calculated using the MSTS scale. Quality of life was determined using the EORTC-QLQ-C30 questionnaire.
Results: Postoperative complications amounted to 21.4%, tumor recurrences – 7.1%. The functional result of the limb after elbow replacement was 75.7%. The quality of life of patients after endoprosthetics improved from 40 to 80 points.
Conclusions: Complications after endoprosthesis replacement depend on the size of the tumor, the surgical technique of the operation and the design of the endoprosthesis used. The obtained results of elbow joint replacement practically coincide with the results of leading oncological orthopedic clinics, such as Mayo (USA). Design of endoprostheses and surgical techniques should be improved to obtain more effective treatment results. Endoprosthetics of the elbow joint is a promising direction in the surgical treatment of bone tumors by improving the functional results of the upper limb and, in connection with this, improving the quality of life of this category of patients.

A-0781 OUTCOMES AND COMPLICATIONS ASSOCIATED WITH PEDIATRIC AND ADOLESCENT DISTAL RADIUS FRACTURES MANAGED WITH CLOSED REDUCTION AND PERCUTANEOUS PINNING

Peyton Woodward, Julia L. Conroy, Catherine C. May, Joshua M. Abzug
University of Maryland School of Medicine, Baltimore, Maryland, USA

Introduction: Distal radius fractures are the most common fracture in the pediatric population, with an incidence of approximately 20-30% of all pediatric fractures. Most pediatric distal radius fractures are managed nonoperatively with immobilization with or without a closed reduction. However, if the fracture is displaced and/or closed reduction cannot be achieved in the emergency department/outpatient setting, operative intervention may be warranted. The typical first

choice of operative intervention is closed reduction with or without percutaneous pinning (CRPP).
Aim: The purpose of this study is to investigate the outcomes and complications of pediatric distal radius fractures that underwent closed reduction and percutaneous pinning (CRPP).
Material & Methods: A retrospective review was performed to identify all pediatric and adolescent patients aged 0-17 years who received treatment for a CRPP of a distal radius fracture. Data collected included patient demographics, mechanism of injury, injury classification, outcomes, and complications. Simple statistical analysis was conducted.
Results: 64 patients with an average age of 5.4 years were identified. The most common mechanism of injury was a fall on an outstretched hand (96.7%). 32 (50.0%) patients sustained concomitant injuries, of which 31 (97.0%) were a concomitant ulna fracture and 1 (3.0%) was a concomitant radial neck fracture. The average time from evaluation to surgery was 9.3 days. Patients were most commonly placed in a long arm cast (n=51) postoperatively with an average length of immobilization of 39.0 days. The average time until pin removal was 30.2 days. Eighteen patients (34.6%) experienced complications following CRPP. The most common complications reported were tenderness to palpation at the fracture site (n=5) and the presence of a pin site pyogenic granuloma (n=4). Additional complications included physeal bar formation/physeal arrest (n=3), erosion of skin or eschar at the pin sites (n=3), pins backing out (n=2), hypersensitivity at the pin sites (n=1), development of a maculopapular rash secondary to the patient's cast becoming wet (n=1), mild calcification between the radius and ulna (n=1), and post operative ulnar nerve palsy (n=1).
Conclusions: Pediatric distal radius fractures managed operatively with closed reduction and percutaneous pinning are associated with a high rate of complications. The risk of physeal arrest associated with CRPP of distal radius fractures is 4.6% (3/64). Future studies are need to better evaluate the CRPP of distal radius fracture technique in hopes of decreasing the complication rate.

A-0782 COMPARISON OF A RETROSPECTIVE STUDY OF MECHANICAL FAILURE OF THE UNIVERSAL 2 TWA AND A COMPUTER MODEL

Jannis Papadopulos, David Veigl, Petr Tichý
Department of Orthopaedics, First Faculty of MedicineCharles University in Prague and University Hospital Motol, Czech Republic, Department of biomechanics, Faculty of mechanical engineering, Czech Technical University in Prague, Czech Republic

Introduction: Total wrist athroplasty is an option in surgical treatment of painful arthritis that does not respond to other treatments. This is a comparison of a retrospective study of mechanical failure of the Universal 2 TWA and a computer model.
Aim: The implantation of the Universal 2 model under certain angles will have as a result bone overload, which canlead to bone weakening, loosening of the components and mechanical failure.
The aim of this study is to identify the unsuitable angles of implantation of the components through revision of previous cases and comparing them to computer model, thus bringing us closer to optimization of the implantation.
Material & Methods: We used the results of a retrospective review of case notes of Universal-2 total wrist arthroplasty procedures performed from 2008 to 2015 at our institute and we compared them to the results of a computer model that was created in cooperation with CTU (Czech technical university in Prague) biomechanics department. There were evaluated postoperative radiographs for radiolucenct lines around radial and metacarpal components and screws, subsidence and signs of migration. CT scans were used for the creation of the computer model.
Results: Implants failure occurred in 1/3 of the total number of operations. The most frequent reason of the mechanical failure was an increased dorsal angulation of the metacarpal component which led to bone overload and loosening. Signs of loosening on theradiographic exam were in 2/3.

Revision surgical procedure was needed in 20% of cases

Conclusions: We concluded that the most treacherous part of the implantation is the embedding of the metacarpal component, prone to dorsal and radial tilt, which is the main reason for the loosening of the component. The clinical data are in agreement with the results we have from the computer model. With meticulous surgical technique while keeping in mind the ideal implantation parameters and avoiding the unsuitable angles we can accomplish a longer survival rate of the implants.

A-0783 RING AVULSION INJURIES OF THE FINGER WITH COMBINED PHALANX FRACTURE: FINGER SALVAGE TREATMENT

Batsou V, Tetsios G, Myrgiotis D, Ayfantis I, Syngouna S, Fandridis E

Hand, Upper Limb & Microsurgery Department, KAT Hospital, Athens Greece

Introduction: Finger degloving injuries, known as ring avulsion injuries, range from skin, vessel to complete degloving of the bone. These injuries are described using the Urbaniak and Kay classifications according to which degloving injuries of the fingers that were combined with a phalanx fracture are not classified but they are characterized as non-viable incomplete amputation and the treatment proposed is immediate amputation to reduce complications and comorbidities. Despite the above, and in absence of a firm classification concerning this type of injury, we treated patients in good general health, presenting these avulsion injuries of the fingers combined with a phalanx fracture, with fracture stabilization and vessel anastomosis with good results for the finger survival.

Aim: The aim of this study is to present the algorithm treatment of these ring avulsion injuries combined with a phalanx fracture.

Method: From 2017 to 2023, 4 patients (2 male, 2 female), aged from 35 to 70 years old (MO 42yo) with degloving injury of the digit and fracture of the phalanx (Urbaniak type II, Kay type III) were treated in our department. All 4 patients presented injury of the ring finger. 2 patients had injury of the left hand, non- dominant and 2 patients had right hand dominant. The ring avulsion injury of the finger was combined with a middle phalanx fracture in 3 cases and a distal phalanx fracture in one case. In all cases the fracture was stabilized with K-wire (1.0-1.2 mm). 3 patients presented trauma of one digital artery of the finger, whereas in 2 cases the contralateral artery was found thrombosed. 1 patient presented trauma of both arteries. In all the cases the dorsal veins were traumatized. All vessels were microsurgically sutured both arteries and dorsal veins, and the thrombosed arteries were injected with heparin solution. Both digital nerves were found intact in all 4 patients.

Results: The mean follow-up period was 11 months (4 to 34 months). The healing of the phlanx fracture was completed in a period of 6 to 10 months. Decreased total range of motion and reduced two points discrimination of the finger injured were noted. 3 patients were satisfied, and one patient reported a non-functional grip.

Conclusion: Ring avulsion injuries combined with a phalanx fracture under certain circumstances can be treated with fracture stabilization and soft tissue reconstruction using microsurgery to avoid immediate amputation. The post operative treatment is longer, nevertheless the patient ends up with a partially functional finger and avoids the stump and all its functional and social comorbidities.

A-0784 RARE SOFT TISSUE TUMORS OF THE HAND UNDER WALANT ANESTHESIA

Mihaela Pertea[1,2], Stefana Luca[1,2], Alexandru Amarandei[2], Bogdan Veliceasa[1,3], Dan Cristian Moraru[1,2]
[1]Grigore T Popa, University of Medicine and Phatmacy Iasi, Romania; [2]Plastic Surgery and Reconstructive Microsurgery Clinic, Sf Spiridon, Emergency County Hospital, Iasi, Romania; [3]Orthopaedics Department, Sf Spiridon, Emergency County Hospital, Iasi, Romania

Introduction: Local anesthesia without sedation and without tourniquet – Walant represents good results, safety technique and patient's full satisfaction and made us ask ourselves "what are the limits of this technique?" Benign tumors and tumor-like lesions of the hand have a low incidence compared to other anatomical sites, some of them being included in the category of rare tumors; therefore, diagnosis and surgical treatment require good knowledge and skills. All of these have a surgical indication, and the anesthetic technique used for these cases is Walant.
Material & Methods: The study included a group of 81 patients: 51 were female and 30 were male. The following diagnoses were made: neurofibroma 2 cases, glomus tumor 15 cases, lipoma 30 cases, schwannoma 22 cases, epidermal inclusion cyst 3 cases and idiopathic tenosynovitis with rice bodies 8 cases. In all cases, surgical treatment was performed under wide-awake local anesthesia with no tourniquet (Walant). Local anesthesia, specifically lidocaine 1% with epinephrine (1:100,000 concentration), was administered following literature guidelines, with dosage reductions ranging from 5% to 40%. Adherence to recommended injection points was maintained The immediate postoperative results concerning the neurological symptoms were evaluated using the British Medical Research Council (BMRC) scale modified by Omer and Dellon. The assessment of outcomes was performed by sensitive and motor (active and passive) evaluation and confirmed by specific tests, such as two-point discrimination (2PD) and Semmes–Weinstein (SW) test, and the calculation of the disabilities of the arm, shoulder and hand (DASH) score. The degree of postoperative satisfaction of the patients was evaluated using the Michigan hand outcomes questionnaire (MHQ) scale, which includes six criteria: overall hand function, daily living activities, pain intensity, work activities, aesthetic aspect and patient satisfaction.
Results: No operative incidents or accidents occurred, and complications such as skin necrosis and ischemia of the fingers were absent. Patient satisfaction was consistently high, and significant cost savings were realized through brief hospitalization periods, particularly beneficial during pandemic conditions. Surgical procedures were conducted safely, involving minimal medical staff and maintaining cost-effectiveness.
Conclusions: In the cases of rare tumors of the hand WALANT surgical resection allows for a shorter awaiting period and improves patient safety, while also providing excellent results in symptom resolution, being considered the "gold standard" anesthetic in hand surgery.

A-0785 THE EFFECT OF THE INTERDISCIPLINARY APPROACH TO THE FUNCTIONAL OUTCOMES OF A COMPLEX FOREARM INJURY CASE INVOLVING MEDIAN NERVE, ULNAR ARTERY AND NERVE AND FLEXOR TENDONS

P. Kanellos[1], G.Petta[2,3], C. Argyrou[1], S. Moiros[3], V. Seferiadis-Pettas[3]
[1]Hand Surgery, Upper Limb and Microsurgery Department, KAT General Hospital of Athens, Greece; [2]As Professor, University of West Attica, Physiotherapy Dpt, Advanced Physiotherapy Res Laboratory, Athens, Greece; [3]PHYSIOLAB KYPSELI IKE, Athens, Greece

Introduction: Spaghetti wrist is a devastating injury involving tendons, nerves and arteries, often leading to permanent disability. The management of these cases requires an interdisciplinary approach beginning on the early post-operative rehabilitation period in order to achieve long-term maximal functional outcomes
Aim: The aim of the present work was to present the functional outcomes of an interesting complex spaghetti wrist case

that was treated with a multi-disciplinary approach by hand surgeons and hand therapists.
Material & Methods: A 62-year old male sustained a work accident of the volar surface of his dominant forearm while using a cut-off wheel tool. Surgery was performed on the same day by an experienced hand surgery specialist at a hand surgery referral center. The ulnar artery was primarily repaired with end-to-end anastomosis, the ulnar and median nerves were repaired with epineural sutures, flexor digitorum superficialis and profundus of digits 2-5 were repaired with 4-strand core repair and epitendinous suture. Post-operatively, a below-elbow splint was used for 45 days. Early passive flexion of the digits was encouraged. After splint removal, clinical examination was notable for diffuse hand edema, low digits' temperature, painful stiffness, hypersensitivity and kinesiophobia. Functional score of the MHQ sf questionnaire was very low. Intensive management was decided by the hand therapist, daily for the first week and 3-times per week afterwards according to clinical reasoning and therapeutic plan. These included edema management (kinesiotape, lymph massage, exercise), scar management (kinesiotape, soft vibration, ultrasound, mobilization techniques), stiffness management (soft heat and mobilization exercises, relax and stretching of the healthy tissues, dynamic splinting for extension and flexion in different hours during the day or night), kinesiophobia management (doing exercises under ht supervision in long session and small brakes)
Results: At 6 months' follow-up, clinical examination showed complete resolution of the edema, painless scar, improvement in both passive and active range of motion of the wrist and digits. Also, there was 50% increase of the MHQ score, use of the extremity in daily activities (typing, driving, partial handling of tools) and encouraging improvement in finger sensation
Conclusions: The tight and appropriate follow-up of patients with complex upper extremity injuries as well as the interdisciplinary collaboration that leads to successful management of the different problems that arise during the course of the rehabilitation process, is pivotal to achieve satisfactory functional outcomes

A-0786 BONE LOSS RECONSTRUCTION TECHNIQUES IN HAND SURGERY AFTER TRAUMATIC OR TUMORAL DISEASES

Mihaela Pertea[1,2], Stefana Luca[1,2], Alexandru Amarandei[2], Petru Ciobanu[1,2], Oxana-Madalina Grosu[1,2], Dan Cristian Moraru[1,2]
[1]Grigore T Popa, University of Medicine and Phatmacy Iasi, Romania; [2]Plastic Surgery and Reconstructive Microsurgery Clinic, Sf Spiridon, Emergency County Hospital, Iasi, Romania

Introduction: Bone defects in the hand are frequently encountered as a result of trauma but also as a result of tumour excisions. There are many reconstruction techniques, but they must be adapted to the characteristics and size of the affected bone, the characteristics of the defect and its association with other bone and/or soft tissue lesions, associated defects and patient's bad habits (smoking), and the patient's occupation.
Material & Methods: The studied group includes 37 patients (30 males and 7 females), aged between 27 and 70, with bone defects in the metacarpals and phalanges – 27 cases as a result of trauma by industrial and agricultural machinery and the 10 others as a result of excision of solitary enchondroma.
Under loco-regional anesthesia, different techniques were used for bone loss reconstruction: harvesting of autologous bone from a "bank finger" or from a distance (distal radius) and fixation with osteosynthesis materials. In some traumatic cases bone reconstruction and flap covering (in cases with soft tissue defects) were performed 2-3 days after the first surgery, in all cases the wound pollution was intense.
Enchondromas were diagnosed either during a radiological examination for another pathology or following a fracture without apparent aetiology (on pathological bone). For fixation and/or reinforcement in these cases Kirchner screws, screw plates or in combination both types of osteosynthesis materials were used, after the curettage of the bone. Injectable or solid synthetic bone substitutes, techniques used in some cases in association.

Functional outcomes were assessed using Disabilities of the Arm, Shoulder and Hand (DASH) score and Range of Motion (ROM) score, pain was assessed with Visual Analogue scale (VAS) scale. Patient satisfaction was also recorded. In the case of the patients with tumour pathology, the diagnosis of certainty was established based on the pathological examination.
Results: In patients with post-traumatic bone defects, in 18 cases the bone graft required for reconstruction of a metacarpal or phalanx was harvested from another traumatized finger (without indication for reconstruction) - "bank finger", in 6 other cases the graft harvested from the distal end of the radius was used, and in 3 cases solid bone substitute could be used. Patients with post-excision bone defects for enchondroma benefited in 6 cases from solid substitute (granules), in 2 cases from liquid substitute based on chitosan and in other 2 cases the spontaneous healing was expected. Plates and screw were used for osteosynthesis in cases where instability was found.
Conclusions: The use of autologous bone graft in bone defects reconstruction remains the gold standard. The use of bone substituents is a developing trend, with a facil use; they are available in different forms: solid or liquid.

A-0787 COMPLEX TISSUE DESTRUCTION AND DIFFICULT RECONSTRUCTION IN A SHOTGUN-LIKE WOUND OF THE HAND

Mihaela Pertea[1,2], Stefana Luca[1,2], Alexandru Amarandei[2], Dan Cristian Moraru[1,2], Bogdan Veliceasa[1,3]
[1]Grigore T Popa, University of Medicine and Phatmacy Iasi, Romania; [2]Plastic Surgery and Reconstructive Microsurgery Clinic, Sf Spiridon, Emergency County Hospital, Iasi, Romania; [3]Orthopaedics Department, Sf Spiridon, Emergency County Hospital, Iasi, Romania

Introduction: Gunshot injuries cause severe damage, with massive destruction of soft tissues and bones, often resulting in amputations and serious motor and sensory sequelae, making socio-professional reintegration of the patient nearly impossible. Similar destruction is encountered in injuries caused by industrial machinery.
Material & Methods: We present the case of a 46-year-old patient who suffered a household accident while operating a chainsaw with bearings/rivets/links (metallic balls) that acted like bullets propelled from a firearm. The patient was admitted to the hospital for thoracic trauma with retained foreign bodies and massive destruction of soft tissues and bones in both hands. The patient presented with amputation of the 2nd finger on the left hand and a mediopalmar wound on the right hand with M2 destruction. Necessary amputation of the second finger on the left hand was performed with reconstruction of the first commissure, and M2 reconstruction on the right hand was achieved by transposing M2 from the left hand, covering it with a posterior interosseous flap. Removal of foreign bodies from the left arm and left lateral thorax was also performed.
Results: Surgical interventions were staged, yielding good results with the integration of the transposed metacarpal (radiological evaluation) and viability of the covering flap. A reintervention was carried out at 6 months due to dislocation of the transposed metacarpal head following significant effort. Complete socio-professional reintegration and full patient satisfaction were achieved (DASH scale).
Conclusions: Although initially suspected to be a gunshot trauma, the police confirmed it as a household accident as reported by the patient. Despite the trauma-like marks, tissue destruction, and the extent of bone comminutions suggestive of a gunshot injury, it turned out to be a domestic accident. The reconstructive techniques employed were complex, comprehensive, and staged, resulting in favorable outcomes.

A-0788 SKIN GRAFT FOR ONE-SHOT DEFINITIVE TREATMENT OF SEVERE DUPUYTREN'S DISEASE

Belén García-Medrano[1], Elvira Mateos Álvarez[1], Juan Berrocal Cuadrado[1], David C Noriega González[2]
[1]Hand Surgery Unit, Orthopedic Surgery Department, Hospital Clínico Universitario de Valladolid, Valladolid, Spain; [2]Head of Orthopedic Surgery Department, Hospital Clínico Universitario de Valladolid, Valladolid, Spain

Introduction: Advanced stages of Dupuytren's disease reach several functional limitations. In critical contractures, conventional treatment does not achieve satisfactory results with problems to covert the defect if we extend the digit, and it involves patients in deterioration of their daily activities.
Aim: To describe the indication of total skin grafts after dermofasciectomy in advanced Dupuytren's contracture in active patients to achieve a more functional result.
Material & Methods: This is a prospective cohort study of all consecutive active patients, diagnosed of Dupuytren's contracture Tubiana grade III-IV, with an extension defect of more than 60° at the metacarpophalangeal joint (MCPJ) and more than 90° at the proximal interphalangeal joints (PIPJ) and a well palpable cord in two or three fingers. They were treated by dermofasciectomy, including all the pathological tissue and the skin considering the metacarpophalangeal and proximal interphalangeal areas of the more affected finger. If the contracture was extended to more fingers but with less deformity, only regional selected fasciectomy and skin Z-plasties were performed on the rest ones. The graft to covert the defect was obtained from the antero-internal region of the proximal ipsilateral forearm. The dressing that covered the graft was monitored periodically in the office. We registered epidemiological data, surgical details and follow-up. Patient-reported outcome measures (PROMs) were recorded. Statistical analysis was completed.
Results: We included 14 grafted fingers of 13 patients. 8 of them required a tenoarthrolysis in PIP joint for severe osteoarthritis. The graft size, on average, was 4.2 cm long per 1.8 cm wide. The largest graft used was approximately 5.4 cm by 4.2 cm on the patient with involvement of the 3rd digital web. The anatomical areas structures on which the graft was placed were MP-P1 in 6 fingers, P1-P2 in another 4 cases. One immediate hematoma was the unique adverse event, but the graft reached to survive. Recovery time, until the maximum function, reached of 4,1 months. Their range of movement (ROM) improves 52° on MP joint (70%), with a residual flexion of the PIP joint of 15° (28,6%), and a persistence PIP joint contracture of 32° (57,1%). No cases of graft failure. Two cases got full ROM. No significant complications at final follow-up were detected. The QuickDASH score improved 8.2 points from preoperative period. URAM score median result was 11. 85,7% would repeat same procedure.
Conclusions: Full-thickness skin grafting after dermofasciectomy is a satisfactory surgical alternative that restores quality of life to active patients with severe Dupuytren's disease. It has been proposed as a mechanism of "firewalls", reaching a functional degree of mobility without significant complications.

A-0789 COMPARTMENT SYNDROME OF THE THORACIC LIMB CAUSED BY CUTANEOUS ANTHRAX - A RARE PATHOLOGY WITH CHALLENGING ETIOLOGICAL DIAGNOSIS AND PROVOCATIVE THERAPEUTIC MANAGEMENT

Mihaela Pertea[1,2], Stefana Luca[1,2], Alexandru Amarandei[2], Maria Dan[3], Dan Cristian Moraru[1,2]
[1]Plastic Surgery and Reconstructive Microsurgery Department, "Sf Spiridon" Emergency County Hospital Iasi, Romania; [2]"Grigore T Popa" University of Medicine and Pharmacy Iasi, Romania; [3]Microbiology Department, Sf Spiridon, Emergency County Hospital, Iasi, Romania

Introduction: Bacillus anthracis, a gram-positive rod, non-motile, spore-forming bacterium, holds significant potential as a biological weapon. Although rare, the cutaneous form is the most common (95% of cases). According to CDC (Centers

for Disease Control) diagnostic criteria, a positive diagnosis is established when typical clinical signs are accompanied by the isolation of B. anthracis from cutaneous lesions or a positive PCR test.
Material & Methods: We conducted a study on a group of 6 male patients, aged between 32 and 65, all with a history of contact with the flesh of cattle and sheep. Four patients in the study group with typical cutaneous anthrax lesions were referred to the Infectious Diseases Hospital. Two patients presented with extensive erythematous papules on the forearm, surrounded by areas of black discoloration, significant edema in the right and left thoracic limbs, fever, chills, severely altered general condition, pain, hypoesthesia with anesthesia, and compartment syndrome. Surgical decompression intervention for the compartment syndrome was decided despite the risk of anaphylactic shock. In both cases, under general anesthesia, endotracheal intubation, surgical decompression of the compartment syndrome, and sampling of secretions and tissue for microbiological and histopathological examinations were performed.
Results: Intraoperatively, one patient experienced an anaphylactic shock at the moment of skin incision, treated by the anesthesiologist. Edema in the thoracic limb persisted for 4 and 5 days, extensive necrosis at the site of the initial cutaneous lesions necessitated serial necrotomies, with massive exudation, high fever, symptoms resistant to general treatment with penicillin and ciprofloxacin. Secondary closure was possible at 6 and 7 days post the initial surgery, and antibiotic therapy continued according to the infectionists' indications. Identification of Bacillus spp. was achieved through mass spectrometry using the MaldiTof system. Definitive identification of the species was not possible as the MaldiTof database is restricted in identifying bioterrorism agents in Biosafety Level 2 laboratories. Confirmation of Bacillus anthracis was only made in one patient, with the entire course of the disease being similar in both cases.
Conclusions: Cutaneous anthrax, although rare, with typical skin lesions, can have a fulminant course with massive tissue destruction. In some cases, surgical intervention is imperative even with the risk of anaphylactic shock. In cases with similar symptoms and evolution, the isolation of B. anthracis can be challenging, sometimes impossible.

A-0790 PIP JOINT CONTRACTURE AFTER CONVENTIONAL TRIGGER FINGER RELEASE

Belén García-Medrano[1], Elvira Mateos Álvarez[1], Claudia González García[2], David C Noriega González[3]
[1]Hand Surgery Unit. Orthopedic Surgery Department. Hospital Clínico Universitario de Valladolid, Valladolid, Spain; [2]Orthopedic Surgery Department. Hospital Virgen de la Victoria, Málaga, Spain; [3]Head of Orthopedic Surgery Department. Hospital Clínico Universitario de Valladolid, Valladolid, Spain

Introduction: It is generally accepted that long-standing trigger finger sometime leads to proximal interphalangeal (PIP) joint fixed flexion contracture. Degenerative enlargement of the flexor digitorum superficial (FDS) was considered the most important factor related to PIP joint flexion contracture following long-standing trigger finger. But other causes could be volar plate or capsule tightness. Open surgical release of the A1 pulley is considered the reference standard due to its high success rate. Some studies have shown that the sonographic appearance of the flexor tendon, pulley and other extratendinous connective tissue in the trigger finger is correlated with clinical severity and their evolution
Aim: To detect by ultrasound test the immediate postoperative period after tenolysis of trigger finger, searching the cause of PIP joint pain.
Material & Methods: We registered prospectively 30 patients diagnosed of trigger finger after failure of conservative treatment. Thumbs were excluded. We completed a sonographic analysis focused on dimensions of the anterior-posterior thickness of the hypoechogenic bundle including the A1 pulley and flexor tendon (at the metacarpal head–neck junction). We also measured the anterior-posterior thickness of the hypoechogenic bundle of the flexor tendon at the level of proximal phalanx. We repeated them two weeks after conventional open surgical release, with intertendinous adhesions release.

Results: Patients started to move the finger the same day of surgery with a soft bandage. After two weeks, postoperative pain focused on PIP joint, more than palmar injury. 9 patients showed a PIP contracture of more than 20 degrees, 10% less than 15 degrees. Fingers showed peritendinous hypoechogenic rim between flexor tendon and A1 pulley, which seemed to represent the amount of synovial fluid of 2.8 mm. It increased after the first days postop, so as the dimensions of opened A1 pulley after surgery. PIP joint showed a 25% increased thickness of A2 pulley, a collateral ligamentous thickening and capsular dilation with a 30% of increased diameter. After 3 weeks doing indicated exercises without bandage at home, contracture disappeared in all the patients apart from one who precised physiotherapy. No more surgery was needed.
Conclusions: Long-term positional contracture could result in stiffness of the capsule and ligament of the PIP joint and eventual fixed contracture, after conventional trigger finger surgery. These problems of extension lag and stiffness could be caused by flexor tendon adhesion, whose release is a fundamental step in surgery, in addition to opening the pulley. Early indications of moving and massage get to solve them.

A-0791 IS CAST TREATMENT NON-INFERIOR TO SURGERY FOR ELDERLY PATIENTS WITH DISPLACED INTRA-ARTICULAR TYPE C DISTAL RADIUS FRACTURES? A RANDOMIZED CONTROLLED NON-INFERIORITY TRIAL

D.P. ter Meulen[1], C.A. Selles[2], Y.V. Kleinlugtenbelt[3], G.A. Kraan[4], J.C. Goslings[5], N.W. Willigenburg[1], N.W.L. Schep[2], R.W. Poolman[1,6]

[1]OLVG Hospital, Amsterdam, Orthopedic surgery; [2]Maasstad Hospital, Rotterdam, Trauma surgery; [3]Deventer Hospital, Deventer, Orthopedic surgery; [4]Reinier de Graaf Groep, Delft, Orthopedic surgery; [5]OLVG Hospital, Amsterdam, Trauma surgery; [6]LUMC, Leiden, Orthopedic surgery

Introduction: There is increasing evidence suggesting that cast treatment is equally effective as surgical treatment for treating distal radius fractures in the elderly. However, elderly patients with more severe fractures might benefit more from surgery. Therefore, this study aimed to assess the non-inferiority of functional outcomes of casting compared with surgery in patients aged 65 years or older with a displaced intra-articular distal radius fracture with non-acceptable fracture characteristics.
Aim: This study aimed to determine whether cast treatment is non-inferior to surgical treatment for patients aged 65 years or older with displaced intra-articular distal radius fractures with non-acceptable fracture characteristics.
Material & Methods: This study used a randomized non-inferiority trial design and recruited participants from 19 teaching hospitals in the Netherlands. Eligible participants had to be at least 65 years old, living independently at home, and present with a completely intra-articular distal radius fracture of AO type C. The fracture needed to have a non-acceptable position according to at least one criterion from the Dutch guideline. One hundred thirty-eight participants were randomized with a mean age of 76 years (SD 6.0). After 12 months, 126 patients (91%) completed the trial. Participants were randomized between cast treatment and open reduction and locking plate fixation. The primary outcome was the Patient Rated Wrist Evaluation (PRWE) at one-year follow-up. Secondary outcomes included the Disability of the Arm, Shoulder and Hand (DASH) questionnaire, quality of life (measured by the EQ-5D), range of motion, grip strength and complications. Primary analyses were linear mixed models with an intention-to-treat approach.
Results: The mean PRWE score at the final follow-up (12 months) for the cast treatment group was 20.4 (95% CI, 15.3 to 25.6) and in the surgical group, it was 14.5 (95% CI, 9.9 to 19.0). The primary intention-to-treat crude analysis was inconclusive regarding non-inferiority, with a between-group difference of 6.0 points (95% CI, -2.1 to 14.1) in favor of surgery. However, in a secondary analysis, non-inferiority was demonstrated after correction for baseline covariates. Short-term follow-up results showed that patients treated with a cast had significantly worse PRWE scores up to 9 months

after trauma. Up to 6 months, this difference was also clinically relevant. A subgroup analysis showed that physiologically young patients benefited most from surgical treatment.
Conclusions: In patients aged 65 years or older who have displaced intra-articular distal radius fractures with non-acceptable fracture characteristics, the primary outcome did not demonstrate non-inferiority of cast treatment compared with surgical treatment at 1-year follow-up. The potential benefit of surgery is most prominent at the short term and for physiologically young patients.

A-0792 A NOVEL 3D-PRINTED DYNAMIC EXTERNAL FIXATOR FOR THE TREATMENT OF PROXIMAL INTERPHALANGEAL FRACTURE DISLOCATIONS

Pedro Bronenberg Victorica[1], Fernando Holc[1], Mariano Abrego[1], Agustin Albani[1], Agustin Donndorff[1], Robin Kamal[2], Jorge Boretto[1]

[1]Hand and Upper Extremity Surgery Department, Prof. Dr. "Carlos Ottolenghi Institute", Hospital Italiano de Buenos Aires, Buenos Aires, Argentina [2]VOICES Health Policy Research Center, Department of Ortho- paedic Surgery, Stanford University Medical Center, Redwood City

Introduction: Fracture dislocation of the proximal interphalangeal joint is among the most frequent finger injuries. The treatment is based on two pillars: joint reduction and early rehabilitation. One surgical option that is especially attractive for injuries with significant bone comminution is the use of a dynamic external fixator. In this way, joint reduction is generated by means of ligamentotaxis, and early mobility is also possible.
Aim: The aim of this study was to evaluate the efficacy of a new 3-D printed dynamic external fixator for the treatment of proximal interphalangeal (PIP) fracture dislocations. The primary hypothesis is that the 3-D dynamic fixator is effective in maintaining PIP reduction throughout the full range of motion. The secondary hypothesis is that the 3-D dynamic fixator achieves non-inferior results to the Suzuki fixator. The third hypothesis is that the 3-D dynamic fixator has no loss of function attributable to material fatigue.
Material & Methods: Ten healthy fingers from five fresh cadavers, four males and one female, with an average age of 50.2 years (SD 17 years), were evaluated. Each finger was disarticulated at the level of the metacarpophalangeal joint and was evaluated independently. Oblique osteotomy of the base of the middle phalanx (P2) was performed through a lateral approach to recreate the volar fragment characteristic of dorsal PIP fracture dislocations. Instability of the PIP joint was checked fluoroscopically in the normal range of motion. On each finger, starting randomly, both the 3-D external fixator and the Suzuki dynamic fixator were placed. Each finger was exposed to 1400 flexion-extension cycles. Using fluoroscopy, the relationship between the articular surfaces of P1 and P2 on each finger in full extension was evaluated to determine the dorsal translation of P2 after placement of the dynamic fixators before and after mobility cycles. These values were compared with the normal values before and after osteotomies.
Results: The mean base defect percentage in P2 was 50.76 % (SD = 8.11). After osteotomy, the angle at which subluxation of the PIP joint occurred was 37.8° (SD 14.64), with joint incongruence throughout the range of motion occurring in three patients. The dorsal translation of P2 after osteotomies was 2.84 mm (SD 0.63). Dorsal displacement, after application of the 3-D dynamic fixator and Suzuki fixator was 0 mm (SD 0.18; p= 0.793) and 0.07 mm (SD 0.35 p= 0.606), respectively. During the mobility cycles, all the joints remained stable and reduced. The dorsal displacement after completion of the mobility cycles was -0.07 mm (SD 0.16; p= 0.411) for the 3-D dynamic fixator and -0.04 mm (SD 0.3; p= 0.697) for the Suzuki fixator. The mean dorsal translation difference between both external tutors was 0.04 (SD 0.39; p= 0.792) and 0.004 (SD 0.43; p= 0.979).

Conclusions: The 3-D dynamic fixator has proven to be effective for the treatment of PIP joint fracture dislocations, showing a similar capacity for joint stabilization as the Suzuki dynamic fixator, whose effectiveness has already been demonstrated in several scientific papers.

A-0793 ALLOGRAFT RIVASCULARIZED WITH AUTOLOGOUS VESSELS: A NEW PERSPECTIVE OF BONE RECONSTRUCTION

Alessia Pagnotta[1], Virginia Maria Formica[1], Carmine Zoccali[2], Roberto Biagini[3]
[1]Jewish Hospital of Rome, Italy; [2]La Sapienza University of Rome, Italy; [3]Regina Elena National Cancer Institute of Rome, Italy

Introduction: in patients suffering from malignant bone tumors, the surgical indication is wide resection. Following en-bloc resection, the reconstructive challenge often arises to restore, as far as possible, the functionality of the limb and consequently a good quality of life. In the case of malignant neoplasms affecting the phalanges and/or metacarpals, amputation or en-bloc resection may be indicated and for reconstruction, first ray transplants from the foot or cadaveric allograft are often proposed despite the fact that it often undergoes infection or resorption. In case of tumors of the distal radius, reconstruction is often performed with cadaveric allograft, non-vascularized or non-vascularized fibula, cudtum made prosthesis.
Aim: We propose an innovative reconstructive surgical technique that involves the "revascularization" of an allograft in order to increase the possibilities of integration and reduce the risk of resorption and infection for bone reconstruction.
Material & Methods: We present three cases of patients affected by malignant neoplasms of the upper limb. In two cases a phalanx was affected and in one case the distal radius. Preoperatively the patients were studied with x-ray, CT and MRI. Following a multidisciplinary discussion, an indication was given for resection with wide margins; the phalanx was reconstructed using a revascularized allograft through the passage of a vein graft within the bone itself anastomosed proximally and distally with a digital artery and the allograft was stabilized by osteosynthesis with plate and screws and by IFP arthrodesis; the MCF joint was instead reconstructed. The distal radius was reconstructed using a revascularized allograft through the passage of a vein graft inside the bone itself anastomosed proximally with the branch of the posterior interosseous and distally with the branch of the radial artery. The patients in the follow-up underwent regular clinical, oncological and radiographic checks.
Results:months after surgery, bone fusion was achieved. In only one patient we had wound dehiscence 14 months after surgery, the fixation devices were removed and a biopsy of the allograft was performed which demonstrated the presence of effective revascularization. The SPECT scan also showed local uptake similar to that of the surrounding phalanges suggesting bone vitality. The 18-month follow-up shows no signs of recurrence, the ROM of the metacarpophalangeal joint and IFP is good; as well as that of the wrist, patients do not complain of pain.
Conclusions: the new surgical technique proposed by us appears to be a valid and interesting alternative to the techniques already used as it could favor the biological activity of the allograft by facilitating bone remodelling; this technique could be applied in different segments

A-0794 VALIDATION OF A LOW-COST AND LOW-FIDELITY 3D-PRINTED ARTHROSCOPIC SIMULATION MODEL

Agustin Donndorff, Fernando Holc, Pedro Bronenberg Victorica, Agustin Albani, Ignacio Rellan, Pablo De Carli, Jorge Boretto
Hand and Upper Extremity Surgery Department, Prof. Dr. "Carlos Ottolenghi Institute", Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

Introduction: Acquiring and perfecting arthroscopic skills requires a steep learning curve and extensive practice. Low-fidelity simulators offer a practical solution characterised by cost-effectiveness and encourage regular practice, ultimately leading to automated proficiency in triangulation technology.

A rigorous validation process is crucial to ensure the effectiveness of our training tools in assessing relevant competencies. However, a substantial number of existing simulators have not undergone sufficient validation, with only 6.6% of the validation studies adhering to the Messick validity framework, the widely recognised gold standard in this field.

In response to the growing demand for improved arthroscopic training, we developed a 3D-printed simulator. This accessible, low-cost solution was designed for easy transport and installation.

Aim: This study aimed to evaluate this simulation tool using the comprehensive validity framework proposed by Messick.

Material & Methods: This prospective experimental study recruited first- and second-year orthopaedic and traumatology residents and arthroscopy specialists who voluntarily participated. Residents with prior arthroscopic experience were excluded from this study. The study cohort consisted of 14 participants, who were equally divided into seven novices and seven experts.

The participants engaged in a series of five progressively challenging exercises repeated four times for each hand. Each session was meticulously documented through video recordings and anonymised for subsequent blinded evaluation. Key metrics, including the time taken and the number of errors, were meticulously recorded. The final scores were based on guidelines recommended by the American Society of Gastrointestinal and Endoscopic Surgeons.

Comparisons between the two participant groups were conducted based on their distribution using either the t-test for independent samples or Mann-Whitney U-test. Progression across sessions was analysed using repeated-measures ANOVA or Friedman's test. The reliability of the measurements was evaluated using Cronbach's alpha.

Results: The ability of the simulator to differentiate between different levels of experience was evaluated, revealing statistically significant differences in the scores of both groups across all tests, as well as in the overall score. Experts scored a total of 328 (IQR 301–347), whereas novices scored 295 (IQR 249.2 - 324) ($p < 0.001$). There were 297 and 133 errors by novices and experts, respectively ($p < 0.001$).

Statistically significant improvements were observed in all participants, both experts and novices, between the results of the first and last test sessions. The improvement was more pronounced in the novice group, with a median improvement of 72 points (IQR 45.7 - 163.7), compared to the experts, with a median improvement of 30 points (IQR 13–62).

The reliability of the outcome evaluation system (internal structure) showed satisfactory results.

Conclusions: Our study established the validity and reliability of the simulator for acquiring fundamental arthroscopic skills. The simulator is accessible, portable, and user-friendly, making it a valuable tool with the potential to enhance the training and performance of professionals in the field of arthroscopy.

A-0795 SOFT TISSUE SARCOMAS OF THE HAND: RECONSTRUCTION WITH MICROSURGICAL FLAPS

Alessia Pagnotta[1], Virginia Maria Formica[2], Carmine Zoccali[2], Roberto Biagini[3]
[1]Jewish Hospital of Rome, Itly; [2]La Sapienza University of Rome, Italy; [3]Regina Elena National Cancer Institute, Italy

Introduction: Soft tissue sarcomas of the upper extremity and hand in particular are extremely rare conditions, and hand surgeons typically encounter only one or two soft tissue sarcomas during their career. In most cases these tumors go undiagnosed and treatment is delayed. The most common soft tissue sarcomas of the upper extremity are epithelioid sarcoma, synovial cell sarcoma, and malignant fibrous histiocytoma. Limb sparing surgery is the treatment of choice for soft tissue sarcomas to preserve upper extremity function. After extensive tumor resection, reconstructive surgical time is critical in order to provide the best possible function to the patient. Depending on the histotype, adjuvant therapies such as chemotherapy and radiotherapy may find space

Aim: to present our experience and outcome of this particular deseases

Material & Methods: In the last ten years, 4 patients have been treated for soft tissue sarcomas of the hand and wrist at the hand surgery and microsurgery unit of the Israelitic Hospital in Rome. The patients are all men aged between 30 and 70 years with 4 different histotypes. The cases were subjected to multidisciplinary discussion (DMT) in order to offer the best diagnostic-therapeutic path. In all 4 cases a biopsy was performed and they were subsequently subjected to a second multidisciplinary discussion. Surgical indication was therefore given in all cases to wide resection and reconstruction with microsurgical flaps of the upper limb in order to achieve the best possible functional and aesthetic oncological result. The patients underwent pre-operative staging with radiological examinations (ultrasound, MRI with and without contrast medium, total body CT and PET CT)

Results: In all 4 cases the definitive histological examination confirmed the diagnosis of the biopsy examination performed. During follow-ups, patients were evaluated every 3 months with radiological examinations, clinical examination and DASH score in order to obtain oncological and functional control.

In all cases, no local recurrences were reported and the DASH score values were satisfactory.

Conclusions: Reconstruction with microsurgical flaps of the upper limb after wide excision gives satisfactory results from a functional point of view; although they require microsurgical skills, they represent, when possible, a better choice in terms of function and quality of life for the patient.

A-0796 TOTAL TRAPEZIOMETACARPAL ARTHROPLASTY WITH DUAL MOBILITY PROSTHESIS. RESULTS AND COMPLICATIONS AT 5 YEARS OF FOLLOW-UP

Javier Gonzalez Garcia[1], Gabriel Carrasco Penna[1,2], Marco Naranjo Reyes[1], Bárbara Galleguillos Galindo[2,3], Agustín Gonzalez Passi[4], Ignacio Naranjo Tobar[4], Pedro Cavalla Alvarez[1,3]
[1]Clínica Santa Maria, Santiago, Chile; [2]Universidad de Chile, Santiago, Chile; [3]Hospital Mutual de Seguridad, Santiago, Chile; [4]Instituto Traumatológico, Santiago, Chile

Introduction: rhizarthrosis is a high frequency pathology associated with significant functional impairment. Among their treatment alternatives, the latest generation prostheses have shown excellent results, offering good functional recovery and early return to work on the European continent. However, no results have been published from its use outside of it.

Aim: to describe the functional results and complications of patients with trapezio metacarpal osteoarthritis surgically treated by total arthroplasty with dual Touch mobility prosthesis, in the largest clinical series reported in South America.

Materials and methods: The design of this study was a prospective case report. The sample consisted of patients with

rhizarthrosis with a poor response to conservative treatment surgically resolved in the period between October 2018 and November 2023. All patients with grade II or III rhizarthrosis according to the Eaton/Littler classification were included. All patients with involvement of the STT joint and those who presented a trapezius with a height of less than 8 mm on the trapeziometacarpal radiographs were excluded. The total arthroplasty was performed using the Touch dual mobility prosthesis with spherical cup. Functional evaluation was performed using the VAS pain analogue scale and the QuickDash questionnaire. In addition, the comparative strength with Jamar test, key and 2 finger pinch test was assessed and a serial radiological control was achieved.
Results: 74 prostheses were placed in 66 patients (11% bilateral). The average age was 64 years (range 52 to 86 years). 81% were female. The preoperative staging was 13 (18%) with grade 2 and 61 (82%) with grade 3. The average postoperative pain was VAS 0 at rest and 1.5 during activity. The Quick Dash was 3.1 points. The grip force was 23kg, the opposition clamp was 4.7kg and the lateral clamp was 6.4kg. There were 7 complications (rate 9.4%), 6 required surgical reintervention (rate 8.1%). The problems reported were: 1 impingement (with loosening of the stem); 1 cup loosening that required replacement, 1 cup loosening that required trapezectomy and tight rope suspension and 3 Quervain's tenosynovitis (4%). One patient presented a fracture of the trapezius during the installation of the cup, which was resolved by preserving the implant and enclosing the trapezius with a wire loop. The evolution of this last incident was favorable, showing adequate bone consolidation and good subsequent functionality. No cases of dislocations or surgical wound infections were recorded.
Conclusions: Total trapeziometacarpal arthroplasty with dual mobility prosthesis has proven to be a satisfactory solution for our patients, allowing an early return to their work and manual activities. The rate of complications and reoperations is consistent with the reported literature.
Keywords: trapeziometacarpal osteoarthritis, total arthroplasty, complications.

A-0797 HAND SURGERY: HISTORICAL INTERNATIONAL PERSPECTIVE

Kazem Al-Masri[1], Sharmila Jivan[2]
[1]Pinderfields Hospital, UK; [2]Pinderfields Hospital, UK

Introduction: rnHand surgery was established as a specialty in its own rights after World War II, by Dr Bunnell. Prior to this, upper limb surgery was performed by various specialists including plastic, orthopaedic and general surgeons. The first Hand centres were opened in the US in the 1940s by Dr Bunnell and by 1946, the first Hand Society was created. Worldwide there are now over 37 separate hand societies, all contributing to literature, evidenced based medicine and the development of new treatments and technologies.
Aim: It is important for us to recognise the contribution made by each society and its members to the advancement of hand surgery. We present the most noteworthy contributions by members of various societies, decade by decade and highlight common themes. Our aim is to refresh memories of established hand surgeons and educate and inspire trainee surgeons in our specialties journey in managing hand-related ailments.
Material & Methods: We reviewed and collated information using resources including individual hand society webpages, articles and medical textbooks relating to the history of hand surgery.
Results: As Bunnell established hand surgery centres across the United States of America the American Society for Surgery of the Hand was created; a space allowing surgeons to share experiences and foster ambitions for hand surgery. Pulvertaft and his colleagues were key players in creating a Hand Club in the 50's. Hand surgery clubs and conferences across the world were established. Dr Brand took interest in leprosy, proving it causes nerve paralysis with subsequent hand deformities. The French set up the first 24-hour emergency hand service across the country tending to urgent

hand injuries. Creativity, confidence and innovation in the 60's alongside the microscope led to the first arm re-plant in Boston, the first-hand transplant in Ecuador and finally, the first successfully replanted digit in Japan. Dr Conick in Belgium revolutionized hand surgery in the 70's with the first free flap, the final step of our ladder. Professor Ender introduced scaphoid plating. Dr Brown was inspired by jewellers, with their loupe magnification and forceps. In the 90's Professor Hung published the first dynamic splintage for extensor tendon rehabilitation and Dr Suzuki utilized the German K-wires to create the dynamic traction external fixation. Educational and training committees within societies formalized training into comprehensive programmes alongside courses, tutorials and workshops and in the early 21st century the Hand Diploma was introduced. This all culminated into humanitarian missions with hand specialists and volunteers visiting underserved communities providing education and clinical care.
Conclusions: With advances in technology, it is easier than ever to communicate and form international links for training, education, cross pollination of ideas, both by individual departments and national societies. Having an awareness of what each hand society has to offer can inspire future collaborative research and lead to development and advance of our specialty for the benefit of our patients.

A-0798 SURGERY FOR NERVE TUMORS IN THE UPPER LIMB CAUSES MINOR RESIDUAL PROBLEMS BUT PREOPERATIVE SENSORY DYSFUNCTION CAN BE AN INDICATOR OF A WORSE OUTCOME

Emanuel Istefan[1], Lars B. Dahlin[1,2,3], Erika Nyman[1,4]
[1]Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden; (2): Department of Translational Medicine - Hand Surgery, Lund University, Malmö, Sweden; (3): Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden; (4): Department of Hand Surgery, Plastic Surgery and Burns, Linköping University Hospital, Linköping, Sweden

Introduction: Peripheral nerve tumours, like Schwannoma, neurofibroma, perineurioma, and lipofibromatous hamartoma, mainly arise from nerve-supporting cells. Schwannomas are the most common tumour in the upper limb. These tumours present various challenges in clinical management, such as diagnostic difficulties and risks associated with surgical intervention. Moreover, there is limited literature on long-term outcomes due to the rarity of these tumours.
Aim: This study aims to evaluate the long-term outcome following surgical extirpation of nerve tumours in the upper limb and to investigate any fluctuations of symptoms between cold and warm seasons.
Material & Methods: At two hand surgery units, 93 potential participants were identified, where 26 individuals were excluded, of which 11 individuals had an incorrect diagnosis, and 19 individuals did not respond to questionnaires. After exclusion, 48 surgically treated patients with peripheral nerve tumours in the upper limb were included. Data from patient folders were collected, and patient-reported outcome measures (PROMs; QuickDASH and a specific hand surgery questionnaire, HQ-8; both 0 no impairment and 100 severe impairment) were sent out to the patients at two time-points, 6 months apart, during a cold (n=48) and a warm (n=34) season of the year (data shown as median and [IQR]; for cold and warm seasons, respectively).
Results: The cohort included 34 (71%) patients with Schwannomas, 10 (21%) with neurofibromas, and 4 (8%) with other tumour types, with a balanced gender distribution and a mean age of 48 years (SD: 16). Enucleation of tumour mass was successful in 77% of patients. The median follow-up time for the entire cohort was 7 [4-11] years. Long-term follow-up of QuickDASH scores showed minor daily activity impairments (7 [2-32] at cold season, and 7 [2-25] at warm season). Amongst evaluated HQ-8 questions, remaining problems as numbness or tingling in fingers (20 [0-50] and 20[0-70], respectively), weakness in the affected hand (10 [0-50] and 10 [0-30], respectively), and cold sensitivity (10 [0-45], and 0 [0-30], respectively) were reported to a low extent both at the cold and warm seasons. No statistically significant

differences in symptoms were observed between the cold and warm seasons regarding the two PROM's, even for cold sensitivity. Preoperative sensory dysfunction, defined from patient folders, emerged as a significant predictor of long-term pain on load (Beta=0.39, p<0.01), numbness or tingling in fingers (Beta=0.31, p<0.05), and impairments to the ability to perform daily activities (Beta=0.38, p<0.05).
Conclusions: Surgery for nerve tumours in the upper limb results in minor remaining problems in the long term without any seasonal variations in the postoperative symptoms even regarding cold sensitivity. Preoperative sensory dysfunction predicts to a certain degree postoperative symptoms, such as numbness or tingling in fingers, weakness, and cold sensitivity; information that should be provided to the patients before surgery.

A-0799 RELATIONSHIP BETWEEN BONE DENSITY AND LOSS OF REDUCTION IN DISTAL RADIUS FRACTURES TREATED WITH VOLAR LOCKING PLATE IN PATIENTS AGED > 65 YEARS

Mariano Abrego, Fernando Holc, Pedro Bronenberg Victorica, Pilar Saralegui, Gerardo Gallucci, Pablo De Carli, Jorge Boretto
Hand and Upper Extremity Surgery Department, Prof. Dr. "Carlos Ottolenghi Institute", Hospital Italiano de Buenos Aires, Buenos Aires, Argentina

Introduction: Distal radius fractures (DRFs) are fragility fractures and are markers of osteoporosis. The management of these fractures in the elderly population remains controversial. Osteoporosis has been identified as a potential cause of DRF instability. A correlation was observed between the second metacarpal cortical percentage (2MCP) and the bone density. Understanding the relationship between bone density and postoperative loss of reduction is crucial.
Aim: The primary aim of this study was to evaluate the relationship between bone density measured using the 2MCP and loss of reduction in patients aged >65 years with DRFs treated with a volar locking plate (VLP). The secondary aim was to assess factors related to loss of reduction.
Material & Methods: This was a retrospective cohort study. Patients aged >65 years with DRF who were treated with VLP between January 2017 and June 2023 were included. Patients with concomitant ipsilateral or exposed fractures were excluded from this study.
The baseline characteristics of the patients and fracture patterns according to the Arbeitsgemeinschaft für Osteosynthesefragen (AO) classification were recorded.
Bone density was assessed according to the 2MCP calculated on pre-operative anteroposterior wrist radiographs. Instability was defined using to the Lafontaine criteria, with at least three criteria considered unstable.
Radiological parameters (radial inclination, volar tilt, radial height, and ulnar variance) were measured immediately postoperatively and at the end of follow-up for a minimum of 6 weeks. We also evaluated the distance between the distal locking screws and the densest area of the subchondral articular surface.
Patients were divided into two groups: those with osteoporosis, defined as a 2MCP less than <50%, and those with a 2MCP bigger than 50%. A comparative analysis between the groups and univariate and multivariate logistic regression analyses were performed to identify factors associated with displacement.
Results: A total of 315 patients were included, 256 in the <50%2MTC group and 59 in the >50%2MTC group. Patients in the <50%2MTC group had a higher mean age (74.8 vs. 72, p<0.001).
All radiographic parameters showed statistically significant differences (P <0.001) between the immediate postoperative radiograph and the last follow-up. The volar tilt decreased by 2°, radial inclination by 1°, radial height by 1 mm, and ulnar variance increased by 0.4 mm. However, no statistically significant differences were found between the groups.
Logistic regression analysis revealed a significant association between increased ulnar variance and subchondral screw

position. Loss of radial inclination was associated with a shorter screw length, greater subchondral distance, and type C fractures. Similarly, loss of volar tilt was associated with a shorter screw length, whereas loss of radial height was associated with type C fractures.
Conclusions: The findings of this study indicate that there was no association between the loss of reduction in DRFs treated with VLP in patients aged ≥ 65 years and 2MPC.
It appears that the positioning of the screws and the severity of the fracture played a significant role in determining the degree of loss of reduction on the postoperative radiograph, rather than bone density alone.

A-0800 INTER- AND INTRARATER RELIABILITY OF THE OMT CLASSIFICATION AMONG PHYSICIANS WITH A DIFFERENT BACKGROUND

Feikje ten Cate, Peter Don Griot, Juul Alewijnse, Mattijs Alsem, Jessica Warnink-Kavelaars, Frederique van der Zeeuw, Sarah Dekker, Margriet van Doesburg
Amsterdam University Medical Centre, Amsterdam, the Netherlands

Introduction: The Oberg-Manske-Tonkin (OMT) classification, introduced for an etiologically correct classification of congenital hand anomalies, established excellent reliability scores in several validation studies. However, one published in 2022 found much lower scores in a subanalysis of their sample when very simple anomalies were excluded. Our study assessed the reliability of the OMT among physicians with a different background, all involved in congenital hand anomaly care, and analyzed codes with lower agreement values. Time required for classification was recorded to give an indication on its usability.
Aim: The purpose of our study was to assess the reliability of the most recent version of the OMT classification by raters with a different professional background, who are all involved in clinical care of these children, thereby assessing its usability in clinical care.
Material & Methods: 100 digital cases were classified twice with a minimal one-month time-interval, with the use of the most recent version (2020) of the OMT. Two pediatric hand surgeons, two rehabilitation specialists and two plastic surgery residents participated. The use of multiple codes was allowed. The intra- and interrater reliability was assessed by calculating percentage of agreement. Time necessary for classification was documented in seconds.
Results: The inter- and intra-rater agreement was moderate with a mean Cohens kappa of 0.45 and 0.60 retrospectively. On average, 39 seconds per case were necessary for the first and 24 seconds for the second rating. Background did not influence level of agreement. Lowest agreement levels (i.e. lowest positive agreement) were observed with all the arthrogryposis multiplex congenita subgroups, the ''other'' subgroups of isolated congenital contractures, syndromic syndactyly and synpolydactyly. Codes commonly used interchangeably were: symbrachydactyly and transverse deficiency and the distinction between these anomalies of only the hand or the entire upper limb; symbrachydactyly and brachydactyly; and camptodactyly and distal arthrogryposis.
Conclusions: Our study showed a moderate reliability, regardless of the background of the raters. This emphasizes the complexity of this heterogenous patient population. Despite its imperfections, the OMT remains the best and most versatile classification tool at hand. However, since it is a rather elaborate classification system, its main purpose may lie in contributing to a universal language for research, more so than for clinical application.

A-0801 SALVAGE EMERGENCY EXIT AFTER FAILED TRAPEZIECTOMY LRTI

Adam Domanasiewicz, Jacek Martynkiewicz, Jerzy Gosk
County Hospital Wroclaw Poland

Introduction: Degenerative changes of the metacarpophalangeal joint (CMC OA) are currently successfully treated with joint arthroplasty, trapeziectomy or arthrodesis. In cases of failed arthroplasty, trapeziectomy is the obvious choice. There are few solutions in the literature for cases of failed trapezectomy, with most addressing the problem of proximal migration of the 1st metacarpal bone. In cases of recurrent pollex adductus with thumb adductor muscle contracture, the recommended revision surgeries fail.

Aim: The authors present a method of stabilization of the metacarpal bone and correction of MCP joint hyperextension with dysfunctional thumb deformity (Z-thumb), after several unsuccessful revision surgeries with recurrent adduction of the 1st metacarpal bone

Material & Methods: The patient I. 48 arrived in 2017 for rhizarthrosis III/IV gr. according to Eaton, trapeziectomy LRTI with suspensionplasty APL, after a short period of improvement there was a recurrence of the deformity with adduction of the 1st metacarpal bone. Subsequently, in 2018 - 2020, she underwent 2 revision surgeries combined with repeat suspensionplasty with an ECRL slip and partial intermetacarpal arthrodesis. Both surgeries were complicated by recurrence of the deformity and thumb hyperextention. The authors used as a last resort the procedure used in unrepairable median nerve injuries to create opposition and abduction of the thumb with a bone block graft interposed between the 1st and 2nd metacarpal bones according to Fritschi

Results: The patient regained anatomical alignment of the thumb in all joints, significant improvement in hand function and grip strength (2.5x).

Conclusions: Complications in the functional range of a properly performed trapeziectomy with any LRTI suspensionplasty are rarer than with arthroplasty, and a satisfactory functional outcome is maintained for many years. In cases of failed trapezectomy, the problem is usually proximal migration of the 1st metacarpal bone and conflict with the scaphoid. In the qualification for trapeziectomy, advanced deformities with long-standing adduction of the pollex adductus type and hyperextention in the MCP , should be approached with caution, choosing primary CMC arthrodesis rather than trapeziectomy. For rhizarthrosis of the IV grade with associated ST arthrosis or recurrent deformity, the authors suggest intermetacarpal arthrodesis (bone block) with interposition of the bone graft in opposition and adduction of the 1st metacarpal.

A-0802 FUNCTIONALITY AND SATISFACTION AFTER NEW GENERATION TRAPEZIO-METACARPAL PROSTHESIS IMPLANTATION. A PROSPECTIVE CASE SERIES STUDY

Planas Gil, Alberto. Royo Agustín, María. Castro Sauras, Ángel. Barberena Turrau, Natalia. De la Fuente González, Jorge Luis. Compte Vives, Marina. Ranera García, Miguel. Urgel Granados, Alejandro César
Hospital General Obispo Polanco, Teruel, Spain

Introduction: Rizarthrosis is a common disease that can affect a significant percentage of the general population (predominantly women over 75 years of age), causing pain and weakness of the first carpometacarpal joint (CMC-1). The wear of this saddle-shaped joint is caused by ligamentous imbalances when performing movements.

No surgical treatment has demonstrated superiority over others in relieving pain and recovering function of the CMC-1 joint. Currently, dual mobility implants have been designed for trapezio-metacarpal prostheses, initially published by de

la Caffinière following the concept of "ball and socket". This new design favors a lower rate of dislocation and constitutes an alternative to the classic trapeziectomy.
Aim: Description and preliminary results of functionality and satisfaction of 7 patients operated with new generation trapezio-metacarpal prosthesis.
Material & Methods: A prospective case series study was performed. DASH questionnaire, Kapandji test and VAS (Visual Analogue Scale) scale were analyzed. We compared the results before and after the intervention by using the non-parametric Wilcoxon test for paired data.
Results: We collected data from 7 patients, followed for one year (6 women, 1 man). The mean age was 60.3 years (range 54-67). 6 patients underwent surgery on the left hand and one on the right. The mean DASH questionnaire score was 74.1 before and 103.4 points after surgery (p= 0.091). The average Kapandji results were 5.7 before and 9.1 points after the intervention (p= 0.058). Statistically significant results were obtained on the VAS scale (8.9 before and 3.9 mean points after) (p= 0.027).
Conclusions: The design of ball and socket implants, together with the development of dual-mobility heads, provide pain relief and gain in functionality of the osteoarthritic CMC-1 joint despite not being an anatomical reconstruction. Although only statistically significant results were found in the improvement of pain (VAS scale p=0.027), these preliminary results show a tendency to also improve functionality.

A-0803 RETROSPECTIVE DATA ANALYSIS OF RADIOGRAPHIC PARAMETERS AND SUBSEQUENT CAST FAILURE IN PATIENTS ATTENDING AN ORTHOPAEDIC BIERS BLOCK CLINIC (BBC) FOR MANIPULATION OF DISTAL RADIUS FRACTURES (DRF): A SCOTTISH CENTRE'S EXPERIENCE

Mariam Sattar[1], Liam Lennox[2], Scott L. Barker[1], Anna H. K. Riemen[1,2]
[1]Aberdeen Royal Infirmary, NHS Grampian, Aberdeen, UK; [2]University of Aberdeen, School of Medicine, Aberdeen, UK

Introduction: The burden of distal radius fractures has risen steadily in the past and sets to continue to increase. The Distal Radius Fracture (DRF) is a common presentation to the Emergency Department. Adequate manipulation of these fractures, resulting in sustained radiographic reduction, may reduce the necessity for subsequent open reduction and internal fixation (ORIF), thereby reducing the pressures on busy orthopaedic theatres.
The current consensus on methods of analgesia in achieving reduction is varied. The British Orthopaedic Association (BOA) advises regional anaesthesia over haematoma block. The British Society for Surgery of the Hand (BSSH) however advises considering intravenous regional anaesthesia (IVRA), which can be performed by trained healthcare professionals who need not be anaesthetists. In the circumstance that such qualified individuals are not available, they advise that a haematoma block is appropriate, however given its superior analgesic effect, if IVRA is available within 72 hours, then this should be offered over haematoma block. Our unit established and set up an Orthopaedic led Bier's Block Clinic (BBC) to provide superior analgesic effect during primary manipulation and potentially offset the need for subsequent fixation, given that delay to theatre for DRF is an ongoing issue amongst numerous institutions.
Aim: The aim was to assess if our centre's establishment of an Orthopaedic led Biers Block Clinic (BBC) improved radiological parameters of patients with distal radius fractures (DRF), and therefore reduced the number of patients requiring open reduction and internal fixation (ORIF).
Materials and Methods: Retrospective data was collected for patients who attended the BBC for manipulation of their DRF. An equal cohort of Frykman classification matched DRF presenting in the 2 months preceding the set-up of the BBC was identified. These patients underwent manipulation under haematoma block, and or nitrous oxide with oxygen. The radial

length, radial inclination and dorsal tilt were measured on the presentation radiographs and again on the post reduction radiographs at the first clinic return visit. The change in these radiological parameters was calculated. As the data was normally distributed, an independent t -test compared the mean improvements in these parameters. A Chi-squared test with continuity correction was evaluated the difference in the number of patients requiring ORIF.
Results: The mean improvement in radial length and dorsal tilt was greater in the cohort of BBC versus non-BBC [2.33mm, 0.8mm ($p=0.008$) and -22.0°, -7.3°($p<0.001$)]. The mean improvement in radial inclination was not significantly greater in BBC versus non-BBC [3.0mm,1.3mm ($p=0.183$)]. Seven patients in the BBC cohort needed ORIF compared with 9 in the non-BBC cohort group ($p=0.775$).
Conclusion: Data presented in 2018 (Macdonald et al) from our unit demonstrated statistically significant improvement in radial length only when comparing haematoma block and sedation. Our study shows patients undergoing BBC have a significantly improved dorsal tilt and radial length but not radial inclination. The need for fixation was reduced in the BBC cohort but, not statistically significant. Given small sample sizes, further data is required with age and comorbidity matching to assess the true efficacy of this clinic.

A-0804 THUMB HYPOPLASIA UNFOLDING WHILE MATURING: BROADENING INSIGHT AND UNDERSTANDING OF AFFECTED PATIENTS (THUMBS UP)

Wesley M. Duboile, Christianne A. van Nieuwenhoven
Erasmus MC, Rotterdam, the Netherlands

Introduction: The severity of thumb hypoplasia can be classified according to the Blauth classification ranging from mild hypoplasia of the thenar muscles to complete absence of the thumb. Besides malformations of the thumb carpal bone anomalies can occur as well. In the Bayne Radial Longitudinal Deficiency classification these carpal bone anomalies were already mentioned. However, the severity and extent of carpal bone anomalies have not yet been documented nor related to thumb hypoplasia.
Methods: In this retrospective study, patients from the Pediatric Hand Team database were screened for inclusion. Patients with thumb hypoplasia and available radiographic imaging of their affected hand(s) and wrist(s) were included. Patients with triphalangeal thumbs or radial polydactyly, and patients who had undergone wrist centralization/radialization surgery, were excluded. A checklist to structurally evaluate the radiological images and carpal bone anomalies was developed; carpal bones were identified as hypoplastic, aplastic, bipartite, fragmented, hyperplastic or other. We identified and documented the occurrence of carpal bone anomalies in patients with thumb hypoplasia accordingly.
Results: Forty extremities from 31 patients were included. Half of the identified hands were right hands. Seventeen hands were Blauth type II (54.8%), seven Blauth type IIIa and ten Blauth type IV (32.3%). Blauth types I, IIIa and V each had two hands (6.5%) included. 242 anomalies of the wrist were identified, of which 204 of the carpal bones. The most common anomaly in the carpal bones was hypoplasia (48%), followed by hyperplasia (28.9%). The scaphoid was affected most often (21.1%), followed by the trapezium and capitate (both 18.1%). The most commonly found anomaly was hypoplasia of the trapezium (15.7%), followed by hyperplasia of the capitate (14.2%), and hypoplasia of the scaphoid (11.8%). When extrapolating the radial-sided carpal bones and relating them to the Blauth type I-V, an average of resp. 3; 2.9; 3.3; 4.5; 3.5; 4.5 anomalies per affected extremity were seen.
Discussion: A correlation could be seen between the number of carpal bone anomalies and the severity of thumb hypoplasia. Moreover, when the proximal scaphoid was hypoplastic the radial styloid was hypoplastic in 88.9% of hands, which could suggest a correlation between the development of the scaphoid and the radial styloid process. Similarly, when the distal

scaphoid was affected the trapezium was either hypoplastic (85.7%) or absent (14.3%). This would suggest a close relation between the scaphoid and the trapezium development. Finally, the capitate was hyperplastic
towards the radial side in 29 hands, in 28 of these cases the scaphoid was affected, which suggests that the limited counter pressure from the scaphoid gives the capitate more room to grow. Similar to this, when the lunate was not hypoplastic, it was hyperplastic and elongated into the scaphoid place.
Conclusions: We found 242 anomalies in the forty wrists of our population, of which most were found in the scaphoid, the trapezium, and the capitate bone, followed by the lunate, the trapezoid, and the radius. Although a trend is seen, more research is needed to solidify this possible correlation to the type of Blauth thumb hypoplasia.

A-0805 HOW TO CHOOSE BETWEEN DISTAL RADIUS DORSAL LOCKING PLATES? A COMPARATIVE 3D-ANALYSIS EVALUATING FIXATION OPTIONS

Giovanni D'Angelo[1], Andreas Verstreken[2,3], Frederik Verstreken[2,3,4], Matthias Vanhees[2,3,4]
[1]Orthopaedic and Trauma Department, University of Perugia, Italy; [2]Medical and Healthcare Science, University of Antwerp, Antwerp, Belgium; [3]Orthopedic Department, University Hospital Antwerp, Antwerp, Belgium; [4]Department of Orthopedic Surgery, AZ Monica, Antwerp, Belgium;

Aim: The aim of this study is to compare design, temporary and final fixation options of bicolumnar low-profile dorsal locking plates for distal radius fractures.
Material & Methods: Between January 2022 and October 2023, we retrospectively included all patients who sustained intraarticular distal radius fractures and were treated with at least a dorsal locking plate in the AZ Monica Hospital in Antwerp. Patients without preoperative CT scans were excluded. In total, seven patients were included. The DICOM files of the CT scan were used to perform 3D segmentation and reduction of fracture fragments, using Mimics software (Materialise®).
We selected three commercially available bicolumnar low-profile dorsal locking plates to compare for our study.
Next, each bicolumnar low-profile dorsal locking plate was positioned on all included patient's 3D models of the reduced distal radius fracture. For consistency, we used specific criteria for dorsal plate positioning on the dorsal aspect of the radius. These criteria consist of:
1) Cranio-caudal positioning: the distance between the most distal locking screw and the articular surface on the sagittal plane;
2) Lateral-medial positioning: the distance between the dorsal ulnar corner of the distal radius and the medial distal border of the plate on the axial plane.
Then, we have made a comparative analysis of different objective aspects of the bicolumnar low-profile dorsal locking plates, based on four parameters:
- 1) Number of K-wire's holes in the distal part of the plate;
- 2) Number (in percentage) of K-wires that stabilize the key fragments;
- 3) Number of locking screw holes in the distal row of the plate;
- 4) Number (in percentage) of screws that stabilize key fragments.

For parameter 2, we virtually simulated a temporary fixation with K-wires placed in the plate's dedicated holes in the 3D model and analyzed their setup by doing the proper measurements.
For parameter 4, we proceeded to stabilize the fracture virtually. Every distal locking screw has been virtually fixed with his proper direction, even if the factory's configuration would have allowed us to fix it in a multi-directional way. Again,

we then analyzed the setup and registered the measurements.
Ultimately, the plates will be ranked according to the score achieved in the four parameters.
Conclusions: 3D software applications are gaining more and more importance in Orthopedic surgery. This study shows a potential use of this technology, allowing us to simulate distal radius fracture fixation by comparing different commercially available dorsal locking plates.
The surgeon can use this information to select the plate tailored to the specific clinical case preoperatively.

A-0806 THE VOLAR CENTRAL APPROACH FOR DISTAL RADIUS FRACTURES – A PROSPECTIVE NERVE CONDUCTION STUDY OF 38 PATIENTS

Hugo Jakobsson[1,2], Eva Lundqvist[1,2], Kathe Dahlbom[3], Per Wretenberg[1,2], Marcus Sagerfors[1,2]
[1]Örebro University, Sweden; [2]Department of Hand and Orthopaedic surgery, Örebro University Hospital, Sweden; [3]Department of Neurophysiology, Örebro University Hospital, Sweden

Introduction: Fixation of a distal radius fracture (DRF) with a volar locking plate is often performed using the trans-FCR approach. Distal fragments of the volar ulnar corner are important to fixate, the "critical corner". This part of the radius can be cumbersome to fully expose using the FCR-approach. An alternative approach is the central volar approach (CVA), in which the flexors of the fingers are retracted ulnarly and the median nerve and FPL are retracted radially. This approach allows for an excellent visualization of the distal ulnar part of the radius. A similar approach has been linked to an increased risk of perioperative iatrogenic median nerve affection in a retrospective study, but no study has evaluated the risk of median nerve affection of the CVA.
Aim: The aim of this study was to study the association of nerve conduction study (NCS) impairment of the median nerve and surgical treatment of DRF using the CVA.
Material & Methods: This prospective cohort study included patients with AO type C DRF between 18 and 70 years old that underwent surgery with the CVA. NCSs were performed and subjective sensory deficit was registered preoperatively, 6 weeks, 3 months and 12 months postoperatively. PRWE was collected at 6 weeks, 3 months and 12 months postoperatively.
Results: Of 38 patients, 35 patients had a valid preoperative NCS. Five (14.3%) patients had NCS impairment and three (7.9%) patients had subjective sensory deficit preoperatively. At 6 weeks postoperatively, 30 (78.9%) patients had NCS impairment and 12 (31.6%) had subjective sensory deficit. At 3 months, postoperatively 19 (51.4%) patients had NCS impairment and 11 (28.9%) had subjective sensory deficit. At 12 months, postoperatively 15 (42.9%) patients had NCS impairment and eight (21.6%) patients had subjective sensory deficit. No significant differences in PRWE scores were detected among those with NCS impairment at 12 months compared to those without.
Conclusions: NCS impairment is common at short-term follow-up after surgical treatment of DRF with CVA. The finding is transient in many patients, but one in five patients had NCS impairment at 12 months postoperatively. We believe the CVA is feasible only in select cases were the special exposure of the volar ulnar corner is required for adequate fracture fixation.

A-0807 EMERGENCY OSTEOPLASTY AS A RESCUE TECHNIQUE IN FAILED THUMB REPLANTATION IN CHILD

Adam Domanasiewicz, Jacek Martynkiewicz, Jerzy Jablecki, Jerzy Gosk
County Hospital. Wroclaw, Poland

Introduction: Losing a thumb means a loss of hand function of 35-65%. Replantation, which is the best solution for distal one-third amputations and for crushing-avulsive amputations, is not always successful, if it is possible at all. Several "acute"

rescue techniques are known, such as emergency pollicization of the 2nd finger, emergency pollicization of the damaged 2nd finger, on-top transfer of the 4th finger, and osteoplasty using a radial or inguinal flap. In the case of necrosis of the replanted finger, reamputation and possible reconstruction in the future are usually necessary.
Aim: The aim of the study is to present a simple and relatively technically easy and safe rescue technique that allows maintaining a functional thumb despite necrosis of the replanted part.
Material & Methods: In the years 2005-2023, the authors performed 23 different types of immediate pollicizations in a priori non-replantable thumbs, as well as approximately 20 acute osteoplastic procedures, without losing a single reconstructed neothumb. Currently, they present an osteoplasty procedure in a 12-year-old patient on the 10th day after replantation of the distal 1/3 of the thumb, which had become necrotic.
Results: A good functional result was obtained and aesthetically acceptable for the patient and the surroundings. However, an additional procedure to transfer Littler's sensory island was necessary to restore sensation.
Conclusions: The proposed method of osteoplastic reconstruction of the thumb is technically easy, safe and reliable, and not time-consuming. In adults, it can be performed under local anesthesia. The method is an alternative to other more complicated reconstructions, especially microsurgical ones, when pollicization and toe to hand transfer are not accepted.

A-0808 ESTABLISHING THE RELIABILITY OF THE PARENT-PROXY VS SELF-REPORT FOR THE PROMIS UPPER EXTREMITY (UE) AND PAIN INTERFERENCE (PI) COMPUTER ADAPTIVE TESTS (CATS) IN A PEDIATRIC UPPER EXTREMITY PATIENT POPULATION

Hernan Roca, Erin Tabish, Gretchen Maughan, Nikolas H. Kazmers, Brittany N. Garcia
University of Utah, Salt Lake City, USA

Introduction: PROMIS parent-proxy report instruments were developed to assist in cases where obtaining self-report is not practical, such as where the patient is too sick or physically unable to complete the patient reported outcomes measure (PROM). For a general population the results yielded by proxy-reports are assumed to be comparable to those of self-report in the assessment of a patient's condition. However, the degree of correlation between parent-proxy reported outcomes and patient-reported outcomes has not been evaluated for the pediatric PROMIS UE and PI computer adaptive tests (CATs) in an upper extremity population.
Aim: The purpose of this study was to evaluate the reliability between the PROMIS parent-proxy report and self-report for the UE and PI CATs in a pediatric upper extremity population.
Material & Methods: At a tertiary care, academic center, pediatric patients aged 8-17 years and their parents were prospectively recruited during clinic appointments. Each patient and parent pair were asked to complete the PROMIS pediatric UE and PI self-report or parent-proxy CATs respectively. Interclass correlation coefficients (ICCs) were used to evaluate the correlation between parent and patient scores. The proportion of patients whose scores differed by a value greater than the MCID for the adult version of both instruments (4.1 for UE CAT, 4.3 for PI CAT) was calculated.
Results: A total of 156 patients were included, 48% (75/156) were female and the mean age was 12$\pm$ 3. The PROMIS UE CAT proxy-reports had a mean change in score of -3.24 $\pm$ 8.59 (-26 to 22.1) compared to self-reports and demonstrated an ICC of 0.6 [95% CI (0.45, 0.71)] consistent with 'moderate' reliability. The PI CAT proxy-report had a mean change in score of 4.50 $\pm$ 8.20 (-20.70 to 24.70) and the ICC was 0.50 [95% CI (0.27, 0.66)] consistent with 'poor' reliability. 60.3% (94/156) and 66.7% (104/156) of patients had a UE CAT and PI CAT score difference exceeding their respective MCID.
Conclusions: In a pediatric upper extremity patient population the PROMIS UE CAT demonstrated 'moderate' reliability, while the PI CAT had 'poor' reliability when comparing self-report to parent-proxy. Proxy-reports provided mean results

indicative of higher disease severity (lower UE scores and higher PI scores) than those obtained by self-reports on both instruments. Additionally, differences in score pairs were clinically relevant in more than 60% of cases for both instruments.

A-0810 CT SCAN ANALYSIS TO IDENTIFY SCAPHO-LUNATE INJURIES ASSOCIATED TO DISTAL RADIUS FRACTURE

Jane C Messina, Daniele Cirillo, Valerio Monteleone, Gianluca Folco, Carolina Lanza, Andrea Zagarella, Alessandra Menon, Mauro Gallazzi, Pietro Randelli

First Orthopaedic Clinic University of Milan, ASST Gaetano Pini - CTO Orthopaedic Institute - Milan, Italy

Introduction: Distal radius fractures can be associated to a high percentage of soft tissue injuries and particularly to SL injuries up to 54% of cases. These can be associated to certain patterns of fractures and be suspected on plain Radiographs and then confirmed by second level diagnostic imaging (MRI, CT scan) or arthroscopy. Not all patients undergo surgical treatment.

Aim:the aim of this study is improve the standard radiological and CT method of measurement of SL space in emergency and to identify which fracture type is most likely to have associated scapho-lunate injuries.

Materials and Methods: Three hundreds and fifty five cases affected by fractures of distal radius who had had XRays and CT scans in the emergency department were retrospectively examined; 67 patients had a suspect SL injury (Group 1) of which 27 patients had a SL clear diastasis of more than 3mm at plain AP radiograph (Group 2). Mean age was 51.7 (range 19-70), 154 were males and 201 females. Volumetric CT scans were acquired and multiplanar reformatted images were subsequently obtained on a para-axial plane parallel to radial articular surface in order to measure the scapho-lunate articular space. The measures were done by two orthopaedic surgeons and two radiologists. The measures were adjusted to a standardized lunate. The SL space was measured at anterior, posterior and mid part of SL space and a mean value was found. These data were compared to a group of 20 CT scans of normal wrists and statistical analysis done. .Interobserver and intraobserver ICC index was calculated. The prevalence of SL injuries in each AO fracture group was found and evaluated with Chi square test

Results: The mean value of SL space measured on CT axial images in Group 1 (67 pt) was 2.8± 0.08 and in Group 2 (27 pt) was 3.34±0.06 , while in the control group was 1.5±0,05 These were statistically significant,$p<0.001$ and $p<0.0001$ respectively

In AO Type A we found 5.7% SL diastasis; in group B 15%; in group C 5.42 %. The difference of incidence of SL diastasis in the different AO fracture groups were statistically significant ($p<0.05$).The most frequent fracture types associated to SL injuries were type B2 (28.5%), B4 (18,8%), B1 (16,6%), C3 (13.1%)

Inter-observer ICC index was excellent (0.98) and intra-observer ICC index was excellent (0.94) too.

Conclusions Scapholunate injuries are frequently associated to DRF, but not all are complete injuries and not all require surgical treatment, depending on type of lesion, age of patient, patient's activity and needs. Even if the gold standard of diagnosis in the is arthroscopy in the surgical patient, plain radiographs and CT scans with axial views are useful non invasive methods to assess the lesions in the emergency department. Most frequently fracture types associated to SL injury are the group B and particularly B1, B2, B4, and group C. SL lesions should always be suspected in these groups of fractures in order establish the correct treatment for the patient.

A-0811 3D CT ASSESSMENT OF ACUTE SCAPHOID FRACTURE PATTERNS

Jon Compson
Kings College Hospital, London, UK

Introduction: Classification of scaphoid fractures has always been poor because of the difficulty in visualising the 3D fracture patterns on x-ray. Because the natural history of scaphoid fractures is so dependent on the position in the long axis of the bone, the fracture alignment and the extrinsic stabilising factors both bone and ligament, any classification system must be based on 3D fracture patterns and their position on the long axis with their associated stabilisers.
Though 25 years ago (Compson,1998) I devised a classification based on models and x-rays and divided the fractures into three main types, over the years with the increasing sophistication of 3D CT it became apparent that there was continuation of one fracture type into another along the axis of the bone.
Aim: By reviewing 3D CT scans of acute scaphoid fractures to better define fracture patterns with similar natural history of union and non-union
Material & Methods:Assessment of 50 randomly chosen CTs, with 3D reconstruction, of acute, displaced and early un-united scaphoid fractures and comparison with a previous x-ray classification based on fracture alignment.(Potential instability of the fragments was assessed by visualisation of adjacent joint shape and ligament attachments.
Results: There appears to be 3 major types of fracture but some variation in exact position but each appears to have different fragment instability which may be the main factor effecting the natural history of each type.
Conclusions:Classification of scaphoid fractures depends on 3D fracture pattern and relative type stability. It must be based on CT rather than x-ray but still distinction of type still may need improved definition.
Reference. The anatomy or acute scaphoid fractures. A three-dimensional analysis of patterns. J.P Compson. J Bone and Joint Surg (Br) 1998;80-B:218-24

A-0812 FACTORS OF INFLUENCE ON NEUROPATHIC PAIN AFTER SEVERE ADULT TRAUMATIC BRACHIAL PLEXUS INJURIES

Tawatha C. Steendam, Justus L. Groen, Martijn J.A. Malessy, Willem Pondaag
Leiden University Medical Center, Leiden, the Netherlands

INTRODUCTION: Traumatic brachial plexus injuries in adults (ATBPI) result in upper extremity functional impairment and pain, affecting quality of life. Pain is the symptom that has the greatest negative impact on their quality of life. Little literature is available on pain after ATBPI.
AIM: This study assesses pain and functional outcome scores after reconstructive surgery in ATBPI patients and explores the effect of trauma severity, patient factors and nerve surgical strategies on outcome.
METHODS: A cross-sectional survey study was performed in 158 ATBPI patients who underwent supraclavicular nerve grafting or distal fascicular nerve transfers at Leiden University Medical Center, Netherlands in a ten year period (2009-2019). Primary outcomes are pain assessed by the Brief Pain Inventory (BPI) and PainDETECT questionnaire (PD-Q). Secondary outcomes comprised functionality assessed by the Disabilities of the Arm, Shoulder, and Hand (DASH), Brachial Assessment Tool (BrAT) and the quality of life by the EQ-5D questionnaire.
RESULTS: 85 patients completed the questionnaires on pain, functional outcome and quality of life. Mean follow-up time was 10 years (ranging from 4 to 19 years) after injury. Neuropathic pain prevalence was 46%. Most common pain types were numbness (75%), electric shock feeling (69%), tingling (61%), and burning sensation (58%). The number of

cervical spinal root avulsions and higher body mass index were strongly correlated with a worse outcome in pain. Age, the number of nerve root injuries and follow-up time between trauma and survey completion had a moderate correlation with the reported pain scores. Only in 44% of patients pain treatments or medication provided pain relief, with a mean pain reduction of 20%. Functional outcome measured with the BrAT and DASH and the self-rated health status (EQ-5D) were strongly related to the severity of pain reflected by the BPI score.
CONCLUSIONS: In our cohort of ATBPI patients we observed a correlation of pain outcome scores with patient factors (age and BMI) and the severity of injury. Timing of surgery and nerve surgical strategy did not influence pain outcome. Pain is related to functional outcomes and quality of life in ATBPI patients.

A-0813 RESULTS OF ELBOW TERRIBLE TRIAD MANAGEMENT WITH AN ACTIVE MOVEMENT AGAINST RESISTENCE PROTOCOL OF PHYSIOTHERAPY

Matilde Cacianti[1], Alessandro Crosio[2], F. Locatelli[1], A. Clemente[1], Pierluigi Tos[1]
[1]Hand Surgery and Reconstructive Microsurgery Department, ASST Gaetano Pini-CTO, Istituto Ortopedico Gaetano Pini – CTO, Milan, Italy; [2]Hand Surgery and Reconstructive Microsurgery Department, CTO, Turin, Italy

Introduction: Terrible triad of the elbow can be a challenging injury to treat, with a history of well-known complications.
Aim: The purpose of this study is to report the outcomes of our surgical protocol for the repair of terrible triad of the elbow injuries. We established in 2019 a postoperative protocol done by an Active Movement Against Resistence (AMARe) protocol with a termoplastic cast Dynacast® Prelude for 21 days and immediate mobilization against resistance (first week from 80 to 100° (20° degree of movement), second week (40° of movement), third week 60° (from 60° to 120°) – pronosupination differs by the radial head synthesis. (Ref 1))
Material & Methods: We retrospectively reviewed terrible triad of the elbow injuries treated at our hospital by using the mostly used surgical technique. Surgical procedure includes fixation or replacement of the radial head and repair of the ruptured lateral collateral ligament (LCL) through a lateral approach. Simultaneous fixation of the coronoid process and repair of the common flexor muscle and medial collateral ligament (MCL) injury were performed through an anteromedial incision. Mayo Elbow Performance Score (MEPS) was determined for each patient at the final clinic visit. We addressed all patient to the AMARE protocol for the first three weeks.
Results: There were 10 patients (10 elbows) included in the analysis, and the follow-up period goes from 5 to 71 months. At the last follow-up the mean flexion-extension arc of the elbow was 126° and the mean forearm rotation was 139°. The mean MEPS was 95 points (range, 85-100 points), with 8 excellent results and 2 good results. Concentric stability was restored in all cases. Two patients had heterotopic ossification, one patient had a superficial infection, and one patient had ulnar nerve neuropathy
Conclusions: Our surgical and post-surgical strategy with AMARE for terrible triad of the elbow has the advantage of providing both bony and soft-tissue stability simultaneously, thereby allowing active early motion as well as functional recovery of the elbow. The immediate active movement against resistance give to the patient the possibility to maintain proprioception avoiding stiffness and muscle atrophy after surgery. The rehabilitation period is in that way shorter and results seems to be faster than with immobilization.
1) AMARe protocol of immediate mobilization against resistance after simple elbow dislocation. A randomized cotrolled study on 44 patients – Anna Maria Nucci, Pierluigi Tos, Sandra Pfanner, Massimo Ceruso, Andrea Poggetti
Giornale Italiano di Ortopedia e Traumatologia 2019;45:150-154; doi: 10.32050/0390-0134-138

A-0814 THE NATURAL HISTORY OF PROXIMAL POLE NON-UNION, DISPLACEMENT, INSTABILITY, CYST FORMATION AND FRAGMENTATION

Jon Compson
King's College Hospital, London

Introduction: Proximal pole scaphoid non-union have a different natural history to waist fractures. In particular they often remain minimally displaced (even to the extent that the overlying cartilage heals over the bone non-union), displaced by dorsal sliding of the distal fragment over the proximal pole (not causing the typical humpback deformity of the waist fracture), tend to have predominantly more cysts than the scalloping of mobile waist fractures, and are more likely to be affected by insufficient proximal blood supply.
Aim: To ascertain and describe the displacement of proximal pole scaphoid non-unions, the amount of fragmentation sclerosis and the cyst formation. From this to better understand the influence of bone and ligamentous stabilisers on the natural history of the collapse and non-union.
Material & Methods: CT scans (both 3D reconstructions and cuts) of 50 proximal pole non-unions were examined looking at collapse patterns, displacement, cyst formation and sclerosis/fragmentation.
Results: It appears that proximal pole non-unions either don't displace or do so in a very specific way in the expected direction allowed by the congruency of the head of the capitate and scaphoid fossa. An important factor in instability and collapse may be the integrity of the dorsal scapho-lunate ligament. That cyst formation is not related to instability or probable poor blood supply. Proximal pole sclerosis and fragmentation does not necessarily lead to increased instability.
Conclusions: Further to this CT assessment of proximal pole non-union, if available, should always be used when considering fixation. Also, further investigation into the formation of cysts in scaphoid non-union since they don't appear to be related to the instability of the bone or the blood supply.

