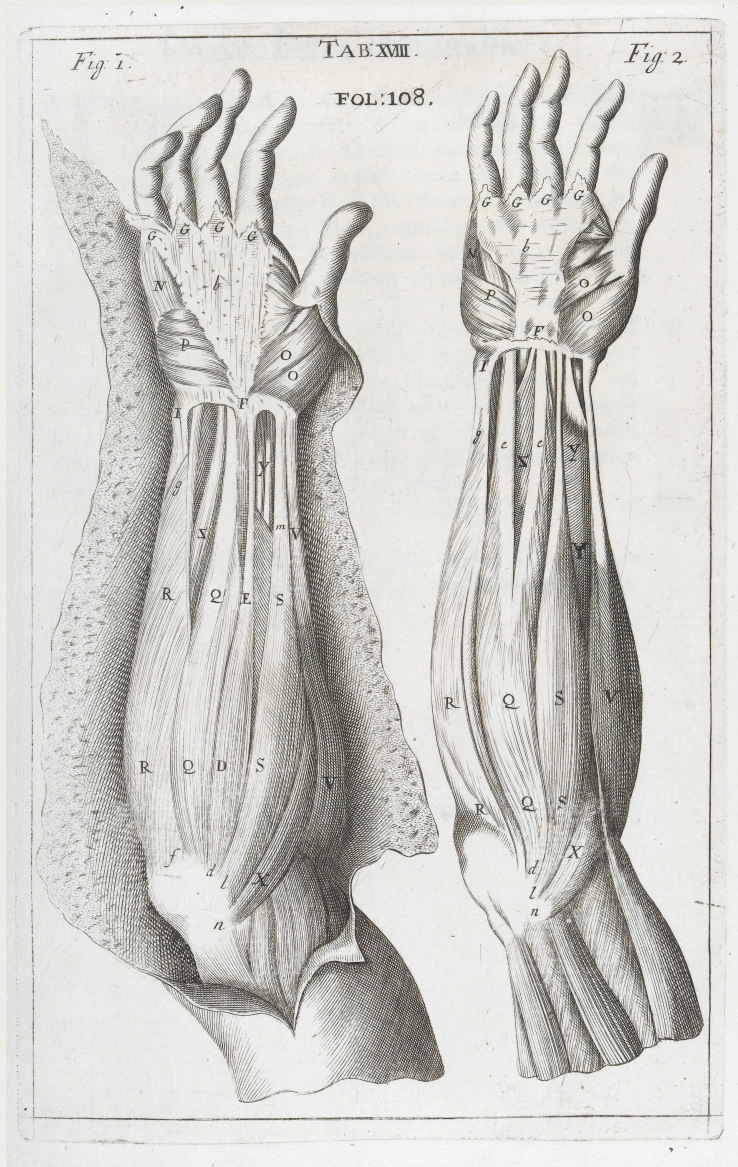


ELBOW, WRIST, & HAND: INJURY ASSESSMENT AND MANAGEMENT

Kevin M. Schroeder DAT, LAT, ATC

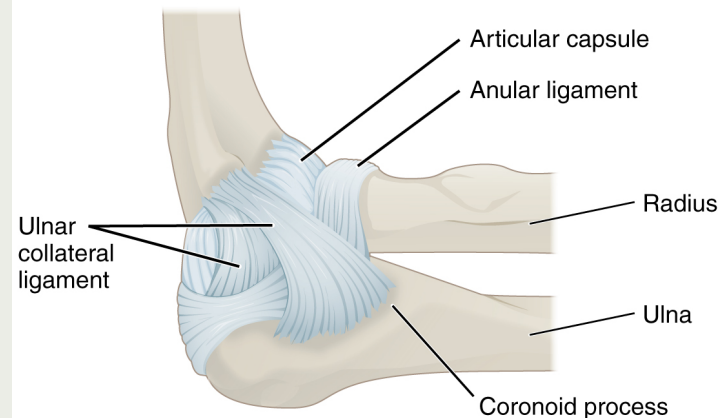
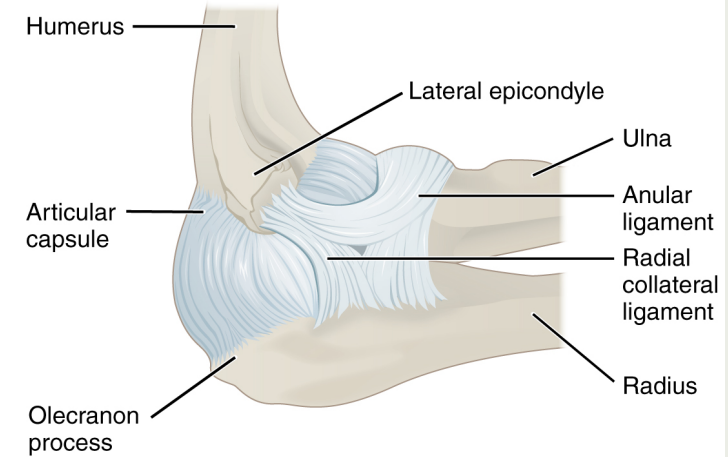
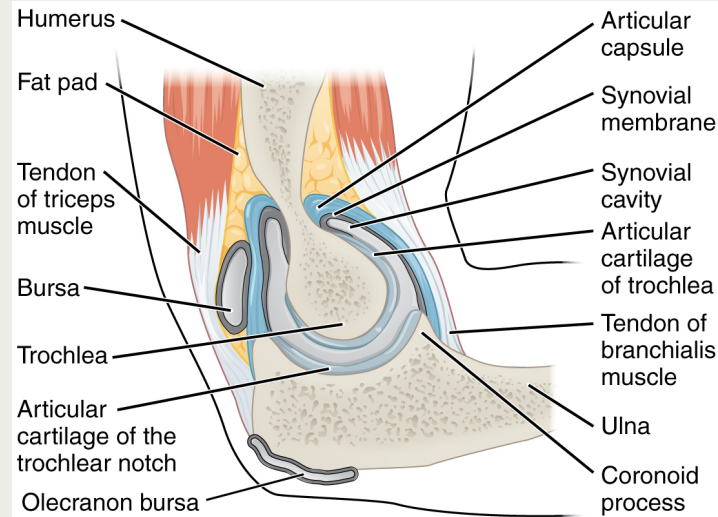
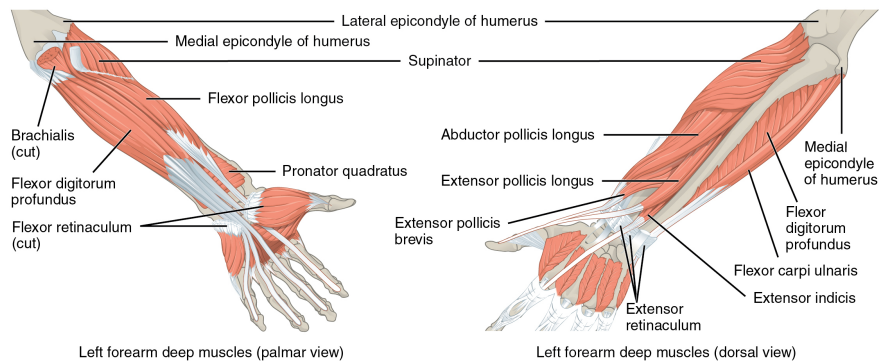
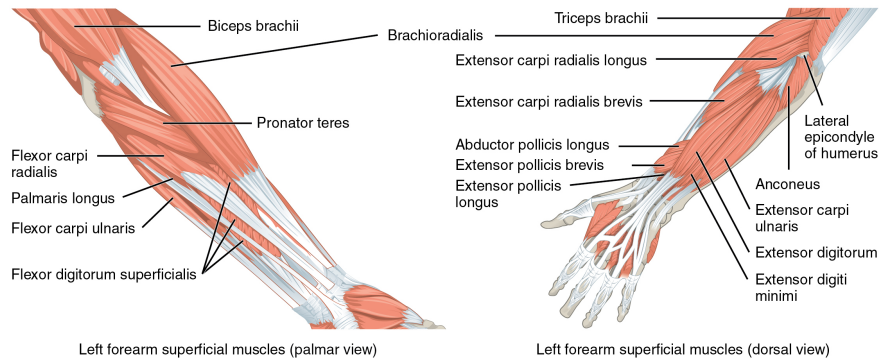
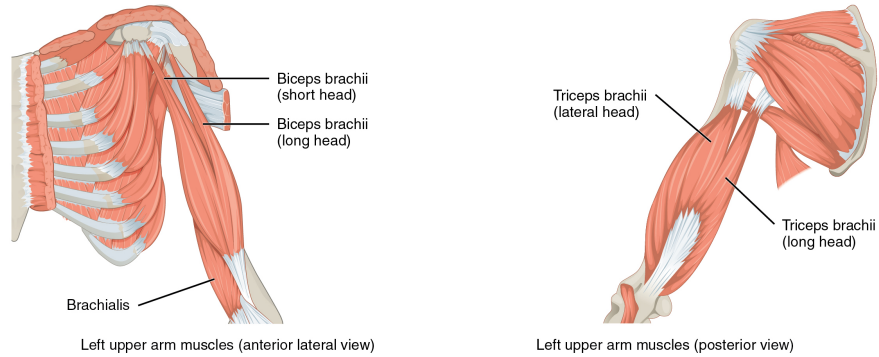
The International Federation of Sports Chiropractic
Fédération Internationale de Chiropratique du Sport

