

Elbow Injuries and Examination

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Disclosures

- No financial disclosures
- Pictures from Thiemes Atlas and selected slides from Dr Aagesen and Hartigan



Objectives

- Review the anatomy of the Elbow
- Appreciate how elbow structure effects function and pathology
- Recognize common musculoskeletal and athletic injuries of the elbow
- Demonstrate exam pertinent physical exam maneuvers of the elbow

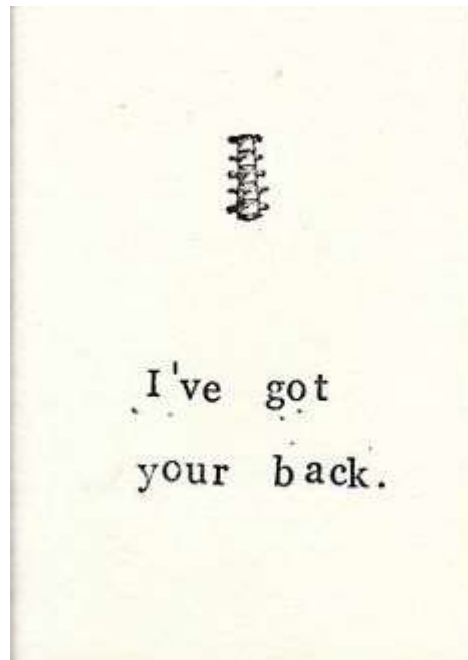
Outline

- Anatomy Review: Structure and Function
- Medial Elbow Pathology
- Lateral Elbow Pathology
- Brief Pediatric considerations
- Posterior Elbow Pathology

Outline

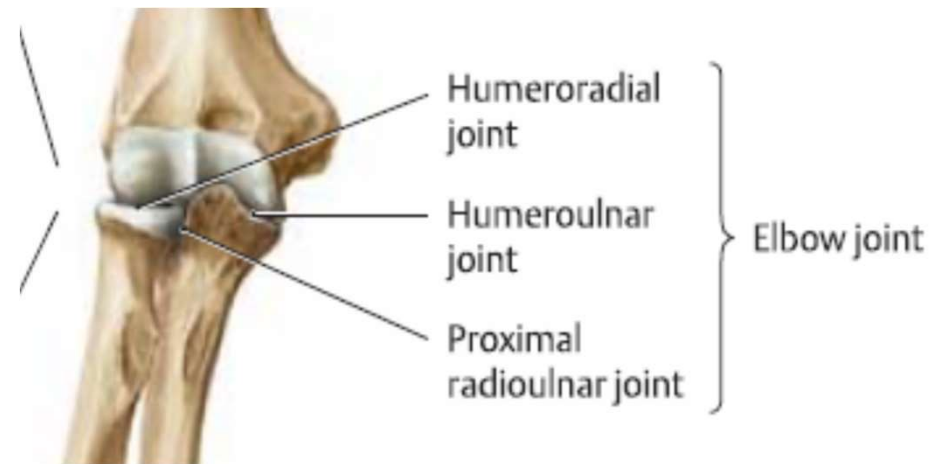
- Anatomy Review: Structure and Function
- Medial Elbow Pathology
- Lateral Elbow Pathology
- Brief Pediatric considerations
- Posterior Elbow Pathology (time willing)

Anatomy



Elbow Anatomy

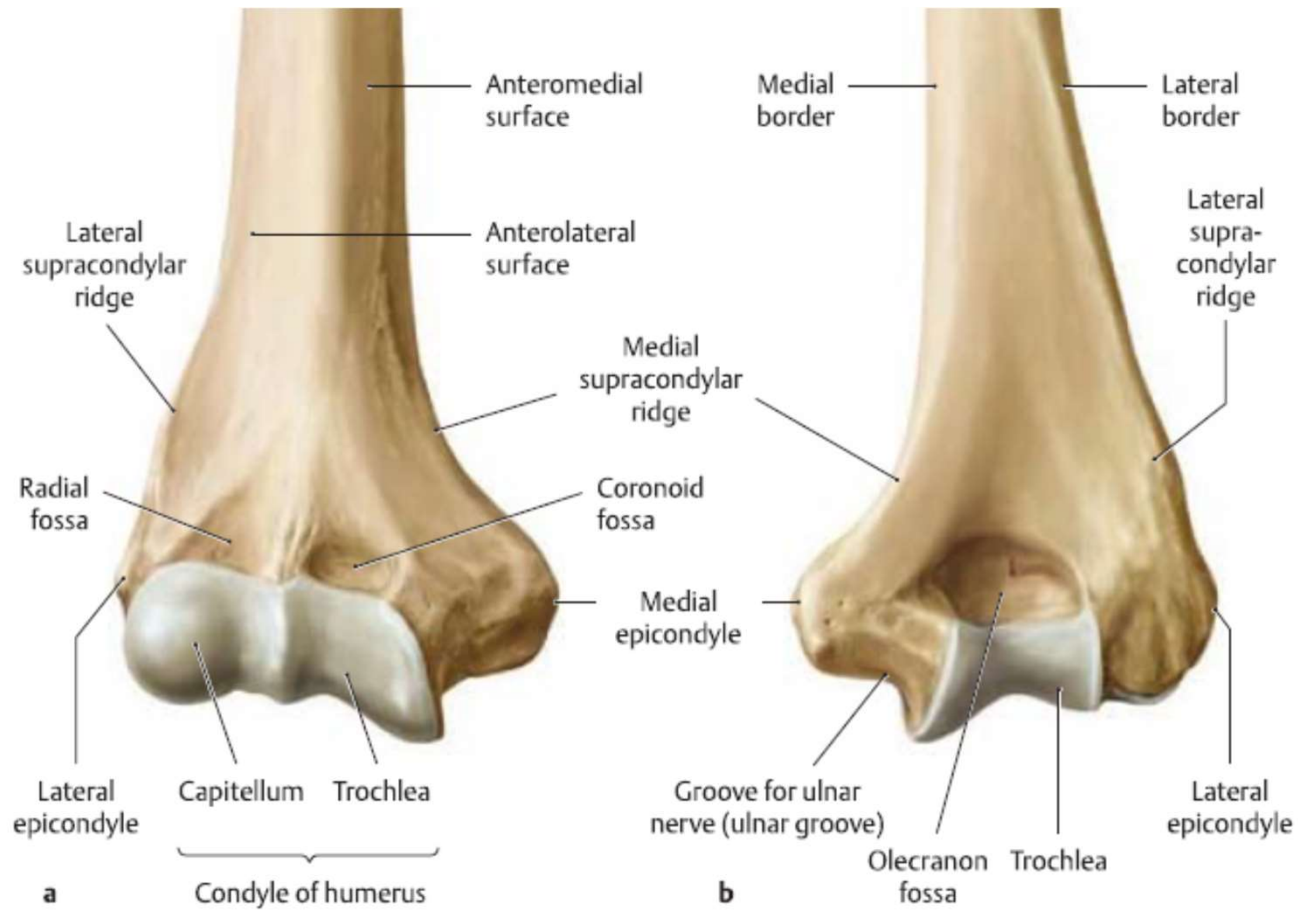
- 3 joints acting as a synovial hinge joint
 - Humeroulnar Joint
 - Humeroradial Joint
 - Proximal Radioulnar Joint

