PRE-CONFERENCE SESSION 3

ORTHOPAEDIC MANAGEMENT OF THE UPPER EXTREMITY

WEDNESDAY, October 21st, 1-5PM

Course Co-Ordinators

Andrea Bauer, MD
Benjamin Shore, MD
Carley Vuillermin, MBBS

Course Faculty

Jon Davids, MD
Loren Davidson, MD
Douglas Hutchinson, MD
Michelle James, MD
Freeman Miller, MD
Laura Peace, OTR/L
Allan Peljiovich, MD
Ann Van Heest, MD
Lisa Wagner, DHS OTR/L
**Botulinum Dosing Chart**

<table>
<thead>
<tr>
<th>Adducted/Internally Rotated Shoulder</th>
<th>Botox Dosing</th>
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<tbody>
<tr>
<td>Pectoralis</td>
<td>2U/Kg</td>
</tr>
<tr>
<td>Lat. Dorsi</td>
<td>2U/Kg</td>
</tr>
<tr>
<td>Teres Major</td>
<td>2U/Kg</td>
</tr>
<tr>
<td>Subscap.</td>
<td>1-2U/Kg</td>
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**Flexed Elbow**

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<tbody>
<tr>
<td>Brachiorad.</td>
<td>1-2U/Kg</td>
</tr>
<tr>
<td>Biceps</td>
<td>2U/Kg</td>
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<tr>
<td>Brachialis</td>
<td>2U/Kg</td>
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**Pronated Forearm**

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<tbody>
<tr>
<td>Pron. Quad.</td>
<td>0.5-1U/Kg</td>
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<tr>
<td>Pron. Teres</td>
<td>1-2U/Kg</td>
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**Flexed Wrist**

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<tbody>
<tr>
<td>Flex. Carpi Rad.</td>
<td>1-2U/Kg</td>
</tr>
<tr>
<td>Flex. Carpi Uln.</td>
<td>1-2U/Kg</td>
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<tr>
<td>Palm. Longus</td>
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**Extended Wrist**

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<tbody>
<tr>
<td>Ext. Carpi Rad. L.</td>
<td>1-2U/Kg</td>
</tr>
<tr>
<td>Ext. Carpi Rad. B.</td>
<td>1-2U/Kg</td>
</tr>
<tr>
<td>Ext. Carpi Uln.</td>
<td>1-2U/Kg</td>
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</table>

**Clenched Fist**

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<tbody>
<tr>
<td>Flex. Dig. Sup.</td>
<td>1-2U/Kg</td>
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<tr>
<td>Flex. Dig. Prof.</td>
<td>1-2U/Kg</td>
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</table>

**Thumb in palm**

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Flex. Poll. Long.</td>
<td>0.5-1U/Kg</td>
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<tr>
<td>Flex. Poll. Brev.</td>
<td>0.5-1U/Kg</td>
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<tr>
<td>Add. Pollicis</td>
<td>0.5-1U/Kg</td>
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<tr>
<td>First Dors. Inter.</td>
<td>0.5-1U/Kg</td>
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**Extended Digits**

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<tbody>
<tr>
<td>Ext. indicis prop.</td>
<td>0.5-1U/Kg</td>
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<tr>
<td>Ext. dig. Comm.</td>
<td>0.5-1U/Kg</td>
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Surgery of the Upper Extremity in Children with Hemiplegic Cerebral Palsy: Use of the Shriners Hospitals for Children Upper Extremity Evaluation (SHUEE)

Jon R. Davids, MD
Assistant Chief of Orthopaedics
Medical Director, Motion Analysis Laboratory
Shriners Hospitals for Children
Sacramento, California, USA

I  Rationale
A. Identify all functional deficits
B. Single, simultaneous Surgical Intervention
   1. Multiple surgical procedures
   2. Single period of immobilization
   3. Single rehabilitation

II Methods
A. Shriners Hospital Upper Extremity Evaluation (SHUEE)(1)
   1. Spontaneous Functional Analysis (SFA)
      a. Degree of neurological impairment
      b. Lower SFA → less functional improvement anticipated
   2. Dynamic Positional Analysis (DPA)
      a. Alignment during functional tasks
         1. Elbow, forearm wrist, fingers, thumb
      b. Surgical interventions directed towards dynamic segmental malalignments
   3. Grasp and Release Analysis (GRA)
      a. Relationship between finger function and wrist alignment
      b. Thumb alignment and stability
### III Indications