A-0815 THE NOVEL AND VALIDATED THORACIC OUTLET SYNDROME INDEX TOSI TO EVALUATE THE FUNCTION AND QUALITY OF LIFE (QOL) IN PATIENTS WITH TOS

Niina Ruopsa[1,3], Heidi Vastamäki[1,2], Leena Ristolainen[1], Tero Vahlberg[4], Katri Laimi[5], Mikhail Saltychev[5], Martti Vastamäki[1]
[1]Research Institute Orton, Helsinki, Finland; [2]Mehiläinen Neo Sports Hospital, Turku, Finland; [3]Tampere University Hospital, Tampere, Finland; [4]Biostatistics, University of Turku, Turku, Finland; [5]Turku University Hospital, Turku, Finland

Introduction: Before, no disease-specific evaluation score for thoracic outlet syndrome (TOS) patients' quality of life was available. It has been difficult to compare outcomes after TOS treatment between studies, because so many different dimension-specific tools have been used to evaluate TOS patients. Our cross-sectional survey studied whether considered items adopted from validated QoL scales could be suitable for patients with TOS.
Aim: Our aim was to develope a disease-spesific quality of life -score (Thoracic Outlet Syndrome Index, TOSI) for TOS-patients. The aim was to avoid the need for several TOS-nonspesific scores. In addition, our aim was to assess the validity of this new index.
Material & Methods: At first, a panel of 14 specialists with a long experience in treating TOS-patients, evaluated the relevance of 19 items adopted from scales used in other upper-extremity syndromes. Then, 52 patients who had undergone TOS surgery, rated the relevance of these items. Content validity was measured by a content validity index, content validity ratio, and modified κ. The internal consistency of 15 retained items was assessed with the Cronbach α, and its construct validity was assessed by an exploratory factor analysis. In addition, we assessed the convergent validity of the

TOSI when compared with the short form of Disabilities of the Arm, Shoulder and Hand (QDASH), the Cervical Brachial Symptom Questionnaire (CBSQ) and pain numeric rating scale (painNRS).
Results: Of the 19 items, 15 were considered relevant for TOS by the panelists, with an overall test content validity index of 0.93. The internal consistency of these 15 items was excellent. The exploratory factor analysis accompanied by a parallel analysis confirmed the uni-dimensionality of the TOSI. All 15 items that the panelists considered relevant were also items that the patients marked with scores over 7 points on an 11-point scale of relevance. In addition, the TOSI takes into account 5 domains important to TOS patients with 15 questions while QDASH considers only 4 domains and CBSQ and painNRS each have only one domain.
Conclusions: The Thoracic Outlet Syndrome Index TOSI has been tested to be internally consistent and face- and content-valid. In addition, it demonstrated good convergent validity. We encourage clinicians and researchers to use this validated, new TOSI, Thoracic Outlet Syndrome Index, both in clinical work and in future studies as an outcome measure when assessing function and quality of life in TOS patients before and after treatment for TOS.

A-0816 INDICATIONS AND RESULTS OF CORRECTIVE OSTEOTOMIES OF THE UPPER LIMB

Jane C Messina, Valerio Monteleone, Paolo, Arrigoni, Pietro S Randelli
First Orthopaedic Clinic University of Milan, ASST Gaetano Pini - CTO Orthopaedic Institute - Milan, Italy

Introduction: Malunions of fractures of the upper limb can cause deformity, pain, restriction of range of motion, reduction of strength and at later stages development joint osteoarthritis. The indications to treatment are young and symptomatic patients but also older patients with an active life. The classical method of measurement of bone and joint axis of the different upper limb bones on XRays are very useful, but also comparative XRays, as well as CT scan which is mandatory in order to understand the tridimensional malunion. Custom made plate and engineer assisted osteotomy guide systems can be useful in selected cases in complex malunions.
Aim: Aim of the study is evaluate the results of the treatment of several malunions of the upper limb
Materials and Methods: From 2018 to 2023 we have treated 26 malunions of the upper limb: 6 distal humerus, 8 radius, 1 forearm, 5 ulna, 2 metacarpals, 4 phalanges. Mean age 38 (11- 70 yo), 7 females and 19 males. Mean pre-operative DASH was 43 15, mean VAS was 7.3 0.7, mean Mayo 46.5 11, mean PRWE 57.7 19, mean Grip 15 Kg. Closing wedge osteotomy was used for distal humerus and ulna and and open wedge for the rest of the patients, in two cases bone graft was used. The majority of patients were treated with plate and screw fixation, one kid was treated with K wires and external fixation was used in phalangeal correction. In one case of forearm complex malunion engineer assisted guide system was used. Patients were reviewed with a mean follow up of 18 months (6 – 60months) with XRays.
Results: all patients obtained an excellent score with the Mayo wrist score or Mayo Elbow score with an excellent recovery of function at Follow-up. All malunion united. One case of distal radius had a loss of radiographic correction at FU and one elbow had a residual stiffness of 20° in extension (already present in the pre-op). Mean DASH was 7.8 11, mean PRWE was 6.6 2, VAS 0,5 0.8.
Conlcusions: corrective osteototomies allow optimal correction of post-traumatic upper limb deformities in order to improve function and prevent osteo-arthritis. The preoperative planning is essential with Xrays and CTscans. Custom made systems are useful in selected cases. Modern internal fixation systems allow an optimal correction and stabilization of the fragments. Osteotomies are indicated in young patients with malunions of the upper limb bones but also in older symptomatic, active and independent patients.

A-0817 COMPARISON OF SINGLE PORTAL ENDOSCOPIC AND MINI-OPEN CARPAL TUNNEL RELEASE: MIDDLE TERM OUTCOMES

Arsen Arsenishvili[1], Harun Yasin Tüzün[2], Mustafa Kürklü[3]
[1]Military Hospital of Georgia Gori, Georgia; [2]Gulhane Research and Tryning Hospital Ankara, Turkey; [3]Memorial Bahcelievler Hospital, İstanbul, Turkey

Introduction: Carpal tunnel syndrome (CTS) is the most frequent peripheral compressive neuropathy observed in patients worldwide. Traditional Open carpal tunnel release (OCTR) with visualization of carpal tunnel is considered the gold standard for decompression. However, Single Portal Endoscopic (SP-ECTR) and single portal mini-open carpal tunnel release, a less invasive technique than OCTR is emerging as a standard of care in recent years.
Aim: The purpose of this study was to determine whether single portal endoscopic carpal tunnel release (SP-ECTR) compared with mini-open carpal tunnel release (SP-MOCTR), provides better symptom relief, validated outcome scores, grip strength, and digital sensibility; entails a differential risk of complications such as nerve injury, scar tenderness, reoperation and allows an earlier return to work.
Material & Methods: We included all patients over 18 years of age undergoing carpal tunnel release at a single hand center between January 2013 and December 2017. Each patient was assessed with patient-reported outcomes measurement information system (PROMIS) questionnaires , Michigan hand outcomes questionnaires , DASH, Visual Analog Scale (VAS), grip strength and return to work. The carpal tunnel syndrome-functional status score(CTS-FSS) and carpal tunnel syndrome-symptom severity score (CTS-SSS) with other parameters were recorded before surgery and at 3, 6, 12, 24, and 60 months postoperatively
Results: We included 43 (19 SP-ECTR and 24 SP-MOCTR) patients. The median age was 59 years, and 85% of the patients were women. At Middle-term(mean 56 months) follow up, patients who underwent SP-ECTR reported significantly lower postoperative PROMIS upper-extremity scores than those who underwent MOCTR but similar postoperative VAS , Michigan hand outcomes questionnaire scores, DASH, grip strength and return to work. The postoperative pain and satisfaction scores were similar between the 2 groups. The preoperative or postoperative CTS-SSS and CTS-FSS values did not differ significantly ($p > 0.05$).
Conclusions: This study found no evidence suggesting the definitive superiority of one surgical technique with regard to middle-term clinical outcomes. Both, Single portal Endoscopic carpal tunnel release and Mini-open CTR may be preferred in patients who need to return to work within the first 2 weeks after the procedure. SP-ECTR and SP-MOCTR produce satisfactory results in pain relief, symptom resolution, patient satisfaction, time to return to work, and adverse events disappears over time. SP-ECTR and SP-OCTR has an increased risk of transient nerve injury, whereas open carpal tunnel release has an increased risk of wound and scar complications. The most concerning reason for not preferring the other technique was scar or pillar pain. ECTR has higher direct costs but is associated with earlier return to work. ECTR and MOCTR is a safe and effective approach to carpal tunnel release in the hands of experienced surgeons.

A-0818 EFFECTS OF SIX WEEKS OF WRIST PROPRIOCEPTIVE TRAINING ON MOTOR PERFORMANCE VARIABLES

Semiha Tomiris Erzincanlı[1], Cigdem Ayhan Kuru[2], A. Ruhi Soylu[3], Hanife Avcı[4], Ilhami Kuru[5]
[1]Başkent University Hospital, Orthopedics and Traumotology Department, Ankara, Turkey; [2]Hacettepe University Medicine Faculty, Ankara, Turkey

Introduction: Proprioceptive exercises are an integral part of wrist rehabilitation programs aimed at improving kinetic

and kinematic stability of the wrist while promoting sensorimotor function, both in healthy wrists and in pathological conditions. Understanding the effects of wrist proprioceptive exercises on motor performance is crucial for the development of effective neuromuscular rehabilitation programs that provide prevention approaches and promote functional recovery after wrist injuries.

Aim: The aim of this study was to investigate the effects of proprioceptive exercises on motor performance in healthy individuals.

Material & Methods: A total of 41 healthy individuals (25 males, 16 females) aged between 20 and 30 years (mean 23.12 ($\pm$2.23) years) participated in this study. The participants were randomly divided into two groups: Group 1 received proprioceptive exercises and traditional upper extremity exercises, and Group 2 received traditional upper extremity exercises only. Both groups performed exercises with the non-dominant upper extremity twice a week for 6 weeks. Motor performance outcomes included wrist position sense (flexion, extension, radial and ulnar deviation) measured using a validated goniometric platform, grip and pinch strength measured with a dynamometer, reaction time using the Nelson test, weight-bearing capacity measured with a non-digital analog scale, and upper extremity stability using the Y-balance test. The measurements were performed for both extremities before the exercise program and after 6 weeks.

Results: Between-group comparisons showed improved wrist position sense in Group 1 compared to Group 2 for flexion ($p = 0.002$), extension ($p < 0.001$), radial deviation ($p < 0.001$), and ulnar deviation ($p < 0.001$) for both extremities. In both groups, grip strength, and weight-bearing tolerance increased, whereas reaction time decreased.

Conclusions: The integration of proprioceptive exercises into the rehabilitation program has been shown to increase wrist position sense in all directions.

A-0819 USE OF MINIPLATES AND WALANT AS A TREATMENT FOR FLEXOR DIGITORUM PROFUNDUS AVULSION INJURIES. OUR EXPERIENCE IN 2 CASES

Amer Mustafa Gondolbeu[1,2], Anna Scott-Tennent de Rivas[1], Marta Bonjorn Martí[1,2], Laura Prats Gispert[1,2], Pau Forcada Calvet[1,2]

[1]Hospital Universitari Arnau de Vilanova, Lleida, Spain; [2]Faculty of Medicine, Universitat de Lleida, Spain

Introduction: Flexor digitor um profundus injuries due to avulsion, known as Jersey fingers, are often challenging due to the complexity of restoring the articular anatomy of the distal interphalangeal joint and, in turn, the correct functionality of the flexor that mobilizes it.

Aim: We present 2 cases of Flexor digitorum profundus avulsion injury type III according to Leddy and Packer classification. In both cases, the affected finger was the ring finger and surgery was performed using WALANT anaesthetic technique.

Material & Methods: By means of a Bunnel-type approach on the distal interphalangeal joint, a reduction of the bone fragment was performed and, given the size, an osteosynthesis was performed with straight mini-plates of 1.5mm with cortical screws, achieving a correct joint reconstruction and checking intraoperatively the stability of the synthesis and the correct flexor tendon functionality. It is paramount to highlight the importance of using screws that do not penetrate the dorsal region of the distal phalanx excessively, due to the risk of injuring the nail matrix and causing nail deformities.

Results: It was possible to start early active mobility with a protective splint and achieving optimal mobility at 3 months with complete active joint balance in flexion and extension

Conclusions: We considered the option of osteosynthesis with mini-plates and screws to provide good initial stability and thus allow early initiation of mobility and recovery of functionality.

A-0821 AMYOTROPHIC NEURALGIA – PAIN WITH A TWIST

Alain Schiffmann, Einar Wilder-Smith, Urs Hug
Luzerner Kantonsspital, Luzern, Switzerland

Background: Recent research has offered new pathophysiological, diagnostic and therapeutic insight into neuralgic amyotrophy, also known as Parsonage-Turner or Kiloh-Nevin syndrome as well as Bratwurst-Phenomenon.
Aim: The disease is underreported or often times missed due to the unspecific findings and the delay between the event causing damage (prolonged surgical procedures or extreme exercise) and the onset of symptoms. The aim of this presentation is to sensitize young hand surgeons to this uncommon but severe complication.
Material & Methods: This case presentation uses a meticulously documented case, which includes histologic findings and pictures, as well as a follow-up of more than a year, to discuss the pathology and the recent literature.
Results: A 43-year-old patient had a 3-hour gynecological procedure and left the hospital after 3 days. 6 days postoperatively she had an onset of pain in the left arm. This pain caused her to present to the emergency department 9 days postoperatively. Sensory and motor deficiencies of the median nerve, especially the anterior interosseus nerve (AIN) led to a neurologic work-up. The neurosonography showed a twist of the nerve which led to a referral to the hand- and peripheral nerve surgeon. Intraoperatively a double torsion (2cm) of the AIN was confirmed. Intraoperative neurography (ENMG) showed no remaining nerve function, leading to nerve reconstruction. The functional results are good, and the patient returned to work. The neuropathic pain is persisting on a low level (Numeric Rating Scale, NRS 3/10).
Conclusions: Delayed onset of pain and nerve dysfunction are a hallmark of neuralgic amyotrophy. Once the diagnosis is presumed, an urgent referral to a multidisciplinary center is recommended. Magnetic resonance tomography or neurosonography, as well as an ENMG are important diagnostic tools. When a torsion is seen, an early surgical procedure with De-Torsion and intraoperative ENMG help to determine if an immediate reconstruction is necessary.

A-0822 OUTCOMES OF MASON II-III-IV RADIAL HEAD FRACTURES TREATMENT

Matilde Cacianti[1], Alessandro Crosio[2], Francesco Locatelli[1], Martina Macrì[1], Pierluigi Tos[1]
[1]Hand Surgery and Reconstructive Microsurgery Department, ASST Gaetano Pini-CTO, Istituto Ortopedico Gaetano Pini – CTO, Milan, Italy; [2]Hand Surgery and Reconstructive Microsurgery Department, CTO, Turin, Italy

Introduction:
Aim: The purpose of this study was to evaluate the results of patients treated for a type Mason II-III-IV radial head
1-Mason type IV radial head fracture with elbow dislocation by open reduction with internal fixation or arthroplasty, collateral ligament repair and early mobilization
2-Mason type II-III radial head fracture by open reduction with internal fixation or resection of radial head.
An additional purpose was to investigate whether there is any effect of elbow dislocation on the severity and functional outcome.
Material & Methods: We treated nineteen radial head fractures. Fifteen patients were treated with open reduction with internal fixation using screws for comminuted fracture of the radial head. Ten fractures were Mason type IV. One patient was treated with resection of radial head. Three patients were treated with arthroplasty. After surgery for all patients we used AMARE protocol o physiotherapy (Active Movement Against Resistance). The follow-up time goes from 1 to 71 months. Patients were reviewed for functional ability with MEPS (Mayo Elbow Pain Score), physical examination, and radiographic assessment

Results: At the last follow-up the mean flexion-extension arc of the elbow was 124° and the mean forearm rotation was 135°. The mean MEPS was 95 points (range, 85-100 points), with 16 excellent results and three good results. Two patients had heterotopic ossification, one patient had a superficial infection, and one patient had ulnar nerve neuropathy.
Conclusions: Selected Mason II and III radial head fractures and fracture dislocations could be stabilized successfully with internal fixation. Meticulous surgical technique, combined with rigid internal fixation, can allow early motion of the forearm and elbow with and without elbow dislocation and ligamentous injury. We believe there is still a role for prosthetic replacement in comminuted Mason III radial head fractures that cannot reliably be treated with open reduction and internal fixation. In rare cases, when there aren't ligament lesion it is possible the resection of radial head. We couldn't appreciate any significant difference in the outcomes of Mason II-III radial head fractures treatment with (type IV) or without elbow dislocation (type II-III).

A-0823 THE USE OF LOCAL FLAPS FOR THE RECONSTRUCTION OF SOFT TISSUE DEFECTS OF THE FINGERS

Vasiliki Tsiampa, Christina Chatzidaki, Aris Georgountzos, Emmanouil Fandridis
Hand, Upper Limb, Microsurgery Clinic, KAT General Hospital of Athens, Greece

Introduction: The use of local mini pedicled flaps have some advantages in comparison to free flaps for the reconstruction of soft tissue defects of the fingers.
Aim: The presentation and results analysis of the use of local pedicled flaps for covering soft tissue defects of the fingers.
Material & Methods: 39 men ,median age 36(19-75), during the period 2019 -2023 were treated surgically. 12 patients sustained traumatic distal phalanx thumb amputation, 6 patients with volar defects and 21 with dorsal defects of idex,middle or ring finger.11 patients were treated with kite flap, 6 with reverse flow island intermetacarpal (second) artery flap, 19 with reverse cross finger flap and 3 with cross finger flap.
Results: The mean postoperative follow up lasted 8 months(6-12). Full healing and defect coverage.Active kinesiotherapy was achieved from the 4th postoperative week.25 (64percent) patients achieved full range of motion of the finger.14 presented small or medium stiffness.
Conclusions:The above mentioned mini flaps proved to be very effective for the covering df soft tissue defects.They provoke small stifness and are more safe in the surgical practice and follow up from the free flaps..

A-0824 DRUJ HEMIARTHROPLASTY AND POSSIBLE FUTURE DEVELOPMENTS

Aalna Mittal, Jagmeet Bhamra, Jon Compson
Kings College Hospital, London

Introduction: The Distal Radio-ulnar Joint Hemiarthroplasty (DRUJ) used as part of the First Choice DRUJ System marketed by Integra has now been taken off the market due to commercial factors. However, for future developments in this field certain complications and possible improvements needed for this particular replacement may be useful when an alternative is being planned.
Aim: To assess if any lessons can be learnt from technical difficulties and/or complications of its insertion techniques in a now withdrawn prosthesis which can be used for future development of DRUJ joint replacements
Material & Methods: A retrospective review of 22 hemiarthroplasties with good sigmoid notches inserted by the same surgeon, looking particularly at any difficulties with the surgical technique, difficulties in revision and, after developing

a zone classification for the wrist similar to that used for hip replacements, the bone loss associated with stress shielding
Results: 75% of the cases showed increasing distal bone loss, in 8 over 5 zones.6 had revision surgery mainly for instability and stiffness.
Conclusions: Improvements in design and technique could include.
1. Distal only osteo-integration of the stem to reduce bone loss and ease of movement.
2. Clamp system for head to control rotation as prosthesis is inserted.
3. Preoperative assessment by 3D CT to assess state of sigmoid notch and bowing of distal ulna.
4. Avoiding unstable wrists or change technique to adapt.
5. Early supination to optimise rotation.
6. Input from lower limb arthroplasty bio-engineers.

A-0825 CASE REPORT OF A RARE PATTERN OF SEGMENTAL FOREARM FRACTURE IN A PEDIATRIC PATIENT

Guilherme Marques[1,2], Rita Alçada[1], António Serrano[1,3], Tiago Botelho[1,2], Carlota Nóbrega[1], Sara Rodrigues[1], Francisco Baptista[1], Patrícia Wircker[1], Diogo Ramalho[1]
[1]Hospital de Cascais, Cascais, Portugal; [2]Centro Hospitalar Universitário de Lisboa Central, Lisbon, Portugal; [3]Centro Hospitalar de Lisboa Ocidental, Lisbon, Portugal

Introduction: Forearm fracture in pediatric patients are one of the most common injuries in this population. The majority of these fractures usually involve the radius, specially if there is physeal involvement, which, in turn, is much less commonly seen in the ulna. On the other hand, segmental forearm fractures are usually associated with high-energy trauma in adults. In children this pattern is quite rare and there are scarce reports of segmental fractures involving the distal phyeas of the forearm in this population.
Aim: We report a case of a 14-year old male child that sustained a distal both bones fracture as well as an ipsilateral dislocated Salter-Harris (SH) type I distal ulna fracture.
Material & Methods: 14-year boy presented to the Emergency Department after a fall from a swing with pain and deformity of the right forearm. Simple x-rays were taken and diagnosed with both bones forearm fracture and immobilized in a cast. During the pre-operative planing the Orthopedic Surgeons diagnosed an ipsilateral dislocated SH type I distal ulna fracture which was not diagnosed previously. The patient was submitted to surgery with open reduction and internal fixation with plates, screws and k-wires with immobilization with a long-arm cast with the elbow flexed at approximately 90 degrees and forearm in neutral rotation.
Results: The patient had a tight follow-up at 1,2,4 and 6 weeks and later at 3 months. Long-arm cast was kept for 2 weeks and at this point it was exchanged for a bellow-elbow cast which was kept for another 4 weeks. K-wire removal was at 4 weeks pos-op. Serial x-rays were taken with maintenance of reduction and evidence of healing.
Conclusions: Forearm fractures are one of the most frequent fractures in children, comprising around 40% of all pediatric fractures. However segmental fractures in this population are very rare, specially involving the distal physaes, with almost no documentation found in the literature about this fracture pattern.
The use of elastic nails has gained a lot of popularity in treating long bone fractures in pediatric patients. Despite that in this case the surgeons thought it wasn't the appropriate fixation method because of the fractures locations and specially due to the inability to obtain a good closed reduction due to multiple highly unstable injuries. Open reduction with internal fixation with plate and screws was performed in both of the more proximal fractures. After doing so the physeal fracture remained irreducible and the open approach was extended to perform an anatomic reduction with k-wire fixation. Given

the rarity of this pattern of fracture there is no consensus regarding its treatment but the anatomic reduction of these injuries is mandatory, particularly the physeal fracture. This should not be disregarded in favor of a less invasive approach.

A-0826 MESENCHYMAL STROMAL CELLS FOR THE ENHANCEMENT OF FLEXOR TENDON REPAIR IN ANIMAL MODELS

Ilias Ektor Epanomeritakis[1], Andreas Eleftheriou[2], Anna Economou[2], Wasim Khan[1]
[1]Addenbrooke's Hospital, Cambridge, United Kingdom; [2]University of Cambridge School of Clinical Medicine, Cambridge, United Kingdom

Introduction: Hand trauma comprises a significant proportion of Emergency Department attendances and usually affects the working population. The primary treatment option for tendon injuries resulting in functional deficits is surgical repair. Despite adequate apposition of the tendon stumps, due to the poor intrinsic healing ability of tendons, the sutured repair site may remain weak and adhesion formation can lead to a poor range of motion post-operatively. Mesenchymal stromal cells (MSCs) have been trialled to improve the repair and regeneration of multiple musculoskeletal structures in animals and humans, including the Achilles tendon, rotator cuff and synovial cartilage. MSCs may be obtained from multiple sites in the body. They are recognised for their ability to differentiate into osteogenic cell lineages and their immunomodulatory potential.

Aim: Our goal was to determine the efficacy of MSCs in enhancing the biomechanical properties of surgically repaired flexor tendons in vivo.

Material & Methods: A PRISMA systematic review was conducted using five databases (PubMed, MEDLINE, EMBASE, Web of Science, and CINAHL) to identify studies using MSCs for the enhancement of surgical repair of flexor tendon injuries in animal models. Ten studies were included in our systematic review. We extracted the results of biomechanical testing of repaired flexor tendons, including the maximum load, elasticity, stiffness and range of motion analysis. The histological and macroscopic appearances of repair tissue, as well as any complications observed, were also recorded.

Results: While some authors reported a promising improvement in biomechanical properties following treatment with MSC, this was inconsistent across the studies. This may, in part, be explained by the variety of cell delivery methods used. We suspect that injections of MSCs within a biocompatible solution may perform better than cells embedded in polymer scaffolds, which can provoke an inflammatory reaction that impairs healing. Further variation between studies was noticed with regard to the MSC source, cell concentration, and post-operative immobilisation protocols, all of which may alter the outcome of the repair.

Conclusions: In summary, while current in vivo evidence suggests that MSCs may enhance the surgical repair of flexor tendons, there is insufficient evidence at present to recommend this treatment for use in humans. Future studies are necessary to investigate the role of the individual variables mentioned in order to standardise a potential treatment approach.

A-0827 TEMPORARY SPANNING PLATE FOR COMPLEX DISTAL RADIUS FRACTURES - A SINGLE-CENTER EXPERIENCE

André Santos-Moreira[1], David Ferreira[1], João Carvalho-Pereira[1], Tiago Barbosa[1], Paulo Cunha[1], Guilherme Correia[1], Luís Filipe Rodrigues[1], Pedro Varanda[1,2], Elisabete Ribeiro[1]

[1]Serviço de Ortopedia e Traumatologia, Hospital de Braga, Portugal; [2]Escola de Medicina da Universidade do Minho, Braga, Portugal

Introduction: Distal radius fractures are the most common orthopaedic injury and its incidence is increasing worldwide. Although this injury is usually treated nonoperatively, surgical management is often indicated. However, fixation techniques can be limited in certain high-energy fracture patterns. More recently, dorsal spanning plate (DSP) has been introduced for fractures with severe dorsal or volar comminution and fracture-dislocations, specially in geriatric patients with poor bone quality.

Aim: This study aims to evaluate clinical and functional outcomes of temporary spanning plate fixation of the wrist for complex distal radius fractures.

Material & Methods: This retrospective study included all patients who underwent dorsal spanning plate fixation (DSP-F) for distal radius fractures at our institution between 2022 and 2023 with a minimum follow-up of six months.

Results: All patients were female. Mean age at surgery was 73,1 years-old (range 25-89). Main surgical indication for DSP-F were AO/OTA C3 fracture type. There were no cases of implant failure or other complications. Plate removal was performed on average 3.8 months after initial surgery (range 3.3-4.3 months). Mean follow-up time was 8.8 months. Mean VAS and quickDASH scores were 2,2 and 21,6 points, respectively. Mean flexion/extension averaged 34.1º and 35º, respectively.

Conclusions: DSP allows for secondary bone healing in patients when it is not possible to achieve a stable reduction through a standard plate due to polytrauma, fracture morphology, degree of comminution, and/or poor native bone biology. In our series, DSP-F provided a safe and reliable method for treating complex distal radius fractures and can be associated with good clinical and functional outcomes and low complication rate.

A-0828 VOLAR LOCKING PLATE FIXATION VERSUS PLASTER IMMOBILIZATION FOR ACCEPTABLY REDUCED EXTRA-ARTICULAR DISTAL RADIUS FRACTURES: LONG-TERM FOLLOW-UP OF A RANDOMIZED CONTROLLED TRIAL

S.B. Kramer, M.A.M. Mulders, C.A. Selles, J.C. Goslings, N.W.L. Schep, on behalf of the VIPER Trial Collaborators

[1]Maasstad Hospital, Rotterdam, The Netherlands; [2]Onze Lieve Vrouwe Gasthuis (OLVG) Amsterdam, The Netherlands

Introduction: The aim of this study was to report the long-term results of a randomized controlled trial comparing Volar locking plate fixation versus plaster immobilization for acceptably reduced extra-articular distal radius fractures. The primary outcome was the Disabilities of the Arm, Shoulder and Hand (DASH) score. Secondary outcomes were the Patient-Rated Wrist Evaluation (PRWE) questionnaire, the Short Form-36 (SF-36) and the need for additional surgery.

Material & Methods: This multicenter prospective cohort study was conducted following the CONSORT (CONsolidated Standards of Reporting Trials) statement. the primary outcome of this study was the Disability of the Arm, Shoulder and Hand (DASH) questionnaire. Secondary outcomes were the Patient-Rated Wrist Evaluation (PRWE) questionnaire, the Short Form-36 (SF-36), and additional surgery related to the previously treated wrist fracture.

Results: Five years after the initial treatment, patients treated with volar plate fixation had better functional outcomes compared to patients treated with plaster (DASH score: 1.7 [0.0 – 10.4] versus 8.3 [0.8 – 22.7] p=0.01, respectively). Patients treated with plaster who required subsequent surgery due to fracture dislocation or a symptomatic malunion had significantly worse DASH scores (10.8 [5.0 – 34.0] versus 1.7 [0.0 – 10.4] p<0.01), PRWE scores and SF-36 physical

component subscores compared with patients who were primarily treated operatively. However, this difference was not clinically relevant. Forty-two percent of the patients treated with plaster required subsequent surgery due to a symptomatic malunion or secondary dislocation within the first year.
Conclusions: patients ranging from 19 until 75 years of age, with an adequately reduced extra-articular distal radius fracture treated with volar plate fixation have comparable functional outcomes as patients successfully treated with plaster, five years after the initial treatment. With previous studies reporting fracture redisplacement rates up to 60% 3, 4 and a 42% chance on subsequent surgery due to symptomatic malunion or secondary dislocation, primary surgery might be regarded as the preferred treatment in these patients. Together with operation risks, this information may be valuable as part of the informed consent for distal radius fracture treatment.

A-0829 THE TRANSVERSE SIGMOID NOTCH MORPHOLOGY UNRAVELLED

S.B. Kramer, F. Raad, A. Hauser, I.B. Schipper, N.W.L. Schep
[1]Maasstad Hospital, Rotterdam, The Netherlands; [2]Leiden University Medical Center (LUMC) Leiden, The Netherlands

Introduction: Several studies have described the transverse sigmoid notch morphology in relation to musculoskeletal pathology, such as distal radioulnar joint (DRUJ) instability, triangular fibrocartilage complex (TFCC) injuries and ulnar impingement following ulna shortening osteotomy. The majority of these studies use Tolat's transverse sigmoid notch classification, which describes four sigmoid notch types in the transverse plane; Flat-face, Ski-slope, C-type and S-type notch. It is believed that Tolat's transverse classification adequately reflects the transverse sigmoid shape on transverse CT planes. However, we hypothesised that the sigmoid notch shape depends on the level of the transverse CT plane on the axial axis of the distal radius.
Aim: Therefore, the primary aim of this study was to determine and compare the transverse sigmoid notch shape, as classified by Tolat's transverse classification, on different axial CT levels in the same wrist.
Material & Methods: The transverse sigmoid notch shapes on two different axial CT levels of the distal radius of 60 participants were classified according to Tolat's classification by two researchers, (Fig. 1). Agreement between the measurements of the two observers was assessed with Cohen's kappa coefficient. The transverse sigmoid shape was determined at two levels on the axial axis of the distal radius; at the level of the most prominent part of Lister's tubercle, determined on the sagittal plane and at the level of the 'Smallest Distance between the Ulnar head and Sigmoid notch' (SDUS). The SDUS at the transverse plane was chosen because, in case of ulnar impingement, this would happen at the level of the SDUS.
Results: The classification agreement between the researchers was 'excellent' for both axial levels. The majority of the wrists (52%) demonstrated different transverse sigmoid notch classifications depending on the axial level of the CT scan.
Conclusions: The transverse sigmoid classification described by Tolat et al. is therefore not useful in classifying the potentially pathology related morphology of the sigmoid notch.

A-0830 THUMB REPLANTATION FOLLOWING PROLONGED ISCHAEMIA TIME AND EXTREMELY HOT WEATHER EXPOSURE

Hazem Alhasan, Eyad Alqasim
Dammam Medical Complex, Dammam, Saudi Arabia

Introduction: a unique replantation procedure of a completely amputated thumb following prolonged ischaemia time and hot weather exposure of about 40°C was performed in an attempt to salvage the patient's hand functions. This is a case of a 30-year old, otherwise healthy non-smoker male who sustained an electrical saw injury to his left thumb. He was referred to our hospital 23 hours following the initial injury and only after having visited 3 different hospitals. He presented with a complete trans-metacarpal amputation of his left thumb just proximal to the first MCP joint. However, there was an intact piece of dorsal skin.
Aim: Time and Extremely Hot Weather
Exposure - Do These Factors Significantly Influence Final Results?
Material & Methods: At surgery, adequate shortening of the first metacarpal and proximal phalanx of the amputated thumb was performed, followed by first MCP joint arthrodesis using k-wires. The princeps pollicis artery was exposed and repaired followed by repair of the extensors and flexors. The procedure was completed by reconstruction of the venous anastomosis, and exposure and repair of the digital nerves. The patient was put on routine antibiotics and pentoxifylline.
Results: On 1st post-op day, the patient had good capillary refill of about 3 seconds. On 3rd post-op day, however, a worrisome cyanosis and congestion of the thumb occurred. It was, therefore, decided to refer to leech therapy in an attempt to salvage the replanted digit. Outstanding progressive improvements with resolution of the cyanosis and congestion were noticed thereafter. On the 10th post-operative day, the patient was discharged home. The k-wires were removed at 4 weeks and physiotherapy started thereafter. Current examination of the replanted thumb revealed maintained alignment, a good extension-type pinch using the thumb and index, maintained distal vascularity and sensation, and preservation of the majority of hand functions.
Conclusions: The authors believe that the hand is a crucial part of the body, and whenever possible and only after careful evalusation of the risks and benefits, replantation should always be attempted.

A-0831 HETEROTOPIC OSSIFICATION IS ASSOCIATED WITH PAINFUL NEUROMAS IN TRANSTIBIAL AMPUTEES UNDERGOING SURGICAL TREATMENT OF SYMPTOMATIC NEUROMAS

Floris V. Raasveld[1,2], Wen-Chih Liu[1,3], William Renthal[4], Mark Fleming[1], Ian L. Valerio[1], Kyle R. Eberlin[1]
[1]Massachusetts General Hospital, Harvard Medical School, Boston MA; [2]Erasmus Medical Center, Erasmus University, Rotterdam, the Netherlands; [3]Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan; [4]Brigham and Women's Hospital and Harvard Medical School, Boston MA

Introduction: A relationship between nerve regeneration and osseous regeneration has been described. During the surgical treatment of symptomatic neuroma in transtibial amputees, we have noticed that heterotopic ossification (HO) depicted on preoperative radiographs appears to be associated with the location of symptomatic neuromas in both the peroneal and tibial nerve distributions.
Aim: Therefore, this study aims to investigate the association between distal HO on the fibular and/or tibial residual limb with a symptomatic peroneal and tibial neuroma in transtibial amputees. Secondarily, we aimed to investigate the association between the degree of HO and pain.

Material & Methods: Data were collected for transtibial amputees who underwent surgical management of symptomatic neuroma and were prospectively enrolled from 2018 through 2023. Pre-operative radiographs were assessed for the presence of HO located at the distal fibula and tibia. The presence of a peroneal and/or tibial neuroma was based on findings contained within the operative reports. Pain levels were measured on a numeric rating scale (0-10).
Results: Sixty-five limbs of 62 amputees were included. Presence of peroneal neuromas together with fibular HO ($p=0.001$), as well as presence of tibial neuromas together with tibial HO ($p=0.038$) were associated. The odds of having a symptomatic peroneal neuroma with fibular HO present are greater than the odds of a symptomatic peroneal neuroma when fibular HO is absent (OR 9.3; 95%CI [1.9-45.6], $p=0.006$). No significantly higher odds were demonstrated for tibial neuroma and tibial HO (OR, 4.8; 95%CI [0.9-24.7], $P=0.061$). Pre-operative pain scores were significantly higher for all patients with HO ($p<0.001$), those with fibular HO ($p<0.001$), and those with tibial HO ($p<0.001$), compared to patients without HO.
Conclusions: We found that distal residual limb HO in transtibial amputees is associated with both worse pre-operative pain and the presence of a symptomatic neuroma, specifically a peroneal neuroma with fibular distal residual limb HO and a tibial neuroma with distal fibular residual limb HO. These findings may assist in pre-operative screening, indicating which nerves are most problematic, and in intra-operative decision-making on which nerves to address. Therefore, in order to optimally address sources of pain during residual limb revision, we recommend addressing both the HO and the distal nerve end when distal residual limb HO is identified on the radiograph. Further studies are required to confirm and investigate the causality and biochemical as well as physiologic nature of this association.

A-0832 PERI-IMPLANT FRACTURES IN THE UPPER EXTREMITY: RETROSPECTIVE OBSERVATIONAL STUDY

Pilar Saralegui, Fernando Holc, Pedro Bronenberg, Gerardo Gallucci, Mariano Abrego, Pablo De Carli, Jorge Boretto
Hospital Italiano de Buenos Aires, Argentina

Introduction: Although peri-implant fractures (PIF) of the upper extremity are rare, they represent a challenge to orthopedic surgeons. Lack of a classification system to guide treatment has resulted in a paucity of published information on the management of these injuries, which differ from those of the lower extremity.
Aim: The primary objective of our study is to identify and describe the population of patients who sustain these injuries in the upper extremity and in which anatomical region they most frequently occur. Secondarily, to classify these fractures and describe the type of treatment indicated and its complications.
Material & Methods: A retrospective cohort study was carried out between 2002 and 2022. Skeletally mature patients with PIF in the upper extremity were included, while periprosthetic and pathological fractures were excluded. Demographic variables, fracture location, age, fracture mechanism, and implant used were recorded. Treatment of PIF, use of bone graft, and postoperative complications were also recorded. Furthermore, fracture patterns were evaluated through radiographic analysis, and fractures were classified according to the universal classification and the non-prosthetic peri-implant fracture classification (NPPIF).
A descriptive statistical analysis of the data was performed.
Results: Nineteen patients with a mean age of 47 years (SD 22.2) were enrolled; 12 of them were female. The mean follow-up time since PIF was 40.7 months (SD 38.2). The most affected locations were the distal radius, radial diaphysis, and humeral diaphysis, with 4 (21.1%) cases each. In all patients, PIF occurred in cases with plates and screws. In 18 (94.7%) cases, the PIF was stabilized with a plate and screws. In all distal radius or ulna fractures (11 cases), osteosynthesis replacement was the treatment of choice, while in cases of humerus (7 cases) and proximal ulna (1 case) fractures, another plate was added. In one case with PIF in the distal ulna, conservative treatment with a plaster cast was performed. At 5

months, due to delayed consolidation, a new plate was placed.
According to the universal classification, 16 (84.2%) cases were classified as PS2, indicating that the fracture was at the tip of the construct. According to the NPPIF classification, 18 (94.7%) cases were classified as P1A since the initial fracture was consolidated at the time of PIF. None of the patients required bone grafting. There were 3 complications, 2 patients (10.5%) with implant-related pain requiring implant removal and 1 patient (5.3%) with a deep infection.
Conclusions: The population affected by PIF was mainly young patients, and the anatomical locations were the diaphyseal humerus, distal and diaphyseal radius, with a predominant fracture pattern at endplate level.
Treatment of PIFs by plate and screw stabilization may prove to be effective with a low risk of complications. A multicenter study should be carried out to establish a treatment algorithm.

A-0833 INTRAMEDULLARY SCREW FIXATION OF METACARPAL AND PHALANGEAL FRACTURES- A CASE SERIES- SHORT TERM OUTCOMES

Christina Chatzidaki, Ioannis Kolovos, Georgios Tetsios, Vasiliki Mpatsou, Lydia Stilianopoulou, Panagiotis Kanellos
KAT Attica General Hospital, Athens, Greece

Introduction: Metacarpal and phalangeal fractures are very common fractures seen in the emergency department. There are a lot of operative fixation methods including closed reduction percutaneous pinning, open reduction internal fixation, external fixation, and intramedullary screw fixation.Intramedullary screw fixation is an increasingly preferred method of fixation. Benefits include early range of motion, faster recovery, limited dissection, and reduced complications.
Aim: To present the technique and the short term outcomes of metacarpal and phalangeal fractures treated with intramedullary cannulated headless screws in our clinic
Material & Methods:We retrospectively studied the records of 16 patients (3women; 13 men), mean age 32years (range 20-68), with metacarpal and phalangeal fractures, who underwent intramedullary screw fixation from 12/2020 until 11/2023. A total of 28 fractures (9 metacarpal and 19 proximal phalangeal) were identified. We used intramedullary cannulated headless screws, 2.7mm in the phalanges (9anterograded; 10retrograded) and 3.5mm in the metacarpals (2 anterograded; 7retrograded). Closed reduction of the fractures under fluoroscopy and a dorsal small incision (3mm) was made for insertion of the guide wire and the screw. In 3 cases we changed to mini-open reduction. A volar splint was used for a week and active mobilization was beginning after that. Clinical outcomes were assessed and quickDash and VAS score were measured in the 6th month. Time to union was assessed radiographically.
Results:Close follow up in the 1st, 2nd, 4th week and 2nd and 6th month was scheduled. Union was achieved in all fractures by the 2nd month, VAS score was 0.4 (0-3), the mean quickDash score was 0% for metacarpal fractures and 6.1% (0-38.9%) for phalangeal fractures. All working patients return to work in the 2nd month. 3 patients presented stiffness and 2 of them required second surgery for screw removal. No cases of malunion, nonunion or infection were mentioned.
Conclusions: Intramedullary cannulated headless screw fixation is a relatively new technique of the last decade, which presents satisfactory short term outcomes, with minimal incision of the soft tissues and quick return to work and everyday activities. We consider it to be a quite notable and promising technique

A-0834 NEUROMA MORPHOLOGY: A MACROSCOPIC CLASSIFICATION SYSTEM

Floris V. Raasveld[1,2], Daniel T. Weigel[1], Wen-Chih Liu[1,3], Maximilian Mayrhofer-Schmid[4], Barbara Gomez-Eslava[5], Charles D. Hwang[1], Brian J. Wainger[1], William Renthal[6], Mark Fleming[1], Ian L. Valerio[1], Kyle R. Eberlin[1]

[1]Massachusetts General Hospital, Harvard Medical School, Boston, MA; [2]Erasmus Medical Center, Erasmus University, Rotterdam, the Netherlands; [3]Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan; [4]BG Trauma Center Ludwigshafen, University of Heidelberg, Heidelberg, Germany; [5]Boston Children's Hospital, Harvard Medical School, Boston, MA; [6]Brigham and Women's Hospital and Harvard Medical School, Boston, MA

Introduction: It remains unclear to what extend morphological neuroma characteristics contribute to differences in symptomology and whether comorbidities are associated with different patterns of growth and shape.

Aim: Therefore, the primary aim of this study was to introduce and validate a morphological classification for excised, ex vivo, symptomatic neuromas. A secondary objective was to evaluate the morphological classification system for its clinical value by assessment of factors associated with the different morphological groups, including pre-operative pain and patient comorbidity factors.

Material & Methods: Terminal neuroma specimens were collected from prospectively enrolled patients undergoing symptomatic neuromas surgery. Protocolized images of the specimens were obtained intraoperatively. Pain data (Numeric rating scale, 0-10) were prospectively collected during pre-operative interview, patient demographic and comorbidity factors were collected from chart review. A morphological classification is proposed, and the inter-rater reliability (IRR) between 5 independent clinicians and 5 independent researchers was assessed.

Results: Forty-five terminal neuroma specimens from 27 patients were included. Amputees comprised 93% of the population, of which 3 were upper (11%) and 24 (89%) were lower extremity amputees. The proposed morphological classification, consisting of three groups (bulbous, fusiform, atypical), demonstrated a strong IRR (0.8). No association was found between morphological category and time interval from injury-to-neuroma-excision ($p=0.890$). Atypical neuromas were associated with higher pre-operative pain, compared to bulbous ($p=0.007$) and fusiform ($p=0.008$). Atypical morphology was significantly more prevalent in patients with diabetes ($p=0.010$) and peripheral vascular disease (PVD) ($p=0.018$).

Conclusions: A validated morphological classification of neuroma is introduced, indicating that atypically shaped neuromas were associated with higher pre-operative pain. Atypical neuromas were more prevalent in patients with diabetes and PVD. This may reflect the potential relationship with the vascular and metabolic microenvironment. These findings may assist surgeons and researchers with better understanding of symptomatic neuroma development and their clinical implications.

A-0835 ADIPOSE-DERIVED STEM CELLS FOR THE MANAGEMENT OF POST-SURGICAL PAINFUL SCARS IN UPPER LIMB: MID-TERM CLINICAL OUTCOMES

Laura Martini[1], Elena Francioni[1], Giancarlo Caruso[1], Paola Bagnoli[2], Andrea Vitali[1]

[1]Hand Surgery Unit A-USL Toscana Centro, Firenze, Italy; [2]Upper limb Rehabilitation Unit, A-USL Toscana Centro, Firenze, Italy

Introduction: Post surgical scars may be painful and this can be caused by damage to a small cutaneous nerve or can occur when a nerve is compressed by the scar tissue. Neuroma formation at the end of a damaged nerve can cause peripheral neuropathic pain. Moreover, scars may cause severe itching and tenderness, they can impair movement and cause functional disability. Furthermore, a raised, depressed, wide or erythematous scar may cause a cosmetically unpleasant result. Currently, no definitive treatment has been established for painful scars. Autologous adipose tissue

grafting as a treatment option for scars has become more popular and numerous evidences in the literature support its application. Studies have shown that adipose- derived stem cells (ADSCs) have angiogenic and antiapoptotic properties that affect wound healing, soft-tissue repair and scar remodeling. ADSCs appear promising to reduce the severity of pre-existent fibrotic scarring. Several reports investigated the effectiveness of treatment with autologous adipose tissue for painful scars, in which a neuropathic damage can be suspected. Klinger et al. hypothesized that ADSCs could promote scar reorganization of fibrotic tissue and regeneration, leading to reduced nerve excitation and improved pain control.
Aim: The goal of our study was to evaluate the mid-term clinical results of patients treated with grafting of autologous adipose tissue for persistent painful scars after surgical treatment in upper limb.
Material & Methods: From January 2013 to November 2022, 34 patients were treated for post-surgical painful scars with autologous fat graft processed by a system of microfragmentation that obtain a product rich of ASC with minimal handling of the adipose tissue, reducing the risk of damage to the cells and guaranteeing the maintenance of vascular-stromal niches. All patients were evaluated by a preoperative and postoperative VAS scale and they all completed the POSAS questionnaire (Patient and Observer Scar Assessment score). We retrospectively recorded all patients with at least 12 months follow up.
Results:The 34 patients' mean age was 51. The pain level decreased meaningfully from a mean VAS value of 7.9 to 1.5 at 12 months of follow-up. Mean preoperative POSAS score was 25,6 and 33,8 for the observer and the patient evaluation respectively. 12 months after surgery POSAS score improved to 9,1 and 10,5 respectively. All results are statistically significative (p value <0,01).
No major complications were reported
Conclusions: The use of adipose derived stem cells appears to be a safe and effective strategy to treat excessive fibrosis of painful scars in which perineural scarring seems to be one of the major pathogenetic mechanisms. results showed a significant improvement in patient and surgeon satisfaction, scar quality and pain relief after a follow-up of 12 months. The literature and our case series hint fat grafting's versatility, efficacy, and safety

A-0836 TEST-RETEST RELIABILITY OF PROMIS UPPER EXTREMITY (UE) COMPUTER ADAPTIVE TESTING (CAT) IN A PEDIATRIC POPULATION

Erin Tabish, Hernan Roca, Gretchen Maughan, Nikolas H. Kazmers, Brittany N. Garcia
University of Utah

Introduction: Patient Reported Outcomes Measurement Information System (PROMIS) upper extremity (UE) CAT v2.0 and Pain Interference (PI) CAT v1.1 are commonly used patient reported outcomes (PRO) tools to evaluate upper extremity (UE) orthopaedic patients. While this tool has proved to be reliable in adult populations, it has not yet been validated in a pediatric population with upper extremity pathologies.
Aim: Our goal was to assess the test-retest reliability of the PROMIS UE and PI CATs in a pediatric upper extremity population.
Material & Methods: Pediatric (5-17 years) patients with UE pathology and their parent or legal guardian were recruited to complete the PROMIS UE and PI CATs. Self-report and parent-proxy surveys were completed during their clinic visit, and a second survey response 1-7 days after their appointment. Reason for visit and any interventions (cast removal, splinting, suture removal, etc.) were recorded. Test-retest reliability was evaluated using intraclass correlation coefficients (ICCs) and Bland-Altman Plots were used to assess the proportion of patients with scores that differed by more than the MCID for the established adult values (4.3 for PI CAT and 4.1 for UE CAT).
Results: Patient-reported surveys for both the PI and UE CAT received 77 responses that met acceptance criteria and illustrated 'moderate' reliability with ICCs of 0.59 [95% CI (0.38, 0.73)] and 0.71 [95% CI (0.58, 0.81)] respectively. There

mean age was 11.73 ± 2.72 and 45.5% (35/77) were female. Mean time between survey responses was 4.00 ± 2.10 days. The estimated MCID threshold of 5 was exceeded by 59.7% (46/77) for the PI and 42.9% (33/77) for the UE CAT. The change in T-scores between first and second responses was 3.52 ± 7.74 for PI and -1.33 ± 7.70 for UE. Parent-proxy surveys for both the PI and UE CAT received 90 responses that met acceptance criteria and illustrated 'moderate' reliability for PI CAT and 'good' reliability for UE CAT with ICCs of 0.64 [95% CI (0.47, 0.76)] and 0.813 [95% CI (0.70, 0.88)] respectively. The mean age was 11.29 ± 3.15 and 45.6% (41/90) were female. Mean time between survey responses was 4.12 ± 2.13 days. The MCID threshold was exceeded by 46.7% (42/90) for the PI and 37.8% (34/90) for the UE CAT. The change in T-scores between first and second responses was 2.84 ± 7.59 for PI and -2.21 ± 5.9 for UE.

Conclusions: In a pediatric population with upper extremity pathologies, the PI and UE CAT demonstrated 'moderate' test-retest reliability while the parent-proxy survey demonstrated 'moderate' reliability for the PI CAT and 'good' reliability for the UE CAT. Clinically relevant differences in score pairs were highest in the patient self-reported PI at 59.7% and lowest in the parent-proxy UE at 37.8%. While the PROMIS UE CAT and PI instruments demonstrate 'moderate' reliability on a cohort level, they should not be used when assessing symptom and function changes for individual level for pediatric patients.

A-0837 ARTHRODESIS OF DISTAL INTERPHALANGEAL AND THUMB INTERPHALANGEAL JOINT: A RETROSPECTIVE COHORT STUDY OF 149 CASES

Philip Silvano, Evelina Pantzar-Castilla, Eva Lundqvist
Department of Orthopedics and Hand Surgery, Örebro Univeristy School of Medical Sciences and Örebro University Hospital

Introduction: Arthrodesis of finger joints is often the last line of treatment in severe osteoarthritis, rheumatoid arthritis, and mallet finger. There is no consensus on which operative treatment is superior, and it is not known whether complications differ between different techniques. At Örebro University Hospital in Sweden, the Kirschner-wire technique was standard until 2020, when the headless compression screw technique was introduced as a complement.

Aim: The purpose of this study was to examine the outcomes and complications associated with distal interphalangeal (DIP) joint and thumb interphalangeal (IP) joint arthrodesis, and to see whether these correlated with patient-dependent and treatment-related factors.

Material & Methods: A total of 149 arthrodeses (118 DIP joint and 31 thumb IP joint) were performed at Örebro University Hospital between 2012 and 2022. A retrospective single-center study was performed on the basis of patient records, covering data on age, sex, indication for arthrodesis, digit operated, comorbidity, smoking habits, surgical technique, type of anesthesia, surgery length, surgeon experience, time to osseous union, number of doctor's visits, time of immobilization, and complications.

Results: Osteoarthritis was the most common indication (56%) for surgery. K-wire fixation was the most frequently used technique (91%). Diabetes and surgeon experience had the largest influence on the risk of complication ($p=0.036$ and $p=0.006$, respectively. The complication frequency was 35%, with infection being the most common (25%). There were no significant differences in outcome or complication rate between the 136 joints operated using Kirschner wire and the 13 operated using headless compression screws.

Conclusions: Postoperative complications occurred at a rate similar to that reported in the existing literature. Diabetes and surgeon experience were identified as factors increasing the risk of postoperative complications in these DIP/thumb IP joint arthrodeses. However, there was no significant difference between the two techniques regarding outcome and complications. Further studies are needed in order to determine the optimal type of operation and choice of implant.

A-0838 NEUROMA TO NERVE RATIO: DOES SIZE MATTER?

Floris V. Raasveld[1,2], Daniel T. Weigel[1], Wen-Chih Liu[1,3], Maximilian Mayrhofer-Schmid[4], Charles D. Hwang[1], Vlad Tereshenko[1], Brian J. Wainger[1], William Renthal[5], Clifford Woolf[6], Ian L. Valerio[1], Kyle R. Eberlin[1]

[1]Massachusetts General Hospital, Harvard Medical School, Boston, MA; [2]Erasmus Medical Center, Erasmus University, Rotterdam, the Netherlands; [3]Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan; [4]BG Trauma Center Ludwigshafen, University of Heidelberg, Heidelberg, Germany; [5]Brigham and Women's Hospital and Harvard Medical School, Boston, MA; [6]Boston Children's Hospital, Harvard Medical School, Boston, MA

Introduction: Anatomic features of neuromas have been explored in imaging studies. However, this remains limited with the use of resected, ex vivo, human neuroma specimens.

Aim: In this study, excised neuromas were studied ex vivo, to investigate the clinical relevance of neuroma size, growth patterns and their relation to pain, anatomy, and patient factors. The primary aim of this study was to investigate the influence of time on neuroma growth, and the association of neuroma size with pain or other patient characteristics. Secondarily we aimed to investigate the correlation between sensory or mixed nerve types with different neuroma sizes, including immunofluorescence staining of a small sample of neuromas to distinguish between motor and sensory axonal populations of the neuromas.

Material & Methods: Patients who underwent neuroma excision between 2022 through 2023 were prospectively enrolled. Terminal neuroma specimens were obtained following operative resection. Standardized neuroma size measurements, expressed as Neuroma to Nerve Ratio (NNR), were conducted with ImageJ software. Pain data (Numeric Rating Scale, 0-10), were prospectively recorded during pre-operative evaluation, and patient factors were collected from chart review.

Results: Fifty terminal neuroma specimens from 31 patients were included, of whom 29 (92.3%) were amputees. Most neuromas were from lower extremities (n=25, 89.3%). The median NNR was 2.45, which were excised after a median injury-to-neuroma-excision interval of 6.3 years. NNR was not associated with pre-operative pain ($p=0.062$) or with anatomical nerve distribution ($p=0.354$). NNR was associated with a larger injury-to-neuroma-excision interval ($p=0.002$) and with a smaller proximal nerve diameter ($p<0.001$). Also, sensory nerves were associated with a larger NNR, compared to mixed nerves ($p=0.045$).

Conclusions: he results of this study suggest that neuroma size does not correlate with pain severity and that smaller nerves result in relatively larger neuromas. Neuromas seem to keep on growing over time, and sensory neuromas grow relatively larger neuromas, compared to mixed nerves. These findings may assist surgeons and researchers in better understanding of symptomatic neuroma development.

A-0839 ANALYSIS OF ADULT HAND BURN CASES: INSIGHTS FROM AN SEVEN-YEAR BURN UNIT STUDY

Julia Bartkova[1,2], Dusana Selecka[2], Livia Petrasskova[2], Janusz Rucki[2], Marianna Kotradyova[2]

[1]Department of Burns and Plastic Surgery, Institution shared with University Hospital Brno, Faculty of Medicine, Masaryk University, Brno, Czech Republic; [2]Faculty of Medicine, Masaryk University, Brno, Czech Republic

Introduction: Hand burns constitute a significant public health issue, with profound implications for individuals and healthcare systems worldwide. A thorough understanding of the epidemiological landscape is vital for developing targeted interventions and mitigating the burden of hand burns on both individual well-being and societal healthcare resources.

Aim: The purpose of this study was to evaluate the epidemiological characteristics of hand burns patients admitted to the Department of Burns and Plastic Surgery Faculty Hospital Brno, Czech Republic.

Material & Methods: A retrospective analysis was conducted during the period from the January 1, 2016 to December 31, 2022. It included hand burn patients above the age of 18 years, who were hospitalized in single burn unit during a period of 7 years.

Results: Out of the total number of 1378 patients admitted to the burn center, there were 507 patients with hand burns of which 59.4% came from urban regions. Patients were transported to the specialized burn center using a number of modalities including 35.6% by the ambulance, 15 % by air, 21.7 % transfer from another hospital, and 27.7 % by private car. Most hand burns were recorded in males (72.8%). In general, the burns happened as an accident (99.0%), only in a small number of cases it was a self harm (0.4%) or a criminal act (0.6%). Most often, hand burn injuries occurred at home (51.6%), followed by work (19.4%). The most common etiological agent was a flame (61.3%), followed by a burn with a hot liquid (12.8%). First aid, cooling, was given to the 86.3% patients. On the day of admission to the hospital, it was necessary to treat 24.5% patients under general anesthesia in the surgery room. Overall, 53.5% patients underwent surgery, from which a skin graft was necessary in (37.1%) patients. Following reconstructive surgeries during further rehospitalization were needed for 1.6 % patients. The average number of days of hospitalization for patients with hand burns was 18.8 days.

Conclusions: Epidemiological studies of adult burns is critical to understanding the scope of the problem, identifying risk factors, evaluating interventions, and developing prevention strategies to reduce the incidence and impact of hand burn injuries in adults.

A-0840 FOLLOW-UP OF RASL PROCEDURE FOR CHRONIC SCAPHOLUNATE DISSOCIATION

Hazem Alhasan, Ab Jafsher
Dammam Medical Complex. Dammam, Saudi Arabia

Introduction: Scapholunate dissociation is the most common cause of wrist instability.This case is about one of the effective procedure of chronic SL dissociation

30 years old Saudi male, medically free, History of trauma to his left and during playing football, fell down on pronated wrist 2 months prior to his presentation to OPD

He heard click in left wrist, ROM not affected but he complains of pain with lifting heavy objects but unable to do pushups in the gym

Aim: TO found safe and effective treatment of chronic static scapholunate dissociation

Material & Methods: Patient underwent diagnostic wrist arthroscopy Therefore, plan was done to take the patient for open reduction and association of scaphoid and lunate (RASL procedure)

Results:Clinically, patient improved his ROM and hand grip:

Conclusions: Reduction and association of scaphoid and lunate (RASL procedure) is found to be safe and effective treatment of chronic static scapholunate dissociation. It realigns the scaphoid and lunate, restore the function, reduce the pain and appears to be robust over time

A-0841 WHO SHOULD WE TREAT? SUCCESSFUL PAIN REMISSION FOLLOWING TARGETED MUSCLE REINNERVATION FOR TREATMENT OF NEUROPATHIC PAIN IN AMPUTEES

Floris V. Raasveld[1,2], Maximilian Mayrhofer-Schmid[3], Wen-Chih Liu[1,4], Benjamin R. Johnston[5], Ian L. Valerio[1], Kyle R. Eberlin[1]
[1]Massachusetts General Hospital, Harvard Medical School, Boston, MA; [2]Erasmus Medical Center, Erasmus University, Rotterdam, the Netherlands; [3]BG Trauma Center Ludwigshafen, University of Heidelberg, Heidelberg, Germany; [4]Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan; [5]Brigham and Women's Hospital and Harvard Medical School, Boston, MA

Introduction: Targeted Muscle Reinnervation (TMR) is an effective surgical modality for neuropathic pain management and is predominantly established for treatment of chronic neuropathic pain (or Secondary TMR) in amputees.
Aim: However, the specific patient cohort for whom Secondary TMR is most effective is not known.
Material & Methods: Prospectively enrolled amputees who underwent Secondary TMR between 2018 through 2023 (minimum follow-up: six months) were analyzed. Demographic and surgery-related dat were collected retrospectively, pain data (Numeric Rating Scale, 0-10)) were collected prospectively. Sustainable pain remission was defined as NRS of ≤3/10 for ≥3 months until latest follow-up. Multi-level-mixed-effects models were utilized to identify patients achieving pain remission, followed by multivariate regression for identification of associated variables.
Results: Of the 82 enrolled patients, 34 amputees (41.5%) achieved sustained pain remission, and 8 amputees reached pain disappearance (9.8%). The median follow-up was 2.5 years. A shorter follow-up (p=0.004), private insurance (p=0.048), absence of smoking (p=0.024), absence of psychiatric comorbidities (p=0.014), a distal amputation level (p=0.031) and a lower Elixhauser Comorbidty Index (p=0.029) were associated with sustained pain remission.
Conclusions: Following Secondary TMR, almost half of patients reached sustained pain remission, and one out of ten reached disappearance of pain. We identified factors associated with pain remission following Secondary TMR. These results will help surgeons in understanding which patients may benefit most from secondary TMR surgery as treatment of chronic neuropathic pain, and they may assist in managing pre-operative pain expectations.

A-0842 EFFECT OF TOURNIQUET TIME ON OUTCOMES AFTER DISTAL RADIUS FRACTURE SURGERY WITH VOLAR LOCKING PLATE

Maria-Jose Perez-Ubeda, Maria-Dolores Gimeno, Camila Arvinius, Ana Gonzalez, Eduardo Gomez, Fernando Marco
Hospital Clínico San Carlos, Madrid, Spain

Introduction: Currently, the most widely accepted surgical treatment for wrist fractures is osteosynthesis with a volar anatomical plate. This procedure is usually performed under conditions of upper limb ischaemia using a pneumatic cuff. There are scientific articles comparing distal radius fracture (DRF) surgery performed using the WALANT technique with conventional anaesthesia using a tourniquet, but none of them analyse the effect of ischaemia time on functional or mobility outcomes. In ankle fracture surgery, increased postoperative opioid requirements have been observed in relation to ischaemia time. Su et al. identified ischaemia time as a risk factor for infection in open internal fixation of fractures of the calcaneus.
Aim: The hypothesis of our study is that the ischaemia time has a negative effect on the short-term results of DRF surgery using a volar locking plate.
Materials and methods: A secondary analysis was performed on a sample of 180 patients in a clinical trial randomising the use of arthroscopy as an adjunctive technique in DRF surgery using a volar plate. Variables included the PRWE questionnaire,

strength and active mobility at different times during the study. A Pearson correlation test was performed between ischaemia time and the described variables.
Results: A statistically significant negative Pearson correlation was observed (p=0.002), with a weak to moderate effect for mobility measured 3 months postoperatively (r= -0.244).
Conclusions: In surgery for distal radius fractures, ischaemia time negatively affects active mobility at 3 months.

A-0843 ESTABLISHING THE RELIABILITY AND REPRODUCIBILITY OF ULTRASOUND FOR MEASURING PEDIATRIC ULNAR NERVE SIZE: A PROSPECTIVE STUDY OF TYPICALLY DEVELOPED, HEALTHY PEDIATRIC PATIENTS AGED 2-10 YEARS-OLD

Brittany N. Garcia, Gretchen Maughan, Jayden Brennan, Nikolas H. Kazmers, Joshua R. Daryoush, Sophie Hollenberg
University of Utah, Department of Orthopaedics, Salt Lake City, UT, USA

Introduction: Despite its popularity in the adult literature, limited data exists for the use of ultrasound (US) in evaluating nerve size in the pediatric population. Ultrasound has become an accepted, non-invasive method for evaluating cubital tunnel syndrome in adults.1,2 Studies have demonstrated that ulnar mononeuropathy at the elbow is the most frequent mononeuropathy diagnosed on invasive electrodiagnostic tests in the pediatric patients.3
Aim: The purpose of this study was to determine the reliability and reproducibility of US to measure ulnar nerve size at the level of the medial epicondyle, in a typically developed, pediatric patient population aged 2-10 years-old.
Material & Methods: This was a prospective cohort study of pediatric patients aged 2-10 years-old recruited from a tertiary care pediatric orthopaedic surgery clinic. Patients with history of prior trauma to the extremity, medical (e.g. diabetes), genetic, or nerve related conditions were excluded. Age, sex, BMI, race, and hand dominance were tabulated. Ulnar nerve cross-sectional area (CSA) and diameter were measured by two orthopaedic fellowship-trained hand surgeons using a 15-6 MHz linear transducer at the level of the medial epicondyle based on described methods.1 Pearson's rank correlation coefficient was calculated to evaluate the difference between CSA and patient demographics. Interrater and intrarater reliability and interclass correlation coefficients (ICC's) were calculated for the ultrasonographers. Mean nerve CSA with standard deviation for each age category were calculated.
Results: A total of 126 ulnar nerves were measured in 86 patients with a mean age of 7.3 $\pm$ 2.4 years and 45% were female. Children in the 2-4 year-old age category had a mean CSA of 2.8 $\pm$ 0.8 mm2 compared to those aged 8-10 years of 3.8 $\pm$ 0.7 mm2 ($p < 0.001$). Age was found to be 'moderately' correlated with ulnar nerve size ($r=0.51$, $p<0.001$). Interrater reliability between the two ultrasonographers was 0.88 [95%CI(0.82 – 0.91)] which is classified as 'good' according to established criteria. Intrarater reliability between the two ultrasonographers was found to be 'excellent' with ICC's above 0.95 for both surgeons.
Conclusions: Ultrasound is a reliable and reproducible method for measuring pediatric ulnar nerve CSA at the medial epicondyle. Intrerrater reliability was found to be good while the intrarater reliability was found to be excellent. Nerve size increased with increasing age. These data will be useful in future studies where ultrasound is used for evaluating the ulnar nerve in pediatric patients with suspected pathology.
References:
1. Change, K., Wu, W., Han, D., Ozcakara, L. Ulnar Nerve Cross-Sectional Area for the Diagnosis of Cubital Tunnel Syndrome: A Meta-Analysis of Ultrasonographic Measurements. Archives of Physical Medicine and Rehabilitation, 99(4): 743-757.
2. Letissier, H., Dardenne, G., Saraux, A., Le Nen, D., Borotikar, B, Jousse-Joulin, S. (2021). Ultrasound Ulnar Nerve Measurement in a Healthy Population. Rheumatology and Therapy, 9(1): 457-466.

3. Felice, K., Jones, R. (1996). Pediatric Ulnar Mononeuropathy: Report of 21 Electromyography-Documented Cases and Review of the Literature. Journal of Child Neurology, 11: 116-120.

A-0844 NON-TRAUMA-RELATED LUNATE DISLOCATION AS THE EARLY SIGN FOR JUVENILE IDIOPATHIC ARTHRITIS

Christianne van Nieuwenhoven[1], Martijn Baas[2]
[1]Erasmus Medical Center, Rotterdam, The Netherlands; [2]Amsterdam UMC, Amsterdam, The Netherlands

Pediatric carpal disorders are mostly associated with congenital differences of the wrist and hand, and additionally, a different position or function of the wrist or a trauma will influence the development and position of carpal bones. Because the carpals are composed of non-ossified cartilage, with full maturity between 14-18 years of age, abnormalities can be left undiagnosed on X-rays. Especially, a lunate dislocation can be missed in the young child.
In adults, lunate dislocation is seen in high energy injuries, but in some children without any concomitant trauma.
In this case series, we present 3 such cases of 'spontaneous' lunate dislocation developing multi articular problems later in life.
Aim: Awareness of the fact that spontaneous lunate dislocation might be an early sign of Juvenile Idiopathic Arthritis (JIA) without the usual signs of JIA.
Material & Methods: From 2009 until now, three patients with a spontaneous lunate dislocation have been seen by an expertise team in pediatric hand differences diagnosing approximately 400 new pediatric patients per year. Patient records of these patients were evaluated with regard to history, physical exam and radiologic examination.
Results: Case 1: a 4 year old was seen with a painful wrist, no trauma was reported. On physical examination there were no signs of infection or arthritis, only a decreased and painful range of motion (ROM) was reported. On X ray of the wrist, no abnormalities were seen. After a conservative support for 18 months, new bilateral X rays showed increased ossification of the carpals with a subluxed lunate. This was treated surgically and postoperative course was normal. After a year she developed arthritis of one fifth finger PIPJ, the pediatric rheumatologist diagnosed JIA.
Case 2: a 9 year old girl was seen as a second opinion with a painful and swollen wrist after correction of a lunate dislocation. No trauma or artritis was reported by the family. The preoperative X rays of the wrist showed increased ossification compared to the contralateral side. JIA was diagnosed by the rheumatologist.
Case 3: a 12 year old girl with wrist pain and a slightly swollen dorsal wrist, no inflammatory signs upon examination, showed a subluxated lunate and increased ossification of the carpals. An MRI supported the subluxed lunate and an arthritis. She was diagnosed with JIA.
Conclusions: In children presenting with wrist pain localized in the lunate region, without a related trauma, lunate dislocation should be considered as a first presentation of JIA, even if there are no clinical signs of arthritis. X rays of the wrist will be inconclusive with regard to lunate position, especially in young patients with mostly cartilaginous carpals. However, a bilateral X ray could show a difference in ossification due to the inflammatory reaction. An MRI should rule out or confirm lunate dislocation. Furthermore, the MRI might be helpful and support the diagnosis of JIA.

A-0845 REFINING PREEMPTIVE TARGETED MUSCLE REINNERVATION: FACTORS ASSOCIATED WITH SUCCESSFUL PROPHYLAXIS IN AMPUTEES

Floris V. Raasveld[1,2], Maximilian Mayrhofer-Schmid[3], Wen-Chih Liu[1,4], Benjamin R. Johnston[5], Ian L. Valerio[1], Kyle R. Eberlin[1]
[1]Massachusetts General Hospital, Harvard Medical School, Boston, MA; [2]Erasmus Medical Center, Erasmus University, Rotterdam, the Netherlands; [3]BG Trauma Center Ludwigshafen, University of Heidelberg, Heidelberg, Germany; [4]Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan; [5]Brigham and Women's Hospital and Harvard Medical School, Boston, MA

Introduction: Targeted Muscle Reinnervation (TMR) is an established modality for neuropathic pain management. While the preventive effect of Primary (acute) TMR at time of amputation has been demonstrated previously, it remains unclear how many, and which patients, benefit most.
Aim: This study investigates the number of patients reaching sustained pain prophylaxis, and describes associated factors.
Material & Methods: Prospectively enrolled primary TMR patients were included with a minimum follow-up of six months between 2018 and 2023. Pain outcomes (Numeric Rating Scale (NRS), 0-10) were collected prospectively, patient factors were collected from chart review. Patients achieving sustained pain prophylaxis (NRS of $\leq$3/10 for $\geq$3 months until final follow-up) were identified. Multi-level-mixed-effect models and multivariate regression were utilized to visualize pain courses and identify associated factors.
Results: Seventy-five Primary TMR patients were included with a median follow-up of 2.0 years, of whom 57.3% achieved sustained pain remission, while 26.7% reported pain disappearance. Distal amputation levels ($p=0.036$), private insurance ($p=0.027$), a lower Elixhauser Comorbidity index ($p<0.001$), as well as the absence of the following factors were associated with pain prophylaxis: pre-operative opioid use ($p=0.014$), psychiatric comorbidities ($p=0.039$), smoking ($p=0.004$), complex regional pain syndrome ($p=0.048$).
Conclusions: This study demonstrates that more than half of all patients undergoing Primary TMR achieved sustained pain prophylaxis, and around a quarter achieved a sustained pain disappearance. Several factors associated with these favorable outcomes are described. These results will aid in pre-operative counseling and managing patient expectations, as well as in selection of patient who may benefit most from Primary TMR surgery regarding pain prophylaxis.

A-0846 FEATURES OF SURGICAL TREATMENT OF COMBAT INJURIES OF THE FOREARM AND ELBOW IN THE CONDITIONS OF MODERN HOSTILITIES

Igor Kurinnyi
SI "The Institute of Traumatology and Orthopedics" by NAMS of Ukraine

Introduction: Treatment of gunshot wounds of the forearm and elbow is relevant in connection with military operations in Ukraine and other countries.
Aim: Analysis of the specifics of the tactics of surgical treatment of combat injuries of the forearm and elbow in the conditions of modern warfare.
Material & Methods: The surgical treatment of 104 patients with combat injuries to the forearm and elbow was analyzed. The average age of the families was 37.6±1.9. All patients were men who had been injured during hostilities. Mine-explosive wounds were observed in 96% of the population, in 4% - small bullet wounds.
In the previous stages, the hospitals performed standard procedures: wound debridement, external rod fixation devices were used to fix fractures as a protocol, and VAK therapy followed by dermoplasty was performed in the initial stages.

Wounded patients were admitted to our institution for treatment 2-4 months after the injury, provided that the wounds had healed. The severity of patient injuries can be defined as severe or extremely severe consequences of polystructural trauma, which is characterized by the presence of scarring skin defects, unfused fractures and bone defects, nerve and muscle damage, and severe contractures.

Considering the seriousness of the injuries, the treatment consisted of several stages; from one to 8-10, on average 2-3-4 operations. As a rule, treatment began with skin plastic surgery. In the next stage, osteosynthesis and bone plastic were performed. Interventions on bones were often combined with nerve restoration. At the final stages of treatment, joint mobilization, myotranspositions, and elbow joint prosthetics were performed. The peculiarity of the rehabilitation treatment after osteosynthesis was that the early development of movements was not practised, but on the contrary, the limb was immobilized for 4-6 weeks, to prevent inflammatory complications.

Results: Complications related to inflammation during wound healing accounted for 3%. Bone consolidation after osteosynthesis was observed in 96% of cases. About 30% of patients have returned to military units and are participating in combat operations, but in many cases treatment is ongoing, so it is too early to conclude the results of treatment.

Conclusions: Despite severe gunshot wounds in the area of the forearm and elbow joint, the tactics of balanced staged surgical and rehabilitation treatment proved effective.

A-0847 LOW DOSE FOUR-DIMENSIONAL CT IN DIAGNOSING WRIST INSTABILITY

Ian Blom[1,2], Nina Mathijssen[2], Gerald Kraan[2]

[1]Reinier de Graaf Hospital, Delft, the Netherlands; [2]Reinier Haga Orthopedic Centre, Zoetermeer, the Neterlands

Introduction: Scapholunate (SL) instability can be diagnosed by four-dimensional Computed Tomography (4DCT). However, CT scanning increases the radiation dose compared to other diagnostic imaging tools for SL instability.

Aim: The goal of this study was to determine the optimal scanning parameters in order to lower the radiation dose for 4DCT in SL instability.

Material & Methods: In a phantom experiment on anatomic specimen, three hands were scanned using an automatic device for simulating patient movement. Palmair-dorsal flexion and radiair-ulnair deviation were conducted during scanning. Parameters that affect the radiation dose were adapted; scanning time, scanrange and tube current. The effective dose was calculated as the conversion factor for extremities multiplied by the Dose Length Product (DLP). For each image, image noise was measured by drawing a Region-of-Interest (ROI) in bony structures, soft tissue and air.

Scanning time

Standard duration of the protocol was 12.6 seconds. Scanning time was adapted into 10.85 seconds and 6.65 seconds (minimum scanning time).

Scanrange

Scanrange is 140 mm according to the standard protocol. Range was adapted to 120 mm and 80 mm.

Tube Current

Scans with different tube currents were performed, 15 mA (low dose) and 80 mA (clinical settings) with a rotation time of 0.35 seconds. This resulted in 6 mAs and 28 mAs for the two scans.

Results: The effective radiation dose was 0.081 mSv in standard clinical setting (range 140 mm, 28 mAs, 12.6 seconds of scanning time). Reducing the scanrange to 80 mm (which included all the carpal bones), resulted in a decrease of the effective dose to 0.038 mSv.

The effective radiation dose was reduced further (0.004 mSv) when scanning time was reduced to 6.65 seconds and lowered to 6 mAs.

By lowering the mAs, the measured noise in the image increased at soft tissue. However, less noise was measured in the cortical bone for low dose 4DCT. Adapting scanning time and scanrange did not affect the image noise.
Conclusions: Low dose 4DCT was achieved with an effective radiation dose of 0.004 mSv. Although more noise is included in low dose 4DCT, the cortical bone is less noisy compared to normal dose 4DCT. Since cortical bone is used for creating the virtual reconstruction, SL instability can be objectified with low dose 4DCT. Further research is necessary for the use of low dose 4DCT in other indications.

A-0848 IDENTIFYING KEY FRACTURE FRAGMENTS IN DISTAL RADIUS FRACTURES: ARE TRADITIONAL METHODS OF ASSESSMENT APPROPRIATE?

Thomas Cash, Dileep Karthikappallil, Mattia Solari, Craig Wyatt, Graham Cheung, Daniel Brown
Liverpool University Hospitals NHS Foundation Trust, Liverpool, UK

Introduction: Traditionally, interpretation of plain radiographs and classification systems based on fracture patterns/key fragments have been used for the pre-operative evaluation of distal radius fractures (DRF). A seminal paper by Medoff in 2005 increased our understanding of DRF and proposed one such anatomical classification.
Certain intra-articular fragments including the volar-lunate facet (the so-called 'critical corner') are considered key to stabilising DRF. Failure to identify and therefore support key articular fragments has been shown to be the major mode of failure in operatively treated DRF (Newton 2023).
Aim: The aim of this study was to assess whether traditionally used methods, that is interpretation of plain radiographs and use of a classification based upon this, are sufficient to identify these key fragments and thus be useful in the pre-operative planning of DRF fixation.
Methods: The study consisted of two parts. We identified a pool of complex adult DRF where both good quality plain radiographs and CT were available. Exclusions were those with previous surgery to the wrist and metalwork in situ.
Two senior hand and wrist surgeons (GC/DB) reviewed 73 patients from the pool. Fracture lines and key fragments were drawn on a compass grid and graded using the AO classification into simple, intermediate and complex. 20 experienced orthopaedic surgeons were asked to complete the same task on a random selection of 10 plain radiographs. The responses were grouped into; excellent, good, fair, poor and nil depending on the accuracy of interpreting the radiographs compared to the gold standard CT.
A further 47 patients from the pool had their CT scans evaluated by GC/DB and fracture lines plotted on a compass grid. An attempt was then made to classify the injuries according to Melone, Frykman, Medoff, Universal and AO.
Results: The identification of individual fracture fragments and fracture lines recorded on a compass grid showed poor correlation between radiographs and CT. This was true for simple, intermediate and complex fractures.
Only 16 fractures (34%) on CT imaging could be accurately classified using the Melone classification. Although other more comprehensive classifications, such as Universal and Medoff can better identify fragments, as the fracture complexity increases this becomes more problematic. In more comminuted fractures, there is increased variability in the number and position of fracture lines and fragments such that these injuries do not easily fit any one classification.
Conclusion: Identifying fracture lines in DRF using plain radiographs alone is unreliable, even in experienced orthopaedic surgeons, as are classification systems based on plain radiographs. We suggest a low threshold to perform a CT scan in comminuted DRF to evaluate key fracture fragments. Once a CT has been performed descriptive terms should be used for the fragments as existing anatomical classifications, such as Melone, cannot accurately describe the number and position of individual fragments.

This has a potentially significant clinical implication with inability to identify key fracture fragments during DRF fixation recognised as being the main cause of failure.

A-0850 WHY SOME PATIENTS ARE DISSATISFIED WITH THEIR TREATMENT RESULTS DESPITE ACHIEVING PERSONAL GOALS: A CLOSE LOOK THROUGH QUALITATIVE IPA RESEARCH

G.R. Arends[1,2,3], Y.E. van Kooij[1,2,3], B.Z. Stern[5], S.E.R. Hovius[6], R.M. Wouters[1,2], W.A. de Ridder[1,2,3,4]

[1]Department of Rehabilitation Medicine, Erasmus MC, Rotterdam, The Netherlands [2]Department of Plastic, Reconstructive, and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands [3]Xpert Handtherapie, Utrecht, The Netherlands [4]Xpert Clinics, Eindhoven, The Netherlands [5]Icahn School of Medicine at Mount Sinai, New York, NY, USA [6]Department of Plastic, Reconstructive, and Hand Surgery, Radboud UMC, Nijmegen, The Netherlands

Introduction: Satisfaction with treatment results (STR) is a multi-dimensional construct. It provides an individual's subjective assessment of whether the treatment improved their condition, positively impacted their well-being or health, and achieved their desired goals. Thus, hypothetically, patients obtaining personal treatment goals should be more likely to be satisfied with their treatment results. However, some patients achieve their personal goals but are dissatisfied with their treatment results. It is unknown which factors explain this phenomenon, and more insights into these factors will improve STR and patient-centered healthcare.

Aim: To investigate the experiences of patients with hand and wrist conditions who are dissatisfied with their treatment results despite achieving their personal goals three months post-treatment.

Material & Methods: We conducted a qualitative study comprising semi-structured interviews using interpretative phenomenological analysis to collect and examine the data. Data were collected in a specialized clinic for hand surgery and therapy in the Netherlands. Before treatment, a validated questionnaire was used to set personal treatment goals. We interviewed patients who were very or extremely dissatisfied with their treatment results despite having achieved these self-reported personal treatment goals.

Results: We included six patients and identified four main themes that may have caused the dissatisfaction: (1) the patient's focus on the performance activities, (2) other symptoms or adverse medical events, (3) the experience with the delivery of healthcare services, and (4) a patient's personal needs and personality traits. Participating in activities was an essential yet often not identified treatment goal for most of these patients.

Conclusions: Our study identified several themes explaining why certain patients are dissatisfied with their treatment results despite achieving their personal goals. Clinicians can directly target these factors in their treatment strategy to optimize satisfaction with treatment results. Most importantly, a treatment focus on the performance of activities seems imperative for any patient, even if the patient did not identify this as their personal treatment goal, as humans need to be able to engage in activities.

A-0853 BIOLOGICAL VERSUS NON-BIOLOGICAL RECONSTRUCTION OF THE ULNAR COLLATERAL LIGAMENT OF THE THUMB METACARPOPHALANGEAL JOINT: A RETROSPECTIVE CASE-CONTROL STUDY

Barrera-Ocha, Sergi[1], Pereira Cavaca, Rita[2], Martinez-Garza, Julio[1], Mendez-Sanchez, Gerardo[1], Prieto-Mere, José[1], Soldado, Francisco[3]

[1]Institu de la Mà, Hospital General de Catalunya, Barcelona, Spain; [2]Centro Hospitalar e Universitário de Coimbra, Portugal; [3]Hospital HM Nens, Barcelona, Spain

Introduction:In the hand, the ulnar collateral ligament (UCL) of the thumb metacarpophalangeal joint (MCPJ) is one of the most frequently injured ligaments. If ligament healing is improper, it can lead to a chronic MCPJ-UCL injury. The resultant instability may cause pain, weakness in grasping and pinching and, ultimately, MCPJ osteoarthritis. A wide range of treatment options is available for chronic UCL, including direct repair, dynamic tendon transfers, static ligament reconstruction, and arthrodesis, among others. Static biological ligament reconstruction (BLR) with a free tendon graft is the method most commonly used to treat chronic instability of the thumb MCPJ. However, though traditional reconstruction techniques have successfully achieved clinical stability, this is often at the cost of joint flexion and attaining normal strength has been erratic Acknowledged contributing factors for this complication are excessive tension in the graft, and the generally-required prolonged postoperative immobilization which delays rehabilitation for 4–7 weeks. Non-biological augmentation with suture tape has recently been introduced as a novel concept in ligament repair, as a means of internally bracing the BLR to accelerate rehabilitation and patients' return to work and other normal activities.
Aim: The purpose of this study was to compare both clinical and radiological outcomes of biological ligament reconstruction (BLR) versus non-biological ligament reconstruction (NBLR) for chronic injuries involving thumb's metacarpophalangeal joint (MCPJ) ulnar collateral ligament.
Material & Methods: Forty-two patients with this MCPJ injury underwent static BLR (n=24) or NBLR (n=18) and were included in this retrospective case-control analysis. Preoperative, postoperative, and contralateral thumb measurements (clinical evaluation, radiographs, and subjective outcome questionnaires) were compared over a mean 38 months follow-up
Results: Average postoperative thumb metacarpophalangeal and interphalangeal joint ranges of motion were 2.2–53.9° and 0–71°, respectively for BLR, and 0–57.5° and 0–71° respectively for NBLR. Average grip and pinch strengths, relative to the unaffected hand, were 102.0% and 84.0% versus 103.3% and 88.7%, respectively. All patients demonstrated stability with a firm endpoint, compared to the unaffected thumb. The average Quick Disabilities of the Arm, Shoulder, and Hand score among all patients was 11.9 for the disability/symptom module, 0 for the sports module, and 16.5 for the work module. Stiffness was reported among four patients and no patient sustained wound-related issues or other complications.
Conclusions: Non-biological ligament reconstruction of the thumb ulnar collateral ligament generates short-term outcomes comparable to those of biological ligament reconstruction, potentially allowing for expedited recovery and rehabilitation.

A-0854 ULNAR LONGITUDINAL DEFICIENCY TYPE 0 – AN UNDERREPORTED ENTITY?

