Manual Therapy: Inter-Relationship of the Elbow, Forearm, Wrist & Hand

Pam Kikillus PT, DHSc, OCS, CHT, FAAOMPT
NSC 2013

PT, CHT, FAAOMPT
• Discuss using all 3 of these for patients with elbow, forearm, wrist and hand problems...

60- minute GOALS
• Simplify and de-mystify the distal arm and “hand therapy”
• Highlight biomechanics of the proximal RU joint
• Exposure to new examination tools (mobility)
• Exposure to clinic pearls of manual therapy intervention

What is Hand Therapy?

Manual therapy
www.NAIOMT.com

60‐minute GOALS
- Simplify and de‐mystify the distal arm and “hand therapy”
- Highlight biomechanics of the proximal RU joint
- Exposure to new examination tools (mobility)
- Exposure to clinic pearls of manual therapy intervention

PT, CHT, FAAOMPT
- Discuss using all 3 of these for patients with elbow, forearm, wrist and hand problems...

What is Hand Therapy?

Manual therapy
www.NAIOMT.com

60‐minute GOALS
- Simplify and de‐mystify the distal arm and “hand therapy”
- Highlight biomechanics of the proximal RU joint
- Exposure to new examination tools (mobility)
- Exposure to clinic pearls of manual therapy intervention

PT, CHT, FAAOMPT
- Discuss using all 3 of these for patients with elbow, forearm, wrist and hand problems...

What is Hand Therapy?

Manual therapy
www.NAIOMT.com

60‐minute GOALS
- Simplify and de‐mystify the distal arm and “hand therapy”
- Highlight biomechanics of the proximal RU joint
- Exposure to new examination tools (mobility)
- Exposure to clinic pearls of manual therapy intervention

PT, CHT, FAAOMPT
- Discuss using all 3 of these for patients with elbow, forearm, wrist and hand problems...

What is Hand Therapy?
What is Hand Therapy?

- "art and science of rehabilitation of the upper limb, which includes the hand, wrist, elbow and shoulder girdle"
- "combines comprehensive knowledge of the structure of the upper limb with function and activity."

(From HTCC and ASHT)

HTCC

- Hand therapy certification commission
- [http://www.htcc.org](http://www.htcc.org)

APTA:

Hand Rehab Section


Who are Certified Hand Therapists?

- An OT or PT

- ≥ five years of clinical experience
- Pass examination, recertify every 5 years
  - 4,000 hours in hand therapy

PT or OT?

- Majority of CHTs are OTs

- Washington State has 18 CHTs who are PTs
  - 10% of CHTs are PTs in WA

- (18% of CHTs are PTs in KY)
CHT Interventions

- Activity/Exercise regimes with the ultimate goal of improving function.
- Behavior management
- Compressive therapy
- Desensitization, sensory re-education or sensory compensatory techniques
- Electrical modalities
- Ergonomic modifications
- Improve the performance of daily life skills by teaching adaptive techniques and suggesting adaptive equipment
- Industrial consultation, work conditioning/hardening/retraining
- Joint protection and energy conservation training
- Manual therapy
- Orthotic fabrication
- Pain management, acute or chronic
- Patient and family education
- Prosthetic Training
- Scar tissue management
- Thermal modalities
- Wellness Education
- Wound management

Mobilization and Manipulation

- To restore MOBILITY
- Will focus on assessment and intervention for loss of MOBILITY

Types of patients:

- "diversity of upper extremity disorders and injuries, from simple fingertip injuries to replanted extremities"
- "crush injuries; tendon and/or ligament lacerations/repairs; tendinopathies; peripheral nerve disorders; fractures/dislocations; infections; sports related syndromes"

From HTCC.org and ASHT.org

What is Manual Therapy?

- The use of skilled, hands-on techniques to restore motion & function and decrease pain
- Formal training which may result in certification or fellowship

Manual Therapy in the arm

- Combination of art & science
- Part of entry-level training
- Same biomechanical principles apply
- Same rationale for intervention choices

The Elbow and more....
Proximal Considerations

- Not a new concept
- Similar to treating the elbow for patients with pain upon active wrist extension....
- Similar to interventions in the lower extremity

Mechanical Connection

Elbow → wrist

- Elbow & proximal RU joint
  → distal RU joint and therefore wrist
- FOOSH injury can injure hand, wrist, forearm, elbow or more

Patient reports...