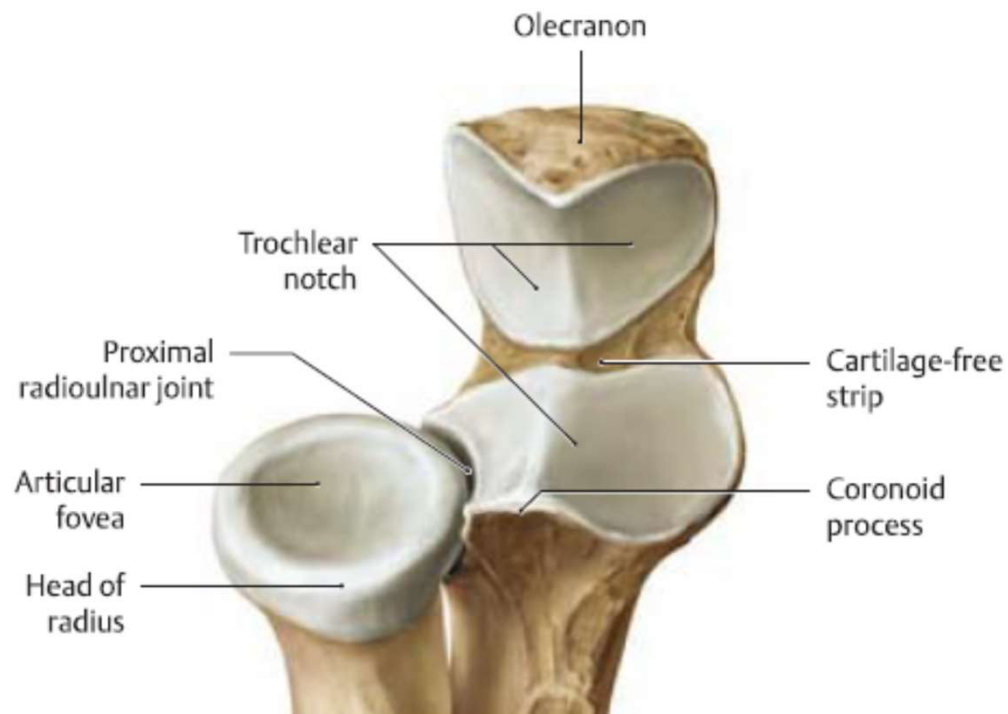


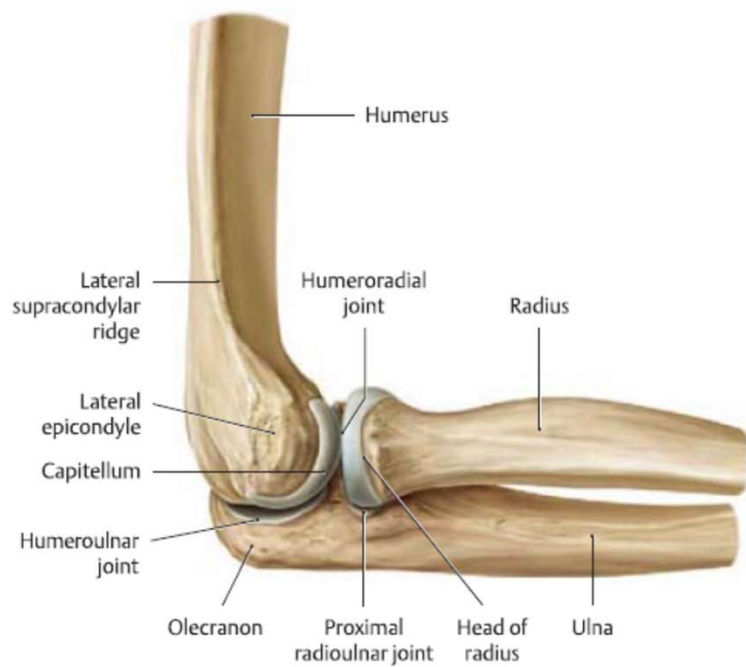
Elbow Anatomy

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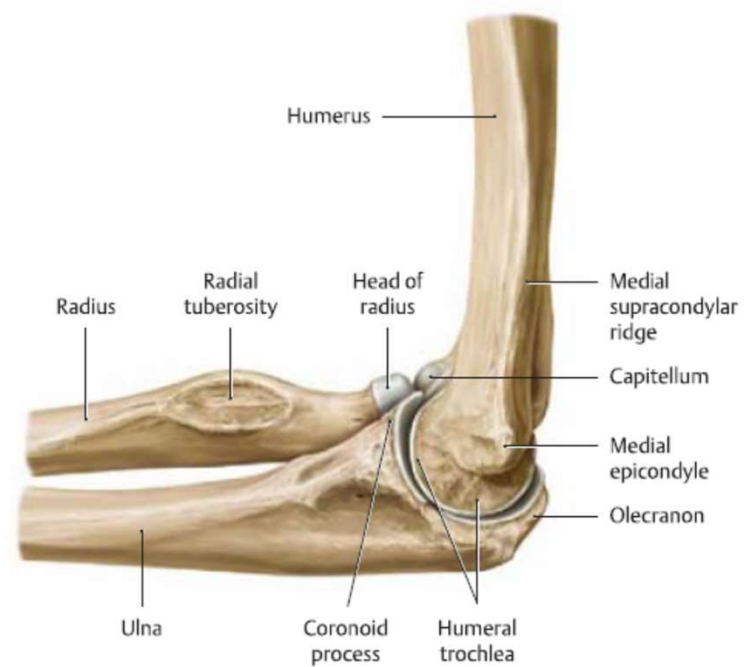








c Lateral view

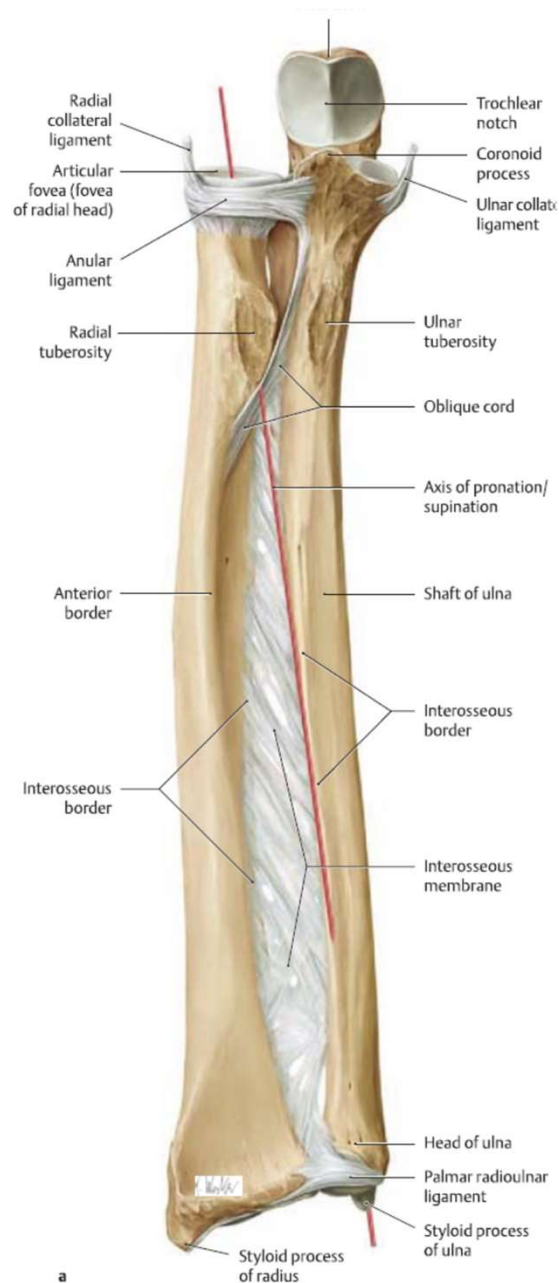


d Medial view

Fat pads of the elbow



Interosseous Membrane



- Not part of the joint
- Tension at mid point between supination and pronation
- Prevents proximal displacement of the radius on ulnar with pushing motioned
- Oblique cord!!

What is Functional?

- ADLs can be preformed between 30-130 degree flexion
- 50 degree pronation
- 50 degree supination
- 140 degree flexion to reach head

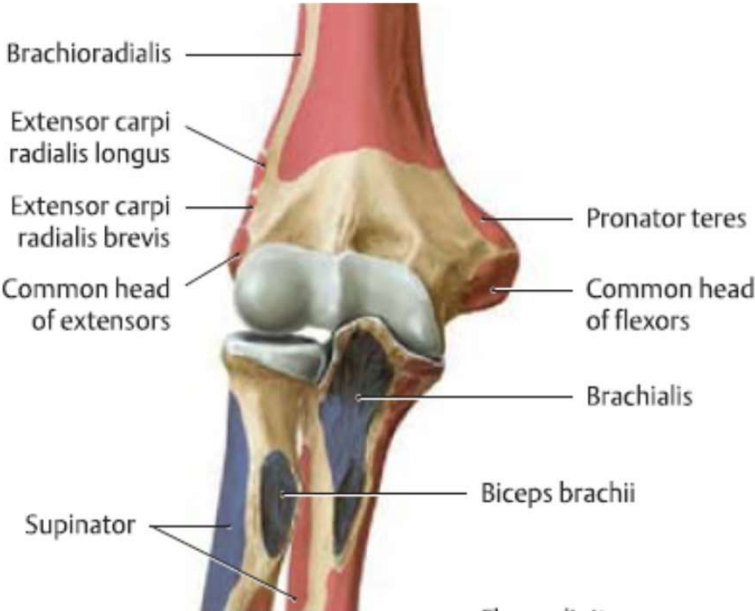
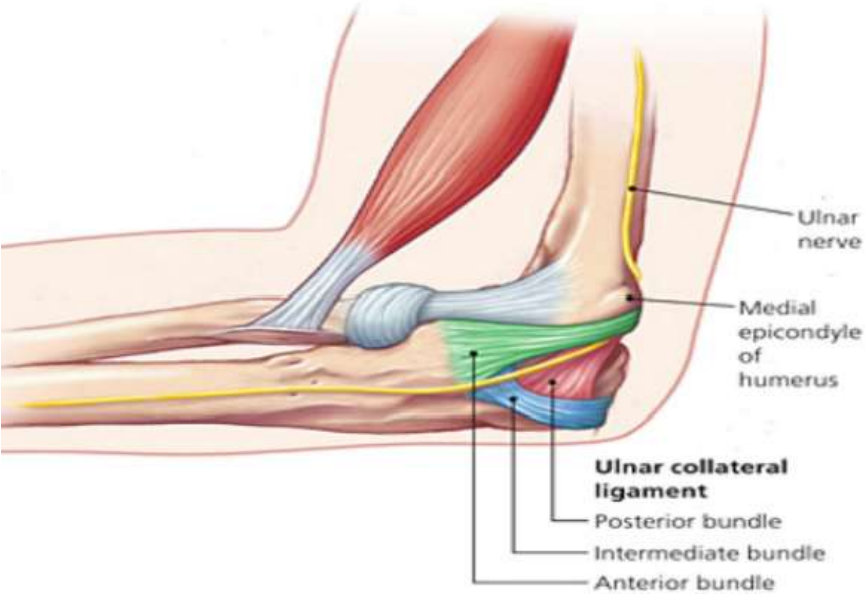
What is Normal?

