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Hand surgery in Sweden

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Hand surgery as a clinical entity started in Sweden in the 1940s. Today, Swedish hand surgery holds a strong position among surgical specialities, being a specific entity with its own residency programme.

Historical perspective: early days

Dr Erik Moberg is considered the 'father of hand surgery' in Scandinavia and had a great impact on the development of the speciality throughout the region. Being a general and orthopaedic surgeon with a specific interest in trauma, Erik Moberg, in his early career, visited Sterling Bunnell in the United States. After returning in 1948, Moberg wrote the first Swedish textbook on the subject, '*Acute Hand Surgery*', which was translated and disseminated in many countries. In 1949, he organized the first hand surgical ward in Scandinavia at Sahlgrenska Hospital. Later he focused on reconstructive hand surgery and tetraplegia reconstruction. In 1986, he was named a 'Pioneer in Hand Surgery' by the International Federation of Societies for Surgery of the Hand (Nils Carstam and Göran Lundborg are the other two in Sweden so entitled). Moberg had a great impact on the development of independent hand surgery clinics and specific hand rehabilitation units. Five out of the seven present university hand surgical centers (Malmö, Stockholm, Gothenburg, Örebro and Umeå) were directly established, and one (Linköping) was indirectly established by surgeons trained by him.

Among other pioneers, Drs Helge Wulff and Nils Carstam deserve to be mentioned. Helge Wulff was a professor of surgery at Malmö General Hospital. He realized the need to specialize in various surgical fields. He arranged for one of his colleagues, Nils Carstam, to spend time with Moberg and Bunnell. When Carstam returned in 1950, he started the first surgical ward in Malmo. At the same time, Wulff signed a memo that could be considered the first 'structured protocol for level of care' of hand surgical patients. This memo gave recommendations on what hand injuries needed special attention at his department. In 1962, this unit became the first independent hand surgery clinic in Sweden.

A structured protocol that defines which patients should be referred to a hand surgery unit and which patients should be treated by orthopaedic or plastic surgeons is still in use. Both the Swedish Society for Surgery of the Hand and the Swedish Orthopaedic Association sanction the current form of this protocol, which has proven importance to the healthcare system by defining what patients should be treated at what level of expertise.

Several of Moberg and Carstam's colleagues and trainees established hand surgery centres elsewhere in Sweden. The first such unit in Stockhom was founded by Lars Önne in 1952 at the Department of Surgery at Serafimer Hospital. This unit was later transformed into an independent hand surgery clinic. Lennart Mannerfelt started a hand surgery clinic in Lund in 1964 and Göran Lindström in Umeå in 1975. Ivar Isacsson became director of the plastic surgery unit in Linköping in the late 1960s, which in 1987 was transformed into a combined hand and plastic surgery unit. In 1974, Holbus Mattsson started a hand surgery unit within a plastic surgery department in Örebro. In 1967, Sune Johansson became the head of a hand surgery unit within plastic surgery at Uppsala University Hospital.

Two societies for hand surgery: Scandinavian and Swedish

In 1951 Erik Moberg founded the Nordic Hand Club together with Nordic colleagues. This club was later renamed *Scandinavian Society for Surgery of the Hand*, and was the first European hand surgery society. This society now has biannual meetings with attendees participating from all of Scandinavia.

In 1969, after much effort, especially by Carstam, the National Board of Health and Welfare accredited hand surgery as an independent specialty. The *Swedish Society for Surgery of the Hand* was then formed in 1973. The society currently has 160 active members and has its annual meeting in September (Figure 1). Anna Gerber Ekblom is the current president. Since 1983, this society has been an official part of the Swedish Society of Medicine.

