Treatment Strategies of the Hand, Wrist and Elbow

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Introductions

• Marcy Deatherage- worked at CMH since 1997; received Hand Therapy certification in 2017; works at College Boulevard

• Amy Kiser- worked at CMH since 1998; received Hand Therapy certification in 2019; works at the Northland location

• CMH also has hand specialists at the downtown/Adele Hall location
Hand Therapists.....

• Specialize in treatment of the hand, wrist, elbow and shoulder
• Treat a variety of diagnoses including:
  • Congenital- amputation, amniotic bands, syndactyly
  • Neurological- hemiplegia
  • Athletic- sprains, dislocation, overuse, sport-related injury
  • Traumatic- fractures, burns, complex injury
Treatment Strategies

Our goal is to give you at least 30 treatment strategies in the next 30 minutes that you will be able to use to help your patients and athletes.
The Hand
MCP Taping for Stabilization and/or Painful Finger [https://youtu.be/fRXrJqu8ebw](https://youtu.be/fRXrJqu8ebw)

- Position finger in full flexion. Start distal to PIP, 50% stretch over MCP, lay the end.
- Position MCP in 45 deg of flexion. Start distal to MCP (distal to webbing), wrap around ulnar side with 25% stretch. Lay the end along the EDC tendon.
- Repeat on radial side of finger.
PIP Taping for Stabilization and/or Painful Finger [https://youtu.be/hMLO_-sbaJk](https://youtu.be/hMLO_-sbaJk)

- **Lateral support with pieces on radial and ulnar sides of PIP. Max stretch except ends.**
- **Volar or dorsal support provided with 2 pieces crossed over joint. Max stretch except ends.**
- Loosely tape around the distal and proximal ends to help secure the other tape.

**This taping can be done volar or dorsal depending on injury or pain location.**
Orthoses for the Hand
Orthoses for the Hand/Finger

- Increasing finger flexion

- Finger flexion strap
- Glove tip for flexion
- Coban wrap thumb
- Coban wrap fingers
Orthoses for the Hand/Finger

• Increasing finger extension

- Custom finger gutter
- Bunnell Modified Safety Pin Splint
- LMB Spring Finger Extension Assist
Orthoses for the Hand/Finger

• Serial casting for finger extension (or flexion)

Per systemic review in the Journal of Hand Therapy, studies that provided a wearing schedule of a minimum of 6 hours per day obtained the greatest improvements in the motion of the PIP joint.
Orthoses for the Hand/Finger

• Immobilization

Mallet Finger

A traumatic zone 1 lesion of the extensor tendon with either tendon rupture or bony avulsion at the base of the distal phalanx.

Surgical repair of the rupture or conservative treatment with splinting immobilization have been compared frequently in the literature without significant statistical difference.

Success of conservative treatment is closely related to patient compliance. Orthosis must be worn 24 hours per day for 6-8 weeks.

Orthosis for the Hand/Finger

• Immobilization post fracture

The intrinsic plus position is also known as the ‘safe position’ for the hand. The hand can be immobilized in this position for long periods of time without developing as much stiffness.

This orthosis is commonly used with Boxer’s fracture of the 5th metacarpal.
Orthoses for the Hand/Finger

• To increase active motion of PIP/DIP joints

Intrinsic Plus Orthosis or Anti-Claw Orthosis

MCP joints are positioned in flexion to facilitate IP joint extension.

Frequently used with ulnar nerve palsy.
Orthoses for the Hand/Finger

• To increase active motion of IP joints

Relative Motion Orthosis

- Can be fabricated to improve motion in the IP joints of a finger

- Position MCP of involved finger in slight extension to improve flexion

- Position MCP of involved finger in slight flexion to improve extension
Treatment Activities for the Hand
Improving Range of Motion

• Tendon Glides

These exercises allow FDS and FDS tendons to maximize excursion.

Commonly used after injury to help regain full motion and prevent scar adhesions.

Glides can also be used to decrease edema.

2-hook fist
4-full fist
6-intrinsic plus
8-straight fist
Improving Range of Motion

- Tendon glide activities

- Stamping in putty with varying diameter items
- Touch and slide
- Tendon rolling with pencil
Improving Range of Motion

- Joint blocking - stabilizing one joint to maximize motion in another

Manual blocking

Custom orthosis to block

Custom cast to block MCPs for IP motion
Improving Range of Motion

• Paraffin
Improving Range of Motion

- Target touches - gradually decreasing size for increased flexion
Improving Range of Motion

- Target touches - using opposite hand for progressive finger flexion
Increasing Range of Motion

• Increasing finger extension

Using a scarf or towel to extend (or flex) fingers
Extending fingers into putty
Extending to table top
Improving Range of Motion

• Kapandji Scale
Assess opposition of the thumb, based on where on their hand they can touch with the thumb tip
Improving Range of Motion

- Edema management
Strengthening

• Extrinsic muscles: muscles located in the forearm with tendons inserting within the hand

Digi-Flex
Eggsercizer
Power-Web
Strengthening

- Extrinsic strengthening

Resistive tongs  Theraputty  Theraband
Strengthening

• Intrinsic muscles: muscles located within the hand itself

Rubber band abduction  Geoboard with opposition  Puttycise Tools  Lumbrical strengthening splint
Strengthening

