2006 EATA Student Conference  
Basics of Hand/Wrist Evaluation  
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I. Anatomy
A. Osteology/Arthrology (Skeletal/Joint Structure)
   1. Distal radioulnar joint (DRUJ)
      a. Includes the TFCC (Triangular Fibrocartilage Complex)
      b. 1 deg of freedom - uniaxial pivot joint (sup/pron)
   2. Radiocarpal/Ulnomeniscotriquetral joint
      a. 3 deg of freedom (flex/ext/RD/UD/sup/pron)
   3. Midcarpal joint
      a. 2 degrees of freedom (flex/ext/RD/UD)
   4. Carpometacarpal joint (CMC)
      a. the 2-5th CMC joints are plane joints with 1 deg of freedom
         (flexion/extension occur only)
      b. the 1st CMC joint has 3 deg of freedom
         (flexion/extension/abd/add/sup/pron/circumduction)
   5. Intermetacarpal joints 2-5
      a. really synarthrosis, not synovial joint
      b. 1 degree of freedom (volar/dorsal glide)
   6. Metacarpophalangeal joint (MP)
      a. they have 3 deg of freedom (flexion/extension/abd/add/sup/pron)
   7. Interphalangeal joint (IP joints - PIP’s and DIP’s)
      a. 1 deg of freedom (flexion/extension)

B. Musculature
   1. Extrinsic Hand Muscles
      a. volar side – Flexor carpi radialis
         - palmaris longus
         - flexor carpi ulnaris
         - flexor pollicis longus (FPL)
         - Flexor digitorum profundus (FDP)
         - Flexor digitorum superficialis (FDS)
      b. dorsal side – Abductor Pollicis Longus (APL)
         - Extensor Pollicis Brevis
         - Extensor carpi radialis longus ( ECRL)
         - Extensor carpi radialis brevis (ECRB)
         - Extensor pollicis longus
         - Extensor digitorum communis
         - Extensor indicis
         - Extensor digiti minimi
         - Extensor carpi ulnaris
   2. Intrinsics – lumbricales
      - palmar interossei
- dorsal interossei
- thenar muscles
- hypothenar muscles

C. **Lymphatic System** — the only system that can remove large molecule substances such as excess plasma proteins, hormones, fat cells, and waste products from the interstitium that you see in **chronic edema**. The lymphatics are tubes which are in the dermis layer of the skin; they rely on changes in interstitial pressure to open and close (pressures>60mmHg will collapse the tubes).

1. “Squeezing” tissue removes the fluid from the lymph but not the large molecules, so the edema becomes more concentrated
2. The proteins are hydrophilic and when the pressure is removed, the fluid is attracted back into the interstitium

D. **Myofascial/Skin**

1. Dorsum of the hand is very different than the palm
2. The palmar fascia has longitudinal, transverse, and vertical fibers
   a. the vertical fibers run superficially to stabilize the thick palmar skin
   b. the lymphatics run through the dorsal hand

E. **Nerves**

1. **Median**
2. **Ulnar**
3. **Radial**

II. **Phases of Connective Tissue Healing**

A. **Inflammatory Phase**
   1. vasodilation
   2. hyperemia
   3. increased cell permeability
   4. increased vascularity
   5. cell migration
   6. debris removal

B. **Fibroplastic Phase**
   1. **re-epithelialization** causing wound closure (skin)
   2. **fibroplasia** — fibroblasts are activated and move along the fibrin meshwork to generate new collagen, elastin, GAG’s, proteoglycans, and glycoproteins
   3. **neovascularization** — regeneration of small blood vessels
   4. wound contraction
   5. collagen with random alignment

C. **Remodeling Phase**
   1. consolidation phase
   2. increased wound strength
   3. realignment of collagen
   4. reduction of abnormal cross links
   5. **maturation phase** — the scar links change from weak hydrogen bonds to strong covalent bonds
III. Evaluation

A. History of Mechanism

1. Details as to the Mechanism of injury are very important because they can assist you with the evaluation, treatment, and prognosis
   a. examples - infection will precipitate more scar formation
      - a tendon laceration from a crush injury will have more scarring and surrounding tissue adherence than if from a clean knife

