



Evaluation of the Elbow Wrist and Hand

Andrew B. Stein, MD
Boston University Medical Center

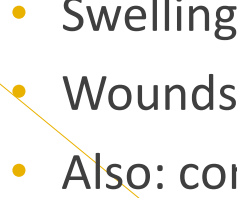
History

- The most important tool in developing an accurate diagnosis
 - Occupation
 - Hand Dominance
- Physical Exam should be *Confirmatory*

Physical Examination: 8 Parts

- Inspection
- Palpation
- Range of motion
- Stability
- Muscle and Tendon Function
- Nerve Assessment
- Vascular Assessment
- Integument Assessment

Inspection: Look For...

- Discoloration
 - Deformity
 - Muscular atrophy
 - Trophic changes (sweat pattern, hair growth)
 - Swelling
 - Wounds or scars
 - Also: compare to normal side
- 

Discoloration

- Redness: cellulitis
- White: arterial blockage
- Blue/purple: venous congestion
- Patches of blue/purple: trauma



Deformity

- Asymmetry, angulation, rotation, missing parts
- Fractures: check angulation and rotation



Malrotation of ring finger due to proximal phalanx fracture.

Muscle Atrophy

- Generalized: may indicate disuse
- Specific muscle groups: suggest nerve pathology
 - Thenar atrophy: carpal tunnel syndrome
 - Interossei atrophy: cubital tunnel or cervical spine problem
- Subcutaneous atrophy: often after local steroid injection



Muscle Strength

- Five basic grades of strength
 - Grade 5: normal strength
 - Grade 4: diminished strength to resistance
 - Grade 3: enough strength to overcome gravity
 - Grade 2: enough strength to contract but not to overcome gravity
 - Grade 1: fibrillations or faintly palpable contractions
 - Grade 0: no contractions

Trophic Changes

- Can represent a derangement of the sympathetic nervous system (CRPS)
- Increased hair growth or altered (usually increased) sweat production: may indicate sympathetically mediated pain syndrome



Swelling

- Compare to uninvolved extremity
- Localized swelling: trauma or inflammation
- Diffuse swelling: many causes
 - Infection anywhere in the extremity
 - Venous or lymphatic obstruction
 - Fractures as far proximal as the shoulder
- Dorsal subcutaneous space in the hand frequently swells first, even if a palmar hand infection is present
- Atypical: consider factitious disorder

Inspection for Wounds/Scars

- Can often predict likelihood of nerve or tendon damage just based upon location of wound



normal flexor tone is absent in the long finger = tendons lacerated


Palpation

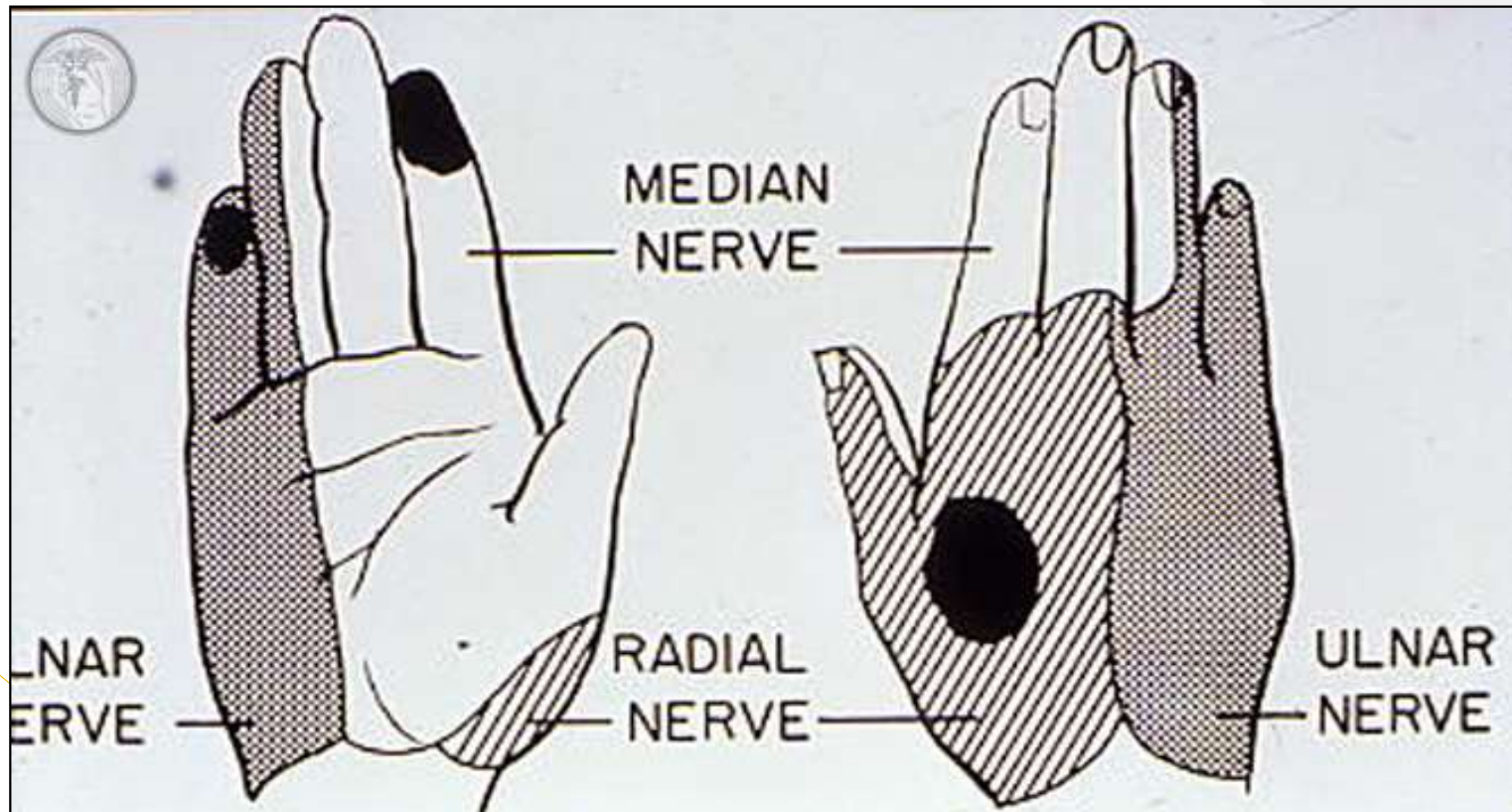
- Masses: lymph nodes, ganglions
- Heat: infection, inflammation
- Cold: vascular pathology
- Absence of Sweating: nerve pathology
- Tenderness/crepitus: fracture
- Clicking or snapping: tendonitis
- Joint effusion: infection, inflammation, trauma

