Management of Ulnar-Sided Wrist Pain

Diane Coker, PT, DPT, CHT

Differential Diagnosis

- **Osseous**
  - Hamate fracture
  - Pisiform fracture
  - Ulnar styloid fracture
  - Triquetral avulsion
  - Base of 5th metacarpal
Differential Diagnosis

- **Soft Tissue**
  - TFCC
  - Radioulnar Joints
    - Radioulnar joint instability or arthritis
    - Ulnocarpal impingement syndrome
  - Carpal issues
    - Lunatotriquetral instability
    - Midcarpal instability
    - Pisotriquetral arthritis
  - Ganglions

- **Nerve**
  - Ulnar nerve entrapment at Guyon’s canal
  - Ulnar dorsal sensory nerve neuritis

- **Tendons**
  - ECU tendonitis or instability
  - FCU

- **Vascular**
  - Ulnar artery thrombosis
Ulnar-Sided Wrist Pain Caused by the Extensor Carpi Ulnaris
Extensor Carpi Ulnaris

- Arises from lateral epicondyle of distal humerus
- Passes through a fibro-osseous tunnel as it leaves the f/a
  - 6th extensor compartment
- Lies in a bony groove on dorsal surface of ulna
- Inserts into base of 5th MC
- Innervation: ulnar nerve

The ECU at the Distal Ulna
Ligaments of the DRUJ/TFCC

- Bony groove for ECU dorsum of ulna
- Dorsal extensor retinaculum
- Superficial fibers of dorsal radioulnar ligament split to form a subsheath for the ECU tendon
  - Anchored to ulna, semi-rigid
  - Floor of ECU tendon sheath connects with TFCC

The TFCC Relationship to the ECU
ECU Motions

- Wrist extensor in supination
  - Ulnar deviator in pronation
- ECU only motor unit w/ a relationship to the TFCC
- ECU held close to center of rotation of wrist by the TFCC
  - Subsheath & TFCC important pulleys for the ECU
ECU Motions

- ECU exits sixth compartment sheath at approx 30° when f/a supinated
- In pronation, ECU depresses ulnar head volarly, elevates ulnar carpus dorsally
Caput Ulnae

- Results in dorsal dislocation of distal ulna, supination of carpus on hand, volar subluxation of ECU
- ECU becomes a flexor of the wrist, and no longer stabilizes the ulna
- Radial deviation deformity results
Vaughn Jackson Syndrome

- Radial wrist deviation and erosion of the ulnar head from synovitis causes rough surfaces or bone spurs to develop
- Potential develops for attritional ruptures of extensor tendons
  - Most commonly 4th & 5th compartments
  - Less common 2nd, 3rd, 6th

ECU & Its Sheath

- Pain can be assoc w/ subluxation of the tendon over the head of the ulna
  - Snapping, crepitation
  - Synovitis within sheath
    - Periostitis, bone resorption
  - Subsheath can stretch
    - Potential rupture
2\textsuperscript{nd} most common sports-related overuse injury of the wrist
Excessive ulnar head translation = herniation away from dorsal superficial R-U ligament

In pronation, only <10% of the dorsal notch still in contact with articular seat of ulna
ECU Sheath Rupture

ECU Stenosis

- Tenosynovitis
  - Similar to de Quervain’s-stenosing tenovaginosis
Cascade of ECU Pathology

- Tenosynovitis: sheath is irritated by repetitive wrist flexion and extension, especially in supination
- Tendon instability: disruption or dysfunction of subsheath
- Tendinopathy: adaptive response of tendon to repetitive stress.
  - Three stages:
    - Reactive tendinopathy: thickens and stiffens
    - Tendon disrepair: structural changes
    - Degenerative tendinopathy: matrix breakdown, partial tears, ruptures (rare)

Evaluation and Therapy Interventions
Hand Therapy Evaluation

- Prominence of the ulna may indicate ligament instability
- Inspect for swelling about DRUJ, ECU sheath, carpus
- Exam can include
  - Piano key test
  - Relocation test
  - ECU subluxation
  - ECU Synergy test

Pronation vs. Supination

- ECU subluxes with wrist flexion, UD, and supination
  - ECU or sheath pathology
  - Conservative management suggests avoiding these motions
- Ulnar head elevates dorsally during pronation
  - TFCC, DRUJ pathology
  - To reduce ulnar head dorsal migration, forearm should be in supination
• Patient’s hand pronated on table.
• Apply a gentle downward pressure to the distal end of ulna. Head will move volarly & spring back when released, resembling the action of a piano key.

Sensitivity .59  Specificity .96

Piano Key Test

• The distal ulna is grasped and moved in the volar or dorsal plane at the extremes of pronation and supination.
Relocation Test

- Pronation, then anterior to posterior glide of the carpus on the ulna
- Relocates the carpus into normal alignment
- + test if the relocation of the subluxed ulnar carpus reduces the patient's wrist pain
- Similar to pisiform boost test

ECU Subluxation

- Supination
- Ulnar deviation
- Wrist flexion
- + test = pain, snapping
The ECU Synergy Test

- Extra-articular vs intra-articular
- Patient’s forearm supinated
- Pt radially deviates thumb against resistance
  - Test minimizes loading of other structures
- Note ECU tendon bowstrings against the skin (large arrow)

Sensitivity 75.7, Specificity 85.7  Sato 2016

Conservative Management

- Initial treatment may include activity modification, splinting, anti-inflammatory medications, ice, injections
  - Consider night splinting to place forearm in pronation, wrist neutral, slight RD
  - Some authors recommend 4 weeks complete immobilization for subsheath healing
  - Promote gliding and stretching for tendinopathies
    - Enhances nutrition by synovial diffusion, prevents possible adhesions
Conservative Management

- Strengthening once inflammation subsides
  - Begin with pronation, wrist extension for ECU subluxation/sheath injuries
  - Supination for caput ulnae/ligament injuries

Conservative Management: Eccentric vs Concentric

- Many extrapolations based on Achilles tendon research
  - LE: closed chain, midsubstance tendinopathy
  - UE: often used open chain, insertional tendinopathy
Eccentrics vs Concentrics

- Arguments are that muscles produce greater force eccentrically than concentrically
  - Eccentrics offer more stretch potential
- Evidence from animal models suggests eccentric and concentric muscle contractions do not yield a differential response of the tendon or the growth of collagen at the cellular level
  - Martinez-Silvestrini (2005): no differences between 3 groups with chronic lateral epicondylitis
    - Stretching
    - Eccentric/stretching
    - Concentric/stretching

Minimizing Rotation

Sugar Tong

Muenster
Conservative Management: Custom Ulnar Gutter (for TFCC Injuries)

The Evidence
- Sugar Tong vs Muenster vs Anti-pronation vs wrist support
- 5 healthy subjects, small case series
- Goniometric measurements taken at end point of maximal exertions
- No splint immobilized rotation completely
- Sugar tong provided maximum restriction in pronation
- Anti-pronation splint more restrictive for pronation than a standard wrist support

Slaughter 2010
Taping Techniques

Stroia 2009

Taping Techniques
Conservative Management: Prefabricated

Pisiform Boost Orthoses
Key Points

- Careful evaluation needed for a referral of “wrist sprain”
- Differentiate pathology behind pronation and supination motions
- Conservative management may take many weeks, esp for sheath healing