#### Indications for upper extremity surgical procedures.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Physical Examination</th>
<th>Radiographic Examination</th>
<th>SHUEE</th>
<th>SFA</th>
<th>DPA</th>
<th>GRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCU to ECRB Transfer</td>
<td>Passive wrist extension to neutral</td>
<td></td>
<td>Poor Active Assist or better</td>
<td>Wrist segment: volar flexion/ulnar deviation</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Wrist Arthrodesis</td>
<td></td>
<td>AP Hand: Less that 1 year of growth remaining</td>
<td>Poor active assist or worse</td>
<td>Wrist segment: volar flexion/ulnar deviation</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Thumb MCP Arthrodesis</td>
<td>Thumb MCP hyperextension instability</td>
<td>AP Hand: Skeletal age 10 or greater</td>
<td>-</td>
<td>Thumb segment: closed or in palm</td>
<td>-</td>
<td></td>
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<tr>
<td>Thumb MCP Sesamoid Capsulodesis</td>
<td>Thumb MCP hyperextension instability</td>
<td>AP Hand: Skeletal age less than 10</td>
<td>-</td>
<td>Thumb segment: closed or in palm</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Thumb Web Release</td>
<td>Limited thumb passive palmar extension/abduction</td>
<td></td>
<td></td>
<td>Thumb segment: closed or in palm</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>EPL Rerouting</td>
<td>Ability to selective active EPL</td>
<td></td>
<td></td>
<td>Thumb segment: closed or in palm</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PT Lengthening</td>
<td>Passive forearm supination to neutral</td>
<td></td>
<td>Poor Active Assist or better</td>
<td>Forearm segment: pronation or worse</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>FDS/FDP/FPL Fractional Lengthening</td>
<td>Limited passive finger PIPJ/DIPJ and thumb IPJ extension</td>
<td></td>
<td>Poor active assist or worse</td>
<td>Finger segment: flexion</td>
<td>Limited release with wrist in neutral or extension</td>
<td></td>
</tr>
<tr>
<td>Biceps/Brachialis Lengthening</td>
<td>Passive elbow extension to 30 degrees or worse</td>
<td></td>
<td></td>
<td>Elbow segment: flexion or worse</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
SFA = spontaneous functional analysis; DPA = dynamic positional analysis; GRA = grasp and release analysis; FCU = flexor carpi ulnaris; ECRB = extensor carpi radialis brevis; MCP = metacarpophalangeal joint; EPL = extensor pollicis longus; PT = pronator teres; FDS = flexor digitorum superficialis; FDP = flexor digitorum profundus; FPL = flexor pollicis longus; PIPJ = proximal interphalangeal joint; DIPJ = distal interphalangeal joint; IPJ = interphalangeal joint; AP = anteroposterior; “-” = not applicable

IV Preferred Techniques
A. FCU to ECRB Transfer (2-8)
B. Wrist Arthrodesis (9-11)
C. Thumb MCP Arthrodesis (12-15)
D. Thumb MCP Sesamoid Capsulodesis (12, 16, 17)
E. Thumb Web Release (12-15, 18-20)
F. EPL Rerouting (12, 14, 21)
G. PT Lengthening (22-25)
H. FDS / FDP / FPL Fractional Lengthening (2, 6, 26-29)
I. Biceps / Brachialis Lengthening (10, 27, 30-32)

V Outcomes
  1. Retrospective case-control series, level III evidence
  2. Case Cohort: 40 children with hemiplegic CP, pre-post- SEMLS
  3. Control Cohort: 26 children with hemiplegic CP, no upper extremity surgery
  4. Pre-, post-, follow up SHUEE analyses

<table>
<thead>
<tr>
<th>Group</th>
<th>Initial SHUEE</th>
<th>Follow-up SHUEE</th>
<th>Difference SFA (p value)</th>
<th>Difference DPA (p value)</th>
<th>Difference GRA (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SFA</td>
<td>DPA</td>
<td>GRA</td>
<td>SFA</td>
<td>DPA</td>
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<tr>
<td>Non-operative</td>
<td>21.5</td>
<td>38.7</td>
<td>4.1</td>
<td>21.7</td>
<td>38.0</td>
</tr>
<tr>
<td></td>
<td>(±11.0)</td>
<td>(±13.9)</td>
<td>(±0.5)</td>
<td>(±8.7)</td>
<td>(±11.9)</td>
</tr>
<tr>
<td>Operative</td>
<td>19.2</td>
<td>37.1</td>
<td>3.2</td>
<td>23.2</td>
<td>54.7</td>
</tr>
<tr>
<td></td>
<td>(±10.0)</td>
<td>(±10.7)</td>
<td>(±0.4)</td>
<td>(±10.2)</td>
<td>(±10.8)</td>
</tr>
<tr>
<td>Non-operative versus Operative</td>
<td>p=0.374</td>
<td>p=0.734</td>
<td>p=0.16</td>
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</tbody>
</table>