Andreas Weber[1], Christopher Gaffney[2], Daniel Weber[1]

[1]Department of Hand Surgery, University Children's Hospital Zürich, University of Zürich, Zürich, Switzerland; [2]Harvard University DCE, Cambridge, MA, USA

Introduction: Ulnar Longitudinal Deficiency (ULD) is a non-inherited, congenital condition that usually presents as a unilateral, abnormal development or absence of the ulnar structures of the elbow, forearm, and hand. ULD occurs in approximately 1 in 25,000 live births. Several classification systems for ULD have been described in the published

literature, notably the Bayne and Manske. Havenhill et al. (2005) expanded upon Bayne's work by adding a Type 0 ULD, which is defined by an ulnar-sided hand anomaly and normal length ulna.
Aim: To describe the characteristics and prevalence of Ulnar Longitudinal Deficiencies seen at our institution. Specifically, we delineate ULD Type 0 compared to other sub-types.
Material & Methods: A retrospective chart review was completed for all patients who were seen at our institution between 2003 and 2023 with a diagnosis of ectrodactyly, oligodactyly, hand hypoplasia, or ulnar longitudinal deficiency of the upper extremity. The patients' radiographs and clinical information were reviewed to determine the appropriateness for inclusion. Demographic, medical comorbidities, and musculoskeletal conditions were also extracted and reported. Each applicable patient record was classified based on the Havenhill classification.
Results: We identified 32 patients that were ultimately determined to have a diagnosis of ULD. Of those, 66% were male. Unilateral involvement was found in 25 individuals, whereas 7 patients showed bilateral involvement for a total of 39 evaluable limbs.
Using the Havenhill/Goldfarb classification, patients were most likely to have a ULD Type 0 (n=22, 56%). Nine patients had associated musculoskeletal conditions (lower limb differences and/or scoliosis), and one patient was diagnosed with Cornelia de Lange syndrome.
Conclusions: Differentiating between the various types of Ulnar Longitudinal Deficiency remains challenging, even for the experienced hand surgeon, given the rarity of this patient presentation. In our retrospectively reviewed cohort of individuals over 20 years, ULD Type 0 was the most commonly encountered form at our institution. This is a considerably higher rate than has been demonstrated in the published literature to date. Therefore, while some cases continue to be challenging to diagnose and classify (particularly amongst clinical presentations that closely resemble cleft hands), it appears as though Type 0 ULD may be an under-reported entity.

A-0855 COMPLEX UPPER LIMB RECONSTRUCTION WITH A PREFABRICATED MEDIAL FEMUR CONDYLE CHIMERIC FLAP INCLUDING A SUPERFICIAL CIRCUMFLEX ILIAC ARTERY PERFORATOR FLAP: 5 CASES

Thomas Giesen[1], Francesco Costa[1], Davide Brucato[2], Elmar Fritsche[3]
[1]Clinica Ars Medica, Gravesano, Switzerland; [2]Ospedale Civico, Lugano, Switzerland; [3]Lucern Regional Hospital, Switzerland

Introduction: The chimeric medial femur condyle (MFC) with a skin island has been described, but arterial variation can occur that prevent its harvest and the donor area of the skin paddle has been debated as poor.
Aim: We present 5 cases of fabricated chimeric MFC cortico-periosteal flap joined with a superficial inferior epigastric perforator (SCIP) flap to reconstruct bones and joints in the upper extremiity with the skin paddle acting as a monitor and as a skin substitute.
Material & Methods: 5 patients with complex composite osteocutaneous defects to the upper limb were treated in our clinic. There were 2 females and 3 males with an average age of 35 years (range 18-39). The defects were 3 complex scaphoids, 1 olecranon, and one clavicle. In all cases the surrounding soft tissue was extremely scarred or damaged. All reconstructions were done using a medial condyle and a thin SCIP flap from the groin. An osteochondral flap was used in 3 cases. A cortico-cancellous flap in one case. A cortico-periosteal flap in one case. The SCIP flap was combined end to side to the genicular descending artery or to its branch for the vastus medialis.
Results: results All flaps survived. At 12 months, we observed a radiological and clinical satisfactory reconstruction in 4 cases. One case of scahoid reconstruction needed further surgery.
Conclusions: A fabricated chimeric flaps composed of a medial femoral condyle and a SCIP flap may be an additional option for tailored reconstruction of complex osteo-cutaneous defect of the extremities.

A-0856 IMPROVING STANDARD VOLAR PLATE FIXATION IN 3D GUIDED CORRECTIVE OSTEOTOMY OF THE DISTAL RADIUS: EVALUATION OF A PLATE POSITIONING TOOL

Katleen Libberecht[1,2], Emilia Gryska[1,2], Charlotte Stor-Swinkels[1,2,3], Per Fredrikson[1,2], Peter Axelsson[1,2], Anders Björkman[1,2]
[1]Department of Hand Surgery, Sahlgrenska University Hospital, Mölndal, Sweden; [2]Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden; [3]Department of Medical Physics and Biomedical Engineering, Sahlgrenska University Hospital, Gothenburg, Sweden

Introduction: Corrective osteotomies can be planned and executed with high precision with the use of 3D surgical planning and the design of patient specific drilling and cutting guides. When using standard volar plates during planning it is often found that the anatomical plates do not fit the malunited distal radius. The plate needs to be fixed to the distal fragment with an offset angle to achieve adequate volar tilt correction. Since the fixed angle screws of many plate systems allow for a certain variable angle, it is important that the plate is held in the correct angle when the distal screws are locked. A positioning tool was developed to aid the surgeon to fixate the plate according to the plan.
Aim: Evaluation of the postoperative results and the functioning of the positioning tool.
Material & Methods: Five patients with dorsally angulated extra-articular malunions of the distal radius were operated with the use of 3D printed guides and the plate positioning tool. The screw entry points and axes were identified on postoperative 3D reconstructions. The position of the guides during drilling, the angles of the screws in the plate and in the bone, the position of the plate on the bone and the correction of the distal radius were compared with the planning and errors measured according to an anatomical coordinate system.
Results: The patients were all female, aged between 63 and 74. The preoperative dorsal tilt ranged from 16° to 35°. The mean rotational position error of the guides was 1.8° in the coronal plane. The mean radial inclination correction error was 1.6°. The mean volar tilt correction error was 6.1°. The mean error of the screw angles to the plate was 2.1° in the sagittal plane, representing the functioning of the plate positioning tool. The mean error of the screw angles in the distal radius was 3.5°, representing migration of the screws within the bone after drilling. The mean ulnar variance correction error was 0.6mm.
Conclusions: A mean loss in volar tilt of 6.1° is above the acceptable error of 5°, according to previous publications. The main finding of this study was that this error occurred despite a low fixation error of the screws in the plate of 2.1°, which was the result of the functioning of the plate positioning tool. Distal rotation of the screws within the osteoporotic bone led to a relative loss in volar tilt of 3.5°, which was a consequence of tension during and after reduction. Future planning and fixation need to address tension to achieve higher accuracy.

A-0857 CAUSES OF REVISION SURGERY IN TOTAL WRIST ARTHROPLASTY: A MULTICENTRE STUDY

Natan Silver[1], Shruti Raut[2], Rami Estfan[3], Greg Packer[3], Sumedh Talwalkar[2], Daniel Brown[1]
[1]Liverpool University Hospitals Foundation Trust, Liverpool, UK; [2]Wrightington Hospital, Apley Bridge, UK; [3]Southend University Hospital, Southend-on-Sea, UK;

Introduction: Total wrist arthroplasty (TWA) can effectively treat pain in inflammatory, traumatic, and degenerative conditions affecting the wrist. Its primary advantage over arthrodesis is preservation of motion, but the trade-off is a higher re-operation rate. TWA is a technically demanding procedure and has been shown to have a “steep” learning curve. Understanding why these operations require revision provides important information to surgeons and potentially improves implant survival rates.

Aim: The aim of this study was to explore the causes of revision surgery in TWA by analysing patients referred for revision TWA.
Material & Methods: A multicentre retrospective cohort study was undertaken in three UK tertiary-referral centres. Patient demographic data, implant particulars and intra-operative findings were examined. Patient notes were scrutinised to determine the cause of implant failure. All revision surgery involving TWA implants were included, from exchange of articular components to conversion to arthrodesis. Revisions not affecting the implants, such as carpal tunnel release, were excluded, along with patients with incomplete medical files precluding analysis.
Results: 85 cases were included. 36 were revised to arthrodesis and 49 underwent revision arthroplasty.
Six implant types were revised: Motec (49), Universal2 (26), Maestro (4), Kinematix hemiarthroplasty (4), Biaxial (1), and Remotion (1). We do not have data regarding the number of primary surgeries for each implant so this does not infer survival/revision rates.
Reasons for revision were grouped into the following six categories:
Infection – Ten patients were diagnosed with peri-prosthetic infection, one of whom was acutely unwell with a bacteraemia. Of these ten, two had staged revisions to arthrodesis and seven had staged/non-staged revision arthroplasty. One patient absconded following the first stage of a planned revision arthroplasty.
Other biological factors – 12 patients suffered from non-infectious biological factors. These consisted of inflammatory disease/synovitis (4), heterotopic ossification (4), and disease progression following previous hemiarthroplasty (4).
Aseptic loosening – This represented the largest group of patients (46) and was sub-categorised accordingly: Chronic loosening due to wear-related osteolysis (25), failure of primary osseointegration (18 patients - 16 affecting the metacarpal component and 2 affecting the radial component), and impingement related osteolysis (3). The latter being a recently described phenomenon unique to Motec TWA.
Periprosthetic fracture – Three patients suffered peri-prosthetic fracture.
Technical error – technical error during the primary arthroplasty was recognised as the cause of revision in four cases. One patient was overstuffed, one had incorrect joint level leading to erroneous centre of rotation, and two were over-reamed causing implants to be smaller than the reamed cavity.
Persistent pain – eight patients had persistent pain with no clear cause and were offered revision surgery. Six improved following arthrodesis, but two patients continued to suffer from pain and ultimately underwent trans-radial amputation.
Conclusions: TWA is a complex procedure and should be performed by surgeons with knowledge and experience of these implants. We have described and categorised the problems leading to revision arthroplasty. Whilst only four revisions were identified where surgical error was the direct cause, recognising all causes of revision can help identify and prevent potential complications.

A-0858 CASE REPORT: DISTAL RADIOULNAR JOINT SYNOVIAL CHONDROMATOSIS

Mariona Balart Vila, Laia Sabaté Cequier, Ana María Carreño Delgado, Raúl Jiménez Aguilar
Hospital Clínic de Barcelona, Spain

Introduction: Synovial chondromatosis (SC) is a rare metaplastic transformation into cartilage of the connective tissue of the synovial membrane, tendon sheath or bursa lining of or near the joints. It occurs mostly between the third to fifth decades of life with no particular sex predilection. It is usually monoarticular and tends to involve large charging joints, predominantly the knee, rarely compromising the wrist. Although this lesion is described as a benign condition, there are a few cases of malignant transformation into secondary chondrosarcoma in the literature. Patients present with pain, swelling, articular effusion and/or reduced range of motion of the affected joint. Diagnosis is made with x-ray +/- MRI.

Aim: To share a case of wrist synovial chondromatosis to familiarize Orthopedic surgeons with this pathology.
Material&Methods: We report a 45-year-old man with a 1'5-year history of a painful mass in the dorsum of his right wrist who also complained of reduced forearm supination. The rest of upper extremity examination was unremarkable. He had no account of trauma nor any plausible lesional mechanism. Laboratory was normal. Wrist x-ray displayed an excavated notch in the ulnar aspect of the distal radius. MRI showed an 25x26x13mm interosseous cystic image immediately proximal to the distal radioulnar joint (DRUJ) which caused erosion of the radius with corticalization of the edges and without bony edema. It was orientated as a synovial cyst without being able to exclude a synovial sarcoma.
Surgery was then performed preferentially. A dorsal wrist approach between the 4th and 5th extensor compartments was used to access the DRUJ allowing good exposure. An oval rosy well-defined non-infiltrative tumor was found, which was meticulously dissected, achieving the complete excision of the mass. The spontaneous aperture of the lesion during the surgery discharged a compact aggregate of whitish particles (cartilaginous?). Next, the closure was carried out in layers repairing the dorsal radioulnar ligament and retinaculum. After that, it was checked the DRUJ remained stable. At last, the wrist was immobilised with an antebrachial cast blocking the pronosupination.
Results: The anatomopathological analysis of the specimen confirmed the diagnosis of synovial chondromatosis.rnNo postoperative complications took place.
Immobilization was maintained for the first 2weeks, followed by the initiation of wrist flexoextension. At 4weeks, pronosupination was started. After 3months, the patient reached full joint balance, had no function impairment compared to the other side and was free of symptoms. One year after surgery, there is no evidence of recurrence.
Conclusions: SC is an infrequent entity, especially when it appears in the DRUJ.
Time to diagnosis takes long due to nonspecific symptoms amb because x-ray can be normal. Consequently, SC should be contemplated in between the differential diagnosis of a soft tissue mass that grows in the DRUJ.
It is reported synovial chondromatosis can relapse and recurrence is believed to be secondary to poor resection at the time of surgery. Therefore, it is of importance to ensure an accurate excision of the entire lesion without leaving any traces. Likewise, great care must be taken when reconstructing the dorsal radioulnar ligament in order to preserve DRUJ stability.

A-0859 THE MEANING OF GRIP STRENGTH IN ADOLESCENT STUDENTS

Burcu Semin Akel, Kübra Önerge, Adnan Apti, Halenur Evrendilek, İmge Nas, Nazif Ekin Akalan
İstanbul Kültür University Faculty of Health Sciences Department of Physical Therapy and Rehabilitation, Türkiye

Introduction: Grip strength measurement is established as an indicator of muscle status. It is also a gold standart measure for predicting disability and wellness. Tests are done to measure physical fitness of adolescents at school, however measuring grip strength is not common. Some studies showed the relation of grip strength with lower extremity muscle force. We wondered if grip strength can be a gold standart for predicting especially core and general stability in adolescents.
Aim: This study aimed to analyze the relation of grip strength with hypermobility, respiratory muscle strength and core stability in adolescents.
Material & Methods: Fifty six adolescents (mean age 15.59 ± 1.20 years, mean height 170.09 ± 8.68 cm, mean weight 64.38 ± 11.24 kg, BMI: 22.11 ± 2.73) were included in the study. Age, sex and hand dominance were recorded. Hypermobility level was assessed with Beighton Score (>4). Hand grasp strength was measured by a hand grip strength dynamometer. Forced expiratory volume in 1st second (FEV1) and forced vital capacity (FVC) were evaluated with a spirometer (Pony FX, Cosmed, Italy) with 3 repetitions and averaged. Sit up test was used to evaluate strength and endurance of trunk and pelvis muscles. Pearson's correlation was used for statistical analysis (Cohen d, $p<0.05$).

Results: Core stability (abdominal endurance) and grip strength had positive and medium correlation (p=o.o33). Respiratory muscle strength was highly correlated with grip strength (p=0.002). Hypermobility was also significantly related with grip strength (p<0.01).
Conclusions: The results of the study indicates that grip strength can be used as a tool to have a indication of general muscle endurance and stability in adolescents. Upper extremity testing is important in adolescents to predict general muscular health.

A-0860 BIOMECHANICAL COMPARISON OF SUTURE CALIBER AND NUMBER OF PASSES IN EPITENDINOUS REPAIR

Anca Dogaroiu, David Cardenas, Muhammad Harirah, Andrew Zhang, Andrei Odobescu, Douglas Sammer
The University of Texas Southwestern Medical Center at Dallas, Department of Plastic Surgery

Introduction: Flexor tendon repair involves the use of epitendinous and core sutures. Epitendinous sutures have been shown to improve early mobilization strength. Early mobilization is crucial for promoting intrinsic healing and preventing the formation of peritendinous adhesions. Epitendinous repairs have been reported to increase the strength of repairs by 10-25%, improving the quality of tendon repairs, and making the core repair less vulnerable to rupture. There are limited biomechanical descriptions of the ideal number of passes and suture size for epitendinous repairs. Biomechanical studies of the absolute values of strength added by epitendinous repairs are also limited.
Aim: The purpose of this cadaveric study is to compare the biomechanical characteristics of epitendinous repairs using a simple running technique with different calibers of suture and numbers of passes.
Methods: 30 FPL, FDP, and FDS flexor tendons were harvested from three cadavers and transverse zone 3 lacerations were produced. Tendons were repaired with only an epitendinous suture in 3 groups: 5-0 prolene with 6 passes, 5-0 prolene with 8 passes, or 6-0 prolene with 6 passes. Repair strength was tested to failure using an Instron materials testing machine and maximum load of the repair was recorded.
Results: The use of 8 passes using 5-0 suture had a significantly greater maximum load than 6 passes (20.52 N +/- 6.84 vs. 13.99 N +/- 4.69, $p < 0.05$). Although 5-0 suture had a higher average maximum load than 6-0 suture, this difference was not statistically significant (13.99 N +/- 4.69 vs. 10.09 N +/- 3.08, $p = 0.1739$). Furthermore, the uses of 8 passes using 5-0 suture had significantly greater load at 2 mm gapping as compared to 6 passes (8.16 ± 6.44 N vs. 3.66 ± 2.06 N, $p<0.05$). The failure mode for all groups was most often tendon tear-through.
Conclusion: When considering an epitendinous repair to augment the biomechanical strength of a tendon repair, 8 passes provide significantly more strength than 6 passes. The choice of suture caliber may also have an impact on the strength of the repair, but more research is needed to determine if this impact is significant. Repair failure is a potential complication in flexor tendon repair surgery. Improving the strength of repairs may reduce complication rates. We demonstrate the increased strength obtained through the application of 8 passes. Furthermore, we focus on isolating epitendinous repairs to emphasize the increased strength they impart to the reparative procedures.

A-0861 DISTAL RADIAL FRACTURES: A NATIONWIDE REGISTER STUDY ON CORRECTIVE OSTEOTOMIES AFTER MALUNION

Leena Raudasoja[1], Heidi Vastamäki[2], Samuli Aspinen[1], Jorma Ryhänen[1], Sina Hulkkonen[1]
[1]Helsinki University Hospital, University of Helsinki, HUS, Finland; [2]Sports Trauma Research Unit, Hospital Mehiläinen Neo, Turku, Finland

Introduction: When the initial treatment for a distal radius fracture (DRF) fails, a corrective osteotomy is considered. Even though DRF is the most common fracture type, only few studies report on the epidemiology of its' corrective osteotomies.
Aim: Our aim was to find out the incidence of corrective osteotomies after conservatively treated distal radius fracture. In addition, our aim was to evaluate the risk for late correction depending on the patient's age.
Material & Methods: The Care Register for Health Care is one of the oldest individual-level hospital discharge registers and covers the entire country. We used the data from the Finnish National Care Register of Health Care, Specialist Care, to find all corrective osteotomies carried out in Finland during 2015-2019 in adults aged ≥20 years. We calculated the mean annual incidence rates per 100,000 person-years, standardized with the European Standard Population 2013. The cases were identified by the International Classification of Diseases, 10th revision (ICD-10) diagnosis codes S52.5 (fracture of lower end of radius) and S52.6 (fracture of lower end of both ulna and radius). Patients with primary surgical treatment were identified with surgical procedures using the Nordic Medico-Statistical Committee (NOMESCO) classifications of Surgical Procedures (NCSP) for procedure codes. Corrective osteotomies were identified with codes NCK30 (osteotomy of forearm bone) and NCK68 (shortening or lengthening osteotomy of forearm) accompanied by the previously mentioned diagnosis codes, and codes M84.0 (malunion of fracture) and T92.2 (sequelae of fracture at wrist and hand level).
Results: During 2015-2019, the Finnish Care Register, Specialist Care, revealed a total of 41,418 adult cases of distal radius fractures. Of these, 30,841 (74.5%) were treated non-operatively. In this group of primarily conservatively treated distal radius fractures, 321 (1.04%) corrective osteotomies emerged. The mean standardized incidence rate of corrective osteotomies was 1.5/100,000 person-years. Within the older age groups men aged ≥60 years and women aged ≥70 years, there was a decreasing frequency of corrective osteotomies.
Conclusions: The need for corrective osteotomies after conservatively treated distal radial fractures was unfrequent. Patients in the 30–39 and 40–49 year age groups had the highest risk for late corrective osteotomy. This highlights the importance of the correct initial treatment in this age group.

A-0862 METACARPAL LENGTHENING BY DISTRACTION IN ADULTS AFTER TRAUMATIC AMPUTATION

Ariadna Da Ponte Prieto, Pablo Feito Martínez, Manuel Andrés Martínez, Oscar Izquierdo Corres
Hospital Egarsat, Barcelona, Spain

Introduction: Bone loss after a traumatic amputation, typically in workplace, may cause functional impairment of the hand, especially in the pinch and grasp functions if it involves the thumb.
The level of thumb or finger amputation guides the type of reconstruction, that might range from soft tissue coverage to toe-to-hand transplantation. Metacarpal lengthening with distraction is an option in the treatment of the functional impairment in these patients, as the lengthened fingers help to improve functions and position of hand in space.
Aim: Metacarpal lengthening allows increase in the absolute length of finger's ray, so, it is a valuable technique for restoring the function of the affected finger.
Our aim is to present the operative treatment and postoperative outcome in 5 patients with traumatic amputations of

the hand in the work environment.
Material & Methods: We present 5 patients with 6 metacarpal lengthenings, 3 thumbs and 3 index fingers. Two metacarpal lengthenings are still in progress by now.
In the first surgery, we performed a osteotomy of the metacarpal. Then, two pairs of 2 mm threaded half-pins were inserted parallel to one another 2 mm proximal and distal to the osteotomy site. The distractor device was then assembled to pins. The device used was Orthofix Minirail frame.
The planned rate of lengthening was 0.5mm/day.
Postoperative follow-ups were given in order to evaluate the efficacy
of the distraction, stability of the distractor and pin site care. Active finger exercises began during the early post-operative period.
Once we achieved the desired length, we maintained the external fixator in order to achieve consolidation.
In the second surgery, we removed the distractor device, stabilized the metacarpal osteotomy with a plate (Compact Hand, Synthes) and added some cancellous bone graft.
In the same setting, the first webspace was deepened by performing a Z-plasty.
Results: The mean duration of distraction was 43 days (range 30 – 69) and the second surgery was performed with a mean duration of 20 days (range 4 – 37). The post-operative rate of bone lengthening and consolidation was analysed on the basis of anteroposterior radiographs. There was improvement of hand function in all cases.
In our series, the complications observed were pin loosening, pin tract infection and fracture non-union that required a microvascular periosteal flap.
Conclusions: Metacarpal lengthening is a considerable option in case of bone loss due to traumatic amputation, and may improve pinch and grasp function of hand.

A-0863 COMPARISON OF THE RESULTS OF DIFFERENT OPTIONS FOR CORRECTION DEVIATION OF THE THUMB IN POLYDACTYLY TYPE IV

Vladimir Zavarukhin, Anna Firsova, Natalya Prokophieva
St.Petersburg University Hospital, St. Petersburg, Russia

Introduction: Preaxial polydactyly is one of the most common congenital anomalies of the hands in children. Type IV with thumb deviation is not only the most common variant of preaxial polydactyly, but also one of the most difficult for surgical reconstruction. The choice of osteotomy level to correct deviation is one of the controversial issues.
Aim: To compare the results of various options for correction and deviation of the thumb in polydactyly Type IV D u/r.
Material & Methods: The results of treatment of 60 patients with preaxial polydactyly are presented. Patients were evenly distributed into three groups - with distal osteotomy of the proximal phalanx, distal osteotomy of the proximal phalanx and distal osteotomy of the metacarpal bone, two-level osteotomy of the proximal phalanx. The axis and symmetry of the skeleton of the hand ray were measured.
Results: Two-level osteotomy of the proximal phalanx showed the best results among the groups in terms of restoration of the thumb axis and symmetry of bone structures after surgery.
Conclusions: Two-level osteotomy of the proximal phalanx may be recommended like surgical option for preaxial polydactyly Type IV D u/r.

A-0864 MACHINE VERSUS MAN – ARTIFICIAL INTELLIGENCE DIAGNOSTIC ACCURACY IN HAND AND WIRST FRACTURES DIAGNOSIS

Fábia Silva, Ana Isabel Morais, Ana Rita Senra, Jorge Lopes, Miguel Relvas, Luís Vieira, Mariana Ferreira, Vítor Vidinha, António Sousa
Centro Hospitalar Universitário de São João

Introduction: Yearly around 21 thousand adult patients visit our tertiary hospital's emergency department after suffering from high or low energy trauma. Skeletal radiographs, being inexpensive and widely available, are the first-line imaging modality used to diagnose traumatic skeletal injuries. However, diagnostic errors in the emergency department are the highest when interpreting trauma radiographs. Computer-aided detection software has been around for a couple decades now and is widely used for breast cancer screening, among other pathologies. Recent studies are showing encouraging results of the use of artificial intelligence in the detection of bone fractures. Providing emergency department physicians with AI fracture detection tools could help reduce diagnostic error rates in trauma settings, particularly in more visually challenging anatomical areas such as the hand.
Aim: The main objective of this study is to compare the diagnostic accuracy between a medical-grade artificial intelligence (AI) software (BoneView, Gleamer) and orthopaedic surgeons of various levels of expertise for the detection of hand and wrist fractures in a tertiary hospital's emergency department.
Material & Methods: Retrospective analysis of a series of posttraumatic radiographic examinations, including only adult patients with plain radiographs of the hand or wrist obtained after a recent trauma. Exclusion criteria were patients with cast control radiographs, images with inadequate radiographic quality, and examinations showing only obvious fractures. The diagnostic performance of the AI software and six orthopaedic surgeons was measured by sensitivity, specificity, and area under the receiver operating characteristic curve (AUC).
Results: A total of 141 sets of radiographs were included in this study with 70 (49,64%) identified fractures. The AI software was calculated to have a sensitivity of 97.1% (95% CI: 90.06-99.76) and a specificity of 90.1% (95% CI: 80.74-95.94). When analyzing the six readers' individual performances, sensitivity varied from 0.714 (95% CI: 59.38-81.60) to 0.871 (95% CI: 76.99-93.95). The AUC of the BoneView software (0.936; 95% CI: 89.00-98.30; $P < .001$) was larger than that of any reader to diagnose patient's fractures.
Conclusions: Our study demonstrated that the BoneView software has a high diagnostic capacity for hand and wrist fractures and, in this regard, can be considered a useful tool in the emergency department. By reducing diagnostic errors, it assists orthopedic surgeons in decision-making, thereby enhancing care for the population.

A-0865 METACARPOPHALANGEAL JOINT RECONSTRUCTION OF A COMPLEX HAND INJURY WITH A VASCULARIZED LATERAL FEMORAL CONDYLE FLAP

Michael Kohlhauser[1], Anna Vasilyeva[1], Lars-Peter Kamolz[1,2], Karl-Heinz Bürger[1,3], Michael Schintler[1]
[1]Division of Plastic, Aesthetic and Reconstructive Surgery, Department of Surgery, Medical University of Graz, Graz, Austria; [2]COREMED – Cooperative Centre for Regenerative Medicine, JOANNEUM RESEARCH Forschungsgesell-schaft mbH, Graz, Austria; [3]Division of Hand Surgery, Private Hospital Maria Hilf, 9020 Klagenfurt am Wörthersee, Austria

Introduction: A 57-year-old patient sustained a complex left hand injury while working with a circular saw. The injury included a partial amputation of the index finger, a fracture at the proximal phalanx of the third finger, and a comminuted fracture at the head of the fifth metacarpal bone. Due to the extensive osseous defect in the fifth metacarpal, a two-

stage reconstructive procedure was planned, slated for performance subsequent to the healing of the soft tissues. The fabricating a replica of the affected hand with the 3D printer facilitated accurate preoperative planning and simulation. Consequently, a decision was taken to perform the reconstruction by using a vascularized lateral femoral condyle flap.
Results: During out-patient follow-ups, a progressive osseous consolidation of the flap was observed in the x-ray imaging. Six months post-transplantation, the affected hand demonstrates functional utility in daily activities, with subsequent evaluations indicating further improvement. The patient has successfully reintegrated into his professional environment and is able to perform his duties as a blacksmith with no limitations.
By the time of 11 months' post-surgery, minor restrictions of the little finger were observed. During the assessment of full-range of motion, the reconstructed fifth MCP-joint achieved 10 degrees in extension, 0 degrees in a neutral position, and 75 degrees in flexion.
Conclusions: Overall, we report on the reconstruction of a metacarpophalangeal joint with successful functional recovery by using a vascularized flap from the lateral femoral condyle. Furthermore, this case report highlights the efficacy of integrating individualized 3D printing technology to plan complex reconstructions, creating promising opportunities for personalized and optimized interventions.

A-0866 SURGICAL APPROACHES TO THE TREATMENT OF THE CHRONIC POSTTRAUMATIC DRUJ INSTABILITY

Andrey Bespalchuk[1], Ihnat Shamko[2], Alexey Volotovski[1]
[1]Belarusian State Medical University, Minsk, Belarus; [2]Minsk City Hospital №6, Belarus

Introduction: Chronic posttraumatic distal radioulnar joint (DRUJ) instability is a relatively common and controversial problem in terms of surgical approaches. Practical interest in this pathology is also due to the fact that it often leads to the loss of normal hand function and patient disability. Triangular fibrocartilage complex (TFCC) is the main anatomical component providing stability in DRUJ. Timely undiagnosed tears of TFCC lead to the development of post-traumatic arthrosis of DRUJ, which complicates the choice of an approach to the treatment of this pathology. Undoubtedly, arthroscopic methods of treating DRUS instability today are becoming more and more popular in modern society. But one should not underestimate the open surgical approaches, which can also lead to the patients cure.
Aim: The aim of this work was analysis of the clinical and diagnostic algorithms to the visualization and evolution of patient treatment outcomes by using different open surgical approaches for resolving problems related with chronic DRUJ instability.
Material & Methods: In the presentation pointed and substantiate choice of surgical tactics based on our own experience of treating nineteen adult patients with chronic posttraumatic DRUJ instability over a six-year period. Preferred methods of open TFCC reinsertion with reconstruction of the fifth compartment canal wall by using a portion of the fourth extensor compartment retinaculum (twelve cases), TFCC reconstruction by using palmaris longus tendon (one case) and Sauve-Kapandji procedure (six cases) presented.
Results: Long-term treatment outcomes were studied from one year to five years from the date of surgery in all patients. For assessing treatment results, we used the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and functional stress tests and compared them with preoperative research observes. In all cases, there was a sharp decrease in DASH scores in postoperative periods exceeding half a year from the date of surgery. All patients returned to their previous jobs, including professional athletes.
Conclusions: The differentiated approach to choosing of optimal surgical tactics for the treatment of chronic TFCC injuries allows achieving optimal treatment outcomes.

A-0867 FUNCTIONAL AND RADIOGRAPHIC OUTCOMES OF STANDARD VS DOUBLE-MOBILITY MAÏA PROSTHESIS FOR TRAPEZIOMETACARPAL ARTHRITIS. A CASE SERIES WITH 2 YEAR FOLLOW-UP

Sergi Barrera-Ochoa[1], Julio Adrián Martinez-Garza[1], Edna Buitrago[2], Agustina Laboranti[3], Alejandro Meritano[3], Jose Antonio Prieto Meré[1], Daniel López Guevara[1,4]

[1]Hand, Elbow and Microsurgery Unit, Institut de la Mà. Hospital Universitari General de Catalunya, Barcelona, Spain; [2]Division of Hand Surgery, Pontificial Xavierian University, Cali, Colombia; [3]Hospital Universitario Austral, Buenos Aires, Argentina; [4]Instituto de Microcirugía Valencia, Valencia, Venezuela

Introduction: Trapeziometacarpal joint (TMC) arthritis is one of the most prevalent degenerative conditions affecting the radial side of the hand. This common condition affects approximately 76% of the general population.

The field initially saw the introduction of first-generation prostheses, followed by more advanced prosthetic implants with standard components and the concept of double mobility. When comparing standard TMC prostheses to those with double mobility, we hypothesize that there may be better functional and radiographic outcomes with double mobility prostheses in the short and long-term follow-up.

Aim: This retrospective study aims to compare clinical and radiographic outcomes of patients diagnosed with TMC arthritis who have undergone treatment with either standard or double-mobility Maïa prostheses at a two-year follow-up.

Methods: This retrospective unicentral case series included patients with TMC arthritis treated with standard or dual-mobility prostheses by the same surgeon. Two groups of patients were studied: Group A received a standard prosthesis from Feb 2019 to Jan 2020, while Group B received a double-mobility prosthesis from Feb 2020 to Mar 2021.

Inclusion criteria were patients with symptomatic TMC arthrosis, Eaton's stage III and IV, with a minimum two-year follow-up. STT arthritis was excluded.

QuickDASH and VAS scores are presented as continuous variables, with mean +/- standard deviation.

Differences between groups were assessed using a T-test. A single measurement was used in this trial.

Results: The study included 118 postoperative thumbs at a mean of 2 years; standard prosthesis was used in 45 thumbs, and dual mobility in 73. After surgery, mean VAS and QuickDASH scores significantly improved in standard and dual mobility prosthesis groups. The student test found no significant differences between the two groups' postoperative VAS and QuickDASH scores ($p=0.788$ and $p=0.637$, respectively).

Standard prosthesis had mean satisfaction scores of 8.23 (SD 2.01) for postoperative satisfaction and 8.38 (SD 2.43) for aesthetics. Dual mobility prosthesis had mean satisfaction scores of 7.95 (SD 3.20) and 7.80 (SD 3.52) for aesthetics.

Opposition to Kapandji's score was 9.62 (SD 0.87) in patients with standard prosthesis and a mean of 8.90 (SD2.29) in those with dual mobility.

Postoperative and latest follow-up radiographs indicated no signs of osteolysis, implant migration, or joint subluxation. However, 5% of patients experienced postoperative dislocations during this study, with 3 cases in each group. All dislocations were treated with the suture button suspensioplasty technique using the Microlink.

Conclusion: This study's survival rate for the first two years was 95% for patients with either standard or double-mobility Maïa prostheses, with no differences.

There were no significant differences in the VAS and QuickDASH scores between the two groups, and good outcomes were achieved in Kapandji's and aesthetic satisfaction scores.

Although there are various treatment options available for TMC osteoarthritis and no single method has been proven to be consistently superior to others, we firmly believe that using a standard or dual mobility prosthesis for arthroplasty is an excellent choice that can lead to improved functionality, faster recovery, pain relief for patients, and restoration of thumb length.

A-0868 TRAUMATIC EXTENSOR CARPI ULNARIS INSTABILITY: IT'S ALL A SUBSHEATH MATTER! - A CASE REPORT

Carlota Nóbrega[1], Tiago Pereira[2], Fábio Sousa[3], Eva Campos-Pereira[3]
[1]Hospital de Cascais Dr. José de Almeida, Cascais, Portugal; [2]Hospital de Santa Maria, Lisbon, Portugal; [3]Hospital Dr. Nélio Mendonça, Funchal, Portugal

Introduction: Extensor carpi ulnaris (ECU) tendon subluxation represents a frequently undiagnosed pathology. When symptomatic, stabilization is recommended. Multiple techniques have been described.
Aim: Presentation of the functional results of a subsheath stabilization with anchors after a traumatic instability of the ECU.
Material & Methods: A healthy 31 years-old male complained of an acute ulnar-sided wrist pain after elevation of a 50 kg beer barrel from the ground. Plain radiographs revealed no osteoarticular lesions. A month after conservative treatment (wrist orthosis and non-steroidal anti-inflammatory drugs) patient sustained a painful supination. An ECU subsheath tear with an intact extensor retinaculum was detected in the magnetic resonance imaging (MRI). The dynamic subluxation with supination, ulnar deviation and wrist flexion, performing during ultrasound (US), corroborated the MRI findings. An uneventful stabilization of the ECU subsheath was performed with 3 pushlock anchors. No ulnar groove deepening was performed.
Results: On the 1st month post-operative the patient started rehabilitation. At 3 months post-operation the patient returned to work without overload activities and 4 months after surgery full recovery was achieved.
Conclusions: ECU instability is a challenging diagnosis. The role of the subsheath in preventing ECU tendon subluxation is well established. Therefore, subsheath repair or reconstruction must be performed when instability is a cause of wrist pain. MRI is important to exclude other concomitant injuries or pathologies causing ulnar-sided wrist pain.

A-0869 THE MINIMAL CLINICALLY IMPORTANT DIFFERENCE OF THE SOUTHAMPTON DUPUYTREN'S SCORING SCHEME

Jens Jørgsholm, Rasmus Wejnold Jørgensen
Department of Orthopedic Surgery, Copenhagen University Hospital – Herlev and Gentofte, Gentofte, Denmark

Introduction: The minimal clinically important difference (MCID) for patient-reported outcome questionnaires is important in the interpretation of outcome in clinical and research settings. MCID represents the smallest change in score that the patient would identify as important. In other terms the improvement after a treatment may be statistically significant, but not considered worthwhile by the patient. There is, to our knowledge, no reported MCID value for Southampton Dupuytren's scoring scheme (SDSS). The SDSS is a 5 item 20 points scale, where 0 is considered no discomfort or physical limitations and 20 the worst possible discomfort and physical limitations. The most widely used patient-reported outcome measure (PROM) for Dupuytren's Disease (DD) is DASH and Quick-DASH. Both PROMs are not disease specific for DD and are intended to assess the entire upper extremity. The SDSS is a disease specific PROM and is more sensitive to change in the disease.
Aim: The aim of this study was to determine the MCID for the SDSS.
Material & Methods: The study population consisted of 192 patients, in a prospective period from 2018 to 2021. All patients completed baseline SDSS questionnaires and again at 6 months follow-up. At six months follow-up the patients were also asked whether they were satisfied with the result (yes/no), and the answer was used as an anchor. We calculated the mean change in scores of SDSS and used the anchor-based approach to calculate the MCID. In total, 163/192 (85%) of the patients were satisfied with the result at six months according to the anchor question.
Results: As a result, the anchor-based MCID estimate was 1.5 point using the receiver operating characteristic curve, with an area under the curve of 0.74, that is considered an acceptable accuracy.

Conclusions: This MCID estimate can be an important tool in research and clinical settings. The MCID estimate in this study contribute to the evaluation of clinical significance and can guide in the clinical decision making. In a sample size calculation, the MCID prevents the inclusion of more patients than necessary and ensures that enough patients are included to determine a true difference between groups, that is experienced as beneficial by the patients

A-0870 ELECTROPHYSIOLOGICAL EVIDENCE OF HAND INTRINSIC MUSCLE REINNERVATION WITH MEDIAN NERVE AXONS AFTER END-TO-SIDE ANTERIOR INTEROSSEOUS NERVE TO ULNAR MOTOR NERVE TRANSFER

Xiya Ma[1], Natalie Habra[2], Jenny C. Lin[1]
[1]Division of Plastic Surgery, Université de Montréal, Montreal, Canada; [2]Department of Physiatry, Université de Montréal, Montreal, Canada

Purpose: To evaluate hand reinnervation patterns following distal anterior interosseous nerve (AIN) to ulnar motor nerve end-to-side (ETS) transfer with clinical and electrophysiological data.
Method: A retrospective cohort study was done with patients having undergone AIN to ulnar nerve ETS transfer from a single centre between 2017 to 2023. Motor reinnervation of the abductor digiti minimi (ADM) by the AIN was evaluated by recording motor nerve conductions from the median nerve in the forearm to the ADM. Muscle recruitment with and without pronation was also assessed by needle EMG.
Results: A total of 12 patients were included in the study. Post-operative EMGs were performed on average 17.4 months after the intervention. Nine of the 12 patients had undergone motor nerve conduction studies from the median nerve to ADM. Six of the nine showed positive amplitudes, ranging from 0.6mV to 3.7 mV, while the remaining three had no evidence of conduction from the median nerve to the ADM muscle. A qualitative increase in muscle recruitment was present in 37.5% of patients while pronating.
Conclusions: This study shows clinical and electrophysiological evidence to support the growth of median nerve axons into muscles normally innervated by the ulnar nerve in patients with ETS distal AIN to ulnar motor nerve transfers.

A-0871 COMPLIANCE WITH NICE GUIDELINES ON TIMING TO FIXATION OF DISTAL RADIUS FRACTURES IN A SCOTTISH MAJOR TRAUMA CENTRE. WHAT'S THE NEXT STEP?

Liam Lennox[1], Mariam Sattar[1], Scott Barker[1], Alexandra Haddon[2]
[1]NHS Grampian, Aberdeen, United Kingdom; [2]NHS Lothian, Edinburgh, United Kingdom

Introduction: Distal radius fractures (DRF) constitute a substantial portion of emergency department presentations, accounting for up to 20% of all fractures. They are often overshadowed by more threatening trauma, frequently delaying treatment. NICE advises when surgical fixation is required intra-articular and extra-articular DRF should be treated within three days and seven days of injury respectively, and within three days of the decision to operate for re-displaced fractures. American Academy of Orthopaedic Surgeons (AAOS) guidelines presents strong evidence that fixation for patients ≥65 does not lead to improved long-term outcomes compared to conservative management, and moderate evidence that fixation improves outcomes when radiographic parameters are met for those <65 years. Aim: This audit aimed to assess compliance with NICE guidelines for timely intervention of DRF in our university teaching hospital, and how this compares with five years ago. Secondary aims explored if seasonal variations in compliance occurred and if our unit was compliant with AAOS guidelines on fixation of DRF. Material & Methods: A closed-loop audit was conducted by

retrospectively analysing routine data between February 2022 and January 2023 in our unit. Cases were dichotomised into intra- or extra-articular fracture groups following review of imaging. Timestamps for the presentation and surgical intervention were collected to calculate each patient's time to surgery. Descriptive analysis was conducted to investigate compliance during distinct seasons of the year. A compliance of 90% was deemed to be an appropriate standard after consultation with senior clinicians. results were compared with a local audit conducted by Bruce et al between April 2018 and September 2018. Radiographs were reviewed to ascertain compliance with AAOS guidelines on indications for surgical fixation.Results: Initially, 137 cases within the specified timeframe were identified. Subsequent exclusions resulted in 127 cases being included in the analysis. Over the year, only extra-articular fractures demonstrated compliance with NICE guidelines (20/22 (90.9%)). Intra-articular (18/44 (40.9%)); intra-articular and re-displaced (19/30 (63.3%)); and extra-articular and re-displaced (24/31 (77.4%)) compliance was reduced. Compliance was observed to be lowest during winter months, with intra-articular fractures being particularly concerning (4/14 (28.6%)). When compared to the audit completed by Bruce et al (2018), which included 61 cases over six months, our compliance for intra-articular fractures has reduced by 31% (81% to 50%) and has remained at 83% for extra-articular fractures over five years. Of the original 137 identified cases, 54 patients (40%) were aged ≥65. Of these patients, when compared to AAOS guidelines for patients <65, 3 (2%) did not meet the indication for surgery criteria. Conclusions: Timely management for DRF compliance was suboptimal throughout the year, particularly during the winter months. Despite equitable numbers, our compliance has reduced from five years previously. This may be attributed to the increased trauma burden over time. Certainly, the recent Orthopod study found higher rates of cancellations for day case trauma patients, and DRF are commonly discharged home awaiting surgery. Assessment of compliance with AAOS guidelines revealed that patients were appropriately offered surgery. However, it is unclear if delayed patients experienced worse outcomes and should be prioritised.\\r\\n

A-0873 GRIP STRENGTH – ONE MEASURE TO RULE THEM ALL IN OUTCOME EVALUATION AFTER DISTAL RADIUS FRACTURES

Jakub Marchewka[1,2]

[1]Department of Orthopedics and Trauma Surgery, 5th Military Hospital, Kraków, Poland; [2]Department of Physiotherapy, University of Physical Education, Kraków, Poland

Introduction: Distal radius fractures (DRFs) are among the most commonly seen types of fractures worldwide. Numerous studies suggested variety of tools for evaluating the effectiveness of treatment outcome, however streamlined and effective tool to gauge the multifaceted impact of interventions on distal radius fracture management is needed.

Aim: The aim of this study was to investigate the utility of grip strength as a tool for assessing clinical, radiological, functional outcomes and quality of life following distal radius fractures.

Materials and methods: We identified all consecutive adult patients hospitalized in our 1st level trauma center between January 1st, 2008, and May 30th, 2015, with isolated distal radius fractures. The fractures were assessed based on AO, Frykman, and Fernandez classifications. Out of the 1774 eligible participants aged ≥ 18 years with isolated distal radius fractures, we randomly selected 240 patients. Follow-up was performed at least 1 year after DRF. We collected multiple data on radiographic parameters, such as radial length, ulnar variance, volar tilt, teardrop angle (TDA), and anteroposterior distance (APD), range of motion (ROM), hand sensation using Semmes-Weinstein monofilaments. Grip strength was assessed with a Jamar hand held dynamometer in accordance to guidelines of American Society of Hand Therapists. To assess long-term functional outcomes, we used the Patient Rated Wrist Evaluation (PRWE), Disabilities of the Arm, Shoulder and Hand (DASH), Nine Hole Peg Test (9-HPT). Quality of life was evaluated through the Short Form Health

Survey (SF-36) and the International Osteoporosis Foundation Quality of Life Questionnaire (IOF QLQ). Correlations were evaluated by Spearman's correlation test. All p - values are two-sided, $p < 0.05$ was considered statistically significant.
Results: Of the 207 patients with DRF in the study group 101 were treated operatively and 106 nonoperatively. Mean age of entire cohort was 64 ± 17.9 years. Women comprised of 150 (72.5%), men 57 (27.5 %); mean observation time was 3.9 ± 1.6 years; ranged from minimum 1.1 to 8.1 years. We found that grip strength was best single tool in evaluating outcome of treatment and was strongly correlated with PRWE ($r = -0.072$; $p < 0.0001$); DASH ($r = -0.77$; $p < 0.0001$), IOF QLQ ($r = -0.81$; $p < 0.00010$) as well as 9-HPT and SF-36 components.
Conclusions: Grip strength demonstrates a strong correlation with clinical, functional and quality of life outcomes following distal radius fractures, making it a valuable and straightforward tool for assessing the results of treatment for such fractures.

A-0874 UNSEEN INJURIES, VISIBLE CONSEQUENCES: MID-TERM FUNCTIONAL OUTCOMES IN PATIENTS WITH LUNOTRIQUETRAL INJURIES TREATED BY DORSAL CAPSULODESIS

Alfonso C Prada Cañizares[1], Victor Triviño Sanchez-Mayoral[1], Juan M. Pardo Garcia[2], Pedro J Delgado Serrano[1]
[1]Hospital Universitario de Monteprinicpe, Madrid, Spain; [2]Hospital Universitario General de Villalba, Madrid, Spain

Objectives: Chronic (> 3 months after initial injury) lunotriquetral (LT) instability can be treated by various surgical techniques (LT fusion, ligament repair or reconstruction, or arthroscopic debridement), with varying degrees of success. We retrospectively evaluated the results of dorsal capsulodesis with the dorsal radiocarpal ligament in an attempt to strengthen the dorsal LT interosseous ligament in patients with chronic dynamic LP instability.
Material and Methods: A total of 23 patients (mean age, 43 years) with persistent post-traumatic wrist pain and weakness were reviewed and diagnosed with dynamic instability of the LT ligament (positive LT ballotment, shuck test +, volar intercalated segment instability deformity on stress radiograph, arthroscopic findings of Geissler grade 3 or 4 LT tears). All of them were treated by arthroscopic dorsal capsulodesis. Subjective and functional measures were used for outcome assessment (DASH scale, visual analogue scale, range of motion measurement, return to work/sport).
Results: The mean follow-up period was 27 months (range, 10-54 months). Significant improvement was obtained in postoperative pain (VAS pre 5.4 vs. VAS post 1.2), in perceived hand disability (DASH pre 65 vs. DASH post 14) and above all in the return to sport (87%) and work (83%), with the range of pre- and postoperative mobility obtained being very similar.
Conclusion: Our study demonstrates that arthroscopic dorsal capsulodesis provides significant improvement in functional and pain outcomes in patients with chronic LT instabilities. The surgery resulted in early recovery of function, allowing patients to return to sports and work activities in a shorter period of time. In addition, a significant reduction in postoperative pain was observed, improving patients' quality of life. These findings suggest that arthroscopic dorsal capsulodesis can be considered as an effective treatment option to improve functional outcomes and reduce pain in patients with chronic LT instabilities. However, further studies are needed to confirm these results and to determine whether additional factors may affect surgical outcomes.

A-0875 INVESTIGATION OF THE EFFECT OF UPPER EXTREMITY PROBLEMS ON PROXIMAL BODY SEGMENTS

Seda Namaldi[1,2], Aynur Demirel[1], Cigdem Ayhan Kuru[1]
[1]Hacettepe University, Faculty of Physical Therapy and Rehabilitation, Ankara, Turkiye; [2]Eskisehir Osmangazi University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, Eskisehir, Turkiye

Introduction: Treatment approaches for hand and wrist injuries often focus solely on the affected area, neglecting other joint involvements. Issues like functional loss and pain in overlooked joints contribute to increased patient readmissions for hand and wrist injuries, potentially burdening the healthcare system. Considering the upper extremity as a kinetic chain, it's evident that the cervical region serves as its starting point. Responsible for sensory, motor, and reflex innervation of the upper extremity, the cervical region should be assessed in surgical decision-making for upper extremity injuries. Literature highlights postural changes resulting from disruptions in the upper extremity's kinetic chain, even in minor hand injuries. Moreover, after immobilization due to injury, pain and functional losses often manifest in more proximal joints, particularly the shoulder region. Compensatory movement patterns in the upper extremity and overuse injuries in the shoulder are attributed as sources of these problems. While many studies stress the relationship between issues in the cervical and distal regions and their significance in treatment, information regarding the consequences of distal problems on the proximal region remains mostly anecdotal.
Aim: This study aimed to ascertain the correlation between shoulder/neck problems and distal arm and hand disorders/injuries.
Material & Methods: The study comprised thirty patients aged between 18 and 65 (mean age: 46.9±12.76 years, 21F/9M) experiencing trauma or chronic issues at the hand or elbow level. Exclusions encompassed patients with neurological disorders, pregnant individuals, users of nonsteroidal anti-inflammatory drugs, and those with cognitive disorders. Demographic data, including age, gender, body mass index, dominant and affected side, surgical history, and previous cervical or shoulder problems, were recorded. Pain threshold and tolerance were gauged using an algometer bilaterally at two sites (upper trapezius and tibialis anterior muscles) to detect central sensitization. Neck disability was assessed via the Neck Disability Index, upper extremity functional problems via the Disabled Arm Shoulder Hand Questionnaire, general health status via Nottingham Health Profile, and kinesiophobia via the Fear Avoidance Beliefs Questionnaire. Special tests were employed to evaluate the presence of cervical radiculopathy, upper extremity nerve compression, and thoracic outlet syndrome.
Results: Among the thirty patients, seventeen underwent surgical treatment, while thirteen were managed conservatively. Statistical analyses revealed correlations among upper extremity function, neck disability scores, kinesiophobia scores, and quality of life scores in patients. Furthermore, associations were found between upper extremity function and neck disability scores with pain threshold and tolerance values.
Conclusions: Assessing the shoulder and cervical regions subsequent to distal injuries may aid in mitigating or preventing secondary problems that might arise.

A-0876 AI-SUPPORTED LITERATURE SCREENING: A TOOL WHICH CAN SERVE HAND SURGERY

Michael Oyewale[1], Daniel Herren[1], Harm Slijper[2], Miriam Marks[1], Ruud Selles[2]
[1]Schulthess Klinik, Zurich, Switzerland; [2]Erasmus MC - University Medical Center, Rotterdam, the Netherlands

Introduction: With the emergence of online publishing, the number of scientific manuscripts on many topics has surged. Consequently, researchers face challenges in conducting systematic reviews and meta-analyses due to the labor-intensive

and error-prone manual screening of vast numbers of studies. This often leads to inefficiencies and the risk of overlooking relevant studies or results in authors narrowing their literature searches. The rapidly evolving field of machine learning can assist researchers in conducting systematic reviews even on a large number of studies.
Aim: We recount our experiences using ASReview, an open-source software using state-of-the-art machine learning techniques to conduct a systematic review and explore the effectiveness of ASReview to enhance the efficiency of the abstract screening.
Material & Methods: ASReview utilizes active reinforcement learning techniques, where a machine learning algorithm iteratively learns from the user's decisions on a subset of papers to prioritize relevant studies for inclusion in a review. This human-in-the-loop machine learning application drastically reduces the amount of manual screening required. We applied ASReview to the abstract screening phase of an ongoing systematic review (PROSPERO; CRD42023393334) with the title 'Preoperative prognostic factors of persistent pain following total joint arthroplasty of major joints: a systematic review and meta-analysis'.
Results: From the 15'832 abstracts resulting from the search string of our systematic review, we needed to screen1654 abstracts in order to reach the pre-defined stopping criteria ('review at least 10% of literature and reach a sequence of 50 irrelevant abstracts'). This finding aligns with literature on ASReview, reporting that ASReview markedly reduces the workload in systematic reviews. By using active reinforcement learning, the tool can decrease manual screening efforts by up to 92% without sacrificing accuracy. For instance, in simulation studies, ASReview achieved a work reduction ranging from 67% to 92% at 95% recall, meaning that 95% of relevant studies were identified after screening only 8% to 33% of the total studies (van de Schoot et al., 2020). This contrasts sharply with traditional manual screening methods, where researchers typically need to screen a much larger percentage of studies to achieve the same level of recall.
Conclusions: ASReview marks a vital development in AI-supported literature research. Its capability to process vast amounts of literature data both efficiently and accurately makes it an indispensable tool for researchers. The application of active learning in ASReview not only saves time but also maintains the quality of systematic reviews, making it a reliable alternative to manual screening methods. Lastly, as this field rapidly advances, we expect AI tools such as ASReview to evolve quickly, offering increasingly efficient research solutions.

A-0877 LATEST UPDATE ABOUT TREATMENT OF SCAPHOID NONUNION WITH A VASCULARIZED THUMB METACARPAL PERIOSTEAL PEDICLED FLAP

Sergi Barrera-Ochoa[1], Julio Adrian Martínez-Garza[1], Jose Mere-Prieto[1], Gerardo Mendez-Sanchez[1], Esther Mora[1], Francisco Soldado[2]
[1]Hand, Elbow and Microsurgery Unit, Institut de la Ma, Hospital General de Catalunya, Barcelona, Spain; [2]Hospital HM Nens, Barcelona, Spain

Introduction: Open reduction and stable fixation with conventional bone grafting is successful at achieving union in about 80% of scaphoid nonunion cases. Some factors portend a poor prognosis. They include avascular necrosis (AVN) of the proximal pole, nonunion for longer than five years, and a previous failed attempt at scaphoid nonunion. In such difficult cases, vascularized bone flaps (VBF) are indicated.
Aim: Purpose: To update clinical and radiological outcomes after surgical treatment of difficult scaphoid nonunion in adults with a vascularized thumb metacarpal periosteal pedicled flap (VTMPF).
Material & Methods: From January 2015 to December 2021, Fifty-nine patients ≥18 years old with scaphoid nonunion and characteristics associated with a poor prognosis, who underwent a VTMPF procedure, were included in this prospective

cohort study with a mean follow-up of 32 months. Factors associated with a poor prognosis were a delay in presentation of over 5 years, the presence of avascular necrosis, and previous nonunion surgery. All patients had at least one poor prognostic factor and 22% had two or more.
Results: In 54 men and 5 women, the mean age was 39 years (range 19-58). There were 18 type D3 nonunions (Herbert classification) and 27 type D4. Eight patients had delayed presentation of over five years. Twenty-Eight patients had previously undergone an unsuccessful surgical attempt to treat their nonunion. The patients experienced no postoperative complications. Overall union rate was 97% (57 of 59 patients), with 70% cross-sectional trabecular percentage bridging at 12 weeks. Pain subsided after surgery and patients experienced improvements in both their QuickDASH and MMWS scores. Overall 41% and 42% gains in strength and wrist motion, relative to the contralateral normal side, were observed. At final follow-up, there were no differences between the treated and untreated (healthy) hand, in terms of wrist range of motion, grip or pinch strength.
Conclusions: In this study, the use of VTMPF for difficult scaphoid nonunion in adults was associated with good general outcomes.

A-0878 FROM INFANCY TO ADOLESCENCE: UNDERSTANDING TRENDS AND PATTERNS IN PEDIATRIC HAND BURNS OVER 18 YEARS

Julia Bartkova[1,2], Dominika Miklisova[2], Klaudia Jarosova[3], Barbara Buganova[4], Sona Hrizova[5], Kristian Kanuscak[6], Dusana Selecka[2]

[1]Department of Burns and Plastic Surgery, Institution shared with University Hospital Brno, Faculty of Medicine, Masaryk University, Brno, Czech Republic; [2]Faculty of Medicine, Masaryk University Brno, Czech Republic; [3]St Anne´s University Hospital Brno, Department of Urology, Brno, Czech Republic; [4]Faculty of Medicine of the Slovak Medical University, Bratislava, Slovak Republic; [5]Faculty of Medicine, Comenius University Bratislava, Slovak Republic; [6]Hospital Kyov, Department of Surgery Kyov, Czech Republic

Introduction: Pediatric hand burns represent a critical area of concern due to their potential for lifelong impact on physical, emotional, and psychological well-being. This abstract underscores the pivotal role of epidemiological studies in elucidating the patterns, risk factors, and preventive avenues associated with hand burns in the pediatric population.
Aim: The aim of this study was to collect and evaluate the basic epidemiological characteristics
and access to care of pediatric hand burns who were admitted to single burn unit and to determine if differences exist between children who sustain burns in rural/urban areas or the presence of a complete/incomplete family.
Material & Methods: A retrospective analysis included hand burn patients under the age of 18 years, who were hospitalised to the Department of Burns and Plastic Surgery Faculty Hospital Brno, Czech Republic from the January 1, 2005 to December 31, 2022.
Results: Out of the total number of 2604 children had hand burn 22.6% children. Most of these children 63.1% came from urban region. Overall, more than half of the children 51.4% were transported to the specialized burn center by the Medical emergency service, 12.1%% of children were transported by the Air rescue service, 36.2 % of children were transported by private transport (family, guardians). 80.4 % of children from the urban region were transported on the day of the injury and 9.2% of children were transported the day after the injury. From the rural region 81.1% children were transported on the same day of the injury and 9.2 % the day after the injury. Treatment in the operating room on the day of admission was necessary for 8.5% children.
86.0% of children were from complete families (both parents present, living together), 14.0% were from incomplete

families. Boys were likely to sustain burns in both populations (rural and urban). In terms of etiology, the most common is a burn with a hot liquid (46.1%), followed by a contact burn (25.2%). First aid (cooling with cold water) was provided correctly for 92.7% children. The home was the most common place for all burns to occur.
Conclusions: Epidemiological investigations provide a foundation for understanding the unique characteristics of pediatric hand burns, shedding light on the incidence, causative factors, and demographics involved. These studies reveal that scald injuries often predominate in younger age groups, emphasizing the importance of age-specific prevention strategies. Additionally, the role of child development stages, environmental exposures, and socioeconomic factors becomes apparent, guiding targeted interventions.

A-0879 ONE YEAR EXPERIENCE WITH WALANT PROGRAM: RESULTS, PROGRESSION AND IMPACT ON OVERALL SURGICAL ACTIVITY

José Caldeira[1], Diogo Gaspar[1], Rui Viegas[1], Lucas Armada[1], Rui Freitas[2]
[1]Hospital Beatriz Angelo EPE, Loures, Portugal; [2]Centro Hospital Universitário de Lisboa Norte EPE, Lisbon, Portugal

Introduction: Operating rooms dependent on Anesthesiology support are a scarce and costly resource, which is often the main factor limiting the surgical activity of many hand surgery groups.
Facing an increasing shortage of operating times, our Hand group implemented a Wide Awake Local Anesthesia with no Tourniquet (WALANT) / Local Anesthesia (LA) program in order to overcome this issue.
For its recognized limitations, LA with tourniquet has been used as an alternative only for minor procedures.
WALANT is an acknowledged method developed by Dr. Lalonde, reported to expand the indication of local anesthesia to more complex and lengthy procedures with safety and comfort for the patient and increased autonomy for the surgeon.
Aim: Describe our experience with one year of WALANT surgery program, the impact in our overall surgical activity and complexity of approached cases.
Material & Methods: Descriptive retrospective study. All cases operated in a WALANT/LA designated setting and following the program guidelines from October 2022 to October 2023 were included. Variables included the demographic data; number, type of procedures, trauma/elective context, reported major complications (including irreversible ischemia, need to stop the procedure or assistance from on-call Anesthetist).
Results: In one year period 247 patients were operated in our program with a mean age of 56,13 years [12-92], 73,13% of which were women, 57,84% of the patients were operated on the right hand, with one case of bilateral surgery. A total of 288 surgical procedures were performed in this setting, contributing to 56,99% of the overall number of surgeries done by our group during this time. Of these surgeries, 43,06% were prior to this program made almost exclusively under sedation, regional or general anesthesia, including within others trauma procedures (13,19%) such as osteosynthesis of fractures of the Phalanx (11), Metacarpal (19), Scaphoid (6), Stener Lesion (2) and also elective cases: Trapeziectomy-Suspensoplasty (17) Selective Fasciectomy (6), distal interphalangeal joint fusion (3) Hand tumor excisions (17), Proximal ulna nerve decompression (13) and median nerve decompression at the level of Lacerdus Fibrosus (14). No major complications were reported, namely irreversible ischemia, need to stop the procedure or assistance from the emergency on-call Anesthetist. Since the introduction of WALANT, the proportion of patients operated in a LA setting raised from an average of 34,08% in the period from 2018-2021 to 57,13% from 2022-2023.
Discussion/Conclusion: The introduction of WALANT in our practice allowed, in a safe and effective way, the transition of a substantial part of our surgical production to a LA setting and enable its use in many surgeries previously only done with regional or general anesthesia.

A-0880 REVIEW OF PATIENTS WITH SPINAL INJURY WHO HAVE UNDERGONE ENDOSCOPIC CARPAL TUNNEL RELEASE FOR CARPAL TUNNEL SYNDROME

Soha Sajid[1], Amrit Jha[2], Rebecca Shirley[3], Samar Mousa[3], Simon Pickard[2]
[1]Dudley Group of Hospitals, Dudley, UK; [2]Robert Jones Agnes Hunt Orthopaedic Hospital, Oswestry, UK; [3]Stoke Mandeville Hospital, Buckinghamshire, UK

Introduction: Patients with spinal injuries often rely on their hands for mobility required for independent living. Hand function is necessary for transferring, using walking aids or wheelchairs as well as eating, dressing, hygiene, and self-care. Like the general population, Carpal Tunnel Syndrome (CTS) is a common presentation in this subset of patients. However, recovery from surgery can be more arduous due to loss of independence, particularly as it can affect mobility. Carpal tunnel decompression is most frequently performed using open surgery. This leads to a scar in the proximal palm of the hand that can be painful and scar tenderness can take time to settle. Endoscopic carpal tunnel release (ECTR) is done through a limited transverse incision in the distal wrist and avoids scars in the palm of the hand. This can allow patients to start weight bearing and using their hands sooner.

Aim: This study aims to analyse patients who have spinal cord injury and carpal tunnel syndrome. We review the level and grade of injury, the time taken for patients to self-propel, length of stay, result of surgery and complications.

Method: We collected data from 18 patients with spinal cord injury, 15 men and 3 women. There was a total of 28 ECTR done from March 2011 to June 2023. Five patients had concurrent ulnar nerve transposition, one patient had concurrent ipsilateral trigger thumb release and one had ipsilateral botox injections to intrinsics and FPB. Neurophysiology was also evaluated.

Results: Median age of patient in the study was 65 years. Level of injury ranged from C5 incomplete to L1 incomplete. Median time from injury to surgery was 23.5 years.

There were 13 hands that had reported 'Severe' carpal tunnel syndrome on neurophysiology studies, 10 reported as 'Moderate' and 2 reported as 'Mild to Moderate'. Neurophysiology data was missing for 2 patients (3 hands).

The median time to self-propel was 1 day (range 0 to 5).

The median time to transfer was 1 day (range 0 to 5).

The median length of stay was 1.5 days (range 0 to 5).

There was one patient who had unilateral ECTR had recurrence of CTS. All other patients had resolution of symptoms.

One patient was noted to suffer from bed sore and one reported cervical spine pain, but no other complications were reported.

Conclusion: Our cohort of patients, the largest majority had 'Severe' (13) reported neurophysiology followed by 'Moderate' (10). In our experience, performing ECTR has shown resolution of symptoms in all but one patient. The were no direct complications of the procedure, although one patient was noted to have bed sore and one reported cervical spine pain during the admission. Time taken for patients to patients to self-propel and transfer were brief (1 day), and length of stay was also short (1.5 days).

We would recommend this technique in this group of patients. There is resolution of symptoms even in patients with 'Severe' CTS with minimal complications. It allows quick return to mobility and short length of stay.

A-0881 EARLY TREATMENT OF METACARPAL FRACTURE ON ENCHONDROMA

Antonio Kory, Paola Napoli, Emanuela Foci, Salvo Milazzo, Gianfranco Longo
Azienda ospedaliera per l'emergenza Cannizzaro, Catania, Italy

Introduction: Metacarpal fracture on enchondroma it's s rare and challenging condition. We present a case report of a young male who experienced a low-energy trauma while engaged in work activities. The patient presented with a metacarpal neck fracture and an associated enchondroma. We have present our clinical outcome with complete healing and excellent functional recovery.
Aim: Recognizing the opportunity for simultaneous intervention, our approach aimed at addressing both issues concurrently.
Material & Methods: The treatment strategy involved the utilization of bone substitutes to address the enchondroma, after an adequate currettage, alongside the application of a K-wire for fracture fixation of 5th metacarpal neck. The patient underwent a comprehensive four-week of immobilization period to facilitate optimal healing. Subsequent to this period, X-ray imaging was performed at the five-week mark, leading to the timely removal of the K-wire. Physiotherapy was started subsequently k wire removal.
Results: The outcome of the combined treatment was highly favorable. Radiographic assessments revealed complete healing of both the metacarpal fracture and the enchondroma at 3 months post op. This success was mirrored in the clinical domain, where the patient exhibited excellent functional results. The simultaneous intervention not only expedited the recovery process but also ensured a comprehensive resolution of both conditions within a relatively short timeframe.
The utilization of bone substitutes in addressing the enchondroma is noteworthy, reducing the donor site complications. The choice of K-wire fixation for the metacarpal fracture on enchondroma allow us to achieve restoration of bone alignment with minimal invasive fixation system.
Conclusions: This case report underscores the feasibility and effectiveness of simultaneously managing metacarpal fractures and enchondromas. The successful outcome supports the notion that a well-coordinated treatment strategy, incorporating surgical techniques and appropriate immobilization, can lead to optimal results in complex cases. Further studies and exploration of similar cases will contribute to refining treatment protocols and expanding the understanding of combined interventions for metacarpal fractures associated with enchondromas.

A-0882 NAIL GUN INJURY TO THE HAND AND WRIST: A SYSTEMATIC REVIEW

Satya Chintapalli[1], Eimear Phoenix[1], Shane Cullen[1], Roisin Dolan[1,2]
[1]Plastic and Reconstructive Surgery, St Vincent's University Hospital, Dublin, Ireland; [2]Royal College of Surgeons Ireland, St Stephen's Green, Dublin, Ireland

Introduction: Nail gun injuries to the hand are a common encounter amongst those in the construction industry and a frequent presentation to the emergency department. Nail gun projectiles may penetrate structures such as nerves, tendons, major vessels or bone. Resultantly, there is significant potential for long standing morbidity including pain, sensorimotor deficits and stiffness. However, few studies report on the outcomes of nail gun injuries to the hand and wrist, and no systematic reviews have been conducted on the topic to the best of the authors' knowledge.
Aim: To analyze the persistent effects of nail gun injury to the hand and wrist, including stiffness, sensory and motor deficits.
Material & Methods: A comprehensive systematic review of the literature on nail gun injuries to the hand and wrist in accoradnace with PRISMA guidelines. The databases of Scopus, MEDLINE, PubMed and the Cochrane Library were searched.

Results: Overall 106 studies were identified, and after applying exclusion criteria, 16 were eligible for inclusion in this review, capturing a total of 185 patients. Persistent sensorimotor deficit rate appears to be 3.9% and stiffness at 4.5%. The majority of nail gun injuries affect the soft tissue only, but cases involving structural injury to the nerve, vessels, tendons or bone have significant potential for long term morbidity.
Conclusions: Nail gun injuries have the potential to result in persistent sensory deficits and stiffness in many patients and must be managed with caution to avoid iatrogenic injury on nail extraction. We recommend a systematic approach to the assessment and management of nail gun injuries to the hand and wrist, involving careful history taking, physical exam, use of radiography and appropriate surgical technique taking account of nail characteristics. Further research into the follow-up and outcomes of these injuries is required, as is an increased awareness of the need for appropriate follow up and hand therapy input.

A-0884 CLINICAL DIAGNOSIS IN EXTENSOR TENDON INJURIES

Martin Langer
University Clinic Muenster, Germany

Introduction: Clinical diagnosis of extensor tendon injuries is often difficult because of the complex anatomy of the extensor aponeurosis
Aim: to understand anatomy and biomechanics of the extensor system and their pathologies
Material & Methods: all tests in the literature and new tests or variations where testet clinically over years. fine preparations and biomechanical investigations were done in anatomy to understand this system.
Results: 10 different extensor tests are shown and explained
Conclusions: Many tests of the extensor tendons are in literature and most of them are difficult to understand. Here anatomy of these test is shown in detail.

A-0885 COMPARISON OF ULNAR SHORTENING OSTEOTOMY FOR IDIOPATHIC ULNAR IMPACTION SYNDROME USING CONVENTIONAL OR ULNAR OSTEOTOMY PLATES AND WITH OR WITHOUT INTERFRAGMENTARY SCREW FIXATION

Jong Pil Kim[1], Su Hyun Choi[1], Kyung Wook Kim[2]
[1]Naeun Pil Hospital, Cheonan, South Korea; [2]Dankook University Hospital, Cheonan, South Korea

Introduction: Ulnar impaction syndrome (UIS) can cause medial wrist pain related to excessive weight bearing across the ulnar aspect of the wrist. Idiopathic UIS is generally seen in patients with static or dynamic positive ulnar variance with wrist pronation and forceful grip. Ulnar shortening osteotomy (USO) has been widely used in clinical practice and various modified surgical methods. Although USO has been successfully used for the treatment of idiopathic UIS, the surgery carries the risk of hardware irritation, delayed union, and nonunion.
Aim: This study investigated the impact of plate type on the clinical and radiological outcomes of ulnar shortening osteotomy (USO) by comparing conventional and ulnar osteotomy plates. The effect of interfragmentary screw fixation (ISF) during USO was also assessed.
Material & Methods: Seventy-eight patients were divided into three groups according to the type of plate: 3.5-mm dynamic compression plate (DCP), 3.5-mm limited contact DCP, and 2.7-mm locking compression plate ulna osteotomy system (all from Depuy-Synthes). The patients were also divided into two groups according to whether ISF was performed. Clinical and

radiological outcomes, including time to bone union, presence of delayed union, and refracture after hardware removal, were analyzed. Other factors that might affect bone union, such as smoking and underlying diseases, were also evaluated
Results: No significant differences were found in clinical and radiological outcomes according to the type of plate. Eight of 51 patients (15.7%) in the without-ISF group showed delayed bone union. Forty-three patients in the without-ISF group underwent hardware removal, and refracture due to low-energy trauma after hardware removal was observed in five of those 43 patients (11.6%). Bone union time was significantly shorter in the with-ISF group (7.6±2.7 weeks vs. 9.8±6.6 weeks). Diabetes mellitus and ISF were associated with the delayed bone union.
Conclusions: The plate type had no influence on the clinical and radiological outcomes of USO in patients with idiopathic ulnar impaction syndrome. However, ISF during USO has several advantages, such as early bony union and prevention of refracture after hardware removal.

A-0886 CASE REPORT: ISOLATED LATERAL TROCHLEAR FRACTURE FOLLOWING MOTORCYCLE CRASH

Sebastião Serrasqueiro, Orlando Simões, Rita Cavaca, Carlos Freitas, João Moreno, Vitor Pinheiro, Fernando Fonseca
Centro Hospitalar Universitário de Coimbra, Coimbra, Portugal

Introduction: Isolated trochlear fractures represent a unique and infrequently encountered subset of orthopedic injuries. The rarity of isolated trochlear fractures sets them apart in the realm of musculoskeletal trauma, with their occurrence being so uncommon that comprehensive literature on the subject is limited. Despite the pivotal role of the trochlea in the complex mechanics of the elbow joint, these fractures remain elusive and pose diagnostic and therapeutic challenges.
Aim: This case aims to report the presentation, diagnostic workup, treatment, and outcomes of a 31-year-old male who sustained an isolated lateral trochlear fracture following a motorcycle crash.
Diagnostic Workup and Treatment: Ordered AP and lateral X-rays, coupled with a subsequent CT scan, confirmed a lateral trochlear fracture with 4mm displacement. Immediate immobilization ensued with the application of a posterior splint. One week later, surgical intervention took place through a medial approach to the trochlea, achieving fixation of the fragment using two 2.5x24 mm self-drilling, self-tapping cannulated screws.
Outcome: The one-week follow-up revealed a surgically healed wound without signs of inflammation or infection. Postoperative X-rays confirmed satisfactory alignment.
One week after surgery mobilization exercises were initiated and at the one-month and two-month follow-up, the patient showed complete range of motion and no functional impairment.
Conclusions: The inherent inaccessibility of the trochlea to direct trauma elevates the rarity of these fractures, rendering them enigmatic and challenging for both diagnosis and management. This case underscores the successful management of an isolated lateral trochlear fracture, employing a judicious blend of prompt immobilization and surgical intervention. The medial approach, coupled with cannulated screw fixation, proved efficacious in achieving stable alignment. The patient's recovery, marked by sustained flexion limitation without functional compromise, accentuates the significance of tailored interventions and postoperative rehabilitation.

A-0887 OSSEOINTEGRATED PROSTHESIS IN UPPER LIMB

May Tove Hestmo[1], Trygve Holm Glad[1], Magne Rokkum[2]
[1]Oslo University Hospital, Oslo, Norway; [2]University of Oslo, Oslo, Norway

Introduction: Implantation of osseointegrated percutaneous prosthesis provides a reconstruction alternative for upper and lower limb amputation. Bone anchored prosthesis based on osseointegration principle have been widely used since 1970 in different parts of human body including oral, cranial, facial and extremity prosthesis. During the first years, the implants and rehabilitation was not standardized. In 1999 a treatment protocol called OPRA (Osseointegrated Prostheses for the Rehabilitationof Amputees) was established. The treatment has been performed in Norway from early 2022 by a group of ortopaedic surgeons, physiotherapist, occupational therapist and prosthetist. We uses the OPRA implant and the protocol detailing the surgical technique followed by the rehabilitation protocol.
Aim: To present an alternative for patient where use of conventional prosthesis causes problems with pain, infections and ulcers and cause reduced wearing over time, where the amputated limb is too short for use of conventional prosthesis or where the standard of care for reconstructive procedures for restoring limb function is not possible.
Material & Methods: We have treated 13 patients with osseointegrated prosthesis, 1 humerus, 2 thumbs , 2 metacarpals in one patient, 6 femur and 1 tibia. In addition we have performed revision surgery in 7 patients this includes tibia operated by us and six patients operated abroad prior to start of the procedure in Norway.
We will present the 4 upper limb operated patients. They have completed or is still performing the OPRA protocol. The four patient were posttraumatic amputees, they underwent first and second stage surgery. The humerus in two stages with 4 months healing periode between the stages. The thumbs and metacarpals were single-stage surgical protocol
Results: The samples are small and we have a short-term follow up. However our data reports one superficial infection in one thumbaround the skin opening. The infection was treated with orl antibiotics and resolved within 2 weeks.. We have no reports of deep infection, implant loosening or other mechanical complications. None of the patients reports load related pain. All patients used the prosthesis
7 days /week 10-17hour/day. The patients report improved quality of life.
Conclusions: Treatment of upper limb amputees using bone anchored percutaneous prosthesis with the osseointegrated technique is a safe alternative for patient when use of conventional prosthesis or standard of care for reconstruction for different reasons is not possible.

A-0888 VASCULARIZED PROXIMAL RADIUS BONE GRAFT FOR MASSIVE BONE DEFECTS OF ELBOW: ANATOMICAL STUDY AND A CASE REPORT

Sergi Barrera-Ochoa[1], Julio Adrian Martínez-Garza[1], Jose Mere-Prieto[1], Gerardo Mendez-Sanchez[1], Esther Mora[1], Francisco Soldado[2]
[1]Hand, Elbow and Microsurgery Unit, Institut de la Ma, Hospital General de Catalunya, Barcelona, Spain; [2]Hospital HM Nens, Barcelona, Spain

Introduction: Massive upper extremity bone defects are a major surgical challenge, especially when the elbow is involved. Resection arthroplasty, total elbow arthroplasty, arthrodesis, and amputation are salvage options. Elbow arthrodesis has been tried in patients with deep infections as a salvage solution; unfortunately, the outcome has been universally poor, with no reported patients achieving bony union.
Aim: Through an anatomical review, the aim of this study is to define the proximal radial bone branches of the radial

artery (RA). In addition, we report the clinical utility of a vascularized proximal radius bone graft (VPRBG), supplied by the investigated RA, in a complex case of elbow massive bone defect.
Material & Methods: Ten upper limbs latex colored from fresh human cadavers were used. The radial artery (RA) was dissected in the proximal forearm under 2.5x loupe magnification, noting the origin of the artery, the distance (cm) of the bifurcation of the brachial artery (BA) to radial head, the number of periosteal and bone branches for the radius. The distance (cm) of the branches to radial head and between them were also noted. The VPRBG was measured in length (cm).
Results: In the proximal forearm, the RA provides 10 (7-14) periosteal and bone branches to supply from the radius head to the proximal diaphysis. A 15-cm (11-17) vascularized bone graft can be harvested of the proximal radius, and dissection of the RA enables a 12-cm (9-15) pedicle with a wide arc of rotation readily able to reach the distal part of the humerus. We used a VPRBG of 14 cm for an elbow arthrodesis with a defect of 12 cm of the right elbow in a 50-year-old man, secondary to previous recalcitrant elbow infection. The patient experienced no postoperative complications. Successful consolidation was achieved 6 months after surgery, confirming the flap's survival. After 2 years of follow-up, the dorsal contoured plate was removed, there were no signs of infection, and the Disabilities of the Arm, Shoulder, and Hand score was 23 and the Mayo wrist score was 88.
Conclusions: A VPRBG might be a safe and effective surgical option for massive osseous elbow defects, whenever elbow arthrodesis is planned, where it should be combined with a one-bone forearm technique

A-0889 THE RELATIONSHIP BETWEEN OVERUSE INJURIES IN MUSICIANS AND ROTATION LIMITATIONS IN DRUJ

Katleen Meeûs
Medihand, Heist-op-den-Berg, Belgium, Heilig Hart Hospital, Lier, Belgium

Introduction: The relationship between overuse injuries in musicians and mobility impairment in the DRUJ, due to capsular retraction, has never been discussed. Prolonged awkward playing postures exert excess force on muscles and joints, culminating in musculoskeletal pain and injury. Musculotendinous overuse injury (RSI), common in musicians, manifests as persistent pain in the muscles and joints of the upper limb, due to excessive use.
Aim: To investigate the relationship between overuse injuries in the hand and movement restrictions in the distal radioulnar joint focusing on rotation limitations in professional musicians.
Material & Methods: From June 2021 to November 2023, we followed 22 musicians aged between 27-48 years experiencing overuse injuries, representing various instruments (5 violinists, 3 saxophonists, 3 harpists, 4 accordion players, 7 guitarists). Mobility limitations in DRUJ particularly rotational limitations within the DRUJ were assessed. Goniometry was employed to measure active pronation and supination, while passive rotational movements and capsular restrictions were evaluated by assessing end-feel. These measurements were independently conducted by two certified hand therapists during the initial examination.
Results: The findings revealed a mild objective rotational impairment of 5 degrees on the affected side in 15 out of 22 (68%) musicians. Additionally, a hard end-feel was observed on the affected side in 20 out of 22 (91%) musicians. Notably, the restricted rotation demonstrated a direct correlation with the prolonged playing postures inherent to each instrument.
Conclusions: This study establishes, for the first time, a significant correlation between overuse injuries in musicians and rotation limitations in the DRUJ. The high correlation observed in our sample suggests the need for further research in a more standardized setting to validate and generalize these findings. Preventing overuse injuries in musicians should targeted exercises aimed at enhancing the mobility of the DRUJ, with a focus on selective traction and translations.

A-0890 RECONSTRUCTION OF 1ST WEB SPACE AND THUMB POSITION IN CENTRAL SPASTICITY

Fialova Ludmila[1,2], Horackova Daniela[1], Sorelova Vendula[1,2], Fajtova Katerina[2]
[1]Institute for Hand and Plastic Surgery, Vysoke nad Jizerou, Czech Republic; [2]Department of Plastic Surgery, Faculty Hospital Bulovka, Prague, Czech Republic

Introduction: In a spastic upper limb, the narrowing of the 1st web space makes it impossible to grasp. According to Tonkin, we distinguish intrinsic, extrinsic and the most common \"thumb in palm\" deformity. The reconstruction solves the lack of skin in the 1st web space, releases spastic and strengthens paretic muscles, stabilizes unstable joints.
Aim: The necessity of releasing the spastic muscles not only in the 1st web space, but also in the center of the palm
Material & Methods: Since 2003, we have been reconstructing the position of the thumb in cerebral palsy, brain stroke, brain injury and brain surgery. We always widen the 1st web space VYZZ plasty and release spastic muscles - sliding and reinsertion of AddP to I.MTC and fasciotomy of the 1st dorsalis IO. We lengthen the FPL -Z plasty. We prefer rerouting the EPL with its shortening in reinsertion to augment thumb extension-abduction. If it is shortened PL, we transpose it to APL-EPB. When the entire 1st ray is significantly retracted into the palm, we release the AddP not only from the 3rd MTC, but also from the carpal bones and carpal tunel release. We stabilize the MP joint by capsulodesis or arthrodesis and IP joint by FPL split to DA.
We introduced this method in 2015. In the period 2015/1 to 2023/11, we performed a total of 262 spastic upper limb surgeries. In 94 patients, we reconstructed the position of the thumb, of which only in 14 we released the AddP from MTC III and the os capitatum - primarily 8 times, 6 times secondarily due to persistent severe adduction of the thumb.
After surgery, we splint for 4 weeks, then we start exercising with a removable splint for another 6-8 weeks.
Results: In all patients, the aesthetic appearance of the hand was improved by reconstructing the position of the thumb during the reconstruction of the grip position of the hand, hygiene was always facilitated, and thumb extension improved by an average of 30 degrees in the MCP and thumb abduction by 30 degrees. However, the grip function of the hand does not only depend on the movement of the thumb, but also on the function of the long fingers and the position of the wrist and forearm, the condition is also influenced by the patient\'s cognitive abilities and his cooperation.he center of the palm to avoid the need for another phase of reconstruction when the thumb is pulled into the palm.
Conclusions: Widening of the 1st web space and reconstruction of the thumb in palm deformity is an integral part of grip reconstruction. The results of our group show the necessity of widening the 1st web space with skin plasty, always strengthening the abduction-extension of the thumb and releasing the spastic muscles not only in the 1st web space, but also in the center of the palm to avoid the need for another phase of reconstruction when the thumb is pulled into the palm.

A-0891 LIGAMENT RECONSTRUCTION OF THE MP JOINTS OF THE FINGERS

Martin Langer
University Hospital Muenster, Germany

Introduction: Injuries to the collateral ligaments of the MP joints are often missed in primary diagnostics
Aim: to show different techniques and biomechanical important fact that are necessary in reconstruction
Material & Methods: 5 different techniques for late reconstruction are shown and advantages and complications of each technique are demonstrated
Results: Ligaments reconstructions were performed in 16 patients with collateral ligament injuries. most often is the radial collateral ligament of the index finger, radial collateral ligament of the middle finger and the radial collateral

ligament of the little finger. A transosseous ligament reconstruction with palmaris longus tendon is the gold standard now with exact anatomical reconstruction.
Conclusions: Ligament reconstruction of the MP joint of the fingers show good and very good results except in patients with beginning arthritis and degenerative ligament ruptures.

A-0893 TITLE: REEVALUATING THE ETIOLOGY OF POST TRAUMATIC BOUTONNIERE DEFORMITY: AN ANATOMICAL STUDY AND CASE REPORT

Lorenzo Ferrazzini[1], Thomas Giesen[2]
[1]Università della Svizzera Italiana, Switzerland; [2]Lucern Regional Hospital, Switzerland

Introduction: Post-traumatic boutonniere deformity in fingers, a challenging correction in hand surgery, has traditionally been attributed to the detachment of the central slip at the middle phalanx, followed by the palmar luxation of lateral bands.
Aim: This study presents an anatomical exploration and a case report that contests this prevailing interpretation.
Material & Methods: Utilizing a 3D rotating camera for captions, we dissected 16 human long fingers in an anatomy lab. The study involved two series of eight fingers each, comprising index, middle, ring, and little fingers. In the first series, we removed the central slip insertion by 5 mm, followed by a passive flexion test to examine lateral band luxation. We then induced a longitudinal detachment of the lateral bands from the central slip and the contralateral band at the triangular aponeurosis, followed by a flexion test and interruption of the collateral PIP joint ligament. In the second series, we first caused a longitudinal detachment of one collateral band before performing similar tests. A clinical case of an acute boutonniere deformity in a young patient, resulting from a longitudinal split of one lateral band coupled with a collateral band lesion at the PIP joint, was also examined.
Results: We never observed palmar dislocation of lateral bands post central slip removal. However, a boutonniere mechanism consistently occurred following a longitudinal lesion of one of the collateral bands, irrespective of central slip detachment. Moreover, collateral band lesions at the PIP joint invariably enhanced the palmar dislocation of the lateral extensor band.
Conclusions: Our findings suggest that boutonniere deformity might initiate early in some cases, triggered solely by acute lateral extensor band palmar luxation and concurrent collateral ligament lesion. This might underscore the need for revised approaches in diagnosing and treating this complex deformity.