2. PMH (past medical history)
   a. smoking is extremely significant especially with hand injuries

B. Observation

1. Skin
   a. obvious wound areas
   b. thickness and suppleness – noting callouses and thickness of skin folds
   c. skin atrophy (ex. from long term corticosteroid therapy
   d. Russell’s sign
   e. Scars - can reduce the mobility of joints and tendons if they cause adhesions
      - dorsal scars can effect the flexion or mobility of the extensor tendons underneath
      - web space scars can interfere with the separation of the fingers and mcp joint flexion

2. Circulation

3. Edema
   a. note the location and type of edema
   b. when edema occurs in tissue and the fluid remains in the interstitium, the body uses two systems to remove it
      - the venous system relies on valves, the heart pumping, and muscle pumping to remove low plasma protein swelling (acute edema)
      - the lymphatics is the only system that can remove large molecule substances such as excess plasma proteins, hormones, fat cells, and waste products from the interstitium that you see in chronic edema. The lymphatics are tubes which are in the dermis layer of the skin; they rely on changes in interstitial pressure to open and close (pressures>60mmHg will collapse the tubes). “Squeezing” tissue removes the fluid from the lymph but not the large molecules, so the edema becomes more concentrated. The proteins are hydrophilic and when the pressure is removed, the fluid is attracted back into the interstitium.
   c. Treatment of the edema
      - the treatment goal for acute (low plasma protein) edema is to decrease the fluid flow into the tissue/interstitium by elevation, compression, retrograde massage, etc
-the treatment goal for chronic edema is to reduce the excess plasma proteins in the interstitium by stimulating the lymphatics. This treatment is called Manual Edema Mobilization (MEM) and it incorporates the following:
  *light proximal to distal, then distal to proximal massage of the skin
  *specific pre- and post-exercises
  *massaging the lymph node areas proximal to the edema
  *the massage must follow the direction of lymphatic pathways

C. ROM – The American Society of Hand Therapists endorses the American Medical Society’s method where the motions are measured from 0 degrees (neutral) starting position

  a. flexion measurements are (+) positive numbers
  b. extension to neutral is 0
  c. inability to extend a joint fully is a negative (-) number
  d. hyperextension is a (+) number
  e. example - -20/105 is 20deg extension lag and 105 deg of flexion
  f. Finger ROM measurements can be recorded as AROM, PROM, TAROM, TPROM, or flexion-DPC

    - TAROM – with each finger measured separately, it is the sum of the simultaneous active MP/PIP/DIP flexion in a fisted position minus the sum of any active extension deficits at the MP/PIP/DIP joints
    - TPROM – with each finger measured separately, it is the sum of the simultaneous passive MP/PIP/DIP flexion in a fisted position minus the sum of any passive extension deficits at the MP/PIP/DIP joints
    - Flexion-DPC – the distance between the pulp of finger and the distal palmar crease when the patient attempts to make a fist

D. Palpation

  a. to determine variations in skin temperature and sweating
  b. consistency of subcutaneous tissue
  c. presence and location of hypersensitivity
  d. muscle spasm
  e. trigger points
  f. tenderness over specific structures

E. Special tests as appropriate for the injury (see Special Test section)

IV. Treatment
A. Modalities
B. Manual Skills
  1. Scar massage
  2. Soft Tissue massage
  3. Joint mobilization
C. Therapy

1. Tendon gliding/neural glides
2. Isometric/isotonic/isokinetic
3. Active/passive/active assisted
4. Eccentric/concentric
5. PNF
6. Proprioception
7. Cardiovascular
8. Aquatic
9. Functional rehab and reconditioning
10. Plyometrics
11. Sports specific exercise

D. Splinting

1. Static – to support area or isolate movement at certain joints
2. Dynamic – to provide stretch to tissues in the remodeling phase of healing or allow passive glide/motion to newly repaired tendons

V. Case Studies

A. Tonya is a 23 year-old professional basketball player who underwent a surgical procedure involving a partial excision and debridement of the triangular fibrocartilage in the dominant right wrist eight days ago. She has been placed in a dynamic splint (wrong) to facilitate flexion and referred to you for rehabilitation. Your evaluation reveals 10° of extension, 15° of flexion, 5° of UD, and 15° of RD.

1. Outline your rehab program considering the phases of connective tissue healing. Include two short term and two long term goals.
2. Describe three different aquatic therapy exercises which would be appropriate to increase range of motion during the initial phase of rehab.
3. List four strengthening exercises that would be appropriate for the second phase of healing. Demonstrate your ability to implement and/or instruct each of the exercise prescriptions.
4. List four different functional tests based on objective criteria you could utilize to determine her readiness to return to unrestricted basketball activities.