SHUEE = Shriners Hospital upper Extremity Evaluation, SFA = spontaneous functional analysis, DPA = dynamic positional analysis, GRA = grasp / release analysis
5. Results: SEMLS Cohort
  a. Improved spontaneous use and dynamic positional alignment following SEMLS
References


Outcome Assessments – What, How, and Which Ones?  
Lisa V Wagner DHS, OTR/L

What areas should I be addressing?

The ICF diagrams a model exhibiting the dynamic interactions between the health conditions and the environmental factors. Function is described in the areas of Body Function/Structure, Activity and Participation. Outcome assessments need to address these areas. Current trends of instruments have included caregiver perceptions of functional abilities, quality of life concerns, and the transitions from childhood to adulthood. A comprehensive evaluation approach must be used in order to completely identify and address impairments and challenges.

There is no specific tool that addresses the multidimensional needs of each individual or each clinician’s question. There are a plethora of outcome assessments available for a variety of domains.

How do I choose the best assessment?

After you have chosen a purpose for the evaluation and a population to evaluate; ask the following:

1. **Content**- Does the assessment address the question that is being considered? Does the scoring algorithm provide the information that is desired?
2. **Methodology**- Has the assessment been validated for the population? Is it reliable? Does the assessment have the ability to demonstrate change?
3. **Clinical Utility**- Can the patients or caregivers complete the assessment? Does the study staff have the time to administer the assessment? Is the training required to administer and score feasible? Is the cost of the assessment acceptable?

Which ones are typically found in the literature for children with Cerebral Palsy?

<table>
<thead>
<tr>
<th>Body Structure/Body Function</th>
<th>Activity and Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROM</td>
<td>Assisting Hand Assessment</td>
</tr>
<tr>
<td>Modified Ashworth Scale</td>
<td>Assessment of Life Habits</td>
</tr>
<tr>
<td>Tardieu Scale</td>
<td>ABILHAND-kid</td>
</tr>
<tr>
<td>Grip/ Pinch strength</td>
<td>Activities Scale for Kids</td>
</tr>
<tr>
<td>Stereognosis</td>
<td>Box and Block</td>
</tr>
<tr>
<td>Semmes Weinstein</td>
<td>Canadian Occupational Performance Measure</td>
</tr>
<tr>
<td>Questionnaire of Pain Based on Spasticity</td>
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<tr>
<td>Quality of Life-Peds QL-Parent/Child perception they can't keep up</td>
<td></td>
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<tr>
<td>Caregiver Response/Quality of Life</td>
<td></td>
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<tr>
<td>Pediatric Quality of Life Inventory</td>
<td></td>
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<tr>
<td>Caregiver Priorities &amp; Child Health Index of Life with Disabilities</td>
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<tr>
<td>Cerebral Palsy Quality of Life Questionnaire for Children</td>
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<tr>
<td>Child Health Questionnaire</td>
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Assessment of the Fingers and Thumb

• Listen to the child and parent
  o Is the child able to perform activities of daily living at the appropriate age- and developmental level?
  o Which tasks do they struggle with?
  o Do they use both hands to put on their socks or pull up their pants?
  o If they see an OT regularly, what is the therapists’ assessment of the child’s abilities?

• Observe the position and use of the child’s fingers and thumb during age-appropriate activities
  o Quick House test (tape measure, specimen jar, folded paper and marker)
    o Thumb
      ▪ Does it get in the way?
      ▪ Can the child use it to grasp?
      ▪ Sometimes difficult to see on standard SHUEE video
  o Fingers
    ▪ Does the child have more difficulty with grasp, release, or both?
    ▪ Do the fingers have dynamic or static swan neck deformities?
  o Gather information from other team members
    ▪ Pinch, grip, ROM, stereognosis, SHUEE

• Examine the child on more than one occasion before determining a surgical plan
**Expert Tip: Elbow flexion contracture – How do you address it?**

Ann Van Heest MD, Professor, University of MN Dept of Orthopedic Surgery
Gillette Children’s Specialtycare, Shriner’s Hospital for Children Twin Cities