A-0894 TECHNICAL CHALLENGES AND SURGICAL STRATEGIES IN REVISION TOTAL WRIST ARTHROPLASTY

Natan Silver[1], Shruti Raut[2], Rami Estfan[3], Greg Packer[3], Sumedh Talwalkar[2], Daniel Brown[1]
[1]Liverpool University Hospitals Foundation Trust, Liverpool, UK; [2]Wrightington Hospital, Apley Bridge, UK; [3]Southend University Hospital, Southend-on-Sea, UK;

Introduction: With increased use of total wrist arthroplasty (TWA) we are seeing an increase in the number of revision TWAs. Revision TWA is technically demanding and requires both experience and ingenuity.
Aim: The aim of this study is to describe the challenges and technical solutions for revision TWA by analysis of patients undergoing this procedure, and comparison with the experience and literature of lower limb revision arthroplasty.
Material & Methods: A multicentre retrospective cohort study was undertaken in three tertiary referral centres in the

UK. Included were any operation involving TWA implants, from articular component exchange to implant removal and arthrodesis. Excluded were any surgery not affecting the implants, such as carpal tunnel release.

Patient details, implant particulars, imaging and intra-operative findings were examined. Special note was made of technical challenges encountered pre/intra-operatively and strategies used to address them. A thematic analysis of technical challenges and strategies was performed.

Results: A total of 85 cases were analysed; 36 were revised to arthrodesis and the remaining 49 underwent revision arthroplasty.

Six implant types were revised: Motec (47), Universal2 (26), Maestro (4), Kinematix hemiarthroplasty (4), Remotion (3), and Biaxial (1). We do not have data regarding the number of primary surgeries for each implant, so this does not infer survival or revision rates.

Technical challenges encountered specific to revision surgery include:

a. Removing well fixed implants (14 cases)

b. Diagnosing and managing infection (14 cases)

c. Issues related to bone stock

i. Contained and uncontained defects (5 cases)

ii. Massive bone loss (17 cases)

d. Restoring anatomy

i. Restoring level of articulation, centre of rotation etc (4 cases)

ii. Soft tissue balancing (2 cases)

Some challenges, such as those involving specific anatomy or joint biomechanics, were unique to TWA revision. Other challenges were common to all revision arthroplasty, for example managing bone loss. Given the much higher prevalence of lower limb primary and revision arthroplasty, we consulted with our lower limb revision arthroplasty colleagues in such cases, drawing from their experience and well-established literature.

Strategies utilised to address these challenges include:

a. Use of wires, gouges and osteotomies

b. One and two stage revisions, sampling and antibiotic strategies

c. Use of:

i. bone graft, bone substitutes and cement

ii. alternative or custom implants or ectopic implantation

d. Careful preoperative planning, judicious implant placement and attention to local bony and soft tissue anatomy

Conclusions: Revision TWA is complex and is associated with varied technical challenges. Many of these are common to revision surgery of other joints and surgical strategies can be adapted from the greater experience and literature of hip and knee revision arthroplasty.

This paper describes the common technical challenges faced and the strategies to deal with those challenges based on the experience of the authors and their lower limb colleagues.

A-0895 THE EFFECT OF DISTAL RADIOULNAR JOINT TRANSLATION AFTER ULNAR SHORTENING ON CLINICAL OUTCOMES IN IDIOPATHIC ULNAR IMPACTION SYNDROME

Jong Pil Kim[1], Su Hyun Choi[1], Neung Han Jeon[1], Kyung Wook Kim[2]
[1]Naeun Pil Hospital, Cheonan, South Korea; [2]Dankook University Hospital, Cheonan, South Korea

Introduction: Ulnar shortening(USO) has often been successfully used to relieve such an impaction between the ulna and lunate and also help in stabilizing the distal radioulnar joint (DRUJ) by increasing the tension in the triangular fibrocartilage complex (TFCC). However, little is known about biomechanical effect of USO on the DRUJ in patients with idiopathic ulnar impaction syndrome.
Aim: The aim of this study is to quantify translation of the DRUJ after USOT and to determine its clinical implications.
Material & Methods: The study included 90 consecutive patients who had undergone USOT in idiopathic ulnar impaction syndrome between March 2013 and January 2018. CT scans of symptomatic and asymptomatic contralateral wrists were performed with the hand in 70° supination, neutral, and 70° pronation preoperatively and at 1-year after ulnar shortening. Four CT methods for diagnosing subluxation of the DRUJ were used: the radioulnar line method; the epicenter method; the radioulnar ratio method; and the subluxation ratio method. In addition, ulnar variance was assessed at coronal reconstruction image. Correlations between CT parameters and clinical outcomes including VAS, range of motion, grip strength, and DASH and PRWE scores were assessed.
Results: All clinical outcomes significantly improved after surgery. An average preoperative ulnar variance of +2.43 mm (95% CI, 0.12 to 6.26 mm) was reduced to an average of −0.19 mm (95%CI, -2.69 to +3.69 mm) postoperatively. Significant changes of ulnar translation were observed in neutral and pronation position with all CT methods, except Epicenter method with pronation position after USO. There were significant correlations between preoperative ulnar variance and the degree of subluxation of the ulnar head in neutral position with the epicenter (R=0.36, p=0.008) and the radioulnar ratio methods (R=0.39, p=0.004) and in supination with the epicenter method (R=0.60, p 0.001). However, no significant correlation was observed after surgery. The differences between preoperative and postoperative DASH and PRWE scores showed a significant correlation with the changes of translations of the DRUJ, when measured by radioulnar line method (R=0.345, p=0.011; R=0.357, p=0.009; respectively) and subluxation ratio method (R=0.355, p=0.009; R=0.364, p=0.007; respectively) at pronation position.
Conclusions: The data of this study demonstrated that USO relieves impaction and reduces translation of the DRUJ in idiopathic ulnar impaction syndrome. Clinical outcomes of USO are associated with the recovery from abnormal translation of the DRUJ.

A-0896 ACELLULAR PIG NERVE GRAFT TO REPAIR MEDIAN NERVE INJURY: A PRELIMINARY STUDY ON RAT

Alessandro Crosio[1,2], Luisa Muratori[2], Arianna Lovati[3], Debora Molinaro[3], Simona Odella[4], Stefania Raimondo[2], Pierluigi Tos[4]
[1]Hand Surgery, City of Health and Science, Turin, Italy; [2]Department of Clinical and Biological Sciences, Neuroscience Institute Cavalieri Ottolenghi (NICO), University of Turin, Turin, Italy; [3]Cell and Tissue Engineering Laboratory, IRCCS Istituto Ortopedico Galeazzi, Milan, Italy; [4]Reconstructive Microsurgery and Hand surgery Unit, ASST Pini-CTO Milano, Italy;

Aim: The first aim of the present study was to test the efficacy of a decellularization method currently used to decellularized horse tendons in order to evaluate its possible application to create efficient nerve graft. The second aim was to evaluate the ability of the acellular porcine nerve graft obtained through the decellularization procedure to repair a median nerve lesion in rats.

Material & Methods: The decellularization protocol described by Lovati was applied in vitro on porcine superficial peroneal nerve (SPN) segments. To investigate ability of the decellularization protocol to remove immunogenic cellular components of the nerve tissue and to preserve the basal lamina and extracellular matrix, morphological analysis has been performed comprising Masson's Trichrome staining, immunofluorescence, high resolution light microscopy and transmission electron microscopy (TEM).
For the in vivo study segments of SPN were decellularized according to Lovati protocol and used to reconstruct a 1 cm median nerve gap on rat median nerves. The group one was operated bilaterally and animals were sacrificed 4 weeks after surgery; in the second group bilateral median nerve was repaired by xenograft. These animals were sacrificed after 3 months. The results were compared to a control group in which both median nerves were reconstructed by autograft. Morphological analysis were performed on both groups, while grasping test (functional analysis) was performed on the second and control groups to compare recovery induced by autograft compared to xenograft at different timepoint.
Results: In vitro study confirmed the results obtained on horse tendon, especially few immunogenic components were present in morphological analysis.
In vivo study demonstrated that four weeks after injury, regenerating fibres have colonized the graft suggesting a promising use for repairing severe nerve lesions. Furthermore TEM showed myelinc and amyelinc fibres in all xenograft samples. Masson's trichrome staining revealed axons fibres in all segments of the graft. Functional analysis at short time point presents comparable results between autograft and xenograft.
Conclusions: Decellularized processed allografts are a weapon to reconstruct nerve gaps. Their exact indication is still debated, Despite this, employment of nerve segments from cadavers seem to be a promising. So that we introduced the use of a xenograft for nerve reconstruction. Applying the Lovati decellularization protocol no signs of immunogenic material seemed to be kept into processed nerve segments. Moreover, no signs of immunogenic response were detected in morphological analysis. In post operatory analysis clear signs of nerve regeneration were detected and functional recovery was comparable to autograft. The use of decellularized xenograft could be useful and safe. One of the advantages could be the use of nerve segments from dead animals used for example from alimentary production. Further study are required to confirm our findings and a sterilization protocol is needed for human employment.

A-0897 LUNATE MOTION IN RELATION TO THE OTHER CARPALS – A 4D CT ANALYSIS IN HEALTHY WRISTS

Mathias Haefeli[1,2], Joris G. M. Oonk[2], Johannes G.G. Dobbe[2], Geert J. Streekstra[2,3], Gustav J. Strijkers[2], Philipp Honigmann[2,4,5]
[1]Hand Surgery, Cantonal Hospital Graubünden, Chur, Switzerland; [2]Amsterdam UMC, University of Amsterdam, Department of Biomedical Engineering and Physics, Amsterdam Movement Sciences, Amsterdam, Netherlands; [3]Department of Radiology, Academic Medical Center, University of Amsterdam, Amsterdam Movement Sciences, Amsterdam, The Netherlands; [4]Hand and Peripheral Nerve Surgery, Cantonal Hospital Baselland, Bruderholz, Switzerland; [5]Medical Additive Manufacturing, Department of Biomedical Engineering, University Basel, Switzerland

Introduction: The lunate plays a central role in the wrist. By its ligamentous connections to the scaphoid through the scapho-lunate ligament and to the triquetrum through the luno-triquetral ligament, it acts as a neutralizer of rotational forces within the proximal carpal row. Only if the proximal carpal row may act as an intact unit, physiological force transmission through the wrist is possible. To better understand the kinematic changes of bony and ligamentous pathologies, a thorough understanding of normal kinematics is necessary. Recent studies have reported on scaphoid, lunate and capitate rotation in relation to the distal radius using 4D-CT. However, little is known about inter-carpal motion in the numerous carpal joints.
Aim: To investigate intercarpal motion as rotation and translation between the lunate and the capitate, scaphoid,

triquetrum and hamate as well as between the lunate and the distal radius in a healthy population.
Material & Methods: 42 healthy wrists first underwent a static 3D-CT scan before a 4D-CT scan during a full cycle of Extension-Flexion and Radial-Ulnarduction was done. Study participants actively performed a guided E-F and R-U motion within 10 seconds in a specifically designed wrist guiding device to allow for reproducible and comparable results, while the wrist was scanned. DICOM images were directly imported into image analysis software. From the static 3-D-CT scan, the scaphoid, lunate, triquetrum, capitate, hamate and radius were segmented to yield 3-D polygon models. After segmentation, the outlines of the carpal bones and radius were registered to their representations in each of the corresponding time frames of the 4D-CT scan to obtain rotation and translation parameters. Lunate rotation and translation were then plotted in relation to the other carpals and the distal radius.
Results: Lunate rotation relative to the other carpals was largest in the sagittal plane and only small in the coronar and transversal plane. Between lunate and scaphoid, a total rotation of 38° and 7°, between lunate and triquetrum of 19° and 14° occurred during a E-F-cycle of 50°/0/80° and a R-U-cycle of 30°/0/30°, respectively. The rotation pattern of the lunate in relation to the other carpals and the distal radius showed a relatively linear course. Rotation and translation between lunate and capitate were very similar to those between lunate and hamate as a result of the functional unit with nearly no intercarpal motion between capitate and hamate. About 50% of total rotation occurred in both, the radio-lunate and the capito-lunate joints, respectively.
Conclusions: Using 4D-CT scans the motion pattern of the lunate in relation to the other carpals could be defined in a healthy population. In the luno-triquetral joint about half of the rotation of that in the scapho-lunate joint could be observed. Rotation during R-U was substantially larger in the LT-joint than in the SL-joint. About half of rotation occured in the radiocarpal joint and half in the midcarpal joint. This may help to better understand carpal kinematics in the healthy wrist and serve as a foundation to better understand kinematics of pathologies in the wrist.

A-0898 SCREW FIXATION VERSUS ARTHROPLASTY FOR 3-PART RADIAL HEAD FRACTURES

Cátia Coelho Nunes, José Carlos, Maria Inês Rocha, Sofia Madeira, Susana Rodrigues, Marcelo Alves, Júlio André, Ricardo Ferreira
Hospital Garcia de Orta, Almada, Portugal

1. INTRODUCTION: Fractures of the radial head represent 4% of all fractures and nearly one-third of elbow fractures, specially affecting younger to middle-aged patients. The radial head is essential for elbow biomechanics, allowing elbow and forearm stability. As radial head resection is seldom recommended, treatment of a 3-part radial head fractures remains controversial. The most common surgical methods for treatment of this complex fractures include open reduction and internal fixation with screws (ORIF) and replacement of the radial head.
The goal of this study was to compare the outcome following headless compression screw fixation and radial head arthroplasty for 3-part, Mason types III or IV radial head fracture.
2. METHODS: We identified 19 adult patients (mean age 51.9, range 18-83 years) with 3-part radial heal fracture (Mason III-IV), regardless of the mechanism of injury and the presence of associated elbow injuries, who were operated from January 2016 to September 2022. Of these, 7 cases received radial head arthroplasty and 12 cases underwent fixation using 2-4 cannulated headless compression screws. Surgical options were based on surgeon analysis of the fracture characteristics and surgeon preference. Patients who underwent ORIF with plate were excluded.
3. results All patients were followed up for an average of 11.5 months (range 5-36 months) after surgery and were re-evaluated for this study (average 5.3 years, range 1.5-7.5 years)

According to the Elbow Mayo Performance Score, 4 patients achieved excellent results, 10 were good, 2 were fair and 3 was poor. In the ORIF group, excellent results were seen in 2 cases, good in 5, fair in 2 and poor in 3. The rates of excellent and good in the arthroplasty group were 100%, while in the ORIF group were 58.3% ($p<0.001$).
As for grip strength, in the arthroplasty cases 71% had slightly diminished muscular force, while in the ORIF group only 25% had a slight loss ($p<0.001$), with 50% reporting a moderate loss of strength.
Visual Analogue Scores (VAS) for replacement and ORIF groups were 1.00 and 2.08, respectively ($P<0.001$).
4. CONCLUSIONS: Both surgical options are viable for a 3-part radial head fracture, regardless of the associated elbow injuries, allowing acceptable results for patients. However, radial head arthroplasty shows less pain and is associated with better range of motion and stability, allowing better functionality and grip strength in the short and long term.
Keywords: radial head fracture; radial head arthroplasty; ORIF; Mayo Elbow Performance Score

A-0899 DYNAMIC OR STATIC PROGRESSIVE BRACING IN THE TREATMENT OF ROTATIONAL LIMITATION OF THE FOREARM

Eline van Es[1], Remco Timmermans[2], Denise Eygendaal[1], Joost Colaris[1]
[1]Erasmus University Medical Center, Rotterdam, The Netherlands; [2]Rijndam Rehabilitation Center, Rotterdam, The Netherlands

Introduction: A limitation in forearm rotation can occur following antebrachial, wrist, or elbow trauma and, in some cases, without a clear cause. This can greatly affect the patient's ability to perform daily activities. Therefore, we investigated the influence of conservative treatment, consisting of a combination of brace and exercise therapy, in patients with limited forearm rotation. To determine whether there are differences in improvement between two common bracing techniques, we set up a clinical trial in which we randomized between the use of a dynamic and a static progressive rotation brace.
Aim: The aim of this study was to investigate the impact of conservative treatment, involving a combination of rotation brace and exercise therapy, on range of motion in patients with limited forearm rotation. Secondarily, possible differences between two forms of brace therapy were investigated: dynamic and static progressive rotation bracing.
Material & Methods: Sixty patients experiencing limited forearm rotation, were randomly assigned to either a dynamic rotation brace (worn for 8 hours per night) or a static progressive rotation brace (worn three times a day for 30 minutes). Both groups underwent physiotherapy-guided exercise therapy. The treatment duration ranged from a minimum of 3 to a maximum of 12 months, with the option to discontinue if progress was inadequate. Measurements of pronation and supination were performed at baseline, at 3 months and, if treatment was continued, also at 6, 9 and 12 months of follow-up.
Results: Total forearm rotation improved significantly and clinically relevant from an average of 91° at baseline to 116° at the last follow-up measurement (54% versus 69% of contralateral). The increase in supination exceeded that of pronation (16° versus 9°). There were no significant differences between the dynamic rotation brace group (n=30) and the static progressive rotation brace group (n=30) at any of the time points. Mean wearing time of the rotation brace until no further progression of rotation occurred was 4.8 months.
Conclusions: Rotational limitation of the forearm can improve with a combination of brace and exercise therapy. Depending on the desired activities, this improvement is sufficiently functional for the patient. No significant differences between a dynamic or a static progressive rotation brace were found.

A-0900 PLATE FIXATION FOR SCAPHOID NON-UNION IN THE ADOLESCENT: A SENSIBLE OPTION? AND CAN 3D PRINTING HELP IN THE PROCESS?

Ernst. Smits, Twan Verspuij, Michiel Zuidam
Erasmus Medical Center, Department of Plastic Surgery, Rotterdam, The Netherlands

Introduction: Scaphoid fractures are rare, especially in children. Often this heals well after conservative action, but sometimes a non-union arises. There are several treatments for a non-union in the scaphoid, including plate fixation. However, plate fixation is rarely done in children. This is because the scaphoid is still growing.
Aim: does a ct scan and also 3D printing make it possible to accurately measure the size of the scaphoid, and thereby the possibility to use the scaphoid plate.
Material & Methods: Before surgical treatment, a Computer Tomografie (CT) scan can be made of the scaphoid, of which a three dimensional (3D) print can be made. 3D printing makes it possible to accurately measure the size of the scaphoid, and thereby the possibility to use the scaphoid plate.
Results: Two 14-year old patients with a non-union of the scaphoid which are successfully treated with plate fixation. 3D printing is been used
Conclusions: 3D printing makes it possible to accurately measure the size of the scaphoid, and thereby the possibility to use the scaphoid plate

A-0901 THUMB TO THUMB TRANSFER IN A 12 YEAR OLD PATIENT

Ernst Smits[1], Wim Janssen[2], Lisette Melis- Schrijver[2], Teun Luijsterburg[1]
[1]Erasmus MC, Rotterdam, the Netherlands; [2]Rijndam revalidate, Rotterdam, the Netherlands

Introduction: Outcomes after reconstruction of finger replantation have been described, however the outcome of injuries with spare part surgery are less well-known in children and can provide valuable insight
Aim/Material & Methods: We would like to present an unusual spare parts reconstruction of a bilateral upper-extremity injury treated with a heterotopic thumb-to-thumb replantation in a child. And describe the 1ste year of rehabilitation.
Results: This report displays the utility of microsurgical reconstruction with available autogenous tissue in the acute setting. We would like to present the results of the first year post op result of range of motion, grip pinch and Semmes Weinstein. Patient experience a normal semmes weinstein; pinch and fist grip are sufficient compared to the average. unfortunately we cant compare to the contralateral side, because it has been amputated
Conclusions: Thumb tot thumb transfer in children have good result

A-0902 METHODS OF CLINICAL ASSESSMENT OF POST-TRAUMATIC STIFFNESS OF THE IPP JOINT: NARRATIVE REVIEW OF THE LITERATURE

Emily Benassai[1] Giula Pompili[2] Paolo Boccolari[3]

Introduction: Knowing how to assess the stiffness of the IFP following trauma or prolonged immobilization is important for the choice of treatment and/or the creation of an appropriate splint. Over or under stress on stiff tissues will lead to damage or no structural change, so it is necessary to be able to identify the optimal force to be applied in terms of amount, direction, and duration of action, which will be different depending on the type of joint stiffness we are dealing with.

Aim: The main purpose of this study was to identify the various techniques for measuring IPP stiffness following trauma or prolonged period of immobilization.
Material & Methods: To answer the research question, a narrative review of the literature was done. We searched Pubmed, the Cochhrane Database, Google Scholar, Web of Science, Embase and Scopus using "Siffness" AND "PIP joint evaluation" as keywords. Articles to be included had to have as their object of study the methods of PIP joint stiffness evaluation following trauma. Articles pre-1960, and articles published in languages other than Italian and English were excluded from the search. In addition, all articles that did not answer the research question were excluded.
Results: So, 16 articles were analyzed in which 6 different evaluation methods emerged: the PROM, end feel, torque-angle ratio, slope, TAC, WTM and MAP
Conclusions: these the PROM and end feel provide a less precise and more subjective evaluation, which is hardly repeatable, TAC is the most used, most efficient and repeatable method identified. WTM is also a good alternative to TAC, also reliable and repeatable. Techniques using electronic devices appear to be a valid alternative, but sufficient studies are lacking to state this with certainty.

A-0903 WAIST DOWN TO WAIST UP- TRI-CORTICAL ILIAC CREST GRAFT IS A RELIABLE OPTION IN THE MANAGEMENT OF SCAPHOID WAIST NON-UNIONS

Vivek Singh, Roop Bhushan Kalia, Aditya K.S
All India Institute of Medical Sciences,Rishikesh, India

Introduction: Scaphoid non-union often leads to a change in the biomechanics of the wrist joint. Various types of bone grafts(vascularised vs non-vascularised; cortical vs cancellous) and different sites of harvest have been described in the literature for reconstruction.
Aim: This study aims to assess the clinical and radiological outcomes after non-vascularised tri-cortical iliac crest bone graft augmented fixation for non-union of scaphoid waist fractures.
Material & Methods: 32 adult patients who underwent reconstruction of scaphoid waist non-union with tri-cortical iliac crest grafting and internal fixation with headless compression screws (31 cases) and k-wires (1 case) were prospectively analyzed. There were 26 males and 6 females (mean age 23.9 years). The mean duration of presentation was 5.7 months following injury. Outcomes following surgery were analyzed clinically by the range of movements (ROM) and functional scores like DASH and modified Mayo wrist score and radiologically by X-rays and non-contrast CT of the wrist. Radiological assessment included scaphoid length, radio-lunate (RL) angle, and scapho-lunate (SL) angle at mean 24 months (range 12 months to 72 months) follow-up.
Results: Bony union was achieved in 30 cases (union rate 93%). All the cases which achieved union had a significant improvement in radiological and clinical outcome criteria at a minimum 1-year follow-up interval. 2 patients had persistent non-union and 1 had k-wire back out with fixation failure.
Conclusions: It is important to restore scaphoid length and to correct flexion deformity for a successful outcome. This can reliably be achieved by a carefully planned wedge-shaped tri-cortical iliac crest graft along with secure fixation with a headless compression screw. This study further consolidates the principle that restoration of scaphoid biomechanics is more important than biology.

A-0905 CURRENT TRENDS IN DIGITAL REPLANTATION – A NARRATIVE REVIEW

Min Kai Chang, Jin Xi Lim, Sandeep Jacob Sebastin
Department of Hand and Reconstructive Microsurgery, National University Health System, Singapore

Introduction: Digital replantation for traumatic amputation has become the standard of care with advances in microsurgical techniques and technology. While digital replantation has progressed significantly, there are still gaps in knowledge in many aspects. Some of the controversial topics in digital replantation include the indications and contraindications, anesthesia, number of vessel anastomoses, mechanism of injury, role of vein graft, distal fingertip replantation, and postoperative management.
Aim: We have performed a narrative review that discusses these controversies and current issues pertaining to digital replantation.
Material & Methods: PubMed, Web of Science, and Google scholar were searched using keywords relating to "digit replantation", "amputation", and "digital replant" with the following terms: "indications", "contraindications", "anaesthesia", "survival", "vessels", "mechanism of injury", "vein graft", "outcome", and "thrombophylaxis"". Relevant articles pertaining to digital replantation and deemed by the authors as current or controversial were included.
Key content and findings: The reported survival rates of digital replantation are high. With the advancement of microsurgical techniques and technology, the boundaries of digital replantation continue to be pushed. Various methods have been described recently to improve the success rates of difficult replants, such as strategies for venous outflow and vein grafting. However, there are still aspects of digital replantation that remain unanswered, such as the number of veins to anastomose and the thromboprophylaxis regime.
Conclusions: The review delves into controversial aspects of digital replantation, including contraindications, anesthesia, and postoperative management. Indications and contraindications will continue to evolve alongside advancements in microsurgical techniques and anesthesia. It highlights key factors influencing survival rates, such as the number of repaired vessels and the mechanism of injury. Finally, the review consolidates strategies for managing challenging digital replantations.

A-0906 THE ROLE OF RECONSTRUCTIVE MICROSURGEONS IN LIVER TRANSPLANTATION – A NARRATIVE REVIEW

Min Kai Chang, Andre Eu Jin Cheah
Department of Hand and Reconstructive Microsurgery, National University Hospital, Singapore

Introduction: Liver transplantation is a life-saving procedure, but also associated with complications. Hepatic artery thrombosis is one of the most devastating complications, especially for living donor liver transplantation. The application of microsurgical techniques for hepatic artery reconstruction has greatly reduced the risk of hepatic artery thrombosis.
Aim: In this narrative review, we discuss the role of microsurgeons and the technical considerations and challenges faced in microsurgical reconstruction of hepatic artery in liver transplantation.
Material & Methods: PubMed, Web of Science, and Google scholar were searched for keywords relating to "liver transplantation", "microsurgery", "living donor liver transplantation", "deceased donor liver transplantation", "hepatic artery", "hepatic artery thrombosis", "hepatic artery reconstruction" and "microsurgical anastomosis". Relevant articles pertaining to the technical considerations and challenges of microsurgery in liver transplantation were included.
Results: The conditions of liver transplantation pose unique challenges to the microsurgeon. Nonetheless, there are described strategies that can overcome these conditions, as well as technical details that may improve the outcomes

of hepatic artery reconstruction. These strategies start from proper positioning of the patient, conscientious selection of donor and recipient hepatic vessels, and minimizing movements during critical microsurgical anastomosis. Technical details include techniques to overcome vessel delamination, size mismatch, poor quality vessels, and short vessel stump. This review also explores the outcomes of microsurgical hepatic arterial reconstruction.
Conclusions: There are various strategies to mitigate the challenges of microsurgery in liver transplant. Microsurgery improves the outcome of liver transplantation. Microsurgeons will continue to be a priceless resource that all liver transplant teams should have.

A-0907 BONE REMODELING AFTER THUMB CMC TOTAL JOINT ARTHROPLASTY BASED ON BONE SCINTIGRAPHY

Tim Philips[12], Laurens Van Melkebeke[2], Pieter Caekebeke[2], Joris Duerinckx[2]
[1]Ghent University Hospital, Ghent, Belgium; [2]Ziekenhuis Oost-Limburg, Genk, Belgium

Bone scintigraphy is a potential first-line nuclear medicine study for pain after total joint arthroplasty when there is concern for periprosthetic joint infection or aseptic loosening. In total joint arthroplasty of large joints, nuclear studies may be falsely positive for up to two years after surgery due to normal physiologic bone remodeling. Most trapeziometacarpal total joint replacements are of the ball-in-socket type and are intended for cementless implantation. Stable long-term fixation requires osseo-integration of the implant.
The goal of our study was to evaluate the normal bone scintigraphic appearance and evolution after thumb CMC total joint arthroplasty. We selected all patients who received a thumb CMC total joint arthroplasty in our department during the last 13 years (n=1000) and afterwards underwent bone scintigraphy for another reason than pain in the operated hand. Patients with pain at the thumb CMC total joint arthroplasty were excluded. Scintigraphic appearance of the thumb CMC implant was regarded relative to the time elapsed after surgery.
To our knowledge, this is the first study to describe the bone scintigraphic appearance of asymptomatic cementless thumb CMC total joint arthroplasty. This information is essential to allow proper evaluation of painful implants.

A-0908 RESTORATION OF ELBOW ACTIVE FLEXION IN CHILDREN WITH AMYOPLASIA: WHAT BETTER TO DO AND WHEN TO DO?

Olga Agranovich
H. Turner National Medical Research Center for Children's Orthopedics and Trauma Surgery of the Ministry of Health of the Russian Federation, St. Petersburg, Russia

IIntroduction: the absence of active elbow flexion is the most common problem in children with amyoplasia, leading to a violation of daily living. There are many variants of muscle transfer use for restoration of active elbow flexion. Pectoralis major muscle (PM) and latissimus dorsii muscle (LD) are the most used muscles for this purpose. There are no information in the literature what muscle better to use and what optimal age for these operations.
Aim: to find the best donor muscle and optimal age for restoration of elbow flexion in children with amyoplasia.
Material & Methods: the retrospective study involved 61 patients (90 upper limbs) with amyoplasia (30 (49%) girls and 31 (51%) boys) who were examined and treated from 2011 to 2020. In 46 cases (51,1%) we used PM and in 44 (48,9%) LD as a donor muscles. All patients were divided into 4 groups: 1 group - 1-3 y.o. (17 children, 27,9%), 2 group - 3-7 y.o. (30 patients, 49,2%), 3 group - 7-11 y.o. (8 children, 13,1%), 4 group - 12-18 y.o. (6 patients, 9,8%). The clinical examination

of the patients was carried out before and after operation (6 months and more).
Results: the age of patients at the time of surgery was from 1,5 to 15,5 years (6,24 ± 4,24 лет), the follow-up period after surgery was from 6 to 99 months (41.25 ± 30.19). After surgery all patients had elbow flexion contractures however, when was used as a donor muscle LD the degree of contracture was less then after PM transfer (15.19° ± 13.04 and 23.24° ± 15.37, respectively, p=0.0483). In addition, after the LD transfer the strength of the forearm flexors was on average 1 point greater than after the PM transfer (2.85 ± 1.08 and 4.00 ± 0.62 points, respectively, p <0.0001). After LD transfer the amplitude of elbow active flexion was bigger compared to the PM transfer (75.37 ° = 17.86 and 55.88° = 24.60, respectively, p = 0.0022). The elbow flexion contractures were observed mainly in patients of 1-3 groups (p<0.05). The greatest dynamics of such indicators as the strength of forearm flexor muscles, the active elbow flexion, the function of the elbow were noted in patients of 1 group (p<0.05). The patients of 4 group had same indicators after surgery worse than the younger patients (p<0.05). The children of 3 and 4 groups had less strength of the donor muscles than the children of 1 and 2 groups (p<0.05).
Conclusions: the study demonstrated the effectiveness of using LD and PM for restoration of elbow flexion in children with amyoplasia however, if it is possible to choose a donor muscle, the preference should be given to LD. We recommend these operations at the age from 1 to 3 years.

A-0911 USE OF A CROSS-FINGER FLAP FOR AN UNUSUAL COMPLICATION IN A DUPUYTREN'S DERMOFASCIECTOMY

Hannah John, Olakunie Alonge, Angus Maclean
Royal Glamorgan Hospital, Llantrisant, UK

Introduction: In a case of severe Dupuytren's contracture, a volar plate and pulley release were used in conjunction with a dermofasciectomy to achieve a good correction of the finger. Unfortunately the flexor tendon then eroded through the skin graft, leaving a section of exposed tendon.
Aim: To make other surgeons aware of the risks of skin graft breakdown, if the loss of a pulley beneath has exposed the tendon.
Material & Methods: This case report illustrates the complication of an exposed flexor tendon through a skin graft, and documents the use of a cross finger flap to satisfactorily cover the tendon and maintain a good correction of the finger.
Results: A good resolution of this complication was achieved with a cross finger flap (pictures available)
Conclusions: Care should be taken when combining volar plate and pulley release, with a full thickness skin graft. A cross finger flap can be used to deal with the complication of graft erosion, and may be used as primary coverage.

A-0912 REPAIR OF ROTARY AVULSION REPLANTATION OF THUMB BY BRIDGING VEIN GRAFT WITH DEEP METACARPAL ARCH

Li Ling
Shaoxing Central Hospital Medical Community General Hospital, China

Introduction: Repair of rotary avulsion replantation of thumb by bridging vein graft with deep metacarpal arch
Aim: To evaluate the feasibility of repairing rotary avulsion replantation of thumb by bridging superficial carpal vein with deep metacarpal arch.
Material & Methods: From January 2018 to January 2022, 10 cases of rotary avulsion of thumb from metacarpophalangeal

joint were treated in our department. Under the condition of not shortening the bony structure, the superficial carpal vein graft was used to bridge the deep palmar arch to repair the bilateral digital artery of the thumb, and the same incision was used to repair the flexor pollicis longus tendon by transposition of the superficial flexor digitorum tendon of the ring finger. The survival of the amputated finger was observed after operation, and functional exercise and follow-up were performed after complete survival.
Results: 8 cases were followed up for 6-10 months (mean, 8 months). 9 cases survived successfully, 1 case had partial necrosis of the proximal skin margin of the severed finger body, and the necrotic part healed after dressing change.
Conclusions: Venous transplantation from deep metacarpal arch was used to connect the thumb digital arteries to form a new vascular pathway and restore the physiological blood supply of the thumb. It is feasible to repair the rotary avulsion of the thumb and preserve the length of the finger. Vein transplantation and tendon transposition share the same incision, and reduce the secondary injury caused by vascular transposition. After survival, the appearance and function were satisfactory.

A-0913 CLINICAL AND RADIOLOGICAL EVALUATION OF SURGICAL TREATMENT OUTCOMES IN NONUNION OF THE SCAPHOID IN CHILDREN AND ADOLESCENTS

Piotr Koschel, Leszek Kaczmarek, Piotr Czarnecki
Department of Traumatology, Orthopaedics and Hand Surgery, Poznan University of Medical Sciences, ORSK im. W. Degi, Poznań, Ul. 28 Czerwca 1956 r. 135/147, 61-545 Poznań, Poland

Introduction: Fractures of the scaphoid are the most common fractures within the wrist, accounting for 60-70% of cases. In 10-15% of cases, delayed union or the formation of a nonunion is observed, and if left untreated, it increases the risk of degenerative changes in the wrist. The majority of publications focus on adult patients; hence, we decided to evaluate individuals under 18 years of age.
Aim: The aim of the study was to assess the clinical and radiological outcomes of surgical treatment of nonunion and delayed union of the scaphoid in patients up to 18 years of age, and to analyze potential factors influencing surgical outcomes and failures.
Material & Methods: Since 2016, we treated 21 boys with disturbances in the fusion of the scaphoid at the Department of Traumatology, Orthopedics, and Hand Surgery in Poznań. The study included 21 patients whose time from injury suspected of causing the fracture to surgery was 3 months or longer. The average age at the time of surgery was 15 years. The mean observation time was 24.3 months. We analyzed the surgical technique, range of motion, and pain before surgery and at the final assessment. The time to achieve bone fusion was also assessed. Based on lateral X-ray examination, CLA (capito-lunate angle), SCA (scaphoid-capitate angle), and SLA (scapholunate angle) angles were measured before and after surgery and at the last follow up.
Results: The following treatment outcomes were obtained: union confirmation in 17 patients (81%), absence of pain in 18 patients (85%), and full range of motion in 12 patients (57%). A statistically significant change in the SLA angle and an increase in dorsal wrist flexion were achieved. After surgery, a decrease in the CLA and SCA angles was also observed.
Conclusions: Our study indicates that surgical treatment positively influences the improvement of range of motion, relief from pain, and enhancement of anatomical relationships within the wrist. In our study, we did not identify factors influencing surgical outcomes or those indicating an increased risk of treatment failure.

A-0914 PSYCHOLOGICAL IMPACTS AND RADIOLOGICAL PREDICTORS IN PERSISTENT PAIN AND DISABILITY AFTER DISTAL RADIUS FRACTURES: A RETROSPECTIVE ANALYSIS

Maryam Farzad[1], Joy MacDermid[2], Amir Reza Farhoud[3], Mohammad Javad Shariyate[3], Seyed Hadi Kalantar[3], Samira Chaibakhsh[3], Mohammad Mahdavi[3]

[1]School of Physical Therapy, Western University, Roth McFarlane Hand and Upper Limb Centre, St. Joseph's Hospital, London, ON, Canada; [2]Hand and Upper Limb Center, St. Joseph's Health Center, London, Ontario, Professor Rehabilitation Science McMaster University, Hamilton, ON; [3]Department of Occupational Therapy, The University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

Introduction: Distal radius fractures (DRF) can lead to persistent pain and disability. While radiological factors are commonly evaluated, the influence of psychological factors, including unhelpful thoughts, symptoms of depression, and distress, remains less explored.

Materials and Methods: A retrospective cohort study was conducted on 79 eligible patients (mean age: 45.68, SD: 15.19) who underwent operative treatment for DRF within the last year. Radiologic parameters were collected from hospital records, such as palmar tilt, ulnar variance, radial inclination, and radial height before and after treatment. One year post-fracture, validated questionnaires assessed reaction to symptoms (the Pain Catastrophizing Scale and the Tampa Scale of Kinesiophobia) and symptoms of depression and anxiety (DASS-11). The Patient-rated Wrist Evaluation (PRWE) questionnaire evaluated pain and functional limitations at the same time point.

Results: High levels of instability and malunion were observed, with 98% of the cohort displaying these in at least one parameter. About 50% reported fear of movement, 5.9% exhibited symptoms of depression and anxiety, and 28% catastrophized their pain. Psychological factors, notably pain catastrophizing (PCS) and kinesiophobia (TSK), demonstrated significant positive correlations with pain, usual activity, and specific activity outcomes (all $p < 0.001$). Radiological factors also showed significant associations with outcomes; postoperative radial height was significantly associated with pain ($p = 0.03$), usual activity ($p = 0.04$), and specific activities ($p = 0.02$).

Conclusions: Mental health factors, particularly pain catastrophizing and kinesiophobia, exert a pronounced impact on persistent pain and disability post-DRF. In comparison, the role of radiological factors in adverse outcomes is relatively minor. This emphasizes the need to incorporate strategies addressing mental health and unhelpful thinking in interventions to enhance patient outcomes after DRF.

A-0915 UNDERSTANDING AND MANAGING SYNDACTYLY IN APERT SYNDROME

Gia Jalalishvili[1], Zaza Jalalishvili[2]

Apert syndrome, primarily caused by a spontaneous mutation in the fibroblast growth factor receptor 2 (FGFR2) gene, leads to premature fusion of cranial sutures, resulting in characteristic craniofacial and skeletal abnormalities. However, beyond the facial features, Apert syndrome often encompasses hand abnormalities, notably syndactyly—the fusion of digits—posing significant functional and psychological challenges.

The management of syndactyly in Apert syndrome involves a multidisciplinary approach, incorporating surgical intervention to enhance hand function and aesthetics. Various surgical techniques are employed to address syndactyly, including but not limited to simple division, flap techniques, skin grafts and use of distraction devices to increase the volume of soft tissues. The selection of the most suitable method depends on the severity and specific characteristics of the syndactyly present in each case.

In our clinical practice, we encountered four cases of Apert syndrome accompanied by syndactyly in the hands. Each case posed unique challenges, demanding individualized approaches to optimize outcomes. Our presentation will elucidate the distinctive features of these cases, discussing the preoperative assessment, surgical strategies employed, postoperative care, and functional outcomes. Through these cases, we aim to contribute valuable insights into the complexities of managing syndactyly in Apert syndrome and highlight the significance of tailored treatment plans to address the diverse presentations encountered

We used a mixed method - distraction device to increase the volume of soft tissues and skin grafting

As a result of the treatment, the function was restored and the visual effect was corrected. We have a case where ten fingers are joined and the child is completely disabled and after our treatment the child has full use of the fingers.

Children with Apert's syndrome are disabled because they have no hand function, and regardless of the method used, it is necessary to treat them in time

A-0916 SLIC LIGAMENTOPLASTY IN ACUTE AND SUBACUTE PERISCAPHOID INSTABILITY

Emmanuel Piguet, Marie Peclard, Jean-Yves Beaulieu
Geneva University Hospital, Geneva, Switzerland

Introduction: The treatment of periscaphoid instability is a therapeutic challenge. Whether in the context of scapholunate or perilunate lesions, numerous repair or reconstruction techniques have been proposed.

The SLIC (scapholunate, intercarpal) ligamentoplasty published in 2017 allows not only reconstruction of the scapholunate complex but also of the entire posterior ligament plane (LT and DIC).

Aim: Our aim was to review all the patient that underwent a SLIC reconstruction in our institution. We present our experience for acute and subacute lesions.

Material & Methods: This is a retrospective review of 26 operated patients (5 women, 21 men) between 2021 and 2023. The average age is 42 years. The minimum follow-up is 3 months with an average follow-up of 13 months (range 3-29). All patients had a scapholunate lesion.

4 patients underwent emergency surgery. 5 patients had a lesion less than 3 months old, 5 patients between 3 and 6 months old and 12 patients had a lesion more than 6 months old.

The patients all benefited from a three-dimensional radiological assessment to look for ligament injuries. The series is two-operator and the review was carried out as part of post-operative follow-up with a clinical and radiological assessment.

Results: 13 patients reported a favorable evolution with total disappearance of pain. 9 patients had residual pain. 3 patients are unsatisfied. One patient underwent midcarpal arthrodesis after 8 months.

Preoperative mobility is: 68° flexion, 69° extension.

Postoperative mobility is: 56° flexion (25-90°), 62° extension (30-85°). The preoperative strength was 28kg compared to 35kg postoperatively.

Radiologically, we found preoperatively, an average SL diastasis of 3mm, an SL angle of 63° and an RL angle of 5.7°. The posteroradioscaphoid angle was 113°.

Postoperatively we found a diastasis of 2.5mm, an SL angle of 59° and an RL angle of 5.6°.

Conclusions: Patients treated with SLIC acutely in the context of periscaphoid instability, particularly for perilunate dislocations, present a satisfactory outcome. Our results are comparable to published series.

The diastasis and the increase in the SL angle following pin removal are not correlated with an unfavorable clinical outcome.

In conclusion, SLIC intercarpal ligamentoplasty is a valid technique in the management of acute, subacute and chronic SL dissociation, which gives superior results in terms of pain and mobility than historical techniques.

A-0917 CLINICAL OUTCOMES FOR LINKED FIXATION OF DISTAL HUMERUS FRACTURES: A PRELIMINARY REPORT

John Heifner[1], Scott Sandilands[2], Luis Bolano[3], Edgar Araiza[4], Deana Mercer[5], Francisco Rubio[6]
[1]Miami Orthopaedic Research Foundation; [2]HCA Hospitals; [3]Three Gables; [4]Methodist Hospital; [5]University of New Mexico; [6]Miami Bone and Joint Institute

Introduction: O'Driscoll popularized the principles of linked column fixation for distal humerus fractures. Currently "screw interdigitation" is the common technique intended to link the distal humerus columns. Despite the linked column concept being widely accepted, there are few reported techniques intended to accomplish this goal. A novel device was designed based on the principles of linked columns. An interlocking beam is used to connect the medial and lateral plates, creating a unified fixed angle construct.
Aim: Our primary objective was to report clinical outcomes across multiple institutions for a linking beam used in distal humerus fracture fixation. Secondarily, we aimed to determine whether plate configuration or fracture pattern impacted outcomes.
Material & Methods: A retrospective series was collected from five institutions for the TiBeam™ (Skeletal Dynamics, Miami, Florida, USA) with a minimum follow-up of six months. Acute and chronic treatment of distal humerus fracture patterns were included for analysis. Parallel and orthogonal plate configurations were included.
Results: A total of 32 cases were gathered with a mean patient age of 42 years. The mean follow up was 22 months; 71% were AO type C fractures, and 62% were parallel plate constructs. The mean Mayo Elbow Performance Score was 81 and the mean Disabilities of the Arm, Shoulder, and Hand score was 27. The mean rate of revision was 6.2% (2/32). Heterotopic ossification occurred in 21% of cases and transient ulnar nerve symptoms in 16% of cases.
Conclusions: Short term results for linked fixation of the distal humerus demonstrate satisfactory outcomes with low rates of revision. We attribute these findings to unique characteristics of the linking beam including improved resistance to cantilever bending and robust compression within the articular segment. Linked fixation of distal humerus fracture is often described as an arch configuration. However, a beam may be a more appropriate description. Engineering principles provide a basis for understanding distal humerus fixation constructs. An arch spans an opening between two columns and resists downwardly directed loads. When applied to the distal humerus, downwardly directed loads are axial loads. A beam is utilized to resist multi-directional loads. Compared to an arch, a beam has more capacity to resist rotatory and anteroposterior loads which comprise a large proportion of the stabilizing requirement of distal humerus repair constructs.

A-0918 A CASE REPORT OF REVERSE FLOW OF SPBRA FREE FLAP

Fang LI, Joyce Tie Lin, Duncan Angus McGrouther
Singapore General Hospital, Singapore, Singapore

Introduction: Orbay reported a reverse-flow SPBRA island flap. Based on the same principles, we designed a reverse-flow SPBRA free flap to resurface a middle finger pulp defect. The vessel size was 0.7mm which is suitable for microsurgical repair with Ethilon 11.0.
Aim: to introduce a new way to harvest free thenar flap which is based on reverse flow of SPBRA
Material & Methods: We would like to report an alternative way to harvest the free thenar flap, which is based on reverse flow of SPBRA that connects to the superficial palmar arch. This was used to resurface a middle finger pulp defect.
A 41 year old, right handed male construction worker sustained a crush injury by a heavy metal structure to his left middle finger during his work, resulting in left middle finger crush injury. The pulp was not viable and was severely crushed.

Bone was exposed, but the flexor and extensor tendon insertion were still intact, and 6 mm of nailbed was preserved. The estimated defect involved the entire pulp.
Results: The surgery was done in Emergency operating theatre under general anaesthesia. Veins were identified using AccuVein before surgery. Post debridement, the soft tissue defect was 2x3 cm, and a corresponding 2x3 cm free thenar flap was designed based on one branch from superficial palmar arch which connect with SPBRA.
End to end coaptation was done using Ethilon 11-0, and one vein was coapted to dorsocentral vein over dorsal middle phalanx of middle finger. The flap immediately pinked up and was well perfused post coaptation. The donor site over the palmar aspect was primarily sutured. Anastomosis of artery was covered with subcutaneous tissue and dressed with mepitel. It took us seven hours to complete the operation. The middle finger along with the wrist was immobilized (five days) to reduce postoperative pain and to help with initial wound healing. There was a small raw area over the arterial anastomosis which healed with dressings. The patient subsequently underwent flap debulking two months after the initial operation. He recovered well and there were no complications.
Conclusions: Reverse flow SPBRA based free thenar flap give us more options to choose recipient vessel, which is not reported before.
The finger has smaller scar and contour is nicer.

A-0919 ADDRESSING THE CENTRAL BAND IN ACUTE AND CHRONIC ESSEX LOPRESTI INJURY

John Heifner[1], Gustavo Lacau[2], Deana Mercer[3], Greg Bain[4], Jorge Orbay[2]
[1]Miami Orthopedic Research Foundation, [2]Miami Bone and Joint Institute, [3]University of New Mexico, [4]Flinders University and Medical Centre

Introduction: Although the central band (CB) is increasingly understood, acute and chronic treatment of Essex Lopresti injury (ELI) rarely involve the CB. Restoration of the bony and ligamentous longitudinal stabilizers - the radial head (RH) and CB - is imperative to minimize the risk of sequelae and chronic dysfunction. A disrupted CB renders the forearm unstable during rotation and the loss of load distribution may yield excessive radiocapitellar loads which predispose to arthrosis. Loss of the buttressing capacity of the RH leads to increased reliance on the CB to prevent proximal migration of the radius. Chronicity leads to attrition of the CB and proximal migration of the radius with consequential positive ulnar variance at the wrist. Historically, treatment of EL consisted of methods to distally address the radioulnar relationship. This may transiently reduce pain, but it does not address the underlying pathology. Almost invariably, these cases suffer recurrence due to further attenuation of the CB.
Aim: Our objective was the report outcomes for acute and chronic treatment of the central band in Essex Lopresti injury.
Material & Methods: A retrospective series from two institutions were collected for acute and chronic management of the CB in ELI. A minimum follow-up of six months was required.
Results: A total of seven cases were collected at a mean follow up of 16 months. The mean Disabilities of the Arm, Shoulder, and Hand score was 13.2, and the mean Mayo Elbow Performance Score was 92. Revision surgery was performed in zero cases.
Conclusions: The surgeon must be acutely aware that despite fixation or replacement of the RH, CB repair may still be indicated. We have an increased index of suspicion for CB disruption in cases with a highly comminuted RH fracture and apparent proximal translation of the radius shaft fragment. We colloquially refer to this as a "squashed radial head". In cases of RH fracture, we routinely order radiography of the ipsilateral wrist. If the wrist is ulnar positive, radiography of the contralateral wrist is used to determine the native radioulnar relationship. Thus, a true posteroanterior view of both

wrists is a critical factor of the clinical assessment. Acutely, we address the CB in the presence of a "squashed" radial head fracture and greater than 2-3mm of ulnar positivity compared to the contralateral side. Treatment of the RH and CB obviates the need for DRUJ treatment. The first step is addressing the CB which restores length and stability, Secondly, RH fixation or arthroplasty restores bony stability. Following these steps, the DRUJ is anatomically reapproximated and repair of the TFCC is rarely necessary. Chronically, reconstruction of the CB is imperative to reduce the risk of recurrent collapse. An ulnar shortening osteotomy may be indicated in cases with greater magnitudes of ulnar positive variance. However, an ulnar shortening osteotomy is not done in isolation. The RH and CB must be addressed to prevent recurrent proximal migration of the radius.

A-0920 HOW TO FACILITATE THE SELECTION OF THE RECEIVING FASCICLES OF THE ULNAR NERVE DURING NERVE TRANSFERS? THE VASA NERVORUM AS AN ANATOMICAL LANDMARK

Joaquin Calisto[1,2,3], Augusto Garrido[1], Mikaela Vittori[1], Daniel Wolff[3]
[1]Departamento de Anatomía, Facultad de Medicina UdelaR; [2]Cátedra de Cirugía Plástica Reparadora y Estética, Hospital de Clínicas, UdelaR; [3]Servicio de Cirugía Plástica y Microcirugía, Hospital Pasteur

Introduction: To recover the function of the intrinsic muscles in ulnar nerve injury, transfers of the median nerve to the ulnar nerve are described, we highlight the transfer of the anterior interosseous nerve to the motor fascicle of the ulnar nerve in the forearm. Successful muscle reinnervation is achieved only when the donor nerve axons are correctly wired to the appropriate targets.
Aim: We aimed to identify the presence or absence of the vasa nervorum and its topography between the motor and sensory fascicles of the ulnar nerve, in order to validate it as an anatomical landmark in nerve transfer surgery.
Material & Methods: A descriptive, observational, transversal study was performed in 2022. Twenty upper limbs fixated with formaldehyde, intravascular injection with coloured latex was performed and then were dissected using the approach described by Mackinnon for Supercharge's technique. Two samples from ulnar nerves were recovered and processed for histological study with hematoxylin eosin technique.
We identified the presence or absence of the vasa nervorum and its topography between the ulnar nerve motor and sensitive fascicles.
Results: Ulnar nerve's vasa nervorum presence between its motor and sensitive branches was verified in 100% of the cases. A large unique vessel was identified in the histological samples, compatible with the macroscopic findings.
Conclusions: The vasa nervorum between the motor and sensory fascicles of the ulnar nerve is a constant structure that constitutes a valid landmark for interfascicular dissection in nerve transfer surgery.

A-0921 VALIDATION OF NEW ARTHROSCOPIC CLASSIFICATION OF TFCC INJURIES

Toshiyasu Nakamura[1]
[1]International University of Health and Welfare, Tokyo, Japan

Introduction: We introduced new classification of TFCC lesion according to the findings of the radiocarpal joint (RCJ) arthroscopy into Class 0 to 4 based on the site of the tear on the fibrocartilage area and the findings of the distal radioulnar joint (DRUJ) arthroscopy into stage 0 to stage 4 according to the condition of the DRUJ, especially it of the radioulnar ligament (RUL).

Aim: We validated the classification system to the TFCC injury cases since 2014.
Material & Methods: Since July 2014 to August 2019 (5 years 2 months period), there were 722 wrists of 716 cases of TFCC injuries who underwent surgical treatment by single surgeon and who all had RCJ and DRUJ arthroscopy. There were 398 males and 318 females. Right wrists were 425, left 301 and 6 bilateral, with an average age of 40 (range: 10-79). We classified TFCC lesions into the new classification system with RCJ and DRUJ arthroscopic findings. The details of TFCC lesions were evaluated, ability ratio of classification was calculated.
Results: In RCJ arthroscopy, all TFCC lesions were classified into Class 0 (intact) 68, Class 1 (intra-disc tear) 71, Class 2 (radial border tear) 14, Class 3 (peripheral tear) 551, Class 4 (degenerative tear) 170. The double lesion was found in 148. In DRUJ arthroscopy, fovea lesion could not be seen in 5 wrists, while in other wrists, there were 385 Stage 0 (intact), 23 Stage 1 (slit tear), 39 Stage 2 (partial RUL tear), 90 Stage 3 (complete RUL tear), 180 Stage 4 (degenerative). Single lesion (only one lesion) was found in 374 (52%), while the double lesion was 282 (39%), and triple lesion was found in 66 wrists (9%). Evaluation ratio of the classification was 99.3% (711 wrists), while impossible to be classified was in 5 wrist (0.7%) in whom DRUJ arthroscopy was not possible.
Conclusions: The new arthroscopic classification system based on the RCJ and DRUJ arthroscopic findings worked well with excellent evaluation ratio of 99.3%.

A-0922 PATIENT SPECIFIC TITANIUM PLATES IN TREATING ACUTE DISTAL RADIUS FRACTURES

Bas M Derksen, Niels W L Schep
Maasstad Ziekenhuis Rotterdam

Introduction: Treating complex malunions of the distal radius fractures (DRFs) with patient specific implants (PSI) is a well described and established technique. However, using PSIs for acute DRFs is rarely described .
Aim: In this feasibility study we describe a case series using a custom made, 3D printed titanium plates for the surgical treatment of acute distal radius fractures. Our aim was to assess the logistics and intra-operative feasibility of this technique , as well as the surgical outcome.
Material and Methods: The non-injured side served as reference for preoperative planning. During this planning the fracture was virtually reduced. Next a patient specific aiming device and plate were designed. Intra-operatively with the help of the aiming device the proximal holes for the shaft were drilled. Each volar plate had two oval and two round holes accommodating the shaft. In case of remaining shortening the oval holes could be used to accomplish additional length. Next the fracture was reduced and the plate was positioned. When the distal part was not anatomical the fragments were brought to the plate with a Kapandji technique or a lag screw through the ulnar distal hole of the volar plate. Five consecutive patients with complex distal radius fractures were treated with custom made hardware. According to the AO classification one was a type B3 and four were C3.
Results: Five patients were included with a median age of 68 There were four women. The median time between presentation at the emergency department until surgery was 11.2 days. Median surgery time was 52 minutes . Anatomical reconstruction was successfully achieved in all five cases, with fixation of all relevant fracture fragments. All patients were treated with a volar plate. In one patient an additional dorsal plate to fix the dorsal ulnar corner was used. All fractures united. After a median follow up of 6 months the PRWE score was 22.
Conclusions: In distal radius fractures, custom made, patient specific implants can be used safely to aid in achieving anatomical reduction and fixation.

A-0923 EXPLAINING THE KAPPA PARADOX IN FRACTURE CLASSIFICATION RELIABILITY

Bas M Derksen, Wendy Bruinsma, J. Carel Goslings, Niels W. L. Schep
Maasstad ziekenhuis Rotterdam

Objective: Observer reliability studies for fracture classification systems evaluate agreement using Cohen's kappa as well as absolute agreement as outcome measures. Cohen's Kappa is a chance-corrected measure of agreement and can range between 0 (no agreement) and 1 (perfect agreement). Absolute agreement is the percentage of times observers agree on the matter they have to rate. Some studies report a high absolute agreement, but a relatively low kappa value, which is contra-intuitive. This phenomenon is called the Kappa Paradox. The objective of this article is to explain the statistical phenomenon of the Kappa Paradox and to help researchers to prevent this issue.
Explanation: The kappa statistic corrects for the difference between the observed agreement (o) and the agreement expected by chance (c). The kappa statistic is denoted as (o – c)/(1-c). The higher 'c' is, the lower the kappa coefficient will be. However, the agreement expected by chance is influenced by the distribution of positive and negative cases displayed to the observers. When there is a high amount of only positive or only negative cases, the observed agreement based on chance will increase, in turn lowering the Kappa value without influencing the absolute agreement.
In a published interobserver study, AO classifications from the Swedish Federal Register were compared to classification performed by an expert observer group. Low kappa values were found along with high absolute agreement. Analysis of the case distribution showed vastly uneven distribution along the different AO fracture types. This imbalance in case and answer distribution rendered lower kappa values. Balancing the case distribution demonstrates this effect.
Conclusion: Kappa values are influenced by case and answer distribution. We would advise investigators to balance their case distributions to ensure that the amount of agreement by chance is as low as possible.

A-0924 THE EFFECTS ON HYPOXIA TO INDUCE DUPUYTREN DISEASE BY DIRECT MEANS OR BY INDIRECT MEANS USING PERIPHERAL SENSORY NEURONS

Aoife O'Brien[1,2], Andrew Stevenson[2], Lucy Barrett[2], Nicole Hortin[2], Fabio Quondamatteo[1], Fiona Wood[2], Mark Fear[2]
[1]Royal College of Surgeons Ireland, Dublin, Ireland; [2]Burn Injury Research Unit (BIRU), School of Biomedical Sciences, University of Western Australia, Perth, Australia

Introduction: Dupuytren's disease (DD) is a fibro-proliferative disorder of unknown aetiology. It affects the palm and is characterised by progressive fibrosis, thickening of palmar fascia, and excess collagen deposition. Patients present with nodules, progressing to the cords, causing flexion deformity in ~50% and resulting in loss of hand function. Hypoxia is an example of cell stress when an initial tissue injury causes damage to blood vessels, leading to an interrupted blood flow, thus leading to acute tissue hypoxia, (Forrester et al., 2013; Xi Qin, 2021). In a paper on vascular endothelial growth factor (VEGF) and HIF-1α in DD, they discussed how both were present on DD nodules, and hypothesised that hypoxia may have a role in the pathophysiology of DD.(Holzer et al., 2013).
Aim: To test whether hypoxia by direct means, on fibroblasts, or by indirect means, by exposing peripheral sensory neurons to hypoxia, induces Dupuytren's disease like changes in previously normal fibroblasts by testing for the downregulation of WNT4 in the fibroblasts.
Material & Methods: The link was tested between neurons and DD cells and their interaction, by exposing peripheral sensory neurons, and DD control fibroblast cells and exposing them to each other and to hypoxic conditions.
Results: The study of the effect of hypoxia on fibroblast cells alone showed that there is minimal change when comparing

the different samples for WNT4). by neural crest cells. However, different media type, such as neural crest cell conditioned media has an effect on the marker for fibrosis on fibroblast cells, however this is seen in both treated and untreated media, thus it is highly unlikely to be a specific effect mediated unused fibroblast media, unused neural cell media, treated (hypoxia) neural cell media, and treated (non hypoxic) neural cell media have different effects on WNT4 in fibroblasts
Conclusions: Hypoxias effects alone on fibroblast cells lead to minimal change when comparing the samples. However, exposure to hypoxic peripheral sensory neuron media leads to a change in fibroblasts, which one can hypothesis that hypoxic peripheral sensory neuronal cells release a substance which causes an effect on WNT4 in fibroblasts, thus inducing DD like changes in normal samples.

A-0925 TREATMENT OF CHRONIC ESSEX-LOPRESTI LESION. LITERATURE REVIEW AND DESCRIPTION OF A CLINICAL CASE

Raquel Maroto - Rodríguez[1], Miguel Pérez Abad[1,2], Maria Tibau Alberdi[1], Andrés Pérez Prieto[1]
[1]Hospital de Mataró, Consorci Sanitari del Maresme (Mataró, Barcelona, Spain); [2]Institut Kaplan (Barcelona, Spain)

Introduction: The forearm is considered a single joint involving the relationship between ulna and radius. It is composed of proximal radioulnar joint (PRUJ), interosseous membrane (IOM) with the medial band as a prominent component and distal radioulnar joint (DRUJ), which encompasses the triangular fibrocartilage complex (TFCC). The radial head plays the primary role as longitudinal stabiliser of the forearm, while the IOM and TFCC act as secondary stabilisers. Essex-Lopresti lesion (ELL) is defined as a complex injury caused by axial loading of the forearm, involving longitudinal radioulnar dissociation and loss of stability due to rupture of the IOM, fracture of the radial head and DRUJ injury. Diagnosis can be challenging in the acute setting, requiring high index of suspicion. Early treatment can lead to satisfactory outcomes, but chronic injuries present challenges, as treatment options are limited and outcomes are controversial.
Aim: Describe chronic ELL, review literature and share our treatment experience.
Material&Methods: Thirty-year-old male patient who suffered a motorbike traffic accident in 2019 with fall and pain in the right elbow and wrist. At another centre, he was diagnosed with a comminuted fracture of the radial head, which was excised.
He arrived to our centre in June 2023, on examination he presented a dorsal deformity corresponding to the distal ulna which was reductable but was unstable. He had pain in the wrist with elbow extension counter-resistance in pronation. No pain and full range of motion (ROM) in flexoextension and pronosupination in the elbow.
Complementary tests (X-ray, CTScan and MRI) revealed positive ulnar variant, dorsal subluxation of the ulna, intact IOM and partial lesion of the TFCC.
Results: Surgical intervention was performed. The procedure included an examination under anaesthesia and fluoroscopic assessment to examine elbow and DRUJ stability and ROM and longitudinal instability of the forearm by longitudinal traction, where no instability was observed.
The approach to the mid-distal third of the ulna was done between extensor carpi ulnaris (ECU) and flexor carpi ulnaris (FCU). After preoperative planning, a 10 mm shortening osteotomy was performed and fixed with a plate and screws (FreeFix® SKDynamics). After a correct X-ray, the arthroscopic procedure was performed.
Through portals 3-4 and 6R, detachment of the TFCC was observed in its most dorsal area. The reinsertion was performed using a modification of Mantovani technique. Final stability was checked and a Münster splint was applied. Postoperative follow-up included specific guidelines: wrist flexoextension from the fourth postoperative week, free pronosupination from the sixth week and weight bearing and strength training from 7-8 weeks postoperatively.

At 3 months of follow-up, no pain in the elbow or wrist, limitated ROM that continues working in rehabilitation, currently a dorsal/volar flexion of 60º/60º, and a deficit of supination/ pronation of 30º/10º.
Conclusions: Chronic ELL presents a significant challenge. Therapeutic possibilities include radial head arthroplasty, allograft reconstruction of the IOM, arthroscopy for TFCC and radioulnar synostosis as a last-resort solution. In our experience ulna shortening is a good option in chronic cases in where there is no longitudinal instability.

A-0926 LATE SPIN TRANSFER IN TETRAPLEGIA: CASE SERIES

Renata Paulos, Emygdio de Paula, Fernando Pontes
Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, Brazil

Introduction: Nerve transfers have been increasingly employed in treating the upper limbs of tetraplegic patients. Unlike peripheral nerve injuries where the regenerating axon must reach the target muscle within 12 to 18 months after injury, it is known that in spinal cord injuries, some patients are candidates for surgery even several years after the lesion
Aim: To evaluate cases of late supinator to posterior interosseous nerve (SPIN) transfers in tetraplegic patients.
Material & Methods: Between january 2018 and march 2023, 50 cases of SPIN transfers were performed on patients with over 18 months of injury. As part of the preoperative assessment to determine the patient's candidacy for surgery, apart from the physical examination, we observed muscle activation using FES (Functional Electrical Stimulation), and the current intensity was recorded.
Twenty-nine patients underwent surgery, comprising 4 women and 25 men. In 8 cases, the surgery was unilateral. Following the International Classification for Surgery of the Hand in Tetraplegia (ICSHT), we had patients classified from group 0 to group 5.
Results: Three patients were lost to follow-up. Among the 44 evaluated transfers, concerning finger extension strenth, all cases except one achieved at least anti-gravity extension (M>=3), comprising 24 cases with M4 and 19 cases with M3. Regarding the thumb, 36 attained strength of m>=3 (17 M4, 19 M3), while 8 reached M2. No statistical significant association was found between the intensity of the current used in FES during the preoperative assessment and the strength (MCR) of finger and thumb extension obtained postoperatively.
The average age of the patients was 32 years (ranging from 20 to 64).
The average time interval between trauma and surgery was 51 months, ranging from 19 to 137. We did not observe a relationship between the time elapsed since the accident and the surgical outcome.
Conclusions: Late spin nerve transfer is a feasible surgery that can yield favorable outcomes. The preoperative evaluation employed is simple and incurs no additional costs. Among the evaluated cases, no statistical significant correlation was observed between the intensity of the current used in the preoperative Functional Electrical Stimulation (FES) assessment and the achieved finger extension strength in the postoperative period.

A-0927 THE EVOLUTION OF THE HAND TRAUMA SERVICE AT THE PULVERTAFT HAND CENTRE

L Wright, S Owdziej, J Arrowsmith, N Johnson
Pulvertaft Hand Centre

Introduction: Here we present our retrospective review of our hand trauma service and highlight how the case-mix has evolved at the Pulvertaft Hand Centre over the last 16 years

Aim: To review the evolution of the hand trauma service in a tertiary referral unit
Material & Methods: Audits of hand trauma from 2007, 2011, 2014, 2018 and 2022 were retrospectively reviewed. Data were collected on all hand trauma cases operated on within the audited month and analysed using Excel.
Results: The number of operations being performed has broadly increased (108 in 2007 to 143 in 2022 with general trend towards increasing numbers). The case mix shows that the number of fingertips operated on has doubled. The number of simple lacerations being operated on has also increased. The number of nerve and tendon injuries as well as hand fractures being operated on have not increased in the same time frame. Mean age of patients and sex have remained relatively unchanged.
Geography – the number of cases being managed from satellite units has increased – almost half the patients being treated most recently live in a region outside of Derbyshire.
Conclusions: There has been a notable increase in number of 'simple' cases being operated on in our unit. The reasons for this may include a lower threshold of satellite units to refer to our centre or a more general trend towards being surgically interventional. To accommodate this increasing need, we discuss strategies employed in our unit including utilising a procedure room on an ad-hoc basis, increasing use of telemedicine and education within satellite units to ensure optimal use of the finite health care resources available.

A-0928 AUTOMATIC WORKFLOW FOR ANALYSING ULNAR IMPACTION IN HEALTHY VOLUNTEERS DURING FULL RANGE OF WRIST MOTION USING 4DCT

Jesse Wolters[1,2], Erin Teule[1], Stefan Hummelink[1], Nico Verdonschot[1], Brigitte van der Heijden[1]
[1]Radboud University Medical Centre; [2]University of Twente

Introduction: Ulnar sided wrist pain is often called the headache of wrist complaints due to the challenge to find the cause of the pain. Despite the long-standing awareness of the relationship between (dynamic) ulnar plus variance and ulnar wrist pain (called ulnar impaction syndrome), objective diagnosis is difficult. Current estimation of ulnar variance on conventional radiographs suffers from subjectivity and is influenced by radiation angle, position of the wrist and overprojection. A novel, dynamic imaging modality is four-dimensional computed tomography (4DCT), which allows for quantification of ulnar impaction kinematics during full range of wrist motion. To gain insights into the kinematics of the 3D wrist , an automatic workflow analysing 3D parameters is proposed. This workflow is applied to 4DCT data of healthy volunteers to obtain reference data.
Methods: Static and dynamic CT data was acquired of 31 healthy volunteers. Dynamic CT was acquired during radial deviation (RD), ulnar deviation (UD), flexion, extension, pronation and supination of the wrist, and clenching of the fist (CF) followed by image reconstruction at a frequency of 10 frames per second. Scans were automatically segmented and bones from the static scan were subsequently registered to all dynamic positions. To quantify ulnar impaction, two parameters were automatically determined: 3D ulnar variance (defined as the relative height difference between the most distal point of the ulnar articular surface and the most distal point of the radial sigmoid notch) and ulnar proximity (defined as the smallest distance between the lunate and triquetrum to the ulna). results are presented as median and interquartile range and the points of closest proximity are mapped on the respective bones.
Results: 4DCT data of all 31 volunteers was analysed to acquire normal values and videos of separate volunteers were created to associate findings with the visual kinematics of the ulna. The median 3D ulnar variance was found to be -0.21mm [-1.11mm–0.42mm] in neutral position and increased during UD, flexion and CF, while it decreased in the first 40 degrees of extension, after which again an increase was observed. Minimal changes in 3D ulnar variance were observed during

RD. Ulnar proximity to the lunate was smallest during extension (2.67mm [2.02mm–3.19mm]); decreased from UD to neutral position; stayed constant during RD and minimally increased from extension to flexion. The ulnar proximity to the triquetrum was (3.76mm [2.84mm–4.10mm]); increased from UD to RD and decreased during extension as well as flexion. Currently newly acquired data of the pronation supination wrist movement in healthy volunteers is being analysed.
Conclusions: A novel automatic method to quantify ulnar impaction during full range of motion of healthy volunteers was successfully developed which provided reference values of ulnar kinematics. The developed parameters might provide new insight into the kinematics of the ulnar side of the wrist, which may aid in the diagnostics of ulnar sided wrist pain in patients.

A-0929 SAUVE-KAPANDJI VERSUS RADIO-LUNATE ARTHRODESIS IN TREATMENT OF MADELUNG DEFORMITY. A CASE REPORT WITH A LONG FOLLOW UP

Piotr Koschel, Leszek Kaczmarek
Department and Clinic of Traumatology, Orthopedics, and Hand Surgery, Poznan University of Medical Sciences, ORSK named after W. Dega, Poznań, Ulica 28 Czerwca 1956 r. 135/147, 61-545 Poznań, Poland

Introduction: Madelung deformity consists of excessive ulnar and palmar angulation of the distal radius it may also involve the radiocapitellar joint and the sagittal bow of the radius. The deformation is mostly bilateral and is very often associated with Leri-Weil syndrome. Commonly the disease becomes clinically apparent in young adolescents with the wrist deformity, pain and limited range of movement, in case of a Leri-Weil syndrome also mesomelia and growth insufficiency are present. There are multiple options for operative treatment. We present a case report of a patient treated with a ulnar head resection and finally radio-lunate arthrodesis on the left side and Sauve-Kapandji procedure on the right side.
Aim: We report an adolescent patient with Madelung deformity inflicting both forearms with a long follow up of 3 years. One side was treated with resection of the ulnar head and radio-lunate arthrodesis(RLa), the second with a Sauve-Kapandji procedure(SKp).
Material & Methods: We retrospectively assessed a patient treated in our clinic in 2019 and 2020. The patient required treatment due to worsening pain in both wrists. Initially, due to more severe pain, the left hand was treated. A resection of the ulnar head was performed, resulting in a reduction of symptoms. However, persistent pain led to the decision to perform a radio-lunate arthrodesis. Subsequently, symptoms appeared in the contralateral hand, prompting operative intervention following the Sauve Kapandji procedure. Three years post-surgery, the patient was called for a follow-up visit. The assessment included measuring the range of motion using a goniometer, grip strength with a dynamometer, and evaluating follow-up wrist X-rays in lateral and posteroanterior views. The patient has also been evaluated with PRWE and DASH questionnaires.
Results: Three years post-operation, the patient reported the absence of rest pain and occasional pain during loading. Better strength on the right side was observed, with thumb flexor strength at 110%, thumb adduction at 150%, and overall grip strength at 123% compared to the contralateral side. With the Sauve Kapandji procedure, a greater range of dorsiflexion was achieved at 70 degrees compared to 55 degrees on the opposite side. Additionally, a similar range of palmar flexion at the wrist (0-35 degrees) was observed on both sides. The patient scored 5.83 points on the DASH scale, 9.5 points in the left hand, and 8.5 points in the right hand on the PRWE scale.
Conclusions: In the case of this patient, better outcomes were achieved by employing the Sauve-Kapandji procedure. This is confirmed by a better range of motion, increased strength and lesser pain during limb loading. The patient's right-handedness may have influenced the results.

A-0930 WAR RELATED HAND INJURIES - SINGLE CENTRE EXPERIENCE

Vadim Nefjodov, Martins Kapickis, Ervins Lavrinovics, Martins Tecis, Uldis Krustins, Janis Krustins, Aivars Tihonovs, Kalvis Pastars
Microsurgery Centre of Latvia

Introduction: Since the war has started in Ukraine, many heavily injured soldiers and civilians have been brought to Latvia for medical treatment. The upper extremities are amongst the most commonly injured body parts. Not only musculoskeletal organs but also sensor innervation have to be restored to restore the functionality of severed hands.
Material & Methods: All patients from the Ukrainian warzone have been treated in our department since February 2022. Patients with injuries from the elbow and distally were summarized.
Results: From February 2022 until November 2023 14 injured patients were treated. All males, ranged from 23 to 50 years. Documented defects - extensor defects in 5 patients, flexor defects in 4 patients, tendon contracture in 5 patients, nerve defects in 10 patients, forearm and wrist bone pseudarthrosis in 4 patients, soft tissue defects in 3 patients. 13 patients were treated surgically. Performed manipulations - microvascular flap transfer in 5 patients, tenolysis in 3 patients, neurolysis in 2 patients, nerve graft transfers in 6 patients, tendon graft transfers in 3 patients, osteosynthesis with grafts/flaps in 4 patients. No major postoperative complications were experienced.
Conclusions: Hand injuries acquired in the warzone are severe and cause tissue defects. Fully fledged reconstruction requires complicated surgeries with tissue transfers.

A-0931 V-SHAPE DORSAL APPROACH FOR CARPAL BONE EXPOSURE

Vadim Nefjodov[1], Enrico Carita[2], Mara Laterza[2], Piergiuseppe Perazzini[2], Alberto Donadelli[2]
[1]Microsurgery Centre of Latvia; [2]Clinica San Francesco, Verona, Italy

Introduction: Wide exposure of the carpal bones is required to successfully perform various procedures. Many variations of dorsal capsulotomies have been described in the literature described – longitudinal, oblique, transverse, L-shapes, and T-shaped. Most recent techniques for exposure are described based on a deeper and more accurate understanding of the neurovascular and ligamentous anatomy of the wrist.
Aim: To develop and test a novel technique for dorsal wrist capsulotomy.
Material & Methods: A V-shaped capsulotomy has been proposed and used in clinical practice since 2019. Patient data and performed manipulations were summarized. The V-shaped capsulotomy is performed with the proximal tip of the incision placed in the medium of the dorsal radiocarpal ligament, the ulnar part of the incision is marked along the dorsal radiocarpal ligament until the border of the dorsal intercarpal ligament. On the radial aspect, the incision is marked at around 150° and is continued distally until the dorsal intercarpal ligament following distal radius inclination and 4 mm distal to proximal insertion to wrist capsule.
Results: The V-shaped capsulotomy has been used for 72 patients (mean age 52 years, male/female ratio 1.5/1). The following procedures have been performed - proximal row carpectomy in 11 patients, 4-corner fusion in 20 patients, scapho-lunate ligament reconstruction in 34 patients, and other intercarpal fusions in 7 patients. No short-term or long-term complications have been observed in patients.
Conclusions: The dorsal V-shaped capsulotomy technique described in this study meets all requirements for a universal dorsal approach to carpal bones. It is convenient to perform any procedures with carpal bones, including ligament reconstruction, fusions, arthroplasties and carpectomies The only limit of this distal based flap is the necessity to interrupt PIN so it cannot be considered a nerve sparing capsulotomy that could be important in treatment of instabilities.

A-0933 THE PENN CRITERIA: A DIAGNOSTIC ALGORITHM IN THE DETECTION OF ACRAL MELANOMA

John Keaney[1], Mary Ellen McMahon[2], Paul Sullivan[2], Safwat Ibrahim[2], Kevin Cahill[2], Fiachra Martin[2], Roisin Dolan[2]
[1]Royal College of Surgeons in Ireland, Dublin, Ireland; [2]Department of Plastic and Reconstructive Surgery, Beaumont Hospital, Dublin, Ireland

Introduction: Acral melanoma (AM) is a rare low mutational burden sub-type of melanoma, prevalent in the palms, soles and nail matrix in non-Caucasians and is associated with poor prognosis.
Aim: The aim of this study was to assess prevalence of this aggressive sub-type of melanoma in an Irish cohort and identify patterns of disease and treatment factors distinct to other sub-types of melanoma.
Material & Methods: We performed a retrospective review of consecutively presenting patients to 2 tertiary referral cancer centres for the management of melanoma. Patients diagnosed with melanoma treated between 2017 and 2023 at Beaumont Hospital and St Vincent's University Hospital Groups, Dublin were identified from a prospectively maintained melanoma database. Patient medical records, pathology and radiology were reviewed for data extraction. Analysis of histopathological characteristics, treatment processes and outcomes was undertaken for patients with AM and then compared to non-acral melanomas (NAM). Descriptive statistics, data distribution and comparison between groups was performed using SPSS Version 28 software.
Results: A total of 33 AM and 350 NAM patients met the inclusion criteria. The majority of AM patients were acral lentiginous sub-type melanomas (63.64%) followed by nodular (18.18%). The average breslow's thickness of AM was 3.39mm (range 0.65mm to 8mm) compared with 2.74mm (range 0.5mm to 9.5mm) for NAM ($p=0.038$). T stage greater than or equal to 3 was noted in 72.72% of AM presentations. A positive sentinel lymph node biopsy was identified in 48.28% of AM compared with 15.80% NAM ($p=0.01$). Molecular mutation analysis was detected in 40% with BRAF being most prevalent (18.18%). Over 50% of the cohort presented 6 months after the lesion was first detected with 10% having seen >3 physicians until an accurate diagnosis was made.
Conclusions: Diagnosis of AM is rare in Ireland and its atypical presentation has led to diagnoses at more advanced stages. AM is then more likely to require aggressive surgical management resulting in digital amputations and adjuvant immunotherapy with significant morbidity to the patient. We have developed the PENN criteria as distinct from the ABCDE of melanoma to help outline key characteristics to improve recognition of AM at earlier stages, PENN: Pigmented or non-pigmented, Enlarging, Non-healing lesions of the Nail-bed, palms or soles.

A-0934 DEGENERATED NERVE GRAFTS IN COMPLEX NERVE INJURIES - PRELIMINARY RESULTS IN AN ANIMAL MODEL

Philipp Tratnig-Frankl[1], Udo Maierhofer[2], Martin Schmoll[3], Lisa Jöns[1], Homayon Zirak[1], Christopher Festin[2], Vlad Tereshenko[2], Konstantin Bergmeister (2,4), Oskar C. Aszmann (1,2)
[1]Department of Plastic, Reconstructive and Aesthetic Surgery, Medical University of Vienna, Austria; [2]Clinical Laboratory for Bionic Extremity Reconstruction, Department of Plastic, Reconstructive and Aesthetic Surgery, Medical University of Vienna, Austria; [3]Center for Medical Physics and Biomedical Engineering, Medical University of Vienna, Austria; [4]Karl Landsteiner University of Health Sciences, Department of Plastic, Aesthetic and Reconstructive Surgery, University Hospital St. Poelten, Krems, Austria

Introduction: To reconstruct peripheral nerve defects in global plexopathy patients, the sural nerves, the medial brachial, antebrachial and occasionally also the ulnar nerve serve as grafts, despite the primary lesion involving a lower root rupture or avulsion. The current state of research is lacking sufficient knowledge, whether a predegenerated nerve has sufficient regenerative potential, as both the conductive matrix and the reactive Schwann cells have undergone significant changes

in structure and function through injury that may not be ideal to support regenerating axons.
Aim: This animal study thus aims to investigate the potential of degenerated donor nerves in promoting nerve regeneration as compared to standard fresh grafts in the reconstruction of critical nerve defects in an animal model.
Material & Methods: This experimental study involved 35 adult Sprague Dawley rats, which were divided into two groups. The initial surgical procedure created a unilateral two-centimeter defect in the right common peroneal nerve. In the first group, the sural nerve was left intact, while in the second group, it was cut proximally during the same procedure. After a three-week period, the nerve defect was reconstructed using either a fresh or the predegenerated sural nerve. After a six-week follow-up, rats were anesthetized, either for bilateral isometric force measurements of the tibialis anterior muscles (including tetanic force during a maximal evoked contraction (MEC) and maximal twitch force), or for installment of a retrograde fluorescent marker. Following the muscle measurements, the animals were euthanized and histological samples were taken, while animals utilized for nerve labeling continued for another week.
Results: A comparative analysis was conducted between experimental groups, expressing the recovery as a ratio between injured and healthy side. In the fresh graft group, the mean MEC was measured at 9.6% ± 6.9%, compared to 7.6% ± 4.4% in the predegenerated graft. The mean maximum twitch force in the first group was 6.0% ± 3.1% compared to 5.6% ± 3.9% in the second group. The mean weight of the tibialis anterior muscle, comparing the injured to the uninjured side was 34% in the first group and 32% in the second group. All measurements showed no statistical inferiority between the groups. The histological analysis demonstrates axonal ingrowth in both the predegenerated and fresh nerve graft. Analysis of the retrograde labeled motorneurons is still ongoing.
Conclusions: In regards of muscle strength, recovery and muscle weight, the preliminary results show comparable outcomes for predegenerated and fresh nerve grafts. Overall, these results are promising particularly in the context of critical nerve defects involving multiple nerves, as well as plexus injuries, where the use of a degenerated graft often remains the only additional source of graft material.

A-0935 ARTHROSCOPIC DORSAL SCAPHOTRIQUETRAL LIGAMENTOPLASTY FOR DYNAMIC SL AND LT INSTABILITY

Jin-Hyung Im, Taeyang Jang, Joo Yup Lee
The Catholic University of Korea, Seoul, Korea

Introduction: Various techniques have been introduced for treatment of scapholunate and lunotriquetral injuries but they often require a wide dorsal approach with suboptimal results. We hypothesized that an arthroscopic ligamentoplasty representing one linkage system with non-absorbable suture tape and bone anchor is stronger, less invasive and more reproducible than previous techniques.
Aim: The present study describes an all arthroscopic dorsal scaphotriquetral ligamentoplasty that can be implicated separately or simultaneously for SLIL and LTIL injuries with dynamic instability as a single procedure, and the short-term results of it.
Material & Methods: SLIL injury, LTIL injury and combined injury were diagnosed by arthroscopy and the procedure was performed in EWAS Grade 3 instability. Other procedures were performed simultaneously to address other intracarpal problems (i.g; TFCC tear, carpal impaction syndrome, ECU subluxation, carpal ganglion). From April 2020 to December 2022, this procedure was conducted in 152 patients and follow-up was performed over 3, 6 months and 1year after surgery. Range of motion, grip strength, VAS score, modified Mayo wrist score,Quick DASH questionnaire were compared before and after surgery.
Results: 89 Male, 63 Female (mean age: 29.8) were included. 117 SLIL injuries, 22 LTIL injuries, 13 combined injuries were

observed. The mean VAS score improved from 7.4 ± 1.6 (range: 6-9) preoperatively to 1.1 ± 2.3 (range: 0-4) at the final follow-up. The mean strength of hand grip increased from 28.6 ± 9.8 (range: 16-39) kg to 39.5 ± 11.4 (range: 23-52) kg at the final assessment. The mean modified Mayo wrist score improved from 48 ± 11.3 preoperatively (range: 30-64) to 87 ± 11.6 (range: 61-100) at the final follow-up.
Conclusions: With the encouraging short-term outcomes, arthroscopic dorsal scaphotriquetral ligamentoplasty might be an effective surgical technique in improving functional outcomes and reducing pain in patients with SLIL, LTIL and combined injuries with dynamic instability. This procedure could preserve the soft tissues, neurovascular structures, and the secondary dorsal stabilizer, the PIN maintaining the proprioception and prevent postoperative joint fibrosis with accompanying other procedures.

A-0936 FOREARM NONUNION

Martin Czinner (1,2,3), Radek Kebrle[1], Tereza Peterková[1], Karel Pěnička[1]
[1]Hand Surgery Department, Dr. Pírek's Clinic, Mladá Boleslav, Czech Republic; [2]Orthopaedic surgery department, Regional Hospital Liberec, Czech Republic; [3]1st Faculty of Medicine, Charles University

Introduction: Diaphyseal forearm bone nonunion is sometimes difficult to treat due to the biomechanical properties of the forearm bones. Not only does single bone nonunion have to be solved, but also, the length and bone axis in conjunction with the second forearm bone have to be looked at. Anatomic reconstruction, stability and vascularity are essential factors for nonuion healing.
Aim: Material & Methods: The authors are presenting group of 15 patients treated for forearm nonunion from 2020-2023. Post traumatic conservatively treated (3), operated (9) or iatrogenic nonunions after elective diaphyseal osteotomy (3) were aetiological factors.
Results: 13 out of 15 nonunions healed within 3 months. Intramedullary nailing (6), ORIF (6) and ORIF with corrective osteotomy of the other forearm bone (3) was performed. Bone graft was used in 4 cases and 3D preoperative planning was used in 2 case. The two longstanding nonunions (4 and 8 years) were decorticated after 5 months and did not heal within 10 months.
Conclusions: The Authors present different problems of nonunion treatment, show different treatment techniques and discuss preoperative planning as an essential part of the treatment.

A-0937 CONSERVATIVE THERAPY FOR BABIES AND TODDLERS WITH CONGENITAL FLEXION CONTRACTURES

Kinderhandchirurgie, Kinderkrankenhaus Wilhelmstift, Liliencronstraße 130, 22149 Hamburg, Germany
Objectives / Interrogation: Congenital flexion contractures such as thumb-in-palm deformity, camptodactyly or multiple flexion contractures of fingers 2-5 are usually noticeable in infancy due to an altered child's grasping function. This refers to incomplete opening of the entire hand or complete extension of the affected fingers.

The malformation can be made worse by the baby's own weight during crawling and can also be exacerbated by growth. Treatment that begins in infancy is not only important for the child's development; it also leads to success much more quickly and often prevents surgical measures in later childhood.
Methods: After analyzing the severity of the malformation, the explanation and implementation of manual therapy begins. Depending on the findings and the child's age, splint or orthotic therapy is carried out. In most cases, conservative

treatment involves a night splint. Rarely, is a day and night splint required. Depending on the severity, age and growth spurt, new fittings are carried out every 3-6 months. When the child is presented again, the child's development is taken into account, the manual therapy is tailored accordingly and the splint or orthotic fitting is adjusted. In the orthosis, each individual joint is taken into account in its position, the stretching is carried out as much as possible without causing pain and the soft tissue is guided. Due to the high proportion of soft tissue, the base joints in the orthosis in particular must be palpated in order to detect and prevent hyperextension.
Results: and Conclusions: Because the tissue structures are still soft in infancy and toddlerhood, conservative therapy can be more effective. It is possible to achieve good and quick treatment goals. In many cases with completely healthy grasping function. This has proved more successful when the treatment is started in babies and toddlers age.
Keywords: Camptodactyly, thumb in palm deformity, multiple flexion contractures, pediatric orthoses, manual therapy, congenital malformations

A-0938 TOTAL SUBMUSCULAR TRANSPOSITION ACCORDING TO LEARMONTH: THE DESIGNATED TECHNIQUE FOR PATIENTS WITH RECURRENT CUBITAL TUNNEL SYNDROME?