B. Eric is a 33 year-old recreational bowler who underwent a surgical repair of a Boutonniere deformity of the PIP joint of the ring finger on his dominant hand four weeks ago. He has been in a splint, which maintained the PIP joint in extension. The prescription from his physician asks you to begin gentle ROM and strengthening exercises for four weeks. You are also requested to devise a home exercise program. The splint is to be worn whenever Eric is not exercising.

1. List four exercise prescriptions designed to improve range of motion, including joint mobilizations. Demonstrate your ability to implement and/or instruct each of the exercise prescriptions.
2. List three exercise prescriptions, which utilize rubber bands to strengthen the musculature of the fingers. Demonstrate your ability to implement and/or instruct each of the exercise prescriptions.
3. Create a home exercise program for Eric, which includes at least three exercises to maintain/improve ROM and three exercises to increase...
strength. The exercises/activities should be different from the ones outlined above.

VI. Commonly Difficult Hand Pathologies to Differentiate

A. Boutonniere Deformity versus Volar Plate Contracture

1. **Boutonniere Deformity** – Extensor tendon injury at Zone 3 and the lateral bands move volar to the axis of the PIP joint
   a. **Mechanism** – volar dislocation or subluxation of the PIP joint. Because the lateral bands are volar to the axis, when the extensor contracts, instead of extending the joint, they flex the PIP joint. Over time, the extensor force is concentrated on the DIP joint, causing DIP hyperextension and loss of DIP flexion.
   in early stages, there is full passive extension of the PIP joint.
   **KEY – recognition of the injury**
   b. **Treatment**: 
      - possible surgical repair 
      - consult with a hand therapist 
      - continuous splinting in extension, buddy taping is not sufficient 
      - finger splints are generally accepted by officials if they are covered with tape. 
      - when appropriate healing has occurred, early short-arc motion 
      - exercise where the PIP joint is held in extension and the DIP is flexed 
      - night splinting may be required for 2 to 3 months, and protective splinting for the remainder of the season

2. **Volar Plate Contracture at the PIP Joint**
   a. **Mechanism** - commonly injured with dorsal dislocation of the PIP joint (hyperextension injury).
   - the volar plate is a fibrocartilaginous structure on the volar aspect of the PIP joint. In response to injury it can become fibrotic and immobile, thus limiting PIP joint extension.
   - PIP joint extension will be limited **actively and passively**

3. **Treatment for the dorsal dislocation**:
   - for a grade I – splinted in slight flexion until acute pain subsides.
   - for a grade II - a dorsal splint with 20deg to 30deg of PIP joint flexion for approximately 7 to 14 days. After immobilization, the finger can be taped to an adjacent finger for protection. Patient needs to be watched for a missed Boutonniere.
   - for a grade III - as per grade unless reduction is not maintained, then surgery is appropriate

4. **Treatment for the volar plate contracture**:
   - modalities to increase mobility of the volar plate
   - volar plate mobilization
   - PIP ext stretches, with cuing to avoid hyperextension of the DIP joint
   - possible night time static splinting in progressive extension
-possible day time dynamic splinting

B. Flexor Digitorum Profundus Injury versus a Flexor Digitorum Superficialis Injury

**Flexor Digitorum Profundus Rupture or Avulsion**
Mechanism – a forceful eccentric load on the FDP can cause an avulsion off the distal phalanx
Called *Jersey Finger* because this frequently occurs as a player grabs another player and the finger becomes caught in their jersey

**Signs and Symptoms:**
- swelling and discomfort at the DIP joint
- patient will not be able to flex the DIP joint actively

**Treatment:**
- RECOGNITION – often missed if FDS function is intact
- Referral to MD (surgery to re-attach tendon)

**Flexor Digitorum Superficialis Injury** (to 3rd through 5th fingers)
Uncommon in athletics
Mechanism – mostly lacerations from sharp objects

**Sign:**
- patient will not be able to flex PIP joint of fingers with the other two fingers held in full extension

**Treatment:**
- referral to MD
DIAGNOSES/TREATMENTS

Avascular Necrosis of the Lunate – see Kienbocks Disease

Boutienniere Injury – see above section IV

Carpal Boss – a carpal boss can be a variation or anomaly in some individuals and not necessarily pathologic. It may however represent hypertrophic changes of traumatic origin. These can occasionally cause pain and irritation of the local soft tissues