**SURGICAL TECHNIQUE**

Mital performs biceps-brachialis lengthenings through a curved antecubital approach. The lacertus fibrosus is excised, and Z-lenthening of the biceps tendon and release of the brachialis aponeurosis through multiple transverse incidions in the fascia are performed. Most commonly, a correction of 30 to 40 degrees is obtained. If near–full extension is achieved, then no further release is necessary. Further correction can be obtained by release of the origin of the brachioradialis, and/or partial myotomy of the brachialis. In long-standing contractures of greater than 60 degrees, further elbow extension is blocked by contracture of the neurovascular structures and skin. Excessive tension on the neurovascular elements is unnecessary and can lead to vascular compromise. It is not necessary to release the anterior capsule. If this procedure is performed on nonfunctional limbs, full extension is not necessary and surgery in combination with postoperative serial casting provides adequate correction. A period of 4 weeks of postoperative immobilization, followed by bivalved elbow splinting, is recommended.

**RESULTS**

Carlson reported on early results of 90 elbows in 86 patients at an average age of 10 years old for patients with contractures of less than 45 degrees, and 14 years old for patients with contractures of greater than 45 degrees. At follow up of 22 months, active extension improved by 17 degrees and elbow flexion with ambulation improved by 57 degrees for the lesser involved group treated with a partial release of the biceps, brachialis, and brachioradialis. At follow up of 18 months, active extension improved by 38 degrees and elbow flexion with ambulation improved by 51 degrees for the more involved group treated with a more extensive release of the biceps, brachialis, and brachioradialis. Carlson reported on 9 year follow up with the same surgical cohort, totally 23 elbows in 23 patients. She showed that improved elbow extension with less elbow flexion during gait persists for the long term. No loss in surgical improvement was noted. Though movement deviations in upper and lower extremities often occur simultaneously in patients with unilateral CP, it is the upper extremity deviations and not the lower extremity deviations that correlate best with lower self-esteem. Even in high functioning individuals with mild CP, self-esteem may be adversely affected by such deviations. Elbow flexion is the main contributor in arm posturing deviations (compared to shoulder flexion, shoulder abduction, and wrist flexion). As such, correction of this particular anomaly could be of benefit for the child’s development of improved self-esteem.

**REFERENCES**


Pronator transfer versus release

Indication: Limitation in active supination, for most cases the goal should not be full active supination. If the goal is cosmetic then having neutral position is ideal, if it is an assist hand (Hemiplegia) active supination of 10 to 20 degrees is enough. For a primary use hand, quadriplegia, having hand that can supinate to 40 to 50 degrees without loosing active pronation is ideal however usually very hard to achieve. In these hand be very careful not to loose active pronation since this is the area in which they have typically developed functional skills such as driving wheel chairs and using eating utensils. Consider that in most situations under correction of the pronation deformity will be better accepted by the patient and family and be more functional then overcorrection into a fixed supination position.

Release or Transfer: My bias is toward release however transfer is also indicated

1. Full passive supination and limited active supination - this pattern may indicate underlying primary dystonia with little or no spasticity - avoid transfer because of over correction risk, often no treatment is best, release is typically OK if there is clearly some spasticity. Do not release either if it is pure movement disorder.

2. Mild to moderate passive fixed contracture (lacking up to 60 degrees of full supination) and active motion in a similar range. Pronator transfer will likely provide more long lasting active supination with low risk of over correction.

3. Severe contracture (no passive supination possible) and no or very limited active supination in any range, Release is more simple then transfer and likely yields the same results. There is no work of over correction this group, and the goals are usually limited to reducing severe pronation instead of a goal of function active supination.

Procedure Note: Make sure the whole distal tendon is harvested for either release or transfer because it has a long relatively wide insertion and it is easy to leave a piece on the volar side attached.
Wrist Tendon Transfers (Getting the Balance Right)

- Review all data pre-operatively
  - Previous exams
    - Active wrist ROM
    - Can the child open their fingers with the wrist supported in neutral extension?
  - SHUEE
    - Wrist position during activity
  - Dynamic EMG
    - FCU activity: continuous vs. out of phase vs. inactive
  - Tone (spastic vs. dystonic vs. combination)

- FCU to ECRB indications
  - FCU active out of phase (during grasp)
  - Child is able to open fingers with wrist supported in neutral
  - Child uses fingers better when wearing wrist splint (they don’t have to like it...)

