Institutionen för klinisk forskning och undervisning,
Södersjukhuset, enheten för handkirurgi.

Congenital Upper Limb Anomalies –
Studies of Epidemiology and Hand Function

AKADEMISK AVHANDLING

som för avläggande av medicine doktorsexamen vid Karolinska Institutet offentligen
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av
Anna Gerber Ekblom
Leg. Läkare

Huvudhandledare:
Docent Marianne Arner
Karolinska Institutet
Institutionen för klinisk forskning
och undervisning, Södersjukhuset,
enheten för handkirurgi

Bihandledare:
Professor Lars B. Dahlin
Lunds Universitet
Medicinska fakulteten,
Institutionen för kliniska vetenskaper Malmö,
enheten för handkirurgi

Professor emeritus Birger Winbladh
Karolinska Institutet
Institutionen för klinisk forskning
och undervisning, Södersjukhuset,
enheten för pediatrik

Professor Marybeth Ezaki
University of Texas South Western Medical School,
Dallas, USA
Department of Orthopaedic Surgery

Fakultetsopponent:
Professor Ann van Heest
University of Minnesota,
Minneapolis, USA
Department of Orthopaedic Surgery

Betygsnämnd:
Professor Anders Ekbom
Karolinska Institutet
Institutionen för medicin Solna,
enheten för klinisk epidemiologi

Docent Eva Weidenhielm Broström
Karolinska Institutet
Institutionen för kvinnors
och barns hälsa,
enheten för neuropediatrisk

Professor emeritus Birger Winbladh
Karolinska Institutet
Institutionen för klinisk forskning
och undervisning, Södersjukhuset,
enheten för pediatrik

Professor Marybeth Ezaki
University of Texas South Western Medical School,
Dallas, USA
Department of Orthopaedic Surgery

Medicine doktor Jan-Ragnar Haugstvedt
Universitetet i Oslo, Norge
Medicinska fakulteten

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ABSTRACT

Objectives: This thesis has three interrelated aims:
(1) To describe the epidemiology of congenital upper limb anomalies (CULA) in Stockholm County, Sweden, in order to augment the few existing population studies of CULA (paper I);
(2) To measure the incidence of different categories of CULA while using and evaluating a recently proposed new classification scheme (Oberg, Manske and Tonkin (OMT) Classification) based on more current knowledge of limb development than the previously used International Federation of Societies for Surgery of the Hand (IFSSH) Classification is based on (paper II); and
(3) To investigate the relationship between measurements of body function and structure with both activity and participation in children and adults with radial longitudinal deficiency (RLD) by using the International Classification of Functioning and Health (ICF) framework, in order to shed light on what aspects of physical limb function and structure actually affect individuals’ daily life activity (papers III and IV).

Methods: 562 children born with a CULA were identified through registry studies. Incidence and relative frequency of different types of anomalies were calculated. Distribution of gender, affected side, associated non-hand anomalies and occurrence among relatives were investigated (paper I and II). In twenty children (paper III) and 20 adults (paper IV) with RLD, Body function and structure was evaluated by measures of range of motion, grip strength, key pinch, sensibility and radiographic parameters. Activity was evaluated by Box and Blocks test, Assisting Hand Assessment (AHA) and Sollerman Hand Function test and participation by Children Hand-use Experience Questionnaire (CHEQ), Quick-DASH and SF-12. Statistical correlations between assessments of body function and structure, activity and participation were examined.

Results: The incidence of CULA in Stockholm, Sweden, 1997 to 2007, was 21.5 per 10,000 live births (paper I). All CULA could be classified using the OMT classification. The largest main category was Malformations (429 cases), followed by Deformations (124 cases), Dysplasias (10 cases) and Syndromes (14 cases) (paper II).
In children with RLD (paper III), significant relationships were found between measurements of activity and range of motion of digits as well as between measurements of participation and range of motion of wrist. In adults with RLD (paper IV), significant relationships were found between measurements of activity and grip strength, key pinch and range of motion of elbow and digits. In adults, measurements of participation showed significant relationships with grip strength, forearm length and range of motion of elbow and digits. However, radiographic measurements of radial wrist deviation did not show a significant relationship with measurements of activity or participation in children or in adults with radial longitudinal deficiency.

Conclusions: The incidence of CULA in one Swedish region confirms the findings in the only previous comparable total population study. The OMT classification proved useful and accurate and with further refinements can replace the IFSSH classification. In children and adults with RLD, grip strength, key pinch, forearm length and elbow and digital motion seem to be more important for the individual’s levels of activity and participation than the radial angulation of the wrist. The current treatment principle of surgical correction of the angulated wrist could therefore be questioned.

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