Complex Regional Pain Syndrome(CRPS)/Reflex Sympathetic Dystrophy(RSD)

A. Etiology/Mechanism
   1. painful lesion, either from trauma or disease
   2. Predisposition of the individual to develop the problem
   3. Abnormal sympathetic reflex

B. Signs and Symptoms
   1. pain
   2. swelling
   3. stiffness
   4. discoloration
   5. osseous demineralization on X-Ray
   6. temperature changes
   7. sudomotor changes
   8. vasomotor instability

C. Treatment
   1. Recognition and referral to specialty MD
   2. TENS (burst mode)
   3. splinting to avoid pain
   4. stress loading
   5. nerve blocks
   6. referral to hand therapist

Cyclist’s Palsy –

A. Mechanism – compression of the ulnar nerve in Guyon’s tunnel

B. Signs and Symptoms
   1. numbness and paresthesias in the 4th and 5th fingers

C. Treatment
   1. prevention of compression in this area
   2. anti-inflammatory modalities as needed
   3. gentle nerve glides

De Quervain’s Tenosynovitis – stenosing tenosynovitis of the APL and EPB tendons in the sheath

A. Anatomy – the APL and EPB tendons pass through the first dorsal compartment of the extensor retinaculum. There is a synovial sheath under the retinaculum encasing the tendons.
B. **Etiology** –
   1. **Microtrauma** – forceful, sustained, or repetitive thumb abduction and simultaneous wrist UD. Some MD’s feel that RD with pinch is the most stressful because the APL and EPB tendons are taut and sharply angulated at the wrist and trapeziometacarpal joint
   2. **Acute trauma** – sudden wrenching of the wrist and thumb while trying to restrain an object or person or a fall

C. **Signs and Symptoms**
   1. radial-sided wrist pain over the 1⁰ dorsal compartment
   2. pain can radiate to the thumb
   3. increased pain with increased tensile load on the EPB or APL
   4. (+) Finkelstein’s test
   5. wrist flexion will intensify the pain and extension should relieve it
   6. painful thumb extension
   7. MRI may show increased fluid in the 1⁰ extensor compartment
   8. rarely pseudotriggering
   9. can co-exist with or be confused with trapeziometacarpal arthritis, scaphoid fractures, scapholunate instability, intersection syndrome, radial neuritis, and radioscaphoid/scaphotrapezoid joint problems

D. **Treatment**
   1. splint to minimize UD at wrist and substitutes power grip for pinch
   2. anti-inflammatory modalities
   3. gentle gliding of tendons and gentle AROM
   4. possible injection into sheath
   5. after failed conservative management, surgical release of the 1⁰ dorsal compartment

**Dorsal Wrist Syndrome** – localized scapholunate synovitis

A. **Mechanism** – overstress of the SL ligaments

B. **Signs and Symptoms**
   1. (+) finger extension test

C. **Treatment**
   1. stabilization of the area externally (bracing)
   2. stabilization of the area internally (proprioceptive exc)
   3. anti-inflammatory modalities

**Dorsal Wrist Ganglion** – the most common mass on the dorsum of the hand and often arise from the scapholunate interval.

A. **Mechanism** – possibly no mechanism or a blow

B. **Signs and Symptoms**
   1. they are soft and mobile
   2. tenderness may be present with wrist flexion or extension

C. **Treatment**
   1. prevention of irritation (tape/brace) if needed
   2. possible surgery – typically needs some mobilization therapy afterward

**Drummer’s Palsy** – EPL tendonitis
A. **Etiology** – the EPL tendon passes around Lister’s tubercle on its path to the thumb

B. **Mechanism** – friction around Lister’s tubercle

C. **Signs and Symptoms**
   1. tenderness of the third extensor compartment just ulnar to Lister’s tubercle

D. **Treatment**
   1. splinting or resting of the tendon
   2. anti-inflammatory modalities
   3. possible injection

**ECU subluxation** – the ECU tendon is normally held securely in the ulnar groove of the distal ulna by the ECU sheath. With disruption of the sheath, the ECU tendon will sublux and snap during forearm rotation as it slides out of its groove and bowstrings ulnarly and volarly across the ulnar styloid. The ECU tendon is palpated in the gap between the ulnar styloid and the base of the fifth metacarpal with the forearm in pronation and during active ulnar deviation.