- FCU to ECRB technique
  - Mobilize FCU until ≥3 cm excursion
  - Create a generous subcutaneous tunnel around the ulna so that the path of the transferred tendon is not constrained by sharp turns or tight tissue
  - Weave through ECRB proximal to the crossover of the APL/EPB or, if FCU is short (common), transect the ECRB proximally (close to the musculotendinous junction) and weave or repair side-to-side
  - Set tension so the repair holds the wrist at neutral or in slight (30 degrees or less) extension
    - Set in slight extension only if the child can open fingers easily with the wrist held in slight extension
  - If performing a simultaneous EPL re-routing, repair FCU to ECRB first and route EPL superficially
  - Immobilize for 6 weeks, then protect from passive wrist flexion > neutral for 4 more weeks
Wrist Arthrodesis in Children with Cerebral Palsy
Jon R Davids, MD
Shriners Hospital for Children
Sacramento, CA USA

I. Indications / Patient Selection / Anticipated Outcomes

A. GMFCS
   1. GMFCS IV, V: Hygiene, Pain Relief, Ease of Care
   2. GMFCS III: Function, Hygiene, Pain Relief, Ease of Care
      a. Assess WC / Walker / Computer use prior to surgery
   3. GMFCS II, I: Function, Hygiene, Pain Relief

B. SHUEE Assessment Pre- and Post-operative
   1. Spontaneous Functional Analysis: Neurological Impairment
   2. Dynamical Positional Analysis: Task specific deficits

C. Outcomes
   1. Hygiene: Improved position
   2. Pain Relief: Articular cartilage degeneration / contracture correction
   3. Function
      a. Based on initial degree of impairment
      b. Accurate assessment / management of Grasp / Release function
      c. Stabilization effect for more complex movement disorders: Dystonia

II. Surgical Technique: Pearls / Pitfalls

A. Skeletal shortening is better that soft tissue lengthening
   1. Proximal Row Carpectomy
      a. Preserve distal radio-ulnar articulation / ligaments / stability

B. Soft tissue surgery
   1. Less is more
      a. Preferred: Fractional lengthening of extrinsic finger and thumb flexors
      b. Occasional: Tendon Z lengthening
      c. Never: Sublimus to Profundus Transfer
      d. Never: Complete release
   2. Finger Swan Neck deformities
      a. Intrinsic / Extrinsic imbalance unmasked
      b. Overly aggressive extrinsic lengthening / release

C. Alignment
   1. Extension: 5°
   2. Ulnar Deviation: 5°

D. Thumb Reconstruction
   1. Almost always required
The Role of Thumb Arthrodesis in Cerebral Palsy

AACPDM 2015
PreCourse 3

Allan Peljovich, MD, MPH
The Pediatric Hand & Upper Extremity Center of Georgia;
Atlanta, Georgia

I. CP and the Thumb
   A. Inability to control thumb motion impairs functional pinch and grasp.
   B. Presentation of spasticity is somewhat variable.
      1. House Classification.
         a. 1- Adduction.
         b. 2- Adduction and MCP flexion.
         c. 3- Adduction and MCP extension.
         d. 4- Adduction and MCP/IP flexion.

II. Principles in treating thumb spasticity (general)
   A. Determine the real impact of spasticity on the child.
      1. Affect on function and daily life ability.
      2. Affect on care and hygiene.
   B. Implement treatment based upon the problems found during assessment.
      1. Nonoperative modalities.
         a. Splinting.
         b. Therapy.
         c. Spasticity modulation.
            (1). Injectables.
               (a). botulinum A.
               (b). phenol.
            (2). Oral medications.
      2. Consider surgery.
         a. When non-operative treatment is insufficient.
         b. When non-operative treatment is onerous.

III. Surgical principles
   A. If the goals are for function...
      1. Improve ability to oppose, pinch and release.
   B. If the goals are to eliminate problems with care and hygiene...
      2. Get the thumb out of the palm.
   C. Steps.
      1. Weaken the tight or spastic muscles.
      2. Augment weak or paralyzed muscles needed for function.
         a. Tendon transfer.
         b. Tendon re-routing.
      3. Stabilize joints that are unstable statically or dynamically.
         a. There are 3 intercalated joints in the thumb ray.
         b. Capsulorrhaphy.
         c. Arthrodesis.
(1). Primary reconstruction.
(2). Salvage or revision of a failed reconstruction.
   (a). Not all parents/patients ready for fusion.