- Flexion: 130-150
- Extension: to 0 or -10
- Pronation: 90
- Supination: 90

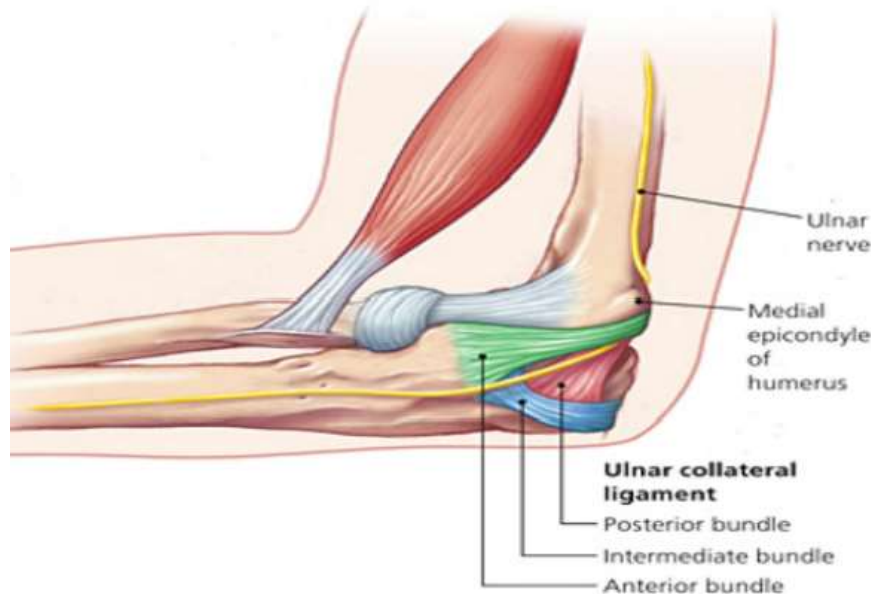
Medial Elbow: Pathology

- Common flexor tendinopathy
 - (medial epicondylitis- golfers elbow)
- Ulnar collateral ligament injury
- Ulnar nerve compression
- Ulnar trochlear OCD
- Age related:
 - Medial epicondylar avulsion fracture
 - Medial epicondylar traction apophysitis
- C8/T1 Radicular pain

Medial Elbow: Pathology

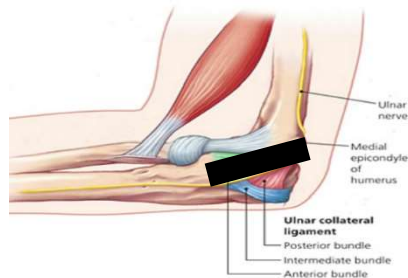
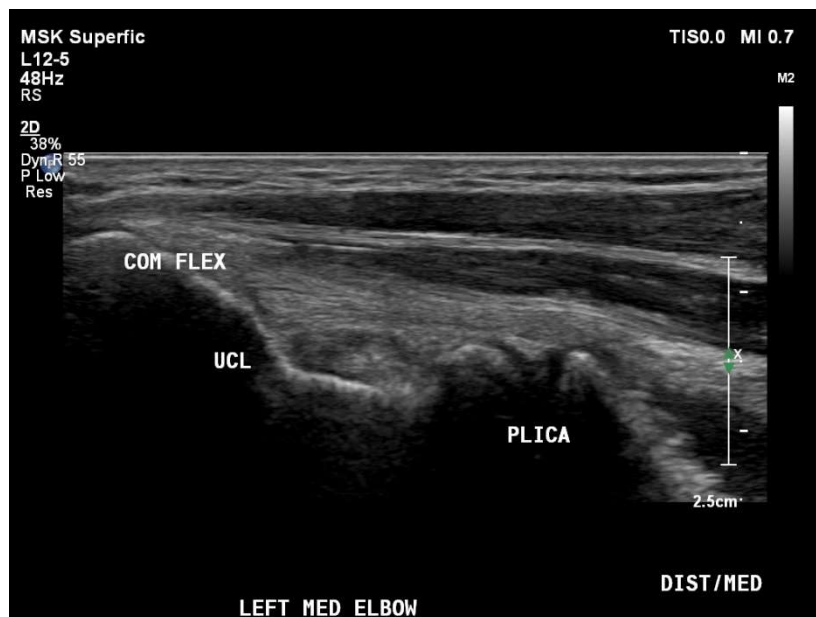


Ulnar Collateral Ligament



- Three parts:
 - Anterior bundle!
 - Posterior bundle
 - Transverse bundle
- Resists valgus force
- Prevents Valgus instability

Ulnar Collateral Ligament



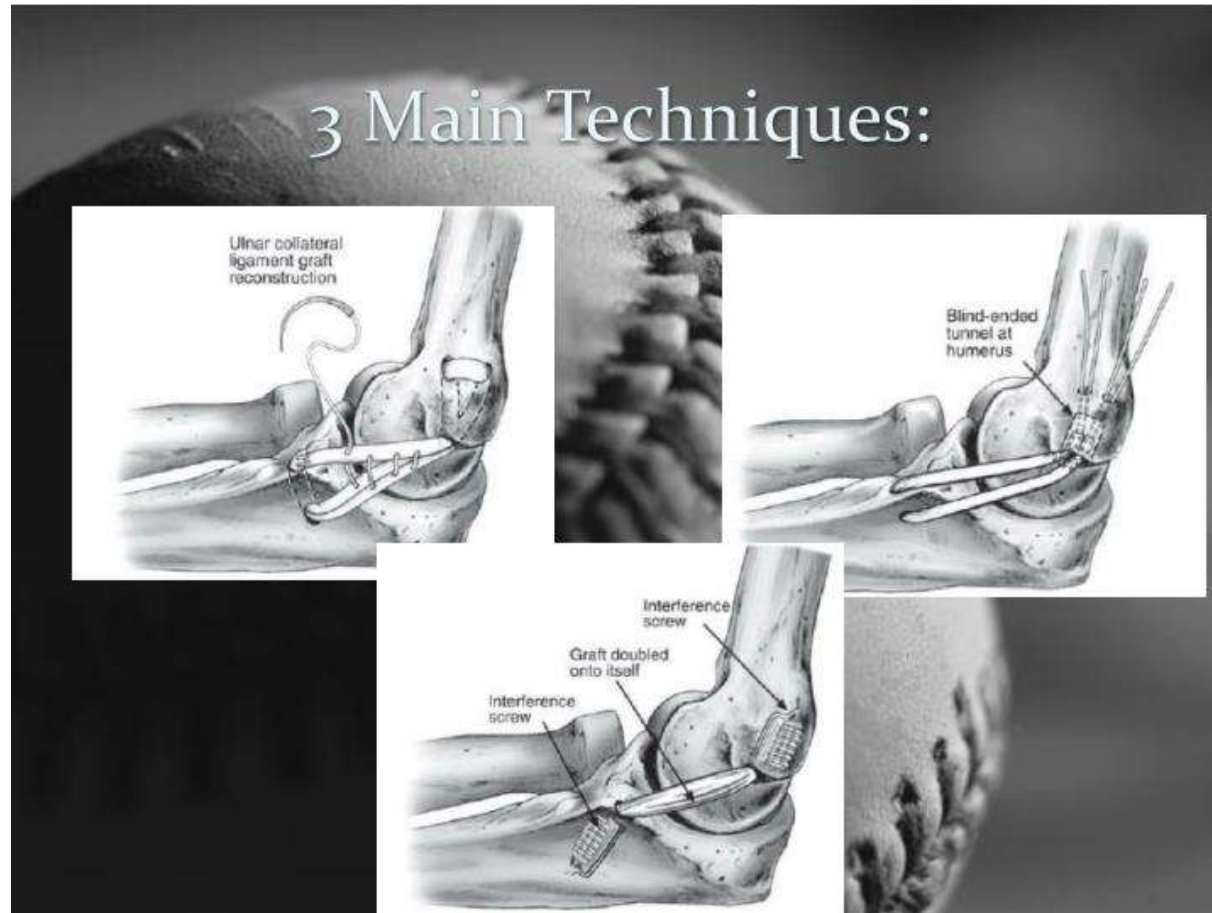
UCL Exams

- Palpation
- Valgus stability >25 degrees (forearm pronation)
- Milk maneuver
- Dynamic valgus stress (80-120 degrees)

