

## Elbow/Wrist/Hand Pointers

### Elbow Injuries

-break elbow into 4 quadrants

-Lateral

1. Lateral Epicondylitis (Tennis Elbow)
  - a. extensor supinator tendinopathy
  - b. repetitive gripping/wrist turning
  - c. Resisted wrist and long finger extension
2. Radial Tunnel Syndrome

-Medial

1. Medial Epicondylitis (Golfers Elbow)
  - a. flexor pronator tendinopathy
2. Ulnar Collateral Ligament Sprain/Tear
  - a. Milking Maneuver
  - b. UCL Stress Test
    1. valgus stress with elbow flexed 30 degrees

-Posterior

1. Olecranon Bursitis
  - a. infection, trauma, gout/pseudogout, overuse
2. Triceps Tendinopathy
  - a. fairly rare
  - b. repetitive elbow extension (wt lifters)
3. Cubital Tunnel Neuropathy

-Anterior

1. Biceps Tendon Strain
2. Distal Biceps Tear
  - a. weakness supination and flexion

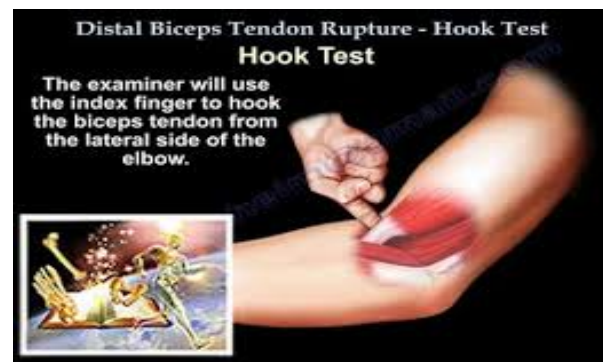
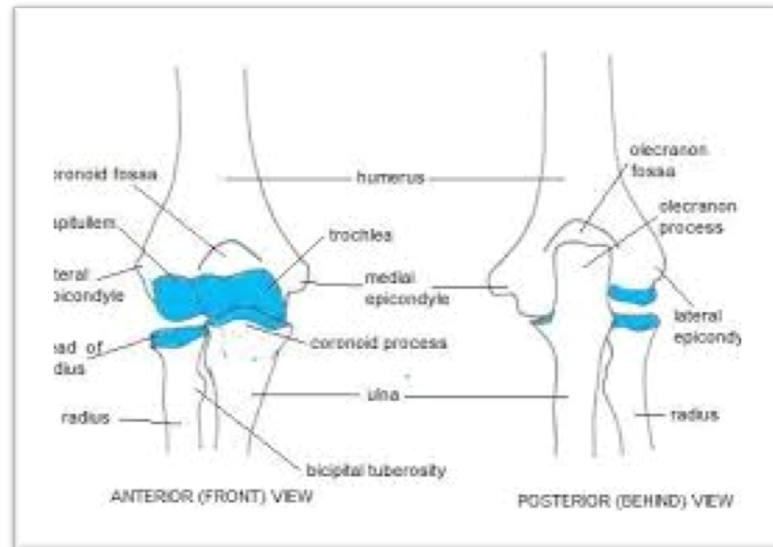
### High Pressure Injection Injuries to Hand

-often initial benign appearance and delayed presentation

-paint guns, power injectors, hydraulics, car wash sprayers

-injected material forced along fascial planes, tendon sheaths, or neurovascular bundles

1. tissue damage far from original injury



-high risk for:

1. acute compartment syndrome
2. acute carpal tunnel syndrome

-X-rays, broad spectrum abx, and hand surgeon consultation

### **Fight Bites**

-high risk for multiple complications

1. Any fracture = open fracture
2. Tendon lacerations
3. Retained foreign bodies
4. Polymicrobial joint infections

- may appear as benign abrasion or laceration

-most common over 4<sup>th</sup>/5<sup>th</sup> metacarpal head(s)