Range of Motion Assessment

- Active motion:
 - Identifies tendon continuity, nerve function, muscle strength
- Passive motion:
 - Identifies joint stiffness and soft tissue contracture
- Note whether motion produces pain or is associated with instability or crepitus (trauma, infection, inflammation)

Nerve Assessment: Sensibility

- Radial: test dorsal thumb-index web space
 - Median: test palmar surface of index or thumb
 - Ulnar: test palmar aspect of little finger
 - Digital nerves: test each the radial and ulnar side of each fingertip on the palmar aspect
- 



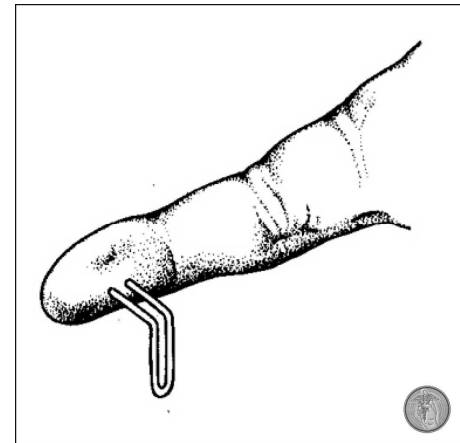
The black areas represent reliably specific areas to test sensibility for each of the three main peripheral nerves.

Special Tests: Threshold

- Threshold tests assess single nerve fibers that innervate a receptor
- Thought to be more sensitive than innervation density testing for determining early nerve damage
- Examples of threshold tests
 - Von Frey pressure testing with Semmes-Weinstein monofilament
 - Variable amplitude vibrometry

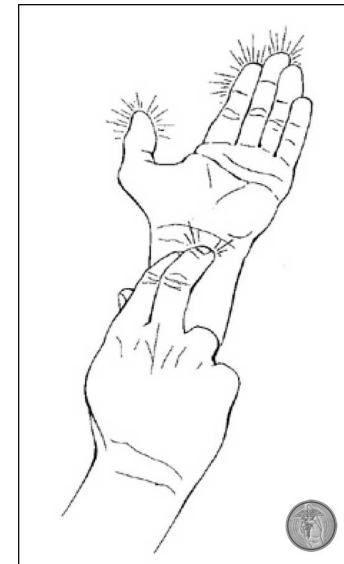
Special Tests: Innervation Density

- These tests measure innervation of multiple overlapping receptors
- Results can remain almost normal even if advanced nerve pathology is present
- Example of innervation density test: two-point discrimination



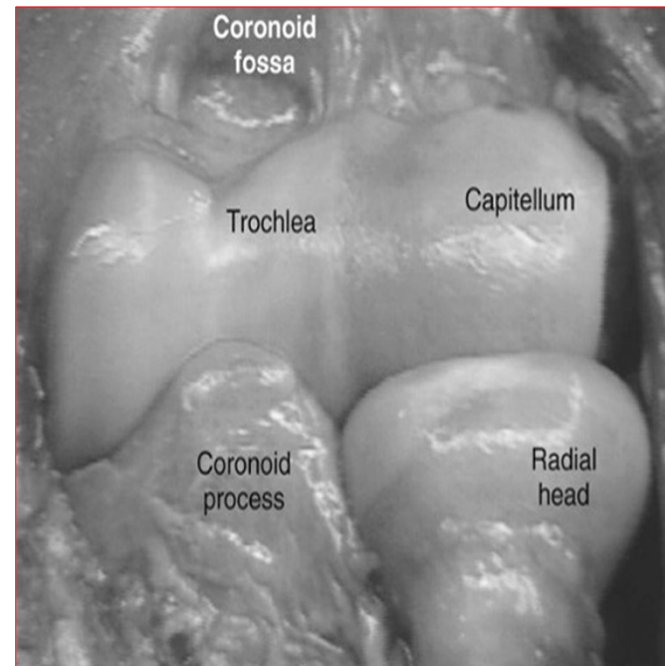
Special Tests: Tinel's

- A provocative test for nerve irritation
- The examiner percusses with two fingers directly over the nerve in question
- Positive test: patient reports paresthesias in the nerve distribution when the nerve is percussed



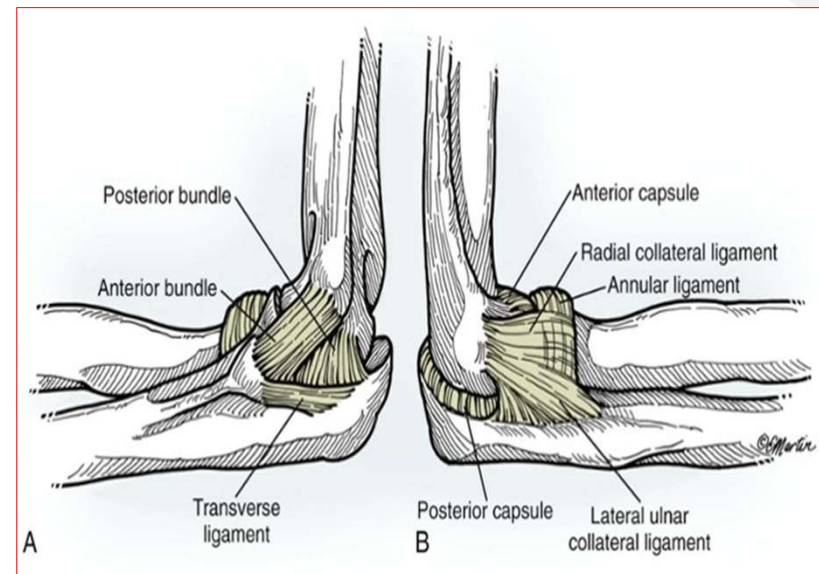
Elbow Anatomy

- Articular congruence
 - Provides ~50% of elbow stability (esp. in extension)
 - -olecranon is “unlocked” from fossa at 25° of flexion