OBJECTIVES



- Review anatomy of the elbow, wrist, and hand
- Explore orthopedic pathologies that affect the elbow, wrist, and hand
- Discuss management strategies for pathologies of the elbow, wrist, and hand

ELBOW - ANATOMY



ELBOW - ASSESSMENT

- History

- PMHx, Family Hx, etc...
- Hx of Present Condition
 - Location of s/s
 - Onset of s/s
 - Mechanism of Injury (MOI)
 - Technique of ADLs or Sport
 - Throwing
 - Seroyer ST, Nho SJ, Bach BR, Bush-Joseph CA, Nicholson GP, Romeo AA. The kinetic chain in overhand pitching: its potential role for performance enhancement and injury prevention. *Sports Health*. 2010;2(2):135-146. doi:10.1177/1941738110362656

- Inspection

- Anterior Structures
 - Carrying Angle
 - Cubital Fossa
- Medial Structures
 - Medial Epicondyle
 - Flexor Mass
- Lateral Structures
 - Alignment of the wrist and forearm
 - Cubital Recurvatum
 - Extensor Mass
- Posterior Structures
 - Bony Alignment
 - Olecranon Process and Bursa

ELBOW - ASSESSMENT

- Palpation
 - Anterior Structures
 - Biceps Brachii
 - Cubital Fossa
 - Brachioradialis
 - Wrist Flexors
 - Pronator Teres
 - Flexor Carpi Radialis & Ulnaris
 - Palmaris Longus*
 - Medial Structures
 - Medial Epicondyle
 - Ulna
 - Ulnar Collateral Ligament (UCL)
- Lateral Structures
 - Lateral Epicondyle
 - Radial Head
 - Radial Collateral Ligament
 - Capitulum
 - Annular Ligament
 - Lateral Aspect of UCL

ELBOW - ASSESSMENT

- Palpation
 - Posterior Structures
 - Olecranon Process & Fossa
 - Triceps Brachii
 - Anconeus
 - Ulnar Nerve
 - Wrist Extensors
 - Extensor Carpi Ulnaris
 - Extensor Carpi Radialis Longus & Brevis
 - Finger Extensors
 - Extensor Digitorum
 - Extensor Digiti Minimi
- Thumb Musculature
 - Extensor Pollicis Longus & Brevis
- Radial Tunnel

ELBOW - ASSESSMENT

- Joint & Muscle Assessment
 - Goniometry
 - Flexion, Extension, Pronation, Supination
 - Active Range of Motion
 - Flexion, Extension, Pronation, Supination
 - Manual Muscle Testing
 - Flexion, Extension, Pronation, Supination
 - Passive Range of Motion
 - Flexion, Extension, Pronation, Supination
- Joint Stability Testing
 - Stress Testing
 - Valgus & Varus Testing
 - Joint Play Assessment
 - Humeroulnar
 - Radioulnar
- Neurological Screening
 - Upper Quarter Screening
 - Dermatomes
 - Myotomes
 - Deep Tendon Reflexes
- Region-Specific Pathologies & Selective Tissue Tests

ELBOW - PATHOLOGY

- Elbow Dislocation
 - Acute Onset
 - MOI: Axial load to the forearm when the arm is load bearing (e.g. FOOSH), forearm supinated
 - P! – Localized to the elbow, radicular symptoms may be described in the forearm, wrist, hand if neuro involvement
 - Predisposing Conditions:
 - Hx of elbow instability
 - Shallow olecranon fossa with prominent olecranon tip
 - Higher incidence rates in children
 - F'n Assessment
 - Limited ability to utilize the elbow and possible wrist, hand.
 - Inspection & Palpation
 - Obvious deformity and edema
 - TTP
 - ROM & MMT
 - Do not perform
 - Special (Stress) Testing
 - Do not perform
 - Neurovascular
 - Need to assess for impairments to the radial, median, and ulnar nerves
 - Radial pulse & capillary refill
 - Imaging
 - AP, lateral XR
 - Potentially CT if difficult to visualize with XR or other suspected ST issues
 - Angiography if necessary to R/O vascular injury
 - Note
 - May also occur concurrently with fx of coronoid process, radial head and/or olecranon process

ELBOW - PATHOLOGY

- Elbow Dislocation
 - Management
 - Refer to ED
 - Splint in place
 - Assess (& reassess) neurovascular
 - If absent, send via ambulance
 - Pillow and elastic wrap
 - Be sure you have continued access to radial pulse and fingers to assess NV
 - Monitor for shock
 - Transport via ambulance

ELBOW - PATHOLOGY

- Elbow Fx
 - Acute Onset
 - MOI: FOOSH; Hyperextension
 - P! – Localized to the elbow
 - Predisposing Conditions:
 - Skeletal immaturity, osteoporosis
 - F'n Assessment
 - Limited ability to utilize the elbow and possible wrist, hand.
 - Inspection & Palpation
 - Potential obvious deformity and edema
 - May not be present if intra-articular or non-displaced
 - TTP
 - ROM & MMT
 - Do not perform
- Special (Stress) Testing
 - Do not perform
- Neurovascular
 - Need to assess for impairments to the radial, median, and ulnar nerves
 - Radial pulse & capillary refill
- Imaging
 - AP, lateral XR
 - Fat pad sign – indicative of bleeding into the joint
 - Not always present
- Note
 - Distal humeral fx are often intraarticular
 - The fx may be open
 - Concurrent elbow dislocation may also occur

ELBOW - PATHOLOGY



ELBOW - MANAGEMENT

- Elbow Fx
 - Management
 - Refer to ED
 - Splint in place
 - Assess (& reassess) neurovascular
 - If absent, send via ambulance
 - Pillow and elastic wrap
 - Be sure you have continued access to radial pulse and fingers to assess NV
 - Monitor for shock
 - Transport via ambulance



<https://felixwong.com/gallery/images//fractured-elbow-x-rays-jul-2016-001.jpg>

ELBOW - PATHOLOGY

- Ulnar Collateral Ligament (UCL) Sprain
 - Acute or Insidious Onset
 - MOI:
 - Acute – Valgus force
 - Insidious – Repetitive activities from valgus stress activities
 - P!: Medial Elbow
 - Predisposing Conditions:
 - IR deficits
 - F'n Assessment
 - OH Throwing Pt's will describe a significant decrease in velocity/accuracy/endurance
 - Pain during the late cocking or early acceleration phases of throwing
 - Inspection & Palpation
 - Effusion, ecchymosis may be present
 - Potential scapular dyskinesis with AROM
 - TTP medial epicondyle to coronoid process
- ROM & MMT
 - AROM may be limited secondary to p!, but usually full
 - MMT decreased with wrist flexors (pain may be present)
 - PROM may be painful at endrange with supination, extension, and wrist extension
- Special (Stress) Testing
 - Valgus Testing at 15-25° elbow flexion
- Neurovascular
 - Usually unremarkable
- Imaging
 - Usually not necessary
 - Suspected Tear – MRI
 - May see gapping with stress on XR in OH throwing Pt's with medial opening

ELBOW - MANAGEMENT

- Ulnar Collateral Ligament (UCL) Sprain
 - Management
 - RICE, NSAIDs, Manual Therapy, etc...
 - Dry Needling
 - Therapeutic Exercises
 - Examine and correct poor mechanics
 - E.g. Quality throwing mechanics?
 - Be sure to look beyond the elbow/wrist...
 - Strengthening elbow flexors and extensors



https://upload.wikimedia.org/wikipedia/commons/9/9b/Chaz_Roe_2017_GCL_Braves_Rehab.jpg