Nienke H.A. Mendelaar[1], Caroline A. Hundepool[1], Liron S. Duraku[2], Alexander Y. Shin[3], J. Michiel Zuidam[1]
[1]Erasmus Medical Centre, Rotterdam, The Netherlands; [2]Amsterdam UMC, Amsterdam, The Netherlands; [3]Mayo Clinic, Rochester, Minnesota, USA

Introduction: The standard approach for the surgical management of primary cubital tunnel syndrome typically involves a simple decompression. However, in recurrent symptoms, alternative strategies such as subfascial, subcutaneous, or total submuscular transposition of the ulnar nerve are recommended. The total submuscular transposition according to Learmonth is posited to offer potential advantages by addressing all conceivable compression points of the ulnar nerve and mitigating adverse dynamic loading and stretching during elbow flexion. The primary goal of this treatment is focused on alleviating pain, acknowledging that enduring issues like sensory loss, muscle weakness, and atrophy may not achieve complete resolution. Despite promising outcomes associated with this technique, its documentation in the existing literature remains limited.
Aim: This study elucidates the Learmonth technique for recurrent cubital tunnel syndrome, substantiated by visual representations and findings from a multicentre case series.
Material & Methods: The Learmonth technique was meticulously documented and executed on a freshly frozen cadaveric arm. The procedure was recorded, and the footage was compiled into an educational demonstration. Additionally, a multicentre case series encompassed patients who underwent submuscular transposition according to Learmonth between 2021 and 2023. Outcome measures included the symptom severity scale of the Boston Carpal Tunnel Questionnaire (BCTQ), Numeric Pain Rating Scale (NRS), patient satisfaction, and return-to-work data at a mean follow-up time of seven months postoperatively.
Results: A total of ten patients underwent total submuscular transposition according to Learmonth with available follow-up data. The mean scores of the symptom severity scale of the BCTQ, at a mean follow-up of seven months postoperative, were 2.39 (0.54 SD). The mean NRS score was 2.6 (2.37 SD). On average, patients returned to work three weeks post-surgery. All patients affirmed their willingness to undergo the procedure again in similar circumstances, and 86% reported being satisfied.
Conclusions: In conclusion, this study provides a comprehensive representation of the Learmonth technique. In addition, the analysis of patient-reported outcome measures supports the efficacy, particularly in providing pain relief,

of total submuscular transposition according to Learmonth as a treatment for recurrent cubital tunnel syndrome. The postoperative outcomes observed in this study highlight the considerable potential of this technique to improve clinical results significantly. The advantages of the Learmonth technique ensure that it should be considered an approach for addressing recurrent cubital tunnel syndrome. These findings warrant further exploration and may pave the way for advancements in managing this condition.

A-0939 CORRECTIVE OSTEOTOMY OF A DIAPHYSEAL RADIUS MALUNION USING 3D CUSTOM GUIDES

Norma Trigo Bermúdez, Miguel Ángel Martínez de la Torre, Anna Rubio Roca, Eva Cases Rodriguez, Inés Mingorance de la Prieta, Enric Cruz Olivé
Hospital General de Granollers , Barcelona, Spain

Introduction: Rotational malalignment is a well-known complication following diaphyseal radius fractures and can be responsible for functional complaints. With the use of derotating osteotomies the initial rotational malalignment can be restored, however, the ideal degree of rotation is often difficult to achieve without proper planification tools. This is where virtual 3D preoperative planning and design of cutting guides with 3D printing becomes useful, achieving better results in terms of surgical accuracy and timing
Aim: To expose a clinical case of a corrective osteotomy for a rotational malalignment following a diaphyseal radius fracture with 3D preoperative planning and custom 3D printed surgical osteotomy guides. The surgical technique, as well as clinical and radiographic outcomes will be reported
Material & Methods: An 18 y/o male patient presents with a history of a proximal diaphyseal left radius fracture treated with a cast. During follow-up a rotational deformity is observed, as well as clinical functional limitation to perform pronosupination together with DRUJ instability. An MRI is then performed, with no evidence of FCT involvement. It was decided then to perform a corrective osteotomy with the aid of 3D virtual planning and the design of custom 3D printed surgical guides, together with a PSI (patient specific implant) to fix said osteotomy
Results: Satisfactory clinical and radiographic outcomes have been achieved, with a complete pronosupination ROM (range of movement) and adequate DRUJ stability
Conclusions: The use of 3D printed surgical guides for corrective osteotomies of the radius following a diaphyseal radius fracture with malrotation alignment is a safe and reproducible method to achieve satisfactory clinical and radiographic outcomes. Furthermore, this method has been proved to improve accuracy and surgical time

A-0940 THE "NASSA" SUTURE IN THE AUTOLOGOUS GRAFT SURGICAL TECHNIQUE FOR EPL INJURIES: LONG-TERM CLINICAL AND ULTRASONOGRAPHIC EVALUATION.

Andrea Cuomo[1], Vittoria Mazzola[1], Federico Vitali[1], Giulia Pachera[1], Federico Zaottini[2], Alessandra Galuppi[1], Emanuela Dapelo[1], Giacomo Demontis[1], Stefania Briano[1]
[1]U.O.SSD. Chirurgia della Mano e dell'Arto Superiore, IRCCS Policlinico San Martino – Genova; [2]U.O. Radiologia, IRCCS Policlinico San Martino – Genova

Introduction: Extensor pollicis longus (EPL) tendon rupture is a condition that occurs either spontaneously or after a fracture of the distal radius. Suggested surgical treatments for this lesion are divided into three categories: primary repair, tendon transfer, or graft.

Aim: Our aim is to propose a new type of suture, the "Nassa suture", for use in autologous graft procedures, electing the extensor carpi radialis brevis (ECRB) as the donor site.
Material & Methods: From 2018 to 2022, 15 patients with ELP tendon rupture had surgery using the Nassa suture in autologous graft with harvesting from ERBC/ERLC. The surgical outcome was evaluated with scheduled follow-up visits, with an average follow-up of one year. Neotendon function and performance were assessed with goniometric ROM measurements and subjective assessment scores (QDASH and PRWE).
In addition, a follow-up ultrasound examination was conducted to identify the possible occurrence of donor site tendinopathy and to examine the integrity of the neotendon.
Results: One year after surgery, the calculated PRWE score was <15 in 86,7% of cases and the Q-DASH score <15 in 73,3%. The articular ROM of the distal interphalangeal joint of the thumb was almost completely restored.
Ultrasound study showed no signs of donor site tendinopathy or adhesions with the second compartment in any of the patients; good graft vascularization was documented in 66%. The Nassa suture status was good in all cases, with traces of residual thread in 83%.
Conclusions: The Nassa suture in autologous tendon grafting showed satisfactory results. It ensures excellent flow within the native canal and, as confirmed by ultrasonography, a good endurance and effective vascularization. Autologus graft using the ERBC tendon as a donor site is a viable alternative in ELP tendon rupture: rehabilitation is rapid and the function of other motor units are not affected. In addition, no changes in function were detected at the donor site.

A-0941 SINGLE-PORTAL ARTHROSCOPY IMPROVES THE ASSESSMENT OF SLIL, SLAC AND SNAC DEFORMITIES OF THE WRIST

Luchetti Riccardo[1]; Montanari Sara[1]; Marcovici Lucian Lior[2]; Cozzolino Roberto[3]; Sanjeev Kakar[4], Atzei Andrea[5]
[1]Rimini Hand & Upper Limb Surgery and Rehabilitation, Rimini (Italy); [2]Jewish Hospital of Rome, Rome (Italy); [3]Campano Hand & Wrist Surgery and Rehabilitation Center, Scafati (Italy); [4]Department of Orthopedic Surgery, Mayo Clinic, Rochester, Minnesota (USA); [5]Pro-Mano, Hand Surgery and Rehabilitation, Treviso (Italy)

Introduction: Single-portal arthroscopy (3-4) can be performed in patients with complete lesion of the SLIL and in cases of SLAC by passing the arthroscope through the scapho-lunate gap (reverse drive-through manouvre), as well as in patients with SNAC by passing the arthroscope through the site of nonunion.
Aim: To describe the technique, indications and advantages of the single-portal arthroscopic approach for the diagnosis and staging of chronic SLIL disorders, SLAC and SNAC.
Material & Methods: The single portal technique was used in 138 patients (25 female and 113 male with a main age of 52 yo) affected by suspected SLIL, SLAC and SNAC wrist (82 right and 56 left wrist). It was used to graduate the SLIL (stage 4 or stage 4 versus SLAC wrist) and the extension of the osteochondal damage in the SLAC and SNAC wrist deformity in order to guide appropriate treatment and/or future salvage procedures.
Results: Patients were divided in group 1 (SLIL: 45 cases), group 2a (SLAC: 65 cases) and group 2b (SNAC: 28 cases).
In group 1 all the 12 cases preoperatively suspected as SLIL stage 3 were assessed as stage 4. In the 33 cases suspected as stage 4, 24 were confirmed and 9 were assessed as SLAC wrist deformity.
In group 2a preoperative clinical and imaging assessment the 65 patients were divided into SLAC 1 (1 case), SLAC 2 (24 cases), SLAC 3 (39 cases) and SLAC 4 (1 case).
Single-portal arthroscopy confirmed the preoperative diagnosis in 74% of cases (48 cases): 9 cases of SLAC 2, 38 cases of SLAC 3, 1 case of SLAC 4.

In the remaining 26% (17 cases), arthroscopy modified the preoperative diagnosis: 1 case of SLAC 1 resulted in SLAC 2, 14 cases of SLAC 2 resulted in SLAC 3, 1 case of SLAC 3 resulted in SLAC 2, and finally one SLAC 2 turned out to be a SLIL lesion stage 4.
In group 2b preoperative clinical and imaging assessment the 28 patients were divided into SNAC 1 (2 cases), SNAC 2 (7 cases), SNAC 3 (18 cases) and SNAC 4 (1 case).
Single-portal arthroscopy confirmed the preoperative diagnosis in 86% of cases (24 cases: in 6 cases of SNAC 2, 17 cases of SNAC 3 and 1 case of SNAC 4). In the remaining 14% (4 cases) it modified the preoperative diagnosis: 1 of SNAC 1 resulted in SNAC 2 and the other in SNAC 3, 1 case of SNAC 2 turned out to be a SNAC 3 and 1 case of SNAC 3 resulted in SNAC 4.
Conclusions: The single-portal wrist arthroscopy allowed to modify the preoperative diagnosis of the wrist pathology in 42 patients over 138 cases. In particular, 21 cases for SLIL lesion, 17 cases for SLAC deformity and 4 cases for SNAC deformity, respectively.
The use of the single-portal wrist arthroscopy can be considered as the first-choice to achieve complete joint visualization in cases where pre-operative imaging shows a static SLIL dissociation or obvious SLAC and SNAC wrist.

A-0942 ENDOSCOPIC VERSUS MINI-OPEN DECOMPRESSION OF CARPAL CANAL

Hynek Zitek, Ivan Humhej, Jan Lodin
Department of Neurosurgery, Purkinje University, Masaryk Hospital, Usti nad Labem, Czech Republic

Introduction: Open carpal tunnel release remains a standard procedure for carpal tunnel syndrome (CTS) in the Czech Republic and across Europe. Recently, the introduction of monoportal endoscopic techniques to our practice prompted a comparative analysis against the mini-open approach.
Aim: To compare mini-open and monoportal endoscopic carpal tunnel decompression surgery utilizing a custom patient questionnaire including Boston Carpal Tunnel Questionnaire (BCTQ).
Material & Methods: A total of 418 patients with CTS requiring surgical release were included in the study. The mini-open group comprised 254 patients operated on in 2006, while the endoscopic group consisted of 164 patients undergoing surgery between 2021 and 2023. Patients in both groups completed a custom questionnaire, including the BCTQ, preoperatively, at 3 months, and at 6 months post-surgery.
Results: Demographic parity existed between groups, although the mini-open group exhibited a female predominance of 3.5:1 compared to 1.3:1 in the endoscopic group. The endoscopic group showed significantly better outcomes in symptom severity and functional status scales at 3 and 6 months post-surgery. A higher number of patients in the endoscopic group reported major improvement post-surgery. Patients in endoscopic group were able to return to work earlier than in mini-open group after 1 month post surgery. There were no serious complications in either group.
Conclusions: Endoscopic carpal tunnel release yielded significantly better improvements in CTS symptoms as assessed by the BCTQ. The results also indicates higher patient satisfaction and benefit of faster rehabilitation and return to work.

A-0943 ROBOTIC SURGERY FOR CARPAL PATHOLOGIES: CURRENT APPLICATIONS AND FUTURE DIRECTIONS

Bo Liu[1], Rebecca Qian Ru Lim[2]
[1]Beijing Ji Shui Tan Hospital, Beijing, China; [2]Singapore General Hospital, Singapore

Introduction: The use of robotics and artificial intelligence (A.I) has been gaining traction in the field of wrist surgery in recent years. We present our experience of using the TiRobot- robotic navigation system (TINAVI Medical Technologies,

Beijing, China) and 3D fluoroscopy unit (ISO-C3D, Siemens, Erlangen, Germany) in the management of carpal pathologies.
Aim: To showcase our experience in using a minimally invasive robot navigation system to treat carpal fractures and to discuss advantages, patient outcomes, our limitations as well as potential future developments.
Material & Methods: From 2019-2023, we retrospectively reviewed 19 patients who underwent arthroscopic and robotic assisted management for a variety of carpal pathologies: trans-scaphoid perilunate fracture dislocations (PFLD), scaphoid fractures, scaphoid non-unions and scaphoid non-union advanced collapse (SNAC) wrist and analyzed their postoperative outcomes.
Results: For PFLD (n=2), computed tomography (CT) scans verified 100% union at average of 10 weeks. At the mean 13.5 months follow up, the mean Mayo score was 82.5, PRWE was 11.5 and there was good recovery of wrist motion and grip strength as compared to the uninjured contralateral hand. For scaphoid fractures (n=10), CT scans verified 100% bony union at average of 8 weeks. At the mean 6.5 months follow up, the mean Mayo Wrist Score was 96, PRWE of 2 with flexion-extension arc of 96% and grip strength of 91% as compared to the contralateral side.
For scaphoid non unions (n=6), CT scans verified 100% bony union at average of 16 weeks. At the mean 18.3 months follow up, there was significant improvements in wrist range of motion, grip strength and patient rated outcomes. For SNAC (n=1), CT scan verified bony union at 12 weeks. At the mean 6 months follow up, the patient achieved a VAS score of 0, Mayo Wrist Score of 85, PRWE of 6 and QuickDASH score of 2.3. All the guidewires used for the fixations of these pathologies were achieved in a single attempt using the robotic navigation system.
Conclusions: Robotic assisted fixation is a viable and promising alternative for the treatment of carpal pathologies. This technique is safe, allows for precise reduction and accurate placement of implants and is a satisfactory method of treatment.

A-0944 A COMPARATIVE CADAVERIC STUDY FOR PERCUTANEOUS SCAPHOID FIXATION: ROBOTIC VS FREEHAND

Rebecca Qian Ru Lim[1], Yaobin Yin[2], Zhixin Wang[2], Zhe Yi[2], Shanlin Chen[2], Bo Liu[2]
[1]*Singapore General Hospital, Singapore*

(2) Beijing Ji Shui Tan Hospital, Beijing, Singapore

Introduction: Robotic-assisted percutaneous screw fixation has been demonstrated to be a feasible technique for scaphoid fractures with favourable outcomes. However, there is a lack of comparative studies between robotic-assisted and traditional freehand methods for scaphoid fracture fixation.
Aim: To compare the robotic-assisted and the traditional freehand percutaneous scaphoid fixation in number of guidewire attempts, duration of fluoroscopy time, amount of radiation dose, and screw centrality.
Material & Methods: Twenty cadaveric specimens were randomized into either the robotic or freehand group. The scaphoids in both groups were fixed by either the same attending or resident from our hand surgery department. The operation duration, amount of radiation from intraoperative fluoroscopy, total fluoroscopy time, and the number of guidewire attempts were documented and compared. Postoperatively, all the specimens had a computed tomography (CT) scan performed, and the difference in the final position of the screw and the central axis of the scaphoid was examined.
Results: In the robotic group, all the guide wires were satisfactorily positioned within a single attempt, while the median number of attempts in the traditional freehand group was 18 (quaternion 14–65). This also meant that the surgeon in the robotic group experienced significantly lower radiation exposure dose and time as compared to the freehand group. There were no significant differences in the final screw position as compared to the central axis of the scaphoid in both groups. Although there was no difference in surgeon performance in the robotic group, the operative time for the attending was significantly lower as compared to the resident in the freehand group.

Conclusions: Robotic-assisted surgery for scaphoid fracture fixation is superior to the traditional freehand method as it facilitates accurate screw placement with lower radiation exposure and fewer guide wire attempts.

A-0945 DISTAL RADIOULNAR JOINT TRANSLATION EVALUATED BY MAXIMUM INTENSITY PROJECTION IMAGES OF COMPUTED TOMOGRAPHY

Sotetsu Sakamoto, Satish Annabhau Mane, Yuji Saeki, Yasunori Hattori, Jun Sasaki, Kota Hayashi, Kazuteru Doi
Ogori Daiichi General Hospital, Yamaguchi, Japan

Introduction: Distal radioulnar joint (DRUJ) instability is a common disorder, the assessment of which is mainly based on physical examination. However, this is subjective and not always decisive. Various authors suggested techniques for measuring DRUJ translation on computed tomography (CT) scans. However, CT scan cannot show the widest part of the sigmoid and the widest part of the ulnar head together in one slice for wrists with an ulnar positive variance where the ulnar head and sigmoid notch are not at the same level. Maximum intensity projection (MIP) is a simple three-dimensional visualization tool that can display CT data sets. It can reveal a view of a whole selected section like a shadow, which allows visualization of the widest part of the sigmoid notch and the ulnar head in the wrist.
Aim: This study compared the conventional CT (con-CT) and MIP techniques to evaluate DRUJ translation.
Material & Methods: Thirty patients with 30 preoperative CT scans of the wrists who underwent ulnar shortening osteotomy for ulnar impaction syndrome from 2013 to 2021 were included in this study. There were 11 men and 19 women with an average age of 44 (17-72) years. The right side was involved in 20 and the left in 10. The average ulnar positive variance was 2.1 mm (0.5- 4). The CT images were obtained with the forearm in three positions: neutral, pronation, and supination. Conventional axial CT images showing the largest areas of the sigmoid notch, the ulnar head with ulnar styloid, and the Lister's tubercle were selected. We evaluated con-CT and MIP images using the subluxation ratio (SR) method. Two observers evaluated the images in pronation independently and randomly to assess inter-observer reliability for SR. One observer also performed the measurements of the SR method in the supination and neutral position of the forearm to compare the con-CT and MIP images. Intra-observer and inter-observer reliability of the SR method was determined by Intraclass correlation coefficients (ICC).
Results: The ICC (1,1) for intra-rater reliability were 0.94 for con-CT and 0.96 MIP. The ICCs (2,1) for inter-rater reliability were 0.91 for con-CT and 0.94 for MIP. Both con-CT and MIP showed almost perfect ICC values; however, the ICC value for MIP was slightly superior to con-CT. The averages of SR values for con-CT and MIP in pronation were 0.28 (SD 0.09) and 0.25 (SD 0.08), in supination were -0.16 (SD 0.09) and -0.17 (SD 0.09), and in the neutral were 0.11 (SD 0.12) and 0.11 (SD 0.13). There was a significant difference in SR between con-CT and MIP in pronation ($p < 0.001$) but no difference in supination or neutral positions. Given that ulnar positive variance is higher in pronation than in neutral and supination, we interpret this result as MIP having more accuracy than con-CT for DRUJ instability of the wrists with ulnar positive variance.
Conclusions: MIP is a reliable technique and can be used for assessing DRUJ translation.

A-0947 EARLY ULTRASOUND DIAGNOSIS AND SURGICAL STRATEGY FOR UPPER LIMB NERVE HOURGLASS CONSTRICTIONS

Xueyuan Li, Wei Jiang
Hand surgery department Ningbo No.6 Hospital, Ningbo, China

Introduction: Aim: To investigate the diagnosis and surgical treatment of early hourglass-like changes in brachial plexus neuritis.

Material & Methods: Among 65 patients with acute brachial plexus neuritis admitted to the outpatient department from January 2018 to June 2022, 12 patients were found to have hourglass-like nerve degeneration through B-ultrasound examination. All 12 patients underwent surgical exploration, and the completely constricted nerve was directly cut off and re-sutured microscopically, and the pathological tissues were sent for pathological examination. Intraoperative observations were recorded and the prognosis was closely followed up.

Results: There were 5 males and 7 females aged 20-49. The radial nerve was involved in 2 cases, the posterior interosseous nerve in 4 cases axillary nerve in 1 case, anterior interosseous nerve in 5 cases. Preoperative B-ultrasound indicated that the affected nerve was constricted at specific sites, and the local nerve was significantly swollen compared with the healthy side, with the length of involvement ranging from 5-15cm. Postoperative follow-up showed that muscle strength of 8 patients recovered to grade 4 within 6 months.

Conclusions: B-ultrasonography can help determine whether the nerve affected by brachial plexus neuritis has serious hourglass stenosis. During the operation, we noticed that the affected nerve bundle was covered by thickened congested epineurium in the acute stage, and recovered satisfactorily after excising the stenosis and reattaching the nerve.

A-0949 HOW AND WHEN FIX THE DISTAL ULNA IN ASSOCIATION WITH A FRACTURE OF THE DISTAL RADIUS? OUR EXPERIENCE

S. Briano[1], F.Vitali[2], V. Mazzola[2], G. Pachera[1], A. Galuppi[1], E. Dapelo[1], G. Demontis[1], M. Formica[2]
[1]Hand and Upper Limb Surgery Unit, San Martino Policlinic Hospital, Genoa, Italy; [2]Orthopaedic Clinic, University of Genoa, Genoa, Italy

Introduction: Distal ulna fractures are rare fractures associated with radio fractures in 3-6%, an increasing percentage due to the aging of the population and therefore older people becoming more active and exposed at a far greater risk of more complex fractures.

This kind of fractures are unstable, because they can affect distal radio-ulnar joint, TFCC and secondary stabilizers. For this reason, in recent years much more importance has been given to the ulnar side. Classifications that we have available are morphological and do not guide us in the treatment. Some studies report good results from conservative treatment, but others consider necessary surgical treatment in case of permanent instability.

Over the past few years, there has been much debate about the need to treat or not a distal ulna fracture concurrently with the distal radius fracture.

Aim: The purpose of our study was to report our experience about the treatment of this kind of fractures, when operate and how.

Material & Methods: In the Unit of the Hand and Upper Limb Surgery of the Policlinic Hospital San Martino in Genoa, a total of 90 patients, who were included in our study, underwent surgery for distal ulna fracture associated with the distal radius fracture from 2018 to 2023.

The ulna fractures have been classified in according to the classification of Biyani and AO.
The minimum follow up has been 4 months and the maximum has been 48 months. Patients were evaluated with an X-ray clinical examination and a functional evaluation using 3 questionnaires.
Results: The results were satisfactory. 90 patients have been included. The surgery was performed with different approaches and different methods of synthesis based on the fracture pattern. We first dealt with the synthesis of the radio having good restoration of parameters, ulnar variance, tilt and congruence of the RUD and then we moved to the synthesis of the ulna. We have achieved satisfying results. Complete activity return in 3 months. Good results at DASH and MAYO score and full ROM recovery in 90%. 3 patients reported pain on the ulnar side, 3 suffer a reduction in pronosupination and 3 suffer a reduction of the elbow extension. The most relevant complication has been an intolerance of the fixation devices.
Conclusions: We can state that the synthesis of the ulna is necessary to obtain a rapid recovery, to start an early physical therapy and avoid a prolonged immobilization.
In controversial cases like fractures of the styloid, is important to assess stability through a ballotment test.
For us, first of all, is important to obtain a correct reduction and synthesis of the radio with restored parameters.
These are difficult fractures and they required experience and an high learning curve.
Further studies will be needed in the future, and it may be useful to create classifications to guide us in diagnosis and treatment.

A-0950 ACUTE TRAUMATIC MUSCULOTENDINOUS AVULSION OF THE FLEXOR POLLICIS LONGUS IN PEDIATRIC AGE: CLINICAL CASE

Norma Trigo Bermúdez, Miguel Angel Martínez de la Torre, Joan Antoni García Albiñana, Eva Cases, Anna Rubio Roca;, Enric Cruz Olivé
HOSPITAL GENERAL DE GRANOLLERS

Introduction: Avulsions from bony insertion are common and have been studied extensively. But avulsions from musculotendinous junction are rare. As far as we have knowledge, there are few reported cases of musculotendinous avulsions in a child
Aim: Description of the therapeutic management, surgical technique used and results in a rare injury due to traumatic miotendinous avulsion of the flexor pollicis longus after direct trauma in a pediatric patient
Material & Methods: We report the case of a 11-year-old patient who sustained a direct trauma on the thenar eminence causing an open traumatic proximal avulsion of the flexor pollicis longus ,thumb pulleys injury and thenar muscles damage. The surgical reconstruction was performed in two stages. Firstly, the pulleys were repaired and FPL was referenced above flexor palmaris longus. The second stage consisted on miotendinous sewing and encapsulation of the tendon into the muscle belly
Results: At 6 months of follow-up , full range of movement was observed , and the strenght and pinch grip were comparable to the uninjured hand
Conclusions: Traumatic avulsion of the flexor pollicis longus in pediatric patients is very rare with only a few case reports in the literature. The technique of repairing myotendinous avulsion by encapsulating the tendon of the remaining muscle belly is an effective treatment

A-0952 9-YEAR FOLLOW-UP OF THE REVERSE NEUROCUTANEUOS FLAP BASED ON THE DORSAL BRANCH OF THE ULNAR ARTERY: PALMAR SOFT TISSUE COVERAGE IN CHILDREN

Matthias E.Sporer[1], Jayme A. Bertelli[2]
[1]Department of Plastic Surgery, Academic Teaching Hospital Feldkirch, Feldkirch, Austria; [2]Department of Orthopedic Surgery, Governador Celso Ramos Hospital, Florianópolis, Brazil

Introduction: Although the palm of the hand is mostly spared in severe burn injuries, it is often affected in children. Deep thermal injuries of the palm may result in severe post-burn contractures, which require radical excision to allow normal hand development.
Aim: Since alternatives in palmar soft tissue coverage are limited and often come along with a significant donor-side morbidity, we primarily employ a reverse-perfused, neurocutaneous dorsal ulnar artery flap. Here, we´d like to report our long-term follow-up results.
Material & Methods: We reviewed the long-term results of ten post-burn palmar contracture release and flap coverage procedures in ten children. The applied flap was based distally on the dorsal branch of the ulnar artery and harvested along the ulnar aspect of the hand and wrist. The pivot point of the flap was located dorsally, close to the 4th and 5th metacarpal base. Patients were followed for a mean of 8.7 +/- 5.6 years (median of 6 years, range: 4-20 years)
Results: Flap size ranged from 60-130mm in length and 20-35mm in width. This variation in flap dimensions resulted from different hand sizes, on account of the various patient ages at time of surgery. All flaps survived, donor site healing was uneventful, and marginal flap necrosis occurred only once. Satisfactory restoration of range of motion without secondary contractures was observed. Moreover, we detected adequate progressive growth, adaptability and sensory recovery in all flaps. Over time, the flaps mostly becomes hairless and progressively flattened without debulking
Conclusions: The importance of this flap lies in the potential for considerable tissue mobilization to cover palmar defects without sacrificing any major vascular axis. Following our patients for a median of 6 years, we learned that the flap mostly becomes hairless, progressively flattens without debulking and becomes sensorily reanimated. Due to the appropriate size growth over time, a functional recovery of palmar burn contractures and adequate hand development was facilitated in children. Finally, the predictable vascular anatomy, its wide range, as well as the availability of a well vascularised, durable, thin and pliable skin make the reverse, neurocutaneous dorsal ulnar artery flap an appealing alternative in soft tissue coverage of the hand.

A-0953 A RARE PRESENTATION OF A COMPLEX GALEAZZI FRACTURE-DISLOCATION AND A REVIEW OF LITERATURE COMPLICATIONS: DISLOCATION AND INTERPOSITION OF FLEXOR DIGITIMINIMI

S.Briano[1], G. Demontis[1], M. Pansecchi[-2], F.Vitali[-3], V.Mazzola[-3], G. Pachera[1], A. Galuppi[1], E. Dapelo[1], M. Formica[-3], C. Martinoli[-2]
[1]Hand and Upper Limb Surgery Unit, San Martino Policlinic Hospital, Genoa, Italy; [2]Radiology Department, University of Genoa, Genoa, Italy; [3]Orthopaedic Clinic, University of Genoa, Genoa, Italy

Introduction: Fractures of the distal third of the radius can often lead to an injury of the DRUJ and secondary stabilizers. Sometimes the reduction of the DRUJ is prevented by the interposition of other dislocated structures. Dislocations of the flexors digitiminimi are rarely observed as a result of this type of injury.
Aim: The authors present a review of the literature and the case of an active woman, 36-years-old, who came to an emergency department after a forearm trauma due to an incorrect performance during a CrossFit training. She presented a fracture of the third distal of the radius and apparent deficit in extension of the IV and V finger. She showed a bending

attitude of the IV and V finger. Following an initial reduction and synthesis of the fracture, no lesions of the ulnar nerve were found. Subsequently orthopedic and radiological consultation, she was determined to have a dorsal dislocation of V finger flexor. This article describe a review of literature regarding irreducible Galeazzi and a case report describes the clinical history, management and treatment of this rare case of flexor dislocation following fracture of the third distal radius.

A-0954 TREATMENT OF RADIAL HEAD COMMINUTED FRACTURES: OUR EXPERIENCE

S. Briano[1], G. Demontis[1], F. Vitali[2], V. Mazzola[2], G. Pachera[1], A. Galuppi[1], E. Dapelo[1], G. Traverso[2], M. Formica[2]
[1]Hand and Upper Limb Surgery Unit, San Martino Policlinic Hospital, Genoa, Italy; [2]Orthopaedic department, University of Genoa, Genoa, Italy

Introduction: The radial head is essential for the stability of the elbow. Often, radial head fractures are comminuted and difficult to treat. We can treat them with ORIF and the placement of a plate. However, when it is not possible to obtain a stable synthesis, the head of the radio can be resected, or we can opt for a radial head arthroplasty. In comminuted fractures ex situ reconstruction may also be an option.
Aim: The purpose of our study is to report our experience of the Mason III and IV radial head fractures.
Material & Methods: This retrospective study examined a total of 138 patients with radial head fractures treated in our trauma center between 2018 and 2022. In our study we included patients over the age of 18 with radial head fractures classified in Mason III and Mason IV. We involved fractures treated with plate and with a follow-up longer than 10 months. We considered absence of concurrent fractures on the affected limb and bone maturity with closed epiphysis. Therefore, we included a total of 20 patients (10 females and 10 males), 13 type Mason III fractures and 7 type Mason IV fractures. The patients average age was 49 years (range 19-65). The diagnosis was confirmed by conventional elbow x-rays, followed by a CT scan. We performed a lateral Kocher approach. The plate was placed in the safe zone. All 20 patients were assessed radiographically and clinically, evaluating ROM, VAS, MEPS and DASH score.
Results: The average follow-up time was 28 months (range 11-56, SD 12.8). The average MEPS was 88.2 points (range 64-100, SD 9.3) and the average DASH score was 10.1 points (range 0-31, SD 6.1). The average elbow's bending was 126 degree (range 110-135 degrees, SD 7 degrees). The average extension deficit was 2 degrees (range 0 degrees-10 degrees, SD 3 degrees). In addition, the rotation's range of the forearm was satisfactory and in almost all cases with a supination of 85 degrees and pronation of 80 degrees. Four patients showed a feeling of mild laxity-instability in valgus stress. No patients had neurological deficits. Every evaluated elbows were clinically stable in flexion and stress in varus/valgus. Four patients required revision surgery.
Conclusions: The reconstruction of the radial head using a low-profile plate is a reasonable and safe option. This approach leads to a good clinical results with good joint mobility and with a low complications rate.
In our opinion, the arthroplasty of the head of the radio can be an option as extreme ratio or be conducted as a rescue procedure in cases of failure of the ORIF.
The main limitation of this study is due to small sample and the bias of being a retrospective study. In the future, further prospective studies will be important.

A-0955 CLINICAL STUDY ON REPAIR OF FINGER DEGLOVING INJURY WITH LOBULATED VENOUS FLAP WITH DORSUM OF FOOT AS DONOR AREA

Xinjiang Mao,Wei Ouyang LiLing
SHAOXING CENTRAL HOSPITAL

Finger degloving injury refers to the superficial avulsion of finger skin self-extensor flexor muscle caused by protective pullback after finger injury, which is a common serious injury. At present, the common repair methods are in situ replantation, mu nail flap repair, abdominal skin flap, pedicled skin flap (hand flap), free flap repair and so on. Although the finger length can be retained, there are still all kinds of problems and lack of ideal repair methods. We believe that the texture of the dorsalis pedis skin is similar to that of the dorsum of the hand and has a rich venous network. the advantage of the dorsalis pedis vein flap is that it is easier to accept the changes of vascular anastomosis and blood perfusion so as to be close to the physiological flap. at the same time, the dorsalis pedis cutaneous nerve is attached to repair the sensation of the flap. Therefore, we imagine that the lobulated vein skin flap with the dorsalis pedis as the donor area will be used to repair finger degloving injury. Based on the analysis of the preoperative, intraoperative and postoperative clinical data of 8 cases of finger degloving injury caused by machine rolling, we believe that free dorsalis pedis lobulated venous flap has the following advantages: not limited by the number of injured fingers, not restricted by the size of the defect area (maximum preservation of donor function), and one-stage repair. It minimizes the burden of patients and is easy to operate without multiple operations, less damage to the donor area, satisfying the repair of appearance, sensation and function of the affected finger, and is suitable for popularization.

A-0956 SCHWANNOMA OF UPPER AND LOWER LIMB - CASE SERIES

Aristeidis Georgountzos[1], Ioannis Kotsalis[1], Panagiotis Kanellos[2], Olga Theodorolea[1]
1st Orthopaedic Department of General Hospital of Athens G.GENNIMATAS, Athens, Greece[1]; Hand, Upper Limb & Microsurgery Department K.A.T. Hospital, Athens, Greece[2]

Introduction: Schwannoma is a rare benign tumor of the peripheral nerves, usually (90%) localized in a single nerve. Due to its absence of specific symptomatology, its slow growth and its rarity, diagnosis is usually difficult, delayed or incorrect. Symptomatology ranges from a painless swelling, to a painful on palpation mass surrounding a nerve. The mass is usually mobile in the transverse plane and fixed in the longitudinal plane.
Methods and Materials: We present a series of 15 patients treated by surgical removal of the tumor in 1st Orthopaedic Department of G.H.A G.Gennimatas as while as in Hand, Upper Extremity and Microsurgery Clinic of G.H.A. K.A.T. from January 2020 to March 2023. All patients were male with a mean age of 46 years(24,68). Patients presented to the outpatient clinic complaining of either palpable painful mass(10) or painless swelling(5) and none had neurological features. All had positive Tinel's test. The location of the schwannoma was 9 in the upper limb and 6 in the lower limb. Clinical and radiological examination and MRI were performed. Sensory nerve was affected in 9 patients and mixed nerve in 6. Surgical resection was recommended. After preparation of the tumor with microsurgical techniques and instruments during surgery, in 11 patients no involvement of nerve bundles in the schwannoma was identified while in 4 nerve bundles were involved. All of them underwent complete resection of the tumor and histological examination was sent for confirmation of the diagnosis. No one had a nerve graft used. The tumors removed ranged from 0.6/0.9/0.4 cm to 5.2/6.4/5.5 cm. Patients were reassessed in the outpatient clinic at 2 weeks,1,3 and 6 months.
Results: No patients developed neurological semiology, both immediately postoperatively and at re-examinations.

Conclusion: Although schwannoma is a rare peripheral nerve tumor, it is very important to recognize and treat it early to avoid its deterioration and possible neurological damage. Removal using microsurgery results in a reduced incidence of postoperative neurological semiology.

Key words: Schwannoma, Microsurgery, Nerve tumor

A-0957 NONVASCULARIZED ILIAC CREST AUTOGRAFT FOR WRIST AND HAND RECONSTRUCTIONS: A REVIEW OF LITERATURE BASED ON TWO CLINICAL CASES

Joana Páscoa Pinheiro; André Spranger; Paulo Almeida; José Portela; Joaquim Soares do Brito

Centro Hospitalar e Universitário Lisboa Norte; Orthopedics and Trauma Department; Hospital de Santa Maria; Avenida Professor Egas Moniz, 1649-035, Lisbon, Portugal

Introduction: Hand and wrist bony defects can occur after a trauma or be secondary to a specific disease; either by a tumor, infection or idiopathic avascular necrosis. Early stable fixation and bone grafting of the bone defect is recommended as long as there is a rich blood supply since it allows early range of motion and enhances recovery

Aim: We present immediate bone autografting in two patients with secondary hand and wrist bone defects where iliac crest autograft was used to reconstruct the anatomy of the joints.

Material & Methods: Patient 1: 37-years-old male patient with a right distal radius open fracture after a high energy motorbike accident. Radiographs showed a complex, articular, comminuted distal radius fracture with a significant loss of diaphyseal and metaphyseal bone. The defect was 36,7 x 23,6mm. At the articular surface, the scaphoid facet was intact but there was an important defect at the lunate radial facet. The patient underwent surgery with a volar locking plate and k-wires, and iliac crest bone graft to fill de metaphyseal and diaphyseal defect, and to reconstruct and restore the congruity of the wrist joint.

Patient 2: 68-years-old male patient presented a left midcarpal epithelioid osteoblastoma with the origin at the trapezoid bone. The patient underwent wide resection of the tumor remaining a defect of 30,7 x 27,2 mm filled with left iliac crest graft followed by carpal arthrodesis (lunate-hamate-second and third metacarpal) with a dorsal plate and suspensionplasty of the first-to-second metacarpal.

Results: Patient 1: At two years follow-up bony fusion was achieved, patient presented a slight depression of the lunate facet, with acceptable range of motion (flexion 85º, extension 30º, complete pronosupination), with a VAS score of 1, quick DASH score of 15.9 and PRWE of 30,5. The patient is able to performe his daily life activities and work duties.

Patient 2: At one year follow-up bony fusion was achieved, the patient demonstrated a wrist motion of 15º of flexion, 20º extension, complete pronosupination, no finger movement restriction, VAS score of 0, quick DASH score of 15,. and PRWE of 24. The patient reports no limitation regarding daily life and work related activities.

Conclusions: Non-vascularized bone graft from the iliac crest is a safe and viable option to treat hand and wrist bone defects, especially when one stage procedures and early limb range of motion are recommended. Iliac crest grafts have a low rate of donor site morbidity, allowing fast osteointegration and mechanical stability.

A-0958 EFFECTS OF EQUOL FOR PAIN CAUSED BY HAND OSTEOARTHRITIS IN PERIMENOPAUSAL WOMEN

Takashi Shimoe, Yusuke Kido, Yuki Matsuyama, Akimasa Murata, Hiroshi Hashizume and Hiroshi Yamada
Department of Orthopaedic Surgery, Wakayama Medical University, Japan

Background: In menopausal women, pain caused by hand osteoarthritis (HOA) is commonly reported. Although oral and topical analgesics and orthotics are used, they do not fully meet the expectations of patients. Equol is the metabolite of daidzein. Equol has estrogen-like effects and has been reported the effectiveness on treating menopausal symptoms, including hand symptoms.
Objective: To investigate whether equol intake improves pain caused by HOA in perimenopausal women.
Subjects and Methods: The study included 104 women aged 45-60 years, who had pain caused by HOA for at least 3 months and were non-producer of equol were included in this study. Participants took 10 mg of equol er day. The primary endpoint was the change in VAS (Visual Analog Scale) for pain on movement from baseline to 12 weeks after baseline. Secondary outcomes included changes in VAS on movement, the number of joints with pain, and VAS changes for various menopausal symptoms at 4, 8, and 12 weeks after baseline.
Results: The change in VAS on movement at 12 weeks compared to baseline was -34.0±23.5. The VAS on movement was 62.6±18.8 at baseline, 47.4±24.6 at 4 weeks, 36.7±26.5 at 8 weeks, and 30.0±25.9 at 12 weeks. The number of painful joints was 6.8±5.5 at baseline, 5.4±4.6 at 4 weeks, 4.9±4.5 at 8 weeks, and 4.4±4.2 at 12 weeks. Among other menopausal symptoms, a notable improvement was observed in shoulder stiffness, with VAS values of baseline 48.3±28.7 and 12 weeks 34.3±30.0.
Discussion: This study is the first prospective trial implementing equol as a therapeutic intervention for pain due to HOA. The study showed improvement in pain, a decrease in the number of painful joints, and improvement in stiffness in the shoulders in a short period of time from the start of intake to 12 weeks. Equol could be a treatment option for women in the menopausal status experiencing pain due to HOA.

A-0959 ACUTE ISCHAEMIC HAND FOLLOWING INTRA-ARTERIAL INJECTION INTO ULNAR ARTERY

Kayen Chan, Kai Yuen Wong
Cambridge University Hospitals NHS Trust

Introduction: Intra-arterial drug injuries, although rare, have increased in number in the last decade due to the prevalence of intravenous drug use. Despite this and their potentially serious consequences, there are no standard guidelines on how to manage these injuries. We report a rare case of acute hand ischaemia following intra-arterial drug injection.
Clinical case: A 29-year-old male presented to the emergency department with pain and swelling of his right hand and forearm, following injection of crushed cyclizine tablets into his right antecubital fossa the day before. Clinically he had signs of compartment syndrome and an acute ischaemic hand. He underwent emergency fasciotomies of his right forearm. Intra-operatively, his ulnar artery was found to be thrombosed and an embolectomy retrieved a 15cm occlusive thrombus. However, there was no change in hand perfusion following this and the patient was started on therapeutic anticoagulation. Post-operatively, he developed necrosis of his right hand. Part of his thumb and index finger were viable and preserved to maintain pincer grip. He underwent staged debridement and resurfacing of his right hand with a pedicled groin flap.
Conclusion: Intra-arterial drug injuries are uncommon but serious injuries and should be considered in any patient with a history of intravenous drug use presenting with severe limb pain. Admission for 24 hours of close observation may be warranted as ischaemia may only occur 24-48 hours after the injury. In patients with ischaemia, anticoagulation with

heparin may be considered. Our patient presented with signs of compartment syndrome requiring fasciotomies and staged debridement prior to definitive reconstruction.

A-0960 ACCURACY OF CLINICAL CODING AND IT'S FINANCIAL IMPLICATIONS IN HAND SURGERY

Ibrahim Inzarul Haq, Cheryl Fox, Deepak Samson
University Hospitals Coventry and Warwickshire, UK

Introduction: Since 2004, the National Health Service (NHS) has utilised the Office of Population Censuses and Surveys Classification of Intervention and Procedures Version 4 (OPCS-4) for recording surgical procedures. Accurate clinical coding is crucial to enabling adequate reimbursement through government tariffs, therefore impacting hospital budgets and service provision at local and national levels. Furthermore, analysis of clinical coding over time can allow for the organisation to track health care trends and help with resource allocation.

The Quality of Clinical Coding 2014 by Capita was a study of the coding in 50 acute NHS trusts which revealed no trust achieved 100% accuracy, with an average error rate of 7%. The lowest quartile demonstrated significant variability in spell price changes, ranging from 10.5% to 45.8%. Clinical coding is typically performed by non-clinical staff translating medical notes who often face challenges with incorrect terminology or insufficient information.

Aims: To assess the accuracy of clinical coding in Hand surgery and it's financial implications in a tertiary care referral centre.

Methods and Materials: Over a three-month period, patient notes were analysed by a senior clinician and clinical coders. Monthly discussions between the clinician and coders took place, documenting code changes and their financial implications. The codes were checked for totality, depth and accuracy.

Patient electronic records were reviewed for each episode. Diagnoses, co-morbidities and surgical procedures were recorded. Liaising with the clinical coders in the organisation, the codes allocated to each of these patient episodes were retrospectively reviewed. The accuracy of coding was determined and compared with the national averages. Coding errors were identified and analysed for cause. The national figures and recommendations laid out in the Payment by results Data Assurance Framework 2013/14 were used as standards for comparison.

Changes that led to Healthcare Resource Group(HRG) code changes were then analysed for tariff discrepancy which was used to calculate the financial implications of the changes.

Results: During the assessed three months in 2023, 306 patient episodes were analysed. Inaccurate coding was identified in 23.5% (72 patient episodes out of 306). The national average was 10.8% (range of 3.1%-38.4%).

The resultant changes in the HRG code led to a tariff uplift of approximately £50,000. As these analyses were done within the allowable time limit for code changes, the trust benefitted from it.

Conclusion: This audit brought into focus the errors in clinical coding and identified the possible remediable factors contributing to them. Laycock et al and Carr et al have both identified better liaison between clinicians and coders be a potential factor in reducing inaccurate coding. Based on the findings of the audit we would like to put forward the following recommendations.

Recommendations:

1. Better source documentation by the clinicians
2. clinical engagement with liaison between the clinicians and coders
3. Regular audits and analysis

The study underscores the ongoing need for efforts to enhance clinical coding accuracy, ensuring effective and appropriate resource allocation for local and national patient care.

A-0961 NORA LESION: A RARE CASE OF BIZARRE PAROSTEAL OSTEOCHONDROMATOUS PROLIFERATION

João Pires, Rita Cavaca, Gonçalo Fernandes, João Mendes, Gonçalo Modesto, José Casanova
Centro Hospitalar e Universitário de Coimbra

Introduction: Nora lesion is a rare and benign bone pathology characterized by parosteal osteochondromatous proliferation affecting bones of hand and feet. Bizarre parosteal osteochondromatous proliferation was first described in 1983 by Nora et all. The aetiology is not completely understood. Due to its nonspecific clinical presentation, agressive radiological manifestation and unclear histopathologic results, the final diagnosis is challenging.
Case Presentation: The authors present one clinical case of bizarre parosteal osteochondromatous proliferation in a 45 years old female. The patient was first evaluated in the orthopedic outpatient department with pain and swelling of the distal volar aspect of the right thumb. The patient noticed the swelling 2 years ago, which gradually grow. A radiograph was obtained which showed an exophytic lesion arising from the distal phalanx of the thumb. The following evaluation lead us to a subsequent CT scan that showed a heterogenic calcified mass adjacent to the distal phalanx measuring approximately 1 cm. Magnetic resonance imaging revealed an hypointense exophytic lobulated mass without medullary bone invasion. To exclude a malignant lesion A CT-guided bone biopsy was performed and the histopathological evaluation revealed a proliferation of cartilage, bone and fibrous myxoid spindle cells. Biomarker research and immunohistochemistry study did not favor the diagnosis of parosteal osteosarcoma. The mass was excised using a volar incision and sent to histopathology evaluation confirming the suspicion of bizarre parosteal osteochondromatous proliferation and excluding malignant changes.
Clinical Outcomes: At the post operative evaluation, 6 months after surgery, the patient showed an improvement in her symptoms and no recurrence was noted.
Discussion: Bizarre parosteal osteochondromatous proliferation is a rare benign osseous tumour which is more prevalent in the second and third decades and without gender preponderance. The clinical presentation is characterized by a growing and painful mass emerging from the small bones of the hand or feet. The presence of an exophytic growth in the hand or feet composed of bone, cartilage and fibrous tissue could suggest the presence of Nora lesion. However, more dangerous diagnosis most have in our thought such as malignant lesion like chondrosarcoma, parosteal osteosarcoma and benign pathologies like myositis ossificans, florid reactive periostitis and osteochondroma. The high rate of local recurrence and progressive growth might rise a clinical suspicion for a malignant process. The excision of the lesion should always be considered because making a final clinical and radiological diagnosis is difficult and the possibility of a malignant tumour is a real concern.

A-0962 CLINICAL IRRELEVANCE OF THE MARTIN-GRUBER COMMUNICATION: AN EVALUATION IN HIGH ULNAR AND MEDIAN NERVE LESIONS

Matthias E. Sporer[1], Jayme A. Bertelli[2]
[1]Department of Plastic Surgery, Academic Teaching Hospital Feldkirch, Feldkirch, Austria; [2]Department of Orthopedic Surgery, Governador Celso Ramos Hospital, Florianópolis, Brazil

Introduction: Ulnar nerve lesions limit the overall hand function and tremendously impair tasks of daily life, such as eating, drinking, and washing. The main complaint in patients suffering from ulnar nerve lesions is a general weakness of the hand and thumb. Due to paralysis of the first dorsal interosseous muscle, the pinch strength is significantly reduced, whereas the subterminal key-pinch is entirely lost. However, several mechanisms are discussed that could compensate for ulnar

nerve palsy, such as a fiber exchange from the median to the ulnar nerve in the forearm. This so-called Martin-Gruber communication (MGC) was electrophysiologically found to innervate the first dorsal interosseous, adductor pollicis and/or abductor digiti quinti muscle.
Aim: A wealth of anatomical and electrophysiological studies have investigated the origins courses, and variations of the MGC. However, only two studies have based their evaluations on the clinical presentation of high ulnar and median nerve lesions and none have specifically investigated the MGC´s impact on motor function using standardized testing. To overcome this limitation, we conducted a retrospective analysis.
Material & Methods: Thumb adduction and little finger abduction were evaluated in 30 patients suffering from isolated, high ulnar nerve lesions and in 24 patients, who had sustained an isolated, high median nerve lesion. Complete nerve lesions were ascertained by clinical testing, muscle strength measurements, intraoperative nerve inspection and electrical stimulation before nerve repair.
Results: In all ulnar nerve lesions, the first dorsal interosseous, adductor pollicis and abductor digiti quinti muscle were paralyzed. Compared to the contralateral healthy side, mean subterminal key-pinch was significantly reduced in these lesions (N=19). Classically ulnar innervated, intrinsic hand muscles were fully functional in all median nerve lesions.
Conclusions: In this study, we did not explicitly investigate whether or not a MGC exists, but instead aimed to quantify the functional motor contributions from the median to the ulnar nerve. In particular, this is surgically relevant, since a distal opponens nerve transfer is prudent in high ulnar nerve lesions without preserved FDI function. Knowledge of the MGC is essential, since it could mask ulnar nerve lesions by altering electrophysiological findings and thus provoke misdiagnosis. However, in the clinically examination of peripheral nerve lesions, the most relevant parameter to indicate surgery is lost motor function. As motor function of the FDI, AdP or ADQ was neither preserved in ulnar nerve lesions nor limited in median nerve lesions in our study population, we conclude that the eventual presence of MGC is irrelevant to the clinical scenario.

A-0963 ATRAUMATIC SUBCUTANEOUS EXTENSOR CARPI ULNARIS RUPTURE AND SUBSEQUENT RECONSTRUCTION WITH PALMARIS LONGUS GRAFT: A CASE REPORT

Francesco Marco Kostoris, Susanna Clocchiatti, Luigi Murena
Clinica Ortopedica e Traumatologica, Ospedale di Cattinara, Trieste, Italy

Introduction: Atraumatic closed subcutaneous extensor carpi ulnaris (ECU) rupture is a rare condition poorly described by medical literature. Patients may refer pain, exacerbating during prono-supination movements, and/or a sense of instability at the ulnar side of the wrist with loss of grip strength.
Aim: The aim of this article is to report a rare case of atraumatic ECU rupture and its subsequent treatment.
Material & Methods: We report a case of a patient who referred a persistent ulnar sided wrist pain possibly due to a trauma occurred in February 2023. The MRI showed ECU tenosynovitis and its structure was not clearly intact at the level of the ulnar groove. He complained persistent pain at the right wrist (dominant hand) exacerbating during fine movements, prono-supination and traction. He was treated with two local corticosteroid injections, which resulted beneficial.
After 8 months he experienced a painful "click" at the right wrist with a sense of instability at the ulnar side and subsequent loss of function. All the wrist movements were painful.
Radiographs of the wrist showed aftermaths of an ulnar head fracture with periarticular calcification.
Diagnosis of ECU complete rupture was confirmed by ultrasound and MRI exams. The patient was scheduled for surgery for ECU reconstruction and ulnar groove plasty.
During surgery the calcification was removed and the remnant of the ulnar styloid was reinserted on the ulnar head.

An ulnar groove plasty was performed. The ECU tendon was reconstructed using a palmaris longus tendon graft fixed distally to the fifth metacarpal bone and proximally to the proximal tendon stump. Sixth compartment subsheath and extensor retinaculum were reconstructed.
Postoperative treatment relied on Muenster orthosis for 5 weeks and physical therapy for function regaining.
Results: The surgery was successful and there were no complications. The patient is regaining strength and is painless.
Conclusions: Ulnar sided wrist pain is always a challenging diagnosis for hand surgeons and ECU tendinopathy is not an infrequent cause of it. Even though the most common ECU tendinopathy is the tendinitis associated with TFCC injuries, surgeons must be aware that the ECU rupture (partial or total) could be a possible cause of ulnar sided wrist pain.

A-0964 TREATMENT OF SAGITTAL PLANE INSTABILITY OF THE PROXIMAL INTERPHALANGEAL JOINT USING THE ULTRASOUND-GUIDED VOLAR PLATE SCARIFICATION TECHNIQUE: ANATOMICAL STUDY AND CASE SERIES

Sergi Barrera-Ochoa, Jose Antonio Prieto-Meré, Federico Ibañez, Gustavo Sosa, Eduard Font, Francisco Soldado
Institut de la Mà, Barcelona, Spain

Introduction: Laxity in the volar plate of the proximal interphalangeal joint can result in sagittal plane instability due to its incompetence, accompanied by digital hyperextension with dorsal subluxation, loss of functionality, and pain. These clinical manifestations indicate the need for surgical treatment to provide stability and preserve joint function. Surgical treatment options described in the literature include capsulodesis of the volar plate, reinsertion with suture anchors, and tenodesis techniques for stabilization.
Aim: Present an anatomical study and a series of cases of patients with sagital instability of the volar plate of the proximal interphalangeal plate treated with a novel minimally invasive surgical technique guided by ultrasound, evaluating the short and medium term results.
Material & Methods: Patients treated with a minimally invasive surgical technique involving ultrasound-guided scarification of the volar plate for the treatment of laxity in the proximal interphalangeal joint that leads to hyperextension deformity. This technique has been used in twelve patients in a prospective study with a one-year follow-up, where the percutaneous technique is followed by a splinting and joint rehabilitation protocol.
Results: Positive outcomes demonstrating improved joint stability, reduced pain and enhanced function with a rate of resolution of the proximal interphalangeal joint hyperextension and blockage in a 100%, and improvement in the Quick-DASH and Mayo Wrist Score.
Conclusions: The results have demonstrated that it is a safe method with good outcomes for patients with sagittal plane instability associated with volar plate laxity.

A-0965 FACTORS RELATED TO THE NEED FOR SCAPHOLUNATE LIGAMENTOPLASTY

Paula Serrano, Marcos Cruz, Jaime de la Torre, Cristóbal Martínez
Hospital Dos de Maig, Barcelona, Spain; Clínica Teknon, Barcelona, Spain

Introduction: Scapholunate instability is the most common carpal instability.it represents a wide spectrum of clinical conditions,with frequent pain in the dorsal region of the wrist due to the disruption of the physiological distribution of loads. it is important to suspect it in early stages of the injury,when it may be tributary to surgical repair or ligamentoplasty to slow down the degenerative process.in recent years, arthroscopic scapholunate plasty has been developed, which has

been shown to be a reproducible technique with good results, and patients with this type of injury typically present with dorsal pain and positive Watson on examination. However, it is difficult to determine which patients will be eligible for ligamentoplasty.
Aim: To study whether there are clinical variables that allow predicting which patients with scapholunate lesions are more likely to undergo ligamentoplasty.
Material & Methods: Patients with clinical suspicion of scapholunate injury (positive Watson test, dorsal pain) requiring surgical treatment and with suspected indication for ligamentoplasty, operated on in the period between 2018-2022, by 4 hand surgeons. Initially, the arthroscopic review is performed through the usual portals, and after establishing the degree of scapholunate lesion, the corresponding treatment is performed: scapholunateplasty for Geissler II/III-reducible lesions or other techniques (synovectomy, dorsal capsulodesis, arthrodesis, arthrodesis in case of evolved arthropathy). The following variables were collected: age, sex, existence of initial trauma, time of evolution, previous radiological findings, arthroscopic findings/associated lesions.
Results:The ligamentoplasty group included 28 patients with a mean age of 42.8 (27-66), compared to 18 patients who underwent "other procedures", with a mean age of 48 years (29-67). The ligamentoplasty group presented differences in: higher proportion of males (92.8% of males versus 55% of the second group,$p<0.0027$); time of evolution from the onset of symptoms was 7 months, versus 14 months for the "non-plasty" group,$p<0.0064$. No differences were observed in terms of age, presence of increased scapholunate space or previous trauma.
Conclusions: In patients with suspected scapholunate lesion (dorsal pain with positive Watson test),males between the 3rd and 6th decade of life, and evolution time of less than 7 months, a higher probability of needing a ligamentoplasty can be expected. Thus, when facing patients with this profile, it would be advisable to plan the ligamentoplasty after the arthroscopic exploration and to be able to perform it in the same surgical act.

A-0966 PERI-IMPLANT FRACTURE IN A RADIOCARPAL ARTHRODESIS

Miguel Pérez Abad[12], Raquel Maroto-Rodríguez[1], Maria Tibau Alberdi[1]
[1]Hospital de Mataró, Consorci Sanitari del Maresme (Mataró, Barcelona, Spain); [2]Institut Kaplan (Barcelona, Spain)

Introduction: Peri-implant fractures are those fractures that occur in a bone that has an implant used for synthesis or prosthesis. These fractures result from trauma after implant placement and not due to material failure. Moreover, this kind of fractures can affect a bone segment with the implant on it or close to it.
In relation to hand and forearm, the literature reports limited case series or isolated cases, mainly synthesis and some prostheses. However, we have not identified any case in which the peri-implant fracture affecting a plate arthrodesis.
Aim: description and treatment of a peri-implant fracture in a radiocarpal arthrodesis
Material & Methods: A 53-year-old woman with a history of Behçet's disease and erosive rheumatoid arthritis came to our center in May 2021 complaining of pain in both wrists. The X-ray showed destructive radial and midcarpal arthropathy with carpal collapse. Given the joint destruction, total radiocarpal arthrodesis was proposed.
The procedure was performed with the Aptus plate (Medartis®) with excellent postoperative results, consolidation, and pain improvement. One year later, the patient came back after a low energy fall with trauma to the operated wrist. X-ray and CT scan revealed an effective arthrodesis and a peri-implant fracture at the level of the most proximal screws. The surgical intervention proposed to the patient was removal of the proximal screws in order to place a distal radius plate that would allow several points of fixation oat the distal fragment and bone grafting to increase the local bone stock, low due to her underlying disease.

Results: Surgical intervention was performed after 3 weeks. Firstly, a dorsal approach was made over the previous incision to extract the two most proximal screws and the screw that was not well fixed in the first intervention. Subsequently, a standard volar approach to the mid-distal third radius was carried out.
The focus was cleaning and refreshing, and fixation of the fracture was performed with a TCP plate (Synthes®), in addition, demineralized bone matrix graft was added.
Correct bone alignment and radio-ulnar stability was observed by radioscopy. The patient was immobilized with a cast for four weeks and a functional orthosis for two more.
After 4 months the patient presented a correct evolution of the wounds, absence of pain and functionality similar to the previous peri-implant fracture.
Conclusions: Peri-implant fractures, although more prevalent in the lower extremity, also occur in the upper extremity. Linked to the increase in surgical indications for osteosynthesis, prostheses and arthrodesis, peri-implant fractures have increased significantly in recent years.
It is necessary to develop classifications that allow establishment of treatment guidelines. For this reason, it is mandatory to report cases and experiences in relation to treatment. In this way we have presented this case. We also consider that this type of fractures affecting arthrodesis should be considered peri-implant fractures and their treatment can be carried out surgically by grafting and an osteosynthesis system such as a plate with screws.

A-0967 FEASIBILITY OF A FASCIAL FLAP TO AVOID ANTERIOR TRANSPOSITION OF UNSTABLE ULNAR NERVE: A CADAVER STUDY

Marco D'Orio[1], Camillo Fulchignoni[1], Rocco De Vitis[1], Marco Passiatore[2], Giuseppe Taccardo[1], Luciana Marzella[3], Alberto Lazzerini[3]
[1]Department of Orthopaedics, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy; [2]Bone and Joint Surgery Department, ASST - Spedali Civili, Brescia, Italy; [3]Galeazzi Orthopaedic Institute, Milano, Italy

Introduction: Compression of the ulnar nerve at the elbow is the second most frequent site of nerve compression in the upper limb. Upon release, anteposition of the nerve may be necessary to avoid dislocation of the latter when unstable. Numerous techniques are described in the literature (subcutaneous transposition, intramuscular transposition, subfascial transposition, medial epicondylectomy . . .), none of which is without complications. Based on Han's work, the authors propose a technique of covering the ulnar nerve with epicondylar fascial flap, avoiding transposition, but ensuring good stability of the ulnar nerve.
Methods: As part of the SICM (Italian Society of Hand Surgery) cadaver dissection course (ICLO, Verona, Italy) the authors dissected 36 elbows, of which 20 presented subluxation of the ulnar nerve after its decompression. The fascial flap was therefore made on these 20 elbows, coming from 14 different donors (9 men, 5 women) with an average age of 78 years. The diameter of the ulnar nerve was then measured (at the level of the passage in the cubital canal), the diameter of the newly formed canal, the difference between the two previous measurements (residual space in the flexed elbow canal), and it was verified whether the ulnar nerve was unstable once covered by the flap.
Results: The mean diameter of the ulnar nerve was 5.1 mm (range 4-6), while the mean diameter of the neo-canal was 10.1 mm (range 8-11) in elbow extension and 8.9 mm (range 7-10) in elbow flexion. The remaining space in the flexed elbow canal was 3.8 mm (range 3-5).In none of the 20 cases the ulnar nerve was dislocated after having made the fascial flap.
Conlusions: In light of the results obtained, the authors think that the use of the epicondylar fascial flap may be a solution to keep in mind to avoid dislocation of the ulnar nerve when it becomes unstable following its decompression. This work obviously needs clinical confirmation on living patients.

A-0968 FEASIBILITY OF HOMODIGITAL FLEXOR DIGITORUM SUPERFICIALIS TRANSPOSITION, A NEW TECHNIQUE FOR A2-C1 PULLEYS RECONSTRUCTION: A KINEMATIC CADAVER STUDY

Rocco De Vitis[1], Marco Passiatore[2], Vitale Cilli[3], Alberto Lazzerini[4], Luciana Marzella[4], Giuseppe Taccardo[1]
[1]Fondazione Policlinico Universitario A. Gemelli IRCCS, Università Cattolica Del Sacro Cuore, Istituto di Clinica Ortopedica, Roma, Italy; [2]Fondazione Policlinico Universitario A. Gemelli IRCCS, Istituto di Clinica Ortopedica, Italy; [3]Chirurgie de La Main, CHIREC Site Delta, Bruxelles, Belgium; [4]Istituto Ortopedico Galeazzi, Milano, Italy

Introduction: Homodigital flexor digitorum superficialis transposition (HFT) is proposed as a new technique for A2-C1 pulley reconstruction. Flexor digitorum superficialis is transposed on the proximal phalanx and inserted on the pulley rims, crossing over flexor digitorum profundus and acting as a pulley.
Materials and methods: The kinematic feasibility was investigated in a cadaveric bowstring model (after A2 and C1 pulley removal) on 22 fingers (thumb excluded).
Results: HFT was effective in restoring the correct flexion of proximal and distal interphalangeal joints, compared to bowstring model. No adverse events were registered.
Conclusion: HFT is a feasible technique. Clinical application is encouraged.

A-0969 EXTRAPHYSEAL DISTAL RADIUS FRACTURE IN CHILDREN: IS THE CAST ALWAYS NEEDED? A RETROSPECTIVE ANALYSIS COMPARING EPIBLOC SYSTEM AND K-WIRE PINNING

Marco Passiatore[1], Rocco De Vitis[1,2], Andrea Perna[1], Marco D'Orio[1], Vitale Cilli[3], Giuseppe Taccardo[1,2]
[1]Istituto Di Clinica Ortopedica, Fondazione Policlinico Universitario A. Gemelli IRCCS, Roma, Italy; [2]Università Cattolica del Sacro Cuore, Roma, Italy; [3]Chirurgie de La Main, CHIREC Site Delta, Brussells, Belgium

Introduction: Closed reduction and internal fixation are a widespread surgical treatment for pediatrics displaced extraphyseal distal radius fractures. Post-surgical cast immobilization is usually needed. Epibloc system (ES) is a device used to fix Colles fractures in adults, not requiring post-surgical immobilization. The aim of the study is to investigate the effectiveness of ES in a pediatric population suffering from displaced extraphyseal distal radius fractures.
Methods: We retrospectively analyzed 52 patients (age 8-12 years) who underwent CRIF. Patients were divided into two groups. Group A (25 patients): ES osteosynthesis. Group B (27 patients): K-wires and short arm cast osteosynthesis. The primary outcome is the maintenance of reduction in radiographs (displacement on frontal and lateral view). The secondary outcome is the reaching of the complete active range of motion recovery (compared with the contralateral side) and the time needed to obtain it. The need of further additional treatment (physiotherapy) and the presence of complication were also assessed.
Results: Reduction was equally maintained in both groups ($p > 0.05$). Physiotherapy was mandatory for 11 patients in group B; only for 3 patients in group A, the difference was statistically significant ($p = 0.03$) according to Fisher test. Otherwise, the difference was not statistically significant regarding complications. ($p > 0.05$). At the last follow-up, complete functional recovery was reached in all patients.
Conclusions: Functional recovery is faster, and postoperative physiotherapy is rarely required with ES. This device allows us to go beyond the traditional concept of mandatory postoperative immobilization after pediatric wrist fractures surgery.

A-0970 WHY SHOULD WE USE CORTICOID INJECTIONS MORE OFTEN

István Frendl, Henrik Rybaltovszki
University of Debrecen, Hungary

Introduction: During the COVID pandemic access to operation rooms were very limited in public hospitals in Hungary. Due to this situation, and other safety regulations, we were obliged to use more corticosteroid injections than usual to help trigger finger patients to get along with their life and work. We had to use corticosteroids in more severe cases also which other times would go straight to surgery. Last year I reported our short time results in Rimini.
Aim: We studied the efficiency of corticoid steroid injections and the conditions effecting the outcome
Material & Methods: This retrospective case series analyzed all corticosteroid injections for trigger fingers administered by two hand surgeons at a single center between January 2020 and June 2022. We overviewed the medical records of the patients. In case of unknown outcome phone consultation was initiated to record the residual symptoms of the patients. The maximum amount of injections for one affected finger was 3.
Results: We made analysis on our results according to gender, affected finger, time of existence of symptoms before getting treatment and the stage of symptoms at the first visit. The primary outcome, treatment failure was defined as receiving surgical treatment. We also compared the effectiveness of two or three injections to a single shot
Conclusions: The follow up time was minimal 18 month after the first injections so our data confirms our previous results on the long run.

A-0971 INTRANEURAL GANGLION CYST OF THE MEDIAN NERVE AT THE WRIST: A RARE CLINICAL OBSERVATION

Andrey Fedorov, Dmitriy Druzhinin, Elena Afonina, Pavel Berezin
The Clinical emergency hospital named after N. V. Solovyov, Yaroslavl, Russia

Introduction: Extraneural ganglion cysts are the most common lesions at the wrist and hand. In contrast, intraneural ganglions on the upper limb, and at the wrist and hand in particular, are extremely rare.
Aim: To report a rare case of intraneural ganglion cyst of the median nerve at the wrist presenting with symptoms of carpal tunnel syndrome (CTS).
Material & Methods: We present the case of a 45-year-old male was complained of right-hand numbness, tingling along the fingers and weakness of the right hand. Clinical examination and nerve conduction studies established the diagnosis of CTS, but sonography showed a cystic mass associated with the median nerve proximal to the transverse carpal ligament. The patient underwent surgery. During the operation, it was revealed that the median nerve was cystically altered for 4 cm, the palmar cutaneous branch was also cystically altered. Under optical magnification, extirpation of the cyst and excision of the palmar cutaneous branch of the median nerve was performed
Results: The patient was examined 12 months later: no complaints. According to the control sonography, there is no evidence of reccurence. The patient is very satisfied with the results of the operation
Conclusions: Clinicians should be aware of the possibility of intraneural ganglion cyst in patients with symptoms of CTS. If the presence of this pathology is suspected, in addition to performing nerve conduction studies, it is necessary to perform sonography and/or MRI. Surgical treatment, which consists of searching and resection of the articular branch and microsurgical extirpation of the cyst, reduces the likelihood of reccurence

A-0972 COMPARISON OF REGIONAL ANESTHESIA WITH AXILLARY BLOCK AND WALANT FOR CRPS IN COMMON HAND SURGERIES

Ugur Bezirgan[1], Merve Dursun Savran[1], Malik Kısmet[1], Erdinç Acar[2], Yener Yoğun[1], Mehmet Armangil[1]
[1]Ankara University Medical Faculty, Department of Orthopaedics, Traumatology and Hand Surgery, Ankara, Turkey; [2]Ankara Bilkent City Hospital, Department of Hand Surgery, Ankara, Turkey

Introduction: The flare reaction is characterized by an immoderate presence of erythema, stiffness, and edema in the postoperative period. The addition of pain to flare reaction is the complex regional pain syndrome (CRPS). Both flare and CRPS constitute a formidable challenge for both the surgeon and the patient.
Aim: This study seeks to juxtapose the outcomes concerning the constituent elements of the flare reaction and CRPS between regional anesthesia with axillary block and WALANT (Wide- Awake Local Anesthesia No Tourniquet) for common hand surgeries.
Material & Methods: This single center retrospective study included patients operated for Dupuytren, DeQuervein tenosynovitis, carpal tunnel syndrome and trigger finger under regional anesthesia with axillary block or WALANT. Patients operated under general anesthesia, other types of regional anesthesia (eg: supraclavicular block), and other types of local anesthesia (only prilocaine or bupivacaine) were excluded. Pain, weakness, hypertrophic scar, hypersensitive wound, erythema, and swelling were assessed along with the comorbidities. Risk of flare reaction and CRPS were compared for regional and local anesthesia.
Results: Among the 151 patients who underwent surgeries for Dupuytren's contracture, De Quervain tenosynovitis, carpal tunnel syndrome, and trigger finger, a total of 98 patients (49 under regional anesthesia and 49 under WALANT) were eligible for inclusion. The average age was 56.34 ± 10.90, and the mean follow-up duration was 29.57 ± 18.39 months, notably longer in the regional anesthesia group (47.10 ± 5.95 vs. 12.04 ± 4.55, p=0.000). Significantly, weakness and hypersensitive wound were more pronounced in the local anesthesia group (p=0.037, 0.003). Diabetes emerged as a noteworthy comorbidity affecting flare reaction outcomes, with pain, weakness, and CRPS being more prevalent in diabetic patients (p=0.000, 0.012, 0.004). This difference was particularly noteworthy when diabetic patients underwent surgery under local anesthesia. Diabetic patients experienced significantly more common flare reaction (53.85% vs 8.33%, p=0.020) and CPRS (38.46% vs. 0%, p=0.024) if operated under local anesthesia. Long-term diabetes, HbA1c or blood glucose did not affect flare reaction or CRPS.
Conclusions: While WALANT offers a convenient and efficient approach for performing uncomplicated hand surgery procedures, especially in diabetic patients, the potential risks of flare reactions and CRPS necessitate careful evaluation. Surgeons should weigh the benefits against potential drawbacks, before deciding on the appropriate anesthesia type for optimal patient outcomes.

A-0973 WHAT DOES NOT FIT IS MADE TO FIT

Christian Wirtz, Tim Cordier, Mathias Haefeli
Kantonsspital Graubuenden, Chur, Switzerland

Introduction: Prosthetic replacement of the first carpometacarpal (CMC-I) joint is mostly indicated for painful degeneration in osteoarthritis. Primary goals are pain relief and improvement of strength, whereas improvement of thumb mobility is a secondary aim. However, CMC-I joint motion is crucial for grip function and should be preserved if thenar muscle function is adequate. We report on a case of posttraumatic destruction and stiffness of the CMC-I joint in unfunctional retropulsion

position that we treated in a two staged procedure using a multiplanar distraction fixator (MiniRail®) followed by a total joint arthroplasty (Touch®) to improve grip function.
Material & Methods: A 50-year-old male was involved in a motorcycle accident with severe trauma to his right dominant hand consisting of a perilunate fracture pattern and fracture-dislocations of the CMC II-V joints. The thumb showed a multifragmentary extraarticular fracture of the proximal phalanx and a multifragmentary intraarticular fracture of the first metacarpal base. The trapezium and trapezoid bones were also multifragmentary fractured. Soft tissue damage consisted of complete rupture of the thenar muscles, median nerve compression and skin laceration at the thenar base. After primary damage control with preliminary fracture reduction and retention with an external fixator, nerve decompression and suture of the thenar muscles, definitive osteosynthesis and ligament refixation was performed in the course of 2 weeks.
After one year, all fractures had healed and function of the hand and fingers had improved after tenolyses and plate removal. Also thenar muscle function resolved, but the first ray remained fixed in an unfunctional position of 10° retropulsion and abduction despite intensive therapy.
CT scan exhibited a narrowed and degenerated CMC-I joint. As the patient refused corrective arthrodesis of the CMC-I joint we opted to improve grip function by repositioning the thumb by implanting a total prosthesis. In a first step a multiplanar distraction fixator (MiniRail®) was installed to gain joint distraction and correct position of the CMC-I joint. After 4 weeks, the MiniRail® fixator was removed and a bipolar total prosthesis (Touch®) implanted.
Results: At 3 months follow up (time of abstract submission) the patient was free of pain with better position of the thumb, ante-/retropulsion of 40°/0/10°, abduction of 60° and opposition of Kapandji 3/10. Radiographs showed a solid position of the implant. Further follow-up will be reported.
Conclusions: In this special scenario of posttraumatic stiffness of the CMC-I joint in retropulsion and intact thenar muscle function, total CMC-I arthroplasty lead to an improved thumb position and grip function. The multiplanar MiniRail® distraction fixator is a helpful and effective device to improve joint position prior to prosthesis implantation.

A-0974 PREMIER LEAGUE GOALKEEPER'S RAPID REHABILITATION FOLLOWING THUMB ULNAR COLLATERAL LIGAMENT RUPTURE WITH ASSOCIATED STENAR LESION. TRANSFERABLE REHABILITATION TIPS FORM A PREMIER LEAGUE FOOTBALL ACADEMY TO ARE NHS PRACTICE

Yasmeen Khan (1,2)*, Rebecca Morgan[1], Liam Donovan[2], Ramon Tahmassebi[3], Adil Ladak[2]
Nuffield Orthopaedic Centre, Oxford, United Kingdom; Chelsea Football Academy, Cobham Surrey, United Kingdom; King's College Hospital, London, United Kingdom

Aims: Football is one of the most popular world sports, with FIFA estimating there to be around 270 million active players. Goalkeepers are five time greater to sustain an upper limb injury than an outfield player and lay off time is significantly greater. A complex injury to the hand and wrist of a goalkeeper can be career ending. Tears to the ulnar collateral ligament (UCL) of the thumb metacarpophalangeal (MCP) joint are commonly sustained sports injuries, with an incidence of 50 per 100,000 per year. Rapid Rehabilitation to preinjury level is essential for professional goalkeepers and the team.
Method: An 18-year-old gifted academy goalkeeper in the development squad sustained a right thumb abduction and hyperextension injury whist training. He presented to the medical team with ecchymosis, tenderness at the level of the thumb MCP joint. Following clinical examination radiographs and magnetic resonance imaging confirmed rupture of the UCL with associated stenar lesion. He underwent surgical intervention using the Arthrex suture anchor and internal braceTM suture tape. Rapid rehabilitation progressed day 1 post operation. A clear post operative weekly plan resulted in return to play at 6 weeks.

Results: Rehabilitation following the UCL surgery resulted in protection of the thumb MCPJ but early range of movement for the interphalangeal joint. The Activforce-2-digital-dynamometer daily provided reading on range of movement, grip strength and pinch strength compared to the non-injured hand. Rice bucket work and Cando finger webs were used to mobilise fingers. At week 3 Size 1 ball handing commenced. Weekly progression of handling and grip strength was recorded. He returned to full contact play at 6 weeks post operation.
Conclusion: Rapid rehabilitation protocols following UCL reconstruction for professionalfootballers can be implemented in the NHS. The use of portable digital Activforce-2-digital-dynamometer can provide a valuable motivating resource for patients to monitor progress.

A-0975 SUCCESSFUL USE OF THE INTERNALBRACETM SYSTEM TO TREAT LESSER ARC PERILUNATE INJURIES IN 7 PATIENTS WITH A 4 YEAR CLINICAL AND RADIOLOGICAL FOLLOW UP

Yasmeen Khan*[1], Rebecca Morgan[1], Alex Bolt[2], Nicholas Riley[1]
Nuffiled Orthopaedic Centre, Oxford, United Kingdom (1); Pulvertaft Hand Unit, Derby, United Kingdom (2)

AIMS: Perilunate dislocation (PLD) are associated with high energy injury in young men. Goals are achieving reduction of the carpus, reconstructing the injured ligaments whilst protecting the repairs prior to mobilisation. Open reduction and direct repair, of the disrupted scapholunate interosseous ligament (SLIL) and the lunotriquetral interosseous ligament (LTIL) can be challenging. The repairs are commonly supplemented with Kirschner (K) wires, requiring a second procedure for removal. The InternalBraceTM system (IBS) uses non absorbable high strength tape between suture anchors to recreate the integrity of the interosseous ligaments without using supplementary K wires.
METHODS: We use four 3.5mm Arthrex SwiveLock anchors and the internal brace plus/ minus tendon graft to reconstruct the SLIL and LTIL with stabilisation of the proximal row onto the capitate. Intraoperative dynamic images showed stability and congruency of movement. We retrospectively reviewed are electronic notes of the patients in whom this technique was performed, demographic data was collected on age, sex and pattern of injury. Outcome data including the Michigan Hand Outcome Questionnaire score (MHOQS), range of motion, grip strength, complications, duration of immobilisation and secondary surgery.
RESULTS: Seven patients, male, aged range 27 to 55. Follow up 1 to 4 years. MHOQS mean 89.2. Range of motion in degrees: average wrist flexion 20, extension 43, radial devation 20, ulnar deviation 30,with full spuniation and pronation. Grip strength in postop wrist range 35–89. Duration of immobilisation 4 to 8 weeks. Radiographs were undertaken demonstrating no alteration in carpal alignment. No patient experienced a surgical complication or required a secondary operation for the carpus.
CONCLUSION: This technique has successfully treated perilunate injuries restoring integrity of the SLIL and the LTIL without temporary k-wire stabilisation reducing the risk of infection. The limitations of our study include small number of patients with heterogenous injury patterns and short follow up period.

A-0976 PREDICTION MODELS FOR OUTCOMES OF SURGICAL TREATMENT FOR UPPER EXTREMITY DISORDERS: A SYSTEMATIC REVIEW

Lisa Hoogendam[1,2,3], Nina Louisa Loos[1,2,3], Jaimy Emerentiana Koopman[1,2,3], Harm Pieter Slijper[3], Ruud Selles[1,2], Robbert Maarten Wouters[1,2]

[1]Department of Plastic, Reconstructive, and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands; [2]Department of Rehabilitation Medicine, Erasmus MC, Rotterdam, The Netherlands; [3]Hand and Wrist Center, Xpert Clinics, Eindhoven, The Netherlands

Introduction: Many surgical procedures for upper extremity disorders are elective in nature. For patients and clinicians to decide together what the most suitable treatment option is, it is important to know what the expected outcomes of surgery will be. As prediction models have the potential to provide clinicians and patients with individualized information on the expected treatment outcome, they are increasingly developed and validated for upper extremity disorders. However, implementation of these validated prediction models remains challenging, for example because model performance is insufficient, the model requires (too) many input variables, or the models themselves are not openly available for use by others.

Aim: Therefore, the aim of this study was 1) to provide a literature overview of validated prediction models for surgical outcomes of upper extremity disorders, and 2) to assess the clinical usefulness.

Material & Methods: We conducted a systematic search in the Embase, MEDLINE, Web of Science, Cochrane, and CINAHL databases from inception to 21 April 2022. Studies that developed and validated a prediction model for the prediction of outcomes following elective surgical treatment for upper extremity disorders were included. Two reviewers independently extracted data using the 'critical appraisal and data extraction for systematic reviews of prediction modeling studies' (CHARMS) checklist.

Results: We screened 1737 articles for eligibility based on title and abstract. For 39 articles, we assessed eligibility based on full text, resulting in 22 included articles reporting on a validated prediction model for surgical outcomes of upper extremity disorders. Fifteen articles (68%) described prediction models for outcomes of shoulder arthroplasty, and three articles (14%) predicted outcomes of carpal tunnel release. In most cases (45%), a patient-reported outcome was the target outcome of the prediction model. We found three prediction models (14%) for clinician-reported outcomes (e.g., strength or range of motion) and did not find any prediction models for complications following hand or elbow surgery. Most models predicted a binary outcome, and the Area Under the Curve (AUC) was the most used measure for model performance. For those, in internal validation, the AUC ranged from 0.68-0.89. Only one of the developed models was externally validated. The number of variables required to obtain a prediction ranged from 1-291 across the prediction models. In 59% of the articles, the prediction model was presented as a formula, nomogram, or web application, ensuring that the model could be used by others.

Conclusions: Most prediction models for surgical outcomes of upper extremity disorders are currently developed for the same treatments (i.e., shoulder arthroplasty) and similar outcome measures. Instead of developing new models, we recommend externally validating previously published prediction models, specifically for outcomes of shoulder arthroplasty and models predicting patient-reported outcomes. Certain prediction models showed promising performance in internal validation. The number of input variables required was highly variable (range 1-291). Only 59% of the models was openly available to others. To improve clinical usefulness, we recommend that articles reporting on prediction models always present their models in a usable way (e.g., as an app, formula, or nomogram).

A-0977 THE OUTCOME OF FINGER JOINT ARTHROPLASTY UTILIZING SILICONE IMPLANTS WITH THE VOLAR APPROACH FOR FINGER OSTEOARTHRITIS (PIP JOINT)

Katsuhiro Tokutake, Michiro Yamamoto, Keiichiro Nishikawa, Katsuyuki Iwatsuki, Hidemasa Yoneda, Yasunobu Nakagawa, Masaomi Saeki, Atsuhiko Murayama, Sota Saeki
Nagoya University Hospital

Aim: This study aimed to assess the outcomes of finger joint arthroplasty utilizing silicone implants with the volar approach for managing hand osteoarthritis in the proximal interphalangeal (PIP) joint.
Material & Methods: A total of thirty-seven fingers from thirty patients underwent arthroplasty between 2017 and 2022, excluding cases with inflammatory diseases, with a minimum follow-up of 6 months. The mean follow-up period for the participants was 2.7 years, with a mean age of 68.6 years. Out of the thirty-seven fingers studied, 14 were on the right, and 23 were on the left, with a distribution of 8 index fingers, 9 middle fingers, and 20 ring fingers. The investigation focused on pre- and postoperative factors such as range of motion, pain, lateral deviation, comparison between the index finger and long/ring fingers, and complications.
Results: Flexion range of motion improved by an average of 15° from preoperatively, and extension also improved by an average of 5°. The numeric Rating Scale (NRS) for pain decreased from a preoperative mean of 6.5 to 0.8 postoperatively. Lateral deviation showed improvement immediately after surgery but tended to return gradually to preoperative levels in some cases. The results for the marginal (index) and intermediate (middle and ring) fingers were comparable, with no significant differences in complications or outcomes. Complications included two cases of implant dislocation requiring reinsertion, three cases of implant fracture, and one case of postoperative re-ankylosis. One case of implant fracture resulted in reinsertion.
Conclusion: Finger joint prostheses utilizing the silicone implant with the volar approach demonstrated excellent pain relief and promising short-term results in managing hand osteoarthritis in the PIP joint. The procedure was identified as effective due to its simplicity in postoperative treatment and provision of stable outcomes even consistent results for the marginal fingers. However, because of the short-term results of this study, future long-term follow-up and comparative studies are needed to determine the long-term efficacy of this treatment modality and how it compares to other methods.

A-0978 CORRELATION BETWEEN BOSTON CARPAL TUNNEL QUESTIONNAIRE AND CROSS SECTIONAL AREA IN PATIENTS WITH CARPAL TUNNEL SYNDROME WITH AND WITHOUT BIFID MEDIAN NERVE

Enrique Peces Garcia[1], Eudaldo Gallo del Valle[1], Juan Maria Pardo Garcia[1], Belen Pardo Mayo[1], Carlos Ruiz Moliner[1], Natalia Ruiz Mico[1]
[1]*Hospital Universitario General de Villalba, Madrid, Spain.*

Aim: To analyze the correlation between the Boston Carpal Tunnel Questionnaire (BCTQ) and Cross Sectional Area (CSA) in patients with Carpal Tunnel Syndrome (CTS) with and without bifid median nerve.
Material & Methods: Descriptive prospective one-center study, from November 2021 to November 2022.Inclusion criteria: typical clinical presentation of CTS based on history and physical examination and BCTQ. Exclusion criteria: age <18 or >65 years, previous surgery or secondary cause. CSA was measured at inlet level with a linear transducer (13,5MHz), and non-bifid or bifid median nerve was described.
Results: 217 patients were included in the study, one hundred eighty four (N=184) in the non-bifid group, and thirty three patients (N=33) in the bifid group. Median age was 49 years (24-65) and 51 years (31-65), median CSA was 0.14cm2

(0.10-0.30) and 0.18cm2 (0.14-0.33), and median BCTQ 33 points (15-53) and 33 points (18-49) respectively. The Pearson correlation coefficient in non-bifid group was r=0.108 and in bifid group r=0.103, indicating no correlation in any group. Conclusions: There is no correlation between BCTQ and ultrasound CSA in patients with CTS regardless bifid or non-bifid median nerve presentation.