**Intersection Syndrome** – stenosing tenosynovitis of the second dorsal compartment

A. **Anatomy** – the intersection where the radial wrist extensor tendons pass underneath the muscle bellies of the APL and EPB approximately 4 cm proximally to Lister’s tubercle

B. **Etiology**
   1. repetitive wrist and/or thumb activities
   2. frequently seen in weight lifters and rowers
   3. possible bursal inflammation

C. **Signs and Symptoms**
   1. pain and swelling of the overlying muscle bellies of the APL and EPB muscles
   2. possible redness
   3. possible painful crepitus with thumb and wrist movements
   4. grip and pinch are often painful and weak

D. **Treatment**
   1. forearm or thumb spica splint
   2. anti-inflammatory modalities
   3. gentle gliding of tendons and gentle AROM
   4. possible injection
   5. possible surgical release

**Kienbock’s Disease** - avascular Necrosis of the Lunate

A. **Etiology/Mechanism**
   1. blood supply is limited and differences in resistance to compressive loads lead to microfractures within the lunate
   2. rarely a history of trauma
   3. ulnar-negative variance
   4. variations of the interosseous vasculature of the lunate

B. **Signs and Symptoms**
   1. pain in the central dorsal wrist
   2. weakness of the wrist
3. stiffness
4. (+) X-Ray or bone scan

C. Treatment
1. if diagnosed before lunate collapse or OA – surgery to unload the forces on the lunate (radial osteotomy, ulnar lengthening, etc)
2. if late diagnosis – salvage surgery – proximal row carpectomy or arthrodesis/fusion

Reflex Sympathetic Dystrophy (RSD) see Complex regional pain syndrome (CRPS)

Ulnar Hammer/Hypothenar Hammer Syndrome – thrombosis of the ulnar artery
A. Mechanism – repeated impact on the ulnar side of the palm when using the hand to substitute for a hammer.
B. Signs and Symptoms
   1. ulnar sided pain and coldness
   2. (+) Allen’s test for ulnar artery
C. Treatment – referral to MD

Volar Plate Contracture – see above section IV

Wartenberg’s Syndrome
A. Anatomy – the dorsal radial sensory nerve (DRSN) travels along the dorsal radial aspect of the wrist (very superficial) between the tendons of the brachioradialis and the ECRL.
B. Etiology – because of the superficial location, the DRSN is susceptible to compressive forces (ex. from tight wrist straps). Repetitive pronation, flexion, and UD (pronation causes the ECRL tendon to cross under the brachioradialis tendon and compress the DRSN).
C. Signs and Symptoms
   1. flexion and UD puts the nerve on stretch which increases pain
   2. numbness, tingling, burning and pain over the dorsal radial aspect of the hand
   3. (+) Tinel’s
   4. possible decreased sensation over the dorsal web and thumb dorsum
D. Treatment
   anti-inflammatory modalities (phonophoresis)
   heat modalities (not cold)
   gentle stretching

SPECIAL TESTS/PROVOCATION TESTS

Allen’s test – tests for arterial occlusion. A (+) test is if there is no flush of blood or a delayed flush observed when pressure is individually released on the radial or ulnar artery. Specifically, the subject makes a tight fist and the examiner occludes both the radial and ulnar arteries. The patient opens and closes the hand until the skin is white and blanched. The radial artery is then released, and the palm is observed for flushing which indicates blood flow. If there is no flush or
if blushing is delayed relative to the uninvolved side, occlusion may be present. The test is repeated to assess the ulnar artery.

**Ballottement test** - tests for *LT instability*. A (+) test is pain, clicking, or laxity when the lunate is stabilized and the lunate is mobilized volarly and dorsally.

**Catch-up clunk test** - tests for *midcarpal instability*. A (+) test is a painful clunk which reproduces the patient’s symptoms when a palmar load is placed over the capitate and the wrist is ulnarly deviated with a simultaneous axial load.

**ECU subluxation test** – tests for *ECU subluxation*. A (+) test is observed and palpated with ulnar and volar subluxation when the forearm is supinated, and the wrist is ulnarly deviated.

**Finger extension test** – tests for *dorsal wrist syndrome*. A (+) test is pain in the scapholunate region with resisted finger extension with the wrist in flexion.

**Finkelstein’s test** – tests for *de Quervain’s tenosynovitis*. A (+) test is pain localized to the radial aspect of the wrist when thumb flexion is combined with UD of the wrist.