ELBOW - PATHOLOGY

- Lateral Epicondylalgia (“Tennis Elbow”)
 - Insidious Onset
 - MOI:
 - Overuse with repeated, forceful wrist extension (especially eccentric muscle contractions)
 - P!: Lateral epicondyle, common wrist extensor tendon mass
 - Predisposing Conditions:
 - Rotator cuff pathology, deQuervain’s dz, carpal tunnel synd, smoking, oral corticosteroid therapy
 - F’n Assessment
 - P!, weakness or compensation with activities that require grip or repetitive elbow flexion and extension
 - Inspection & Palpation
 - P!, possible crepitus, potential swelling over lateral epicondyle and common extensor mass
- ROM & MMT
 - AROM: Pain with wrist ext/elbow flex.
 - Pro & Sup may be limited secondary to pain
 - MMT: Pain with wrist ext and MCP joint ext with elbow ext
 - PROM: P! at or limited endrange of passive wrist flex with elbow extended
- Special (Stress) Testing
 - Stress testing is unremarkable
 - Tennis Elbow test
- Neurovasuclar
 - Usually unremarkable
- Imaging
 - Usually not necessary
 - Suspected Tendon Degeneration – MRI
 - MSKUS – Visualize tendon thickening

ELBOW - PATHOLOGY

- Medial Epicondylalgia (“Little Leaguer’s Elbow”)
 - Insidious Onset
 - MOI:
 - Repeated, forceful wrist flexion or pronation
 - P!: Medial epicondyle, common wrist flexor mass and pronators
 - Predisposing Conditions:
 - Repeated activities that eccentrically load the medial elbow musculature (e.g. golfing, throwing)
 - F’n Assessment
 - Decreased grip strength
 - P! or compensation patterns with activities that require gripping or repetitive elbow flexion/extension
 - Inspection & Palpation
 - P!, possible crepitus, potential swelling over medial epicondyle and common flexor mass
- ROM & MMT
 - AROM: Pain with wrist ext/elbow flex.
 - Pro & Sup may be limited secondary to pain
 - MMT: Pain with wrist ext and MCP joint ext with elbow ext
 - PROM: P! at or limited endrange of passive wrist flex with elbow extended
- Special (Stress) Testing
 - Unremarkable
- Neurovasuclar
 - May want to screen upper quarter to R/O cervical involvement
 - Usually unremarkable
- Imaging
 - Usually not necessary
 - XR to R/O osteophytes, arthritis, OCDs, Fx
 - Suspected Tendon Degeneration – MRI
 - MSKUS – Visualize tendon thickening

ELBOW - MANAGEMENT

- Lateral & Medial Epicondylalgia Management
 - RICE, NSAIDs, Manual Therapy, etc...
 - Dry Needling
 - Therapeutic Exercises
 - Examine and correct poor mechanics
 - E.g. Are they gripping the racquet correctly?
Quality throwing mechanics?
 - Be sure to look beyond the elbow/wrist...
 - Strengthening shoulder/rotator cuff
 - “Tennis Elbow” Straps



ELBOW - PATHOLOGY

- Distal Biceps Tendon Rupture
 - Acute Onset
 - MOI:
 - Eccentric loading of biceps brachii with elbow flexed
 - P! : at cubital fossa that decreases over time
 - Predisposing Conditions:
 - 40 y.o.+ , hx of smoking, anabolic steroid use, statin use
 - F'n Assessment
 - Demonstrates or describe weakness with lifting activities
 - Inspection & Palpation
 - Palpable defect at distal biceps tendon
 - may be obscured by swelling; try having Pt hold elbow at 90° flexion and resist
- ROM & MMT
 - AROM: Potentially WNL but could be decreased secondary to pain with elbow flex/ext or pro/sup
 - MMT: Decreased strength of elbow flexors, forearm sup
 - PROM: WNL but may be painful if a partial tear is present
- Special (Stress) Testing
 - Hook Test
- Neurovascular
 - Usually unremarkable
 - May have radial neuropathy secondary to trauma
- Imaging
 - XR, MRI, CT can be ordered to R/O avulsion of radial tuberosity and/or concomitant fx

ELBOW - MANAGEMENT

- Distal Biceps Tendon Rupture
 - Conservative Management
 - RICE, NSAIDs, Manual Therapy, etc...
 - Dry Needling
 - Surgical Intervention is Preferred
 - Therapeutic Exercises
 - Full ROM takes ~8 weeks
 - Progressive strengthening of elbow flexors and extensors once full ROM returns



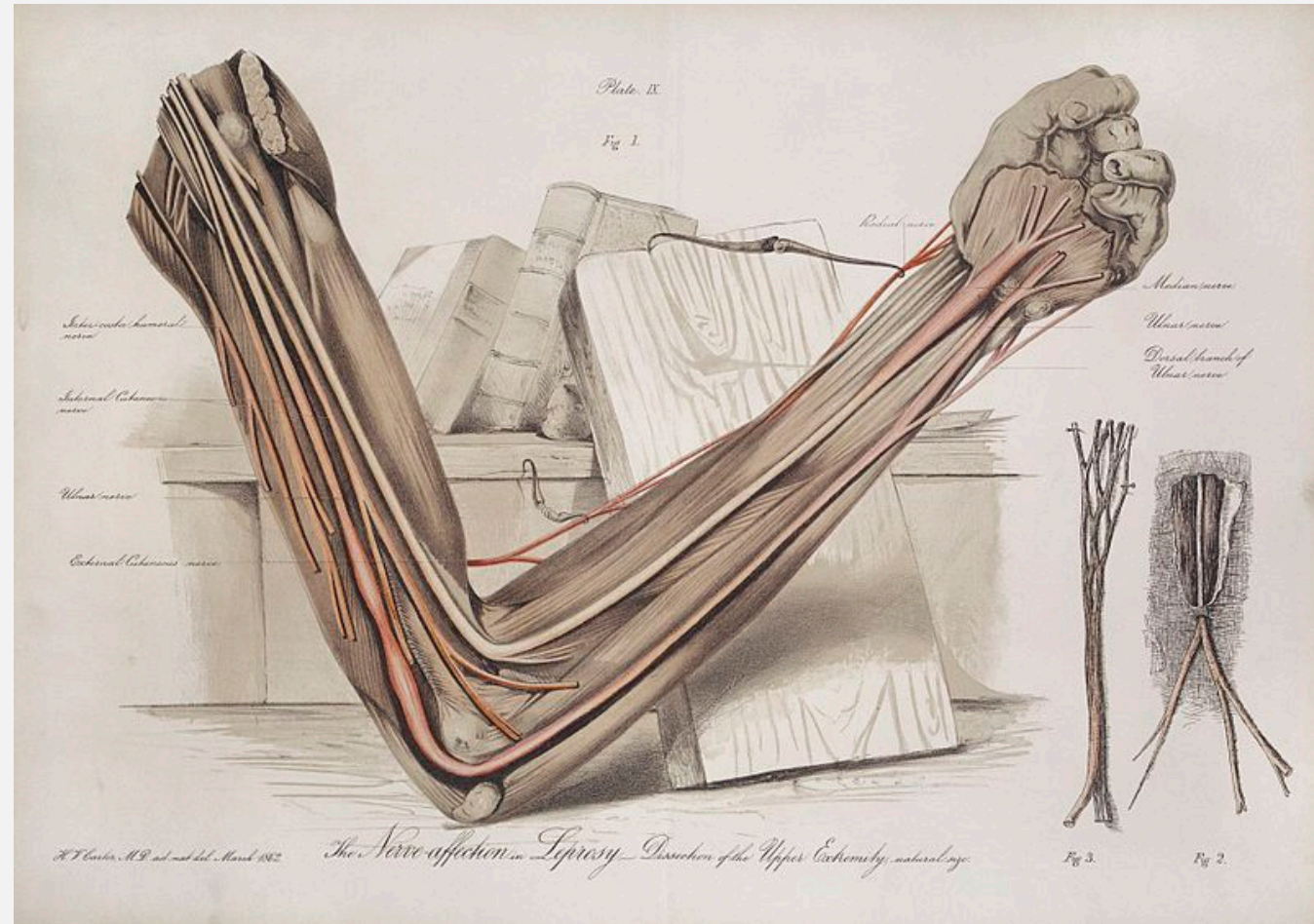
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ELBOW - PATHOLOGY