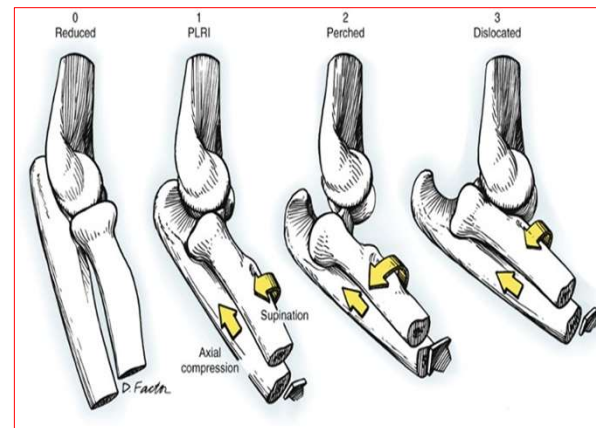
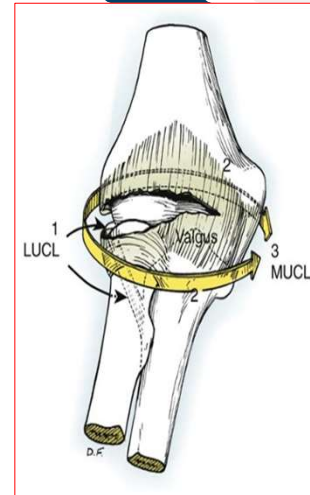
Anatomy

- Ligaments
 - Provide ~50% of stability
 - **MCL** - 1^o stabilizer of ulnohum joint
 - **LCL Complex** – prevent posterolateral rotatory instability



Pathology

- FOOSH leads to ligament disruption from lateral to medial (“Hori Circle”)
 - LCL may be disrupted with intact MCL (“perched” elbow dislocation)
 - Leads to postero-lateral rotatory instability



Elbow Specific Exam

Ulnar Instability

Epicondylitis

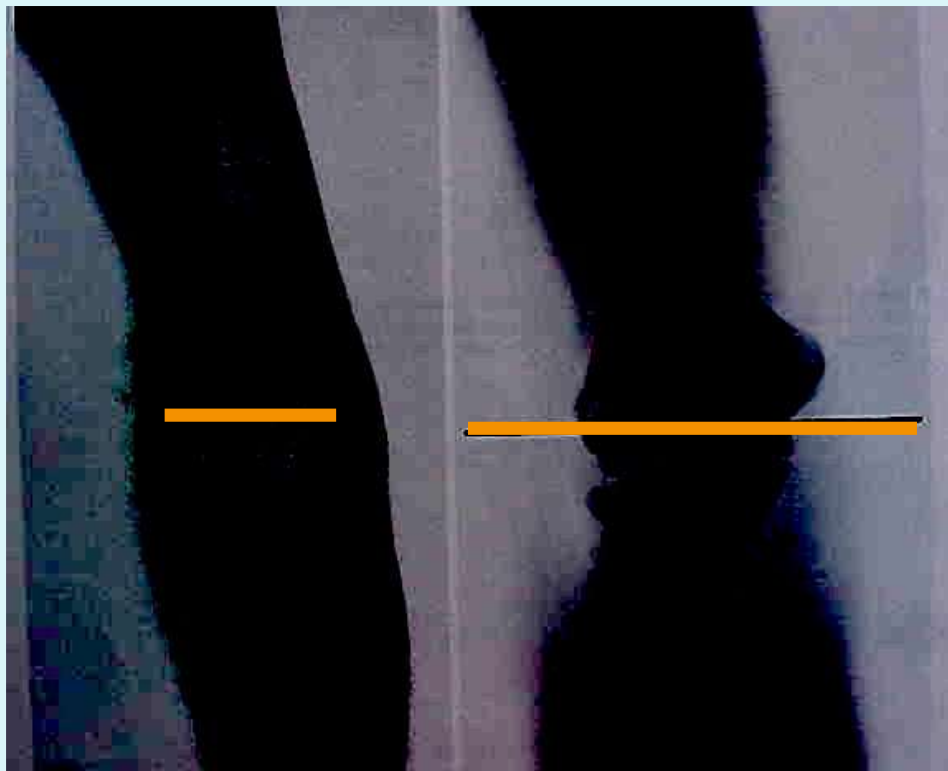
Postero-lateral Instability

Ulnar Nerve

Plica Impingement

Distal Biceps

Elbow Joint Line



- Flexion crease is about 2 cm above the joint line

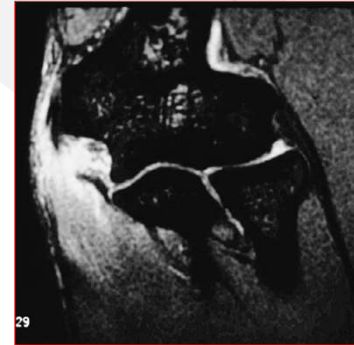
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“Soft Spot”



Ulnar Instability



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Valgus Stress Test

(Moving) Valgus
Stress Test

Milking Maneuver

Postero-lateral Rotatory Instability

Lateral Pivot Shift Test: Supination, Axial Compression, Valgus: Reduces in Flexion



Vague complaint of elbow pain
May describe “clunk” or “pop” or sense of instability
Usually history of trauma
EUA often necessary to confirm dx