A-0979 THREE-DIMENSIONAL SUPERFICIAL INFERIOR EPIGASTRIC ARTERY VISUALIZATION: A CLINICAL TRIAL OF PHOTOACOUSTIC IMAGING FOR RECONSTRUCTIVE SURGERY OF THE HAND

Aiko Makino[1], Susumu Saito[1], Hiroki Yamanaka[1], Ayako Takaya[1], Itaru Tsuge[1], Maria Chiara Munisso[1], Aya Yoshikawa[2], Hiroyuki Sekiguchi[2], Yasufumi Asao[2], Takayuki Yagi[2], Naoki Morimoto[1]

[1]Department of Plastic and Reconstructive Surgery, Graduate School of Medicine and Faculty of Medicine, Kyoto University, Kyoto 606-8501, Japan; [2]Luxonus Inc., Kawasaki, Kanagawa, Japan

Purpose: The superficial inferior epigastric artery (SIEA) flap is one of the thin free flaps, which can be used for hand reconstruction. Knowing the three-dimensional distribution of vascular pedicle and its branches preoperatively and intraoperatively is ideal for safely elevating a large SIEA flap. Photoacoustic imaging is a noninvasive vascular imaging modality that utilizes light absorption of hemoglobin to visualize subcutaneous vessels. We present a clinical trial of this imaging modality for extensive skin replacement of the hand using a non-typical large SIEA flap.

Methods: The patient was a 39-year-old male with extensive scar contractures of bilateral hands caused by chemical burns. There were extensive hypertrophic scars, ranging from the dorsum of the digits to the distal forearm. The scars were repeatedly ulcerated, and the resultant contracture caused adduction contracture of the thumb and a limited range of motion of the digits. We planned to resect scars of the dorsum totally and replace them with a large SIEA flap. A photoacoustic imaging examination was performed one week before surgery. The photoacoustic imaging system we used has an S-factor mode, which can distinguish and delineate blood vessels with different oxygen saturation levels by alternatively shooting laser beams of two different wavelengths (756 nm or 797 nm). The region of interest was set to a 130 mm×180 mm rectangular area including inguinal and upper abdominal regions. The examination was performed in the prone position, and it took 15 minutes. Three-dimensional images were reconstructed to show SIEA and superficial inferior epigastric (SIEV) with different colors. Vascular map sheets were made by printing vessels on a transparent film using an ultraviolet printer. The sheets were used for flap designing preoperatively and used intraoperatively during a thinning procedure. The inverted sheet was used to provide information on the location of SIEA/SIEV and their branch vessels on the backside of the flap. The accuracy of the vascular map was assessed with intraoperative observation. A photoacoustic imaging examination was performed again for the reconstructed hand at 7 months postoperatively.

Results: The SIEA/SIEV and their branches were successfully visualized in three dimensions. The vasculatures caudal to the inguinal ligament were not clearly visualized because of hair signals. The SIEA was shown to bifurcate into two branches at 6 cm from the inguinal ligament, with one branch going into the subcutaneous tissue and the other into the deeper layers. A glove-shaped 30 cm×15 cm flap was designed with referring to the vascular map sheet. During fat thinning, locational agreement of subcutaneous vessels was confirmed. The flap was transplanted to the dorsum of the hand and digits after resecting scars and releasing contractures. Reexamination after reconstruction confirmed the patency of the SIEA vessels and visualization of regenerated veins at the periphery of the flap.

Conclusions: Three-dimensional vascular visualization using photoacoustic imaging is useful for designing a SIEA flap and its vascular map can be used as a guide for flap thinning. This imaging technology provides a new diagnostic tool for reconstructive surgery of the hand.

A-0980 CONCAVE DISTAL RADIUS FRACTURE OF SCAPHOID FACET ASSOCIATED WITH KIENBÕCK DISEASE

Hiroyoshi Hagiwara, Miku Matsuzaki
Tochigi Medical Center Shimotuga, Tochigi, Japan

Introduction: We present a case of unusual concave distal radius fracture of the scaphoid facet,
Aim: Material & Methods: A 56-year-old female was introduced to our institution who sustained right wrist pain and swelling. She had fallen down in the parking 2 days before the medical examination. Radiographs and CT (computed tomography) demonstrated unusual concave depressed fracture, which was only limited to the scaphoid facet of the distal radius. Transverse fissure at lunate facet was also recognized, but it didn't show sequent concave feature. We performed surgical treatment. At first, we conducted arthroscopic inspection and found osteomalacia of the lunate bone and dissociation of scapholunate ligament. After raising up depressed chondral and subchondral bone of the scaphoid facet, volar locking plate fixation with a Kirshner wire (K-wire) support for distal radius fracture and pinning fixation by K-wires for scapholunate dissociation were performed. Splint had been applied for 4 weeks. Active ROM (range of motion) exercise of the fingers was begun soon after the surgery. ROM exercise of the wrist was begun at 4 weeks. Wires were removed at 6 weeks after the surgery.
Results: At 6 months after the initial surgery, the plate and screws were removed. MRI after removal of K-wires indicated osteomalacia of the lunate bone, which was coincident with Kienböck disease. She sustained slight carpal pain, but it didn't interfere with daily life.
Conclusions: It was designed that due to osteomalacia of the lunate bone by Kienböck disease, the unusual concave fracture limited to the scaphoid facet and scapholunate dissociation were occurred. We performed surgical treatment and good clinical outcome was obtained.

A-0982 THE EPIDEMIOLOGY OF DUPUYTRENS' CONTRACTURE IN JAPAN FROM THE LARGEST POPULATION-BASED COHORT: WAKAYAMA HEALTH PROMOTION STUDY

Yuki Matsuyama[1], Takashi Shimoe[1], Hiroshi Hashizume[1], Mito Hayashi[2] , Shoei Iwata[3], Yusuke Kido[1], Akimasa Murata[1], Nobuyuki Miyai[1], Hiroshi Yamada[1]
[1]Wakayama Medical University, Wakayama Wakayama, Japan; [2]Hashimoto Municipal Hospital, Hashimoto Wakayama, Japan; [3]Wakayama Rosai Hospital, Wakayama Wakayama, Japan

Background: Dupuytren's contracture (DC) is a common hand disease among older Europeans. There are few epidemiological studies focusing on DC in Asian demographics. This study investigated the prevalence and quality of life related to DC, and the predisposing factors of DC among the residents in Japan.
Participants and Methods: This is a cross sectional study investigated 1309 participants (588 males and 721 females, mean age 66.3 years old), who participated in the Wakayama Health Promotion Study – a survey of lifestyle-related diseases in parallel with health checkups for residents, between 2019 and 2020. DC was diagnosed by the board-certified hand surgeons based on physical examinations. The severity of the disease was assessed by Meyerding's classification. Participants also completed the Quick DASH score (qDASH) and the Brief Self-Administered Diet History Questionnaires (BDHQ), a detailed dietary habit assessment tool for Japanese. The prevalence of DC by gender and age group, and its relationship with medical history, dietary habits, and qDASH were examined statistically.
Results: DC was found in 7.7% of total participants (12.7% of males and 3.6% of females). The prevalence increased with age. The Meyerding's classification in the group revealed that grade 0 in 79%, stage 1 in 11%, stage 2 in 10%. No

participants had stage 3 or 4 of DC. No significant difference was found in the qDASH function scores between the different Meyerding's stage (i.e. stages 0, 1 and 2). Multivariate analysis showed that factors significantly associated with DC were male sex (OR 3.68), increasing age (+1 year, OR 1.05), and increased alcohol intake (+ 1g/ day; OR 1.02).
Conclusion: This is the largest epidemiological study of DC in a general population in Japan. The prevalence of DC was 7.7%. The majority of DC cases were asymptomatic and did not contribute to upper limb dysfunction. Increased alcohol intake was potential predisposing factor of DC.

A-0983 C7 MOTOR FASCICLE TRANSFER TO SPINAL ACCESSORY NERVE FOR TRAPEZIUS REANIMATION: A CASE SERIES

Kapil Sugand, Dennis Hazell, Anna Panagiotidou, Tom Quick, Marco Sinisi, Mike Fox
Peripheral Nerve Injury Unit, Royal National Orthopaedic Hospital, Stanmore, UK

Introduction: Spinal accessory nerve paresis is disabling, painful and associated with visual stigma. Chronic cases may not suffice with solely neurolysis. Some causes may include blunt or penetrative trauma, iatrogenic especially after sentinel node biopsy or post-radiotherapy, extrinsic or intrinsic compression such as tumours, and mononeuritis syndromes. Its palsy leads to periscapular dysfunction as well as reduced contralateral rotation and lateral flexion of the head.
Aim: We aimed to reanimate the spinal accessory nerve using the motor fascicle from the C7 nerve root.
Material & Methods: 5 patients were selected for spinal accessory nerve reanimation. Surgical technique consisted of an anterior supraclavicular approach, divided omohyoid, exposure of upper and middle trunks prior to identify a C7 motor fascicle. Preference was given to a fascicle innervating latissimus dorsi on stimulation. The spinal accessory nerve was then identified and cut proximally, with distal end brought through to meet with C7 motor fascicle. Neurorrhaphy was performed with use of 9/0 or 10/0 nylon suture and fibrin glue. Since the data were non-parametric, the median, median absolute deviation, ranges and Bonett Price 95% confidence intervals were calculated. Box and whisker diagrams were also compiled.
Results: 5 patients with spinal accessory nerve dysfunction were selected for surgery over an 18-year period (2005 onwards). All right-handed, 3 males and 2 females had a median age of 40 years (±8; IQR: 33-48; 95% CI: 27-53), waited for a median time of 22 days (±17; IQR: 7-101; 95% CI: 0-197) until first clinic appointment and decision to surgery, median time of 38 days (±37; IQR: 1-66; 95% CI: 0-101) until surgery from presentation, first clinic follow-up at 12 weeks, and a median follow-up time of 38 months (±3; IQR: 36-40; 95% CI: 4-73). Causes included 2 iatrogenic neck dissections for excision biopsies of tumours and 3 road traffic accidents (with associated upper trunk injuries as well as fractures of the upper limb and ribs). Patient outcomes at first follow up at 3 months included improved pain in 4 patients and shoulder forward flexion to 110 degrees documented in 1 patient. 1 patient had to be referred to the pain clinic for associated traumatic brachial plexopathy prior to requiring a free flap transfer. There was neurophysiological evidence of reinnervation by 10 months in 1 patient. By time of discharge shoulder forward flexion was possible between 110-150 degrees in 3 patients while 1 patient has yet to attend her 3-month follow-up.
Conclusions: C7 motor fascicle transfer to spinal accessory nerve for its reanimation is a useful and effective procedure to improve range of movement and neuropathic pain.

A-0987 IS SMITH'S FRACTURE OF DISTAL RADIUS A FRACTURE OF NECESSITY?

Jin Young Kim, Min Sung Kum
Dongguk University Ilsan Hospital, Goyang, South Korea

Introduction: Smith fracture generally refers to an extra-articular fracture of the distal radius featuring a volar displacement or angulation of the distal fragment, although volar Barton fracture is also included in the category of Smith fracture. Many of dorsally displaced distal radius fractures is treated successfully with closed reduction and immobilization. However, we found that Smith fractures required surgery quite often, although successful reduction was achieved initially by manipulation.
Aim: Thus we tried to investigate if surgical treatment was necessary when treating Smith's fractures of distal radius.
Material & Methods: We retrospectively reviewed 18 patients who presented with Smith's fracture. Surgical indication includes articular involvement (with step offs over 2mm and/or a displacement of over 3mm), or a sagittal tilt greater than 20 degrees from neutral or radial shortening greater than 3 mm or less than 10 degrees of radial inclination or volar translation of carpus on the initial plain radiographs. Re-displaced fractures within less than two weeks were also included.
Results: All the 18 patients were treated by open reduction and internal fixation with the volar locking plate. An extra-articular fracture was found in 3 cases (17%), an intra-articular fracture in 9 cases (50%) and a juxta-articular oblique fracture in 6 cases (33%). Re-displacement following successful manual reduction occurred in 9 cases, within mean 7.4 (range, 6-9) days. Mean shortening was 2.4(1.3-4.7) mm and mean volar tilt was 24.3 (14.9- 36.2) degrees. Volar translation of the carpus was observed in 12 patients.
Conclusions: Considering all the Smith's fractures were treated by open reduction and internal fixation, surgery might be necessary when treating Smith's fracture of distal radius. Successful reduction of Smith's fractures was achieved by a closed method, but re-displacement was relatively common, which indicates that the distal radius fracture having volar displacement or dorsal angulation of distal fragment might be inherently unstable.

A-0988 IMPINGEMENT OF TORN TFCC IN THE SAGITTAL PLANE AND ITS RELATION WITH DRUJ INSTABILITY

YoungJoon Jeon[1], SeongJu Choi[2], Kee Jeong Bae[3], Yohan Lee[1,3]
[1]Department of Orthopaedic surgery, Seoul National University, College of Medicine, Seoul, Korea; [2]Department of Orthopaedic surgery, Nowon Eulji Medical Center, Eulji University School of Medicine, Seoul, Korea; [3]Department of Orthopaedic surgery, Seoul National University Boramae Medical Center, Seoul, Korea

Purpose: Image analysis of triangular fribrocartilage complex (TFCC) tears have been mainly conducted in the coronal plane and there has been little research in the sagittal plane. In this study, we defined the characteristic findings (referred to as "Root sign") found in sagittal Magnetic resonance image (MRI) of patients with TFCC tears and analyzed the relationship between root sign and distal radioulnar joint (DRUJ) stability.
Methods: We retrospectively analyzed patients who underwent arthroscopic TFCC repair from 2016 January to 2023 March. In preoperative sagittal MRI image, a Root sign positive was defined as a case in which the TFCC showed a characteristic shape as if it was sandwiched between the ulna and the carpal bone. To quantitatively analyze the sagittal images, the thickest and thinnest thickness of the TFCC, and the slope were measured. Before surgery, Ballottement test was performed on both sides to determine DRUJ instability.
Results: Among 29 patients, 18 patients showed Root sign positive (Group 1) and 11 were not (Group 2). Relatively less DRUJ instability was confirmed in the Root sign (+) group, and more DRUJ instability was confirmed in the Root sign

(-) group. (18.2% (2/11) vs 88.9% (16/18); $p < 0.001$). Most thin thickness was significantly smaller (0.7 ± 0.2 vs 1.8 ± 1.1; $p = 0.001$), and the slope was significantly steeper (38.2 ± 6.8 vs 17.1 ± 9.4; $p<0.0001$) in the Root sign (+) group.
Conclusion: If a torn TFCC impinges between the ulna and carpal bone, it can make ulnar subluxation irreducible, and this can be confirmed as a root sign on MRI.
Key Terms: Triangular fibrocartilage complex, sagittal image, magnetic resonance image, DRUJ instability

A-0989 THE EFFECT OF SHOULDER ROM EXERCISE ON THE PREVALENCE OF SHOULDER STIFFNESS AFTER DISTAL RADIUS FRACTURE SURGERY

SeongJu Choi[1], JoonHa Lee[2], Youngchul Shin[1], Yohan Lee[3]
[1]Department of Orthopaedic surgery, Nowon Eulji Medical Center, Eulji University School of Medicine, Seoul, Korea; [2]Hand Surgery Center, Yeson Hospital, Gyeonggi-do, Korea; [3]Department of Orthopaedic surgery, Seoul National University Boramae Medical Center, Seoul, Korea

Purpose: This study is conducted to determine prevalence rate of stiff shoulder after distal radius fracture (DRF) and the natural course of them. Second purpose of this study is to figure out risk factors of stiff shoulder after distal radius fracture.
Methods: The study prospectively analyzed 85 patients who had undergone internal fixation using volar locking plate for DRF between 2022 and 2023. Patients were divided into 2 groups. Group 1 was educated to perform shoulder exercise to prevent iatrogenic stiff shoulder after trauma. Group 2 did not perform routine shoulder exercise but was instructed to use their shoulders freely without wearing an arm sling. Shoulder range of motion (ROM), VAS, and DASH score were evaluated at preoperative, postoperative 3 weeks, 6 weeks, 3 months, and 6 months respectively. A diagnosis of adhesive capsulitis was made if there was restricted (30 degree or more) passive ROM in 2 or more planes of movement, with normal radiographic findings. Basic demographic factors (age, sex, bone mineral density, and the dominancy), radiologic variables (concurrent fractures of the styloid process, positive ulnar variances, classification of DRF, and morphologic type of the distal radioulnar joint) were evaluated.
Results: 65 patients (Group 1 34, Group 2 31) were finally involved. The mean follow-up period was 6.8 months. The range of motion of shoulder decreased most at postoperative 3 weeks and improved continuously until final f/u in both groups. There was no difference in the prevalence of shoulder stiffness in two groups at preoperative, postoperative 3 weeks, 6weeks, 3months, and 6 months respectively.
Conclusion: About 8 % of patients who performed operative treatment of distal radius fracture were suffer from shoulder stiffness after postoperative 6 months. Routine shoulder exercise had no effect on long-term clinical outcomes in patients with distal radius fracture.
Key Terms: Adhesive capsulitis; stiff shoulder; distal radius fracture; shoulder pain;

A-0990 HEAD UPSIDE-DOWN – THE CASE OF AN ISOLATED 4TH METACARPAL NECK FRACTURE

Cátia Coelho Nunes[1], José Carlos[2], Maria Inês Rocha[2], Sofia Madeira[2], Susana Rodrigues[2], Marcelo Alves[2], Júlio André[2], Ricardo Ferreira[2]
Hospital Garcia de Orta, Almada, Portugal

Introduction: Fractures of the metacarpals are one of the most common orthopaedic injuries seen in emergency room with an estimated incidence of 13.6 per 100 000 person-years. Fractures of the neck of the first and fifth metacarpals

are the most frequent, while isolated fourth metacarpal neck fracture is uncommon, because of being protected by the adjacent metacarpals.
Males in the second and third decades of life are the most affected. The two most common mechanisms of injury include accidental fall and direct blow.
Most injuries can be managed non-operatively, but certain fractures require surgery to ensure satisfactory restoration of anatomy and function.
Aim: The goal of this study was to describe an uncommon case of isolated fourth metacarpal neck fracture requiring surgical treatment.
Material & Methods: results We present the case of a 22-year-old Caucasian man, previously healthy, non-smoker with a direct trauma caused by a box falling onto his right hand.
On examination, there was tenderness and visible deformity at the lateral side of the dorsum of the hand. The fourth finger was volarly angulated and rotated under the third finger.
Hand radiographs showed an oblique fracture of the neck of the fourth metacarpal, with significant metacarpal's head dorsal angulation. CT scan was performed and showed 90 degrees of dorsal displacement of the metacarpal head.
At first, a closed reduction after local anaesthesia was attempted without success. We proposed an operative treatment with open reduction and internal fixation.
Under general anaesthesia, we performed a 2.5 cm gently curved longitudinal skin incision over the dorso-ulnar aspect of the fourth MCP joint. The extensor tendons were retracted ulnarly and the extensor hood were incised parallel to the extensor digitorum tendon. After, we identified a ruptured capsule, partially trapped inside the fracture and the articular facet of the metacarpal head facing dorsally. Pointed forceps were useful for reduction and a small K-wire, positioned retrogradely, were useful for preliminary fixation. After anatomical reduction of the joint surface, definitive fixation with 2 cortical 2.0 mm screws, posicioned anterogradely, were made. The joint capsule and extensor hood were repaired with slowly absorbable material. No angulation, rotation or shortening deformities were noticed at the end of surgery.
At follow-up, 2 weeks after surgery, the wound was healing well and the sutures were removed. Mobilization exercises were recommended to start and physical therapy were requested.
At 6 weeks, the wound was completely healed and were confirmed radiologically that no secondary displacement has occurred. Range of motion included complete ex-tension of the 4th finger and 60 degrees of flexion.
At 6 months, the patient were painless and the wound showed a small keloid scar. The range of motion remains with a small limitation, but no limitations in daily living activities were reported.
Conclusions: Despite neck metacarpals fractures are one of the most common orthopaedic injuries, fractures of the 4th metacarpal neck are uncommon. Most of them can be man-aged non-operatively, but in specific situations open reduction and internal fixation is necessary to reestablish hand function.

A-0991 IS PIN FIXATION NECESSARY FOR METACARPOPHALANGEAL JOINT RECONSTRUCTION OF WASSEL TYPE IV RADIAL POLYDACTYLY?

Chi Peng, Che-Hsiung Lee, Shih-Heng Chen, Ren-Wen Huang, Cheng-Hung Lin, Yu-Te Lin, Chung-Cheng Hsu
Department of Plastic and Reconstructive Surgery, Chang Gung Memorial Hospital, Linkou Medical Center, Taiwan

Introduction: Wassel Type IV is a common congenital hand anomaly characterized by duplication of the proximal phalanges at the metacarpophalangeal joint. The objective of thumb polydactyly reconstruction is to achieve a functional thumb with adequate motion, natural width and length, and stable metacarpophalangeal and interphalangeal joints. This

retrospective study compared the use of K-wire fixation versus non-K-wire fixation in the surgical treatment of Wassel Type IV polydactyly.
Aim: The aim of this study is to compare the use of K-wire fixation versus non-K-wire fixation in the surgical treatment of Wassel Type IV polydactyly. We will examine the advantages and disadvantages of each approach, the potential risks and benefits, and the overall outcomes for patients
Material & Methods: The study included 77 radial polydactyly thumbs in 75 patients with Wassel Type IV polydactyly who underwent surgical treatment from April 2011 to July 2021. Surgical procedures, including tendon transfer, tissue augmentation, and the use of K-wire fixation, were evaluated. Outcomes were assessed through various measurements, including the TADA score classification, post-operative x-rays, and range of motion assessments. Complications such as pin tract infection, migration, and maceration were also recorded.
Results: The results showed no significant difference in functional outcomes based on the TADA classification between the K-wire fixation group and the non-K-wire fixation group. Over 70% of patients achieved good outcomes in both groups. However, a significantly higher rate of tissue augmentation was observed in the K-wire fixation group, indicating more severe deformity presentation in cases of radial polydactyly.
Complications associated with K-wire fixation, including pin tract infection (7.9%), migration (11.1%), and maceration (4.8%), were identified.
Conclusions: In this retrospective study comparing K-wire fixation versus non-K-wire fixation for the surgical treatment of Wassel Type IV polydactyly, both approaches yielded favorable functional outcomes according to the TADA classification. However, complications such as pin tract infection, migration, and maceration were observed in the K-wire fixation group, underscoring the significance of carefully considering these potential risks.

A-0992 DUPUYTREN DISEASE SURGERY UNDER WALANT

Inês Severino Rocha, Cátia Nunes, Sofia Madeira, Susana Rodrigues, José Carlos, Marcelo Alves
[1]*Hospital Garcia de Orta, Almada, Portugal*

Dupuytren disease is a fibroproliferative illness, whose etiology remains unknown, and when it affects the hand, the palmar region, dermis, superficial palmar aponeurosis, and digital aponeurosis get thicker, with strings and nodules along the fingers. Clinically, the patient has irreversible contractures in flexion, which limit the activity of the hand.
The natural evolution of this pathology limits the functional range of motion of the hand, whereby the surgical treatment is fundamental. There are different surgical techniques, such as selective regional fasciectomy, fasciectomy, fasciotomy, and dermofasciectomy.
The Wide-awake local anesthesia with no tourniquet (WALANT) technique is cost-effective and safe. This can be used as an alternative anesthetic to Dupuytren surgery.
We retrospectively evaluated 22 patients who underwent selective regional fasciectomy under WALANT for Dupuytren disease between 2019 and 2023. The criteria for surgery were the level of the contracture (above stage two of Tubiana y Michel classification), functional deficit and, whether there were two or more fingers involved, the surgeon chose to operate the worst. It analyzed epidemiological data, Tubiana y Michel classification, and the fingers were affected. The follow-up was at least for three months.
The average age was 64,4 years and 82% of patients were male. There wasn't any difference between the sides operated. Accordingly, with the Tubiana y Michel classification, the patients had the contracture of the phalangeal metacarpal joint between 45-135º, 41% of the patients were classified as a two-stage and 59% as a third stage. The 4th and the 5th fingers

were the most involved. Only 4 patients had Dupuytren disease in two or more fingers. There were no complications, such as hematoma formation, infection, or skin necrosis.
Performing Dupuytren surgery under WALANT is safe, allows the evaluation of the range of motion immediately after the procedure, and is free of complications.

A-0993 REVISION WRIST ARTHROPLASTY

Rami Estfan, Francesca Hill, Greg Packer
Mid and South Essex NHS Trust, Southend University Hospital, UK

As total wrist arthroplasty becomes more popular as a motion preserving, pain relieving procedure there is an inevitable increase in demand for revision prostheses. Patients who have experienced total wrist replacement are often reluctant to consider fusion even in a revision situation. The Motec total wrist is well established as a primary implant. We present our experience of using it as a revision implant.
This is a case series review of 7 cases that had previously had a primary wrist arthroplasty, the average time to revision being average being 9.28 (6-13) years. The primary arthroplasty had been undertaken out using Maestro or Universal 2 implant. Failure was implant dependent with carpal loosening (Universal 2) or polyethylene failure (Maestro) resulting in osteolysis or late infection.
Carrying out revision arthroplasty can be challenging due to difficulty in soft tissue imbalance, extraction the old implant, bone loss and difficulty in establishing new implant fixation.
During these revision cases we established a methodical approach to deal with soft tissue imbalance both pre and post implantation, an implant extraction technique that avoids osteotomy and methods to deal with bone loss to establish good implant fixation and restoration of function leading to a successful outcome.
In reviewing the outcome of these revision cases, six out of the seven had successful implantation with satisfactory pain relief post operatively in addition to restoring an adequate range of movement. One case had limitation of movement with persistent pain which required conversion to wrist arthrodesis.

A-0994 REPAIR OF THE STENER LESION: 7-YEAR RETROSPECTIVE STUDY

Inês Severino Rocha, Cátia Nunes, Sofia Madeira, Susana Rodrigues, José Carlos, Júlio Almeida, Marcelo Alves, Ricardo Ferreira
[1]*Hospital Garcia de Orta, Almada, Portugal*

A Stener lesion is a type of traumatic injury to the thumb. It happens when the ulnar collateral ligament (UCL) of the thumb ruptures and gets trapped under the adductor pollicis muscle aponeurosis.
This retrospective study examines the treatment of eleven thumbs with an injury in the ulnar collateral ligament of the first metacarpophalangeal joint (MCPJ), treated between 2017 and 2023, with at least 9 months of follow-up. Two techniques were used: reattachment of the UCL with a bone anchor or direct repair of the UCL. Each patient was examined and the authors evaluated the stability of the MCPJ, range of motion and thickness of the first MCPJ, pinch, and grip strength, functional limitation, and pain. The authors applied for the Glickel Grading System, Visual Analogue Scale, and QuickDash questionnaire. Stress X-ray views were obtained in all patients in both operated and non-operated hands.
About 63% of the patients were male and the age ranged from 30 to 80 (mean 53) years. The non-dominant hand was

the most involved (72,7%). The mechanism of injury was a fall while doing sports, during nonathletic activities, or injury in a motor vehicle accident. 54,5% of the patients had complained of pain in the ulnar side of the MCPJ and edema in the thumb. About 81% of the patients in the emergency department were immobilized with a thumb spica plaster. The average time between trauma and the surgery was 46,72 days and two techniques were used to restore the anatomy of the UCL. It was performed a mid-axial or "lazy" S to expose the ulnar side of the first MCPJ.

In eight of the patients for whom bone anchors were used, the total score of the Glickel Scale ranged from 14 to 20, which means excellent (18-20 points) and good (14-17 points) outcomes. 75% of the thumbs didn't lose the grip pinch strength compared to the contralateral side. None of the patients complained of pain at present and the QuickDash ranged from 0 to 27,5.

The outcome of the three patients in which the direct repair was performed, was classified as good on the Glickel Scale and only one had lost 13% of the grip pinch strength, in comparison to the non-operated hand. Two of the patients didn't have any pain at the time of the examination. The QuickDash ranged from 2,27 to 9,09.

In this retrospective study, both techniques successfully repair the torn UCL and restore stability of the thumb metacarpophalangeal joint providing little loss of function.

A-0995 DORSAL DISLOCATION OF THE CARPOMETACARPAL JOINTS WITH AN ASSOCIATED FRACTURE OF THE FOURTH METACARPAL BASE AND THE HOOK OF THE HAMATE

Inês Severino Rocha, Cátia Nunes, Sofia Madeira, Susana Rodrigues, José Carlos, Ricardo Ferreira

Carpometacarpal joint dislocation is caused by direct energy trauma to the hand and the direction of the force determines whether the displacement is volar or dorsal. There may be associated fractures of the metacarpal or carpal bones. Clinically, swelling of the hand can make it difficult to diagnose.

The purpose of this report is to present this rare injury, which represents less than 1% of all injuries to the hand and wrist regions.

A case of multiple carpometacarpal dorsal dislocation in a young man of 19 years of age is reported. He presented with pain and deformity of his right hand immediately after falling off the stairs. He was unable to move his right hand. X-rays of the affected hand showed dorsal dislocation of all four medial carpometacarpal joints. In the emergency department, the dislocation was reduced and immobilized. He did a TC scan where it was found a fracture in the hook of the hamate and a fracture of the base of the 4th metacarpal bone. In the operating room, the hook was removed and the dislocated joints were reduced, fixed with Kirschner wires, and immobilized in dorsal plaster. Kirschner wires and the plaster were removed after 6 weeks. Hand function was satisfactory at 6 months postoperatively.

Multiple dislocations of carpometacarpal joints are uncommon injuries and they are frequently missed and misdiagnosed. This case report highlights the importance of a high index of suspicion and careful examination to not miss this diagnosis in the emergency department.

A-0996 TREATMENT OF SYNPOLYDACTYLY 1 AND 2: CONSIDERATION OF THE SPECIAL CHARACTERISTICS FOR BETTER RESULTS MAX MANN, ANNE REISS, DARJA SIPPEL

Catholic Childrens Holspital Wilhelmstift, Hamburg , Germany

Introduction: Synpolydactyly is a rare and complex hand anomaly. It is characterized by a central polydactyly and associated central syndactyly. The literature provides little information regarding treatment strategy and outcome for this complex condition.

Aim: The aim of this study was to identify differences in anatomical findings, movement restrictions, axial deviations and the frequency and type of surgery performed on the fingers in type 1 and 2 synpolydactyly. Understanding these unique characteristics is critical to improving treatment approaches tailored to each type.

Material & Methods: We reviewed our cases of synpolydactyly over the past 25 years. For this study, we included all our patients with synpolydactyly type 1 or 2 with a minimum follow-up of 5 years.

Out of more than 100 patients we identified 22 patients with complete data and X-rays.

We found 37 involved hands (15 bilateral, 7 unilateral). Ther ware 13 male and 9 female

The mean follow-up time was 11.1 years (range 5.0-17.9 years)

The breakdown into the subgroups described by Wall et al (2016) resulted in 11 cases of type 1 (A=8/B=3) and 26 cases of type 2 (A=17/B=9).

We examined the changes in the soft tissue structures, the mobility, the axial deviations and the resulting limitations of the hand. The surgeries performed to stabilise joints and correct the axis were also analysed.

All these results have also been broken down into the types/digits and joints.

Results: Types 1 and 2 usually have a poor functional outcome. The ring finger is worse than the middle finger.

At type 1A, the deviation at the MCP joint level from D3 leads to crossing fingers in approx. 50% of cases.

In these cases, we consider an osteotomy at the distal MC3 in combination with a soft adjustment to be necessary

In type 1B, the number of cases was too small to make a valid statement

In type 2A, we performed most osteotomies and arthrodeses, with a stiff PIP D4 in three quarters and DIP D4 in 90% of cases.

In the case of a kissing epiphysis of the proximal phalanges D4 and a fused base of P2 D4, it is worth waiting with an early PIP arthrodesis, as we have observed good PIP mobility in these cases.

In type 2B, we observed most changes in the flexor tendon apparatus.

In addition to the frequent arthrodesis of the PIP D4, we performed a PIP D3 arthrodesis with correction of the axis in one third.

Conclusions: Understanding anatomical anomalies, anticipated movement limitations, and axis deviations across various synpolydactyly types has the potential to minimize the need for revisions and potentially enhance overall outcomes.

A-0997 A COMPARATIVE STUDY OF RADIATION EXPOSURE BETWEEN C-ARM FLUOROSCOPY (STANDARD AND MINI) AND PORTABLE X-RAY CAMERA

Yohan Lee[1,2], Kyu Wan Kim[2], SeongJu Choi[3], Kee Jeong Bae[2]

[1]Department of Orthopaedic surgery, Seoul National University, College of Medicine, Seoul, South Korea; [2]Department of Orthopaedic surgery, Seoul National University Boramae Medical Center, Seoul, South Korea; [3]Department of Orthopaedic surgery, Nowon Eulji Medical Center, Eulji University, School of Medicine, Seoul, South Korea

Introduction: C-arm fluoroscopy is a crucial tool for surgeons specializing in bone procedures. Although frequently used in operating rooms, its utility is hampered due to the fixed positions of the collimator and detector. Recently, the development and outpatient use of portable X-ray cameras and detectors have increased.

Aim: This preliminary study aims to evaluate the feasibility of utilizing portable X-ray cameras and detectors in operating rooms by comparing their radiation exposure levels with those of C-arm fluoroscopy.

Material & Methods: The study compared the standard and mini types of C-arm fluoroscopy with portable X-ray cameras. An anthropometric foot phantom, made from a sawbone similar to human bone in X-rays, was used. In C-arm imaging, voltage and current intensity settings were automatically controlled. For the portable X-ray camera, these settings were manually adjusted to 40kV, 2mA, and 300 milliseconds for exposure time. Radiation exposure was measured using an Optically Stimulated Luminescence Dosimeter (OSLD) and a Semiconductor Radiation Detector (SCRD). The direct radiation dose received by the human body adjacent to the foot phantom was measured with the SCRD. To measure scattered radiation, 13 OSLDs were placed 30 cm away from the phantom. The distances between the radiation-source and image-intensifier sides were set at 77 cm for the conventional C-arm and 33 cm for the mini C-arm, whereas the portable X-ray camera was placed 70 cm from the detector. Both the C-arm fluoroscopy and portable X-ray camera were used to take 200 shots, and the cumulative radiation dose, as well as the hourly cumulative radiation dose, were recorded.

Results: The direct radiation dose, as measured using the SCRD, was smallest with the portable X-ray camera and largest with the standard C-arm fluoroscopy (Portable X-ray camera: 305.6 µGy, Standard C-arm: 4070.8 µGy, Mini C-arm: 1082.1 µGy). The direct radiation dose per hour was highest with the portable X-ray camera and lowest with the mini C-arm fluoroscopy (Portable X-ray camera: 50.82 µGy/s vs Standard C-arm: 19.20 µGy/ms vs mini C-arm7.47 µGy/ms). The scattered radiation dose, measured using OSLD, was 20 µGy in the portable X-ray camera's OSLD. For the mini C-arm, 30 µGy was measured for only one OSLD positioned parallel to the phantom. For the remaining OSLDs, the lowest measurable dose was recorded.

Conclusions: Under the same experimental conditions, the portable X-ray camera showed significantly lower radiation exposure compared to both the standard and mini C-arm fluoroscopies. The reduced total radiation exposure from the portable X-ray camera is attributed to its shorter imaging time compared to fluoroscopy.

A-0998 BALL-AND-SOCKET REPLACEMENT FOR THUMB CARPOMETACARPAL OSTEOARTHRITIS: A COMPARISON BETWEEN THE SINGLE AND DUAL MOBILITY DESIGN

Willem Geuskens[1,3], Matthias Papen, Maxime De Fré, Annemieke Van Haver, Kristien Vuylsteke, Frederik Verstreken[1,2], Matthias Vanhees[1,2]

[1]AZ Monica Hospital, Antwerp, Belgium; [2]University of Antwerp, Edegem, Belgium; [3]UZ Leuven, Leuven, Belgium

Introduction: Osteoarthritis (OA) of the first carpometacarpal joint is a common cause of pain and functional limitation of the hand. The initial treatment is usually conservative but eventually, surgical intervention will be required to control

symptoms. Total joint arthroplasty (TJA) is a valid surgical option. Currently, there are two types of ball-and-socket implants used for CMC-1 joint replacement: the conventional single mobility design, and the new generation dual mobility design. Literature shows promising initial results for the latter design but there is scant literature on comparing the two types of implants. Therefore, the purpose of this study is to compare the safety and clinical outcomes of the two CMC-1 prosthetic designs.

Methods: This study retrospectively reviewed and compared the radiographic and clinical outcomes of patients who underwent primary CMC-1 arthroplasty with a single mobility (ARPE, n = 168) and dual mobility (Touch, n = 36) design. Plain radiographs were checked for complications (loosening, luxation. . .). Patients were matched based on follow-up, age, and gender to compare the clinical outcomes of two implant designs. Kapandji score, Lateral pinch strength, Grip strength, VAS scores, QuickDASH scores and Nelson scores were assessed to evaluate function and patient satisfaction. Statistical significance was set at $p < 0.05$

Results: An overall complication rate of 5.4% was observed and consisted of seven dislocations, two trapezial fractures, one cup loosening and one revision due to heterotopic ossification. All of the complications were associated with the single mobility design, but the difference between the two types was not statistically different. Apart from the range of motion, the clinical and functional outcomes were slightly better in ARPE group with the strength levels, QuickDASH scores and VAS scores being significantly different.

Conclusion: According to our findings, both types of implants can be considered as safe implant designs that provide great clinical outcomes and patient satisfaction. Although there is no statistically significant difference regarding the complication rate, there is a clear trend towards an increased dislocation risk in the single mobility design when compared to the dual mobility design. It is therefore worth investigating in larger patient groups with longer follow-up.

A-0999 THERAPEUTIC APPLICATION OF KINETIC METHODS IN REGAINING THE CHOPSTICKS MANIPULATION AFTER TRAUMATIC THUMB AMPUTATION: AN ILLUSTRATION CASE STUDY

Miko Chi-yan LAM[1], Raymond Wai-kin CHING[1], Kanis Ka-wing WONG[1], Kelvin Cheong-ho LIU[1], Henry Wing-tong LO[1]
Dept. of Occupational Therapy, North District Hospital, Hong Kong

Introduction: About one-fifth of the world's population uses chopsticks as essential eating utensils, particularly in Asian cultures. Chopstick maneuvers require precise finger dexterity, with the thumb playing a major role in the overall kinetic system. Injured thumb would lead to significant impact on the use of chopsticks. Kinetic analysis, with technological advancements, offers therapists an effective and efficient examination of chopstick manipulation, which includes joint movement analysis, temporal analysis, and muscle activation pattern analysis.

Aim: The aim of this study is to illustrate the use of kinetic approach in hand therapy for patients with traumatic thumb amputation by regaining the ability to manipulate chopsticks.

Materials and Methods: A descriptive study on the progress of hand therapy for a case with dominant hand thumb amputation. Application of motion movement, temporal analysis and muscle activation patterns under kinetic approach, adaptation under assistive splinting, and 3-D printing technology were applied as enabling techniques to improve hand function in chopstick manipulation would be discussed. Outcomes in pinching force, pinching stability, precision, efficacy in chopsticks use and satisfaction would be measured.

Results: A 48-year-old gentleman with a right thumb traumatic amputation at the proximal phalangeal level after a crush injury completed a 12-week course of Occupational Therapy with the use of the Kinetic Approach in guiding the therapy modalities, successfully regained the ability to use the chopsticks in daily living. Various outcomes would be shared.

Conclusion: Thumb amputation had significant impacts on the kinetic use of chopsticks. With the advancement of market-available kinetic technology, therapists could decide the most appropriate splinting, adaptive chopsticks, and training focuses according to individual abilities and needs in more effective and efficient ways. The study findings advocate competency advancement for hand therapists. Other than clinical expertise in integrating the anatomical, physiological, and ergonomic functions of the hand, knowledge of kinetics and its application in 3D scanning and printing technology are equally essential for therapists to meet the challenges of complex hand injuries or diseases.

A-1000 BADUANJIN– PRACTICABLE SELF-MANAGEMENT APPROACH FOR THERAPEUTIC INTERVENTION OF THORACIC OUTLET SYNDROME

Henry Wing-Tong Lo, Raymond Wai-Kin Ching, Miko Chi-Yan Lam, Kanis Ka-Wing Wong, Kelvin Cheong-Ho Liu
Department of Occupational Therapy, North District Hospital, Hong Kong

Introduction: Thoracic outlet syndrome (TOS) is a group of disorders involving compression of neurovascular structures passing through the thoracic outlet. Compression of the blood vessels and nerves can cause shoulder and neck pain together with finger numbness. Conservative treatments should be attempted for patients with neurogenic TOS, accounting for around 95% of cases, before surgery is considered. One of the main conservative treatments is an upper limb exercise program designed to relieve pressure on the nerves and blood vessels in the thoracic outlet. The program includes neck and shoulder muscle stretching, upper body strengthening, breathing retraining and postural exercises aiming at improving posture, strengthening or relaxing muscles, and increasing flexibility in the affected areas of the thoracic outlet. Due to the long waiting time of clinical appointment and shortage of manpower, another self-management approach for practicing Baduanjin at home might be a potential therapeutic intervention for the treatment of neurogenic TOS. Baduanjin is one of the traditional Chinese Qigong exercise therapies with mild to moderate intensity. It only takes 14 minutes to finish a set of eight simple moves in Baduanjin, making it a suitable home program for people of different ages to practise. It is done with movements and physical postures, breathing mechanics, and, concentration and focus which is comparable with the aim of conventional upper limb exercise program for patients with neurogenic TOS. The second and fourth moves of Baduanjin are specifically targeted at stretching neck and shoulder muscles and strengthening the upper body based on motion analysis.

Aim: Investigate the potential non-invasive therapy for patients with neurogenic TOS using a self-management approach

Material & Methods: A quantitative analysis was conducted on patients with neurogenic TOS who practiced Baduanjin at home for a 3-month period after attending a 4-session Baduanjin class. This pilot was evaluated through the change of neurological condition, pain and upper limb function by sensory evaluation, pain scale and the Quick Disability of Arm, Shoulder and Hand (QuickDASH) respectively. An apps with motion analysis function was used to enhance patients' compliance and appropriateness of practising Baduanjin at home. A patient satisfaction survey was used to provide feedback on these apps.

Results: Positive results were demonstrated in neurological condition, pain and upper limb function for those patients with Baduanjin home program. Reports of high satisfaction have been made regarding the use of apps.

Conclusions: The preliminary result of this pilot study indicated that Baduanjin is a practicable self-management approach for therapeutic intervention of thoracic outlet syndrome. Not only the training effect of the moves of Baduanjin is comparable with the conventional upper limb exercise program, but also Baduanjin is culturally relevant to the Chinese population in Hong Kong. Further research is recommended to assess the efficacy of Baduanjin in patients with neurogenic TOS using a more robust study design and a larger sample size.

A-1001 CASE REPORT: ISOLATED DISLOCATION OF THE 5TH CARPOMETACARPAL JOINT IN A 54-YEAR-OLD FEMALE

Sebastião Serrasqueiro, Rita Cavaca, Orlando Simões, Vitor Pinheiro, João Moreno, Fernando Fonseca
Centro Hospitalar Universitário de Coimbra

Introduction: Isolated dislocations of the fifth metacarpal represent a distinctive entity in the spectrum of hand injuries. While fractures and dislocations affecting various metacarpals are relatively common, the occurrence of a solitary dislocation of the fifth metacarpal stands out as an uncommon phenomenon. The anatomical resilience and intricate interplay of ligaments usually safeguard against such isolated disruptions, making this case a noteworthy anomaly in orthopedic literature. This report aims to elucidate the intricacies in addressing the therapeutic challenges posed by this uncommon musculoskeletal condition.
Case Presentation: A 54-year-old female presented to the emergency department with pain and edema in her right hand after a fall from standing height. She reported no other injuries or underlying medical conditions. Physical examination revealed significant soft tissue swelling of her right hand but no neurovascular compromise.
Diagnostic Workup and treatment: Initial X-ray evaluation revealed an isolated cubital and proximal dislocation of the 5th metacarpal. The dislocation was successfully reduced and immobilizied in the emergency department under local anesthesia.
At the one-week follow-up, X-rays revealed a recurrence of the dislocation. Surgical intervention was performed, involving percutaneous pinning with a 1.4 mm K-wire to stabilize the base of the 5th metacarpal.
Outcome: Subsequent follow-up examinations at the 2nd and 3rd weeks demonstrated maintained reduction of the carpometacarpal joint and the K-wires were removed at 4 weeks post op. Residual stiffness was resolved through rehabilitation exercises.
Discussion/Conclusion: In conclusion, this case underscores the pivotal role of timely diagnosis and intervention in the management of isolated 5th metacarpal dislocations. Swift and accurate recognition of such injuries, coupled with prompt reduction and appropriate splinting, not only ensures successful outcomes but also mitigates the risk of future sequelae. It is noteworthy that surgical intervention may become a viable and, at times, imperative course of action. By emphasizing the importance of early intervention, this report reinforces the significance of a proactive approach in preserving hand function and preventing potential long-term complications associated with 5th metacarpal dislocations.

A-1002 DIFFERENCE IN MUSCULAR ACTIVITIES UPON DIFFERENT SPLINTING APPROACHES IN REHABILITATION FOR RADIAL NERVE PALSY

Wong Ka Wing[1], Ching Wai Kin[2], Liu Cheong Ho[3], Lam Chi Yan[4], Lo Wing Tong[5]
Department of Occupational Therapy, North District Hospital, Hong Kong

Introduction: Radial nerve is a commonly injured nerve in upper limbs. It is vulnerable to fractures, compressions and contusion. In radial nerve palsy, the loss of extrinsic extension of wrist and fingers cause a significant loss of functional independency of an individual. Complications prevention and management are essential goals since early phase of rehabilitation as complete recovery may take long period of time. Splintage are, therefore, commonly used in conservative treatment to prevent muscle imbalance in radial nerve palsy. In view of the synergistic motion of wrist and fingers due to the tenodesis principle, both dynamic wrist extension splint with or without assisted fingers extension are commonly prescribed to support the damaged motor functions. Yet, there is limited evidence in evaluating the effect of different splinting approaches on the rehabilitation of radial nerve palsy. This study explores the muscular activity in radial nerve

innervated muscles, comparing dynamic wrist extension splint with or without assisted fingers extension.
Aim: The primary objective is to assess and compare the efficacy of dynamic wrist extension splint with or without assisted fingers extension on forearm extensor muscle activation in radial nerve palsy. Additionally, the study aims to employ surface electromyography (EMG) to measure forearm extensor muscle activity, providing quantitative data on muscle engagement with each splint type.
Material & Methods: Participants with radial nerve palsy will be recruited for this study. They will be assigned to three groups, with custom-fabricated dynamic wrist and fingers extension splint, dynamic wrist extension splint without fingers support and a control group, to receive 6 weeks of hand function training.
Surface EMG electrodes will be strategically placed on forearm extensor muscles to record changes in the muscle activity. The data will be recorded at baseline, 2, 4 and 6 weeks after the training starts.
Results: Preliminary results indicate variations in forearm extensor muscle activity between the two splint types. Dynamic wrist and fingers extension splint demonstrate a more adaptive response to functional tasks, as evidenced by enhanced muscle engagement from surface EMG signal as compared to dynamic wrist splint. Statistical analyses will be applied to quantify and validate these findings.
Conclusions: This study sheds light on the effects of tailor-made dynamic splints in radial nerve palsy. The use of surface EMG provides valuable insights into muscle activity, suggesting that dynamic wrist and fingers extension splints may offer superior extensor muscle engagement during functional hand tasks compared dynamic wrist splint. These findings contribute to the optimisation of therapeutic interventions for radial nerve palsy, emphasizng the importance of personalised dynamic splint designs in enhancing rehabilitation outcomes.

A-1003 ENABLING - THE KEY ROLE OF OCCUPATIONAL THERAPIST IN PROCESS OF BRACHIAL PLEXUS INJURY RECOVERY

Kelvin Cheong-Ho Liu, Raymond Wai-Kin Ching, Miko Chi-Yan Lam, Henry Wing-Tong Lo, Kanis Ka-Wing Wong
Dept. of Occupational Therapy, North District Hospital, Hong Kong

Introduction: Brachial plexus injury (BPI) is one of the most complex and complicated peripheral nerve injuries. It will result in loss of sensation, weakness, and paralysis of the upper limb, depending on the injury's type, location, and severity. Specifically, brachial plexus traction injuries might heal spontaneously within 3 to 6 months, and surgical intervention could be minimized unless there is no evidence of clinical re-innervation. The recovery road for BPI patients takes months and years. Therefore, motivation and vision in outcomes are essential for BPI patients. Other than evidence-driven modalities, incorporating enabling strategies to drive the momentum in the long recovery process is essential. This paper shares practical clinical applications of how therapists empower patients to gain mastery of control in the rehabilitation processes and recovery journey.
Aim: This paper aims to illustrate how Occupational therapists use enabling strategies to enhance motivation and compliance in rehabilitation during the recovery process of traumatic BPI through a case study.
Method: A descriptive study with the logic model framework in a patient's recovery journey with outcomes measures and enabling strategies were studied.
Results: Progress of patient recovery in sensory and motor, upper limbs and activities of daily functions (ADL), patient satisfaction would be presented. The enabling strategies corresponding to different activities inputs, outputs, outcomes, and impacts would be analysed under the logic model framework.
Conclusion: Roles of the occupational therapist in enabling strategies and techniques for the natural recovery process for BPI:

1. Patient-centered approach - Understanding patients' needs through evaluating the interaction between person, environment, and occupation, and motivating them to achieve higher fulfilment.
2. Empowering- work together Co-working-work tangible short-term and midterm goals and objectives
3. Transform the small changes into notable progress: As the slow progress of nerve recovery, the patient may not be aware of the significant clinical progress. Occupational Therapists could drive those subtle changes to keep patients' momentum in rehabilitation. Strategies included various sensor assessment tools and data and assisted dynamic splint for observable dangers of wrist functional movement.
4. Share the success- In tangible success, keep reachable goals

A-1004 NERVE TRANSFER IN BRACHIAL PLEXUS INJURIES

yacine Talbi, Yacine Naceri

Introduction: In case of, brachial plexus palsy with root avulsion, nerve repair by root graft is impossible, in these cases, the only remaining treatment options are nerve transfers or tendon transfers.
Aim: the aim of this study is to present our experience with nerve transfer in brachial plexus palsy.
Material & Methods: Between 2007 and 2017, we operated 36 traumatic brachial plexus palsy, including, 06 total brachial plexus palsy, 03 C5 - C6-C7 palsy, 25 C5-C6 palsy and 02 axillary nerve palsy. For the total palsy, we favored the recovery of the flexion and extension of the elbow by a transfer of the distal spinal accessory nerve on the nerve of the biceps for recovering elbow flexion, and the transfer of intercostal nerves on the triceps nerve for recovering extension of the elbow. For C5-C6 -C7 palsy we performed a transfer of the intercostal nerves on the triceps for recovering extension of the elbow, associated with a transfer of motor fascicle of ulnar nerve on the nerve of biceps, and motor fascicle of median nerve on the nerve of brachial according to Oberlin's technique for recovering elbow flexion. For C5-C6 palsy, we performed a double transfer according to Oberlin's technique for recovering elbow flexion. Actualy for C5-C6 palsy, we associate to the double transfer, the somsak procedure and distal spinal accessory nerve to suprascapular nerve to reinnervate shoulder. For the paralysis of the axillary nerve, we transferred a motor fascicle of the triceps nerve (long head) on the axillary nerve according to Somsak procedure.
Results: For the 06 total palsy, we obtained two complete recoveries of elbow flexion and extension to M4, the recovery of only elbow extension in one patient, the recovery of only elbow flexion in one patient and two failures. For the 03 C5 - C6-C7 palsy, we obtained a complete recovery of elbow flexion and extension in 01 patient and the recovery of the only elbow flexion in two patients. For the 26 C5-C6 palsy, we obtained 22 recoveries of elbow flexion to M4, 02 recovery to M2 and 02 failures. For the 02 axillary nerve palsy, the tow patients recovered a deltoid to M4, the strenght was evaluated with hand dynamometer and the obtained strength was compared with the opposite side.
Conclusions: In case of, brachial plexus palsy with root avulsion, nerve repair by root graft is impossible, in these cases, the only remaining treatment options are nerve transfers or tendon transfers. Nerve transfers have been used with success for reconstruction of brachial plexus injuries to increase the rate of nerve regeneration.

A-1005 CUBITAL TUNNEL SYNDROME – WHEN A SMALL MUSCLE DOES BIG COMPRESSION

João Duarte Gameiro, Ana Catarina Bispo, Liliana Domingues, Inês Domingues, Rui Cunha
Hospital Ortopédico Sant'Iago do Outão, Setúbal, Portugal

Introduction: Cubital tunnel syndrome is a compressive neuropathy of the ulnar nerve caused by anatomic compression in the medial elbow. Symptoms include elbow pain, paresthesias in the fourth and fifth fingers and paralysis of intrisic muscles inervated my ulnar nerve in the hand.
The anconeus epithroclearis is a rare muscle variant that runs from the back of the medial epicondyle of the humerus over the ulnar nerve to the olecranon, It is present in 15% of population and in some cases can lead to ulnar nerve compression. It functions in mammals as an adductor and extensor of the elbow, a supinator of the forearm and protector of the ulnar nerve.
Aim: Show a case report of a cubital tunnel syndrome provoced by the anconeus epithroclearis muscle.
Case Report: A 19 years-old adolescent male, student, presented with intermittent pain in the medial side of the left elbow and hand paresthesia in the ulnar nerve distribution of 3 months duration, while playing computer. There was neither history of elbow trauma nor any sign of ulnar nerve subluxation or dislocation during elbow flexion or extension. Clinically, he had numbness and tingling in the hand and ulnar fingers, and recurring pain as well as weakness of the ulnar innervated muscles. Tinnel, Froment and Wartenberg signs were positive.
After unsucessful conservative treatment, a MRI was done and confirmed an anconeus epithroclearis muscle as the reason of compression. Surgical excision of the anomalous muscle, along with decompression of ulnar nerve was performed. Full symptom relief was achieved immediately after the procedure. After 1 year of surgery, the patient remains asymptomatic.
Discussion: Ulnar neuropathy at the elbow is the second most frequent entrapment neuropathy and is considered idiopathic in most patients. The anconeus epitrochlearis muscle is a congenital accessory muscle between the medial humeral epicondyle and the olecranon that covers the posterior aspect of the cubital tunnel and is usually an operative finding, not a preoperative diagnosis. Ulnar neuropathy as a result of the anconeus epitrochlearis muscle usually has different characteristics than idiopathic disease, including younger age at onset, faster progression with a short duration of symptoms, distinct neurophysiology with velocity drop or conduction block of the ulnar nerve, and edema of the anconeus epitrochlearis muscle on magnetic resonance imaging.
Conclusion: As shown in this case report, recovery of both motor and sensory nerve function can be achieved if the source of compression is an anomalous muscle and is treated with early surgical removal.

A-1007 DIFFERENCES IN SCAPHOID DENSITIES OF THE INTACT BONE: ANALYSIS OF SIX SEGMENTS

Liliane A. Freundt, Ingmar W.F. Legerstee, Oscar Y. Shen, Ryan Weiss, Frank J. Simeone, Chai Mudgal
Massachusetts General Hospital/Harvard Medical School, USA

Introduction: Scaphoid fractures in the proximal pole and displaced fractures are usually treated surgically, since they have an increased risk of non-union. Studies report a nonunion incidence of 1-10.8% after initial surgical treatment. This risk might be due to screw placement in a scaphoid area with insufficient bone stock leading to inadequate compression at the fracture site which prevents bone healing and subsequent fibrous tissue formation. To obtain adequate compression at the fraction site, screws should be placed in areas with sufficient bone strength, determined by bone density (BD) and trabecular architecture.
Aim: Investigating variations in bone density within the intact scaphoid can serve a dual purpose: firstly, to obtain baseline density levels, and secondly, these baseline density levels represent acute scaphoid fractures, given that density changes occur later.

Therefore, the aim of this study is to investigate differences in bone density of six different segments of the intact scaphoid bone in adults under 60 years old.
Material & Methods: 214 intact scaphoid scans were segmented and divided into six regions using 3D Quantitative Imaging (3DQI) Platform (Department of Radiology Massachusetts General Hospital). By creating three planes, the scaphoid bone was divided into six segments. The initial plane was established by using the longest point-to-point axis of the scaphoid, followed by the creation of a second plane perpendicular to the first axis, and finally, a third plane perpendicular to both the first and the second axes. Subsequently, these six segments mapped onto their equivalent anatomical position in the hand, compromising proximal, middle and distal pole, each further subdivided into ulnar and radial segments. The densities of the six segments were calculated in Hounsfield units (HU) and compared using ANOVA test, followed by a Bonferroni correction for multiple comparisons to control for type I errors.
Results: The proximal pole showed the highest density (proximal radial 550.92 ±115.03 HU; proximal ulnar 545.91± 116.18 HU), followed by the middle pole (middle radial 466.74 ± 106.87 HU; middle ulnar 475.8 ±106.2 HU) and the least density showed the distal pole (distal radial 412.4 ± 106.74; distal ulnar 428.72 ± 96.91 HU). Statistically significant differences were found between the proximal, middle, and distal poles. However, no statistically significant differences were found comparing the radial and ulnar segments within the same pole
Conclusions: The proximal pole of the scaphoid exhibits the greatest density of the six segments of the unfractured scaphoid bone, making it an ideal location for screw placement during ORIF. Further subsegmentation into radial and ulnar segments reveals no significant differences, thus allowing surgeons to determine screw placement within the proximal pole based on their preferences and practical considerations.

A-1008 A COMPARISON OF TREATMENT OUTCOMES OF PARTIAL AND COMPLETE RADIAL COLLATERAL LIGAMENT TEARS OF THE INDEX AND LONG FINGER

Liliane A. Freundt, Ingmar W.F. Legerstee, Cameron Darnell, Hinne Rakhorst, MD, Neal C. Chen
Massachusetts General Hospital/Harvard Medical School, US

Introduction: The collateral ligaments of the metacarpophalangeal (MCP) finger joints provide general stability during hand grips and facilitate pinch and grip strength. The radial collateral ligament (RCL) of the index finger and the ulnar collateral ligament (UCL) of the thumb are the primary stabilizers during key pinch. The same principle applies to the long finger during the tripod grip, involving the thumb, index, and long finger. RCL injuries are classified into mild sprains, and partial and complete tears based on the laxity of the ligament during ulnar stress testing. Untreated collateral ligament injuries of the index and long finger can cause MCP joint instability, pain, difficulty with precision grips, and diminished grip strength. Studies about index and long finger RCL injuries are typically retrospective case series with small sample sizes, and they often combine treatment results of several digits and both ulnar and radial collateral ligament injuries.
Aim: The radial collateral ligament (RCL) plays a crucial role in metacarpophalangeal (MCP) joint stability which is essential for pinch and grip strength. Clinical outcomes after treatment of index and long finger RCL tears have been scarcely reported. The purpose of this study was to compare patient-reported outcomes after surgical and nonoperative treatment of partial and complete RCL tears of the index and long finger.
Material & Methods: A database of six urban hospitals in a single city in the United States were searched for patients who sustained an index or long finger RCL injury between January, 2004, and March, 2022. Patients were asked to fill out the QuickDASH score questionnaire. High scores indicated poor outcomes.
Results: Sixty-six patients were included. The survey response rate was 38/66 (58%). Four partial RCL tears of the long

finger treated nonoperatively had higher median QuickDASH scores compared to 10 partial RCL tears of the index finger (4.5, IQR 0-9 vs. 0, IQR 0-9). Similarly, two partial RCL tears of the long finger surgically treated exhibited higher scores than five partial RCL tears of the index finger (14.8, IQR 7-22 vs. 4.5, IQR 2-9). However, nine complete RCL tears of the index finger treated surgically had a higher median QuickDASH score compared to three complete tears of the long finger (14.8, IQR 7-22 vs 11.4, IQR 6-11). Two complete RCL tears of the index finger treated nonoperatively had the highest median QuickDASH score of our cohort (25, IQR 19-31). The nonoperative treatment failure rates for complete RCL tears of the index and long finger were three out of five (60%) and three out of six (50%), respectively. The ligament ruptured proximally in 33 out of 44 (75%) patients on available imaging studies.
Conclusion: We found that complete RCL tears of the index finger treated nonoperatively had the highest median QuickDASH score. The nonoperative treatment failure rate of the index and the long finger was > 50%. In our cohort, the RCL ruptured predominantly proximally. Although our sample size was small, our results suggest that complete RCL tears of index and long finger might benefit from surgical management.

A-1009 WALANT: A REVOLUTIONARY APPROACH IN TRAUMATIC HAND AND WRIST SURGERIES

Vera Vaz, Inês Alturas, Joana Barreto, João Rosado, Sofia Miguel, Sandra Alves
Centro Hospitalar Universitário Lisboa Central, Portugal

Introduction: Wide Awake Local Anesthesia No Tourniquet (WALANT), initially conceived by Lalonde for local hand and soft tissue procedures, has become a key element in various hand surgeries, particularly gaining significance in traumatic hand and wrist orthopedic procedures.
The versatility of WALANT is evident in its ability to adapt to various hand trauma scenarios, offering a compelling and effective alternative to traditional anesthetic methods. Its alignment with outpatient settings reflects the overall goal of reducing hospitalization durations and associated costs in managing traumatic hand injuries. The elimination of the tourniquet also addresses concerns related to ischemia-reperfusion injuries, emphasizing the patient-centered approach of the method.
At its core, WALANT focuses on precision, making sure anesthesia is precisely given where needed, allowing patients to stay awake during surgery. This precise approach helps surgeons communicate with patients in real-time, crucial in hand and finger surgeries where understanding patient responses is key.
Aim: This study aims to clarify the critical importance of researching and understanding the application of WALANT in trauma-related procedures involving the hand and wrist. It aims to unravel its implications on surgical precision, patient outcomes, and healthcare efficiency.
Material & Methods: Conducted as a retrospective study, this investigation identified patients undergoing surgery for hand and wrist fractures anesthetized using the WALANT method over a oneyear period in an ambulatory surgery unit. The study endeavors to provide a comprehensive demographic description of the selected patient cohort, analyze the types of fractures addressed by this method, assess surgical durations, and evaluate postoperative pain within the initial 24 hours using a numerical scale ranging from 0 to 10.
Results: The study identified a total of 22 patients (18 males, 4 females; average age 37) undergoing surgery for hand and wrist fractures anesthetized using the WALANT method. The fractures included 6 phalangeal fractures, 9 metacarpal fractures, 1 extensor tendon rupture, 4 scaphoid fractures, 1 scaphoid and distal radial fracture, and 1 distal radial fracture. The average surgical duration was 48.64 minutes (min 20 min, max 100 min). No complications related to the anesthetic method were documented. Postoperative pain assessments within the first 24 hours, revealed 10 patients with a pain

score of 0, 2 patients with a score of 2, 5 patients with a score of 3, 2 patients with a score of 4, 1 patient with a score of 5 and 1 patient with a score of 7. Only 1 operated patient did not respond to the questionnaire. Nearly half of the intervened patients were pain-free within the initial 24 hours following surgery.
Conclusions: In conclusion, the investigation of WALANT in traumatic hand and wrist surgeries holds significant surgical importance. It provides valuable insights into increased precision, patient-centered care, and potential advancements in the field of trauma-related surgical practices. Ongoing research inquiries into WALANT are crucial in defining its role as an integral component of modern orthopedic trauma care.

A-1010 ARTHROSCOPIC HEMITRAPEZIECTOMY VERSUS CMC PROSTHESIS: WHICH TECHNIQUE ALLOWS AN EARLIER RETURN TO NORMAL ACTIVITY?

Paula Serrano, Marcos Cruz, Jaime de La Torre, Cristóbal Martínez
Hospital Dos De Maig, Clínica Teknon

Introduction: There are multiple surgical treatments for trapeziometacarpal osteoarthritis, and there is unanimous consensus that none of them is superior to the rest. Both replacement carpometacarpal joint (CMCJ) arthroplasty and arthroscopic hemitrapeziectomy are considered to have advantages in terms of early postoperative recovery.
Aim: The aim of this study is to identify which technique offers better results in terms of time to achieve their usual activity.
Material & Methods: Retrospective comparative study between two samples of patients operated on with a trapeziometacarpal prosthesis and arthroscopic hemitrapeziectomy. The inclusion criteria were patients of working age (<65 years) with Eaton II-III rhizarthrosis in whom,having exhausted all conservative treatment measures, they underwent surgery using one of the two previously described procedures. Sociodemographic data, time required for physical therapy until medical discharge, as well as associated complications were analyzed.
Results: Two samples were obtained (20 hemitrapeziectomy, 19 prostheses) comparable in age, sex, laterality and associated surgical gestures. No differences were observed in terms of complications or functional results. A statistically significant difference was observed in terms of recovery time and earlier return to usual and working activity ($p<0.005$) in favor of arthroscopic hemitrapeziectomy (8.9 weeks) over replacement arthroplasty (13.5 weeks).
Conclusions: A shorter post-surgical recovery time has been observed in patients who, fulfilling the indications for surgical treatment of rhizarthrosis in Eaton II-III radiological stages, underwent arthroscopic hemitrapectomy versus CMCJ replacement. This aspect may be relevant when deciding whether to choose one technique or another in patients of working age.

A-1011 A STUDY ON ANALYSIS OF FUNCTIONAL OUTCOME OF PERCUTANEOUS RELEASE OF TRIGGER FINGER UNDER ULTRASOUND GUIDANCE - A NOVEL TECHNIQUE

A/Prof. Prem Kumar K V[1], Dr. Sowbhikh Krishnan[1]
[1]*Chettinad Academy of Research & Education, Chennai, India*

Introduction: Trigger finger is one of most frequently encountered problem in the general population which affects the daily activities. However, with effective treatment like Ultrasound guided percutaneous trigger release a precise and possible improvement in the lifestyle can be achieved and assessed. This is a rapid and cost-effective method which saves a surgical procedure and results in better functional outcome.

Aim: To investigate the effectiveness and functional outcome of ultrasound-guided release of the first annular pulley using our novel technique and compare results with the conventional open operative technique.
Material & Methods: A prospective conventional study of 50 Adult trigger finger and thumb with Adult Trigger finger with QUINNELL'S Grade 2 and 3 who have not responded to conservative treatment of age from 30 to 70 years using our novel technique in Chettinad hospital & Research Institute, Chennai, India from 2021-2022. The follow-up included range of motion scoring, patient satisfaction and overall outcome of the procedure in terms of patient acceptance using QUINNELL'S & Q-DASH scores . The data was analysed to determine the functional outcome at three months.
Results: There was complete release of A1 in all of our 50 patients undergoing ultrasound guided percutaneous release using our novel technique and significant patient satisfaction. No recurrence was observed in those patients after 3 months of follow up.
Conclusions: Ultrasound guided percutaneous release of trigger finger using our novel technique with a needle was not only associated with excellent functional outcome and recovery in terms of patient satisfaction and range of finger motion three months post-procedure but also was found to be cost effective.

A-1012 MAJOR LOWER LIMB REPLANTATION IN CHILDREN – CHALLENGES FACED DURING THE COVID-19 PANDEMIC

Nesrin Gorgun, Rushabh Shah, Ian Grant, Tereze Laing
Addenbrooke's Hospital, Cambridge, UK

Major lower limb replantations are rare and challenging operations associated with high risks of general and local complications often with a poor functional prognosis. A successful replant depends on multiple factors including adequate viability of the amputated part, lack of severe systemic disturbance, the level of amputation and the nature of the nerve injury (sharp injuries versus avulsion). An acceptable functional and aesthetic outcome also depends on appropriate and immediate decision making. Besides the increased challenges of achieving the above in a child, COVID-19 added a whole new layer of difficulties. Expert collaboration of professionals played an instrumental role in ensuring effective care at a time of medical uncertainty and extreme measures. Adherence to COVID-19 safety protocols ensured the safety of both the patient and the healthcare team throughout the entire peri-operative period.
We describe the presentation of a 5-year-old child who suffered a traumatic total amputation of her left foot following a lawnmower accident, during the height of the COVID-19 pandemic and the first UK lockdown. The patient was immediately taken to theatre and a two-team approach was used to successfully replant the foot at the level of the midfoot. Nerve grafts and tendon repairs were performed 48 hours later. Within 6 months of injury, the patient had achieved a good functional and aesthetic outcome, returning to normal activities and competing at sports and ballet. At 2 year follow up the foot has normal sensation, the epiphyses remain open and the foot has grown commensurate with the child's growth and that of the contralateral limb.
This report highlights the challenges of performing replantation surgery during a pandemic, but also underscores the adaptability and resilience of healthcare systems in maintaining limb-salvaging surgical interventions while upholding stringent infection prevention measures during times of global health crises.

A-1013 METACARPAL ANEURYSMAL BONE CYST SECONDARY TO GIANT CELL TUMOR AND ITS RECONSTRUCTION WITH NON-VASCULARIZED FIBULAR GRAFT:A CASE REPORT

Rustem Celil, Oğuz Gokberk Ozhan, Aslı Kahraman
Katip Çelebi University Atatürk Education and Research Hospital, Izmir, Turkey

Introduction: A giant cell tumor of the bone (GCT) is a locally aggressive, benign neoplasm that consists of sheets of neoplastic mononuclear cells interspersed amongst non-neoplastic, uniformly distributed, osteoclast-like giant cells. Primary aneurysmal bone cyst (ABC) account for 1.4% of all primary bone tumors. GCTs are the most prevalent precursor lesions of ABCs developing secondarily.

Case: A 24-year-old female patient was referred to us due to pain in her hand that occurred 3 months ago and subsequent metacarpal bone neoplasia. Upon physical examination, there is a painful swelling on the 4th metacarpal of the left hand. Incisional biopsy was performed, which confirmed GCT. Surgical treatment options included salvage of the native 4th metacarpal head with bone graft reconstruction with iliac bone graft were planned.

When she was taken into surgery 4 months after admission, control radiographs showed that the metacarpal head and shaft was completely lysed. The patient underwent curettage and the addition of bone cement to fill the defect. Pathological analysis of the resected tissue demonstrated that the lesion was consistent with an ABC forming secondary to a GCT. The patient was planned to obtain the first metacarpal stock and then silastatic/vascular MP joint reconstruction. The spacer was excised and a 29 mm nonvascularized fibula graft was applied. During the follow-up, it was observed that the graft was fully unioned in the 4th month and remodeled in the 8th month. At the latest follow-up examination, 8 month after surgery, function was excellent and the patient was able to use the hand normally in manual work.

Conclusions: The features that make this case rare are the ABC that develops on the basis of a GCT and the fact that the ''pseudo MP'' joint performs a very functional job in daily activities.

A-1016 BREAKAGE OF A CUSTOMIZED OSTEOTINTHESIS PLATE. A CASE REPORT

Albert Pardo, Sergi Alabau, Lidia Ana Martín, Xavier Mir
Hospital Quiron-Dexeus Barcelona, Spain

Introduction: The use of customized osteosynthesis plates together with customized cutting guides is already a reality. They require a three-dimensional study (obtained by CT) and a healthy contralateral mirror image if possible . Distribution companies have equipment and technology that shorten the manufacturing time and production costs. But, are they as safe and have the same biomechanical characteristics as the rest of the usual plates?

Aim: report a clinical case where the customized plate was a problem and not a solution, due to intraoperative breakage of the material

Material & Methods: A 13-year-old boy with a distal radial epiphyseal fracture was initially treated conservatively and the patient had no outpatient follow-up. 2 months after the fracture, he came to us with an important deformity of the wrist and with a limitation of flexion and extension.

We decided to perform surgery, an osteotomy through the fracture callus (growth physis), together with fixation of the fragments using a custom-made Koobo plate (Medcometch), to restore the anatomy and subsequently mobility and function. The usual plates were not considered adequate due to the width of the radius and the need for dorsal and very distal placement of the plate

During surgery, when a threaded screw was placed, the plate broke in half. We did not have more plates available, so as

the reduction was correct and there were already 3 screws fixing the fracture, we decided to leave it like this.
Results: At 5 months, the boy presented a correct motor balance, the fracture was already consolidated, so it was decided to remove the osteosynthesis material.
Conclusions: There is not much literature on the biomechanical properties or failures of this type of implants, since the published studies, most of them of low scientific evidence, describe and analyze the functional results of the patients. Evidence is needed to make further progress in this type of technology.

A-1018 AN UNUSUAL PRESENTATION OF TYPE IV THUMB HYPOPLASIA

Ayşe Şencan, Osman Orman, Ethem Ayhan Ünkar
University of Health Sciences Turkey, M.S. Baltalimani Bone Diseases Teaching and Research Hospital, Hand Surgery Clinic, Istanbul, Turkey

Introduction: Thumb hypoplasia is the congenital underdevelopment of the thumb. Its diagnosis is based on clinical findings and is supported by radiological findings. Blauth classification is used to define the degree of hypoplasia and helps when deciding the treatment. Some modifications are added to the Blauth classification. A modified Blauth classification of type IIIB has an unstable carpometacarpal joint and type IIIC has a remnant head of metacarpal only. Type IV is also called floating thumb, where the thumb is attached to the hand by a soft tissue bridge.
Aim: We aim to present an unusual type IV thumb hypoplasia case.
Material & Methods: Four-and-a half year old boy was admitted to our outpatient clinic with right hand thumb hypoplasia. The thumb was attached to the hand with a broad stalk. There was a bony prominence proximally, resembling the proximal first metacarpal bone. When asked to move his thumb, the child could palmarly abduct this bony prominence; however, he could not flex or extend his thumb. A posteroanterior hand X-ray showed a thin and short proximal first metacarpal bone and two phalanges in the floating thumb. There was no joint in between these two structures.
Results: The parents were offered the amputation of the hypoplastic thumb and second finger pollicization. But they denied the offered treatment.
Conclusions: The review of the literature showed no such type IV thumb hypoplasia case with a first proximal first metacarpal remnant. This case might give rise to a subgroup addition in type IV thumb hypoplasia.

A-1019 SURGICAL TRAINING AND MICROSURGICAL UPPER LIMB RECONSTRUCTION – A COMPARISON OF OUTCOMES

Conor Cuggy[1,2], Ciaran Hurley[1,2], Paul Sullivan[1,2], Safwat Ibrahim[1,2], Roisin Dolan[1,2]
[1]Department of Plastic & Reconstructive Surgery, Beaumont Hospital, Dublin, Ireland; [2]Royal College of Surgeons in Ireland, St Stephen's Green, Dublin, Ireland

Introduction: Reconstruction of composite tissue defects in the upper limb represents a variety of functional and aesthetic challenges to plastic surgeons. Research lacks consensus on whether involvement of trainee surgeons' results in greater complications and inadequate patient outcomes. Acquisition of technically demanding skills and accurate self-assessment of limitations is vital to progression and continuous development of trainees.
Aim: The aim of this study is to compare consultant versus trainee flap raising and consultant versus trainee microvascular anastomosis in upper limb reconstruction.
Material & Methods: Through multi-site data base, all upper limb flap reconstruction between the years May 2020 to September 2023. Data available on 38 flaps were analysed.

Results: Overall, when there was any trainee involvement in raising a flap, there was no statistically significant difference in ischaemic (p=0.726) or total operative time (p=0.224). Free flap partial loss, total loss, and complete survival was similar across all groups (p=0.531). When a consultant raised the flap, the consultant was more likely to complete the arterial anastomosis (p<0.01) themselves compared to when there was any trainee involvement in raising the flap.
Conclusions: The lack of statistical difference in post-operative complications adds support to the safety of trainee involvement. Interestingly, the results demonstrate that when the consultant alone raised the flap, trainee involvement in microvascular reconstruction decreased. Thus, these results reinforce evidence that surgical training in microvascular reconstructive techniques provides satisfactory outcomes, however their participation in real-time complex reconstruction requires continuous encouragement.

A-1020 COMPARISON OF NERVE TRANSFERS WITH TENDON TRANSFERS IN PATIENTS WITH TETRAPLEGIA: A SYSTEMATIC REVIEW

Lea Estermann[1,2], Vikneshwaren Senthamil Selvan[3], Liron Duraku[1], James Ledgard[1]
[1]Royal North Shore Hospital, Sydney, Australia; [2]Balgrist University Hospital, Zurich, Switzerland; [3]Lee Kong Chian, School of Medicine, Singapore, Singapore

Introduction: The reconstructive options for restoring upper extremity function following spinal cord injury have been expanded from tendon transfers to a combination of tendon and nerve transfers or nerve transfers only. The reconstructive principles of restoring elbow extension, wrist extension, hand opening and closing remain the same. In general, tendon transfers are thought to be stronger whereas a more natural movement is expected from nerve transfers.
Aim: To summarize the current literature on nerve and tendon transfers in patients with tetraplegia and to compare the postoperative outcome regarding MRC grading, grip- and pinch strength.
Material & Methods: A systematic search in Embase, MEDLINE, Web of Science, Cochrane, and Google Scholar databases was performed. The search included all studies on tendon and nerve transfers in patients with tetraplegia with a minimum of 5 cases and a postoperative outcome measure of MRC grading or grip- and pinch strength.
Results: From a pool of 828 references, 12 studies on nerve transfer and 24 on tendon transfer were included in the analysis. Among the tendon transfer studies, 9 examined elbow extension using MRC, while pinch and grip strength were investigated by 17 studies. In the realm of nerve transfer investigations, seven focused on elbow extension, eight on hand opening, and an additional eight on hand closing—all of which were assessed using MRC measurements.
Conclusions: Tendon and nerve transfers in patient with tetraplegia improve upper limb function. The comparison of the two techniques is difficult due to the different outcome measures. The meta-analysis will be presented at the conference.

A-1021 LONG-TERM EVALUATION OF NERVE TRANSFERS FOR TRICEPS MUSCLE RECOVERY IN OBSTETRICAL BRACHIAL PLEXUS PALSY

Filippo M. Senes[1,2], Francesca Susini[1], Maria Grazia Calevo[3], Nunzio Catena[4]
[1]Hand Surgery department, San Giuseppe Hospital – MultiMedica, Milan, Italy; [2]Former Chief of Reconstuctive Surgery and Hand Surgery Unit -IRCCS Istituto GGaslini Hospital, Genoa, Italy; [3]Scientific Direction - IRCCS Istituto GGaslini Hospital, Genoa, Italy; [4]Chief of Reconstuctive Surgery and Hand Surgery Unit -IRCCS Istituto GGaslini Hospital, Genoa, Italy

INTRODUCTION: Triceps muscle recovery after obstetric brachial plexus injury is a secondary goal, following the restoration of hand function, elbow flexion, and shoulder abduction along with external rotation.

AIM: The aim of this study is the long-term evaluation of the results of nerve transfers for triceps muscle reanimation.
MATERIALS AND METHODS: The database of the IRCSS Gaslini Hospital of Genoa was searched to identify patients who had undergone nerve transfers for OBPI from 2007 to 2018.
Inclusion criteria were the absence of triceps function from birth or a failure of radial nerve recovery resulting in triceps paralysis, and a minimum postoperative follow-up of four years.
Nerve transfer performed for triceps reanimation was directed towards the terminal branches of the radial nerve for the triceps, or the entire radial nerve.
Regarding the choice of donor nerve, the bundles of the ulnar nerve for FCU, or the intercostal nerves, it was made considering the level of lesion of the plexuS.
RESULTS: From 2007 to 2018, 92 nerve transfers were identified. Of these, 16 patients underwent neurotization to reanimate the triceps.
The mean age at the time of surgery was 48.94 months (median four years), ranging between eight and 96 months. The time between surgery and last follow-up (ΔT), was approximately between four and 13 years, with an average of approximately 9 years (median 9.57). The mean age of the patients at the last follow-up was approximately 13 years (median 12.56), with a range between 5.5 and 18.1 years. More than 50% of the patients were over 11 years of age. Only 3 (18%) were less than 10 years old. All were followed up for a minimum of four years. The elbow flexion contracture had mean values of approximately 35°
The outcome measurements demonstrated an improvement in muscle strength: MRC strength assessment scores and Gilbert's elbow function scores taken at the final follow-up demonstrated overall improvement over preoperative values. In the preoperative MRC, only 25% of patients had a grade 1, while in the others no movement or contraction of the triceps was demonstrated (score 0). At the last follow-up, the mean value was 3.75 (range 2 - 5), with a median of four points. Similarly, the preoperative GES values averaged 2.56 (range 1 – 3), with a median of three points, while at the final follow-up, it reached an average of 3.75 (range 2 – 5), with a median equal to four points. The analysis demonstrated for both scores a statistically significant difference between pre and postoperative, with $p=0.0001$ and $p=0.002$ respectively.
CONCLUSIONS: The study demonstrated a good and functional recovery in the majority of patients, allowing the authors to consider triceps reinnervation as a safe and suitable procedure.
Long-term follow-up is important to evaluate whether additional interventions are needed to improve elbow function, to confirm the hypothesis that triceps resuscitation prevents elbow contractures, and to compare elbow function associated with the shoulder and wrist function, for a more global evaluation of the results.

A-1022 OUTCOME COMPARISON OF PRIMARY SUTURE BUTTON SUSPENSIONPLASTY VERSUS SECONDARY SUTURE BUTTON SUSPENSIONPLASTY FOLLOWING FAILED TOTAL TRAPEZIOMETACARPAL JOINT REPLACEMENT

Sergi Barrera-Ochoa[1], Julio Adrián Martinez-Garza[1], Mendez Gerardo[1], Jose Antonio Prieto Meré[1], Daniel López Guevara[1,2], Mora-Esther[1]
[1]Hand, Elbow and Microsurgery Unit, Institut de la Mà. Hospital Universitari General de Catalunya, Barcelona, Spain; [2]Instituto de Microcirugía Valencia, Valencia, Venezuela

Introduction: Many surgical options have been described for the treatment of severe trapeziometacarpal (TMC) arthritis. However, there is no evidence that one technique is better than another.
The aim of this study is to compare the clinical and radiological outcomes between secondary trapezial excision and suture button suspensionplasty (SBS) after failed total trapeziometacarpal joint replacement and primary trapeziectomy and SBS.

Material & Methods: Between January 2012 and December 2018, we performed 17 revision procedures in our institution because of failed trapeziometacarpal joint replacements. All patients were followed up. In a matched-pair analysis, we compared clinical outcomes between this group and 17 patients treated with primary trapeziectomy and SBS. The matching criteria were sex, age, and time from surgery. The mean follow-up period was 42 months. We evaluated mobility (radial and palmar abduction, opposition, and Kapandji score), grip strength, and patient self-assessment (pain; satisfaction; Disabilities of the Arm, Shoulder, and Hand score; and activity restriction).

Statistical analysis: All values were described using means, minimums, maximums, and standard deviations (SD). Differences in pre and post-operative data were analyzed using paired Student's t-tests or the Wilcoxon nonparametric equivalent for pain, ROM, and QuickDASH scores. For comparisons between the operated and the non-operated upon (healthy) hands, means were compared using dependent Students' t-tests. Comparisons between the PT+SBS and RI groups were made using nonparametric Wilcoxon rank-sum tests because of the non-normal distribution of the variables

Results: The patients' mean age at surgery was 66 years. The median follow-up period was 42 months. Twenty-eight (82%) of the patients were women.

Twenty-four patients were engaged in heavy labor, four were engaged in office-type work, and six were attending university.

According to most of the clinical evaluation methods (range of motion and Kapandji score) and subjective assessments (pain; Disabilities of the Arm, Shoulder, and Hand), outcomes did not differ considerably between the 2 study groups.

Conclusions: The present study showed that the outcomes of secondary trapeziectomy and SBS after failed trapeziometacarpal joint replacement arthroplasty generally do not differ from the primary trapeziectomy and SBS results. Although it shows high revision rates in the literature, trapeziometacarpal total joint arthroplasty is a good treatment option. In the case of failure, the secondary trapeziectomy and SBS outcome is comparable to that of primary trapeziectomy and SBS.

A-1023 CEREBRAL CHANGES FOLLOWING CARPAL TUNNEL SYNDROME TREATED WITH GUIDED PLASTICITY – A PROSPECTIVE, RANDOMIZED, PLACEBO-CONTROLLED STUDY

Magnus Flondell[1,2], Peter Mannfolk[3], Birgitta Rosén[1,2], Isabella M. Björkman-Burtscher[3,4], Anders Björkman[1,2,5]

[1]Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden; [2]Department of Hand Surgery, Translational Medicine, Lund University, Malmö, Sweden; [3]Department of Medical Imaging and Physiology, Skåne University Hospital, Lund, Sweden; [4]Department of Radiology, Clinical Sciences, Sahlgrenska Academy, University of, Gothenburg, and Sahlgrenska University Hospital, Gothenburg, Sweden; [5]Department of Hand Surgery, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg and Sahlgrenska University Hospital, Gothenburg, Sweden

Introduction: Compression neuropathy, such as carpal tunnel syndrome (CTS), results in changed afferent nerve signaling, which may result in changes in somatosensory brain areas. Guided plasticity is a concept where the dynamic capacity of the brain is used, for therapeutical purposes, to replace or improve damaged functions

Aim: The aim was to assess cerebral changes following unilateral CTS and to assess short-term and long-term cerebral effects of guided plasticity treatment using cutaneous forearm deafferentation.

Material & Methods: Twenty-four patients with mild-moderate unilateral CTS were randomized to treatment with an anesthetic cream (EMLA®) or placebo on the affected side. Patient-rated outcomes were assessed using the symptom severity scale from the Boston Carpal Tunnel Syndrome questionnaire and the disability of arm, shoulder, and hand questionnaire (QuickDASH). Patients were clinically assessed for tactile discrimination and dexterity. Cortical activation

during sensory stimulation was evaluated with functional magnetic resonance imaging at 3T. Assessments were performed at baseline, after 90 min of initial treatment, and after 8 weeks of treatment.
Results: fMRI showed that sensory stimulation of the hand with CTS resulted in significantly less cortical activation in the primary somatosensory cortex (S1) than stimulation of the healthy hand. Treatment with cutaneous forearm deafferentation on the side with CTS resulted in increased cortical activation in S1 both after the initial treatment and following 8 weeks of treatment. In addition, QuickDASH and tactile discrimination showed improvement in the EMLA® group over time.
Conclusions: Stimulation of median nerve innervated fingers in patients with unilateral CTS results in cerebral changes with a smaller-than-normal activation in the contralateral S1. Cutaneous forearm anesthesia on the side with CTS results in larger activation in S1 suggesting recruitment of more neurons in line with the theory of guided plasticity treatment and a slight improvement in sensory function. Further studies are needed to better understand how cerebral changes affect the symptoms in patients with CTS, and also to describe the role of treatment strategies where brain plasticity is guided.