- Elbow Neuropathy
 - Insidious Onset
 - MOI: Nerve compression, traction, or inflammation
 - P!:
 - Ulnar: medial aspect of elbow, forearm
 - Median: anterior forearm
 - Radial: proximal dorsal forearm, wrist extensor region
 - Note: Other s/s (paresthesia, N/T) can follow along the nerve's dermatome, myotome
 - Predisposing Conditions:
 - Diabetes, circulatory impairments, Fx
 - F'n Assessment
 - F'n of the elbow/hand may deteriorate over time
 - Inspection & Palpation
 - Swelling may be present
 - Pain or paresthesia may be present along the nerve
- ROM & MMT
 - AROM: May be limited
 - MMT: Weakness in muscles innervated by the nerve
 - PROM: Increased s/s when nerve is maximally tensioned
- Special (Stress) Testing
 - Tinel's Sign
- Neurovascular
 - Upper quarter screening to R/O cervical involvement
 - Electrodiagnostics may be necessary for definitive diagnosis (e.g. Nerve Conduction Study)
- Imaging
 - AP, lateral, oblique XR may help visualize bony involvement contributing to s/s
- Note: The nerve may be compressed at several points along its length

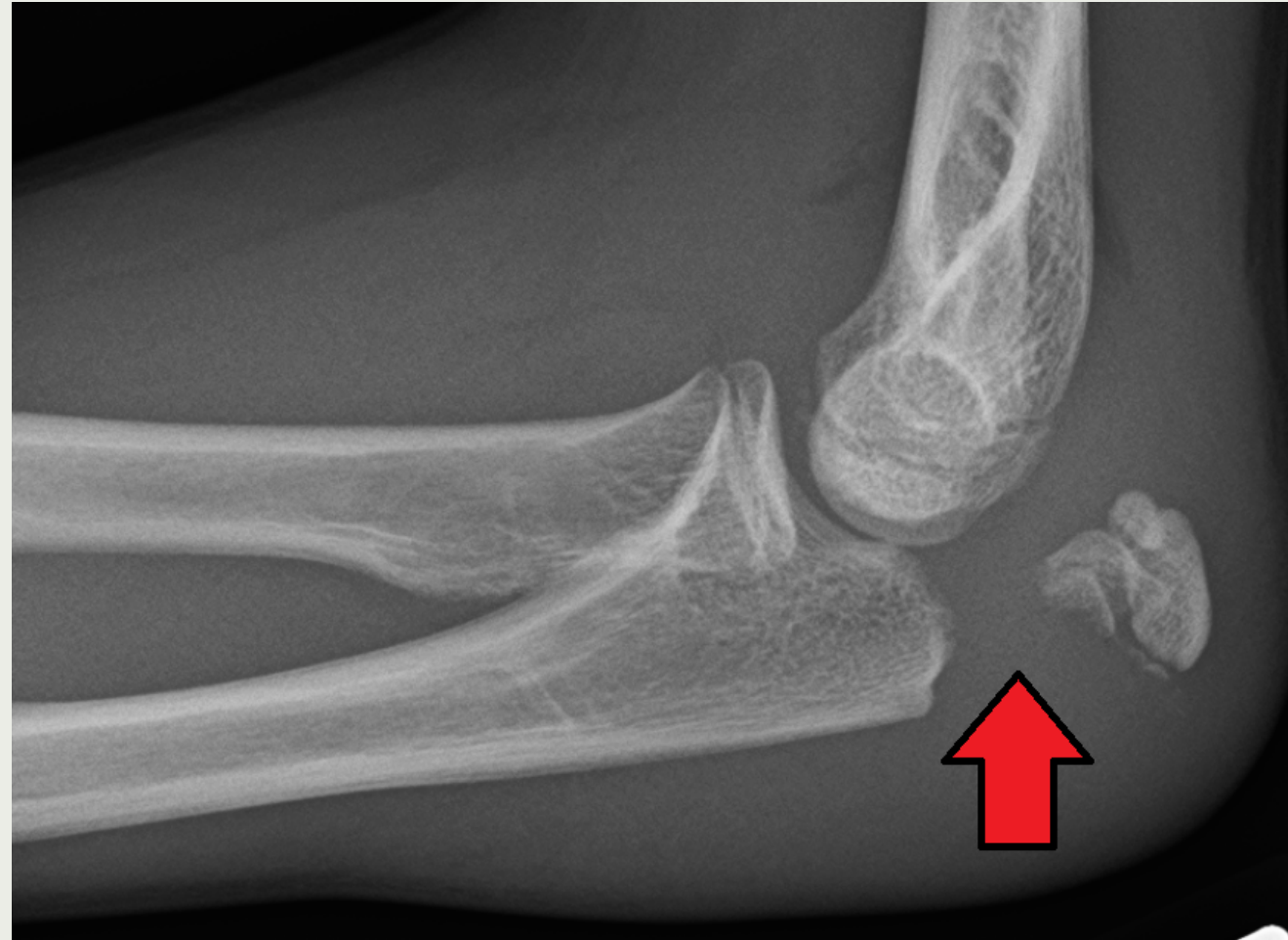
ELBOW - MANAGEMENT

- Elbow Neuropathy
 - Management
 - Really depends on the etiology
 - RICE, NSAIDs, Manual Therapy, etc...
 - Dry Needling
 - Therapeutic exercises
 - Work on correcting muscular imbalances to try to “offload pressure” on the nerve from one area to another
 - Surgical Intervention
 - Entrapments