UCL Treatments

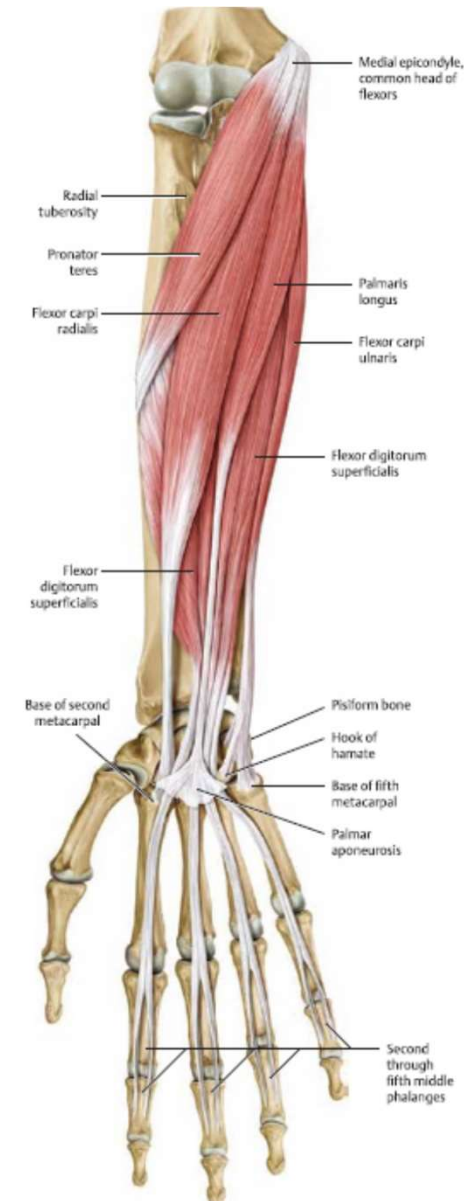
- Splint in 90 degrees flexion (no greater than 10 days)
- Flexor-pronator and rotator cuff strengthening
- Surgery:
 - Tendon graft
 - Primary reconstruction (bony avulsion)

UCL Surgery



Common flexor tendinosis

- Golfers??
- Over use injury
- Less common then Common extensor tendinopathy
- Risk:
 - Repetative wrist flexion and forearm pronation
 - Forceful gripping



Exams

- Palpation
- Rule out UCL
- Resisted wrist flexion
- Medial tennis elbow shear test
- Resisted pronation

Treatments

- RICE
- Decrease sports/modify technique
- Biomechanics analysis
- Modalities?
- Tenotomy
- Surgical debridement

UCL and the Common flexors

Medial elbow pain

Flexor Mass strain



Flexor Mass Tear

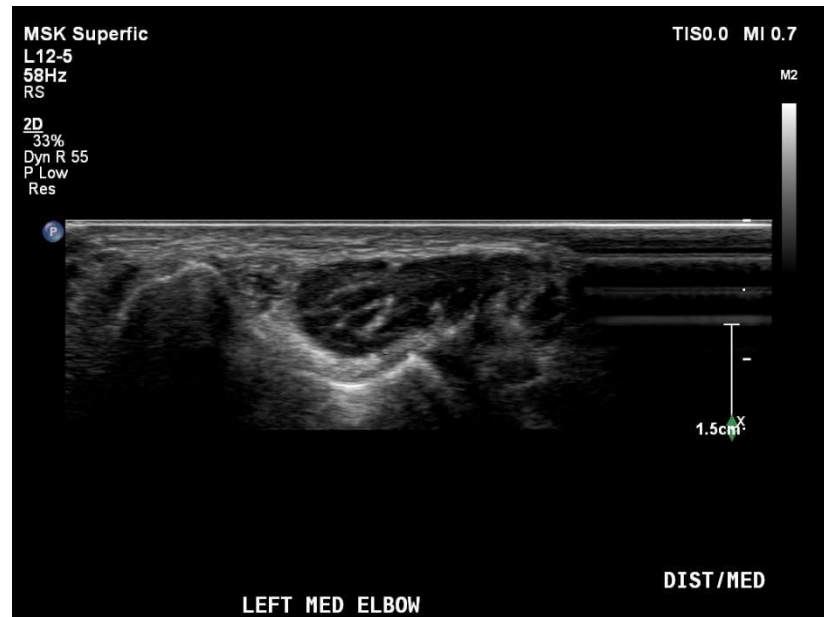
(weakening medial support)

UCL Strain



UCL Tear

Snapping Triceps and Ulnar nerve

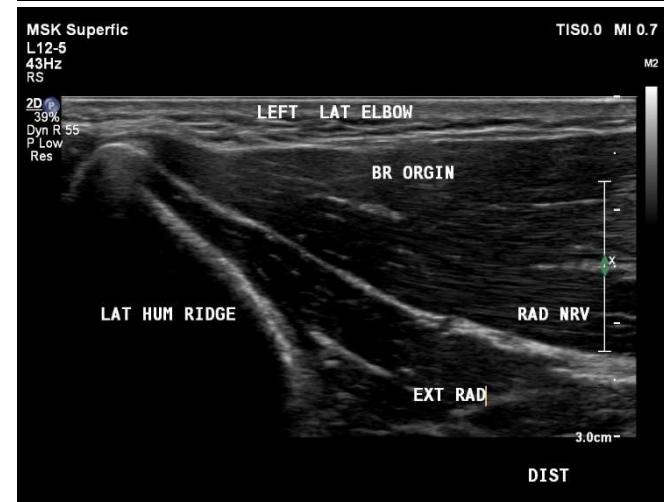
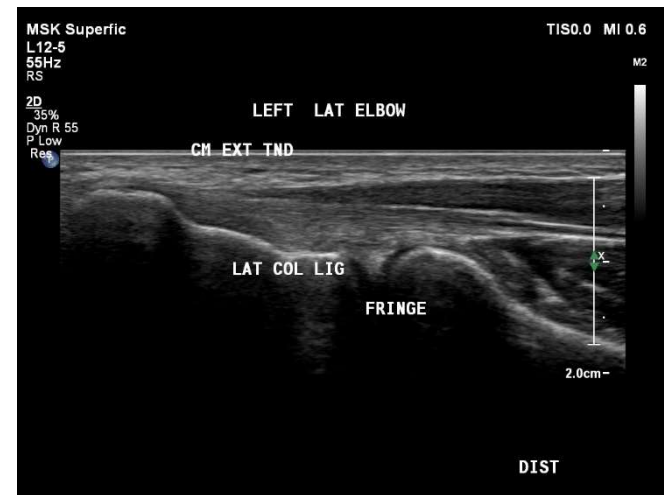


Lateral Elbow: Pathology

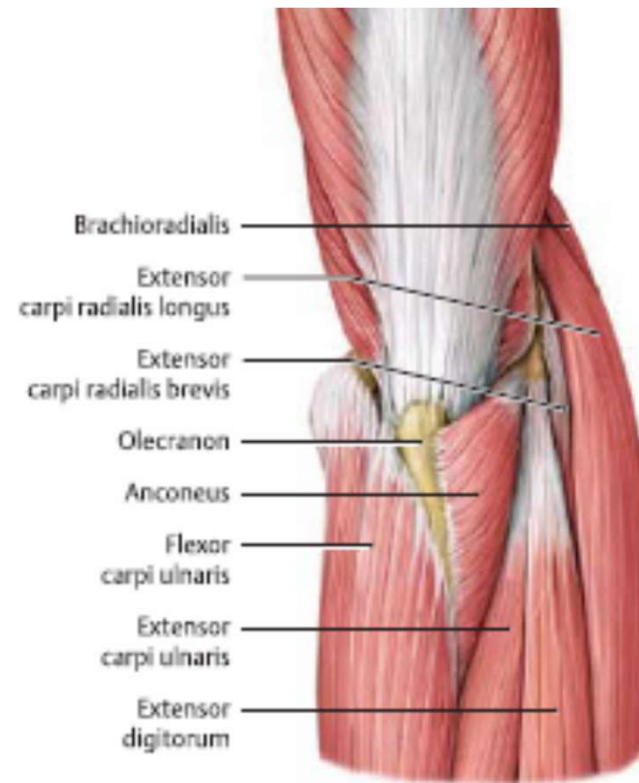
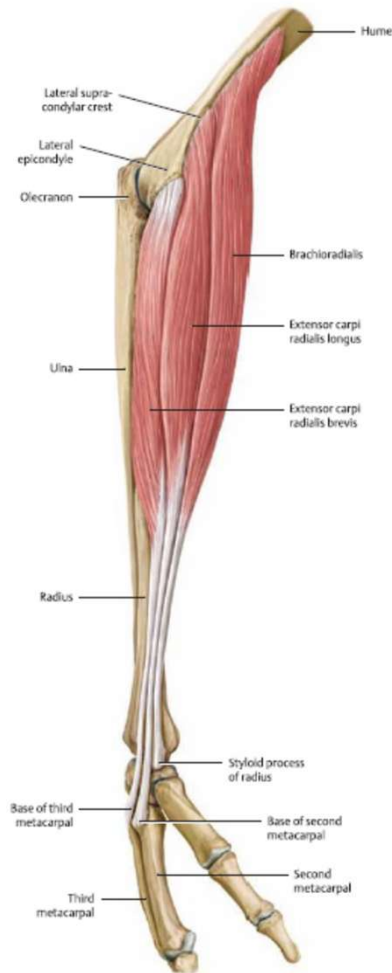
- Common Extensor tendinopathy
 - (lateral epicondylitis- tennis elbow)
- Lateral collateral ligament injury
- Radial nerve injury (PIN vs radial tunnel)
- Radiohumeral bursitis
- Plica Syndrome
- Radial head OCD
- Age related:
 - Capitellum OCD
 - Panner's Disease
- C5-6 Radicular pain
- LABC mononeuropathy