• Use of the affected hand for at least 2 functional activities daily
  • Brushing teeth
  • Eating
  • Writing (dominant hand)
  • Combing hair
Improving Coordination

• In-hand manipulation
Improving Coordination

• Finger isolation
The Wrist
Taping of the Wrist

Wrist support for pain (KT website)

- Apply tape over dorsal wrist with 50% pull over top and sides. Repeat over volar side.
- Apply tape from MCP’s to elbow with moderate stretch. No stretch on ends.
- Apply wrist portion
- Full tape applied
Orthoses for the Wrist

- Wrist supports

Custom wrist cock-up

Over the counter wrist cock-up

Push medium wrist brace

Tiger Paw wrist support to prevent wrist hyperextension
Orthoses for the Wrist

- Compression wrist supports

Tubigrip

Compression sleeve
Orthoses for the Wrist

- Distal radial-ulnar joint (DRUJ), triangular fibrocartilage (TFCC), or ulnar-sided wrist pain

Nustim, coban, or tape can be used to determine if compression decreases the pain

Wrist Widget

M Brace Air
Orthoses for the Wrist

- Distal radial-ulnar joint (DRUJ), triangular fibrocartilage (TFCC), or ulnar-sided wrist pain

3PP Wrist P.O.P.  Push Sports Wrist Support  Bullseye Brace
Treatment Activities for the Wrist
Wrist Anatomy

• A functional, stable wrist includes the following:

• Bony anatomy
• Ligamentous structures
• Proprioception
• Muscle contraction as a stabilizer
Improving Wrist Range of Motion

• **Dart Thrower’s Motion**
  • An oblique wrist motion from radial extension to ulnar flexion
  • Utilizes the midcarpal joint and limits stress to the radiocarpal joint
  • Most functional tasks are performed in this plane of motion
Improving Wrist Range of Motion

- Prayer stretch: maximizes wrist and finger extension
- Towel slides
Improving Wrist Range of Motion

• Ball roll front to back and side to side

• Wrist roller
Improving Wrist Range of Motion

• Jux-A-Cisor

• Transferring items utilizing wrist and finger extension
Improving Wrist Range of Motion - Soft Tissue Work

- Dynamic cupping
- Instrument Assisted Soft Tissue Mobilization (IASTM)
Pyramid model of the SensoriMOtor Control of the Wrist exercise program (SMoC-Wrist)

Level 1- prop, kinesthesia and stable neutral wrist position (unloaded & lightly loaded)

*can add proximal strengthening with any of these tasks

- Holding a moving object steady (perturbations)
- Balancing ball on racquet
- Squeezing ball while working on proximal movements and balance
- Plate or frisbee to move marble or ball
Level 2 - Isometric Wrist Strengthening in neutral wrist position

For ulnar-sided wrist pain, perform strengthening in the following order of forearm position:

1. Supination
2. Neutral
3. Pronation

- Holding weighted ball steady with motion at proximal joint: ABC’s, infinity loop, circles
- Oscillations of flex bar. Can add a weight to top.
- Bouncing ball on racket
- Isometric theraband
Level 3- Conscious, Dynamic Wrist Movements (isotonic strengthening)

Power-Flexor

Ball toss

Weighted extension

Wringing a towel to maximize wrist motion and grip
Force Transmission through the wrist during performance of push-ups on a hyperextended and a neutral wrist  

This study demonstrated that when push-ups are performed in wrist hyperextension with forearms pronated (B), the forces travel ulnarly and dorsally through tissues such as the TFCC.

Push-ups done with the wrist and forearm in neutral positions (A) transfer force more through the broad articular surface of the distal radius.

Neutral wrist push-ups are recommended for any wrist ligamentous injury or pain
The Forearm
Orthoses for the Forearm

• Limiting forearm rotation and elbow flexion/extension

• Sugartong orthosis

  Consists of a long narrow rectangle that is positioned beginning at the dorsal MCP heads, around posterior elbow and extending to the volar palm

• Muenster orthosis

  Essentially a wrist orthosis with long proximal extensions that converge on the medial and lateral epicondyles at the distal humerus
Treatment Activities for the Forearm
Improving Forearm Range of Motion

Lightweight item with extended length

Plate with velcro strap used in supinated and pronated position while balancing an item
Improving Forearm Range of Motion

Dribbling a ball

Supinated and pronated arm position on UE bike
Improving Forearm Range of Motion

Towel stretch for active assist pronation

Towel stretch for active assist supination
Improving Forearm Range of Motion

Distal radioulnar joint mobilization can be done to increase supination or pronation.

The ulna is held stable, and the distal radius is mobilized in the direction desired.

50 degrees of supination and pronation is considered functional.

Pronation is essential to typing, writing, and weight bearing activities.

Supination is essential for hand to face and mouth.
Forearm Strengthening

**The elbow is flexed to 90 degrees to isolate forearm muscles**

Hammer

FlexBar
Forearm Strengthening
Thank You!

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References