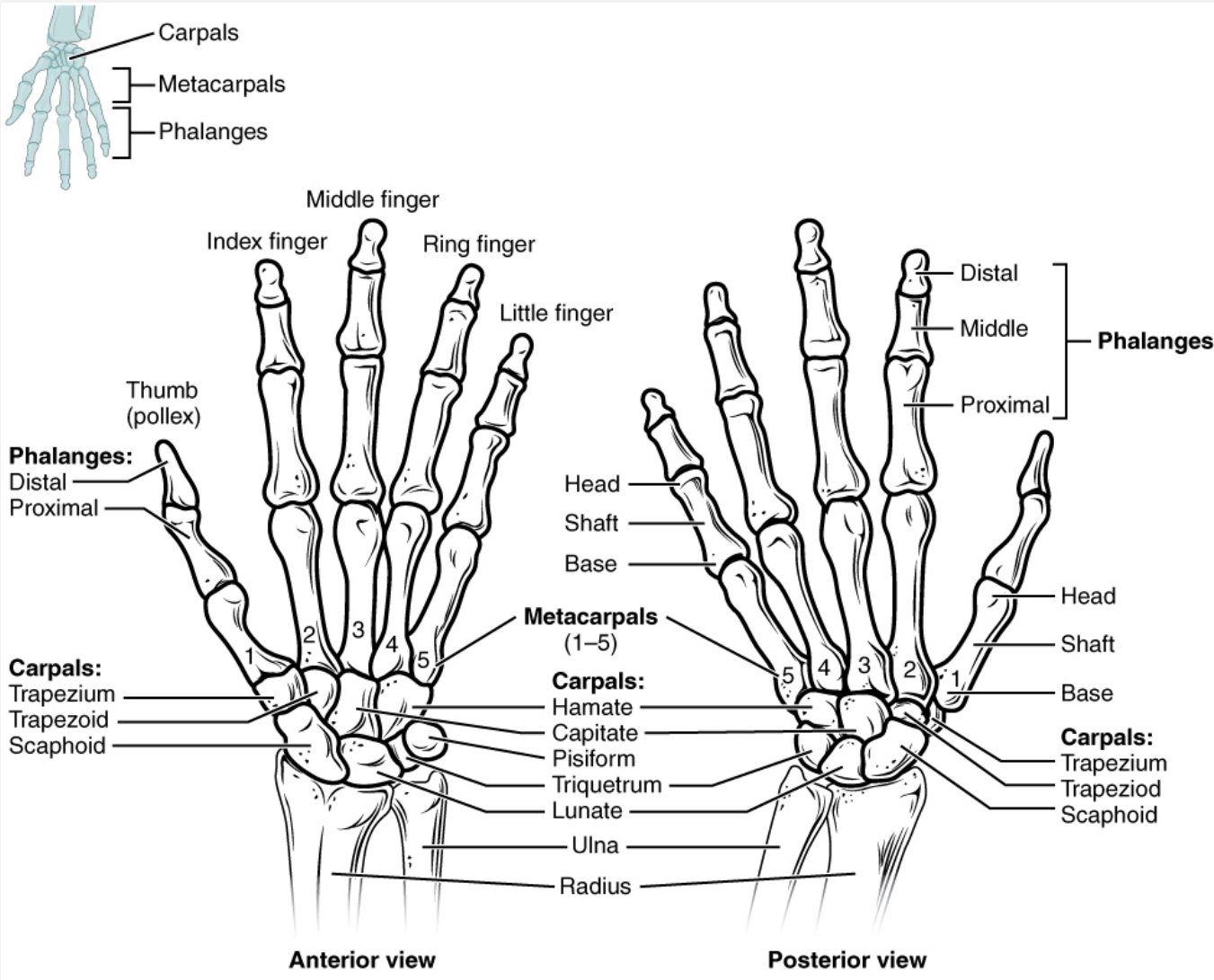
ELBOW - MANAGEMENT

- On-Field Assessment
 - Hx
 - How was the UE position at the time of the injury?
 - What type of force was involved?
 - Physical Exam
 - Inspect:
 - Alignment of forearm and wrist
 - Posterior triangle of the elbow
 - Palpate:
 - Alignment of the elbow
 - Collateral ligaments
 - Radius and Ulna
 - ROM & MMT
 - AROM, MMT, PROM
 - Neuro

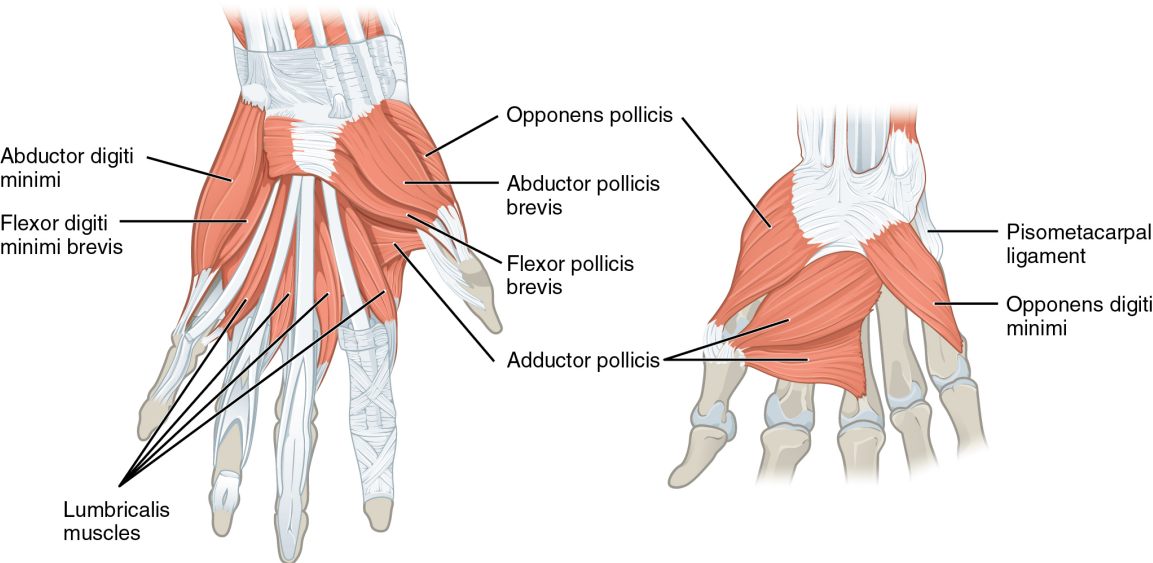


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WRIST & HAND - ANATOMY

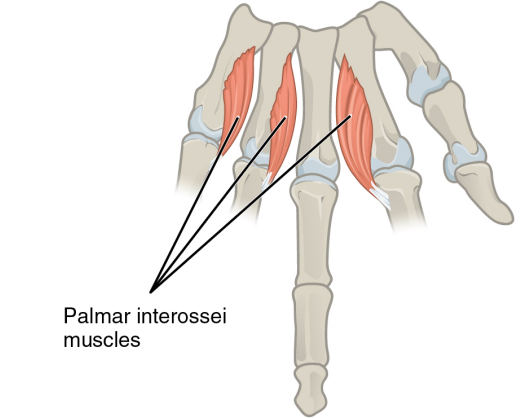


WRIST & HAND - ANATOMY

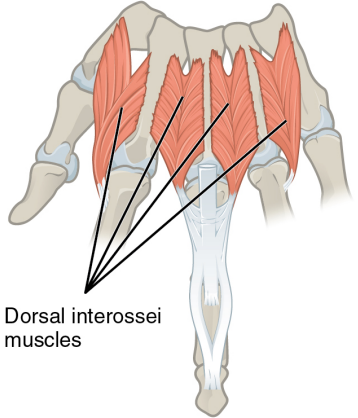


Superficial muscles of left hand (palmar)

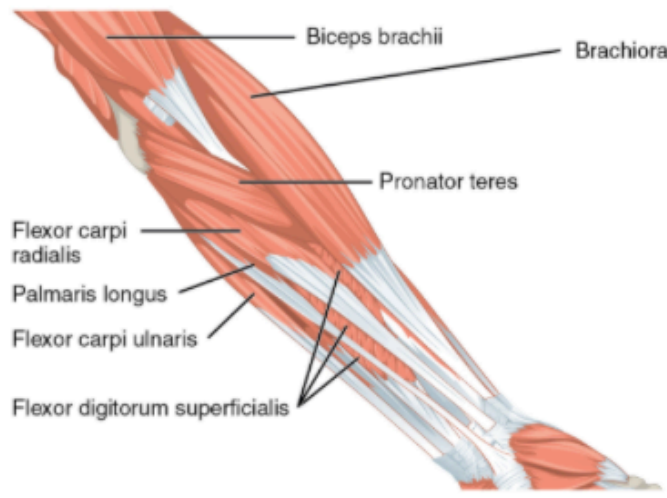
Deep muscles of left hand: (dorsal view)



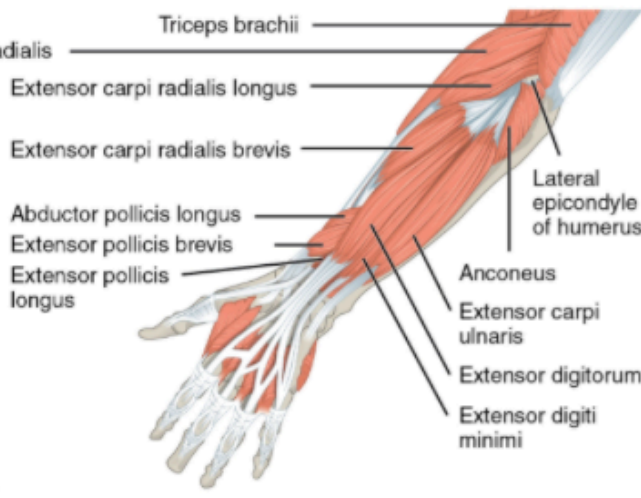
Interossei muscles of left hand (palmar view)



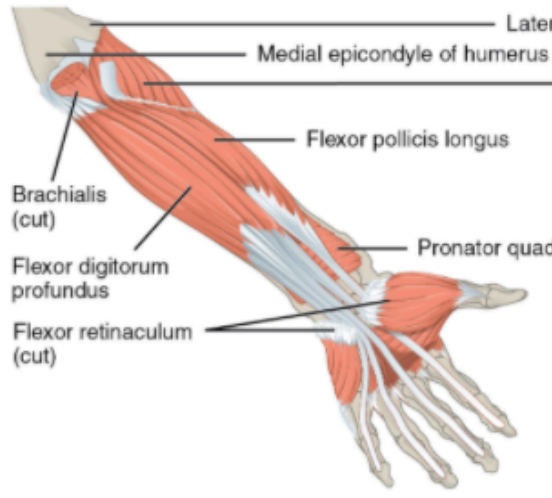
Interossei muscles of left hand (dorsal view)