The *Swedish Society for Surgery of the Hand* promotes national guidelines in hand surgery and helps collaboration between the university clinics on specific patient groups, such as brachial plexus

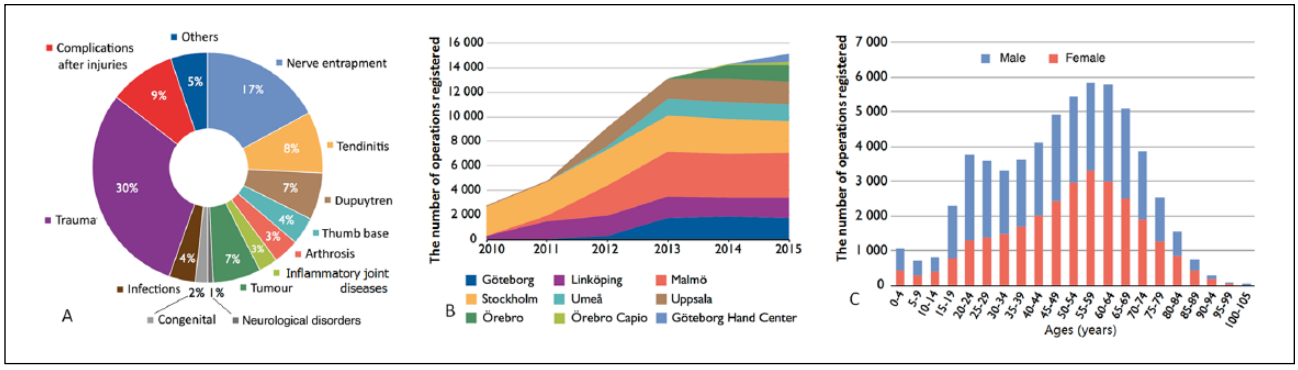

Figure 1. Data from the national HAKIR registry (with permission from HAKIR registry, HAKIR.se) in Sweden from 2010 to 2015. A total of 59,356 were registered in this 6-year period. (A) Distribution of 59,356 operations in different hand problems. (B) The number of operations registered each year. From 2014 all university clinics participated in this registry. (C) The number of operations in the 6-year period analysed by gender and age.

injuries, tetraplegia, and rare congenital malformations, who may benefit from centralized treatment. Active national hand clubs in wrist surgery and congenital malformations ensure a lively dialogue and collaboration between the clinics. A national hand transplantation group was formed 2 years ago, aiming at a national programme for this surgery. This effort recently resulted in a national protocol, though hand transplantation is yet to be performed. Surgeons at two sites, Stockholm and Gothenburg, are highly involved in this programme and are gaining expertise.

Residency: training of hand surgeons

Approximately 30 hand surgery residents are currently in training at the seven university clinics. Full accreditation can only be achieved at one of these clinics. This specialist training programme is typically 5 years, including at least 1 year of training in orthopaedics or general surgery, 6 months of plastic surgery and 3 months of anaesthesiology. National courses covering important topics for trainees are arranged by the Swedish Society for Surgery of the Hand and the university hospitals. The courses range from practical microsurgery training to cadaveric lab sessions on prosthetic procedures, nerve, congenital anomalies and trauma. Residents are encouraged to take the European board examination at the end of their training.

Although hand surgery in Sweden is centred around the seven university hospitals, the landscape has changed rapidly over the last 5 years. A growing private market has been driven by increasing numbers of patients with private or company-paid insurance. Specialist clinics at the university hospitals still treat the majority of trauma cases and complicated reconstructions related to congenital malformations, spasticity, brachial plexus injuries and replantations.

Hand Surgery Quality Registry in Sweden: HAKIR

In 2008, the Swedish Society for Surgery of the Hand initiated a national quality registration of all hand surgical procedures performed in Sweden. The HAKIR registry (abbreviation for Hand Surgery Quality Registry) (website: www.hakir.se) was established shortly after. Since last year, all university clinics, as well as some largest private hand surgery providers, have been participating. Quality registries are common in Swedish healthcare. The aim is to use individual-based monitoring of factors, such as care efforts and treatment results to enable improvement work and research that will progressively improve the state of care provided to patients.