- Wrist or hand pain
- Difficulty using devices
- Fine motor deficits
- Lack of grip strength

Superior Radioulnar Joint

Synovial

Modified ovoid

- 1 DFM: 1) PRO/SUP w/ axis along head of radius to head of ulna
  * MacConaill describes a 2nd DFM: Cranial/Caudal motion between radius & ulna during PRO/SUP
- Conjunct ROT (per Meadows): - Ulna ABD w/ PRONATION
  - Ulna ADD w/ SUPINATION

Radio Ulnar Joint Axis

- Distal end is 2nd digit, not 5th digit?
- Ulna is not stationary with pro/supination
- Ulna ADUCTS with pronation

Superior Radioulnar Ligaments

- RCL
  - Annular
    - strong band forms 4/5 of ring
    - has thin articular disc
    - blends w/ RCL
    - upper border blends w/ capsule
    - portion of Supinator originates from it
    - covered by Anconeus
  - Quadrate
    - thin fibrous layer, separate radius & ulna
    - closers distal aspect of Sep. RU Jt
  - Interosseous membrane
    - Anterior fibers run anteromedially
    - Posterior fibers run Superomedially
SUPERIOR RADIOULNAR JOINT

Supination to Pronation mechanics...

...Radial head spins in radial notch of ulna until Quadrate Lig. tightens. A lateral tilt then occurs which approximates beveled portion of the medial radial head into the capitulo-trochlear groove.

*** Convex radius head glides postero-lateral during PRO, plus slight medial roll @ end range; (Ulna abducts with pronation)

---

Anconeus

- Attaches in part to annular ligament
- "Shunt" muscle
- Function:???
  - Most EMG activity with pronation
  - Abducts ulna
  - Stabilizes joint
  - Prevents capsule from being pinched in extension
  - Can effect proximal RU joint?

---

Application??

- Palpate contraction ANCONOUS
  - Gentle elbow extension
  - Lateral to olecranon

- Recruit isometric of anconeus followed by pronation
- Stabilizing proximal joint may allow increased AROM
- Assess differences....
Examination

**PT Examination**
- History/subjective
- Observation
- Resisted testing
- Mobility testing (osteo and arthro)
  - Straight plane and combined motions
- Stability testing
- Palpation
- Special tests

**Elbow Quadrant Testing**
- In flexion: abduction & adduction
  - In extension: abduction & adduction
  - Both directions
  - Complete in Supination and in pronation

**Additional elbow and forearm examination**
1. Elbow Quadrant testing x 8 in 2 directions
   - Flexion/extension
   - Abduction/adduction
   - Supination and pronation
2. Radial head glide on proximal ulna
3. Medial / lateral glide of ulna on humerus

**Supine elbow quadrant testing**
Elbow Quadrant Mobility Testing

Medial Glide: Ulna on Humerus

Proximal Radial head glide
- Pronation with PL glide
- Supination with AM glide

Lateral Glide

Medial/lateral glide of proximal Ulna
- Mobility Testing
- Not varus/valgus stress testing

Medial/Lateral Glides
Manual Interventions: Radial head

1. Mobilization specific: supination or pronation
2. Traction
3. Percussion

Precautions for mobilization & manipulation
- Same precautions as elsewhere
- Specific to the elbow → wrist
- Anatomy of peripheral nerves
- Tenderness to palpation?

Mobilization Superior Radio-Ulnar Joint: Supination
- Anterior medial glide
- Glide with traction

Mobilization Superior Radio-Ulnar Joint: Pronation
- Posterior lateral glide
- With traction

Radial head traction
- Laurie Hartman D.O.
- Supine, shoulder abducted, elbow at 90
- Protect shoulder
Radial Head Traction (Hartman)

Radial Head Percussion Video

Radial Head Traction

Radial Head Percussion Video

ULNAR “ABDUCTION”
- Increased carrying angle
  - (normal= 5-15 degrees)
- Increased valgus
- Olecranon shifts medially

http://o.quizlet.com/sSKWDaNmGsTC5wbb7Wyqgg_m.png

The Abducted Ulna
- Fryette (1954)
  - Described an “abducted ulna” lesion
    - Abduction at elbow
    - Medial separation
    - Radial head shunted distally relative to ulna
    - Olecranon shifts medially (abducted ulna)
  - Mechanical Distortion
    - Fall onto outstretched elbow
    - Fixed hand....valgus force

Adapted from Fryette ’54, Pettman’80
**Abducted ULNA: Findings**

**Subjective**
- Traumatic onset of pain
- Pain immediate, sharp and constant
- Pain localized to the lateral elbow
- May extend into common extensor origin
- May or may not develop paraesthesia
- No history

**Objective**
- Carrying angle - increased
- Upper Quadrant Screen negative
- Decreased active elbow extension and supination
- Decreased active wrist extension and radial deviation

---

**Abducted Ulna Mobilization**

- Move proximal ulna laterally (with varus force)

---

**Review**

- De-mystify evaluating & treating patients with wrist and hand problems
- Exposure to new examination techniques
- Exposure to new manual therapy techniques

---

**Review**

- De-mystify evaluating & treating patients with wrist and hand problems
- Exposure to new examination techniques
  - Quadrant testing
  - Anconeus function
  - Medial and lateral ulnar glides
- Exposure to new manual therapy techniques

---

**Review**

- De-mystify evaluating & treating patients with wrist and hand problems
- Exposure to new examination techniques
- Exposure to new manual therapy techniques
  - Abducted ulna lateral glide
  - Radial head traction
  - Radial head percussion
Thank You!