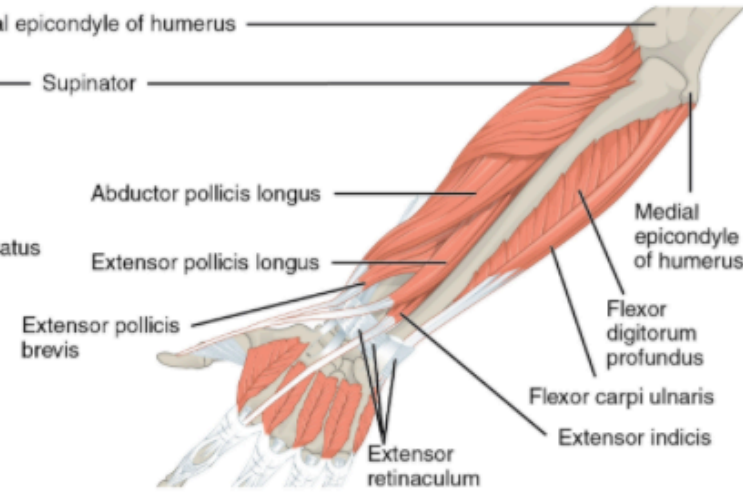
Left forearm superficial muscles (palmar view)



Left forearm superficial muscles (dorsal view)



Left forearm deep muscles (palmar view)



Left forearm deep muscles (dorsal view)

https://upload.wikimedia.org/wikipedia/commons/0/0e/1121_Intrinsic_Muscles_of_the_Hand.jpg

https://upload.wikimedia.org/wikipedia/commons/7/73/1120_Muscles_that_Move_the_Forearm.jpg

WRIST & HAND - ASSESSMENT

- History
 - PMHx, Family Hx, etc...
 - Hx of Present Condition
 - Location of s/s
 - Onset of s/s
 - Mechanism of Injury (MOI)
 - Changes in activity
 - Functional Assessment
 - “What activities make s/s worse?”
 - ADLs, Throwing, ...
 - General Inspection
 - Wrist/hand posture
 - Gross deformities
 - Palmar creases
 - Lacerations or scars
 - Russell’s Sign
- Inspection of the Wrist/Hand
 - Continuity of Radius and Ulna
 - Continuity of Carpals and Metacarpals
 - Alignment of MCP IP Joints
 - Ganglion Cyst
- Inspection of the Fingers and Thumb
 - Skin and Fingernails
 - Subungual Hematoma
 - Paronychia
 - Alignment of the Fingernails
 - Muscle Contour
 - Atrophy?
 - Finger Posture

WRIST & HAND - ASSESSMENT

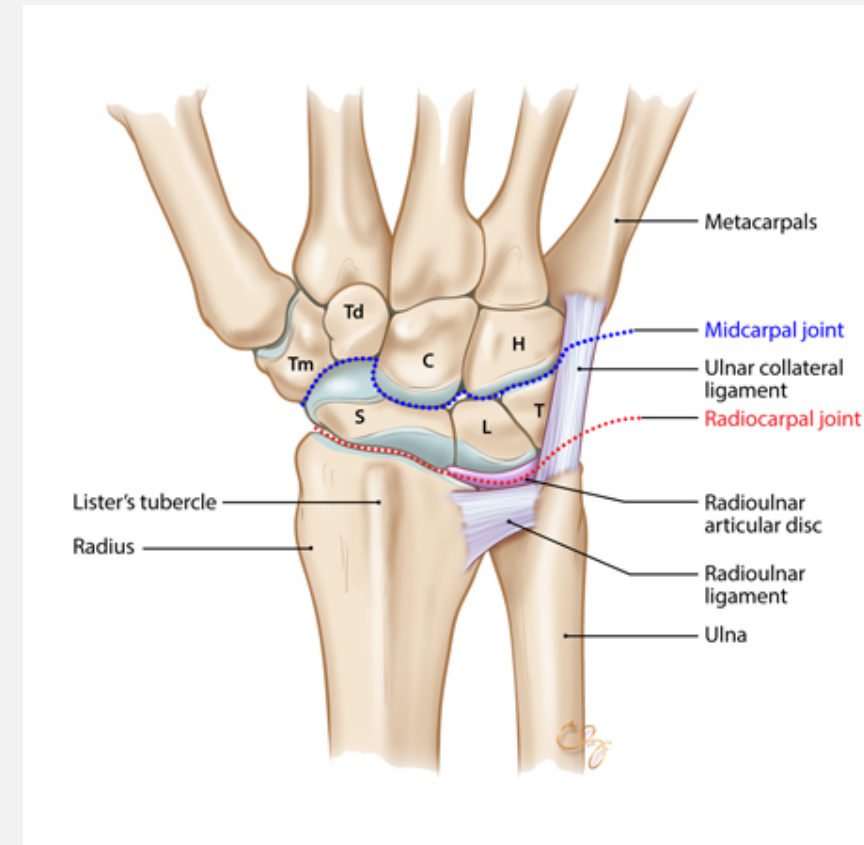
- Palpation

- Palmar Wrist

- Radius
- Flexor Carpi Radialis
- Palmaris Longus
- Carpal Tunnel
- Ulna
- Flexor Carpi Ulnaris
- Triangular Fibrocartilage Complex
- Pisiform
- Hamate

- Dorsal Wrist

- Ulna
- Ulnar Styloid Process
- Ulnar Collateral Ligament
- Extensor Carpi Ulnaris
- Lister's Tubercle
- Distal Radius/Styloid Process
- Radial Collateral Ligament
- Carpals...
 - Scaphoid, Lunate, Hamate
- Extensor Carpi Radialis Longus & Brevis



WRIST & HAND - ASSESSMENT

- Palpation
 - Hand
 - Thenar Eminence
 - Central Compartment
 - Hypothenar Compartment
 - Metacarpals
 - Phalanges
 - MCP Collateral Ligaments
 - IP Collateral Ligaments
 - Extensor Digitorum
 - Extensor Pollicis Longus
 - Abductor Pollicis Longus & Brevis

WRIST & HAND - ASSESSMENT

- Joint & Muscle Function Assessment

- Wrist

- Goniometry
- Active ROM, then MMT, then Passive ROM
 - Flexion, Extension
 - Radial & Ulnar Deviations

- Thumb

- Goniometry
- Active ROM, then MMT, then Passive ROM
 - Flexion, Extension
 - Abduction, Adduction, Opposition

- Fingers

- Goniometry
- ROM
 - MCP Flex, Ext, Abd, Add
 - PIP Flex
- Grip Dynamometry?



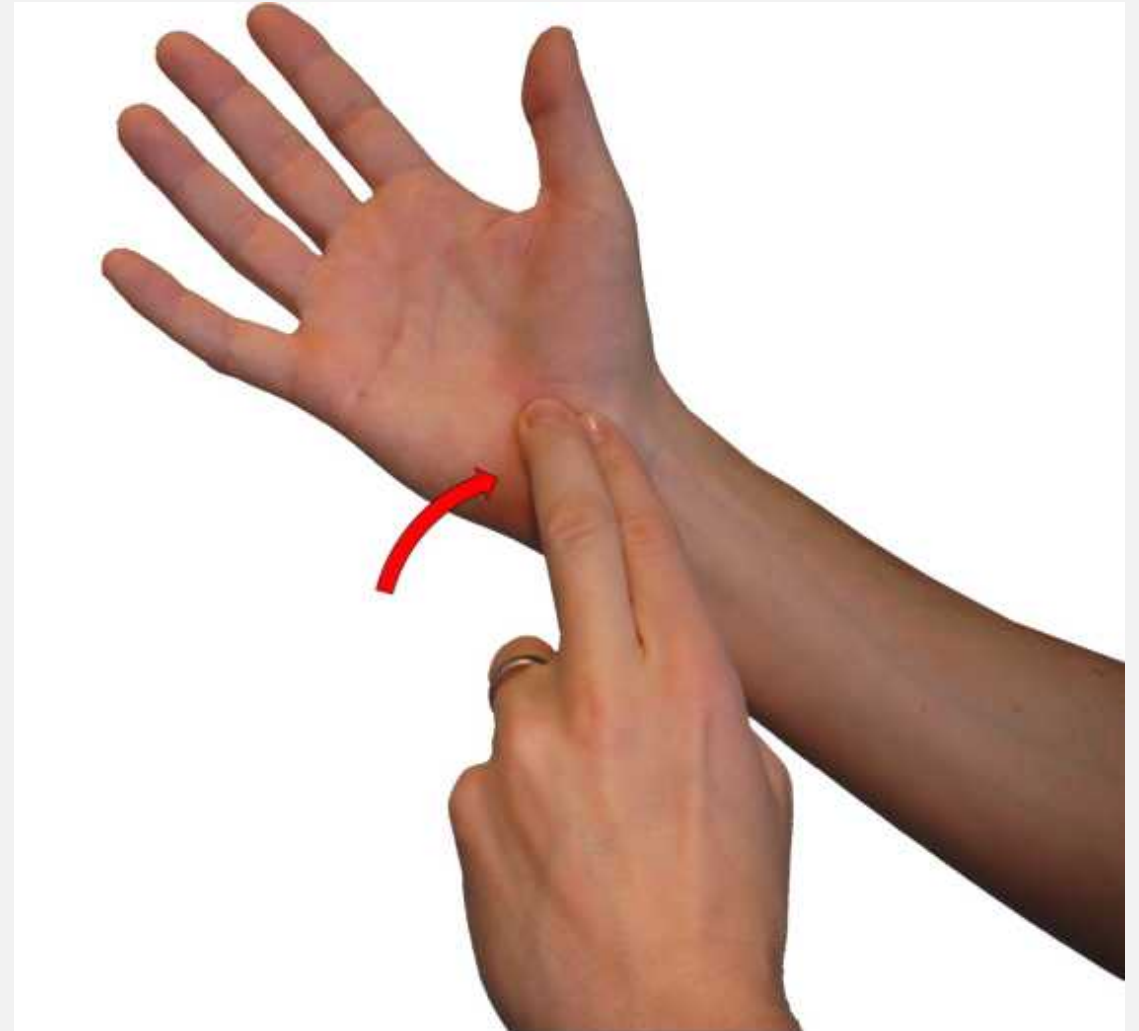
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WRIST & HAND - ASSESSMENT