-explore all wounds to exclude tendon/joint injuries

-x-ray all

-broad-spectrum antibiotics for all

1. Amoxicillin/Clavulanic Acid
2. PCN Allergy = Clindamycin + Doxycycline/TMP SMX DS

-tetanus immunization

### **Scapholunate Dissociation**

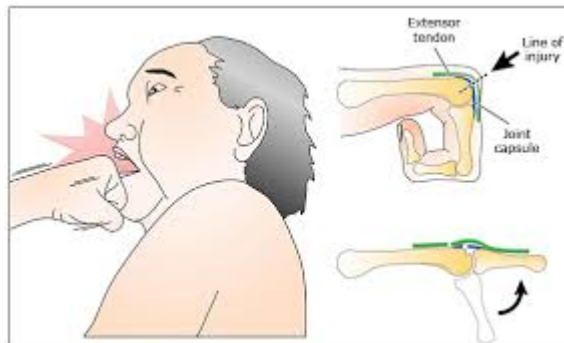
-tear of scapholunate ligament

-FOOSH injury

1. may occur with scaphoid and distal radius fx

-Watson Test

1. thumb and index finger on dorsal and volar scaphoid
2. move wrist from extension and ulnar deviation to flexion and radial deviation
3. (+) = palpable clunk



## Watson's Test of the Wrist

Watson's test  
(scaphoid shift test)

Press the scaphoid tuberosity on the palmar aspect while moving the wrist from ulnar to radial deviation. A painful "click" or "pop" identifies scaphoid instability or scapholunate separation.

Scaphoid tubercle

Painful click or clunk

-Clenched Fist AP X-Ray

1. accentuates scapholunate interval
2. > 3-5 mm widening between scaphoid and lunate

-Treatment = Thumb Spica brace and refer



### Scaphoid Fracture

-most common carpal fracture

-FOOSH injury

-if untreated will improve, then worsen

-variable presentation

-anatomic snuffbox tenderness

1. axially loading thumb and pincer grip

- AP, Lateral, Oblique, Scaphoid

1. initial x-rays often normal
2. especially nondisplaced fractures

-thumb spica brace and repeat x-rays in 1-2 weeks

1. CT scan 90% + sensitivity

-extraosseus blood supply from radial artery

1. proximal pole retrograde flow

-high risk AVN and nonunion = refer

-high rates misdiagnosis

1. chronic arthritis, diminished grip, and loss of function



### DeQuervains Tenosynovitis

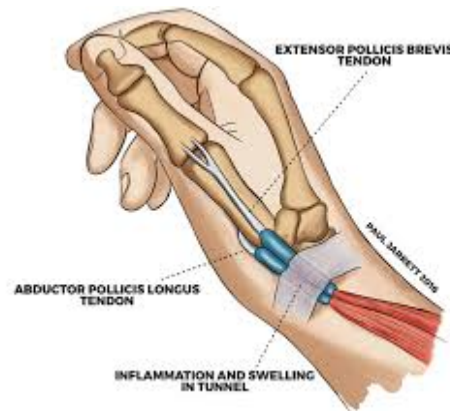
-overuse injury APL and EPB tendons

1. repetitive thumb extension and abduction
2. Mommy Thumb

-TTP 2 cm proximal to radial styloid

-Finkelstein Test

1. tuck thumb under other fingers in fist and ulnar deviate
2. not pathognomonic



-Treatment

1. local anesthetic/steroid tendon sheath injection

2. thumb spica brace with OT

### **Intersection Syndrome**

-overuse friction injury

1. rowers, racquet sports, weight lifters

-site where tendons 1<sup>st</sup> dorsal compartment cross over tendons of 2<sup>nd</sup> dorsal compartment

-TTP 4-8 cm proximal to radial styloid

1. increased pain resisted wrist extension with radial deviation

-often palpable and/or audible crepitus with wrist extension

-Treatment

1. rest, activity modification, thumb spica

2. NSAIDs +/- steroid tendon sheath injection



### **Extensor Carpi Ulnaris Injury**

-Variable presentation

1. Acute or Chronic Tendinosis = overuse

a. racquet sports, golf, baseball, rowing

2. Subluxation

3. Dislocation

4. Rupture

-TTP ulnar wrist at ECU groove

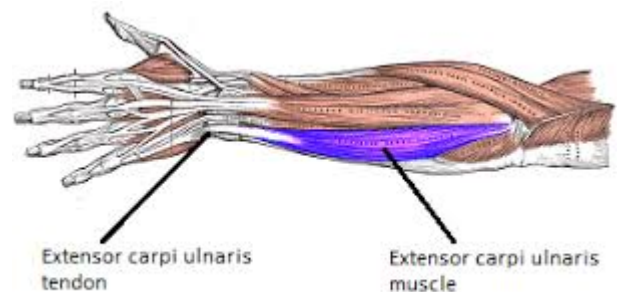
1. increased with resisted wrist extension with ulnar deviation