**First CMC joint instability/laxity test** - tests for *1st CMC joint instability or laxity*. A (+) test is more laxity present when the 1st met is distracted and moved side to side or in a RU direction while the trapezium is stabilized versus on the uninjured side.

**Grind test for the first CMC joint** – tests for *1st CMC degenerative arthritis*. A (+) test is pain and crepitus with axial compression of the 1st met with rotation. This grinds the articular surfaces of the base of the 1st met and the trapezium.

**Linscheid test** – test for *2nd and/or 3rd CMC ligament injury or instability*. A (+) test is pain localized to the CMC joint area when the metacarpal heads are moved in a palmar and dorsal direction on one another.

**Metacarpal stress test** - tests for *CMC joint injury*. A (+) test is pain at the CMC joint when the MCP joint is fully flexed and the metacarpal is pronated and supinated.

**Midcarpal shift test** - tests for *midcarpal instability*. A (+) test is a painful clunk which reproduces the patient’s symptoms when a palmar load is placed over the capitate and the wrist is ulnarly deviated with a simultaneous axial load.

**Phalen’s test** – tests for *carpel tunnel syndrome*. A (+) test is numbness and tingling in the distribution of the median nerve with passive flexion of the wrist for 15 to 60 seconds. Generally bilateral wrists held in 90deg flexion with the hand dorsums touching.
Piano key test – tests for **DRUJ instability**. A (+) test is pain, tenderness, and increased mobility relative to the uninjured side when the distal ulna is grasped and moved passively in a volar/dorsal direction at the extremes of pronation and supination.

Piano key sign – tests for **DRUJ instability**. A (+) sign is pain when the distal ulna springs back after volarly directed pressure on the pronated distal ulna is released.

Pisiform boost test – tests for **ulnocarpal instability** or **TFCC tear**. Not as definitive as the TFCC load test or the Relocation test. A (+) test is pain, clicking, or crepitis when a dorsally directed pressure is applied over the palmar aspect of the pisiform, resulting in lifting of carpals into normal alignment.

Pivot shift test - tests for **midcarpal instability**. A (+) test is a painful clunk which reproduces the patient’s symptoms when a palmar load is placed over the capitate and the wrist is ulnarily deviated with a simultaneous axial load.

Relocation test – tests for **TFCC tear/ulnocarpal instability**. A (+) test is pain reduction when the subluxed ulnar carpus is relocated. The combined movement of pronation, and anterior to posterior glide of the carpus on the ulna relocates the carpus into normal alignment–

Scaphoid thrust test – tests for **scaphoid rotary subluxation**. A (+) test is an apparent shift of the scaphoid when the examiner pushes dorsally on the scaphoid tubercle.

Scapholunate ballottement test – tests for **scaphoid rotary subluxation**. A (+) test is pain or increased motion relative to the other side when the scaphoid is moved in a volar and dorsal direction while the lunate is being stabilized

Shear test (at lunate)– tests for **LT instability**. A (+) test is pain or clicking when the wrist is ulnarily and radially deviated with the lunate supported and the pisotriquetral complex is loaded in the anteroposterior plane.

Shear test (at pisiform)– tests for **pisotriquetral arthritis**. A (+) test is pain or crepitus when the pisiform is pushed or rocked into or around the triquetrum.

Tinel’s Test – tests for **nerve compression and regeneration**. A (+) test is pain and tingling radiating through the nerve’s distribution when the nerve is gently percussed.

TFCC load test – tests for **TFCC injury** and **Ulnocarpal abutment**. A positive test is pain, clicking, or crepitus and reproduction of the patient’s symptoms when the wrist is ulnarily deviated and axial loaded, and then moved volarly and dorsally, or the forearm is rotated-

Ulnar compression test - tests for **DRUJ arthritis**. A (+) test is pain with radially directed pressure on the ulnar head into the sigmoid notch of the radius with pronation and supination
Ulnar snuffbox test - tests for **LT instability**. A (+) test is pain complaints are reproduced when lateral pressure is applied on the triquetrum in the sulcus distal to the ulnar head. The sulcus is formed by the ECU and FCU tendons.

Watson/scaphoid shift test – tests for **scaphoid rotary subluxation**. A (+) test is reproduction of the patient’s symptoms and usually a painful clunk when the examiner applies pressure over the volar prominence of the scaphoid as the wrist is moved from UD to RD with slight flexion.

**REFERENCES**


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