Common Extensor Tendinosis

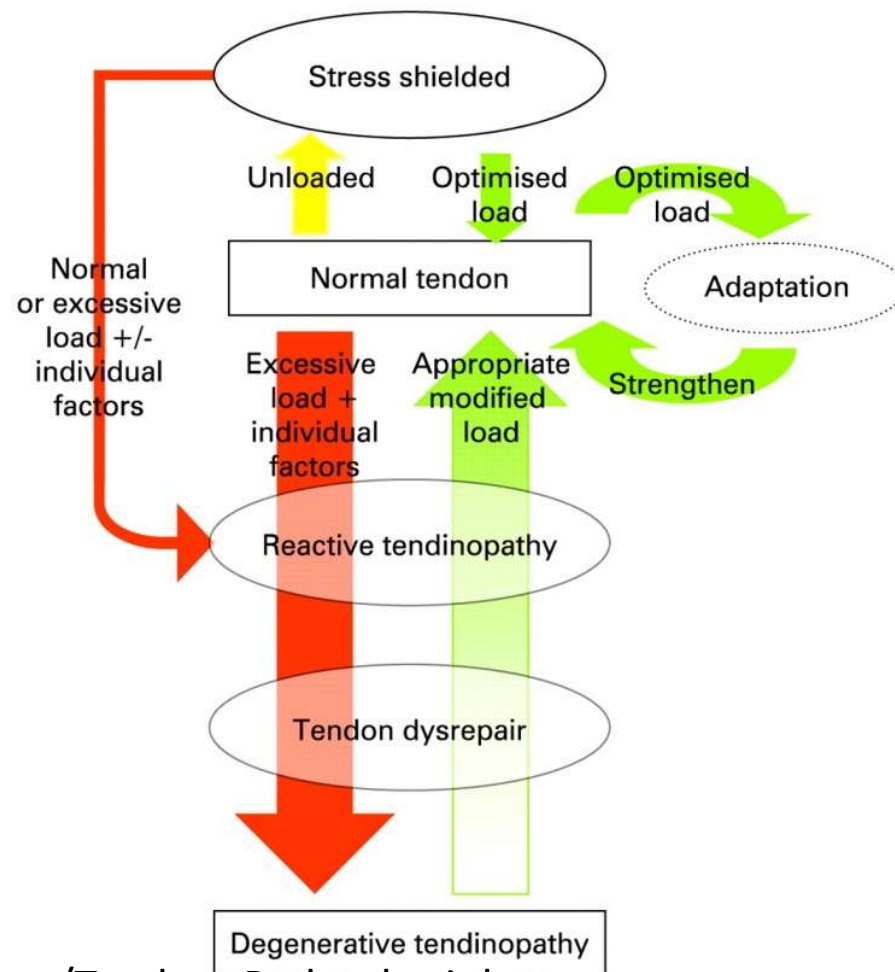
- Muroid degeneration with angiofibroblastic dysplasia
- Most common cause of elbow pain
- 1-3% incidence in adults / year
- Often self resolving in 6-12 months but can extend to 2 years



Common Extensor Tendinosis



A reminder



https://www.physio-pedia.com/Tendon_Pathophysiology

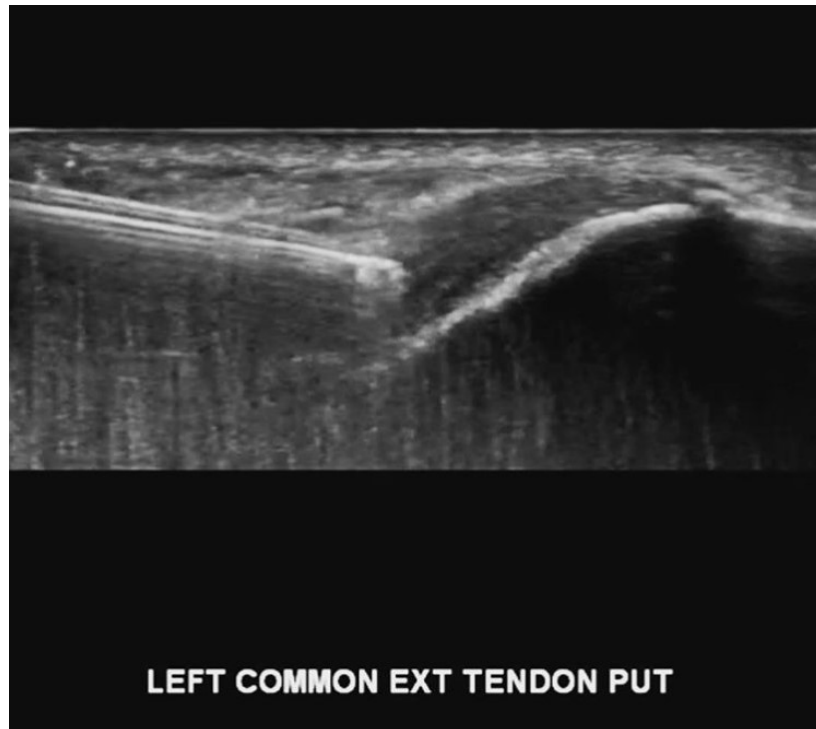
Common Extensor Tendinosis

- Tender over lateral epicondyle and proximal extensor tendons
- Pain with gripping
- Pain with resisted:
 - ECR-B
 - ECR-L
 - EDC
 - Wrist extension
- Maudsely Test
- Cozen test
- Mill's test
- Chair lift test



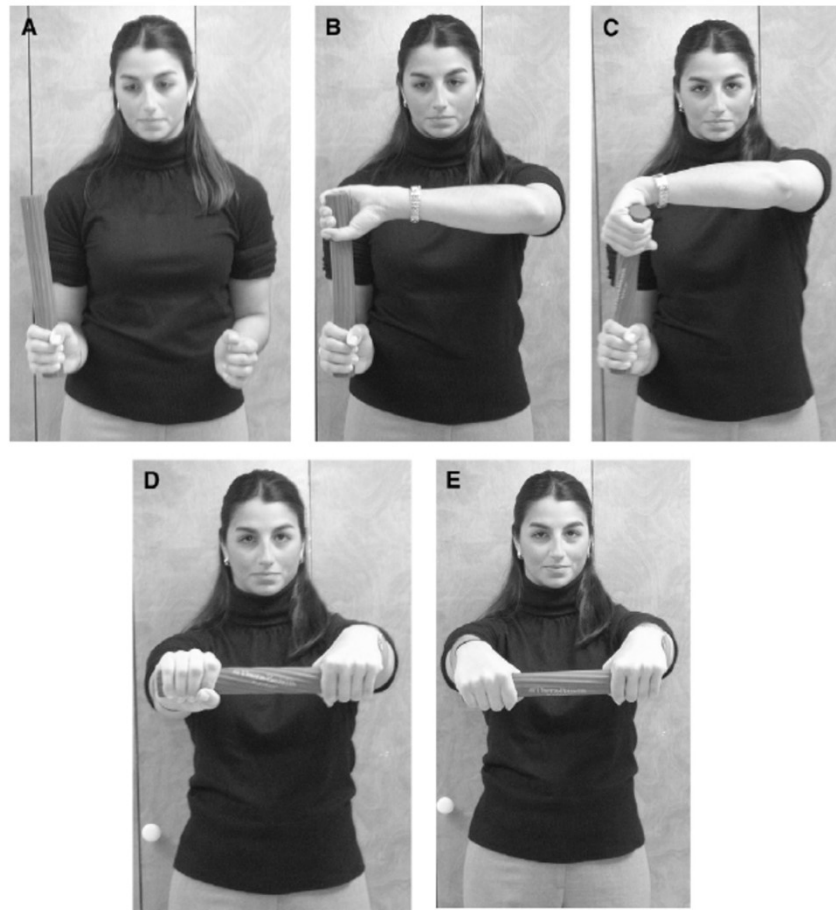
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Common Extensor Tendinosis



- NSAIDs + activity modification
- OT: lumbrical use, flexibility, biomechanics, eccentric loading
- Counter force brace
- Cross friction massage
- Phono/ionto-phoresis
- Therabar exercise
- Nitro patch
- Gratson/edge tooling
- Extracorporeal shockwave therapy (ESWT)
- Laser/light therapy
- **PRP**
- **Tenotomy**
- **Surgery**

Therabar (Tyler JSES 2010)