- Joint Stability Tests – Compare Bilat.
 - Wrist Stress Tests
 - Radial Collateral Ligament (RCL)
 - Ulnar Collateral Ligament (UCL)
 - Finger (PIP & DIP) Stress Tests
 - RCLs & UCLs
 - Wrist Joint Play Assessment
 - Radial, Ulnar, Dorsal, & Palmar Glides
 - Hand Joint Play Assessment
 - Intercarpal Glides
- Neurological Screening
 - Not always necessary
 - Upper Quarter Screening
 - Tinel's Sign



WRIST & HAND - PATHOLOGY

- Finger Deformities
 - Jersey Finger
 - Avulsion of the Flexor Digitorum Profundus Tendon
 - Pt is unable to flex the DIP.
- Treatment
 - Referral (within 24 hours) to Hand Specialists → Surgery
 - Splinting – DIP joint in flexion
 - Concern for lack of vascular supply if left uncorrected.



WRIST & HAND - PATHOLOGY

- Finger Deformities
 - Mallet Finger
 - Avulsion of the Extensor Digitorum Tendon
 - Pt is unable to actively extend the DIP
 - DIP is postured at approx. 25°-35° flex.
 - Treatment
 - Splint DIP in extension
 - 3-4 wks
 - Removal of the splint can “restart” the healing process
 - Referral to Hand Specialists
 - Although rare, surgery may be necessary

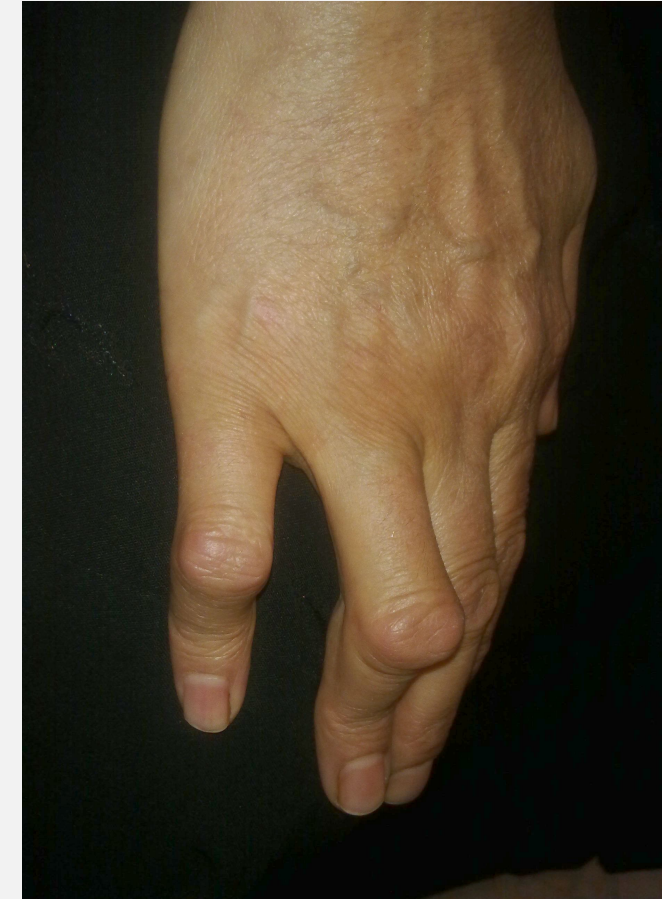


WRIST & HAND - PATHOLOGY

- Finger Deformities
 - Boutonnière Deformity
 - Avulsion of the Extensor Digitorum Tendon
 - Pseudoboutonnière Deformity
 - Rupture of the volar plate
- Treatment
 - Splint PIP & DIP in extension
 - 3-6 wks
 - Therapeutic exercises
 - Referral to Hand Specialists
 - Although rare, surgery may be necessary



Photo Credit: Kevin M. Schroeder (2020)



WRIST & HAND - PATHOLOGY

- Distal Forearm Fx's
 - Acute Onset
 - MOI:
 - Hyperext. of wrist with possible rotation (e.g. FOOSH)
 - P!: Immediate, sharp over distal forearm/proximal wrist
 - Predisposing Conditions:
 - Osteoporosis
 - F'n Assessment
 - None
 - Inspection & Palpation
 - Possible gross deformity
 - Open fx are readily apparent → immediate ED referral
 - Bony palpation may be omitted if gross deformity present
 - May be a discontinuation or TTP along long bones
- ROM & MMT
 - Do not conduct if fx is suspected
- Special (Stress) Testing
 - N/A
- Neurovasuclar
 - Continuously assess vascularity
 - Distal pulse and/or capillary refill
 - Assess ulnar, median, radial nerve distributions
- Imaging
 - XR
- Treatment
 - Splint
 - Monitor for shock
 - Immediate referral to ED or Ortho

WRIST & HAND - PATHOLOGY

- Colles' Fx



WRIST & HAND - PATHOLOGY

- Scaphoid Fx
 - Acute onset, but may delay seeking care because of the “minor nature” of the sensation
 - MOI:
 - Forceful hyperext. of wrist that compresses scaphoid
 - P!: Prox. portion of lat. wrist, anatomical snuffbox
 - Predisposing Conditions:
 - Younger than 40 y.o., male, sports
 - F'n Assessment
 - Reduced grip strength, pain with grip and activities that require ulnar deviation
 - Inspection & Palpation
 - Possible swelling, TTP in anatomical snuffbox
 - ROM & MMT
 - AROM: P! at terminal wrist ROM, esp. with wrist ext. and UD
 - MMT: Unremarkable
 - PROM: Overpressure produces P! with wrist ext. and UD
- Special (Stress) Testing
 - Stress of RCL increases lateral wrist pain due to compression
 - P! may increase with radiocarpal joint play
 - Scaphoid Compression Test
 - Compress 1st MC towards the scaphoid
- Neurovasuclar
 - Screening is WNL
- Imaging
 - PA XR (wrist neutral/sight UD, lateral, 45° pro and sup)
 - Sensitivity and specificity are lower in days immediately following trauma
 - CT
- Treatment
 - Needs to be evaluated by hand specialist
 - Vascular compromise can be difficult to assess clinically (even with radiographs) → necrosis of scaphoid

WRIST & HAND - PATHOLOGY

- Hamate Fx
 - Acute onset
 - MOI:
 - FOOSH, force transmitted via an object into hand (e.g. golf club, baseball bat, racquet), axial load to hamate, direct blow to hamate.
 - P!: Ulnar sided hand pain adjacent to 5th MC (over time, P! becomes diffuse)
 - F'n Assessment
 - Reduced grip strength, pain with grip
 - Inspection & Palpation
 - Possible swelling, TTP over hamate
 - ROM & MMT
 - AROM: P! with Abd/Add of the 5th finger
 - MMT: P! during resisted flex of 4th/5th fingers with wrist in UD or P! with resisted Abd of 5th MCP
 - PROM: P! with passive ext. of wrist and 5th (and maybe 4th) MCP
- Special (Stress) Testing
 - WNL
- Neurovasuclar
 - Potential paresthesia of 4th/5th fingers if ulnar nerve trauma also present
- Imaging
 - XR – carpal tunnel view (with wrist sup)
 - Potential for false negative
 - CT
- Treatment
 - Needs to be evaluated by hand specialist
 - Misdiagnosis or untreated → malunion or nonunion