Between 2008 and the end of 2016, 72,818 operations had been registered, with 94% of all procedures at the participating units included. HAKIR collects a wide range of data, including patient-reported outcome measures and patient-reported experience measures. Objective outcome parameters, such as range of motion, sensibility and strength, are registered before and after surgery. The measurements are based on a manual specific for HAKIR, to assure validity and reliability of outcome measurements.

A total of 47,075 pre- and post-operative patient questionnaires have been collected in this system, covering 2859 nerve repairs, 4651 tendon repairs, 2962 surgeries for thumb basal joint arthritis and 4681 surgeries or collagenase treatments for Dupuytren contracture. Demographics of patients (Figure 2) as well as complications can be analysed. Outcomes of a few well-defined diagnoses were analysed in depth since 2014, including flexor

Figure 2. The attendees of the annual meeting of the Swedish Society for Surgery of the Hand in Sigtuna in 2015.

tendon surgery, basal thumb joint arthroplasty and prosthetic implant surgery for distal radioulnar, finger and wrist joints. A research committee with members from all participating university clinics oversees research projects within the registry, and we anticipate that data will allow unique comparison of outcomes of different treatment and rehabilitation modalities.

Major clinical practice

The disease distribution is similar to other Western countries (Figure 2). Most common are injuries and their complications. The injuries occur mainly in men under 30 years of age. Middle-aged women dominate nerve entrapment, arthritis and tendinitis.

Dupuytren contracture is also common in Scandinavia. Traditionally, total fasciotomy has been a common practice, however, with the introduction of collagenase clostridium histolyticum, the treatment has shifted. Large clinical trials comparing needle fasciectomy, injection treatment and surgical fasciotomy are ongoing, but we see that the current trend is that surgical treatment for primary and recurrent disease is getting more common again.

With better immunological treatment options, rheumatoid patients need less surgical intervention nowadays. Knowledge and techniques gained from rheumatoid patients are used on patients with osteoarthritis, where the number of total wrist replacements and small joint replacements is increasing.

Since the start of industrialization, Sweden has a long tradition of labour unions and active governmental control of workplace safety. The typical Swedish workplace, including the construction sites, mechanical workshops and manufacturing industry, may be regarded as some of the safest in the world. Also, extremity injuries including brachial plexus injuries after high velocity accidents are relatively uncommon. Injuries to the hands are therefore comparatively infrequent, with a few exceptions, especially during springtime. This is mainly due to powered wood splitters that are widely used in the Swedish countryside to split logs into small pieces as firewood for house heating. Mutilating hand injuries are therefore more often seen in the hand clinics during springtime and in early summer.

Traditionally, the tendency to do replant surgery, other than with multiple detached fingers or thumbs, has been relatively restrictive. Problematic cold sensitivity that is aggravated in a cold climate is the main reason for this. In general, cold sensitivity of the hand is a relatively major problem among Swedish patients, especially after hand injuries, including nerve injuries and amputations.

With increasing numbers of refugees from the Middle East and Africa coming to Sweden, we have seen new panorama of hand problems. Sequelae after untreated injuries, including Volkmann contractures and unhealed fractures, non-treated tendon and nerve lacerations, as well as rare congenital malformations, have been more frequent in recent years. Sweden (population 10 million) received 160,000 refugees in 2016, which created a challenge to the health care system.

Research

Swedish hand surgeons have a strong tradition of related research. A considerable expertise has grown within the society, and current projects range from cell signalling to surgical methods, nerve biopsies, and wrist and hand prostheses. Göran Lundborg held the first regular professorship in hand surgery in 1987 and there are currently three full professorships in hand surgery in Sweden; Lars Dahlin in Malmö, Mikael Wiberg in Umeå and Jan Fridén in Gothenburg. More than 35 dissertations have been produced in the last 10 years.

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