Radial Tunnel Syndrome/PIN

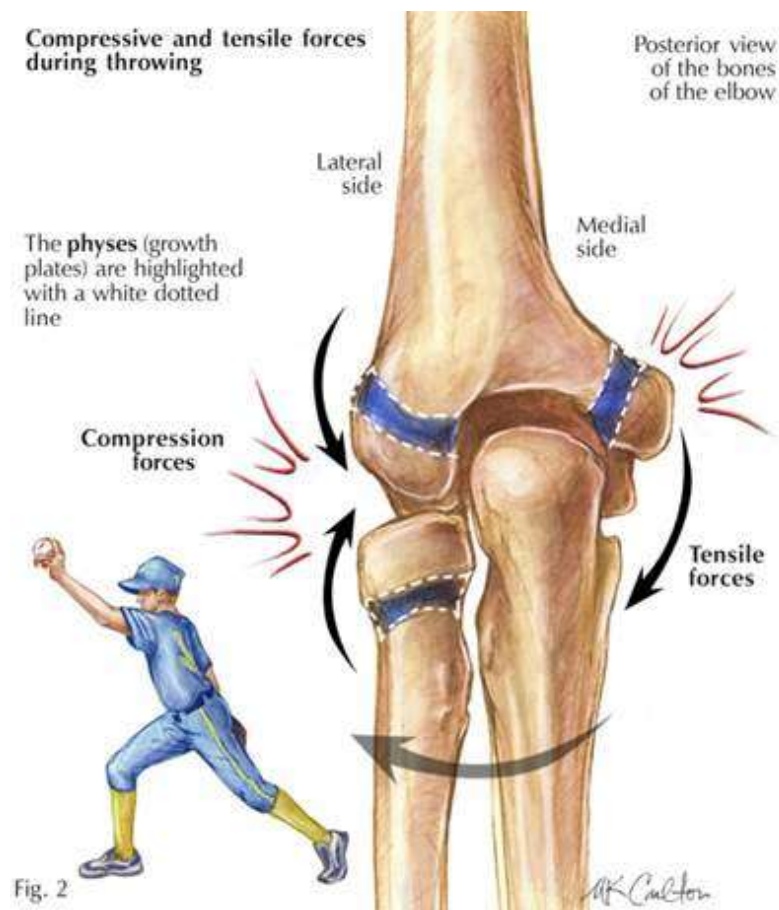
- Deep ache pain
- Compression of the PIN
 - Arcade of Froshe
 - Body of supinator
- Pain 1-2 cm further then CET pain
- Presents with CET in 5% of cases
- Pain with resisted supination



Radiocapitellar joint injuries

Osteochondritis Dessicans

- Avascular necrosis of articular cartilage and subchondral bone of capitellum
- Fragments of bone or cartilage become loose and float around in joint
- Adolescents/young adults 10 yr +; 13-15
- Repetitive UE use
 - Throwers, gymnasts, weight lifters
 - In throwers high valgus force in acceleration



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Radiocapitellar joint injuries

Osteochondritis Dessicans

- Restrict throwing for 8-12 weeks (up to 6 months)
- If non displaced and intact cartilage
 - Restrict throwing until pain free AROM
- If partially or completely detached fragment:
 - surgery



Panner's Disease (Osteochondrosis of the Capitellum)

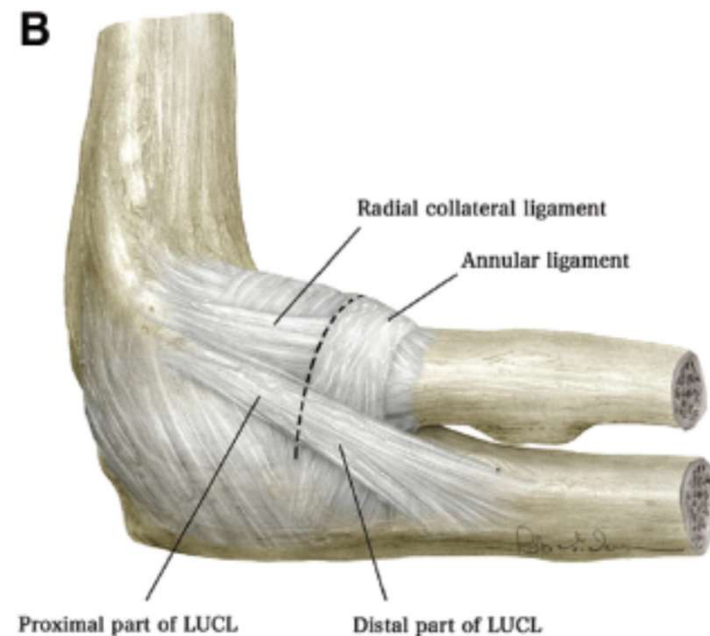
- Children ages 4-8 (7-12)
- “Osgood Schlatter of the elbow”
- Typically, unilateral in dominant (throwing) arm
- Sudden onset of lateral elbow tenderness w/ decreased ROM in extension
- Fragmentation of capitellar ossific zone
- No deformity
- Treat conservatively—avoid elbow stress (usually 6-12 weeks)
- **Self limiting → NO surgery!!**

Panner's vs OCD

	Panner's Disease	OCD Capitellum
Lateral Elbow Pain	Yes	Yes
Throwing Activity	Often	Nearly always
Age (years)	7-10	11-16
Locking, catching	No	Yes
Loss of Extension	Yes	Yes
X-Ray	Entire Capitellum	Anterior Capitellum, loose bodies
Treatment	Non operative	Potentially Surgical
Prognosis	Excellent, self limited	Guarded to Poor

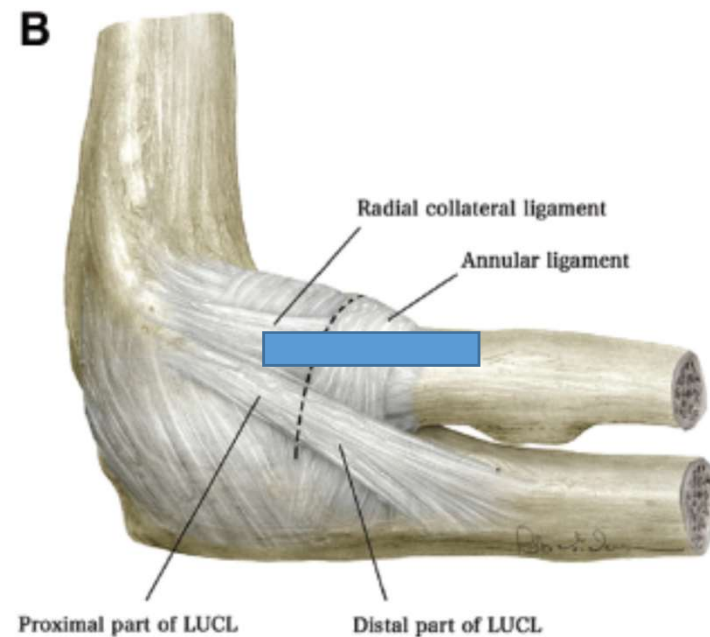
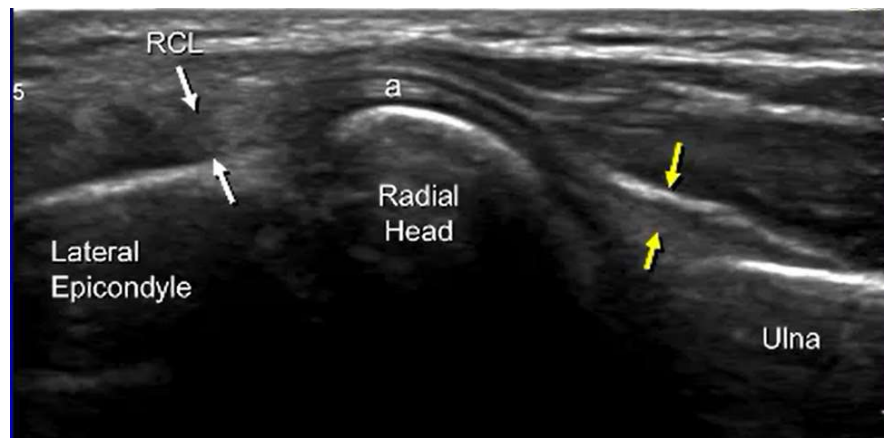
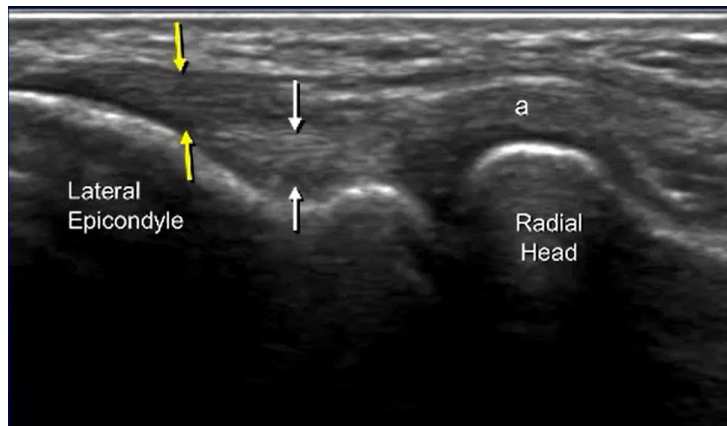
Lateral Collateral ligament

- 4 parts
 - Radial collateral ligament
 - Annular ligament
 - Lateral ulnar collateral ligament
 - Accessory lateral collateral ligament