WRIST & HAND - PATHOLOGY

- Perilunate or Lunate Dislocations
 - Acute onset
 - MOI:
 - Forced hyperextension or wrist/hand (FOOSH); may be an UD with perilunate dislocation
 - P!: Lateral wrist and hand
 - F'n Assessment
 - Reduced grip strength, pain with grip
 - Inspection & Palpation
 - Possible swelling
 - Lunate can be very prominent with palpation if displaced
 - ROM & MMT
 - AROM: Limited wrist ext. Finger flex may be P!
 - MMT: P!, weakness with PIP, DIP flex, but possibly unremarkable
 - PROM: Limited wrist ext. (Pt will be apprehensive at end range), Passive finger ext may produce P!
- Special (Stress) Testing
 - None
- Neurovascular
 - Possible median nerve impingement (paresthesia along distribution)
- Imaging
 - XR – AP, PA, Lateral
 - CT
- Treatment
 - Needs to be evaluated by hand specialist
 - R/O Scaphoid Fx

WRIST & HAND - PATHOLOGY

- Scapholunate Dislocations
 - Acute onset
 - MOI:
 - Tensile forces placed on ligaments as joint is forced past normal ROM
 - P!: Emanates from the palmar and dorsal sides near wrist joint line
 - F'n Assessment
 - Reduced grip strength, pain with grip, Pt may protect ROM
 - Inspection & Palpation
 - Possible swelling (if acutely evaluated)
 - TTP over scapholunate joint
 - ROM & MMT
 - AROM: Decreased wrist flex/ext
 - MMT: Unremarkable
 - PROM: Limited wrist flex/ext
- Special (Stress) Testing
 - Potential for hypermobility at scapholunate joint
- Neurovascular
 - WNL
- Imaging
 - MRI tend to be more specific than CTs
 - May see with clenched fist AP XR
- Treatment
 - Conservative tx rarely is successful
 - Referral to hand specialist

WRIST & HAND - PATHOLOGY

- Triangular Fibrocartilage Complex (TFCC) Injury
 - Traumatic or degenerative
 - If acute, Pt may not report the injury for some time
 - MOI: FOOSH, repeated and/or forced wrist hyperext.
 - P!: Distal to ulna along medial half of wrist, wrist UCL may also be tender
 - Note: there may be an audible click present
 - F'n Assessment
 - Increased s/s with Wt. bearing of arm or with activities that require Ulnar or Radial Deviation
 - Inspection & Palpation
 - Diffuse swelling around wrist is possible, but not usually
 - TTP distal to ulna along the medial half of wrist joint line
 - Potential TTP over wrist UCL
 - ROM & MMT
 - AROM: Limited secondary to P! (esp. with wrist ext, UD)
 - MMT: Unremarkable
 - PROM: Limited secondary to P! (esp. at end ranges)
 - Movement into UD may reproduce clicking sensation or sound
- Special (Stress) Testing
 - Stress of wrist UCL may elicit P! but no laxity
 - P! with lateral and/or medial radiocarpal joint play
- Neurovascular
 - WNL
- Imaging
 - MRI/MRA
- Treatment
 - Try conservative interventions first
 - Manual therapy
 - Therapeutic exercises: wrist, grip strengthening
 - Referral to hand specialist → surgery
- Note: Recurrent radiopalmar ganglion cysts may be associated with TFCC tears

WRIST & HAND - PATHOLOGY

- Carpal Tunnel Syndrome (CTS)
 - Insidious Onset
 - MOI: Repetitive wrist movement involving flex/ext
 - P!: Radiates along the median nerve distribution; made worse with activities with wrist flex/ext (sleeping, typing)
 - F'n Assessment
 - Forward head, neck, shoulder posture may be observed with ADLs
 - Shaking of the hand
 - Inspection & Palpation
 - Palmar aspect of wrist may be thickened
 - Atrophy of thenar eminence
 - TTP or tenderness with sustained pressure over the palmar aspect of the wrist
 - ROM & MMT
 - AROM: May be slightly limited due to stiffness, although most likely WNL
 - MMT: If chronic, strength decreases may be seen with abductor pollicis brevis, flexor pollicis brevis, or opponens pollicis
 - PROM: Median nerve s/s may increase with wrist flex/ext
- Special (Stress) Testing
 - Tinel's Sign
 - Phalen's Test
- Neurovascular
 - Possible decreased sensation along median nerve distribution
 - 2-Point Discrimination
- Imaging
 - XR – R/O bony involvement
 - MRI – visualize ST compression in the tunnel
- Treatment
 - Activity modification
 - including breaks from activity and good posture
 - Splints
 - Meds: NSAIDs, corticosteroids
 - Manual therapy
 - Therapeutic exercises: wrist, grip strengthening
 - Referral to hand specialist → surgery for surgical release of tunnel

WRIST & HAND - PATHOLOGY

- Metacarpal (MC) Fx
 - Acute onset
 - MOI: Longitudinal compression (punch), crush force (stepped on), shear force (finger hypertext.)
 - P!: Along diaphysis of MC
 - F'n Assessment
 - Difficulty and P! with grip
 - Inspection & Palpation
 - Possible gross deformity
 - Localized swelling over MC
 - Fx of 5th (sometimes 4th) may result in shortening of knuckles
 - Abnormal fingernail rotation with fist
 - Do not palpate if gross deformity is present
 - TTP over fx site if palpation is indicated
 - Bony fragments or crepitus may be present
 - Visualization of a false joint
 - “Tenting”
- ROM & MMT
 - Should not be performed if suspected
- Special (Stress) Testing
 - Long bone compression test
 - Do not perform if fx is present
- Neurovasuclar
 - WNL, but monitor distal capillary refill
- Imaging
 - XR
- Treatment
 - Referral to ED; may need intervention from hand specialist



WRIST & HAND - PATHOLOGY

- DeQuervain's Syndrome
 - Insidious Onset
 - MOI: Repetitive stress usually involving RD
 - P!: Over extensor pollicus brevis and abductor pollicus longus, radial styloid process and thenar eminence. Possibly extends into distal forearm. P! increases with UD and RD.
 - F'n Assessment
 - Increased s/s with activities involving RD
 - Inspection & Palpation
 - Swelling over radial styloid process and surrounding tendons
 - ROM & MMT
 - AROM:
 - Wrist – pain with UD and RD;
 - Thumb – P! with flex, ext, add, abd
 - MMT:
 - Wrist – P! with RD
 - Thumb – P! with ext and abd of CMC
 - PROM:
 - Wrist – Pain at endrange of UD
 - Thumb – P! with flex and add of CMC
- Special (Stress) Testing
 - Finkelstein's Test
- Neurovascular
 - WNL
- Imaging
 - Generally none
- Treatment
 - Activity modification
 - Ice
 - Splinting
 - NSAIDs usually are not helpful
 - Surgery – release tendon sheaths
 - High success rate with few complications

WRIST & HAND - PATHOLOGY

- Ulnar Collateral Ligament (UCL) Sprains
 - Acute or Chronic
 - MOI:
 - Acute – hyperext or hyperabd of first MCP
 - P!: Along ulnar aspect of first MCP
 - F'n Assessment
 - Increased P! or weakness with grip tasks
 - Inspection & Palpation
 - Localized (possibly extensive) swelling in adductor compartment and thenar eminence; possible ecchymosis
 - ROM & MMT
 - AROM: P! during ext, abd, and opposition of thumb
 - MMT: Weakness experienced during MCP flex and CMC add; pinch grip strength decreased
 - PROM: P! at endrange of thumb ext and abd
- Special (Stress) Testing
 - UCL Ligament Stability Test
 - Valgus Stress Test
 - May see increased ulnar glide of the MCP joint
- Neurovascular
 - WNL
- Imaging
 - XR if you need to R/O avulsion fx
- Treatment
 - Depends on severity...
 - Less severe – conservative therapies
 - RICE, NSAIDs, therapeutic exercises...
 - More severe (complete UCL rupture) → surgery

THANK YOU

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