-Treatment

1. Cock-up Wrist Brace

2. OT

3. Local anesthetic/steroid tendon sheath injection



### **Triangular Fibrocartilage Complex Tears (TFCC)**

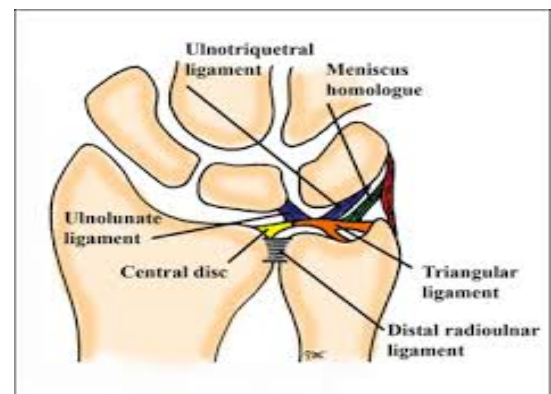
-DRUJ stabilizer

1. load-bearing structure of ulnar wrist

-more common with Ulnar Abutment

1. distal ulna longer than radiocarpal joint

2. easily visible on AP x-ray = + ulnar variance



3. can be dynamic only with grip and pronation

a. visible on Pronated Max Grip PA

-Injury patterns:

1. Acute = FOOSH injury

2. Chronic = repetitive supination/pronation

a. racquet sports, baseball, golf

-deep aching ulnar groove pain

1. often mechanical clicking with wrist supination-pronation

-Ulnar Grind

1. load distal ulna into ulnar wrist with supination and pronation

2. (+) = pain +/- mechanical clicking

-Treatment

1. Cock-up brace with OT

2. Arthroscopic surgery +/- ulnar shortening

### Thumb Ulnar Collateral Ligament Tear

-thumb = 50% hand function

-frequently overlooked and underdiagnosed

1. Acute tear = Skiers Thumb

2. Chronic ligament laxity = Gamekeepers Thumb

-fall on outstretched hand with thumb abducted

-pain, ecchymosis, and swelling at ulnar thumb MCPJ

-Stener Lesion

1. torn UCL moves into adductor aponeurosis and makes nonsurgical healing impossible

2. Bony Stener = avulsion fracture from base proximal phalanx

-UCL Stress Test

1. perform x-rays 1<sup>st</sup> to avoid causing a Stener

2. stabilize affected thumb and push ulnar in both extension and 30 degrees flexion

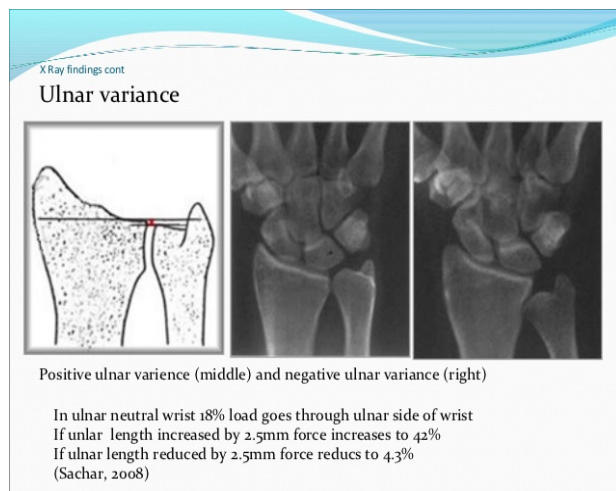
3. (+) = lack of endpoint or 15 degrees greater than contralateral side

-Treatment

1. Partial Tear = Thumb Spica with OT

2. Complete Tear = Surgery

a. early surgical repair within 1<sup>st</sup> 2-3 weeks superior



## Bennetts Fracture

-intraarticular fracture-dislocation of 1<sup>st</sup> metacarpal at CMC joint

1. often associated injuries to UCL and Scaphoid

-unstable fracture due to pull of APL muscle

-fall with axial load on flexed thumb metacarpal

-X-ray = 2 part fracture with triangular ulnar fragment 1<sup>st</sup> CMC with proximal displacement of metacarpal