Hsu Et Al AJSM 2011

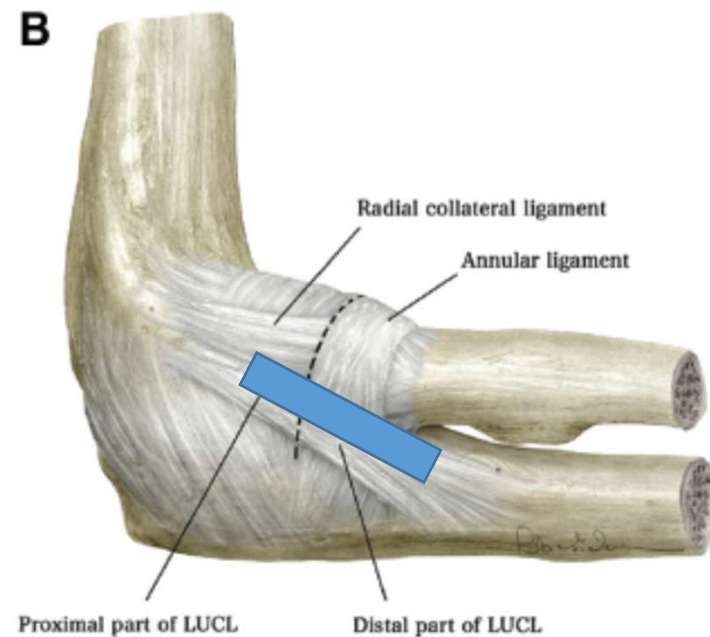
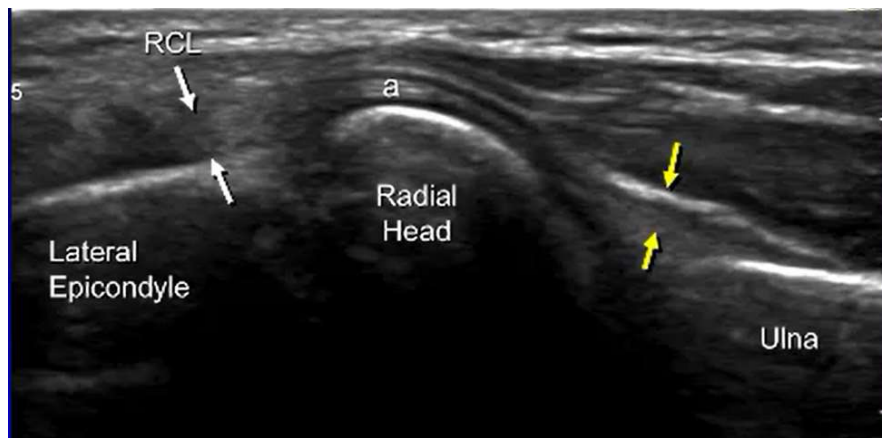
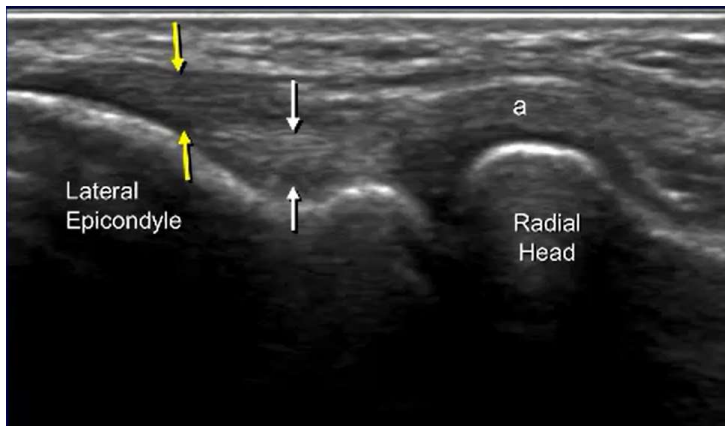
Lateral Collateral ligament



Hsu Et Al AJSM 2011

Jacobson AJR 2018

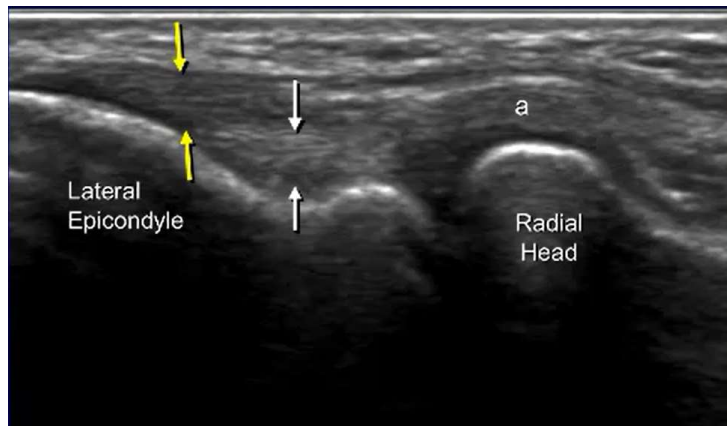
Lateral Collateral ligament



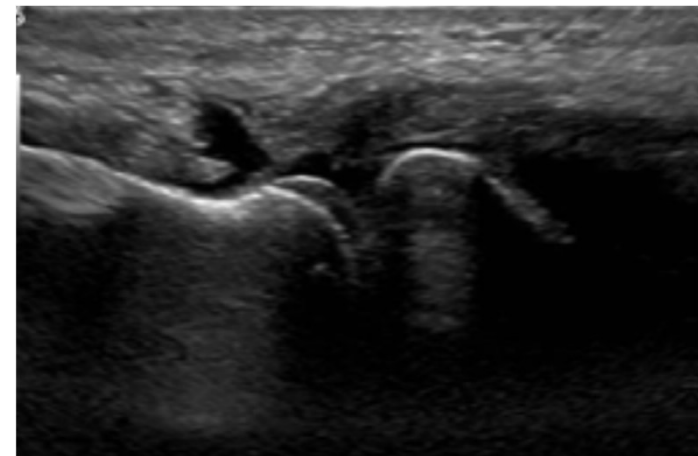
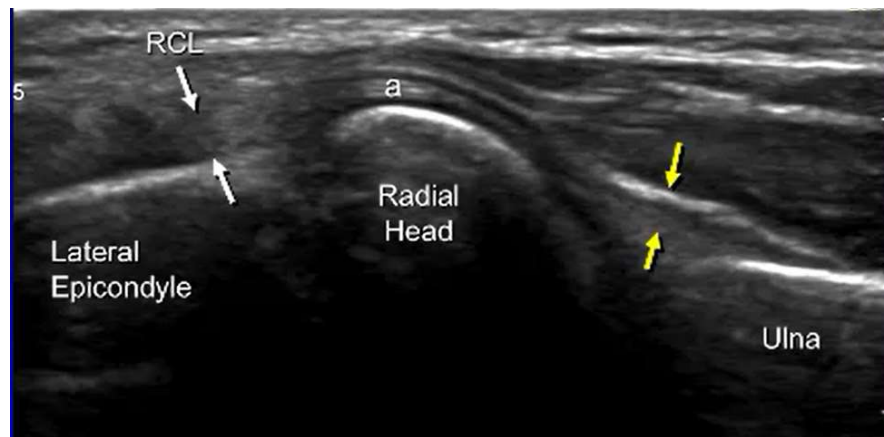
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Lateral Collateral ligament



- Popping sensation
- Chronically sore elbow
- Subluxation



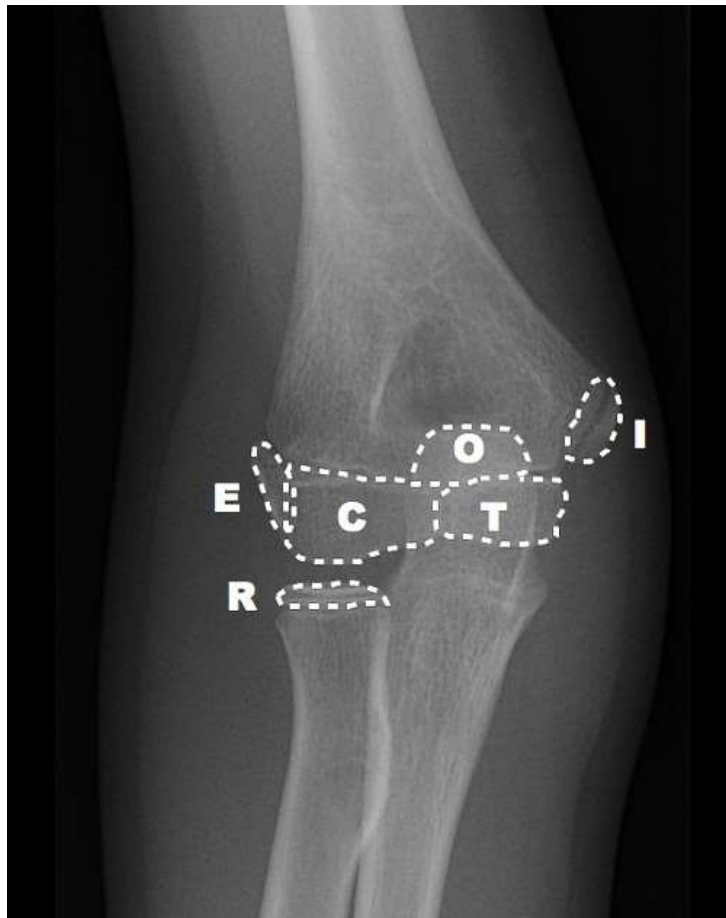
Jacobson AJR 2018

Little League Elbow

- Series of diagnosis but most often Apophysitis (medial)
 - Medial epicondylar fragmentation
 - Delay or accelerate apophyseal of growth of medial epicondyle
 - Delayed closure
- Ages 9-14