A-1024 RISK FACTORS FOR RECURRENCE AFTER OPEN DORSAL WRIST GANGLION EXCISION

Lisa Hoogendam[1], Jaimy E. Koopman[1], Camille Blaaker[1], Jeroen Smit[2], J. Michiel Zuidam[1], Ruud W. Selles[1]
[1]Erasmus University Medical Center, Rotterdam, The Netherlands; [2]Xpert clinics, Rotterdam, The Netherlands

Background: Although dorsal wrist ganglion (DWG) excision results in pain reduction and hand function improvement, recurrence is common. Distinguishing between recurrence after a primary or recurring dorsal wrist ganglion is important because existing evidence suggests that re-excision of a recurrent ganglion cyst may lead to poorer outcomes. Further insight in the factors associated with recurrence can aid surgical decision-making and improve patient counseling. Therefore, this study aimed to compare the recurrence rates following open excision of primary and recurrent dorsal wrist ganglion cysts. The secondary aim was to identify factors associated with recurrence of the dorsal wrist ganglion cyst.
Methods: This is a cohort study of patients undergoing an open excision of a primary or recurrent DWG. Several baseline questionnaires were completed, including on patient characteristics, disease characteristics, and the Patient Rated Wrist/Hand Evaluation (PRWHE). Patients were excluded if (1) they were younger than 16 years, (2) the ganglion was located on another location than the scapho-lunate ligament, or (3) if there was missing data in baseline questionnaires. We screened all medical records to confirm that the patient underwent open DWG excision. Additionally, we extracted information on recurrence of the ganglion cyst and subsequent treatment, regardless of time since surgery. Survival analyses were performed to evaluate time to recurrence and to assess factors associated with time to recurrence.
Results: Of the 1000 patients included, 82 percent were treated for a primary DWG, while 18 percent were treated for a recurrence. The median follow-up time was 4.7 years (IQR 2.9-7.3). During follow-up, 10.4% of the patients developed a recurrence of their DWG, with a median time to recurrence of 56 weeks (IQR 30-104). The probability of a recurrence of the DWG increased by 75.7% (HR 1.76, 95% CI 1.06-2.90, $p=0.03$) after one previous recurrence and in instances with two or more prior recurrences increased by 188.7% (HR 2.89, 95% CI 1.58-5.28, $p<0.001$). An increase in age by one year was associated with a 2.1% (HR 0.98, 95% CI 0.96-0.996, $p=0.02$) reduction in the probability of experiencing a recurrence. No other factors were found to be associated with the recurrence of a DWG.
Conclusion: This study shows that having previously experienced a dorsal wrist ganglion is an important indicator of whether recurrence will occur. In cases with a history of multiple excisions, clinicians should be attentive to the high potential for recurrence. The median time to recurrence of 56 weeks indicates the importance of ongoing monitoring for patients with a higher risk of recurrence. These findings provide clinicians with valuable insights to enhance the care of patients with dorsal wrist ganglion cysts. By taking this information into account during patient counseling and

expectation management, the findings can contribute to an improved shared decision-making process.

A-1026 STABILIZATION OF THE HYPOPLASTIC THUMB TYPE BLAUTH IIIB USING A NON-VASCULARIZED PROXIMAL INTERPHALANGEAL JOINT FROM THE TOE AS AN ALTERNATIVE RECONSTRUCTION WHEN POLLICIZATION IS NOT ACCEPTED - RESULTS AND COMPARISON TO INDEX POLLICIZATION

Michał Górecki, Piotr Czarnecki, Leszek Romanowski
Department of Traumatology, Orthopaedics and Hand Surgery, Poznań University of Medical Sciences, Poland

Introduction: Thumb hypoplasia or aplasia is a significant functional and cosmetic problem for the developing hand in children. The gold standard in the treatment of Blauth IIIB type is the amputation of the thumb and the pollicization of the index finger. Despite the good functional and clinical results, more and more parents do not consent to the operation, mainly for cosmetic reasons - the four-finger hand. Alternatively, there are operations to increase stability and restore the first carpometacarpal joint of the thumb, such as reconstruction using the metatarsophalangeal joint, phalanges, or parts of the metatarsal bone.

Aim: We want to present an alternative technique used in our Department of Hand Surgery for over 20 years: stabilizing a hypoplastic thumb with a non-vascularized proximal interphalangeal joint from the toe to reconstruct the first carpometacarpal joint in kids' hands.

Material & Methods: Over 20 children were operated on with the abovementioned technique, but only half came for a check-up. Mean follow-up is about 7 years. The collected results were compared to a control group of 18 patients after index treatment as the gold standard of treatment. This type of surgery is described in the literature, but there are no reports of its use in this type of defect.

Results: After the operation, the results show an improvement in the stability of the hypoplastic thumb, which improves the grip and active use of the hand in everyday functioning. Only in one patient improved stability was not achieved, probably due to destabilization of the Kirschner wires and nonunion of the graft.

The range of passive motion in the IP, MP, and CMC joints (palmar and radial abduction) was, on average, 63, 27,65, and 80 degrees, respectively, better compared to the control group, but no active movement was observed in most cases. The relative length of the thumb was around 30% shorter than normal. The global grip strength was almost half that of the healthy contralateral hand and almost three times higher than in the control group.

All patients failed to generate force with a two-point grip. The mean overall Michigan Hand Outcomes Questionnaire score was slightly lower than the control group.

Removal of the proximal interphalangeal joint from the toe does not affect the gait quality, and the cosmetic defect is acceptable to patients and parents.

Almost all patients (or their parents) would decide to perform the operation again.

Conclusions: The non-vascularized proximal interphalangeal joint transfer from the toe to the Blauth IIIB hypoplastic thumb is an acceptable alternative for increased stabilization in CMC I joint for patients whose parents do not accept thumb amputation and four-finger hand.

A-1027 AUTOMATIC MOTION ANALYSIS OF WRISTS WITH SCAPHOLUNATE LIGAMENT INJURIES USING DYNAMIC CT IMAGING

Erin Teule[1,2], Maranda Haenen[1,3], Stefan Hummelink[1], Brigitte van der Heijden[1,4]

[1]Department of Plastic Surgery, Radboudumc, Nijmegen, the Netherlands; [2]Orthopaedic Research Lab, Radboudumc, Nijmegen, the Netherlands; [3]Department of Radiology, Radboudumc, Nijmegen, the Netherlands; [4]Department of Plastic Surgery, Jeroen Bosch Hospital, 's-Hertogenbosch, the Netherlands

Introduction: Four-Dimensional Computed Tomography (4DCT, time as fourth dimension) is an emerging imaging modality that enables non-invasive and dynamic analysis of wrist kinematics. 4DCT has demonstrated its potential for diagnosing scapholunate ligament (SLL) injuries, although clinical implementation of 4DCT is challenging due to the substantial amount of generated data (144 CT scans per wrist). Therefore, the aim of this study is to evaluate a fully automatic analysis of wrist kinematics of SLL injured wrists and their contralateral healthy wrists using 4DCT.

Methods: Both wrists of patients with unilateral arthroscopically-confirmed Geissler grade 3 or 4 SLL injury received a 4DCT scan. The imaging protocol included a conventional static CT scan of the forearm and wrist, followed by two dynamic imaging runs: radial to ulnar deviation (RUD) and flexion to extension (FE). Scans were reconstructed at a 10 Hz sampling rate, resulting in 144 dynamic CT scans per participant. Image analysis included automatic segmentation of wrist bones using an AI-model and registration of bones from the static scan onto corresponding dynamic positions. Using the registered meshes of the scaphoid and lunate, the scapholunate distance (SLD) and scapholunate angle (SLA) were automatically computed in each wrist position. Wrists with SLL injury were compared to their contralateral, uninjured wrist using Mann-Whitney U-tests and a p-value <0.05 was considered statistically significant. results are presented as medians and interquartile range.

Results: 18 patients (six females) were included in this study, of which 13 had a unilateral Geissler grade 4, and five patients had a unilateral Geissler grade 3 SLL injury. In the Geissler 4 group, 11 patients (84.6%) had a significantly higher SLD in the injured wrist during both wrist movements, compared to the uninjured wrist. The median SLD of all injured wrists in this group was 1.59mm [0.82-2.96] during RUD and 1.37mm [0.88-2.41] during FE, versus 0.59mm [0.40-1.10] and 0.82mm [0.56-1.28] in the contralateral wrists, respectively. For the SLA, 10 patients (76.9%) showed a significantly higher SLA in the injured wrist during RUD (74.30° [44.44-92.98] versus 65.31° [60.00-72.54]) and 11 patients (84.6%) during FE (81.68° [59.79-98.26] versus 65.19° [50.38-78.46]). In the Geissler 3 group, three patients (60%) had a significantly higher SLD in the injured wrist during RUD (1.08mm [0.60-1.43] versus 0.83mm [0.63-1.10]) and four patients (80%) during FE (0.99mm [0.68-1.44] versus 0.86mm [0.70-1.12]). For the SLA, no significant differences were found in this group.

Conclusion: We developed a fully automated motion analysis of patients with SLL injuries using 4DCT scans and systematically compared the results to the contralateral, uninjured wrists of these patients. Based on our preliminary results, 4DCT scans can aid in the diagnostic workflow of most patients with severe SLL injuries and comparison of both wrists provides valuable insights into personalized wrist kinematics. Although our current patient numbers are small, the SLD emerges as a potentially more efficacious parameter in distinguishing injured from uninjured wrists on an individual patient level, outperforming the SLA. Further research with a larger patient cohort is necessary to verify this hypothesis.

A-1028 ARTHROSCOPIC TREATMENT OF POST-TRAUMATIC STIFFNESS OF THE WRIST IN WALANT

Daniel Vilcioiu, Andrei Popa, Claudiu Jaba
Clinica de Chirurgia Mainii - Zetta Hospital, Romania

Introduction: Articular distal radius fractures can result in wrist stiffness if they are not proprely treated. Strong fibrous adhesions between the radius and proximal row and the DRUJ will lead to loss of function and longer return-to-work times. Arthroscopic debridement and immediate mobilisation has shown excellent results in WALANT, encouraging the patient during the hand therapy program.
Aim: To introduce WALANT as a standard anaesthesia for stiffness surgery. To encourage the patient and the hand therapists directly from the OR
Material & Methods: 14 patients with complex distal radius fractures treated conservative or operatively in other services were treated between January 2020 and September 2023 in day surgery by arthroscopic debridement and complete clinical test with the patient wide-awake. Hand therapy program is started in day 2 to 4 postoperative.
Results: All the patients had immediate intraoperative almost-full ROM and significant improvement in postoperative VAS and DASH scores, returned to work and there was no need for further surgery until present day. Patients underwent hand therapy in the first weeks postoperative to maintain mobility during recovery from operative inflammation.
Conclusions: Arthroscopic wrist debridement in WALANT had an immediate impact in the mobility of patients with wrist stiffness after an articular distal radius fracture, treated by ORIF and immobilization or immobization only- most of the cases prolonged . The technique is reproduceable and basic arhroscopic instruments are needed.

A-1029 DO MORE PLATELETS IN THE PERIPHERAL BLOOD INFLUENCE ON NUMBER OF GROWTH FACTORS IN PLATELET-RICH PLASMA?

Pawel Reichert, Maciej Dejnek, Aleksandra Krolikowska
Clinical Department of Ortopaedics, Traumatology and Hand Surgery, Wroclaw Medical University, Poland

Introduction: The justification behind platelet-rich plasma (PRP) injections in sports injuries is related to the high content of growth factors released locally from platelets a-granules. These molecules, involved in natural healing processes, are expected to accelerate tissue regeneration and recovery of athletes. The wide range of platelet counts in healthy blood, a variety of preparation protocols, and administration techniques may be among the causes of inconsistent results in PRP treatment.
Aim: The study aimed to assess the relationship between the content of cellular components in the whole blood and PRP samples and their correlation with the content of growth factors.
Material & Methods: A blood sample was taken from 43 subjects aged 24 to 60, and PRP was prepared using the Mini GPS III Platelet Concentration System (Biomet Inc., USA). Complete blood count was evaluated in both whole blood and PRP samples. Multiplex bead immunoassays and flow cytometer measurements were used for seven growth factors assessment in PRP: Transforming growth factor-ß1 (TGF-ß1, free active), Epidermal growth factor (EGF), Fibroblast growth factor-basic (FGF-basic), Vascular endothelial growth factor (VEGF), Hepatocyte growth factor (HGF), Platelet-derived growth factor-AA (PDGF-AA), and Platelet-derived growth factor-BB (PDGF-BB). Statistical analysis was performed, searching for correlations between the cellular components of whole blood/PRP and the content of selected growth factors
Results: The complete blood count analysis shows a wide range of the content of platelets (PLT 133 – 419 109/L), white blood cells (WBC 4,06 – 9,82 109/L), and red blood cells (RBC 3,93 – 5,82 1012/L). In PRP, the PLT concentration increased

4.5 times (from 249,67 ±56,51 to 1119,81 ±443,07), the WBC concentration increased 4.75 times (from 6,57 ±1,37 to 31,24 ±10,09), the RBC concentration decreased 4 times (from 4.89 ±0.43 to 1.15 ±0.80). There was a significant high correlation between all cellular components in whole blood and in PRP, except RBC. Significant positive Spearman correlations were found between the concentration of PLT in whole blood and the concentration of PDGF-BB in PRP ($r = 0.41$; $p = 0.008$) and also between concentration of WBC and VEGF ($r = 0.35$; $p < 0.05$), HGF ($r = 0.36$; $p < 0.05$) in PRP. Significant positive correlation were also found between the concentration of PLT in PRP and the concentration of EGF ($r = 0.59$; $p = 0.001$), PDGF-AA ($r = 0.52$; $p = 0.001$), PDGF-BB ($r = 0.49$; $p = 0.001$), WBC in PRP and VEGF ($r = 0.39$, $p < 0.05$). Significant negative correlations were found between the concentration of RBC in PRP and the concentration of TGF-ß ($r = -0.43$; $p < 0.05$), FGF-basic ($r = -0.42$; $p < 0.05$).
Conclusions: The content of platelets and WBC in whole blood strongly correlates with their content in PRP, and thus with a higher content of some of the growth factors. Complete whole blood count analysis before PRP treatment may be helpful in making decision about its used.

A-1030 THE ROLE OF WRIST ARHTROSCOPY FOR THE PATIENTS WITH KIENBOCK'S DISEASE

Iulian- Daniel Vilcioiu, Andrei Popa, Claudiu Jaba
Clinica de Chirurgia Mainii- Zetta Hospital, Romania

Introduction: Patients suffering of Kienbock's with mid-stage or advanced disease are regularly addressed surgically by arthroscopic debridement, temporary pinning, partial wrist fusions or proximal row carpectomies with or without bone lengthening. Recent advancements and growing experience in wrist arthroscopy lead to minimally invasive options with promising results, such as lunate decompression by microdrilling, distal radius decompression, partial denervation which can be combined with bone shortening when the lunate show good clinical signs.
Aim: widening the indications for advanced lunate necrosis, showing the positive impact of miminally invasive surgery
Material & Methods: 15 patients with early and mid-stage Kienbock disease (II, IIIA, IIIB) were treated between January 2021 and September 2023 in day surgery, under WALANT anaesthesia (6 cases) or axillary block (9 cases) by arthroscopic lunate microdrilling in all of the cases combined with distal radius decompression (5 cases), partial denervation (6 cases), radius shortening (4 cases). The patients had 6-week postop splinting and hand therapy after removal of splint.
Results: All 15 patients had good long-term results with a significant improvement in postoperative VAS and DASH scores and CT imaging of the wrist. All patients returned to work and there was no need for further surgery until present day.
Conclusions: Arthroscopic lunate decompression combined with other standard techniques had a positive impact in our clinical practice in both early and mid-stage Kienbock disease, with potential of becoming the mainstay of initial surgical treatment while allowing for salvage options.

A-1031 AUTOMATIC MOTION ANALYSIS OF LUNATE TYPE I AND II HEALTHY WRISTS USING DYNAMIC CT IMAGING

Maranda Haenen, Erin Teule, Stefan Hummelink, Brigitte van der Heijden
[1]Department of Plastic and Reconstructive Surgery, Radboudumc, Nijmegen, the Netherlands; [2]Department of Medical Imaging, Radboudumc, Nijmegen, the Netherlands; [3]Department of Plastic Surgery, Jeroen Bosch Hospital, 's-Hertogenbosch, the Netherlands; [4]Orthopaedic Research Laboratory, Radboudumc, Nijmegen, the Netherlands

Introduction: Four-dimensional Computed Tomography (4DCT) is an emerging imaging modality that enables non-invasive analysis of wrist motion during an entire movement. It has the potential to diagnose ligament injuries associated with

kinematic changes. It also has the potential to gain a better understanding of the complex movement of the wrist. One of the remaining questions regarding complex wrist kinematics is the influence of the lunate morphology on the movement of the wrist. Therefore, this study aims to analyze and compare wrist kinematics of lunate type I and type II in healthy wrists using 4DCT and a fully automated motion analysis algorithm.
Materials and methods: This study included 4DCT scans of healthy wrists. A static CT scan and two dynamic imaging sequences were acquired: wrist radial-ulnar deviation (RUD) and flexion-extension (FE), resulting in 144 dynamic CT scans per wrist. The lunate type was assessed using the static CT scan. Carpal bones were automatically segmented in each scan using an artificial intelligence-based algorithm. Subsequently, the capitolunate angle (CLA), scapholunate angle (SLA), and radiolunate angle (RLA) in the sagittal plane were automatically estimated per dynamic frame and re-sampled per wrist position for comparison between wrists. The average and maximum CLA, SLA and RLA values were calculated during FE and RUD. Finally, the maximum achieved wrist positions (extension, flexion, radial and ulnar deviation) during the two movements were determined. A Mann-Whitney U-test was utilized to compare both groups.
Results: Fifty subjects (21 women) were scanned, resulting in 29 healthy lunate type I wrists and 21 healthy lunate type II wrists. All parameters were expressed in the median and interquartile range. A significant difference was found between the average RLA during RUD and the radial deviation. For example, the average RLA during RUD for lunate type I was -23.11° [-26.20° -18.07°] vs lunate type II -16.17 deg [-25.02° -10.45°], $p = 0.0429$. The radial deviation for lunate type I was 19.00° [14.88° 22.25°] vs lunate type II 14.00° [9.38° 19.00°], $p = 0.0388$. No significant difference was found for the other parameters.
Conclusion: Automatic motion analysis using 4DCT was performed on healthy wrists, and the difference between wrists with a lunate type I and lunate type II was assessed. These preliminary results showed a significantly lower average RLA during RUD and increased radial deviation for lunate type I wrists compared to lunate type II wrists. This implies that the lunate type might have to be considered when analyzing wrists using 4DCT and automatic motion analysis for diagnosing ligament injuries. Future research will expand on the sample size and number of parameters.

A-1032 RECOGNISING MIDCARPAL INSTABILITY: A CASE REPORT

Roxanna Lord, Woo A. Kim, Samuel Coulson, Kirsten Taylor, Pierre W. McCaughran, Patrick Goon
Lister Hospital, Stevenage, UK

Introduction: Midcarpal instability was first described in 1934 by Mouchet and Belot, who noted the characteristic uncoupling of the midcarpal joint without proximal carpal row dissociation, leading to asynchronous movement between the two carpal rows. This condition is mainly seen in younger adults, often caused by congenital carpal ligament laxity, wrist trauma or repetitive strain. Palmar midcarpal instability (PCMI) is the commonest subtype of midcarpal instability. Midcarpal instability can be a difficult diagnosis to establish in a non-specialist setting. In this report, we describe using dynamic x-ray imaging as a diagnostic tool for PCMI.
Aim: A 27 year old male delivery driver presented to our emergency department with worsening left-sided (non-dominant) wrist pain and deformity, intermittent 'clunking' and no obvious history of trauma. The patient's symptoms were exacerbated by lifting delivery boxes of glass bottles at work. Upon further questioning, the patient admitted to a history of hypermobility. Static x-ray imaging demonstrated a volar intercalated segmental instability pattern (VISI) deformity, subtle widening of the distal radioulnar joint and a prominent ulnar styloid, making it difficult to give a concise diagnosis based on imaging. Physical examination showed a clear midcarpal dorsal 'hump' at rest. Minimal tenderness was elicited except during ulnar deviation, which would cause an uncomfortable 'catchup clunk'. These findings led our

senior author to suspect a case of palmar midcarpal instability. Upon further discussion of this infrequent presentation at our local hand multidisciplinary meeting, our senior author and musculoskeletal radiologists agreed that dynamic imaging provides a better demonstration of the midcarpal instability during radioulnar deviation.
Material & Methods: Following assessment by junior members of the plastic surgery department and splint immobilisation with the wrist in extension, this patient was booked for review by our senior author, who, suspecting our diagnosis, arranged for an anti-pronation splint, MDT discussion and subsequent dynamic x-ray imaging alongside our radiology colleagues.
Results: Further dynamic imaging confirmed the 'catchup clunk' of a proximal row jump between flexion and extension and prompted us to maintain the patient in an anti-pronation splint for a total of 6 weeks.
Conclusions: Midcarpal instability is an infrequently seen and poorly understood presentation. Those who are unfamiliar with the examination and investigation findings are liable to miss the diagnosis. We propose that a combined approach with our radiology colleagues to more frequent dynamic imaging assessment of these cases can help us towards more timely confirmation of diagnosis and rehabilitation of these patients, thus reducing the risk of missed or delayed diagnosis leading to worsening wrist function. We aim to implement this diagnostic approach in assessment of future complex wrist cases.

A-1033 FACTORS ASSOCIATED WITH RE-ADMISSION FOLLOWING FIXATION OF A DISTAL END OF RADIUS FRACTURE: AN EXPLORATORY ANALYSIS OF A LARGE ADMINISTRATIVE DATASET IN THE UNITED KINGDOM.

Thomas D Stringfellow[1], Timothy WR Briggs[2], William K Gray[2]
[1]Royal National Orthopaedic Hospital NHS Trust, London, UK; [2]Getting it Right First Time Programme (GIRFT) NHS England, UK

Introduction: Best practice guidelines recommend patients undergoing fixation of an isolated distal radius fracture are managed via day surgery pathways. In this patient group, characterising factors associated with emergency re-admission to hospital following surgery could help identify those patients in need of further pre-operative workup or more support at home during their recovery.
Aim: To assess the effect of demographic factors and patient medical comorbidities on 30-day emergency readmission rates following day case fixation of distal end of radius fractures
Material & Methods: We used data from the Hospital Episode Statistics (HES) administrative dataset for National Health Service (NHS) activity in England. All patients undergoing surgical fixation of the distal end of radius between 01/04/2022 and 31/03/2023 were identified using all Operating Procedure Codes Supplement (OPCS) codes for distal radius open / closed reduction and internal fixation. Age, index of multiple deprivation (IMD) score, hospital frailty risk score (HFRS) and the 17 items comprising the Charlson Comorbidity Index were included as covariates. Multivariable binary logistic regression was used to examine risk factors for 30-day-re-admission. All data were handled and analysed within secure NHS server workspace.
Results: Over the 12-month period, 14,292 patients were identified, of which 12,338 were coded as day case stays (length of stay zero or 1 day) and admitted under either the trauma and orthopaedic or plastic surgery service. These criteria allowed selection of true day case episodes. The median age was 59 years (IQR 45-68) and 73.3% of patients were female. There were 124 health care providers performing surgery for distal radius fractures during this period.
The all-cause 30-day emergency re-admission rate following day case distal radius fracture fixation was 1.9% (n = 234). Primary re-admission ICD-10 diagnosis code was wound infection in 20 patients, wound breakdown in 5, carpal tunnel syndrome in 5, and post-operative pain in 13 patients. Fixation failure or hardware complication codes were the primary readmission reason in 28 patients. Medical, rather than surgical, complications accounted for re-admission in 83 patients, and falls, with or without, further fractures in a further 20.

Patient factors associated with 30-day-readmission included cerebrovascular disease (Odds ratio 3.3, 95% CI 1.4 – 7.8, p=0.006), pulmonary disease (OR 1.7, CI 1.2 – 2.3), p=0.002, renal disease (OR 2.1, CI 1.1 – 4.1, p=0.03)) and severe liver disease (OR 6.9, CI 1.2 – 40.7, p=0.03). In this large dataset, diabetes, age and IMD were not associated with increased risk of readmission. However, increasing HFRS (p<0.001) and age (P=0.03) were associated with increased 30-day-readmission in our model.
Conclusion: Day case distal radius fracture surgery is safe, with low observed complication rates. Exploratory analysis identified comorbidities which, when present, were significantly associated with 30-day emergency readmission. Further anaesthetic or medical workup is required in the presence of these risk factors. Regional anaesthetic techniques should be considered in preference to general anaesthesia in these patients.

A-1034 HOOKPLATES EXTENDING THE WATERSHED LINE SHOULD BE REMOVED

Isabel van Lieshout[1], Sjoerd Paulusma[1], Rohit Arora[2], Niels Schep[1]
[1]Dept of Hand and wrist Surgery Maasstadziekenhuis Rotterdam, the Netherlands; [2]Univ.-Klinik für Orthopädie und Traumatologie Innsbruck, Austria

Flexor pollicis longus (FPL) tendon ruptures are a common and extensively described complication of volar locking plate fixation for distal radius fractures (DRF). This is mostly caused by intersection of the FPL tendon and the distal edge of the plate and is associated with a SOONG grade I or II. Newer volar rim plates fixation have little hooks extending the watershed line to fix small volar ulnar corner fragments. These plates are therefore becoming increasingly popular in treating DRFs. However, the volar ulnar corner of the distal radius is closely in touch with the flexor digitorum profunda (FDP)-2 and FDP-3 tendons. Fixation with these specific hook plates might therefore cause tendon ruptures of the FDP 2/3 tendons.
Five patients (three women and two men) with an average age of 67 years presented with an AO type C DRF were treated with a volar rim plate with two little hooks. All fractures consolidated over time. However, they returned after average 3.5 years (min. 13 months; max. 4 years) with pain and loss of active flexion of the distal interphalangeal (DIP) joint of the index finger, indicating FDP-2 rupture in 4 patients and FDP-3 rupture in one patient.
Given that the fractures had been completely consolidated by that time, the decision was made to remove the plates. Following plate removal in two patients a DIP arthrodesis was performed, other patients declined further treatment. All patients showed pain relieve during follow up.
In conclusion we advise routine plate removal of volar rim plates with little hooks extending the watershed line.

A-1035 WRIST POSITION AFFECTS RADIOGRAPHIC MEASURES OF WRIST INSTABILITY

Diana Varshavsky[1,2], Ido Volk[1], Moamen Salamah[1,2], Ziv Wasrbrout[1], Amir Arami[3], Shai Luria[1]
[1]Hand and Microvascular Surgery Unit, Hadassah–Hebrew University Medical Center, Jerusalem, Israel; [2]Department of Military Medicine and 'Tzameret', Faculty of Medicine, Hebrew University of Jerusalem, Jerusalem, Israel, and Medical Corps, Israel Defense Forces, Israel; [3]Hand Surgery and Microsurgery Department, Sheba Medical Center, Ramat Gan, Israel

Introduction: Radiographic measures are commonly used to examine carpal instability, such as the cortical ring sign and the angular possession of the scaphoid and lunate. It has been demonstrated that these measures are dependent on the position of the wrist when the radiograph was taken.
Aim: This study aimed to examine the effect of wrist position on the measures of instability and to define the position that would minimize this effect. We used the cortical ring signs to demonstrate this.

Material & Methods: The archives of two major hospitals were searched for wrist radiographs taken during the past 10 years, of all patients diagnosed with isolated scapholunate (SL) interosseous ligament injuries and isolated acute scaphoid fractures. These radiographs were compared with a control group, patients injured, with no pathological findings on CT or MRI scans. From each standard PA and lateral radiograph, measures of wrist position (radiocapitate angles) and wrist instability were collected.
Results: The radiographs of 17 patients with diagnosed SL injury were compared with 88 patients with scaphoid fractures and 103 patients in the control group. The radiographic measures of instability were correlated with the pathology as well as wrist position. The cortical ring signs were found in 82% of patients with SL injury, 41% with fractures, and 27% in the control group. The cut-off values to examine the reliability of the cortical ring sign were lateral radiographs with a radiocapitate angle over 10 degrees extension and PA radiographs with over 8 degrees of ulnar deviation. These criteria achieved a false positive rate of 5.6%.
Conclusions: The cortical ring signs were diagnosed in all study groups. To more accurately examine plain radiographs for signs of carpal instability, limiting the effect of wrist position is possible using the radio capitate angle measurements on lateral and PA radiographs.

A-1036 PHYSIOLYSIS – NOT JUST FOR LITTLE FINGERS

Lucie Wright, Bríd Crowley
Royal Victoria Infirmary, Newcastle, UK

Introduction: Physiolysis – the resection of the mid-zone of a continuous epiphysis along with the underlying physis - is a well-recognised treatment for little finger clinodactyly. We present our experience with this technique in a series of congenital limb conditions of increasing anatomical and surgical complexity.
Aim: Indications, contraindications, tips and pitfalls of this technique are discussed.
Material & Methods: 9 congenital limb cases where physiolysis was undertaken were reviewed. Clinical, photographic and radiographic records were evaluated.
Results: Hands: 6 cases. Bilateral n=1.
Digits: thumb n=1, index finger n=2, middle finger n=1, little finger n=3
Feet: 3 cases. Bilateral n=1. All involved the first ray.
Skeletal level of physiolysis: metatarsal = 1, proximal phalanx = 6, middle phalanx = 5
Adjunctive procedures to address soft tissue shortage: z-plasty (n=4), Y-V advancement (n=1) and 1st web release (n=2).
Anomalous insertions of the first dorsal interosseous muscle (n=1) and the abductor pollicis brevis muscle (n=1) were detached and reinserted to correct deforming forces.
Plication of the ulnar collateral ligament at the DIPJ was performed in one finger.
7 of 9 patients had an improvement in growth. In more complex cases there was residual growth mismatch – this may be an indication for an osteotomy.
Conclusions: Learning points include:
• Physiolysis does not produce an immediate improvement. The procedure removes the tether to growth caused by the longitudinal epiphysis. This releases growth potential with improvement in length mismatch over a period of years.
• Soft tissue shortage must be addressed. If adequate soft tissue lengthening is not possible a closing wedge osteotomy may be a more suitable technique.
• Anomalous muscle insertions should be identified and corrected to remove deforming forces

In summary, physiolysis is a valuable technique – not confined to little finger clinodactyly - in the treatment of congenital limb anomalies.

A-1037 FREE NON-VASCULARIZED HEMI-FIBULAR GRAFT FOR TREATMENT OF LARGE BONE DEFECT OF METACARPAL IN MANGLED INJURY OF THE HAND

Frantzeska Zampeli, Giorgos Chatzipanagiotou, Kaliroi Passadi, Emmanouil Fandridis
Hand, Upper Limb & Microsurgery Department, KAT Attica General Hospital, Athens, Greece

Introduction: Large bone defect is a challenging problem in orthopedic surgery. Primary ray amputation and salvage reconstruction are the two treatment options for management of mangled injuries of the hand. Limited available graft options exist for the salvage reconstruction and treatment of bone defect of the hand including tricortical iliac grafting, vascularized or non-vascularized fibular grafting, or metatarsal grafting.
Aim: The aim of this study was to describe our experience in a case of free non-vascularized autogenous hemi-fibular bone graft in which large bone defect and bone loss was caused by open fracture crush injury.
Material & Methods: A 42-year-old male presented with mangled injury of the left hand caused by crush injury mechanism affecting the palm of the hand and index metacarpal region. Finger vascularity was confirmed and the full extent and degree of tissue destruction was verified upon initial surgical debridement and complete wound exploration. Copious irrigation and radical wound debridement removing all devitalized tissue revealed a bone defect of the whole diaphysis and head of second metacarpal and proximal part of proximal phalanx. Fracture stabilisation with K-wire fixation offered a relatively stable environment. A second and third look debridement surgery were performed at 24 and 36 hours. Reconstruction of bone loss was managed by hemi-fibular grafting technique which involves selective osteotomy of the anterior half of the middle third of the fibula for the reconstruction of bone loss. The fibular bone graft was fixed at recipient site with 2 small fragment L and Y shaped plates. This technique ensures a renewable source of autograft with good incorporation at the recipient site that may allow good function and maintainance of the esthetic appearance of the hand.
Results: At 6 months follow up the patient was free of infection, with pain 2/10 (VAS score), DASH 35.8, and grip strength 70% of contralateral side.
Conclusions: This case illustrates the management of mangled hand injury with metacarpal bone defect by reconstruction using hemi-fibular grafting technique. This technique has been used as an innovative technical substitute to the traditional methods of autograft harvesting for GCT of metacarpals with good regenerative potential at the donor site and better incorporation rates at the recipient site providing good functional results.

A-1038 BILATERAL NEUROPATHY OF THE RADIAL NERVE AS A COMPLICATION OF BRACHIOPLASTY: CASE REPORT

Hannah Bridgwater, Samuel Coulson, Hyder Ridha, Patrick Goon
Department of Plastic Surgery, Lister Hospital, Stevenage, UK

Introduction: Brachioplasty is a procedure to remove excess skin from the arm and is most commonly performed following massive weight loss. A risk of such surgery is neurovascular damage, of which the median antebrachial nerve is reported to be the most commonly affected.
We report a case of a 53-year-old female who underwent bilateral brachioplasties, and went on to develop neuropathy of the radial nerve two months postoperatively.

Aim: To discuss our experience of a case of bilateral radial nerve neuropathy following brachioplasties with the current published evidence base.
Material and Methods: A 59 year old female underwent bilateral brachioplasties in February 2022. Two months post operatively she developed pain and numbness in both hands and the dorsum of both forearms.
On examination, there was no weakness of wrist or finger extension however there was slight extensor pollicis longus weakness, left weaker than right. She was very tender over both radial tunnels and had some tenderness to the radial nerve along the humeral groove. Sensation was normal bilaterally.
Results: She had an MRI of both elbows which showed denervation changes to the supinator muscles bilaterally, right worse than left. Nerve conduction studies were negative. She had an ultrasound guided diagnostic local anaesthetic injection to the radial tunnel ten months postoperatively at the elbow level prior to bifurcation of the posterior interosseous nerve/superficial branch of the radial nerve. Pain was abolished around the elbow but not proximally. She then had a further ultrasound guided local anaesthetic and steroid injection around the radial nerve at the level of the spiral groove. At 11 month post operatively her symptoms had improved significantly and by the 17 month post operative point her symptoms had resolved completely. In this case, her symptoms were likely due to post operative swelling and oedema causing local compression.
Other studies have described nerve damage after a brachioplasty. A systematic review across 29 papers and 1578 patients found damage to nerves post operatively in 2.47% of patients, but limited to the median antebrachial nerve and ulnar nerve only. There were no cases in the literature which reported isolated complications with the radial nerve. One author reports a case of radial nerve injury along with median, ulna and medial antebrachial nerve injury which developed one week post operatively. The patient was found to have a very tense, swollen arm and was taken to surgery for decompression surgery.
Conclusion: We report a case of pain along the radial nerve distribution in both arms which developed two months after initial brachioplasty surgery. Diagnostic injection targeting the radial nerve at the elbow and radial groove bilaterally significantly improved her pain. It is likely that symptoms were due to compressive effects of localised swelling and oedema post operatively. Neuropathy to the radial nerve following brachioplasty surgery is a rare complication with scarce reports in the literature, however surgeons should be aware of this potential complication.

A-1039 OCCUPATIONAL HAND TRAUMA – MECHANISM OF INJURY AND TRANSIENT RISK FACTORS ON A NATIONAL SCALE

Nerel Cohen[1,2], Ronit Calderon-Margalit[2], Ido Volk[1], Yuval Krieger[3], Viktor Feldman[4], Uri Farkash[5], Deena Zimmerman[6], Asher Pardo[7], Ornit Raz[7], Shai Luria[1]
[1]Department of Orthopedic Surgery, Hadassah Medical Center, Faculty of Medicine, Hebrew University of Jerusalem, Jerusalem, Israel; [2]Braun School of Public Health, Hadassah-Hebrew University, Jerusalem, Israel; [3]Department of Plastic Surgery, Soroka University Medical Center, Ben-Gurion University of the Negev, Beer-Sheva, Israel; [4]Department of Orthopedic Surgery, Meir Medical Center, Kfar Saba, Israel; [5]Department of Orthopedic Surgery, Assuta Ashdod University Hospital, Ashdod, Israel; [6]TEREM Emergency Care Centers, Israel; [7]Israeli Institute for Occupational Safety and Hygiene, Tel Aviv, Israel

Introduction: Hand trauma is highly prevalent and leads to pain, disability, and productivity loss, especially among young individuals. Is is a great financial burden due to direct and indirect costs. Occupational hand trauma accounts for a substantial percentage of hand injuries with reported geographical differences. Risk factors for occupational hand trauma may include personal and transient risk factors.
Aim: Our aim was to identify transient risk factors of occupational hand trauma on a national level. This will enable identification of high-risk populations and develop intervention measures.

Material & Methods: Patients with occupational hand trauma were interviewed to investigate potential risk factors using a case-crossover study design. Data was collected from eligible patients in several emergency departments and a chain of out-of-hospital urgent care centers, including demographic and work characteristics data, injury mechanism, and potential exposure to risk factors, prior to the injury and during the month before the trauma.
Results: 1,521 injured workers were interviewed (76% male; average age 35). Using malfunctioning equipment and performing unusual activities were significant risk factors across all sectors, resulting in relative risks (RR) of 9.9 and 10.6, respectively. Several risk factors were dependent on sector, such as glove use, work environment, cell phone distraction and working overtime.
Conclusions: In this first national large-scale study of occupational hand trauma, we identified significant risk factors for hand trauma as well as occupation-specific risk factors. Interventions addressing the use of malfunctioning equipment and performing unusual tasks are crucial in all occupational sectors. Management and regulations must address the availability of better-fitted gloves and driving after extended work hours for healthcare workers to reduce injury risk. There is a need to limit the use of cellular phones for heavy workload occupations. Lacking work activity education in multiple work environments should be addressed. This should include specific training for the care of malfunction equipment or this activity should be designated to specified workers.

A-1040 CONSTRUCT VALIDITY OF THUMB DISABILITY INDEX QUESTIONNAIRE AND MODIFIED KAPANDJI INDEX ON THUMB DYSFUNCTIONS: PRELIMINARY RESULTS

Marisa C Registro Fonseca, Alan Rodrigues Pereira, Gabriel M Xavier dos Santos, Heloisa Correa B Nardim, Raquel Metzker M Sugano, Elionaldo G da Silva Junior, Paula G de Carvalho, Leonardo D S Maud, Flávia P Faleiros Macêdo
Ribeirao Preto Medical School, University of Sao Paulo, Brazil

Introduction: The assessment of functionality and mobility are essential measures for clinical practice. One of the instruments used is the goniometer, a reliable, cheap and valid instrument widely used due to its practicality. The Modified Kapandji Index – Thumb opposition and counter-opposition test is a valuable method by which it is possible to evaluate the function of a joint without the use of any other type of instrument as it has a scoring system based on references anatomical features that the patient can actively achieve. Some questionnaires have also already been used and were developed to measure the functionality of the wrist and hand. The Thumb Disability Examination (TDX-Br) is a self-report questionnaire measuring functionality, pain and patient satisfaction. Reliable and valid measurements are essential for analyzing the evolution and defining treatment strategies for hand dysfunctions.
Aim: To analyze the construct validity of the modified Kapandji index - Thumb opposition and counter-opposition test and the TDX-Br Questionnaire.
Material & Methods: Observational study with volunteers with thumb musculoskeletal disorders who meet the inclusion and exclusion criteria based on COSMIN guidelines. Validity analysis was obtained using the Spearman correlation index of the measurements of the Modified Kadandji Index – Thumb opposition and counter-opposition test, goniometry, Numerical Pain Scale, Jebsen-Taylor Hand Functional Test, and Patient-rated wrist questionnaire and hand evaluation (PRWHE- Br), on the more symptomatic side, $p < 0.05$.
Results: 22 volunteers, mean age of 53.4, 57% female. Regarding the construct validity, a moderate correlation was observed between the Kapandji and TDX-Br ($r = -0.43$) and poor with Kapandji and PRWHE-Br (0.11) and Jebsen Taylor ($r = 0.36$). TDX-Br and PRWHE-Br had moderation ($r = 0.53$) and with END (0.42).
Conclusions: The preliminary data suggests that the Modified Kapandji Index – Test of opposition and counter-opposition of the thumb and TDX- Br are valid for thumb symptoms and function analysis. More studies are necessary.

A-1041 POST-OPERATIVE OUTCOME AFTER ULTRASOUND-GUIDED PERCUTANEOUS CARPAL TUNNEL SURGERY: A PROSPECTIVE STUDY

Amandine Ledoux, Fabian Moungondo
Erasme - Université Libre de Bruxelles, Belgique

Introduction: Carpal tunnel release is a very common surgery. While the gold standard technique is open surgery, new and less invasive procedures have emerged, among them, the ultrasound-guided percutaneous surgery is the newest technique described.

Aim: The aim of this study is to quantify whether percutaneous incision of the flexor retinaculum can lead to anatomical modification and how these changes may explain post operative clinical manifestations.

Material & Methods: In a prospective, non-controlled, non-randomized study, twenty-one patients with carpal tunnel syndrome confirmed by electromyography and ultrasound were assessed. These patients were evaluated preoperatively and postoperatively after ultrasound-guided percutaneous carpal tunnel release at one, three and six months.

Clinical and ultrasound evaluation were performed before and after the surgery. Sonography measurements were consisting in median nerve cross sectional areas over and at the carpal tunnel, interapophyseal distance between the hook of the hamate and the trapezium tubercle to assess the potential opening of the tunnel and distance between the transverse carpal ligament and the carpal tunnel bottom to assess the bowstringing effect of the release.

Clinical assessment consisted in: pillar pain, grip strength, key pinch, VAS, Q-DASH, Boston questionnary score as well as a three-dimensional shape of the hand operated by optical scanner. 3D data were taken from two variables: Length (antero-posterior thickness of the hand at the carpal tunnel level) and surface (hand cross sectional area at this level in transversal plane) to quantify the swelling of the palm heel at the four perioperative times.

Results: Ultrasound measurements showed a significant difference between pre-operative and post-operative states for most of the collected datas. However, no significant difference was found for the trapezio-hamatal inter-apophyseal distance.

Almost all clinical quantitative variables showed significant changes between each perioperative times. The comparison of variables at one month postoperatively showed a significant correlation between grip and key pinch strength and length variations. There was no significant correlation between grip and key pinch strength variation and VAS change, nor for DASH in comparison to VAS and length variation.

There was a highly significant correlation between Pillar Pain and Length at each perioperative time.

Conclusions: The lack of significant change in the inter-apophyseal distance before and after surgery suggests an absence of opening of the carpal arch post-operatively in the sample studied.

Because the grip strength improved few weeks after the surgery with persistant increased distance between the carpal tunnel bottom and the transverse carpal ligament, the bowstringing does not appear to be the cause of strength loss observed after carpal tunnel release.

A significant link between the pillar pain and the the swelling at the heel of the hand was observed post-operatively, however this effect remains difficult to be distinguished from the effect of time alone. Otherwise the method used to quantify the swelling could be an objective tool to quantify the pillar pain.

Randomised, controlled trial with a higher amount of patients would be helpful to confirm or invalidate this assumption.

A-1042 RESULTS OF SURGICAL TREATMENT OF CUBITAL TUNNEL SYNDROME USING SIMPLE DECOMPRESSION AND ANTERIOR SUBCUTANEOUS NERVE TRANSPOSITION - A RETROSPECTIVE STUDY, 1527 PATIENTS

Ivan Humhej, Hynek Zítek
Department of Neurosurgery, Masaryk Hospital, Ústí nad Labem, Czech Republic

Introduction: The methods of surgical treatment of cubital tunnel syndrome (CuTS) include simple nerve decompression, medial epicondylectomy and anterior transposition with subcutaneous, intramuscular or submuscular nerve placement. Currently, there is no clear consensus on the most effective method of surgical treatment of CuTS. Rather, the choice of surgical procedure depends on the preference and experience of the surgeon and the local findings during the surgery. However, in recent years, simple nerve decompression has become the most preferred method in the primary treatment of CuTS. With the increasing trend towards a minimally invasive approach and shorter recovery, endoscopic techniques are gaining a greater role in the treatment of CuTS.
Aim: In this retrospective study, we evaluated the results of surgical treatment for CuTS at our institution over a 20-year period (2001-2020).
Material & Methods: During this period we have operated 1527 patients for CuTS, 455 of them underwent anterior subcutaneous nerve transposition and 1072 simple decompression (328 endoscopically assisted simple decompression). In the evaluated cohort, 57% were male and 43% were female, the mean patient age was 50 years (16-89). Patients were followed prospectively for 3-12 months postoperatively and underwent EMG in addition to clinical examination in the postoperative period. At 1-4 years after surgery, patients completed a questionnaire assessing the effect of surgery.
Results: The results of surgical treatment of CuTS by anterior subcutaneous transposition and simple nerve decompression will be presented. Postoperative paresthesias, hypesthesia, fine motor functions, strength and hypotrophy of the affected hand will be evaluated. We will also focus on postoperative complications and recurrences of CuTS including analysis of its causes.
Conclusion: The results of our study confirm the effectiveness of simple nerve decompression in the treatment of CuTS as a fast, minimally invasive and relatively simple method. For these reasons, we use the simple decompression as the first choice method in CuTS surgery. We also summarize our indications for performing anterior subcutaneous nerve transposition in the primary treatment of CuTS.

A-1043 ANTERIOR TRANSPOSITION OF THE ULNAR NERVE WITH ITS VASCULAR BUNDLE IN THE ENTRAPMENT SYNDROME AT THE ELBOW

Antonino Messina, Jane C Messina
*Former Head of Hand Surgery Centre - CTO Traumatological Centre Turin, Italy; *First Orthoapedic Clinic University of Milan, ASST Gaetano Pini- CTO Orthopaedic Institute Milan, Italy*

IIntroduction: Several techniques of ulnar nerve transposition at the elbow have been described since many years as subcutaneous, intra-muscular, submuscular transposition, which allow mechanical decompression of the nerve and reduction of longitudinal traction in flexion-extension movements of elbow. Recently minimally invasive techniques and arthroscopic techniques have been used in early stages. On the other hand in advanced stages, in addition to compression the common finding is a biological and vascular damage to the nerve with intra-neural fibrosis.
In classical techniques of anterior transposition, while the nerve is anteriorly transposed, its vascular bundle remains in the epicondylar groove and this creates an additional hyatrogenic damage and devascularization of the nerve.

The technique of vascularized anterior transposition of the ulnar nerve with its vascular bundle allows to maintain vascularity of the transposed nerve preserving its nutrition and biology.
Aim: the aim of this study is to evaluate the results of this technique.
Materials and Methods: Eighty-seven elbows in 82 patients were treated with this technique from 1987 till 2022.
Mean age was 54 yo (23-79yo), 71 males, 11 females. Dominant arm was interested in 39 cases.
Patients were staged according to Mc Gowan: grade I: 3patients; grade II: 23patients; grade III: 31patients. Mean pre-operative two point DT was 11mm (7-15)
Fifty-seven patients were clinically evaluated with a mean follow- up of 154 months (8- 252 months). In all cases a intra-muscular or sub-muscular transposition was performed of the ulnar nerve with its vascular bundle (formed by superior collateral ulnar artery and posterior recurrent branch of ulnar artery, with one or two satellite veins) using microsurgical instruments and microsurgical loupes
Results: All patients improved after surgey with recovery of partial or complete sensibility of 4-5th fingers with mean 2PD of 4 mm (range 3- 7mm)
Results: were excellent in 34 patients (60%,) with recovery of sensory (S4-S5) and motor function (M4-M5), good in 17 patients (30%) partial recovery of sensory (S3-S4) and motor function (M3- M4) and 6 fair (10%) with slight improvement of sensibility and motor function but persistence of pre-operative muscle waste.
Conclusions: The technique of anterior vascularized transposition of the ulnar nerve with its vascular bundle is indicated in all stages but expecially in advanced stages of compression with sensitive and motor impairment with vascular damage to the nerve. This technique allows the maintainment of nerve vascularity and trophism, avoiding hyatrogenic devascularization. It has given excellent and good results in the majority of cases in the long term.

A-1044 INTRANEURAL GANGLION OF THE ULNAR NERVE IN THE AREA OF GUYON'S CANAL - CASE REPORT

Ivan Humhej
Department of Neurosurgery, Masaryk Hospital, Ústí nad Labem, Czech Republic

Introduction: Intraneural ganglions (ING) are very rare lesions affecting peripheral nerves. The most commonly affected nerve is the fibular/peroneal nerve of the lower limb at its course around the proximal tibiofibular joint, but rarely this pathology is described affecting other nerves in other locations. In ING, synovial fluid from the adjacent joint penetrates the nerve via the articular branch. It is important not only to make a correct preoperative diagnosis, but especially to provide adequate surgical therapy, which not only decompresses the affected nerve, but also prevents future recurrence of ING. For this purpose, the articular nerve branch through which the ganglion penetrates the nerve must be peroperatively identified and transected.
Material & methods: We will present a case of a 48-year-old man with progressive right hand weakness and progressive development of claw hand with severe hypotrophy of the interosseous and hypothenar muscles. According to preoperative ultrasound and MRI, a cystic lesion was identified within the ulnar nerve as it passed through Guyon's canal. The patient was indicated for surgical treatment, which confirmed the finding of ING.
Results: On the basis of perioperative photographs we will illustrate a case of ING of ulnar nerve at the wrist. We will also present the condition of the patient's hand before and after surgery.
Conclusion: Despite the rarity of the diagnosis of ING, it is necessary to be aware of this nosological unit and to know the correct treatment of this affection, which brings good postoperative results even in patients with severe motor deficit and paresis.

A-1045 SURGICAL SCULPTURE: SUPERVISED SCULPTURE OF HUMAN ANATOMIC STRUCTURES IN WAX USING 3D PRINTED NEUROVASCULAR STRUCTURES SIGNIFICANTLY IMPROVES THE ANATOMY KNOWLEDGE OF PLASTIC SURGEONS: A RETROSPECTIVE SURVEY-BASED COHORT STUDY

Thomas Edward Pidgeon[1], Rajive Jose[2], Francis Peart[3]

[1]Post-CCT fellow in Gender Affirmation Surgery, New Victoria Hospital, Kingston upon Thames KT2 7EG, UK; [2]Consultant in Plastic, Reconstructive Surgery and Hands, University Hospital Birmingham, Edgbaston, Birmingham, B15 2GW, UK; [3]Retired Consultant in Plastic, Reconstructive Surgery and Hands, Formerly of University Hospital Birmingham, Edgbaston, Birmingham, B15 2GW, UK.

Introduction: Adequate knowledge of human anatomy is fundamental to the practice of plastic surgery. This retrospective cohort study was conducted to evaluate a novel anatomy training paradigm. This study assessed whether supervised wax sculpting of the structures of the human hand, face and whole-body musculoskeletal system could improve anatomy knowledge and confidence in clinical practice among plastic surgeons.

Methods: For each educational sculpting course, senior plastic surgeons instructed delegates in sculpting an anatomic face, hand or whole-body musculoskeletal system using modelling wax and sculpting tools on a 3D printed skeleton. 3D printed neurovascular structures e.g. (the brachial plexus, palmar arterial arches, peripheral nerves, vasculature of the head and neck), were used to aid delegates in the creation of their sculptures. All major neurovascular structures and muscles were sculpted in phases. A survey was distributed to determine how well delegates scored their own knowledge of clinical anatomy, before and after each course.

Results: From 2018-2023, 16 courses were held for over 150 delegates. One hundred and twenty nine delegates completed the post-course survey. Delegates included consultants (n=14), fellows (9), plastic and orthopaedic surgery registrars as well as surgical registrars from other specialities (60), surgical senior house officers (19), and 27 allied healthcare professionals, artists and academics.

Delegates' own scoring of their knowledge of clinical anatomy in relation to what was required of them in their clinical practice prior to the course yielded a mean score of 57.1 (range 10-90, visual analogue scale). After the course, this increased to a mean of 85.6 (range 49-100) ($P<0.0001$). Thirty-nine delegates agreed, and 77 strongly agreed that the course would improve their confidence in clinical practice.

Conclusions: The use of supervised wax sculpture of human anatomic structures accompanied with 3D printed neurovascular structures as a novel training paradigm significantly increased the self-assessed anatomy knowledge of plastic surgeons, as well as their confidence in their practice.

A-1046 EARLY CLINICALS RESULTS OF THE ANAFAB PROCEDURE FOR CORRECTION OF STATIC SCAPHOLUNATE INSTABILITY

Kai Megerle, Careen Knie, Stefanie Wieschollek

Center for Hand Surgery, Microsurgery and Plastic Surgery, Schön Klinik Munich Harlaching, Munich, Germany

Introduction: The ANAFAB procedure is designed to reconstruct the scapholunate ligament (SLL) and several secondary stabilizers of the wrist. Although the concept is biomechanically intriguing, there are only few reports on clinical results. We present the clinical and radiographic results of 12 consecutive patients with a minimum follow-up of 12 months.

Material & Methods: Our review included 10 patients (1 female, 9 male) with a mean age of 45 (range, 32 – 60) years. All patients were treated for static scapholunate instability with a fixed dorsal subluxation of the scaphoid, but no signs of degenerative arthritis. Patients were followed up after an average of 17 (range, 12 to 28) months. We assessed

radiographic parameters (scapholunate angle, radiolunate angle, scapholunate gap), DASH scores, grip strength, range of motion, pain levels and overall patient satisfaction.
Results: All patients were satisfied with the result of the procedure. Range of motion averaged 60-0-40 degrees for extension/flexion, pain levels were 2 / 10 (range, 0 -5). The average grip strength was 60 (range, 60 – 100) % of the opposite wrist. Average DASH scores were 14 (range, 0 – 46). The preoperative DISI configuration was corrected in all patients immediately postoperatively. At follow-up, 5 patients demonstrated a dynamic and 5 patients static, recurrent scapholunate dissociation. Correction of the scaphoid flexion deformity could be maintained during the follow-up period in all patients, seven patients demonstrated a pathologic dorsiflextion of the lunate.
Conclusions: The ANAFAB procedure reliably reduces pain levels in patients with static scapholunate instability. However, a stable carpal configuration could not be maintained in our series in most of the patients.

A-1047 SELF-REPORTED ADHERENCE TO NONSURGICAL TREATMENT FROM PATIENTS WITH CARPOMETACARPAL OSTEOARTHRITIS

L. Esteban Lopez[1,2,3], Y. van Kooij[1,2,3], R. Selles[1,2], HW Study Group, R. Wouters[1,2]
[1]Department of Rehabilitation Medicine, Erasmus MC, Rotterdam, The Netherlands; [2]Department of Plastic, Reconstructive, and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands; [3]Xpert Handtherapie, Utrecht, The Netherlands

Introduction: Rehabilitation plays a vital role in healthcare, and not only after surgery, as many conditions benefit from nonsurgical treatment, for example, consisting of exercise therapy, activity modifications, or the use of orthotics. While scientific research evaluates the efficacy of these treatments, the critical aspect of treatment adherence often remains overlooked. Patient adherence is foundational to treatment success, yet assessing it and understanding influencing factors pose challenges.
Aim: To investigate the self-reported adherence to nonsurgical treatment (i.e., an orthosis or a combination of an orthosis with exercise therapy) in patients with thumb base osteoarthritis and if this differs from their healthcare professionals' view. Furthermore, we investigated the association between psychological factors, perceived attention, and the Therapy Adherence Assessment Tool (TAAT).
Material & Methods: This was a multicenter, cross-sectional observational study as part of the THumb osteoarthritis Exercise TriAl (THETA). Participants of the THETA study were randomized between two groups: orthoses alone or a combination of orthoses and exercise therapy. The primary outcome was self-reported adherence, measured with the novel TAAT questionnaire six weeks after treatment initiation. This questionnaire consists of five items that the patient and healthcare professional separately answer on a 5-point Likert scale (not at all, a little, quite a bit, mostly, always, or does not apply). The statements apply to adherence to the instructions for doing exercises, changing activities, using orthoses, putting full effort into the therapy, and completing therapy at home.
We used the Consultation and Relational Empathy Measure (CARE) for perceived attention at six weeks to investigate the association, as well as the Credibility and Expectancy Questionnaire (CEQ), Generalized Anxiety Disorder 7-item (GAD-7), Illness Perception Questionnaire (IPQ), Pain Catastrophizing Scale (PCS), and Patient Health Questionnaire-9 (PHQ-9) at intake.
Results: We included 135 patients, of which 61 were in the orthoses and exercise group; we used all statements of the TAAT for them. The orthoses-only group consisted of 74 patients; for them, we used only the statement that applies to wearing the orthoses as instructed. 86.9% of patients responded with 'mostly' or 'always' on the statement putting full effort in their therapy, 85.3% on doing exercises, 85.3% on completing their therapy at home, 84.4% on using their splints

or aids, and 38.1% on changing activities as instructed. When comparing the self-reported adherence with the healthcare professionals' point of view, a significant difference was found in the items doing exercises (p=0.031), where professionals rated it higher, and changing activities (p=0.001), where professionals rated it lower. Credibility is positively associated with therapy adherence (p=<0.001), as well as expectations of treatment outcome (p=<0.001).
Conclusions: We found high self-reported adherence across most treatment aspects. Only two items on the TAAT varied between patients' self-reported adherence and their healthcare professionals' views. Of all studied psychological factors, only credibility and expectancy of the treatment are associated with treatment adherence. Addressing these factors may enhance adherence to nonsurgical treatment for patients with thumb base osteoarthritis.

A-1048 ROLE OF ALPHA-LIOPIC ACID AS A COADJUVANT TREATMENT IN SURGICAL DECOMPRESSION OF CARPAL TUNNEL SYNDROME: A RETROSPECTIVE STUDY

Seri Barrera-Ochoa, Jose Antonio Prieto-Mere, Ester Mora, Gustavo Sosa, Julio Adrian Martinez-Garza, Francisco Soldado
Institut de la Mà, Barcelona, Spain

Introduction: Carpal Tunnel Syndrome (CTS) is considered the most common and frequent cause of neuropathic disability and peripheral nerve compression syndrome in adults. Even if the surgical carpal tunnel release can definitely reduce symptoms, many non-surgical treatments have been proposed.
Alfa-Lipoic Acid (ALA) is a powerful and effective factor reducing oxidative stress, with neuroprotective and neurotrophic properties. The efficacy is well proven in many neurologic diseases, but only a few studies have addressed its role in compression neuropathies and no evidence is available regarding the best protocol for its use.
Aim: The aim of the study was to investigate retrospectively the role of ALA therapy on clinical and functional outcomes in patient affected by mild-moderate CTS, who have to undergo surgical treatment, in three different treatment protocols.
Material & Methods: Patients diagnosed with CTS were categorized into three groups: group A (received a placebo 2 weeks before surgery, underwent surgical decompression, and received a placebo for 60 days postoperatively), group B (received a placebo 2 weeks before surgery, underwent surgical decompression, and received ALA for 60 days postoperatively), and group C (received ALA 2 weeks before surgery, underwent surgical decompression, and received ALA for 60 days postoperatively). Scales and questionnaires were employed to assess and compare outcomes among the groups on days 1, 14, 21, 80, and a one year control with an electromyographic control test. An ANOVA statistical analysis of the results was conducted to determine which patient group exhibited the most significant improvement.
Results: The study involved 147 patients divided into three groups, with a follow-up period of one year. Each group had comparable initial measurements.
The Visual Analogue Scale (VAS) indicated a significant improvement in groups B and C starting from three months, with an average pain reduction of 7.3 points, compared to 6.3 points in the control group.Both the Severity Symptom Scale (SSS) and the Functional Status Scale (FSS), integral components of the Boston Questionnaire, exhibited noteworthy improvement in group C at 6 weeks post-surgery, in contrast to the other two groups.
Pillar pain decreased from 3 months onwards in ALA-treated groups, achieving a 100% resolution at 12 months. Nerve conduction velocity in the electromyogram improved after 6 months in both ALA-treated groups, and latency showed improvement only in group C after 12 months.
Finally, the use of postoperative analgesia was lower in both ALA-treated groups. The overall tolerance of the medication was favorable, with only one participant discontinuing the study due to nausea.
Conclusions: These findings imply a promising role for ALA therapy in improving the clinical and functional outcomes of

surgical interventions for mild-moderate CTS. Both groups treated with ALA demonstrated superior results compared to the control group. The improvement in the VAS, with pain being one of the primary symptoms, points towards encouraging outcomes. The assessment of electromyographic results is crucial as there are no studies presenting both pre and post-treatment follow-ups for CTS. Further prospective investigations and the exploration of optimal ALA treatment protocols are necessary to enhance its application in compression neuropathies and enhance patient outcomes.

A-1049 RADIOCAPITATE FUSION - AN ALTERNATIVE TO THE TOTAL WRIST FUSION, THAT PRESERVES RESIDUAL MOTION AND DECREASES NUMBER OF COMPLICATIONS.

Radek Kebrle[1], Martin Czinner[1,2], Eliška Šulcová[3], Tereza Peterková[1]
[1]Hand Surgery Department, Dr. Pírek's Clinic, Mlada Boleslav, Czech Republic; [2]Orthopaedic Surgery Department, Regional Hospital Liberec, Czech Republic; [3]Hand and Plastic Surgery Institute, Vysoké nad Jizerou, Czech Republic

Introduction: Historically, total wrist fusion in degenerative and posttraumatic cases is fusing all joints of the wrist from the radius to the metacarpals. In the last decade with the development of locking plates and screws CMC joint sparing technique has been described with the preservation of both wrist rows. A high degree of complications related to CMC nonunion, tendon irritation, need for additional bone graft and need for plate removal have been described in the literature.
Aim: Authors are describing a technique of alternative „total" wrist fusion between radius and capitate with concomitant proximal row carpectomy eliminating the above-mentioned drawbacks of wrist fusion.
Material & Methods: A group of 25 patients treated from 2019 to 2023 for primary degenerative wrist arthrosis, posttraumatic arthrosis and failed proximal row carpectomy is described. Nineteen of these patients had previous surgical procedures performed before fusion for different diagnoses related to the wrist. Patients were followed on a regular basis at 2, 6 and 12 weeks radiologically.
Through the dorsal approach, after proximal row carpectomy, direct fusion between radius and capitate was performed with preservation of capitotrapezoid and capitohamate joint. A locking plate dedicated to radiocapitate fusion was used to stabilise fusion. At the end of the procedure, morcelized bone from the proximal row was impacted as a bone graft into the radiocapitate area.
Results: Twenty-four patients healed primarily. Bony consolidation has been observed at three months in 20, and 4 had a prolonged healing time variating between 4,5 and 6 months. One patient needed additional decortication and fixation to promote healing in postinfectious wrist arthrosis. 4 other complications were observed. One patient developed secondary spontaneous CMC fusion, one patient developed carpal tunnel syndrome, and two patients had iritative screw malposition. Only 3 patients needed plate removal and no additional bone graft was necessary in the group. Motion in the CMC area and capitohamate joint has been preserved in all but one patient.
Conclusions: Radiocapitate fusion with proximal row carpectomy with preservation of CMC and capitohamate motion proved to be a reliable procedure preserving residual wrist motion in the transverse and longitudinal axis. Also, this technique reduces the number of complications historically related to wrist fusion.

A-1050 A CASE REPORT ON CHRONIC PERILUNATE DISLOCATION: CHALLENGES, SOLUTIONS, AND SURGICAL INSIGHTS

Inês Alturas, Vera Vaz, Joana Barreto, Jorge Rebola, Sandra Alves, Frederico Teixeira
Centro Hospitalar Universitário Lisboa Central, Portugal

Introduction: Chronic perilunate dislocation, though uncommon, presents a complex clinical scenario when neglected over time. Perilunate dislocations are rare injuries comprising of less than 10% of all wrist injuries. These usually occur after high-energy trauma to the wrist. One-fourth of perilunate dislocations are missed at the initial presentation.
This case report explores the challenges of a neglected chronic perilunate dislocation, exploring its diagnostic challenges and emphasizing the imperative for timely intervention.
Aim: This case report aims to share insights into surgically managing a neglected chronic perilunate dislocation. By detailing the surgical approach and addressing the specific challenges encountered, we aim to contribute to the understanding of effective strategies for managing such cases.
Material & Methods: We present the case of a 60-year-old patient, a right-handed locksmith, with a history of polytrauma following a 7-meter fall. The patient suffered traumatic brain injury, three rib fractures on the right side and underwent surgery for multiple facial fractures and cervical fractures. These multiple injuries led to the patient minimizing complaints related to the left wrist, ultimately resulting in a delayed diagnosis of a neglected chronic perilunate dislocation six months after the accident.
The patient reported persistent pain in the left wrist and symptoms suggestive of carpal tunnel syndrome, and after imaging studies, the diagnosis was confirmed.
The standard initial therapeutic approach for cases of neglected chronic perilunate dislocation is proximal row carpectomy. However, given the patient's manual profession that necessitates preserving hand strength and dexterity as much as possible, after discussing therapeutic options, the decision was made to proceed with scaphoidectomy and four-corner arthrodesis with a concurrent liberation of the median nerve.
Results: A dorsal approach was employed, and intraoperatively, the presence of a neglected chronic perilunate dislocation was confirmed, with associated fibrosis complicating scaphoidectomy and the reduction of the semilunar. After scaphoidectomy and open reduction, osteosynthesis was achieved using a four-corner fusion plate. Finally, a volar approach was utilized, and the median nerve was released.
Postoperatively, we successfully achieved the anatomic restoration of carpal alignment, and the patient's complaints significantly improved. However, the temporal evolution of the case is still ongoing.
Conclusions: This case underscores the complexities of neglected perilunate dislocations, emphasizing the need for early intervention. Surgical management, though effective in alleviating pain and improving function, encounters distinct challenges in chronic cases. Increased awareness among healthcare professionals is crucial for timely recognition, ensuring more favorable outcomes in the management of perilunate dislocations.

A-1051 CARPAL BOSS WITH EXTENSOR MECHANISM RUPTURE - CASE REPORT

Aristeidis Georgountzos, Chatzipanagiotou Georgios, Passadi Kalliroi, Chatzidaki Christina, Fandridis Emmanouil, Kanellos Panagiotis
Hand, Upper Limb & Microsurgery Department K.A.T. Hospital, Athens, Greece

Introduction: A carpal boss, also known as a carpometacarpal boss or a bossing is a bony exostosis usually involving the base of second or third metacarpal. It causes swelling on the dorsum of the hand and may or may not be painful. Specific

etiology of this condition is unknown. It is thought that factors such as atypical bone formation ,osteoarthritis, wrist injuries and overuse are related to its formation.
Spontaneous rupture of the extensor tendons of the index finger is a rare pathology usually degenerative due to chronic inflammation and friction on bony prominence or internal fixation materials. We present the case of a patient who presented with spontaneous rupture of the extensor indicis propius tendon of the index finger (EIP) and the extensor digitorum communis tendon of the same finger (EDC) due to the presence of a carpal boss at the base of the second metacarpal. The diagnostic and therapeutic approach to the condition and the clinical outcome is described.
Case: A 60 year old male presented to the outpatient clinics with sudden loss of extension of the right index finger, without fracture or injury. On clinical examination, a palpable painless swelling was noted on the dorsal surface of the base of the second metacarpal. X-rays and magnetic resonance imaging were performed. A carpal boss was identified at the base of the second metacarpal and a rupture of the EIP and EDC at the same level was confirmed. The treatment was operative. Under local anesthesia and tourniquet, a complete degenerative rupture of both tendons was identified, bony erosion was removed and the peripheral stumps of EIP and EDC were weaved end to side to the common extensor tendon of the middle finger. A palmar plaster cast was placed for 5 weeks and physiotherapy was initiated.
Results: At the end of 10 physiotherapies the patient acquired painless movement of the fingers while the index finger showed a 10° extension deficit. Flexion, abduction and adduction remained unaffected. Index lost the ability of independent extension.
Conclusions: Carpal boss is one of the most common benign tumors of the hand. Only three cases of degenerative rupture of the extensor mechanism of the index finger due to the presence of carpal boss are reported in the literature. Although it occurs rarely, it should be recognized as a complication of a carpal boss and the possibility of extensor rupture should be assessed when treating patients with exostosis at the base of the second or third metacarpal.
key words: carpal boss, extensor mechanism rupture

A-1052 COMPARING UNION IN PROXIMAL THIRD SCAPHOID FRACTURES USING SINGLE OR DOUBLE SCREW FIXATION

ZB Al-Hubeshy & TD Stringfellow, Mr AJ Graham
Trauma and Orthopaedic Department, Buckinghamshire Healthcare Trust, UK

Introduction: Using Herbert or Mayo classification to define proximal pole scaphoid fractures is prone to poor inter-rater reliability. The scaphoid long axis (SLA) measurement (Dean et al 2018) improves reliability and accuracy of classification. We studied operations for fractures of the proximal third of the scaphoid. While double screw fixation is gaining popularity, few publications quantify union-rate benefit. This single-surgeon series examines radiological outcome following surgery for proximal pole fractures (defined by SLA ≤0.33) focussing on differences between acute vs chronic cases, and single vs double screw constructs.
Aims: Primary aim of the study was to assess the rate of union in proximal third scaphoid fractures following single or double screw fixation in acute and chronic fractures. Secondary goals assessed factors such as patient age, delay between injury and surgery, and smoking status on the union rates.
Material and Methods: We analysed a retrospective series of patients having surgery for proximal scaphoid fractures between 2003-2022. We used the SLA method to identify proximal pole fractures (SLA ≤0.33). Acute cases were defined as having surgery within 12 weeks of injury. Primary outcome was union, defined as complete bony bridging on CT scan. Patients had single or double screw (Acutrak, Acumed) fixation. Acute cases had screw fixation alone; chronic cases had additional cancellous distal radial bone graft. We excluded patients with SLA >0.34, those lost to follow-up or managed

with K-wire or retrograde screw fixation. Statistical analysis was performed using SPSS Version 28 (IBM Corp).
Results: From a total of 348 operative cases, 105 were considered 'proximal' at the time of surgery. After applying the SLA and exclusion criteria, we identified 42 patients with 23 acute and 19 chronic fractures. Median age was 23 years (IQR 20-34). Union rate was 38/42 (90%). All 23 acute fractures united (13 single screw, 10 double screw). There was no difference in union rates between single (n=21) and double (n=21) screw fixation for the whole cohort. 15/19 of the chronic cases united (79%). Eight were fixed with a single screw (6/8 united) and eleven with double screws (9/11 united). There was no difference in outcome between single and double screw fixation for established non-union (p=0.7 Fisher's Exact test). Patient age, time since injury, smoking status, fracture location (on SLA) did not predict union using multiple binary logistic regression.
Conclusion: Despite a large operative cohort, after excluding cases outside the SLA ≤0.33 range and those lost to follow up we generated a small number of study cases, consistent with the paucity of publications on proximal pole outcome. The SLA method was a useful tool for defining our study group. Surgery for acute proximal third scaphoid fractures had a higher union rate (100%) than for chronic cases (79%). We found no difference in outcome between single and dual screw fixation; despite the inherent difficulties in obtaining data on large numbers of proximal pole cases, larger series are needed to confirm or refute this conclusion.

A-1053 THE MODIFIED METHOD OF SKIN FLAP FORMATION IN THE TREATMENT OF TYPE I CAMPTODACTYLY

Andrey Bespalchuk
Belarusian State Medical University, Minsk, Republic of Belarus

Introduction: Camptodactyly is characterized by a flexion deformity at the proximal interphalangeal joint of the finger(s) of the hand. More often the fifth finger is involved in the pathologic process and pathology is already present at birth (Type I). The pathology can present either mono- or bilateral. It should be noted that in all cases of camptodactyly, there is a longitudinal skin deficit of the affected finger, along with other anomalies of the osteoarticular and soft tissue components. There are many treatment options for this pathology, including conservative treatment, but there is no consensus on the optimal treatment option for this pathology and at what age it should be performed.
Aim: The aim of the present study was to determine the effectiveness of proposed method of treatment of isolated camptodactyly of the fifth finger of the hand (Type I) in children.
Material & Methods: In the pediatric traumatology and orthopedics department of the Minsk City Center of Traumatology and Orthopedics, single-type surgical approachs for camptodactyly of the 5th finger of the hand in 13 patients (14 hands) were performed in the period from 2015 to 2022. The age of the patients ranged from 1 year 8 months to 15 years. The vast majority of surgical interventions were performed in the age range of two to five.
Surgical technique. At the first stage of surgery, by approach along the ulnar neutral line (from the distal finger crease to the distal palmar crease) with a transition in the proximal region to the hypothenar at an angle of 45 degrees, a skin-subcutaneous full-layer flap was dissected. The superficial flexor tendon was then removed after release of the ligamentous in the volar region of the proximal interphalangeal joint, followed by redressment of the middle phalanx. The PIP was transarticularly fixed with a Kirschner wire (diameter of 0.6-0.8 mm) in the extend position of the middle phalanx. The skin flap formed at the first stage was mobilized distally, which made it possible to eliminate the deficit of the finger skin. At the final stage, the postoperative wound was sutured.
Results: Outcomes of treatment were studied from year up to six years from the date of surgery. When assessing the results of treatment, we assessed not only the range of motion in the joints of the treated finger, but also the satisfaction

of the child's parents or the patient himself with the result obtained.
Conclusions: Analysis of the long-term results of treatment of patients with camptodactyly, using the proposed surgical approach, demonstrates its high efficacy under certain conditions.

A-1054 THE IMPLEMENTATION OF ICHOM CONGENITAL UPPER LIMB ANOMALIES SET IN DAILY CARE

Wim Janssen[1,2], Klaske Nieuwenhuis[1,2], Lisette Melis[1,2], Noemi Hunneman[1,2], Christianne van Nieuwenhoven[2], Ernst Smits[2]
[1]Rijndam Rehabilitation center, Rotterdam, Netherlands; [2]ErasmusMC University Hospital Rotterdam, Netherlands

Introduction: Care for children with Congenital Upper Limb Anomalies is complex for several reasons. There is a large variety of differences, a small number of children involved and a small number of institutes worldwide involved in the care for these children and their families.
Aim: To implement the ICHOM Set of Patient-Centered Outcome Measures for Congenital Upper Limb Anomalies. (https://www.ichom.org/)
Material & Methods: The ICHOM set was the result of work by a group of leading physicians, measurement experts and patients. It was urged to start measuring these outcomes to better understand how to improve the lives of our patients. We have implemented the use of the ICHOM care pathway and further improved this within the hospital widely use of VBHC.
Results: We started using ICHOM as a reference guide to build our care monitor, a web based system which was build to send a digital link by email to the participant which led them to a personal environment for the at that time point appropriate questionnaires. Reality proved otherwise as we noticed that care pathways were not parallel to our measurement pathways. Either the doctor was absent, or the child was ill which led to a different timeline in the care pathway and assessments. Since the original health monitor was sending out the questionnaires automatically it created a very confusing situation for the parents and the children. The questionnaires were not linked to their visit so these questionnaires became less relevant to the patient and so their value decreased. And in addition, the outcomes were not discussed anymore during there actual visit due to the difference of filling in the questionnaire and and the actual visit to the hospital.
So we started implementing VBHC by using the Global health and more disease specific PROMIS questionnaires, like upper extremity functioning, peer relations, esthetic, but also the IT QoL have been added to gain more specific information but also to meet the ICHOM guidelines.
So we have incorporated the use of PROMIS questionnaires in our daily practice; PROMIS = Patient reported outcomes measurement information system (in Dutch). The 'Patient-Reported Outcomes Measurement Information System' (PROMIS®) is a system with which patient-reported health outcomes (PROs) can be measured in a highly efficient, valid and reliable manner. The PROMIS system consists of generic Patient-Reported Outcome Measures (PROMs). This means that the PROMs can be used in children with and without one or more disorders. PROMIS can be used to measure outcomes that are relevant to many patients and people in the general population.
Conclusions: The experiences with the implementation of the ICHOM set led to the conclusion we needed to engage in another combination existing of PROMS and a standardized hand assessment to gather as much information on the child's function and it's (and parents) expectations.
references: https://www.dutchflemishpromis.nl/, https://connect.ichom.org/patient-centered-outcome-measures/congenital-upper-limb-anomalies/

A-1055 BEYOND THE PRIMARY INJURY: ADDRESSING CONCURRENT MUSCULOSKELETAL COMPLAINTS IN THE UPPER LIMB AND NECK IN PATIENTS WITH PRIMARY HAND/FOREARM INJURY

Lukasz Maciej Winiarski[1], Peter Larsen[1,2], Michael Skovdal Rathleff[1,3]

[1]Department of Physiotherapy and Occupational Therapy, Aalborg University Hospital, Aalborg, Denmark; [2]Department of Orthopedic Surgery, Aalborg University Hospital, Aalborg, Denmark; [3]Department of Health Science and Technology, Faculty of Medicine, Aalborg University, Aalborg, Denmark

Introduction: Musculoskeletal complaints (MSCs) in the elbows, shoulders, and neck frequently occur in patients with isolated hand/forearm injuries or conditions, affecting 40% of this population. Notably, over a quarter of individuals with a hand/forearm complaint develop concurrent MSCs in the upper limb and neck after their initial injury or condition. However, there is a lack of research evaluating interventions aimed at reducing pain and improving function in the upper limb and neck following an isolated hand/forearm complaint.

Aim: The present study aimed to explore patient-reported outcomes before and after the implementation of a patient-centered management strategy for upper-limb and neck complaints that developed after an isolated hand/forearm complaint.

Material & Methods: The study included 66 patients with different hand/forearm complaints and concurrent MSCs proximally in the upper limb and neck developed after the primary hand/forearm complaint. The patient-centered management strategy combined patient education, individualized exercises, and manual therapy, and was organized as an add-on to the standard treatment for the primary hand/forearm complaint to target concurrent MSCs proximally in the upper limb and neck. Patient-reported outcome measures: Disabilities of the Arm, Shoulder and Hand (DASH), Pain Catastrophizing Scale (PCS), Hospital Anxiety and Depression Scale (HADS), European Quality of Life 5 Dimensions questionnaire (EQ-5D), and pain questionnaire assessing the intensity of pain across the hand, elbow, shoulder, and neck were collected at baseline, discharge, and three-month follow-up.

Results: Significant improvements were observed across all patient-reported outcomes from baseline to follow-up. DASH scores improved significantly between baseline and discharge, with changes ranging from 17 to 29 points across the three subscales. Additionally, there was a significant 6-point improvement in PCS, a 2-point improvement in HADS, and a .051-point increase in the EQ-5D index. Median pain intensity on NRS (0-10) decreased from 6 (4–8) to 5 (2.5–7) in hands, 3 (0–6) to 0 (0–3) in elbows, 5 (2–7) to 2.5 (0–5) in shoulders, and 3 (0–6) to 2 (0–3) in the neck, between baseline and discharge.

Conclusions: Patients reporting concurrent MSCs in the elbow, shoulder, and neck after an isolated hand/forearm complaint may benefit from patient-centered management comprising patient education, individualized exercises, and manual therapy targeting pain and functional deficits in the upper limb and neck. The study emphasizes the importance of addressing not only the primary injury but also associated musculoskeletal issues for a more holistic and successful patient outcome. These findings contribute valuable insights into the management of concurrent MSCs, providing a basis for further research and improved clinical approaches in similar patient populations.

A-1056 EFFICACY OF DUAL MOBILITY PROSTHESIS IN THE MANAGEMENT OF THUMB TRAPEZIOMETACARPAL JOINT OSTEOARTHRITIS: A LONG-TERM FOLLOW-UP STUDY

S. Matarazzo[1], F. Paganini[1], A. Brandolini[2], J. Teodori[2], A. Minini[1,2], E. Mascherpa[2], S. Robbiati[2], B. Corsini[1], V. Ceretti[1], L. Fresta[1], C. Truini[1], L. Valdatta[1], A. Fagetti[2], F. Tamborini[12]

[1]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy; [2]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy

Introduction: Trapeziometacarpal osteoarthritis stands as one of the prevailing chronic pathologies affecting the hand, leading to the onset of long-term disability. Notwithstanding the elevated prevalence of this pathology within the population, a consensus regarding the optimal treatment modality remains elusive at present.

Aim: This study aims to evaluate the efficacy of dual mobility prostheses in the treatment of rhizoarthrosis, assessing postoperative outcomes, recovery of strength, mobility, pain reduction and implant stability over a four-year follow-up period.

Material & Methods: Between 2019 and 2023, a total of 87 dual mobility prostheses (Touch®, KeriMedical, Les Acacias, Switzerland) were implanted in patients diagnosed with rhizoarthrosis (Grade 2 and 3 rhizarthrosis cases without STT involvement). Pre- and postoperative assessments were conducted to analyze strength recovery (Jamar test, key and 2-finger pinch test), resumption of mobility (Kapandji, radial abduction), changes in pain (VAS) and quality of life (QuickDASH). Radiographic evaluation was performed pre-operatively, at 1 month, 6 months and then annually.

Results: We have recorded a statistically significant improvement (Wilcoxon test and Student t, p-Value <0.05) in all the analyzed domains. Patients demonstrated a substantial enhancement, with hand movement recovery observed as early as one week after surgery. The reduction of pain was also a prominent outcome, highlighting the efficacy of the dual mobility prosthesis in providing swift relief. The results have demonstrated stability and durability, without signs of involution throughout the designated follow-up period. Each patient has expressed the intention to undergo the procedure anew should the need arise.

Conclusions: The use of dual mobility prostheses in the treatment of rhizoarthrosis has shown remarkable success in promoting fast recovery of strength and mobility, accompanied by a significant reduction in pain. The observed outcomes remained durable throughout the four-year follow-up period, suggesting the long-term effectiveness of this intervention. Further research and larger-scale studies may be warranted to corroborate these findings and explore additional aspects of the dual mobility prosthesis in the context of rhizoarthrosis treatment.

A-1057 ROADMAP FOR TMR IN THE LOWER EXTREMITY OF NON-AMPUTEE PATIENTS: A CADAVER STUDY

JWD de Lange, CA Hundepool, JM Zuidam

Department of Plastic, Reconstructive and Hand Surgery, Erasmus MC, Rotterdam, The Netherlands

Introduction: Chronic neuropathic pain is a common result of trauma and a complication of operations when sensory nerves are damaged. Targeted muscle reinnervation (TMR) is a surgical procedure developed for amputee patients. TMR has shown to be reliable in preventing and treating neuropathic pain in those patients. Considering this, TMR could be a feasible treatment for non-amputee patients with chronic neuropathic pain.

Aim: The aim of this study is to describe the options for TMR in the upper and lower leg in non-amputee patients for symptomatic neuromas of the femoral saphenous, sural, and peroneal nerves.

Material & Methods: Seven cadaveric lower limbs were dissected. The course of the femoral, saphenous, sural, and peroneal

nerves was studied and motor nerve supply to adjacent muscles was described by number, length, diameter, and entry points in muscle. At the level of the upper leg, lower leg anterior and posterior, and the foot.
Results: The vastus medialis provided 2 [2-3] motor branches and sartorius 3 [1-3] motor branches. Medial and lateral gastrocnemius had both 3 [2-4] motor branches. Tibialis anterior 4 [2-6] motor branches and extensor hallucis longus 5 [2-6] motor branches. The extensor digitorum brevis 5 [3-5] motor branches and the extensor hallucis brevis were found to have 3 [2-3] motor branches.
Conclusions: For the treatment of neuropathic pain in non-amputee patients we recommend the following options as TMR targets thereby leaving enough motor entry points intact minimizing loss of muscle function. For neuromas of the saphenous nerve in the thigh the motor branches to the vastus medialis and secondary the sartorius. For the sural nerve in the posterior compartment of the lower leg the motor branches to the medial and lateral gastrocnemius. For the superficial peroneal in the lower leg, the motor branches to the tibialis anterior and extensor hallucis longus. And for the superficial peroneal in the foot, motor branches to the extensor digitorum brevis and extensor hallucis brevis.

A-1058 ASSESSMENT OF ADAPTIVE PROXIMAL SCAPHOID IMPLANTS: LONG-TERM OUTCOMES AND CONSIDERATIONS IN PROXIMAL POLE AVASCULAR NECROSIS AND CARPAL COLLAPSE.