-Rolando Fracture

1. 3 part intraarticular fracture-dislocation at base 1<sup>st</sup> metacarpal
2. fracture lines typically Y- or T-shaped

-Treatment

1. Thumb Spica
2. refer to hand surgeon



## Metacarpal Fractures

-shaft fractures typically stable = intermetacarpal ligaments

1. oblique and spiral fractures higher risk malrotation

-always assess for malrotation by asking to make a fist

1. all fingers point to scaphoid
2. look for over/underlapping fingers

-metacarpal neck most common fracture area

1. metadiaphyseal junction weakest bony area
2. Boxers Fracture – 5<sup>th</sup> metacarpal neck fx

-Acceptable angulation

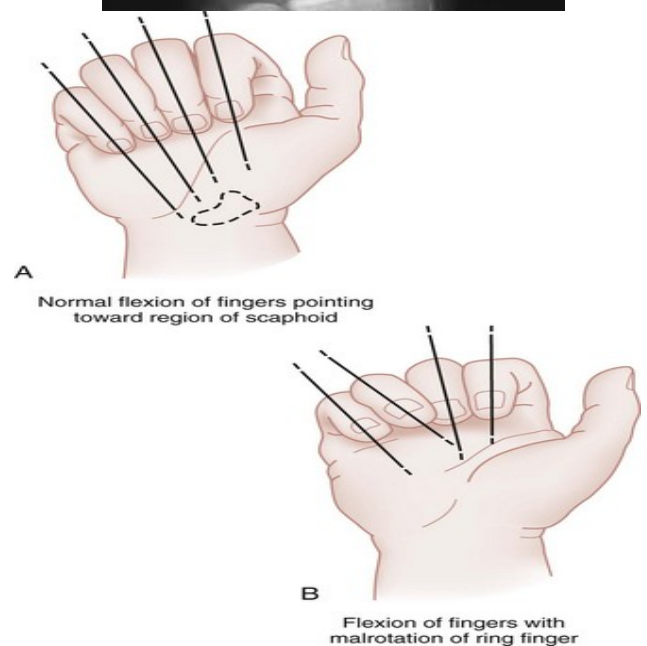
1. no more than 10 degrees for index finger
2. up to 40 degrees for small finger

## Proximal and Middle Phalanx Fractures

-refer if articular

-Buddy tape or splint if:

1. extraarticular without malrotation
2. < 15 degrees angulation



3. < 6 mm shortening

-if unsure, use radial or ulnar gutter splint

### Distal Phalanx Fractures

-stable fractures

-pay attention to nail bed

1. often needs repair

-Treatment = splint DIP in extension

-pain and/or paresthesias may last 6 months or longer

### Volar Plate Avulsion Fractures

-PIP joint capable of largest ROM in hand

1. volar plate stabilizes PIP joint

2. strong fibrous structure connecting volar middle and proximal phalanges to limit hyperextension

-Mechanism = forced PIP hyperextension

1. often associated dorsal or volar dislocation

a. typically reduced prior to arrival

-Clinical Findings

1. pain, swelling, bruising, and tenderness over volar PIP joint

-Key = Lateral X-Ray

1. avulsion fracture at base of middle phalanx typical

2. no joint subluxation = progressive flexion splint

3. joint subluxation = surgery

a. greater than 40% joint surface involved

b. V Sign – crescent-shaped gap at dorsal PIP joint

### MCP Extensor Hood Rupture

-aka Boxer Knuckle or Flicking Injury

-rupture of sagittal band

1. keeps extensor digitorum communis (EDC) centered over MCPJ

-Mechanism of injury

1. blunt trauma with closed fist over MCPJ

2. forcibly trying to flick an object

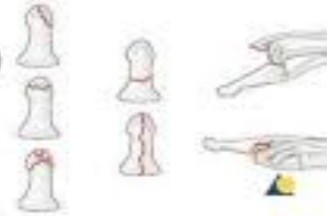
-Exam:

1. weakness MCPJ extension

2. painful EDC tendon subluxation +/- popping

## Fractures of the Distal Phalanx Classification

- Shaft fracture
  - Transverse fracture
  - Longitudinal
- Tuft fracture (associated with nail bed fracture and open fracture)
- Dorsal Base (Mallet finger)
- Volar base (Type III Jersey finger)
- Salter-Harris