Elbow Ossification Centers



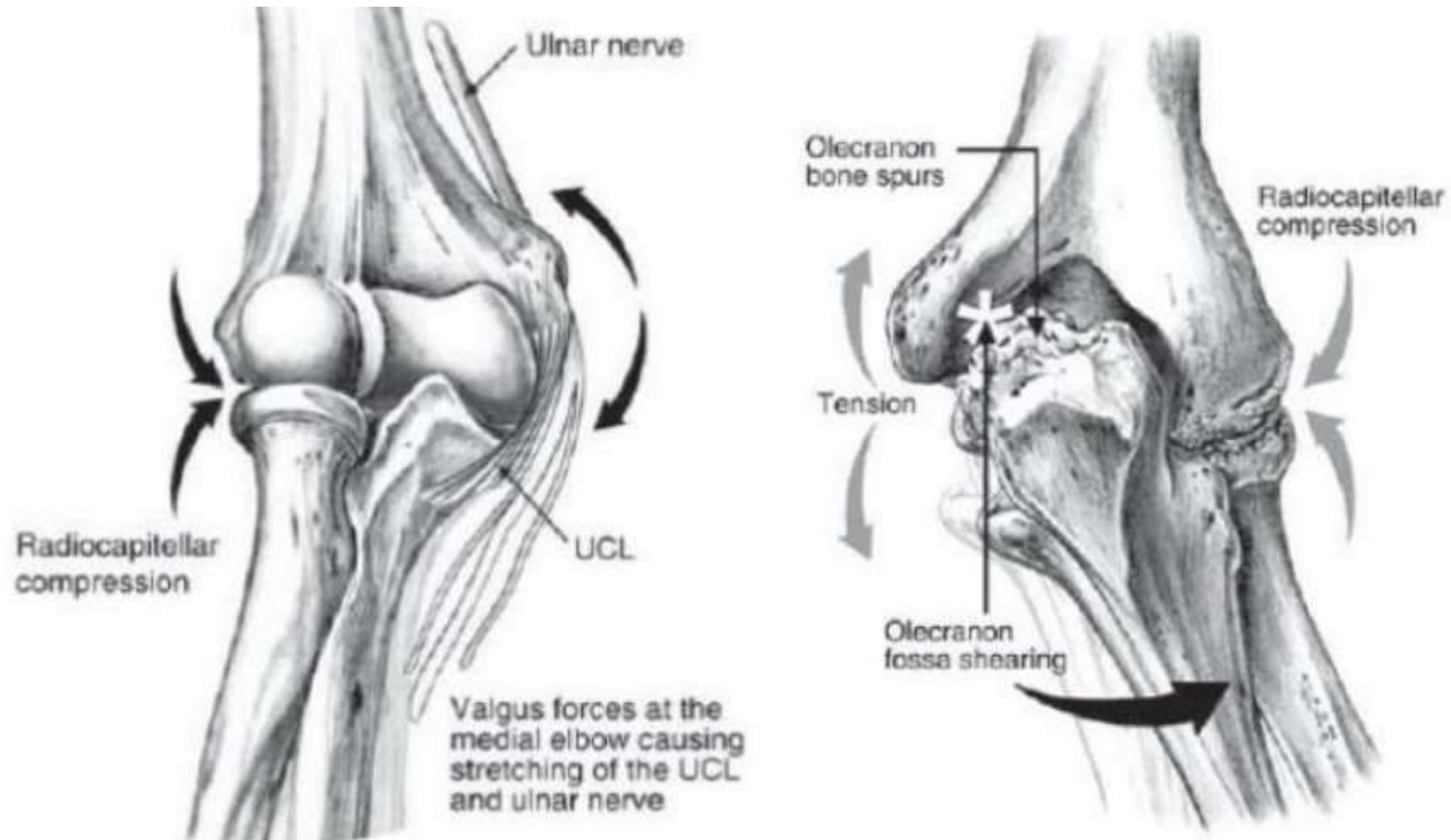
- Capetellum (1-2 years)
- Radial head (2-4)
- Medial (Inner) epicondyle (4-6)
- Trochlea (8-11)
- Olecranon (9-11)
- Lateral epicondyle (10-11)

- “CRITOE” 1,3,5,7,9,11

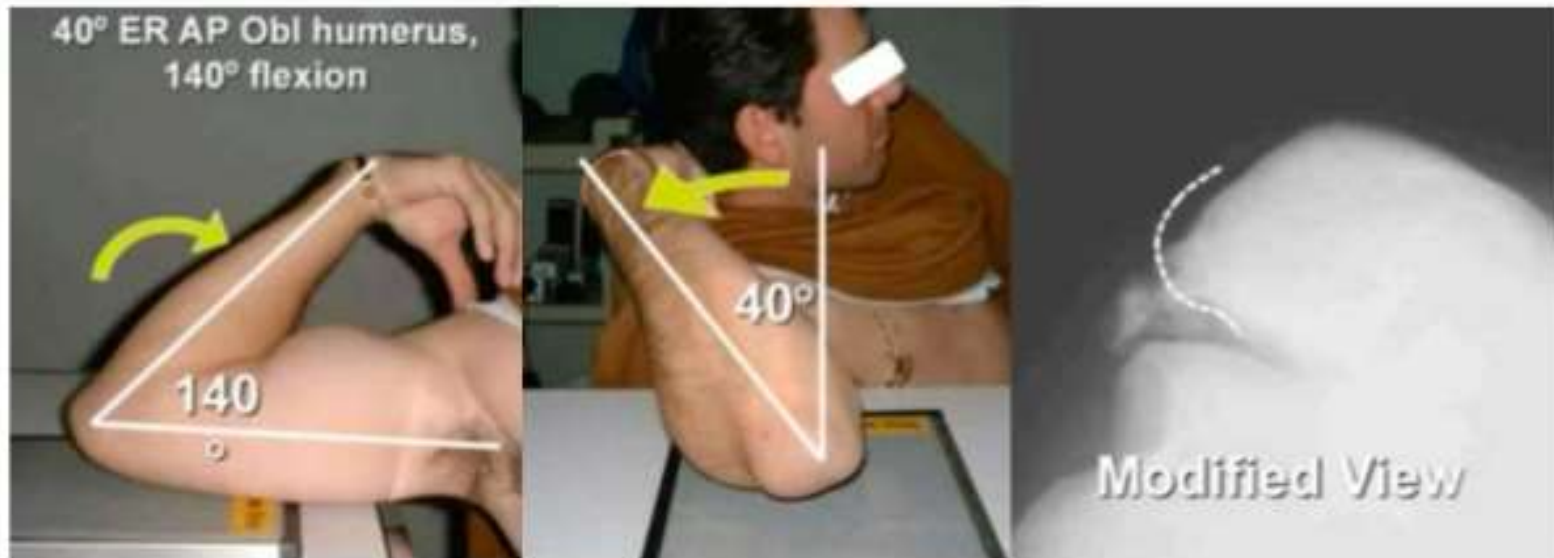
Posterior Elbow

- Valgus extension overload syndrome
- Olecranon stress fracture
- Triceps tendinitis
- Triceps rupture
- Olecranon bursitis

Valgus Extension Overload (VEO) Syndrome



Valgus Extension Overload (VEO) Syndrome



Venouziou, St Luke's Hospital

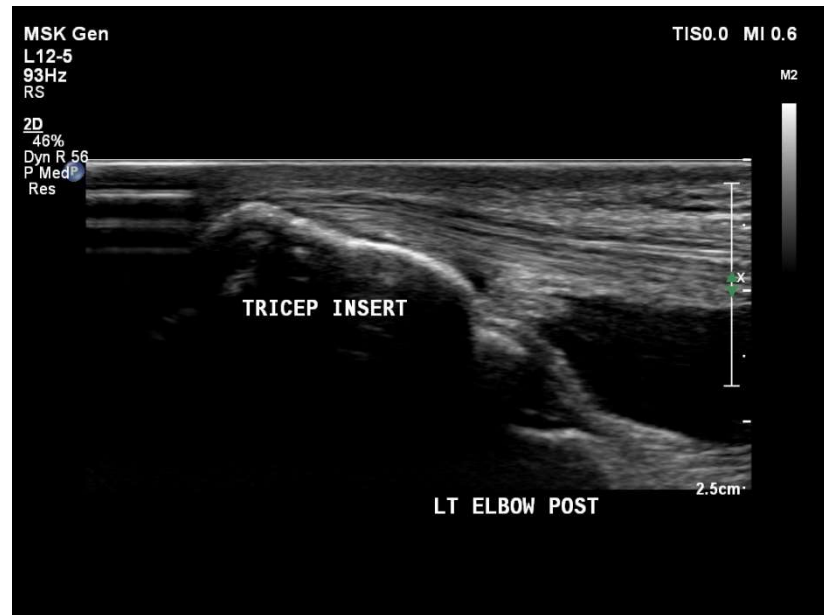
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Olecranon bursitis

- Acute or repetitive trauma/friction
- Infection/Septic bursitis
 - Aspirate
 - Culture, gram stain, cell count
 - erythema and loss of motion
- Who?
 - DM, Gout, RA, HIV, EtOH



Triceps tendinitis

- Population
 - Heavy weight training
 - Canoeists
 - Repetitive extension motions
- Treatment:
 - standard tendinopathy measures
 - Rest, ice, NSAIDs, stretching, strengthening
 - Proper mechanics

Thank You

- Dr Aagesen
- Dr Hartigan
- Dr Prather

- LTMT