Push Up Test

Tabletop Relocation Test

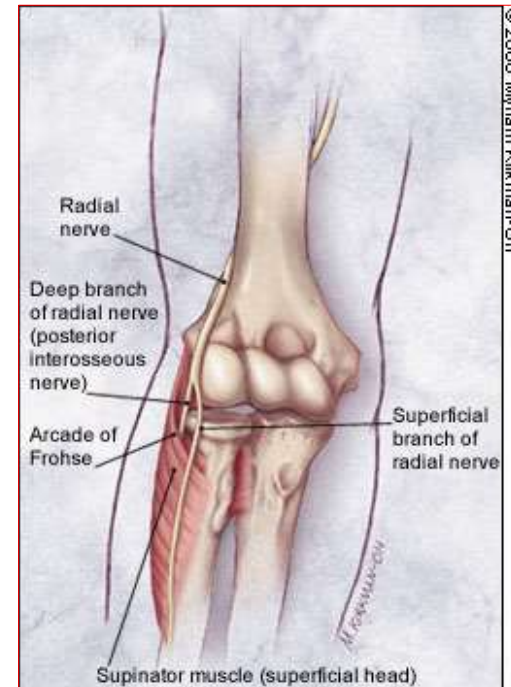
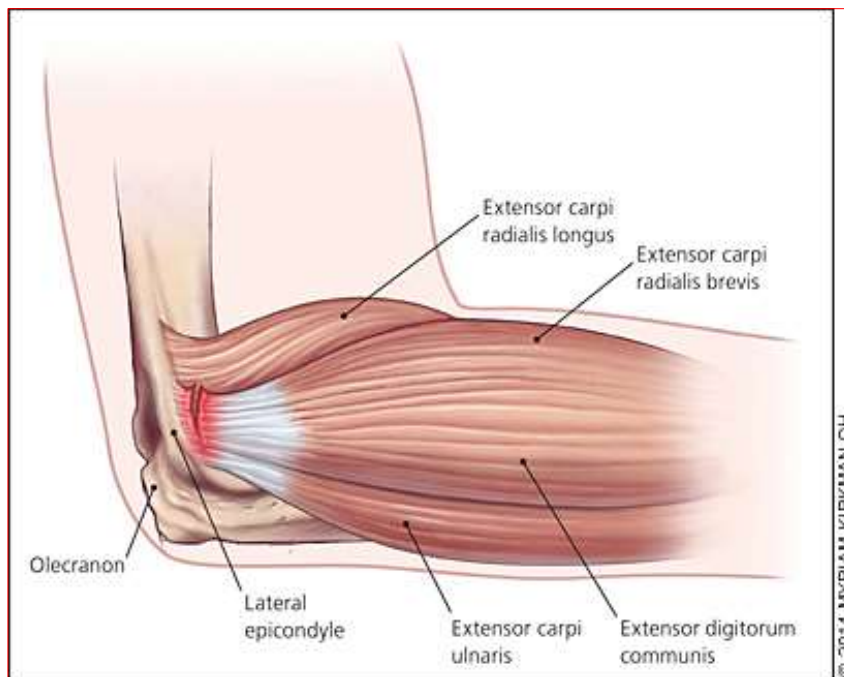
Distal Biceps



