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THE TREATMENT OF THE PEDIATRIC HAND PATIENT:
PART II: THE CONGENITAL HAND PATIENT

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Course Objectives:

• As a result of this course, participants will be able to:

• 1) Identify 2 potential functional limitations for the child with a congenitally absent thumb.

• 2) Describe 2 potential functional adaptations for the child with an absent hand.

• 3) List one possible therapy protocol following syndactyly release.

• 4) By the end of this course, the participant will be able to identify congenital hand conditions and treatment protocols.
## Congenital Classification:

- Why do we need this?
- Oberg, Manske, and Tonkin (OMT) classification
  - Malformations
    - Divided by Axis of development: Whole limb vs. Hand Plate
  - Deformations
  - Dysplasias

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## Hand Therapy: Congenital Population

- Unique population
- Treat the Families
- Therapy
- Function
Ages

- Infant
- 12-18 Months
- 18 months – 4 years
- 4-7 Years
- 7-12 Years
- Adolescent

Symbrachydactyly:

- Malformation
- Proximal-distal Axis
  - Entire Upper Extremity
  - Hand Plate
Functional Limitations:

• Grasp
• In hand Manipulation
• Pinch

• ADLs
• Play
• Sports/Leisure

Adaptations

• Grasp:
Adaptations:

Adaptations:
Treatment:

• Education
• Resources
• Adaptations:
  • Clothing; ADLs; sports/leisure

Radial Longitudinal Deficiency:

• Congenital failure of formation of the radial border of the upper limb.
• Can include:
  • General upper limb hypoplasia
  • From shortening to absence of radius
  • Shortening or bowing of ulna
  • Absence or hypoplasia of scaphoid or other radial sided carpal bones
  • Thumb hypoplasia to absent thumb
  • Radial digits affected
Classifications

- **Radial Longitudinal Deficiency (modified Bayne and Klug)** James, McCarroll, Manske (1999)
  - **N:** normal length radius and a normal carpus with thumb hypoplasia
  - **0:** Normal radius; radial side carpal abnormalities, with thumb hypoplasia or absence
  - **1:** distal radius > 2 mm shorter than ulna; hypoplastic thumb and carpus
  - **2:** hypoplastic distal and proximal radius; hypoplastic thumb and carpus
  - **3:** hypoplastic radius with absence of the distal physis;
  - **4:** complete absence of the radius, with absence or hypoplasia of carpus and thumb

Thumb Classification

- Modified Blauth
  - Type 1: Minimal shortening and narrowing, hypoplasia of normal components are present but undersized. The abductor pollicis brevis and opponens pollicis are hypoplastic.
  - Type 2: Thumb-Index web space narrowing: is characterized by a tight web space between the thumb and index finger which restricts movement, hypoplastic thenar muscles and MCP joint instability
  - Type 3A: Type II features, plus extrinsic tendon abnormalities Type III thumbs are sub classified into two subtypes by Manske. Both involve a less developed first metacarpal and a nearly absent thenar musculature, with a fairly stable CMC joint
  - Type 3B: same as 3A but without stable CMC. Proximal metacarpal is absent.
  - Type 4: Pouce Flottant, or floating thumb. Metacarpal, trapezium and scaphoid are absent.
  - Type 5: Absent Thumb. Phalanges, metacarpal, trapezium and scaphoid are absent.


Thumb:

[Images of thumbs with different classifications]
Functional Symptoms

- Limited finger motion
- Limited grasp
- Limited strength
- Limited manipulation

Functional limitations

- Shortened and bowed forearm
  - Limited ability to reach
  - Hygiene limitations
  - Hair care

- Limited Elbow Motion:
  - Affects on ability to reach
  - No forearm rotation.
Functional Limitations

- Hypoplastic or absent Thumb
- Limited ability to pinch
- Limited ability to manipulate
- Limitations in large item grasp
- Inability to oppose fingertips

Affects on Development

- In hand manipulation
- Mobility
- Feeding
- Dressing
- Writing
- Scissors
- IADLs
- Avocational activities
Treatment: Birth – 12 months

- Begin early
- Education
- Home therapy:
  - PROM
  - Positioning

Splinting

- Soft splinting
Splinting:
- Thermoplastics

Exercise
- PROM
- Active grasp
- Active reach
- Mobility
Adaptations

• Mobility
• Feeding
• Play

Pollicization

• Therapy Objectives
  • Large item grasp
  • Improved manipulation
  • Function
  • Appearance (surgical objective)
Thumb Procedures

- MP joint stabilization
  - Web space deepening
- Opponensplasty
  - Huber
  - FDS
- Pollicization

Post op Therapy

- Splinting
- Scar management
- Desensitization
- AROM
- Active use
- Limited constraint
Post op Therapy

Therapy
School Aged Child

• Handwriting
• Sports
• Musical instruments
• Dressing
• Social issues

Activity Modification
Pre Axial Polydactyly: Duplicated Thumb

- Assessment
- A/PROM
- Functional use of thumbs
- Strength
- Joint Stability with Function

Medical Treatment:

- Excision: Which digit
Four Weeks Post Op

- Post op dressing removal with pin removal per surgeon
- Thumb spica splint/Radial C-bar splint

Concerns Following Excision:

- MP Joint Stability
- Sensitivity
- Web space
Post Axial Polydactyly: Duplicated Ulnar Digit

- Assessment
- Motion
- Strength
- Sensation
- Function

Post operative Treatment

- Splinting
- Scar Management
- Desensitization
Syndactyly:

- Simple
- Complex
- Partial
- Complete
Syndactyly Release

- Assessment
- Digital A/PROM
- Angulation/rotation
- Strength
- Sensation
- Function
Surgical Release:

- Border Digits
- Ages
- Complications

Syndactyly: 2-4 weeks post op

- Remove post op dressing
- Wound care/dressings
Maintain Web Space

- While healing
- Post healing

Maintain web space

- Soft Dressings
- Splint
Web Space

- Elastomer Mold
- Soft Splinting

Maintain Web Space:
Treatment

- Scar management
- Desensitization
- A/PROM
- Function

Functional Improvement
Syndactyly Conclusion:

- Border digits must be separated for optimal function.
- Young age best
- Central digits do not have to be done as early
- Allows optimal grip

Congenital Conclusion:

- The Congenital pediatric Hand population is unique
- Treat the family
- Resource: parents; camps;
- Have fun and be creative
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Bibliography

Bibliography


