Congenital Hand Anomalies
- An Overview

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Presentation outline

• Incidence
• Embryology
• Classification of Congenital Hand Anomalies
• Splinting
• Surgery
Incidence

• 1 in 600 live births
• When 3 or more minor anomalies exist there is 90% chance of a major anomaly in one of the critical organ systems
  • Eg. cardiac, pulmonary, gastrointestinal, genitourinary & haematological
  • Usually in combinations identified as syndromes eg. VACTERL syndrome
Embryology

Congenital hand anomalies may result from:

- Chromosomal abnormalities
- Inborn errors of metabolism
- Infections or other environmental factors
- Other unknown influences
Classification of Congenital Hand Anomalies

I. Failure of formation of parts (arrest of development)
II. Failure of differentiation (separation) of parts
III. Duplication
IV. Overgrowth
V. Undergrowth
VI. Congenital constriction ring syndrome
VII. Generalised “skeletal” abnormalities & syndromes

International Federation of Societies for Surgery of the Hand (ISSH)
I. Failure of formation of parts

Radial deficiency  
1. Radial dysplasia (radial club hand)  
2. Hypoplastic thumb

Central deficiency (involves rays 2, 3 & 4)  
3. Symbrachydactyly  
4. Ectrodactyly

Ulnar deficiency (Little & ring finger may be absent +/- ulna & carpal bones)
II. Failure of Differentiation of Parts

Soft Tissue involvement
1. Arthrogryposis
2. Syndactyly
3. Camptodactyly
4. Clasp thumb
5. Trigger thumb

Skeletal involvement
6. Clinodactyly
III. Duplication

Digit

1. Polydactyly

2. Duplicate thumb
IV. Overgrowth

Digits
1. Macrodactyly
V. Undergrowth

Digits
1. Brachysyndactyly
2. Poland syndrome
VI. Constriction Ring Syndrome

- Amniotic bands

VII. Generalised Skeletal Anomalies

- Chromosomal & others
General Splinting for Congenital Hand Anomalies

Goals of treatment:

- Maximise range of motion
- Maximise functional hand use and independence in occupational performance
- Minimise secondary consequences
- Protection of structures post surgery
Splinting for Congenital Contractures

Timing and Protocol

• As early as possible after birth - Most successful correction before 4-6 months
• Rigid thermoplastic splinting
• Ideal: >8-12 hours daily
• Frequent serial adjustment
• When resolved: splint overnight to maintain
• Consider developmental implications

In older children & adolescents:
• More time is required to serially correct
• Some residual contracture is more likely to remain
• Psychosocial issues have greater impact on compliance
Splinting for Contracture Prevention

Timing and Protocol

• From neonate
• Overnight, rest periods
• Rigid thermoplastic splinting if required
• Neoprene, lycra or elastic may be sufficient
• Functional splints may also be required
Splinting for Function

Timing and Protocol

- From neonate
- During functional hand use
- Rigid thermoplastic splinting if stability required
- Neoprene, lycra or elastic if dynamic assistance required
- Wear during functional tasks
- Not required overnight / at rest
- Consider developmental implications
Surgery for Congenital Hand Anomalies

With early surgery

• Joints are more amenable to remoulding
• Child will develop & cortically imprint fewer bad habits
• Plasticity of the central nervous system (motor & sensory cortex) is greater

With delayed surgery

• Task of surgery is technically easier
• Child’s functional needs are more obvious
• Child is potentially more co-operative
RCH OT Post-surgery protocols

- Hypoplastic thumb reconstruction
- Pollicisation
- Duplicate thumb reconstruction
- Toe-to-hand transfer
- Syndactyly release

*At RCH most procedures of this type will be performed on children between the ages of six months & two years

Protocols available for post-surgical management from RCH
References of interest

Green’s Operative Hand Surgery (6th Ed) Part VI: The Pediatric Hand
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