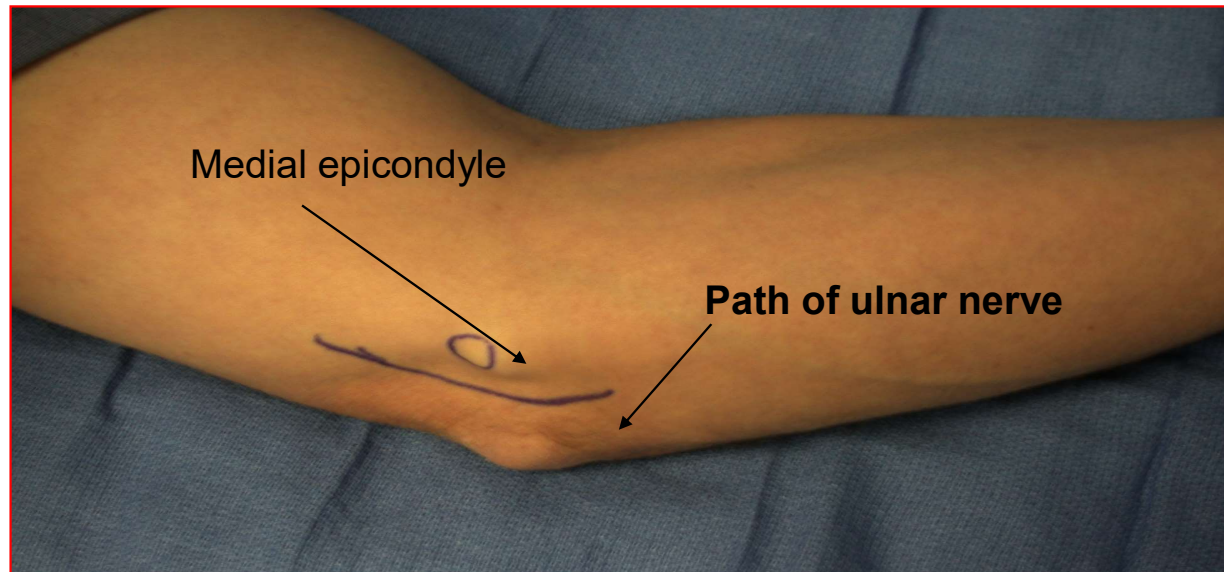
Hook Test

Biceps Squeeze
Test

Lateral Elbow Pain



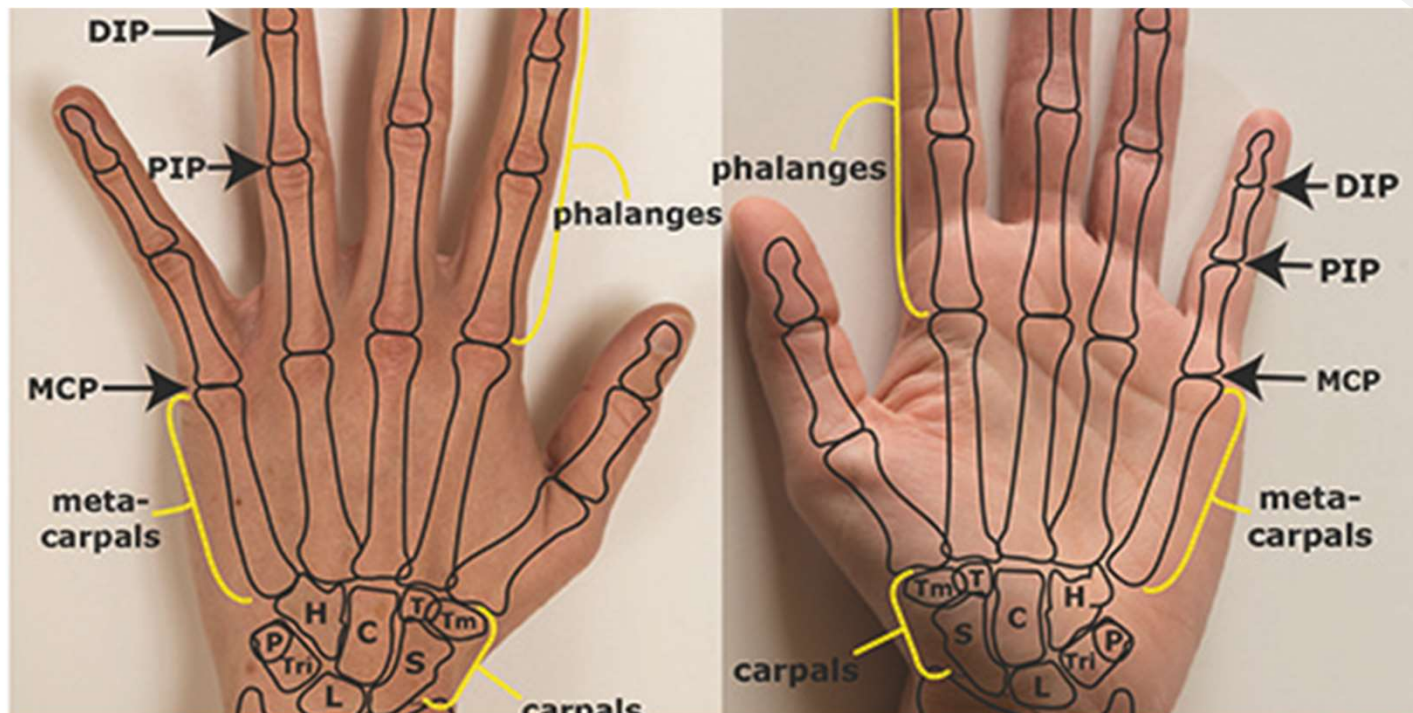
Cubital Tunnel



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Surface Anatomy Wrist/Hand