3. unable to achieve full active MCPJ extension

4. maintain extension if placed passively

-long and index fingers most commonly affected

-Treatment = Refer for surgery

### Central Slip Ruptures

-part of extensor mechanism over PIP joint

-injury = difficulty or inability to extend PIP joint

1. may still have PIP extension through lateral bands

-Causes:

1. Volar PIP dislocations
2. forced PIP joint flexion
3. lacerations

-common basketball and volleyball players

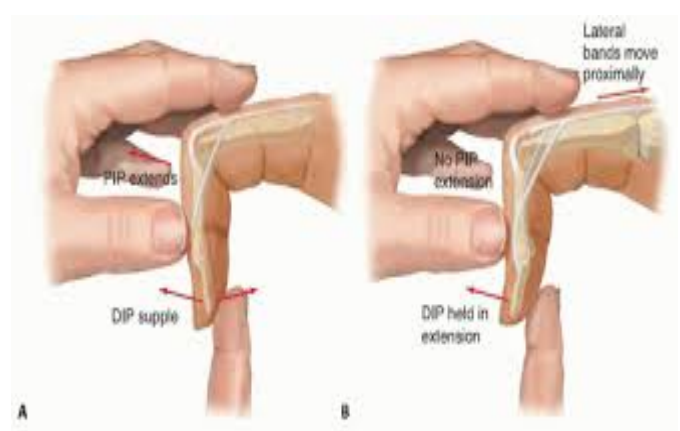
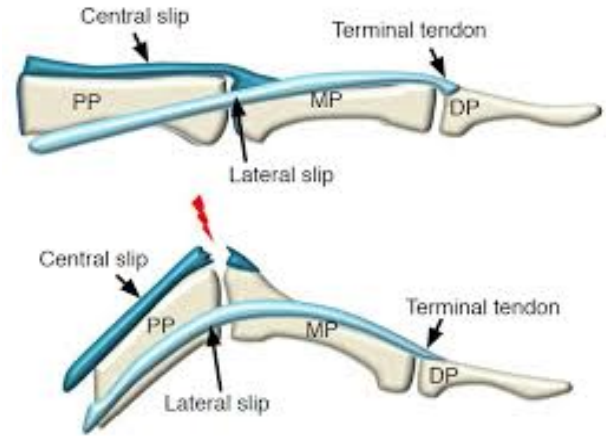
-chronic injury results in PIP joint flexion and DIP hyperextension = Boutonniere Deformity

-Elsons Test

1. bend PIP joint 90 degrees over table edge and resist PIP extension
2. incompetent central slip = weak extension and rigid DIP

-Treatment:

1. Acute injury = splint affected PIP in extension and DIP free
2. Chronic injury = refer hand surgeon



### Mallet Finger

-tear of terminal extensor tendon from distal phalanx

-direct hyperflexion blow

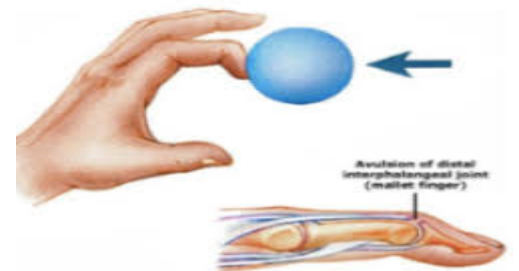
1. fingertip strikes rigid surface/ball
2. common ball sports (baseball, basketball, football, rugby)

-Exam:

1. inability to actively extend DIP
2. DIP drooped in flexion
3. dorsal DIP swelling and ecchymosis

-may result in Swan Neck deformity

1. extended PIP with flexed DIP





-Treatment:

1. extension splinting of DIP joint with PIP free
  - a. 24 hours/day for 6-8 weeks
  - b. any flexion restarts splint period
2. surgical repair



**Jersey Finger**

-DIP flexion injury

1. forceful avulsion of FDP from distal phalanx
2. +/- avulsion fracture

-forceful hyperextension of DIP joint

1. football and rugby players grabbing jerseys
2. ring finger most commonly affected

-present with decreased ROM/stiffness and decreased strength

-Exam

1. straight DIP joint with no or reduced active flexion
2. hold MCP and PIP joints in extension and ask to flex DIP
3. some flexion may be possible with avulsion fracture
  - a. flexion still decreased and painful

-Treatment

1. splint PIP and DIP in slight flexion to block DIP extension
2. refer to surgeon ASAP
  - a. tendon retraction into hand