J. Teodori[1], F. Paganini[2], S. Matarazzo[2], F. Tamborini[12], A. Brandolini[1], A. Minini[1], E. Mascherpa[1], L. Valdatta[2], A. Fagetti[1]
[1]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy; [2]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy

Introduction: The best treatment of pseudoarthrosis of the proximal pole of the carpal scaphoid and associated carpal collapse (SNAC) is currently debated. In the case of persistent forms after previous surgery or in the case of non-reconstructable poles, a prosthetic solution with a pyrocarbon implant (APSI) is available
Aim: This study aimed to assess the long-term progress and stability of APSI implant. The primary objective was to conduct a comprehensive evaluation over a minimum one-year follow-up period to gauge the efficacy of APSIs in restoring joint function and mobility.
Material & Methods: Patients undergoing APSI implantation were systematically monitored through serial outpatient follow-ups at intervals of 1 week, 1 month, 3 months, 6 months, and 12 months postoperatively. The assessment parameters included evaluating the resumption of daily activities, grip strength, pincer strength, and meticulous observation for any deficits in flexion or extension. In all patients, maintenance of carpal ratios and carpal height were also assessed radiographically as parameters of progress in carpal collapse.
Conclusions: Functional and radiographic results demonstrated high functionality of the treated wrist on specific questionnaires and radiographic maintenance of carpal relationships. the APSI is a viable and relatively uncomplicated solution with a short post-surgical rehabilitation period

A-1059 ASSESSMENT OF CAPFLEX PROSTHESIS IN PROXIMAL INTERPHALANGEAL JOINT RECONSTRUCTION: LONG-TERM PROGRESS AND CONSIDERATIONS FOR SUCCESS

J. Teodori[1], F. Paganini[2], S. Matarazzo[2], F. Tamborini[1,2], A. Brandolini[1], A. Minini[1], E. Mascherpa[1], L. Valdatta[2], A. Fagetti[1]
[1]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy; [2]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy

Introduction: Hand pathologies resulting in finger or partial hand loss often necessitate the use of prosthetic solutions for functional and aesthetic restoration. Among these solutions, the CapFlex prosthesis has emerged as a promising option. This prosthesis is tailored to restore function and appearance following finger or partial hand loss, particularly addressing proximal interphalangeal joint-related conditions.
Aim: The study aimed to evaluate the long-term progress and stability of CapFlex prostheses in patients undergoing this reconstructive procedure. The primary objective was to conduct a comprehensive assessment of patients' outcomes, functional recovery, and stability over a follow-up period exceeding one year.
Material & Methods: Patients undergoing CapFlex prosthesis reconstruction were closely monitored through serial outpatient follow-ups at intervals of 1 week, 1 month, 3 months, 6 months, and 12 months postoperatively. Evaluation parameters included the resumption of daily activities, grip strength, pincer strength, and assessment for any deficits in flexion or extension.
Results: Overall, the outcomes revealed largely positive results across functional domains, demonstrating substantial improvements in grip strength, restoration of functional pincer strength, and significant progress in the resumption of daily activities. However, instances of less favorable outcomes were noted in cases where meticulous adherence to the rehabilitation protocol was lacking or in instances of implant failure, emphasizing the critical role of precision in surgical placement and the necessity of a comprehensive rehabilitation regimen.
Conclusions: In conclusion, the CapFlex prosthesis exhibits considerable promise as a reconstructive system specifically addressing proximal interphalangeal joint-related pathologies. The study supports the efficacy of CapFlex prostheses in restoring function and aesthetics; however, successful outcomes hinge upon precise surgical execution and strict adherence to a tailored rehabilitation protocol. These findings underscore the importance of meticulous surgical techniques and postoperative care in ensuring the long-term success and stability of CapFlex prosthetic reconstructions for finger and partial hand loss.

A-1060 LONG-TERM EVALUATION OF HEMIHAMATE ARTHROPLASTY FOR CHRONIC PIP FRACTURE-DISLOCATIONS: STABILITY AND FUNCTIONAL MAINTENANCE BEYOND ONE YEAR

F. Paganini[1], S. Matarazzo[1], A. Brandolini[2], J. Teodori[2], A. Minini[2], E. Mascherpa[2], S. Robbiati[2], L. Valdatta[1], F. Tamborini[1,2], A. Fagetti[2]
[1]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy; [2]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy

Introduction: Fracture-dislocations of the proximal interphalangeal (PIP) joint pose challenges due to persistent stiffness, pain, and joint angulation, especially when more than 50% of the joint surface is affected. Hemihamate arthroplasty, offering advantages in restoring stability for unstable PIP injuries, remains a technically demanding treatment. This study aimed to evaluate the functional recovery, complications, and stability of the joint post-hemihamate arthroplasty in chronic PIP fracture-dislocations involving more than 30% of the joint.

Aim: The primary objective was to conduct a comprehensive long-term evaluation (over one year) to assess the functional recovery, joint stability, and complications following hemihamate arthroplasty in cases of chronic PIP fracture-dislocations with over 30% joint involvement.
Material and Methods: Eight hemihamate arthroplasties were performed since 2021 on patients with chronic PIP fracture-dislocations (>30% joint involvement). Long-term follow-ups with radiological assessments extended beyond one year at regular intervals. A standardized post-operative protocol, including immobilization and physiotherapy, was implemented. Data collection involved pre- and post-operative flexion-extension limitation, pain perception (VAS), post-operative grip strength, subjective stability assessment, and alignment at PIP imaging.
Results: The mean bone segment grafted was 0.97 cm, fixed with 2-3 screws. Patients showed sustained functional improvement (maximum flexion deficit of 15°) and minimal pre- and post-operative pain (mean VAS 1). No graft mobilizations or recurrent dislocations occurred during the extended follow-up period beyond one year. One case of partial bone resorption had no clinical impact, and no complications were noted at the harvest site.
Conclusions: Hemihamate arthroplasty demonstrated long-term reliability and efficacy in treating chronic PIP fracture-dislocations with over 30% joint involvement. The sustained functional improvement and absence of complications or recurrent dislocations during the extended follow-up beyond one year endorse its recommendation as a primary treatment option for such lesions.

A-1061 MUSCLE-IN-VEIN CONDUIT TECHNIQUE: EFFECTIVE NERVE RECONSTRUCTION IN HAND INJURIES

J. Teodori[1], F. Paganini[2], S. Matarazzo[2], F. Tamborini[1,2], A. Brandolini[1], A. Minini[1], E. Mascherpa[1], L. Valdatta[2], A. Fagetti[1]
[1]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy; [2]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy

Introduction: Nerve deficits in hand injuries present considerable challenges in reconstructive surgery, demanding innovative techniques to restore sensory function. This study investigates the outcomes of the muscle-in-vein (MIV) conduit technique in addressing nerve losses concerning common intermetacarpal sensory branches and radial or ulnar digital sensory branches.
Aim: The primary aim of this study is to assess the outcomes of the muscle-in-vein conduit technique in nerve reconstruction for hand injuries. Comprehensive evaluations were conducted to analyze sensory recovery and monitor the development of postoperative neuromas in patients undergoing this reconstructive approach.
Material and Methods: Between 2018 and 2023, a total of fifty-two procedures were performed using the muscle-in-vein conduit technique to reconstruct nerves affected by common intermetacarpal and digital sensory branch injuries. Patients underwent thorough assessments to evaluate the extent of sensory recovery and track the occurrence of postoperative neuromas.
Results: The muscle-in-vein conduit technique demonstrated robust reliability in reconstructing nerve deficits associated with common intermetacarpal and digital sensory branch injuries. Notably, the approach facilitated substantial sensory recovery while exhibiting a remarkably low incidence of posttraumatic neuromas. Moreover, the procedure proved to be cost-effective. Encouragingly, no significant postoperative complications were reported among the patient cohort.
Conclusions: Our study findings substantiate the muscle-in-vein conduit technique as a dependable and effective strategy for addressing nerve losses in hand injuries. Its ability to achieve satisfactory sensory recovery while minimizing the occurrence of posttraumatic neuromas underscores its utility in hand reconstructive surgery. Additionally, the procedure displayed a favorable safety profile, characterized by the absence of notable complications. The muscle-in-vein conduit

technique emerges as a promising solution for nerve reconstruction in cases involving common intermetacarpal and digital sensory branch injuries, offering a reliable and safe approach in hand reconstructive surgery.

A-1062 RESURFACING CAPITATE PYROCARBON IMPLANTS: EVALUATING FUNCTIONAL RECOVERY AND STABILITY

J. Teodori[1], F. Paganini[2], S. Matarazzo[2], F. Tamborini[12], A. Brandolini[1], A. Minini[1], E. Mascherpa[1], L. Valdatta[2], A. Fagetti[1]
[1]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy; [2]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy

Introduction: The use of Resurfacing Capitate Pyrocarbon Implants (RCPI) addresses specific pathologies affecting the capitate bone and advanced carpal collapse. This implantation technique aims to alleviate pain and restore function in cases of capitate-related wrist pathologies, offering a potential solution for patients experiencing severe limitations in wrist function and stability.
Aim: This study aimed to evaluate the efficacy, progress, and stability of RCPI implementation in patients with capitate-related wrist pathologies, conducting a comprehensive assessment over a minimum one-year follow-up period. The primary objective was to analyze functional outcomes, including grip strength, pincer strength, joint mobility deficits, prone supination, lateralization, and the resumption of activity post-operatively.
Material and Methods: A cohort of patients underwent RCPI implantation and was closely monitored with serial outpatient follow-ups at 1 week, 1 month, 3 months, 6 months, and 12 months postoperatively. Assessments included comprehensive evaluations of grip strength, pincer strength, joint mobility deficits in flexion, extension, prone supination, lateralization, and the resumption of daily activities. Early mobilization protocols and targeted physiotherapy were implemented and monitored.
Results: The results demonstrated discrete but significant improvements in joint function post-RCPI implementation, particularly evident in cases where early mobilization and targeted physiotherapy were employed. Patients exhibited a partial return to joint function, showcasing improvements in grip strength, pincer strength, and various joint mobility parameters.
Conclusions: The findings support the efficacy of RCPI as a treatment modality for capitate-related wrist pathologies, providing a pathway to improved functional recovery. While no conclusive evidence suggests superiority over other treatments, RCPI offers a viable option for restoring wrist function and stability. Emphasizing the importance of early mobilization and targeted physiotherapy, RCPI demonstrates promise in facilitating improved joint function, contributing to favorable functional outcomes in patients with capitate-related wrist disorders.

A-1063 ENHANCING STABILITY IN GRADE 4 PERILUNATE DISLOCATION FRACTURE: ANTIPRONATION SPIRAL TENODESIS AS A SALVAGE PROCEDURE FOR CHRONIC INSTABILITY

J. Teodori[1], F. Paganini[2], S. Matarazzo[2], F. Tamborini[12], A. Brandolini[1], A. Minini[1], E. Mascherpa[1], L. Valdatta[2], A. Fagetti[1]
[1]Hand Surgery Unit – Circolo Hospital and Macchi Foundation – Varese, Italy; [2]Plastic and Reconstructive Unit - Circolo Hospital and Macchi Foundation – Insubria University - Varese, Italy

Introduction: Lunate dislocation, present complex challenges in orthopedic management due to severe ligamentous disruptions and potential long-term joint instability. Acute interventions involving reduction, pinning, and attempted ligament reconstruction aim to restore joint alignment and function. However, in cases of chronic instability, late

presentation or inadequate recovery, alternative surgical approaches such as antipronation spiral tenodesis may offer viable solutions for enhancing joint stability and function.
Aim: This case report aims to detail the clinical course, treatment and outcomes of a patient presenting a late diagnosed lunate dislocation. The primary objective was to chronicle the acute management involving reduction, pinning, and attempted ligament reconstruction followed by the subsequent intervention of antipronation spiral tenodesis in the chronic phase. The focus is on evaluating the patient's joint recovery and functional outcomes post-tenodesis compared to the pre-tenodesis status.
Material and Methods: We described the treatment of a misrecognised lunate dislocation that came to our attention in the outpatient clinic following multiple orthopaedic evaluations for persistent pain and median nerve compression symptoms after a domestic fall. The patient underwent acute management involving immediate reduction, pinning and antipronation spiral tenodesis to address the ongoing instability. Post-operative assessments included clinical evaluations, imaging studies, and functional outcome measurements to assess joint recovery and stability.
Results: After antipronation spiral tenodesis, there was a notable enhancement in joint stability and functional recovery. Clinical assessments revealed improved joint alignment, reduced instability, and enhanced functional capabilities, enabling the patient to regain substantial hand and wrist function. The maintenance of joint ratios was monitored with radiographic examinations in the follow-up. The viability of the lunate was monitored with MRI examination 3 months after surgical treatment.

A-1064 TMC JOINT ARTHROPLASTY – RETROSPECTIVE STUDY OF 66 PATIENTS

João Duarte Gameiro[1], João Almeida[2], João Neves[1]
[1]Hospital Ortopédico Sant'Iago do Outão, Setúbal, Portugal; [2]Hospital Nossa Senhora da Arrábida, Barreiro, Portugal

Introduction: The trapeziometacarpal joint is the second most common location of arthrosis in the hand, the most common being the distal interphalangeal joint. Currently, there is still great controversy regarding the surgical procedure that should be chosen: simple trapeziectomy, resection-interposition arthroplasty, resection-suspension arthroplasty, arthrodesis and arthroplasty with prosthesis.
Methods: A retrospective study is presented regarding 66 patients with grade II/III rhizarthrosis, according to the Eaton-Littler classification, who underwent arthroplasty with a double mobility prosthesis between November 2018 and December 2022. The average age is 61 years old (range between 51 and 76 years old) with an average follow-up period of 34 months.
Results: The assessment of patients' global satisfaction was carried out using the DASH questionnaire, demonstrating a statistically significant reduction, with the value going from an average of 54%, pre-operatively, to 14% at 6 months after surgery. As complications, we present a prosthesis revision rate of 13% (9 cases) and in 4 cases a revision of the cup was performed, in 3 cases a revision of the neck size and in 2 cases an open arthrolysis.
Discussion: One of the main complications of these prostheses is the friction caused between the metal and the polyethylene, leading to possible osteolysis and loosening of the trapezoidal dome.
Conclusion: To choose the best surgical treatment for Rizarthrosis, it is essential to evaluate the patient in isolation and the experience of the surgeon. Arthroplasty with prosthesis is reserved for grades II and III, in middle-aged patients with good architecture and trapezius bone stock. Although this type of prosthesis is being used increasingly and more routinely, there is still a short follow-up to see true long-term results.

A-1066 CONVENTIONAL BUTTON SUSPENSIONPLASTY VS ALL-SUTURE SUSPENSIONPLASTY FOR RHIZARTHROSIS. WHAT ARE THE CLINICAL OUTCOMES? A RETROSPECTIVE STUDY

Sergi Barrera-Ochoa[1], Melissa Bonilla-Chaperón[1], Tryno Muñoz[2], Gerardo Méndez[1], Ester Mora[1], Gustavo Sosa[1]
[1]Institut de la Mà, Hospital Universitari General de Catalunya, Barcelona, Spain; [2]Hospital Comarcal de Blanes, Girona, Spain

Introduction: Suspensionplasty is currently one of the preferred methods for the treatment of first carpometacarpal joint (CMCJ1) arthritis. Suture-button suspensionplasty is the most widespread method proposed, using Mini Tightrope® as the implant of choice. Currently, MicrolinkTM has been proposed as a novel, all-suture implant for the same purposes, with the premise of having less implant-related complications. Nonetheless, there are no published studies that display possible postoperative differences between these two methods. The purpose of this study is to compare both implants under the same operative technique and patient conditions, and evaluate their outcomes and complications.
Aim: The aim of this study is to compare both implants under the same operative technique and patient conditions, and evaluate their outcomes and complications.
Material & Methods: This is a retrospective, transversal study. In a one-year period, 56 patients were treated with conventional suture button or all-suture suspensionplasty; all surgeries were performed by the same surgeon using the same technique and postoperative protocol for both implants. Preoperative and postoperative variables were evaluated after a minimum period of 6 months, and postoperative complications were registered. A statystical analysis was performed to evaluate differences between the two implants used.
Results: A total of 26 patients were treated with MicrolinkTM and 30 were treated with Mini Tightrope. Overall, patients treated with MicrolinkTM showed less complications than those treated with Mini Tightrope® ($p<0.05$). Complications reported in our study included implant removal due to intolerance (most frequent), 2nd metacarpal fracture, and neurapraxia of the dorsal radial sensory nerve branch. There were no significant differences in QuickDash (QDASH) improvement among the two groups.
Conclusions: Patients treated with MicrolinkTM presented less overall complications than those treated with Mini Tightrope®. Besides implant-related complications (intolerance that required removal of the Mini Tightrope®), there were mostly no differences among complications between the two implants. There were no significant differences in functional outcomes between patients who underwent suspensionplasty with conventional suture button and with an all-suture implant. It is important to note that future studies with higher level of evidence might provide us with even more information regarding functional outcomes after longer postoperative periods.

A-1067 RECONSTRUCTION AFTER A LARGE JOINT DEFECT AT THE BASE OF THE PROXIMAL PHALANX OF THE INDEX

Crhistian Rodríguez Echegaray, Cristina Valbuena Esteban, Rodrigo Hidalgo Bilbao, Esteban Aragón
Hospital Intermutual de Euskaditraduc

Introduction: Joint defects in the hands imply a significant deficit in functionality. The massive losses of bone stock have a difficult approach.
Aim: Obtain an optimal reconstruction of the articular part of the proximal phalanx and obtain optimal mobility
Material & Methods: The patient is a 52-year-old man with extensive destruction of the proximal phalanx of the index finger after an accident with a chainsaw with bone loss in the accident and comminuted remains at the level of the proximal phalanx of the index finger with a loss of 80% of the articular facet. as well as injury to the extensor and partial flexor apparatus. Washing and stabilization with Kirshner wires are performed in the first stage. In a second stage, the

defect is reconstructed with a graft from the base of the proximal phalanx of the hallux, carved to size and stabilized with Kirshnner wires. The defect in the foot is filled with a tricortical iliac crest graft and fixed with screws.
Results: 2 months after the reconstruction, some Kirshnner wires are removed. 3 months after surgery, complete consolidation and perfect reconstruction of the facet joint is evident, allowing 0-90º mobility of the metacarpophalangeal joint. The foot graft also consolidates the entire foot with full function.
Conclusions: Free bone grafting of foot bones is a valid option for large joint defects in the bones of the hand.

A-1068 DIAGNOSIS AND MANAGEMENT OF TRIGGER WRIST – RESULTS OF A SYSTEMATIC REVIEW

Natan Silver[1,2], Joshua Cohen[2], Daniel Brown[1]
[1]Liverpool University Hospitals Foundation Trust, Liverpool, UK; [2]Shaare Zedek Medical Center, Jerusalem, Israel

Introduction: Trigger wrist (TW) is defined as triggering at the wrist at the level of the flexor or extensor retinaculum and is caused by various lesions. The triggering may be felt in the wrist or fingers depending on the tendon involved.
Aim: This study aims to describe the definition, diagnosis and management of TW, summarising the evidence for this rare condition by means of a formal systematic review.
Methods: A systematic review was performed in accordance with PRISMA guidelines. Aetiology, symptoms, investigations, treatment and outcomes were analysed.
Studies were selected and data extracted by three reviewers. Two reviewers independently selected articles and extracted data and a third (the senior author) checked decisions and resolved disagreements. Data was recorded in an excel spreadsheet.
Results: A total of 74 cases were identified from 64 publications.
Tendons involved included finger flexors (FDS and FDP); finger extensors (EPL, EIP); and wrist extensors (ECRL and ECRB). 47 cases (64%) had associated carpal tunnel syndrome (CTS).
Plain radiograph, ultrasound (standard and dynamic), computed tomography and magnetic resonance imaging were utilised for diagnosis.
All cases were managed surgically, by either carpal tunnel release, tumour excision, tenolysis, or a combination of these.
Conclusions: Trigger wrist is a rare condition causing mechanical "triggering", normally accompanied by pain, at the wrist. It can be caused by entrapment of the finger flexors as they pass through the carpal tunnel (a proximal form of trigger finger) or more rarely by entrapment of the wrist or finger extensors at the extensor retinaculum. When the finger flexors are involved the condition is invariably accompanied by CTS. Diagnosis can be hampered by unfamiliarity with the condition and often requires advanced imaging such as dynamic ultrasonography and magnetic resonance imaging. Treatment is primarily surgical, normally consisting of carpal tunnel release (analogous to A1 pulley release for trigger finger) and excision of any associated space occupying lesions.

A-1069 SURGICAL TREATMENT OF OSTEOARTHRITIS OF THE FIRST CMC JOINT, WITH AN ASSOCIATED ARTHRITIS OF THE STT JOINT

Tadej Voljc, Martina Carnieletto, Ana-Lisa Pignet, Marlies Schellnegger, Werner Girsch
Department of Plastic, Aesthetic and Reconstructive Surgery, University Hospital Graz, Austria

Introduction: Osteoarthritis of the first CMC joint is a common condition with a general prevalence of 10 %, increasing to 30 % in women over the age of 50. In approximately one fourth of all patients the condition includes the neighbouring

STT joint, causing additional complaints and requiring adapted treatment. The subjective symptoms are comparable between both conditions, a diagnosis can be made through a clinical examination and radiographs.
Methods: Between 2018 and 2021, we have surgically treated a total of 14 patients, 7 for arthritis of the first CMC joint, 7 for an associated arthritis of the ST joint. Isolated arthritis of the CMC joint has been treated with a resection-suspension-interposition arthroplasty as described by Wulle. Patients with an associated arthritis of the ST joint were treated according to Wulle and received an additional resection of the proximal third of the trapezoid and interposition of the PL tendon as a spacer in the ST gap ("modified Wulle"). Postoperatively both groups were treated in a similar manner with a cast for the first two weeks and a splint for additional four weeks postoperatively – starting with remobilisation at the 7. week and allowing weight-bearing activities at 12 weeks postoperatively. Both patient groups received additional surgeries at the hand or wrist, grouped as: neurolysis and neuroma surgery, TOS release, arthrodesis and arthroplasty. All patients were assessed at a minimum postoperative period of 12 months clinically – for pain, ROM and grip strength – and using the DASH questionnaire. The results were pooled into two groups: CMC (isolated arthritis of the first CMC joint) and ST (an additional arthritis of the ST joint).
Results: The 12+ months investigation revealed the following results a difference in the VAS score postoperatively compared to preoperatively of -4.2 in both groups (SD 2.9 in the CMC and 1.0 in the ST group); a Kapandji score of 9.1 (SD 1.2) in the CMC group and 8.1 (SD 2.9) in the ST group; grip strength was measured at 21.7 kg (SD 11.5) in the CMC- and 18.6 kg (SD 10.7) in the ST group. The DASH Score was calculated at 36.7 (SD 26.8) in the ST group, compared to 42.9 (SD 24.2) in the CMC group.
Discussion: The results for CMC-I arthroplasty at our institution are comparable with literature. We found similar results in the Wulle-plasty and the modified Wulle-plasty groups with no statistically significant difference in both groups, apart from the preoperative VAS score. Both of our patient groups are small and there is a bias of additional surgical procedures. However, in our experience the modified Wulle-arthroplasty offers a reliable and safe option for the treatment of CMC-I arthritis with an associated arthritis of the ST joint.

A-1070 TREATING PATIENTS WITH PAIN SYNDROMES WITH NERVE TRANSFER, NEUROLYSIS AND NEUROTOMY. A CASE SERIES

Mojahed Sakhnini
Ziv Medical Center, Israel

Introduction: Pain syndromes are a huge basket of patients suffering from ill-defined pain that can occur following injury, surgery or come to existence without seemingly obvious reason.
The spectrum is huge and is not fully categorized in the literature. The ability to differentiate between different pain generators and the categorization of pain syndrome and defining a simple scale would help the treating physician understand what he is dealing with, help him make a based decisions that would eventually tailor a treatment plan for the patients potentially curing them.
Methods: In this study we defined 4 categories of pain syndrome based on recent literature and our experience: Irritative carpal tunnel syndrome, Irritative radial tunnel syndrome, neuroma and CRPS. All patients were treated surgically. The first groups were treated with carpal tunnel release, the second group with radial tunnel release and ECERB tenotomy, the third group was treated with Centro-central nerve transfer and the last group was treated with nerve transfers and TMR. The study included 25 patients in all groups.
Results: All patients had favorable outcomes with a statistically significant VAS score reduction, better quality of life

and increase in function. 20 patients were fully cured and stopped all pain medication. 5 patients have residual pain but regained a better function of the limb.
Conclusion: categorizing pain syndrome is an important step in treating pain syndrome. Pain syndrome can follow an injury in a specific pattern. The injury causes irritative nerve inhibiting function. Electrodiagnostic are not helpful as this irritation is dynamic and not static.
Understanding the different pain syndromes help plan treatment. Surgical treatment of refractory pain is possible and is dependent on the specific category of pain. Different surgical options are available for different pain syndromes. CRPS is curable!

A-1071 LONG-TERM CLINICAL AND RADIOLOGICAL OUTCOMES FOLLOWING POST-TRAUMATIC RADIOSCAPHOLUNATE FUSION

Mehdi Ducasse
Caen Normandy University Hospital Center, France

Purpose: Radioscapholunate (RSL) fusion is commonly performed for the management of painful post-traumatic radiocarpal osteoarthritis. This procedure aims to alleviate the pain but may result in reduced wrist mobility. The objective of this study was to determine the long-term clinical and radiological outcomes of this procedure.
Methods: In this multicentric study, we retrospectively evaluated 23 patients who underwent RSL arthrodesis for painful post-traumatic osteoarthritis (following an intraarticular radius fracture, perilunate luxation or scapholunate dissociation) from June 2005 to May 2022, with a minimum follow-up of 12 months. The clinical examination includes pain (VAS), functional scores (PRWE, QuickDash), range of motion (flexion/extension, ulnar/radial deviation, pronation/supination), grip strength, pinch strength and satisfaction. The radiological analysis focused on bone fusion and the presence of midcarpal osteoarthritis.
Results: Twenty-tree patients were underwent RSL fusion for post-traumatic osteoarthritis (19 males and 4 females) including 4 who had subsequently undergone total wrist fusion after the RSL procedure, with an average age of 42,9 (range 21–73) years. The PRWE and QuickDash were 33 and 31,3, respectively. The mean pain level was 0,3 out of 10. Grip and pinch strength in the operated wrist were respectively 68% and 82% of the contralateral wrist. Wrist flexion/extension averaged 25°/34°, ulnar/radial deviation averaged 10°/16° and pronation/supination 83°/70°. Sixty-one percent of the patients returned to work. Eighty-three percent of patients were satisfied with the outcome. For patients underwent total wrist fusion (17,4%). The reasons for this conversion to total fusion were RSL nonunion in one case and painful secondary midcarpal osteoarthritis (STT, SC, LC or LT) in the three other cases. The mean time elapsed between these two procedures was 17 months.
Conclusions: The radioscapholunate fusion is a treatment option for radiocarpal osteoarthritis to preserve a functional range of motion. Most patients maintain a satisfactory outcome over the long term, despite the possibility of progressive osteoarthritis in the midcarpal joint.
Key words: Arthrodesis, radiocarpal joint, radioscapholunate fusion, wrist.
Type of study/level of evidence: Retrospective IV

A-1072 SURGICAL TREATMENT OF PERIPHERAL NERVE DAMAGE, DEVELOPMENT OF PERIPHERAL NERVE SURGERY IN POST-SOVIET GEORGIA

Teimuraz Gurjidze, Miranda Gogishvili, Alexander Zurabashvili, Tigran Trchunian
Plastic and reconstructive surgery department, LTD Aversi Clinic, Tbilisi, Georgia

The intricate network of peripheral nerves is vital for maintaining motor and sensory functions, both of which may be compromised in instances of peripheral nerve injuries resulting from trauma or acute compression. In the 1970s, Georgia saw development of microsurgical techniques and with it gave rise to peripheral nerve surgery.

Different mechanisms of injury, such as laceration, stretch, or compression, would require a different approach and treatment. Thus, good clinical diagnosis plays a crucial role in the approach. Nerve injuries are classified into three main categories using the Seddon Classification: Clinical diagnosis of peripheral nerve injuries involves a comprehensive evaluation of symptoms like tingling, numbness, and pain. Through physical examinations and diagnostic tests such as electromyography and nerve conduction studies. Imaging techniques like MRI provide detailed insights. This thorough diagnostic approach allows for an accurate diagnosis, facilitating the development of effective treatment strategies for peripheral nerve injuries, including surgical interventions.

The surgical treatment of injured peripheral nerves involves several stages: decompression, neurolysis, reconstruction, and nerve transfer. Reconstruction can be further categorized into nerve grafting, nerve allograft, or neural tube techniques. Currently, in Georgia, allografts and neural tubes are unavailable, making autograft nerves the primary method for nerve reconstruction.

Decompression is used for compression neuropathy and tumor-related compressions. Various syndromes, such as carpal tunnel, Guyon's canal, or conditions like "foot drop," require releasing the compressing structures to alleviate symptoms and restore normal function. Often, neurolysis can provide necessary results through the release of the nerve from scar tissue formed as the body's reaction to trauma.

In our practice, nerve reconstruction primarily involves the use of nerve autografts, particularly in cases where the ends of nerve tissue cannot be adequately approximated for proper healing. Frequently, scar tissue replaces the damaged area, hindering signal transmission and necessitating removal until the fascicles become visible on both sides.

In situations where neither direct repair nor grafting is applicable, we resort to nerve transfer as a viable option.This method yields results that contribute to the restoration of muscle function and an enhanced quality of life. The process involves isolating and selecting neighboring nerve fascicles based on their proximity to the injury site, utilizing a simulator for precision. Subsequently, specific bundles of nerve fibers are redirected from a healthy nerve to the impaired target nerve.

In conclusion, the timing and location of peripheral nerve injuries are pivotal factors in their surgical management. Equally crucial is the thoughtful selection of patients and the implementation of appropriate management methods, as these components collectively determine the success of treatment outcomes. Recognizing the dynamic interplay between injury specifics and patient management is essential for optimizing the efficacy of surgical interventions in addressing peripheral nerve damage.

A-1073 AN ALGORITHM FOR THE TREATMENT OF SOFT TISSUE DEFECTS OF THE HAND

Teimuraz Gurjidze, Miranda Gogishvili, Alexander Zurabashvili, Tigran Trchunian
Plastic and Reconstructive Surgery Department, LTD Aversi Clinic, Tbilisi, Georgia

Defects affecting the hand and fingers may arise due to hand trauma, infections, or the excision of soft tissue tumors. While smaller defects may naturally heal, larger wounds resulting in significant defects necessitate specific surgical interventions.

Various microsurgical techniques are available for addressing extensive defects on the hand and fingers. The treatment of soft tissue defects in these areas is heavily reliant on the physical characteristics of the wound, including its location, depth, etiological factors, and, crucially, the motivation of the patient. The knowledge and experience of the surgical team, along with their skills and access to appropriate surgical equipment, also play a major role. A diverse range of techniques is employed for treating defects in the fingertips and palmar surface, requiring surgeons to master multiple approaches as there is no one-size-fits-all solution.

A meticulous analysis of the wound location, critical structures, and areas requiring coverage is essential before selecting a treatment approach. In our patient treatments, we employ techniques such as the closure of the defect using nearby tissue, Z-plasty and its modifications, local and regional flaps, and free flaps.

Our algorithm involves using Z-plasty and its modifications for digits and interdigital web space contractures. For isolated finger soft tissue defects, we find that V-Y flap, Morgan flap, dorsal middle phalangeal flap, or metacarpal artery perforator flaps are better suited. Additionally, regional perforator flaps, free flaps, groin, and abdominal flaps are frequently utilized to close soft tissue defects on the palmar and dorsal surfaces of the hand. Despite numerous approaches for closing soft tissue defects of the hand, the primary goal is to facilitate wound healing and achieve both functional and aesthetic effectiveness.

The limited literature on reconstructing soft tissues in the hand underscores the importance of advanced microsurgical techniques. While various algorithms can be devised based on these techniques, the ultimate choice of reconstruction depends on factors such as the patient's condition, the nature of the defect, and the surgeon's familiarity with available resources. A contemporary reconstructive surgeon should prioritize the most fitting and suitable reconstruction method, even if it is not the simplest option.

Keywords: hand soft tissue defects, free flap, regional flap, Z-plasty.

A-1074 CASE 1 (FOREARM)

Alex Berenguer
Spain

A-1075 DOS, DON'T AND CHALLENGES WHEN STARTING A 3D LAB

Peter Axelsson
Sweden

A-1076 CASE 3 (SCAPHOID)

Andreas Schweitzer
Switzerland

A-1077 INSIGHTS AND TRENDS REVIEW: ARTIFICIAL INTELLIGENCE IN HAND SURGERY

Robert Miller, Simon Farnebo, Maxim D. Horwitz
Chelsea and Westminster Hospital, UK

A-1078 IS CHATGPT ABLE TO PASS THE FIRST PART OF THE EUROPEAN BOARD OF HAND SURGERY DIPLOMA EXAMINATION?
Philippe Liverneaux
Department of Hand Surgery, Strasbourg University Hospitals, FMTS, Strasbourg, France

A-1079 AI-ENABLED DETECTION, SEGMENTATION AND ANALYSIS OF DISTAL RADIUS FRACTURES ON 2D- AND 3D-IMAGES
Marco Keller
Hand Surgery, Department of Orthopaedic Surgery and Traumatology, Kantonsspital Baselland, Liestal, Switzerland

A-1080 CONVOLUTIONAL NEURAL NETWORK FOR SECOND METACARPAL RADIOGRAPHIC OSTEOPOROSIS SCREENING
Warren C. Hammert
Department of Orthopaedics and Rehabilitation, University of Rochester, Rochester, NY, USA

A-1081 AI-BASED PHASE RECOGNITION FOR DISTAL RADIUS FRACTURE MIPO
Camille Graëff
ICube CNRS UMR7357, Strasbourg University, Strasbourg, France

A-1082 PATHO-ANATOMY & BIOMECHANICS OF THUMB BASE OA
Gerald Kraan
Belgium

A-1083 THE EVIDENCE FOR ARTHROPLASTY
Miriam Marks
Switzerland

A-1084 THE EVIDENCE AGAINST ARTHROPLASTY
Asif Ilyas
USA

A-1085 PATIENT SELECTION FOR YOUR PRACTICE
Daniel Herren
Switzerland

A-1086 THE SURGICAL LEARNING CURVE - TIPS AND TRICKS
Frederick Verstreken
Belgium

A-1087 COMPLICATIONS AND HOW TO DEAL WITH THEM
Adil Trabelsi
France

A-1088 PUSHING THE BOUNDARIES / COMPLEX CASES
Joris Duerinckx
Belgium

A-1089 CLINICAL CASE FORUM
Zaf Naqui
UK

A-1090 WHAT'S NEW IN DUPUYTREN?
Andrzej Żyluk
Department of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland

A-1091 AN EVIDENCE-BASED APPROACH TO THE TREATMENT OF EARLY STAGE DUPUYTREN DISEASE
Jagdeep Nanchahal
Kennedy Institute of Rheumatology, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Oxford, UK

A-1092 MICROFASCIECTOMY IN DUPUYTREN CONTRACTURE
Ilse Degreef
Institute for Orthopedic Research and Training (IORT), Department of Development and Regeneration, Faculty of Medicine, KU Leuven, Leuven, Belgium

A-1093 RELEASING THE TOURNIQUET IN DUPUYTREN SURGERY: A WASTE OF TIME?
Alejandro Liñan-Padilla
Hand Unit, Department of Orthopedic Surgery, Hospital San Juan de Dios del Aljarafe, avda. San Juan de Dios s/n, Bormujos (Sevilla), Spain

A-1094 PROGRESSIVE DISTRACTION IN SEVERE DUPUYTREN
Massimo Corain
Hand Surgery Department, University Hospital of Verona, Verona, Italy

A-1095 TMR FOR TREATMENT OF PAIN
Martin Aman
Germany

A-1096 CORNEAL NEUROTIZATION – A NOVEL SENSORY NERVE TRANSFER APPROACH TO THE ANESTHETIC CORNEA TO IMPROVE OCULAR SURFACE HEALTH AND PREVENT BLINDNESS IN PATIENTS SUFFERING FROM CORNEAL ANESTHESIA
Simeon Daeschler
Germany

A-1097 SOPHISTICATED TRANSFERS IN TRAUMA
Dominic Power
UK

A-1098 THE DISTAL AIN-TRANSFER FOR ULNAR COMPRESSION NEUROPATHY
Leila Harhaus
Germany

A-1099 END-TO-SIDE VS. FREE GRAFT NERVE RECONSTRUCTION
Piotr Czarnecki
Poland

A-1100 FLAPS TO COVER THE PALMAR CARPUS
Max Haerle
Germany

A-1101 FLAPS FOR THE FINGERS
Alexis Studer de Oya
Spain

A-1102 FLAPS FOR THE HAND DORSUM
Magne Rokkum
Norway

A-1103 THE ROLE OF TOE-TO-FINGER VASCULARIZED JOINT TRANSFERS
Diogo Casal
Portugal

A-1104 PERIOSTIC FLAPS- WHY, WHEN, WHERE
Sergi Barrera
Spain

A-1105 THE EUROPEAN PERSPECTIVE IN RA CARE
Daniel Herren
Switzerland

A-1106 THE JAPANESE PERSPECTIVE IN RA CARE
Hajime Ishikawa
Japan

A-1107 THE CARE OF SOFT TISSUE PROBLEMS IN JAPAN: CORRECTION OF RHEUMATOID HAND DEFORMITY BY SOFT TISSUE BALANCING PROCEDURES
Ryo Oda
Japan

A-1108 COMMENT FROM EUROPE
Philippe Bellemère
France

A-1109 THE CARE OF WRIST PROBLEMS IN JAPAN: CLINICAL OUTCOMES OF TOTAL WRIST ARTHROPLASTY IN PATIENTS WITH RHEUMATOID ARTHRITIS: MINIMUM 10-YEAR FOLLOW-UP
Yuichiro Matsui
Japan

A-1110 COMMENT FROM EUROPE
Stephan Schindele
Switzerland

A-1111 THE CARE OF THE RA FINGER DEFORMITY IN JAPAN: EFFORTS TO EXTEND THE LONGEVITY OF SILICONE IMPLANTS FOR MCP JOINT
Takuji Iwamoto
Japan

A-1112 COMMENT FROM EUROPE
Philippe Bellemère
France

A-1113 CASE DISCUSSION: TWO CASES FROM EUROPE
Stephan Schindele, Philippe Bellemère
Switzerland, France

A-1114 CASE DISCUSSION: TWO CASES FROM JAPAN
Takaya Mizuseki, Yoshihisa Nasu
Japan

A-1115 CHOOSING WISELY-THE INITIATIVE AND ITS IDEAS
Daniel Herren
Switzerland

A-1116 IS THERE ANYTHING LIKE SHARED DECISION MAKING?
Grey Giddins
UK

A-1117 RED FLAGS IN OUTPATIENT CLINICS: THINK TWICE BEFORE YOU OPERATE
Alex Lluch
Spain

A-1118 DOS AND DON'TS IN HAND SURGICAL DIAGNOSTICS
Carlos Heras-Pelou
UK

A-1119 HAND SURGICAL INTERVENTIONS I TEND TO AVOID
Frederik Verstreken
Belgium

A-1120 DYSTONIA TAKE 2
Max Horwitz
UK

A-1121 DYSTONIA VS SPASTICITY
Wee Lam
UK

A-1122 THUMB IN PALM DEFORMITY
Miryam Obdeijn
The Netherlands

A-1123 FINGER DEFORMITY
Peter Rhee
US

A-1124 DEVELOPMENTAL DISREGARD
Shai Luria
Israel

A-1125 SUMMARY, Q&A
Shai Luria, Layalee Abu Nasser
Israel

A-1126 NEW APPROACHES IN NERVE REGENERATION – FROM MICROBIOTA TO BIOPHYSICS
Stefano Geuna
Italy

A-1127 ARE IMMUNOSUPPRESSANTS OUR WAY TO IMPROVE NERVE REGENERATION FURTHER?
Simeon Daeschler
Germany

A-1128 POLYNERVE – DEVELOPMENT OF A A NEW CONDUIT AND THE TRANSLATIONAL WORK OF BRINGING IT TO PATIENTS
Adam Reid
UK

A-1129 SUPERCHARGED NERVES AND BABYSITTERS – WHERE DO WE STAND ON NERVE TRANSFERS TO AUGMENT NERVE REGENERATION?
Dominic Power
UK

A-1130 PROTEOMICS - A KEY FOR FUTURE IMPROVEMENT OF NERVE REGENERATION IN HUMANS?
Lars Dahlin
Sweden

A-1131 WHY WOULD YOU USE 3D ANALYSIS IN THE TREATMENT OF HAND AND WRIST PATHOLOGY?
Anne Vochteloo
The Netherlands

A-1132 CASE 2 (WRIST)
Frederik Verstreken
Belgium

A-1133 PATIENT AND SURGEON FACTORS IN COMPLICATIONS
Grey Giddins
UK

A-1134 FLEXOR TENDON REPAIR
Jin Bo Tang
China

A-1135 SCAPHOID FRACTURE
Radek Kebrle
Czech Republic

A-1136 REVISIONS AFTER FAILED CMC RESECTION ARTHROPLASTY: RESULTS OF A DELPHI
Daniel Herren
Switzerland

A-1137 PIP ARTHROPLASTY
Alex Lluch
Spain

A-1138 SL- RECONSTRUCTION
Frederik Verstreken
Belgium

A-1139 CARPAL TUNNEL SYNDROME
Brigitte van der Heijden
Netherlands

A-1140 HAND INJURY PREVENTION COMMITTEE
Anna De Leo
UK

A-1141 SCAPHOID NON UNION PREVENTION
Zoe Dailiana
Greece

A-1142 FIREWORK INJURIES PREVENTION
Ian McNab
UK

A-1143 FLYERS TO PREVENT INJURIES
Marlene O'Donoghue
Germany

A-1144 SCOOTER INJURIES PREVENTION
Martin Leixnering
Austria

A-1145 SAILING SESSIONS CAN BE PRESCRIBED FOR REHABILITATION?
Isabella Fassola
Germany

A-1146 HAND SURGERY IN DISASTER AREA: FEBRUARY 6TH, 2023 TÜRKIYE EARTHQUAKES
Mehmet Ali Acar
Konya, Türkiye

A-1147 HAND SURGERY IN REFERENCE HOSPITALS AFTER EARTHQUAKES
Egemen Ayhan
İstanbul, Turkiye

A-1148 HANDS IN WAR. HAND SURGEON IN WAR INJURIES
Andrii Lysak
Kyiv, Ukraine

A-1149 COMMENTS OF THE HAND TRAUMA COMMITEE
Massimo Corain
Verona, Italy

A-1150 HOW TO PREPARE FOR HAND SURGERY MISSION?
Bastian Bonaventura
Germany

A-1151 HAND SURGERY: WHAT ARE THE DIFFERENCES IN A MISSION
Leila Harhaus
Germany

A-1152 HUMANITARIAN HAND SURGERY IN CHILDREN
Stefan Krieger
Austria

A-1153 WHAT CAN MAKE YOU SURPRISED?
Piotr Czarnecki
Poland

A-1154 DOUBTS IN THE MISSION - PROBLEMS, LIMITATIONS, ETHICS – INTRODUCTION AND PANEL DISCUSSION
Urs Hug
Switzerland

A-1155 AFTER FIXATION OF THE DRF, SHOULD WE ADDRESS AN UNSTABLE DRUJ?
Pascal Hanneman
Netherlands

A-1156 ORIF OF DRFS, SHOULD WE ADDRESS CONCOMITANT SL INJURIES?
Carlos Heras-Palou
UK

A-1157 INFERIOR ARC LESIONS AND VOLAR RIM FRACTURES
Niels Schep
The Netherlands

A-1158 SHOULD ACUTE DRFS BE CLOSELY MANIPULATED AND REDUCED IN THE ED?
Rohit Arora
Austria

A-1159 CONSERVATIVE TREATMENT
János Rupnik
Hungary

A-1160 PIN FIXATION
Balazs Lenkei
Hungary

A-1161 INTRAMEDULLARY SCREW FIXATION
Inga Besmens
Switzerland

A-1162 PLATE AND SCREW FIXATION
Ryan Trickett
UK

A-1163 DISCUSSION AND CASES
Balazs Lenkei
Hungary

A-1164 CONTEMPORARY WRIST ARTHROPLASTIES, CHOOSING PATIENT, IMPLANT AND SURGEON
Ole Reigstad
Norway

A-1165 DIFFERENT DESIGNS, SAME EXPERIENCE?
Sumedh Talwaker
UK

A-1166 HOW TO EVALUATE WRIST ARTHROPLASTY SURGERY
Trygve Holm-Glad
Norway

A-1167 UNDERSTANDING THE FAILURES, REVISING AND GETTING IT RIGHT
Daniel Brown
UK

A-1168 FPL IN DANGER - DIAGNOSIS AND TREATMENT
Joris Duerinckx
Belgium

A-1169 MEDIAN NERVE IN SCARS - HOW TO PROCEED?
Martin Czinner
Czech Republic

A-1170 RSL FUSION IN FAILED DISTAL RADIUS FRACTURES ORIF
Josef Jurkowitsch
Austria

A-1171 WHY DO WE FAIL IN BARTON TYPE DISTAL RADIUS FRACTURES
Radek Kebrle
Czech Republic

A-1172 VICTIMIZED DRUJ IN DISTAL RADIUS FRACTURES
Petr Axelsson
Sweden

A-1173 CLINICAL CASE FORUM
Radek Kebrle
Czech Republic

A-1174 WHAT WOULD WE DO BETTER?
Jörg Bahm
Germany

A-1175 THE NEED FOR CENTRAL NERVOUS SYSTEM ADAPTATION AFTER PERIPHERAL NERVE REPAIR
Willem Pondaag
The Netherlands

A-1176 MYOBREVOPATHY - A CAUSE FOR SECONDARY PROBLEMS IN BPBI?
Gürsel Leblebicioğlu
Turkey

A-1177 ROTATION PRUJ
Jan Debeij
The Netherlands

A-1178 ROTATION FOREARM
Pieter Caekebeke
Belgium

A-1179 ROTATION DRUJ
Michiel Zuidam
The Netherlands

A-1180 THE ROLE OF 4D DYNAMIC CT SCAN IN ASSESSMENT OF COMPLEX CARPAL INSTABILITIES
Greg Bain
Australia

A-1181 THE ROLE OF 4DCT IN SCAPHOLUNATE INSTABILITY
Melanie Amarasooriya
Australia

A-1182 MEASUREMENT OF MOTION BETWEEN BONE FRAGMENTS IN SCAPHOID FRACTURES USING 4DCT
Geert Streekstra
The Netherlands

A-1183 RECOGNITION OF EARLY SL INJURY WITH 4-D CT
Steven Moran
USA

A-1184 THE ROLE OF 4DCT IN KIENBOCK DISEASE
Gerald Kraan
The Netherlands

A-1185 THE ROLE OF 4DCT IN ASSESSMENT OF ULNAR WRIST PAIN
Brigitte van der Heijden
The Netherlands

A-1186 AUTOMATIC PROCESSING OF 4DCT DATA
Stefan Hummelink
The Netherlands

A-1187 BASIC PRINCIPLE FOR NAIL RECONSTRUCTION IN TRAUMA
Pierluigi Tos
Italy

A-1188 FLAPS FOR THE FINGERTIP
Roberto Adani
Italy

A-1189 LATE RECONSTRUCTIONS OF NAIL PROBLEMS
Christian Dumontier
France

A-1190 MICROSURGICAL NAILBED RECONSTRUCTION: DIFFERENT METHODS FOR DIFFERENT TYPES OF INJURY
Chao Chen
China

A-1191 DERMATOLOGICAL NAIL PATHOLOGY: WHAT TO SEND TO THE DERMATOLOGIST WHAT TO THE SURGEON
Marcel Pasch
The Netherlands

A-1192 OPEN VS. ENDOSCOPIC
Joaquim Casanas vs Hans de Schipper
Spain, The Netherlands

A-1193 FREEHAND VS. 3D PSI
Egemen Ayhan vs Pedro J. Delgado
Turkey, Spain

A-1194 PRC VS. 4CF
Sokratis Varitimidis, Ole Reigstad
Greece, Norway

A-1195 FUSION VS. ARTHROPLASTY
Michael Millrose, Stephan Schindele
Germany, Switzerland

A-1196 WHAT IS NEUROPATHIC PAIN? NEW METHODS FOR DIAGNOSIS
Jordi Serra
Spain

A-1197 WHEN I MUST TO PROTECT/TRANSLOCATE PAINFUL NEUROMA?
Dominic Power
UK

A-1198 WHEN I MUST TO RECONSTRUCT PAINFUL NEUROMA?
Kim Casanas
Spain

A-1199 NEW TECHNIQUES FOR PAINFUL NEUROMAS. WHEN MUST I USE?
Leila Harhaus
Germany

A-1200 WHY DO WE NEED PROMS FOR FOLLOW-UP IN HAND SURGERY? LINKAGE OF HAKIR DATA WITH OTHER REGISTERS
Lars Dahlin
Sweden

A-1202 HOW REGISTRY DATA CHANGED MY PRACTICE IN SMALL JOINT ARTHROPLASTY
Daniel Herren
Switzerland

A-1203 PROMS: STANDARD SET VERSUS YOUR OWN CHOICE
Miriam Marks
Switzerland

A-1204 WHY WE NEED A SPECIFIC PREFERENCE-BASED MEASURE FOR HAND CONDITIONS?
Jeremy Rodrigues
UK

A-1205 OPTIMIZING PROMS IN HAND AND WRIST SURGERY?
Joris Teunissen
The Netherlands

A-1206 GET YOUR MINDSET ON THE PATIENT'S MINDSET
Robbert Wouters
The Netherlands

A-1207 SUPEXOR: IMPLEMENTING THE ICHOM HAND AND WRIST DATA SET IN SWITZERLAND
Maurizio Calcagni
Switzerland

A-1208 CLINICAL DECISION SUPPORT TOOLS
Harm Slijper
The Netherlands

A-1209 INNOVATING COLLABORATIVE PROM-BASED RESEARCH
Ruud Selles
The Netherlands

A-1210 CORRELATION BETWEEN BIOMECHANICS AND CLINICS IN WRIST INSTABILITIES
Mireia Esplugas
Spain

A-1212 WRIST ARTHROSIS: WHY IT HAPPENS?
Carlos Heras-Palou
UK

A-1213 LIGAMENT RECONSTRUCTION IS NOT FOR FREE
Alex Lluch
Spain

A-1214 YEHS PRESENTATION
Camillo Fulchignoni
Italy

A-1215 DRAWING SESSION
Theresia Steikelner
Austria

A-1216 CONGRESS FELLOWSHIP WINNER
Natan Silver
UK

A-1217 A TRAVEL AWARD WINNER
Belen Garcia Medrano
Spain

A-1218 SHARK TANK WINNER
Olimpia Mani
Italy

A-1219 SUSTAINABLE PRACTICES IN HAND THERAPY: A GLOBAL PERSPECTIVE
Maryam Farzad
Canada

A-1220 INCORPORATING WATER EFFICIENCY INTO CLINICAL PRACTICE
Edwin Jesudason
UK

A-1221 REDUCING CARBON FOOTPRINT OF THE OPERATING ROOM
Edwin Jesudason
UK

A-1222 ANCIENT TOPICS, NEW TRENDS
Paulo Lopez-Osornio
Spain

A-1223 CHOCOLATE-QUIZ: COMMON HAND CONDITIONS IN CHILDREN THAT MAY NOT BE RECOGNIZED
Gill Smith
UK

A-1224 THE FUNNY LITTLE FINGER: KIRNER*, CAMPTODACTYLY, CLINODACTYLY*, SYNOSTOSIS, BRACHYDACTYLY, SYMPHALANGISM, CONGENITAL MALLET FINGER
Daniel Weber
Switzerland

A-1225 THE STIFF THUMB: TRIGGER THUMB, CLASPED THUMB, THUMB HYPOPLASIA, TRIPHALANGEAL THUMB (?), INCL. CLINICAL EXAMINATION AND X-RAY
Charlotte Jaloux
France

A-1226 CHOCOLATE-QUIZ ANSWERS & WINNER
Gill Smith
UK

A-1227 ULTRASOUND AND EMG IN RECURRENT COMPRESSION SYNDROMES
Nens van Alfen
The Netherlands

A-1228 DECISION MAKING IN RECURRENT COMPRESSION SYNDROMES
Pepijn Sun
The Netherlands

A-1229 THE USE OF WRAPS IN RECURRENT COMPRESSION SYNDROMES
Liron Duraku
The Netherlands

A-1230 IF IT ISN'T A RECURRENT COMPRESSION? WHAT COULD IT BE?
Nens van Alfen
The Netherlands

A-1231 WELCOME FROM FESSH / JHSE
Wee Lam, Leila Harhaus
Singapore, Germany

A-1232 INTRODUCTION TO THE RESEARCH WORKSHOP
Mike Rüttermann, Miriam Marks
The Netherlands, Switzerland

A-1233 WHAT OUTCOME MEASURES SHOULD I USE FOR MY PAPER?
Ruud Selles
The Netherlands

A-1234 RETROSPECTIVE STUDIES: STRENGTHS AND WEAKNESSES
Nadine Hollevoet
Belgium

A-1235 COMPARATIVE STUDIES: STRENGTHS AND WEAKNESSES
Miriam Marks
Switzerland

A-1236 RCTS AND META-ANALYSES: STRENGTHS AND WEAKNESSES
Mike Rüttermann
The Netherlands

A-1237 STATISTICS IN HAND SURGERY
Jonathan Hobby
UK

A-1239 INTERACTIVE EXERCISE 2: WHICH STATISTICAL TESTS WILL YOU CHOOSE? TIPPS AND TRICKS
Miriam Marks, Ruud Selles
Switzerland , The Netherlands

A-1240 FINAL QUESTIONS AND CONCLUDING REMARKS
Mike Rüttermann, Miriam Marks
The Netherlands, Switzerland

A-1241 INTRODUCTION TO THE RESEARCH WORKSHOP
Wee Lam, Leila Harhaus
UK, Singapore, Germany

A-1242 THE IMPORTANCE OF REVIEWING
Ryan Trickett
UK

A-1243 WHAT IS A GOOD PAPER?
Wee Leon Lam
UK, Singapore

A-1244 WHAT CONCERNS DOES AN EDITOR HAVE WHEN EDITING A PAPER?
Jin Bo Tang
China

A-1245 HOW TO GET STARTED WITH A NEW PAPER
Florian Früh
Switzerland

A-1246 MENTORING AND RESILIENCE
Jin Bo Tang
China

A-1247 THE JOURNAL CLUB – WHY AND HOW
Matthew Brown
UK

A-1248 INTERACTIVE EXERCISE REVIEWING: WHAT DECISION WILL YOU CHOOSE FOR THIS PAPER?
Charles Pailthorpe
UK

A-1249 FINAL DISCUSSION

A-1250 SURGICAL TREATMENT OF THUMB BASE (CMC1) ARTHRITIS
Bram Van Hove
Belgium

I will provide a concise and evidence-based review of the (non)operative treatment of thumb base arthritis, discussing the usefulness of bracing, injections, physiotherapy in the conservative treatment, as well as the various operative possibilities

in both young and elderly patients with CMC1 arthritis. This will cover ligamentoplasties, corrective osteotomies, trapeziectomy, fusion and prosthesis.

A-1251 POSTOPERATIVE CARE AFTER TRAPEZIOMETACARPAL TOTAL JOINT ARTHROPLASTY

Elske Bonhof-Jansen
The Netherlands

This scoping review aimed to identify and map the available evidence, practice variation and knowledge gaps regarding immobilization and rehabilitation protocols, as well as complication classifications used after trapeziometacarpal total joint arthroplasty. This resulted in 123 included studies, containing 6695 patients with twenty-one prosthesis types, in a time frame of nearly 50 years. The presentation will provide an overview of the results.

A-1252 OSTEOARTHRITIS OF THE THUMB: A PRACTICAL OVERVIEW

Marjolein Wind
The Netherlands

A-1253 ART OF CONNECTING

Lise Brandsma
The Netherlands

During therapy, the therapist and patient are in the same team, but have different roles and knowledge to use. Combine the two and be curious without judging, in order to explore, to dive more deeply into detail and context to truly understand why a patient is or isn't following up on a treatment plan. A lot of harm can be done if we therapists aren't flexible enough and we don't take time to hear what is going on in a patient's path to recovery.

A-1254 ART OF OBSERVING

Karin Boer-Vreeke
The Netherlands

Observing your patient's movement pattern, stress level and functional use of the affected hand gives you more information than measuring grip strength or range of motion. Instead it is more effective to ask the patient to perform a meaningful activity. This provokes the ingrained movement pattern from before the hand related disorder. Observing is a skill that allows us to see unexpected behavioural and movement patterns that might stimulate our curiosity, leading to new perspectives for treatment.

A-1255 ART OF DOING

Lise Brandsma, Karin Boer-Vreeke
The Netherlands

There is proof Occupation based therapy is more effective than only exercising. No exercise can resemble a daily life activity. You cannot assume that when a patient can perform a specific exercise he/she will automatically use this during daily life activities. It is important for patients to feel in charge of what they do, how they can do it, listen to their own body signals and use this to get back to their new normal.

A-1256 LOCKS AND KEYS: FACTORS AND SOLUTIONS TO NON-ADHERENCE

Valentin Ritschl
Austria

It is estimated that 50-70% of patients with musculoskeletal diseases are non-adherent to treatment recommendations. Non-adherent patients have a higher risk of not reaching an optimal clinical outcome. This session will highlight challenges and resources for patients who do not adhere to treatment plans and discuss the current recommendations.

A-1257 SHARED DECISION MAKING AND THE IMPORTANCE OF MANAGING EXPECTATIONS

Janou Bardoel
The Netherlands

The quality of SDM depends on provider communication and patient understanding of health information. A practical 3-step SDM model is described. However nocebo effect and patient compliance are equally important factors that influence managing expectations. Tools will be given from our daily practice in Occupational Hand therapy & Handsurgery to address these problems.

A-1258 NERVE SURGERY: CHANGE OR IMPROVE?

Michiel Zuidam
The Netherlands

Nerve surgery has evolved in the last decade. In the old days, we sutured the nerve and sat back and waited for the results, which were often disappointing. With the evaluation of nerve transfers, more options are available and, therefore, possibly better outcomes. This presentation will give you insight into these options.

A-1259 DIAGNOSING, TREATING AND EVALUATING ALLODYNIA, USING THE SOMATOSENSORY REHABILITATION METHOD

Karin Boer-Vreeke
The Netherlands

Neuropatic pain, and especially Allodynia, is the most invalidating kind of pain, especially when the hand is involved. Neuropatic pain arises as a direct consequence of a lesion or diseases affecting the somatosensory system. Claude Spicher, occupational and Certified Hand Therapist from Fribourg Switzerland developed the somatosensory rehabilitation method, using the cutaneous nerves of the skin for diagnosing and treating neuropatic pain. Using this method, you make the pain visible and understandable, and it gives tools to treat the problem.

A-1260 LEARNING FROM LEPROSY: HAND NERVE ISSUES AND DEFORMITIES

Ton Schreuders
The Netherlands

Leprosy not only manifests through skin lesions but also induces neuritis in various superficial nerves. This nerve inflammation triggers a chain of hand deformities, often accompanied by stigmatizing signs. Timely recognition of neuritis in the hands is pivotal to intervene promptly and safeguard hand function. Rehabilitation methods involve sensory re-education, muscle strengthening, and surgical procedures. Holistic care approaches are vital to tackle both the physical constraints and societal prejudices associated with the condition.

A-1261 NERVE TRANSFERS IN THE UPPER EXTREMITY

Clemens Gstöttner
Austria

Peripheral nerve transfers aim to reinnervate critical motor or sensory targets in the upper extremity after nerve injury. Expendable fascicles are surgically transferred onto distal target nerve branches, allowing faster reinnervation and minimizing loss of regenerating fibers. This talk will give an overview of popular nerve transfers in the upper extremity and their application.

A-1262 PRINCIPLES OF HAND THERAPY FOLLOWING SELECTIVE NERVE TRANSFERS

Agnes Sturma
Austria

While nerve transfers represent a viable surgical intervention for addressing severe nerve injuries or delayed treatment, they require complex motor learning that intricately engages the brain's plasticity. To facilitate optimal patient outcomes, a structured rehabilitation is needed. This presentation outlines the key components of graded hand therapy after nerve transfers, commencing with motor imagery and mirror therapy, progressing towards the incorporation of sEMG biofeedback and selective muscle training to hand use in daily life.

A-1263 DISTAL RADIUS FRACTURES

Hayley Smith
UK

Presentation of an overview of recent updates in therapy interventions for distal radius fractures, focusing on evidence-based practices, emerging trends and experience.
Key topics covered include early mobilisation strategies, rehabilitation exercises including the proximal upper limb and patient education and self-management with the aim to equip healthcare professionals with the knowledge and tools necessary to optimise therapy treatment outcomes for patients with distal radius fractures.

A-1264 PULLEY INJURIES: ROCK THE JOINTS

Ilke Plaisier
Belgium

In the past years, rock climbing, bouldering, etc. have gained a lot of popularity. One of the most common injuries in this sport are pulley ruptures. We are observing an increasing occurrence of these injuries in routine practice, particularly due to the preference for hand therapy over surgery for grade 1, 2 and 3 injuries. The theory will be discussed during this lecture using practical examples.

A-1265 DISEASE-SPECIFIC OUTCOME MEASURES IN DUPUYTREN´S DISEASE

Sonja Pelzmann
Austria

In addition to goniometry, various Outcome Measures (OM) are used in the diagnosis and evaluation of treatment effects in Dupuytren's disease (DD). In this presentation, the disease-specific OM, their measurement properties, their range based on the International Classification of Functioning, Disability and Health (ICF) as well as their scope, with which they capture the characteristics and problems of the disease, will be presented. This demonstrates their usefulness in everyday clinical practice and in DD research.

A-1266 TFCC INJURIES - DIAGNOSTIC ALGORITHM AND TREATMENT OPTIONS

Jan Ragnar Haugstvedt, Radek Kebrle
Norway, Czech Republic

A-1267 DISTAL RADIUS MALUNIONS - WHEN AND HOW TO CORRECT

Niels Schep, Frederik Verstreken
The Netherlands, Belgium

A-1268 HAND INFECTIONS - ANTIBIOTICS, DEBRIDEMENT OR BOTH
Christian Dumontier, Nick Riley
France, UK

A-1269 SNAC WRIST: DIAGNOSIS AND TREATMENT ALGORITHM
Sandra Pfanner, Gernot Schmidle
Italy, Austria

A-1270 RECURRENT DUPUYTEN'S DISEASE - HOW TO SELECT APPROPRIATE PROCEDURE
Ilse Degreef, Paul Werker
Belgium, The Netherlands

A-1271 PEDIATRIC FRACTURES OF THE HAND AND WRIST - OPERATIVE VS NONOPERATIVE TREATMENT
Nunzio Catena, Emily West
Italy, UK

A-1272 INTRODUCTION TO THE RESEARCH WORKSHOP
Wee Lam, Leila Harhaus
Singapore, Germany

A-1273 COMING UP WITH A RESEARCH IDEA
Teun Teunis
USA

A-1274 WHAT KIND OF RESEARCH SHOULD I DO WITH THE TIME AND RESOURCES THAT I HAVE?
Judit Hetthessy
Hungary

A-1275 HOW DO I SEARCH THE LITERATURE AND ENSURE MY IDEA AND STUDY IS NEW?
Ryckie Wade
UK

A-1276 HOW DO I COLLECT DATA AND WHAT DO I DO WITH THEM?
Jane McEachan
UK

A-1277 WHAT STUDY DESIGN SHOULD I CHOOSE?
Justin Wormald
UK

A-1278 INTERACTIVE EXERCISE 1: WHAT STUDY DESIGN WILL YOU CHOOSE?
Justin Wormald, Ryckie Wade, Teun Teunis, Miriam Marks
UK, USA, Switzerland

A-1279 THE JOURNAL AND FESSH
J. Henk Coert
The Netherlands

A-1280 UPDATES ON THE JOURNAL-NEW INITIATIVES AND THE FUTURE
Wee Leon Lam
Singapore

A-1281 HOW HAS RESEARCH AND PUBLISHING CHANGED?
Jin Bo Tang
China

A-1282 ROBOT-ASSISTED DOUBLE SCREW FIXATION OF MINIMALLY DISPLACED SCAPHOID WAIST FRACTURE NONUNIONS OR DELAYED UNIONS WITHOUT BONE GRAFT
Y Guo, W Ma, D Tong, K Liu, Y Yin, C. Yang
China

A-1283 SURFACE REPLACING ARTHROPLASTY OF THE PROXIMAL INTERPHALANGEAL JOINT USING THE CAPFLEX-PIP IMPLANT: A PROSPECTIVE STUDY WITH 5-YEAR OUTCOMES
V Reischenböck, M Marks, DB Herren, S. Schindele
Switzerland

A-1284 POLYDACTYLY OF THE THUMB: A MODIFICATION OF THE WASSEL-FLATT CLASSIFICATION
JK Kim, BAA Al-Dhafer, YH Shin, HS Joo
South Korea

A-1285 RADIOGRAPHIC MEASUREMENTS OF THE NORMAL DISTAL RADIUS: RELIABILITY OF COMPUTER-AIDED CT VERSUS PHYSICIANS' RADIOGRAPH INTERPRETATION
N Suojärvi, N Lindfors, T Höglund, R Sippo, E. Waris
Finland

A-1286 COMPUTERIZED ADAPTIVE TESTING OF SYMPTOM SEVERITY: A REGISTRY-BASED STUDY OF 924 PATIENTS WITH TRAPEZIOMETACARPAL ARTHRITIS
R Kamran, JN Rodrigues, TD Dobbs, JCR Wormald, RW Trickett, CJ. Harrison
UK

A-1287 NONRESPONDER BIAS IN HAND SURGERY: ANALYSIS OF 1945 CASES LOST TO FOLLOW-UP OVER A 6-YEAR PERIOD
PHC Stirling, PJ Jenkins, N Ng, ND Clement, AD Duckworth, JE. McEachan
UK

A-1288 MEASUREMENT OF FINGER JOINT MOTION AFTER FLEXOR TENDON REPAIR: SMARTPHONE PHOTOGRAPHY COMPARED WITH TRADITIONAL GONIOMETRY
J Chen, A Zhang Xian, S Qian Jia, Y. Wang Jing
China

A-1289 TOTAL JOINT ARTHROPLASTY VERSUS TRAPEZIECTOMY IN THE TREATMENT OF TRAPEZIOMETACARPAL ARTHRITIS: A RANDOMIZED CONTROLLED TRIAL
TR de Jong, EEDJ Bonhof-Jansen, SM Brink, RP de Wildt, JH van Uchelen, PMN Werker
The Netherlands

A-1290 REHABILITATION FOLLOWING FLEXOR TENDON INJURY IN ZONE 2: A RANDOMIZED CONTROLLED STUDY
M Renberg, C Turesson, L Borén, E Nyman, S. Farnebo
Sweden

A-1291 REDUCING THE CARBON FOOTPRINT IN CARPAL TUNNEL SURGERY INSIDE THE OPERATING ROOM WITH A LEAN AND GREEN MODEL: A COMPARATIVE STUDY
P Kodumuri, EP Jesudason, V. Lees
UK

A-1292 ABNORMAL MRI SIGNAL INTENSITY OF THE TRIANGULAR FIBROCARTILAGE COMPLEX IN ASYMPTOMATIC WRISTS
Z Wang, S Chen, B Liu, Z Qian, J Zhu, Q. Wang
China

A-1294 SHIFTING THE PARADIGM: ANKYLOSIS ARTHROPLASTY FOR THE PROXIMAL INTERPHALANGEAL JOINT WITH A NOVEL COLLATERAL LIGAMENT RECONSTRUCTION
BH Miranda, SR Kosasih, R. Krishnamoorthy
UK

A-1295 RESEARCH METHODOLOGY: THE BAYESIAN STATISTICAL FRAMEWORK AND THE FUTURE OF TRIAL DESIGN
T Teunis, A Samadi, N Chen, D. Ring
The Netherlands

A-1296 AWARD OF MEDARTIS PRIZE FOR BEST BONE AND JOINT PAPER

A-1305 FIRST STEPS USING AN ULTRASOUND DEVICE
Fizan Younis
UK

A-1306 ULTRASOUNDS LANDMARK
Xavier Gueffier
France

A-1307 CARPAL TUNNEL SYNDROM
Esther Vögelin
Switzerland

A-1308 TRIGGER FINGER / STENER LESION/ PULLEY TEAR
Xavier Gueffier
France

A-1309 ULTRASOUND INFILTRAATION
Sebastian Kluge
Switzerland

A-1310 PERCUTANEOUS TRIGGER FINGER RELEASE
Fabien Moungondo
Belgium

A-1311 CARPAL TUNNEL RELEASE
Carla Nunes
Portugal

A-1312 DE QUERVAIN RELEASE
Fabien Moungondo
Belgium

A-1314 SUSTAINABLE PROCUREMENT: INTRODUCTION TO GREENING PRINCIPLES
Jacqueline Hart and Nicoline de Haas
The Netherlands

A-1318 HOW TO MAKE A SUSTAINABLE HAND SPLINT
Robert Jharreeah, Mattijs Sturkenboom, Mitchel Nietveld
The Netherlands

A-1319 INTRODUCTION
Belén García-Medrano
Spain

A-1320 ARTHROSCOPIC CLASSIFICATION OF CMC-1 OSTEOARTHRITIS
Anders Wallmon
Sweden

A-1321 ARTHROSCOPIC MANGEMENT IN BADIA TYPE 1 CMC-1 ARTHRITIS
Pedro J Delgado
Spain

A-1322 DISTRACTION ARTHROSPLASTY
Marco Guidi
Switzerland

A-1323 PARTIAL ARTHROSCOPIC TRAPEZIECTOMY & AUTOLOGOUS FAT TRANSFER
Lucian Marcovici
Italy

A-1324 TOTAL ARTHROSCOPIC RESECTION OF TRAPEZIUM FOR ADVANCED BASAL THUMB OSTEOARTHRITIS
Belén García-Medrano
Spain

A-1325 STT ARTHROSCOPIC ARTHROPLASTY WITH CUSTOMIZED IMPLANTS
Vicente Carratalá
Spain

A-1328 UPDATES IN DIAGNOSTIC TOOLS FOR DIAGNOSING NERVE INJURY AND COMPRESSIONS
Grainne Bourke
UK

A-1329 THE ROLE OF PATIENT REPORTED-OUTCOMES IN NERVE SURGERY
Maurizio Calcagni
Switzerland

A-1330 CUBITAL TUNNEL REVISION SURGERY
Zoe Dailiana
Greece

A-1331 CURRENT PERSPECTIVES ON PERIPHERAL NERVE REPAIR AND MANAGEMENT OF THE NERVE GAP
Pierluigi Tos
Italy

A-1333 DISTAL NERVE TRANSFERS FOR PERIPHERAL NERVE INJURIES: INDICATIONS AND OUTCOMES
Mathias Sporer
Austria

A-1334 ADULT TRAUMATIC BRACHIAL PLEXUS INJURIES: ADVANCES AND CURRENT UPDATES
Jean Noel Goubier
France

A-1335 BRACHIAL PLEXUS BIRTH INJURY: ADVANCES AND CONTROVERSIES
Gürsel Leblebicioglu, Willem Pondaag
Turkey, The Netherlands

A-1336 AN ALGORITHMIC APPROACH TO THE MANAGEMENT OF PERIPHERAL NERVE TUMOURS
Tim Hems
UK

A-1337 MUSCLE PRESERVATION IN PROXIMAL NERVE INJURIES: A CURRENT UPDATE
Andrii Lysak
Ukraine

A-1338 MULTIDISCIPLINARY STRATEGIES TO TREAT PAINFUL MONONEUROPATHIES IN THE UPPER EXTREMITY: FROM LABORATORY TO BEDSIDE
Henk Coert
The Netherlands

A-1339 TRENDS AND INSIGHTS REVIEW. NERVE PROCEDURES IN THE MANAGEMENT OF UPPER LIMB SPASTICITY
Caroline Leclercq
France

A-1340 THUMB CARPOMETACARPAL IMPLANT ARTHROPLASTY: THE FAST TRACK BACK TO WORK
Miriam Marks
Switzerland

A-1341 ULNAR DIMELIA – A REVIEW OF 24 CASES
MI Winge, S Guéro, V Zavarukhin, et al.
Norway

A-1342 WELCOME
Zaf Naqui
UK

A-1343 VOTING LIVE - WHICH MEDIA DO YOU USE?
Arne Tenbrock
Germany

A-1344 CAN SOME GUIDE PATIENTS BETWEEN SURGERY AND CONSERVATIVE TREATMENT?
Jens Lundren
Sweden

A-1345 HOW TO CREATE AND USE A PROFESSIONAL SOME ACCOUNT
Sergi Barrera Barcelona
Spain

A-1346 THE DIGITAL EVOLUTION OF THE JOURNAL OF HAND SURGERY (EUR)
Gemma Batten
UK

A-1347 TIPS AND TRICKS TO CREATE A VIDEO IN 4 MINUTES
Thomas Apard
France

A-1348 6 YEARS OF COMCOM - WHAT WE HAVE LEARNT AND ACHIEVED - A TIMELINE
Viviana Maja Rosero
Hungary

A-1349 THE EVOLUTION OF WOW
Lucian Marcovici
Italy

A-1350 M&H GROUP AND THE USE OF DIGITAL COMMUNICATION
Perluigi Tos
Italy

A-1351 SOCIAL MEDIA OSCARS
Maria Larrea- Zabalo, Letizia Marenghi
Spain, Italy

A-1352 MICRO AND "MACRO" FINGER REPLANTATION
Fatih Kabakas
Turkey

A-1353 DEGLOVING INJURIES – TIP AND TRICKS
Roberto Adani
Italy

A-1354 THUMB RECONSTRUCTION
Paco Pinal
Spain

A-1355 FINGER RECONSTRUCTION …. PRESERVING THE FOOT
Zeng Tao Wang
China

A-1356 PARTICULARITY IN FINGER BABIES RECONSTRUCTION
Grainne Bourke, Simon Kay
UK

A-1357 VOLAR APPROACH TO PLATE FIXATION OF DISTAL RADIUS FRACTURE – SHORT INTRODUCTION
Shai Luria
Israel

A-1358 DISTAL APPROACH TO SCREW FIXATION OF SCAPHOID FRACTURE (UNLESS THE WRIST CAN BE FLEXED AND THEN WE CAN DO A PROXIMAL DISTAL APPROACH) – SHORT INTRODUCTION
Jan Debeij
The Netherlands

A-1359 SCREW FIXATION OF METACARPAL FRACTURE (AND IF THEY HAVE TIME, PLATE FIXATION OF METACARPAL FRACTURE AS WELL) - SHORT INTRODUCTION
Layalee Abo Naser
Israel

A-1360 LECTURE OF CLINICAL EXPLORATION
Joaquim Casanas
Spain

Sings and symptoms of peripheral nerve
Positive and negative sings
Tracking nerve injury: How to evaluate
Motor function
Sensitive function
Autonomi function
Get a diagnostic and how to act

A-1361 CLINICAL EXAMINATION IN PRACTICAL SITUATION (WITH RESIDENT/MODEL)
Joaquim Casanas, Jordi Serra
Spain

A-1362 UNDERSTANDING NERVE CONDUCTION STUDIES
Jordi Serra
Spain

What I must require to neurologist?
How to understand nerve conduction studies
What are the parameters I must understand

A-1363 ACUMED LUNCH SYMPOSIUM PRESENTATION 1
Daniel J. Brown
UK

A-1364 ACUMED LUNCH SYMPOSIUM PRESENTATION 2
Nicholas Riley
UK

A-1365 SKELETAL DYNAMICS SYMPOSIUM LECTURE
Jorge L. Orbay
USA

A-1366 COMPLEX SCAPHOID FRACTURES
Radek Kebrle
Czech Republic

A-1367 SCAPHOID NON-UNION – INDICATION AND TREATMENT OPTIONS
Gernot Schmidle
Austria

A-1368 PLATING OR NOT-PLATING? SUCCESS STORY
Pascal Hannemann
The Netherlands

A-1369 MEDARTIS SYMPOSIUM PRESENTATION 1
Niels Schep
The Netherlands

A-1370 MEDARTIS SYMPOSIUM PRESENTATION 2
Philipp Honigmann
Switzerland

A-1371 10 REASONS FOR CMC1 PROSTHESIS
Joris Duerinckx
Belgium

A-1372 SURGERY & KEY POINTS
Alain Tchurukdichian
France

A-1373 CMC1 PROSTHESIS & REVISION
Stephane Barbary
France

A-1374 WALANT & CMC1 PROSTHESIS
Thomas Apard
France

A-1375 ELEVATING YOUR PATIENT EXPERIENCE AND RESULTS IN PRIVATE PRACTICE
Jean Paul Brutus
Montreal, Canada

A-1376 HOW I RUN A COST-EFFECTIVE PRACTICE IN MY UNIVERSITY PUBLIC HOSPITAL IN NIMES
Olivier Mares
Nimes, France

A-1377 SECRETS OF MY COST-EFFECTIVE PRIVATE PRACTICE IN PARIS
Thomas Apard
Paris, France

A-1378 THE TOTAL SUBMUCULAR TRANSPOSITION OF THE ULNAR NERVE
Michiel Zuidam
The Netherlands

A-1379 FROM BASIC TO ADVANCED: WHAT SOFTWARE, PRINTERS, STAFF, CASES, PARTNERS …?
Antoine Rocher
South Africa

A-1380 AND WHAT ABOUT MDR REGULATION AND QUALITY SYSTEMS?
Erik Boelen
3D quality consultant, The Netherlands

A-1381 MADELUNG CORRECTION
Hermann Krimmer
Germany

A-1382 FOREARM CORRECTION
Joost Colaris
The Netherlands

A-1383 WRIST CORRECTION
Radek Kebrle
Czech Republic

A-1384 POSSIBILITIES IN 3D PLANNING - FROM PHALANGES TO PRUJ - AN OVERVIEW OF DIFFERENT INDICATIONS
Urs Hug
Switzerland

A-1385 DISTAL RADIUS AND FOREARM RECONSTRUCTION - MY EXPERIENCE WITH 3D PLANNING AND PATIENT-SPECIFIC IMPLANTS
Maxim Horwitz
United Kingdom

A-1386 RESULTS IN EXTRA- AND INTRA-ARTICULAR RECONSTRUCTION WITH IPS - REVIEW OF 50 PATIENTS AND AN OUTLOOK ON NEW INDICATIONS
Niels Schep
the Netherlands

A-1387 MADELUNG RECONSTRUCTION WITH IPS - RESULTS - HOW I DO? WHY I DO?
Hermann Krimmer
Germany

A-1388 THE CHALLENGES OF PIP ARTHROPLASTY - WHAT COULD WE DO BETTER?
Daniel Herren
Switzerland

A-1389 CAPFLEX COMPARED TO OTHER OPTIONS – HOW I DO? WHY I DO?
Alex Lluch
Spain

A-1390 FOLLOW UP OF 100 PATIENTS - 5 YEARS RESULTS
Martin Richter
Germany

A-1391 VOLAR APPROACH - MY EXPERIENCE WITH CAPFLEX PIP PROSTHESIS
Lauren Uppal
United Kingdom

A-1392 INTRODUCING THE SPECIAL ISSUE
Brigitte Van Der Heijden, Pierluigi Tos, Henk Coert
The Netherlands, Italy

A-1393 FROM BASIC TO ADVANCED: WHAT SOFTWARE, PRINTERS, STAFF, CASES, PARTNERS …?
Max Temmesfeld
Norway

A-1394 FROM BASIC TO ADVANCED: WHAT SOFTWARE, PRINTERS, STAFF, CASES, PARTNERS …?
Nick Assink
The Netherlands

A-1395 INTRODUCTION OF THE COMPETITION
Leila Harhaus
Germany

A-1396 SHARK TANK APPLICATION
Andrea Moser
Austria

A-1397 SHARK TANK APPLICATION
Silvia Pietramala
Italy

A-1398 SHARK TANK APPLICATION
Andre Silva Alves
Switzerland

A-1399 SHARK TANK APPLICATION
Susanne Rein
Germany

A-1400 SHARK TANK APPLICATION
Gamidov Farid
Russia

A-1401 SHARK TANK APPLICATION
Vasiliki Batsou
Greece

A-1402 SHARK TANK APPLICATION
Maria May
Italy

A-1403 SHARK TANK APPLICATION
Xavier Gueffier
France

A-1404 INTRODUCTION OF FESSH GRANTS
Leila Harhaus
Germany

A-1405 GRANT WINNER: PROMS 2024
Sándor Zoltán
Hungary

A-1406 GRANT WINNER: PROMS 2024
Ales Fibir
Czech Republic

A-1407 GRANT WINNER: PROMS 2024
Katranitsa Lamprini
Greece

A-1408 GRANT WINNER: PROMS 2024
Michal Górecki
Poland

A-1409 GRANT WINNER: PROMS 2024
Joanna Kot
Poland

A-1410 BASIC GRANT WINNER 2023
Marco Keller
Switzerland

A-1411 BASIC GRANT WINNER 2024
Vadims Nefjodovs
Latvia

A-1412 CLINICAL GRANT WINNER 2022
Michiel Zuidam, Mirte Langeveld
The Netherlands

A-1413 CLINICAL GRANT WINNER 2024
Gerald Kraan, Nina Mathijssen
The Netherlands

A-1414 SHARK TANK WINNER 2023
Daniele Tosi
Italy

A-1415 ANNOUNCEMENT OF THE 2023 SHARK TANK WINNERS

A-1419 WELCOME ADDRESS BY THE CHAIR OF ORGANISING COMMITTEE
Henk Coert
The Netherlands

A-1420 NVVH PRESIDENTIAL ADDRESS
Mick Kreulen
The Netherlands

A-1421 WELCOME ADDRESS BY THE FESSH SECRETARY GENERAL
Brigitte van der Heijden
The Netherlands

A-1422 FESSH GIANTS CEREMONY
Zaf Naqui
UK

A-1423 SHARK TANK APPLICATION
Zhi Yang Ng
UK

A-1424 CLOSING REMARKS BY THE CHAIR OF ORGANISING COMMITTEE
Henk Coert
The Netherlands

A-1425 IFSSH2025
Daniel Nagle
USA

A-1426 FESSH2025
Jorma Ryhänen
Finland

A-1427 CLOSING REMARKS BY THE FESSH SECRETARY GENERAL
Brigitte van der Heijden
The Netherlands

A-1428 WELCOME AND INTRODUCTION
Henk Coert, Jan-Ragnar Haugstvedt, Eric Wagner, Youssra Marjoua

A-1429 TFCC REPAIR
Lorenzo Merlini
France

A-1430 NEW OPTIONS IN TFCC REPAIR
Jane Messina
Italy

A-1431 ARTHROSCOPIC SL RECONSTRUCTION
Eric Wagner
USA

A-1432 ARTHROSCOPIC SL REPAIR AND MODIFICATIONS
Martin Caloia
Argentina

A-1433 ARTHROSCOPIC LT REPAIR/RECONSTRUCTION
Jan-Ragnar Haugstvedt
Norway

A-1434 MIDCARPAL INSTABILITY VS PROXIMAL ROW DYSFUNCTION
Andrea Atzei
Italy

A-1435 SL INSTABILITY AND THE IMPORTANCE OF THE DIC: THE PORTRAIT OF AN IDEAL PROCEDURE
Ahlam Arnaout
France

A-1436 NOVEL RECONSTRUCTIVE TECHNIQUES FOR CMC ARTHRITIS WITH ARTHROSCOPY
Gustavo Mantovanni
Brazil

A-1437 MINIMALLY INVASIVE DECOMPRESSION OF UPPER EXTREMITY NERVE COMPRESSION SYNDROMES
Olivier Mares
France

A-1438 ARTHROSCOPIC SCAPHOID NONUNION BONE GRAFTING
Asgeir Amundsen
Norway

A-1439 ARTHROSCOPIC TREATMENT OF PERILUNATE INJURIES
Guillaume Herzberg
France

A-1440 ARTHROSCOPIC-ASSISTED DISTAL RADIUS FRACTURE FIXATION
Andrew Chin
Singapore

A-1441 THE ARTHROSCOPIC TREATMENT OF KIENBOCK'S DISEASE
Eva-Maria Baur
Germany

A-1442 INTERACTIVE EXERCISE REVIEWING: WHAT DECISION WILL YOU CHOOSE FOR THIS PAPER?
Ryan Trickett
UK

A-1443 INTERACTIVE EXERCISE REVIEWING: WHAT DECISION WILL YOU CHOOSE FOR THIS PAPER?
Florian Früh
Switzerland

A-1444 INTRODUCTION OF FESSH CONGRESS FELLOWSHIP PROGRAM
Jonathan Hobby
UK

A-1445 PRESENTATION 1
Chiara Arrigoni
Italy

A-1446 PRESENTATION 2
Arsen Arsenishvili
Georgia

A-1447 PRESENTATION 3
Saskia Kamphuis
Switzerland

A-1448 PRESENTATION 4
Petr Machac
Hungary

A-1449 PRESENTATION 5
Lisa Mailander
Austria

A-1450 PRESENTATION 6
Cristian Mitrulescu
Romania

A-1451 PRESENTATION 7
Lisa Ng
UK

A-1452 PRESENTATION 8
Nora Peterfy
Hungary

A-1453 PRESENTATION 9
Ana Scott-Tennent
Spain

A-1454 PRESENTATION 10
Xenia Startseva
Switzerland

A-1455 PRESENTATION 11
Victoria Struckmann
Germany

A-1456 PRESENTATION 12
Marie Witters
Belgium

A-1457 INTRODUCTION OF FESSH RESEARCH FELLOWSHIP PROGRAM
Ruud Selles / Leila Harhaus
The Netherlands

A-1458 PRESENTATION 13
Alexandru Amarandei
Romania

A-1459 PRESENTATION 14
Muhammet Okkan
Turkey

A-1460 DE QUERVAIN DISEASE
Amadine Ledoux
Luxembourg

A-1461 REPORT OF THE SECRETARY GENERAL
Brigitte van der Heijden
The Netherlands

A-1462 REPORT OF THE TREASURER
Alex Lluch
Spain

A-1463 REPORT OF THE CONGRESS COMMITTEE
Piotr Czarneczki
Poland

A-1464 BID 2028 PRESENTATION AUSTRIA

A-1465 BID 2028 PRESENTATION FRANCE

A-1466 BID 2028 PRESENTATION SERBIA

A-1467 REPORT OF YEHS (7 MIN)
Camillo Fulchignoni
Italy

A-1468 REPORT OF THE JOURNAL COMMITTEE
Henk Coert
The Netherlands

A-1469 REPORT OF THE JOURNAL COMMITTEE
Emily Kent
UK

A-1470 REPORT OF THE RESEARCH COMMITTEE
Leila Harhaus
Germany

A-1471 REPORT OF THE RELATIONSHIP COMMITTEE
Ilse Degreef
Belgium

A-1472 REPORT OF THE COMMUNICATION COMMITTEE
Zaf Naqui
UK

A-1473 REPORT OF THE EXAMINATION COMMITTEE
Lindsay Muir
UK

A-1474 REPORT OF THE CLINICAL PRACTICE COMMITTEE
Massimo Corain
Italy

A-1475 REPORT OF THE EDUCATION COMMITTEE
Jonathan Hobby
UK

A-1476 ANNOUNCEMENT OF THE WINNER OF THE BID2028
Piotr Czarneczki
Poland

A-1477 INVITATION TO THE COMING FESSH CONGRESS 2025 IN HELSINKI, FINLAND
Jorma Ryhänen
Finland

A-1478 CLINICAL CASES WITH ATTENDEES
Joaquim Casanas, Jordi Serra
Spain

CONTACT

FESSH Management Office
Email: office@fessh.com
Website: www.fessh.com

ASSZISZTENCIA Congress Bureau
Email: registration@fessh2024.com
Website: www.asszisztencia.hu