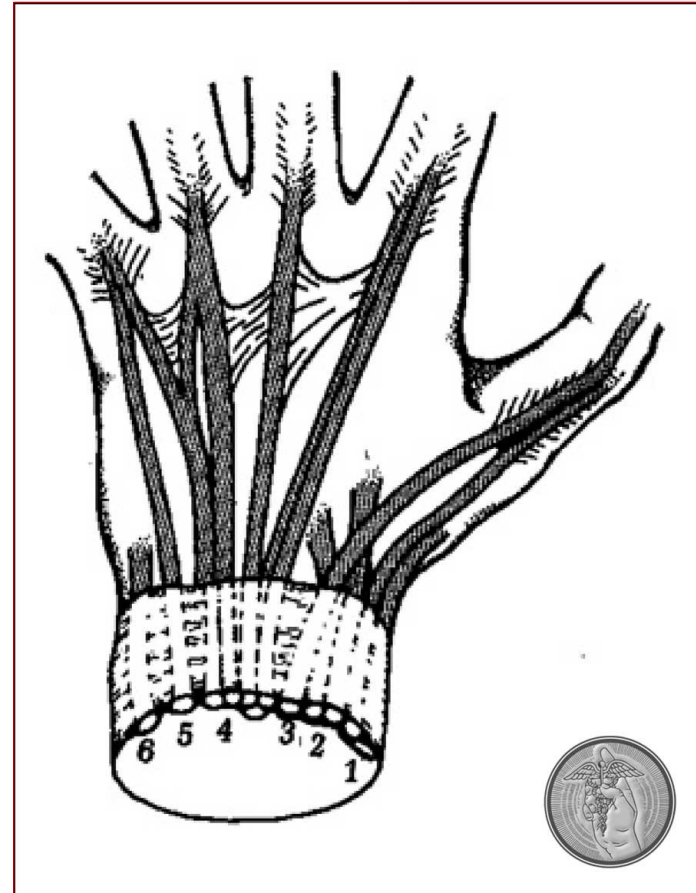
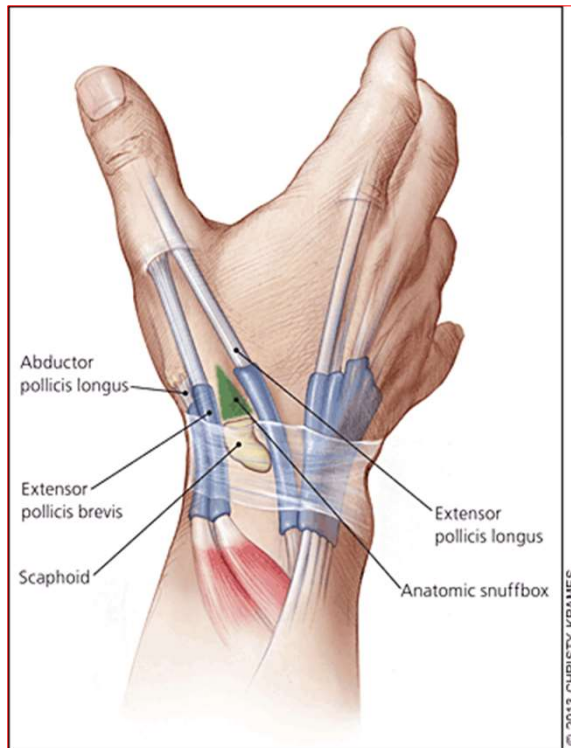
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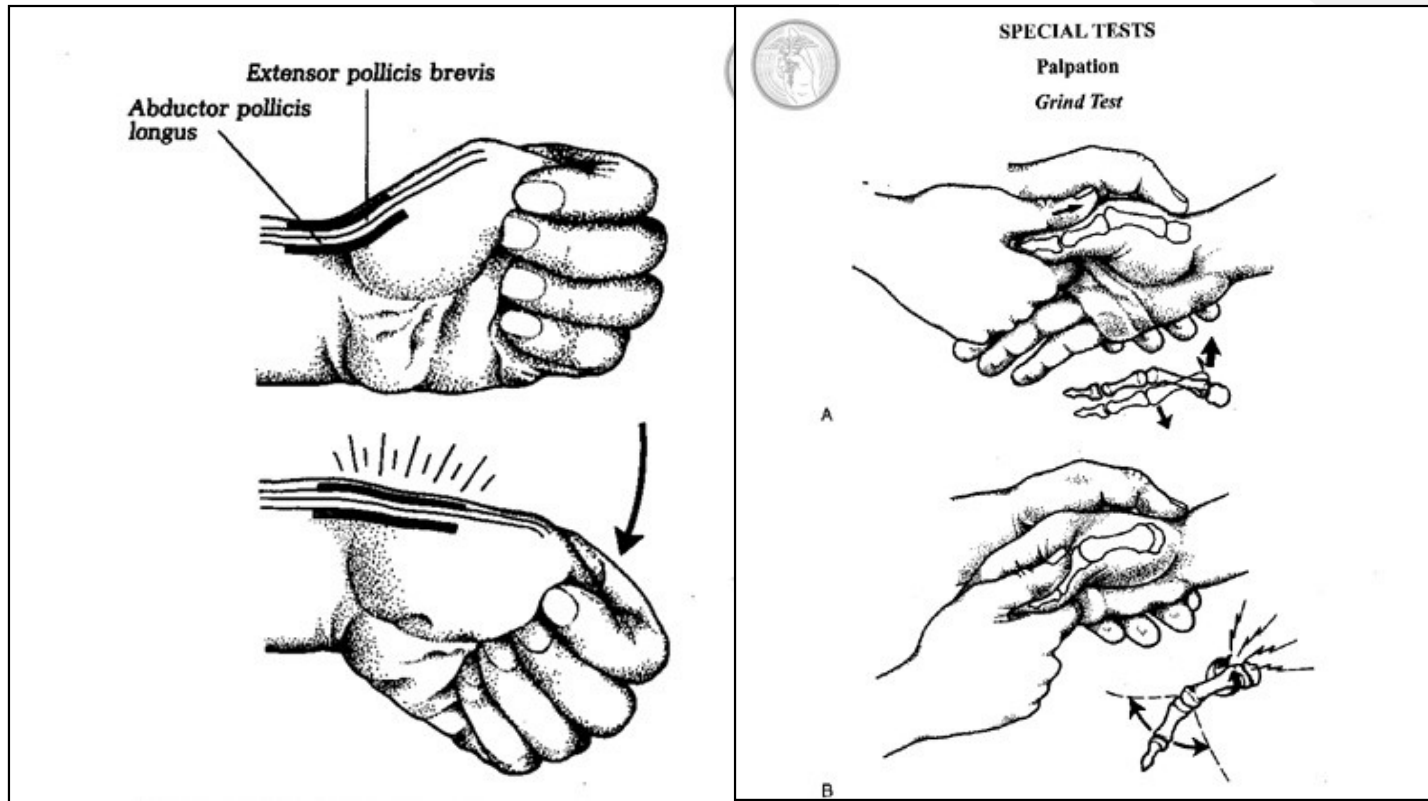
Wrist Anatomy



