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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

- Tonkin, M., Tolerton, S., Quick, T., Harvey, I., Lawson, R., Smith, N., Oberg, K., Classification of Congenital Anomalies of the Hand and Upper Limb: Development and assessment of and New System, JHS, Vol 38A, September 2013, P1845-1853

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

Lake, A. Techniques in Hand & Upper Extremity Surgery
Volume 14, Number 2, June 2010

Symbrachydactyly:

- Malformation
  - Proximal-distal Axis
    - Entire Upper Extremity
    - Hand Plate

Functional Limitations:

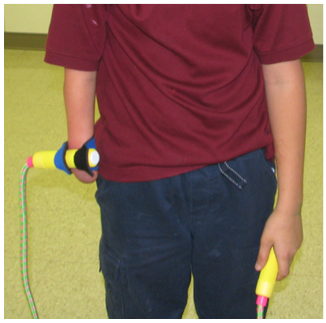
- Grasp
- In hand Manipulation
- Pinch

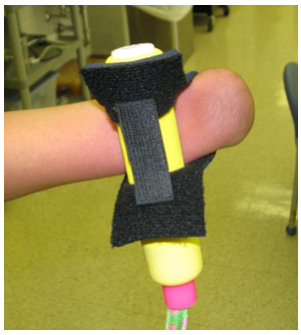
- ADLs
- Play
- Sports/Leisure

Adaptations

- Grasp:

Adaptations:





Adaptations:

Treatment:

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

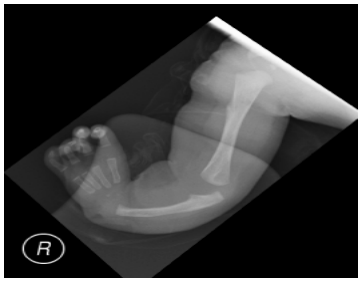
Radial Longitudinal Deficiency:

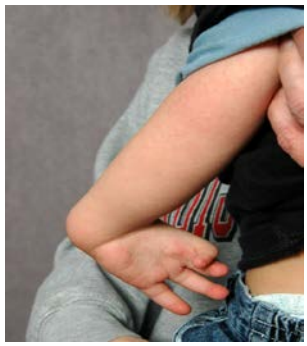
- Congenital failure of formation of the radial border of the upper limb.
- Can include :
  - General upper limb hypoplasia
  - From shortening to absence of radius
  - Shortening or bowing of ulna
  - Absence or hypoplasia of scaphoid or other radial sided carpal bones
  - Thumb hypoplasia to absent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

- James MA, McCarroll HR Jr, Manske PR. The spectrum of Radial Longitudinal Deficiency: a Modified Classification. *J hand Surgery* (Am). 1999; 24; 1145-55.





Thumb Classification

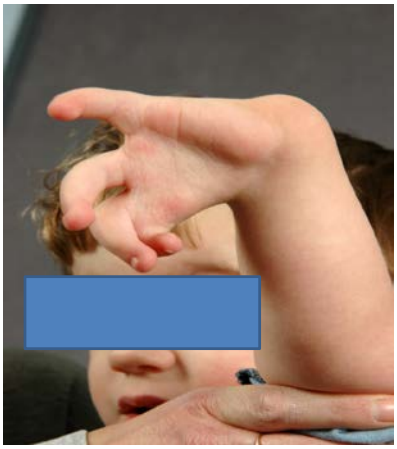
- Modified Blauth
- Type 1: Minimal shortening and narrowing, hypoplasia of normal components are present but undersized. The abductor pollicis brevis and opponens pollicis are hypoplastic.
- Type 2: Thumb-Index web space narrowing: is characterized by a tight web space between the thumb and index finger 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.

- James MA, McCarroll HR Jr, Manske PR. Characteristics of Patients with Hypoplastic Thumbs. J Hand Surg (Am). 1996; 21; 104-13.

Thumb:

Functional Symptoms

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



Functional limitations

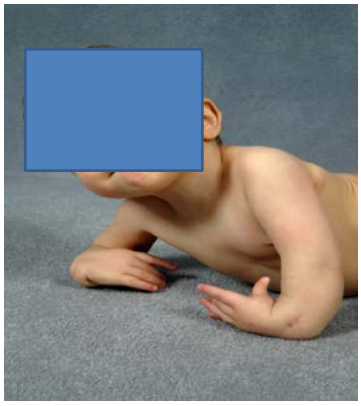
- Shortened and bowed forearm
  - Limited ability to reach
  - Hygiene limitations
  - Hair care
  - Limited Elbow Motion:
    - Affects on ability to reach
    - No forearm rotation.

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

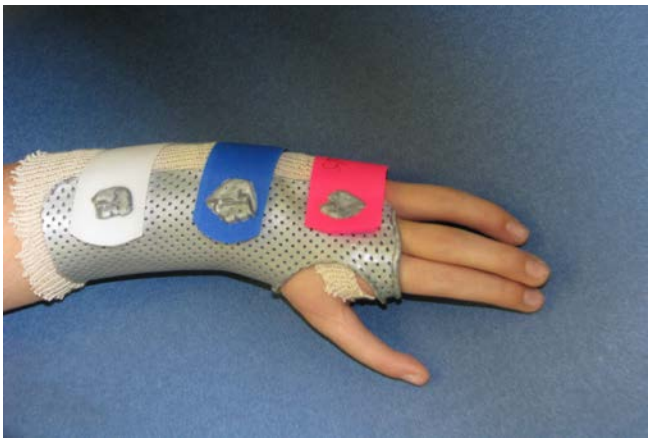
- Begin early
- Education
- Home therapy:
  - PROM
  - Positioning

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

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Pre Axial Polydactyly: Duplicated Thumb

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



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Medical Treatment:

- Excision: Which digit
- Timing: what age.

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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

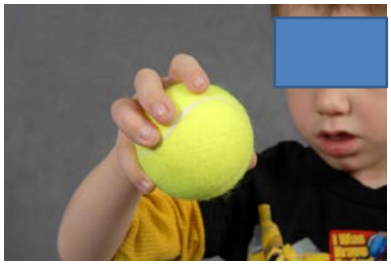
- Soft Splinting

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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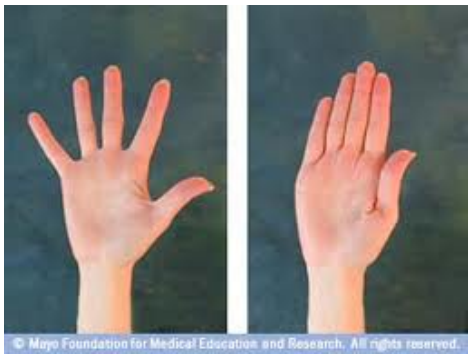

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