IV. Specific Thumb joints.
   A. CMC joint.
      1. Rarely fused as rarely needed.
      2. Relative intolerance to an unopposable stiffer thumb ray.
   B. MCP joint.
      1. Most common thumb joint addressed using fusion.
      2. Effective for hyperflexion and hyperextension deformities.
      3. Effective when capsulorrhaphy has failed or deformity occurs.
      3. Techniques.
         a. Bony arthrodesis versus chondro-arthrodesis.
         b. Sesamoid-metacarpal arthrodesis.
      1. Specifically for hyperextension deformity.
   C. IP joint.
      1. Usually fused for recalcitrant instability or deformity following recon.

References

Extensor Pollicis Longus Re-routing

1) Prerequisites: Adducted thumb(almost a given) and volitional, functional EPL(common but not always)
2) Concomitant procedures; Adductor +/- FPB release depending on adducted thumb posture
3) Other PE considerations: Hyperextension of MP joint? If so the procedure a bit different. Don’t want the EPL to extend IP jt or MPjt primarily but instead act as an abductor first and foremost
4) Surgical steps:
   a) 2 incisions, 1 over MPjt extending to middle of prox phalanx and 1 over 2nd compartment at wrist to allow both harvest of EPL from lister’s and replacement under first compartment retinaculum
   b) Release epl along medial and lateral ‘retinacula’ at MP joint leaving ‘ridge’ of soft tissue behind for repair.
   c) Transect epl over proximal phalanx once distal to retinaculum
   d) Bluntly retract EPL into proximal wound and behind Lister’s tubercle
   e) ‘Tenolys’ EPL proximally under skin to allow better alignment along first compartment muscles.
   f) Use Bunnell tendon passer from distal to proximal following path of EPB and trying to stay as close to radial styloid as possible in an effort(not sure how often this is truly successful!) to place tendon under first compartment retinaculum. If Passer is only subcutaneous you can tell and then replace before passing EPL.
   g) Pass EPL from proximal to distal and bring out thumb wound.
   h) Check to see that you have approximately 1 cm more tendon now IF you were going to simply rerepair to end of EPL(one should, since there is a more direct pull now, have extra tendon you will cut off and therefore its OK to hold end of tendon with any clamp you wish).
   i) Hold thumb in Abduction(radial, not palmar) and wrist in neutral or some dorsiflexion(20 degrees at most) while sewing tendon back down to ‘retinacula’ starting proximal to MPjt. (I use 4-0 Mersilene usually since it is a white nonabsorbable). Tight tension of EPL in cases where volitional function is more in doubt so it can at least act passively as a tenodesis.
   j) If there is MPjt hyperextension tendencies(not uncommon at all) sew EPL tendon directly into capsule/periosteum at proximal edge of joint so its primary force will act to abduct the first metacarpal.
   k) ‘Tenodese the rest of tendon into distal stump, end to end tensioning so IP joint straight and not hyperextended.
   l) I rarely pin MPjt but need to be careful of casted position if you don’t to avoid hyperextension.
   m) Throw away the extra cm of EPL
   n) Close, with absorbable stitch of choice(running monocryl for me) and then immobilize.
5) Post Op Treatment

a) My preference, depending on what else was done concomitantly (Green, pronater release, FDS/FPL fractional lengthening, etc) is a ‘Tape Cast’ with plaster splint holding position of thumb and tape up to elbow directly on forearm skin covered with Coban in younger kids who can slowly get out of regular casts or a bivalve cast in older ‘responsible’ types with over wrapping several days later.

b) Immobilize for 4-6 weeks (depending on convenience of patient and surgeon!) and then go to 3 months of hand-therapy-made thumb spica splint.

c) I usually splint first month ‘Fulltime’ where its only off for showers, then second month ‘Parttime’ where they remove and use their hand quietly around parent but on when at Day care, etc as well as at night and third month ‘Nighttime’ only.

d) Actual therapy rarely needed other than splint adjustments as passive motion not wanted and they really don’t need to ‘relearn it’.
POST-OP PEARLS  By Peace

**Patience**
- Knowing what protocol is
- Knowing parents/patients
- Knowing muscle is small

**Evaluate**
- Pre and Post Op
- Outcome tool repeated
- Video pre/post

**Activate**
- Transfer with:  
  - Place/hold  
  - Short/long arc  
  - Mid/end range  
  - With/without gravity  
  - Resistance at 12 weeks  
  - No compensation  
  - Active/assistive range

**Rapport**
- With child  
- With caregiver  
- With surgeon

**Life Skills/Style**
- Why did they have surgery?  
- Will they have therapy for a lifetime?  
- Will they do Home Exercise Program?