Wrist Anatomy

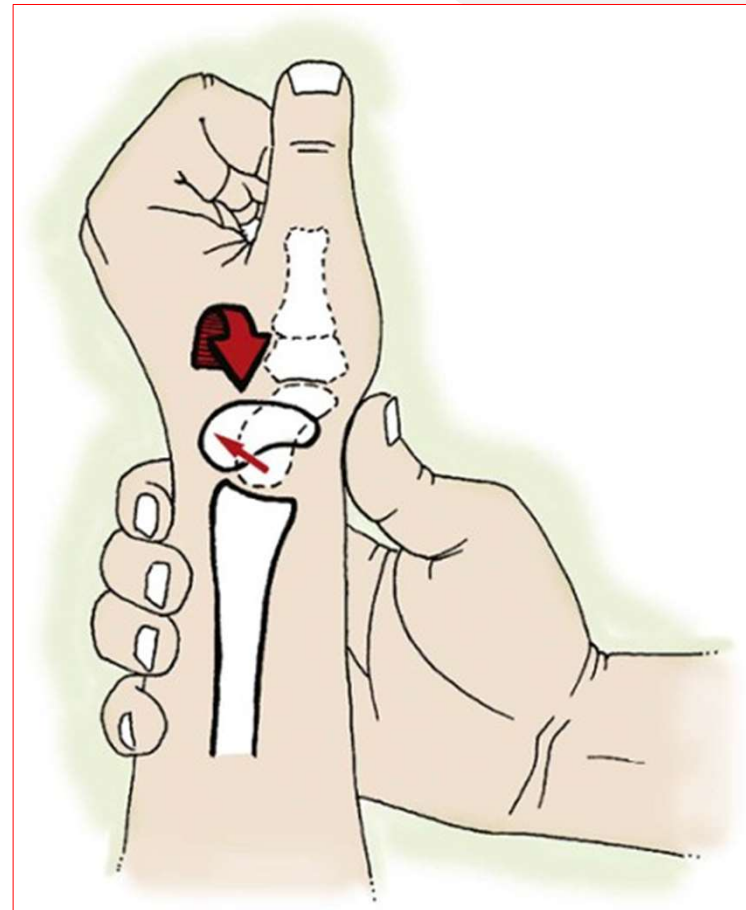


Dequervain's vs. 1st CMC OA

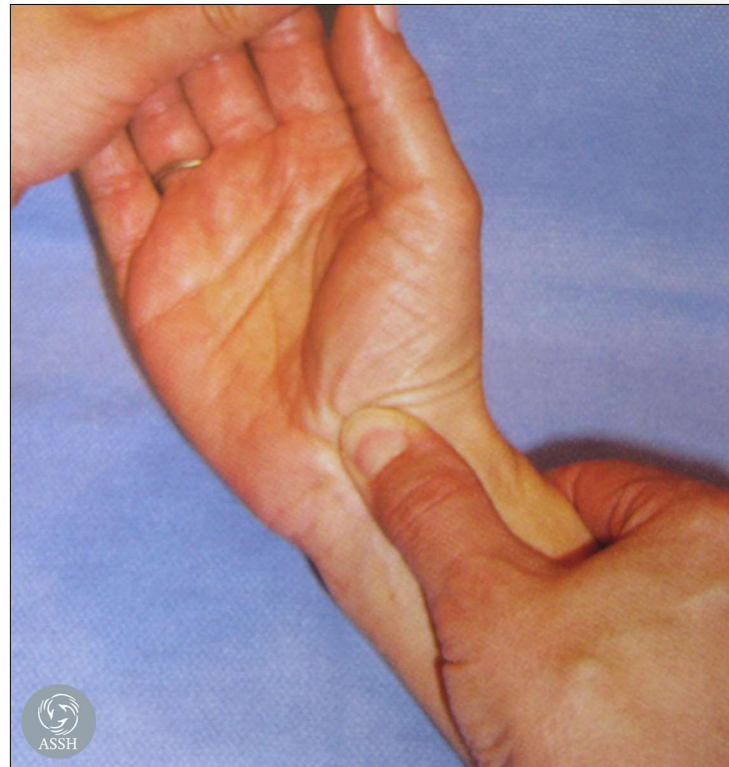
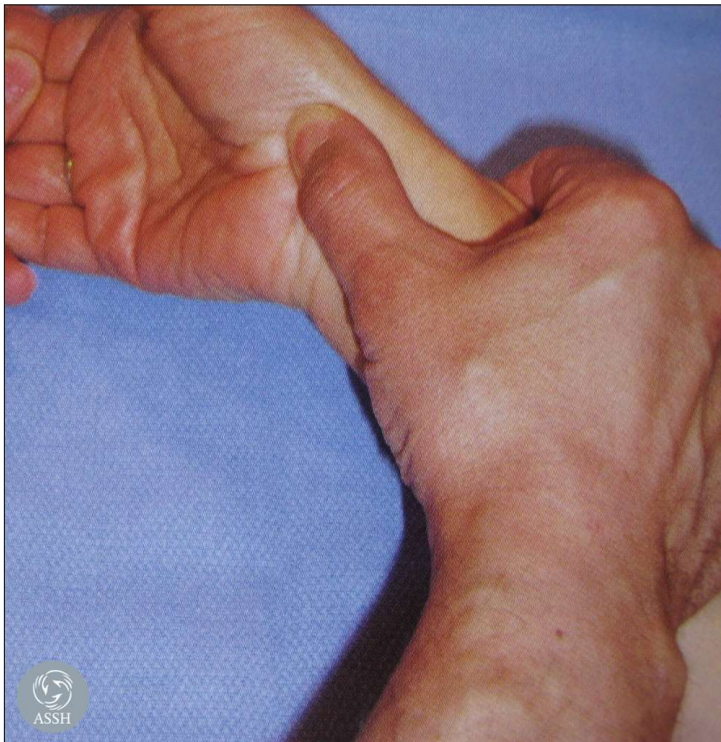


Instability

Scaphoid Shift Test



Watson Test



LT Tears

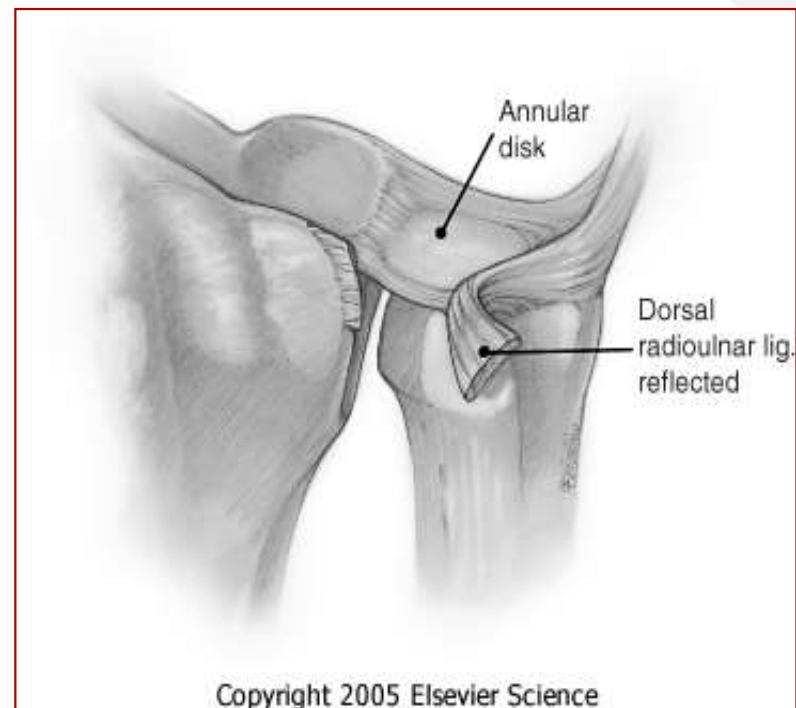


Ulnar-Sided Pain

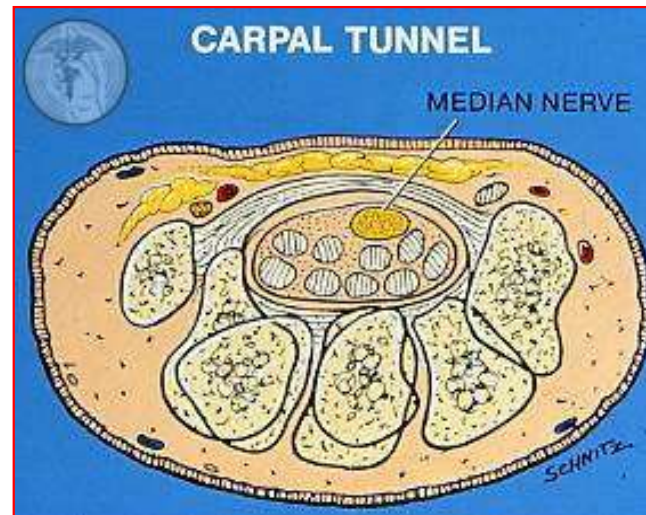
Ulnar-Carpal Shift

LT Shuck

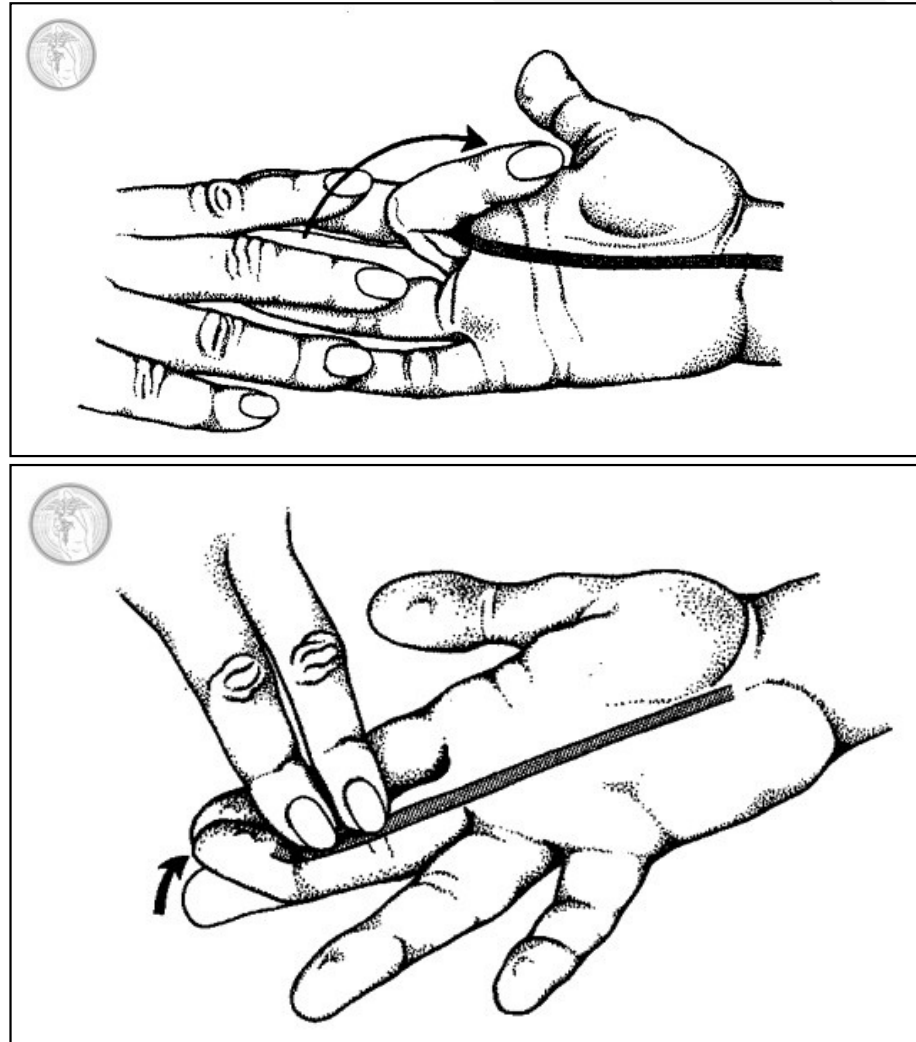
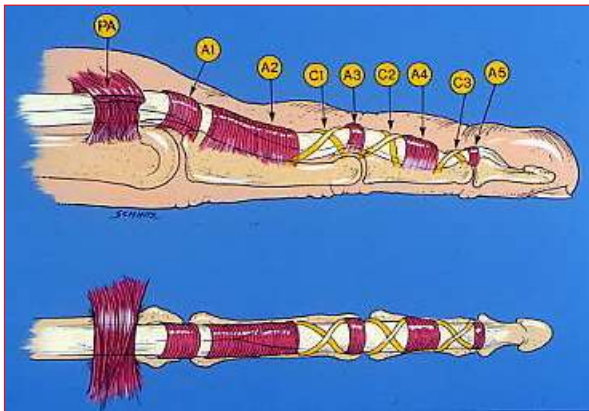
DRUJ Shuck



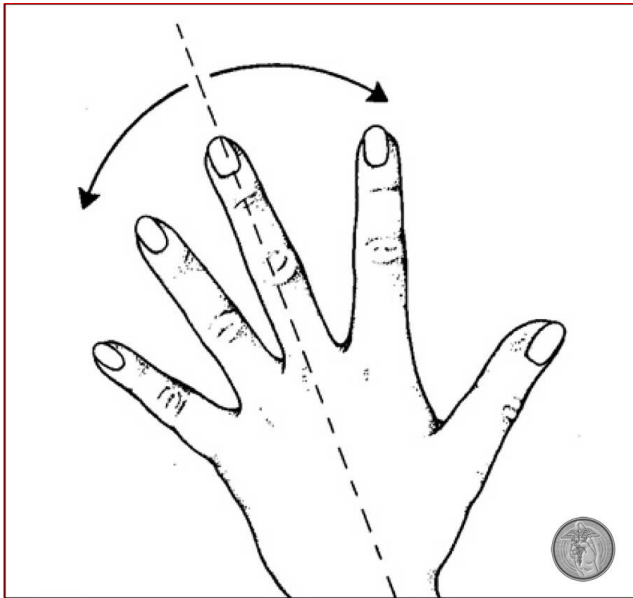
Carpal Tunnel



Long Flexors



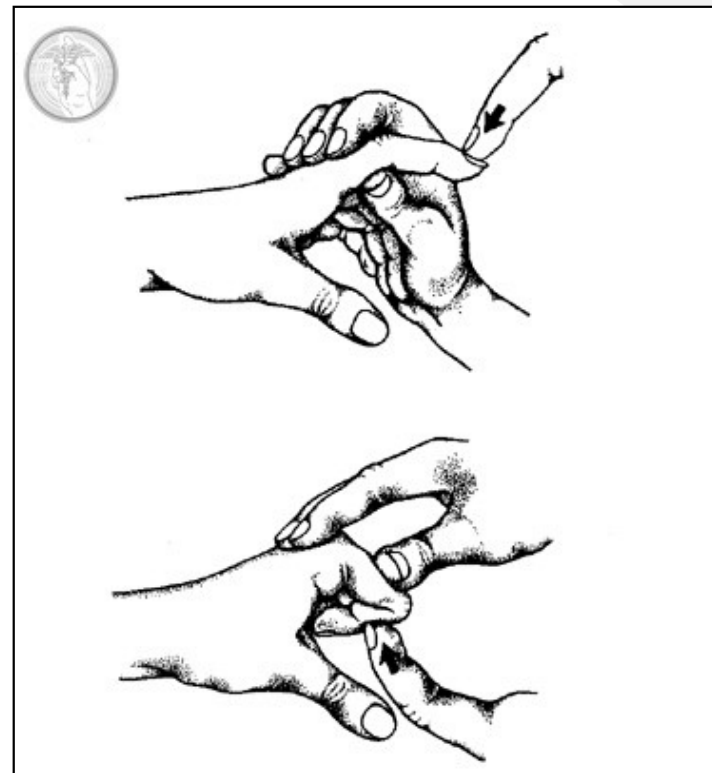
Ulnar Motor



Froment's Sign

Intrinsic Tightness

Bunnel Test



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Thank You!

