

# Ultrasound Evaluation of the Elbow

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## Disclosures:

- Book Royalties: Elsevier
- Contractor: POCUSPRO
- Consultant: Bioclinica
- Not relevant to this talk

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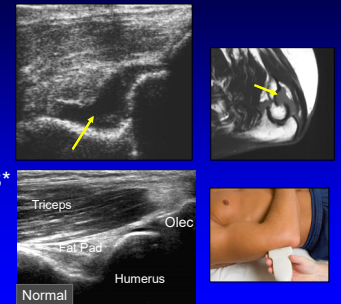
## Pathology:

- Joint effusion and bursa
- Tendon abnormalities
- Ligament abnormalities
- Nerve abnormalities
- Soft tissue masses

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## Joint Effusion

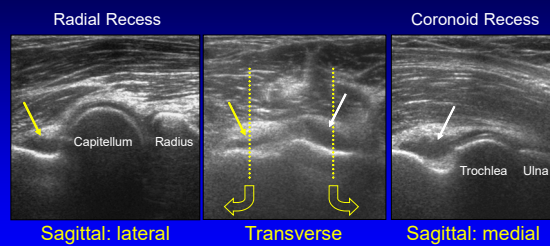
- Olecranon recess
- Displaced hyperechoic fat pad by anechoic / hypoechoic fluid
- Best place to look with US\*
- More sensitive than radiographs\*



De Maeseneer, Invest Radiol  
1998; 33:117

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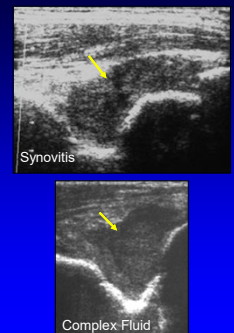
## Joint Effusion: anterior elbow



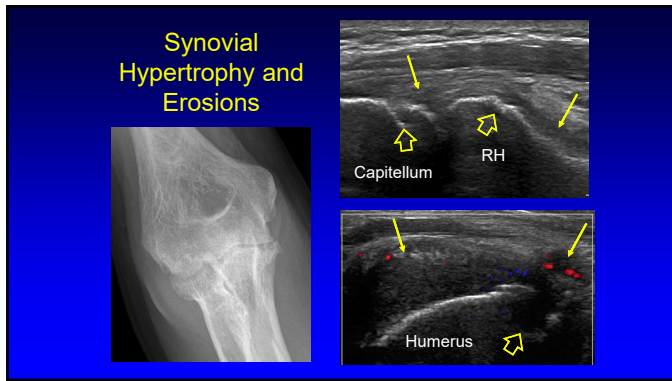
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## Complicated Fluid vs. Synovium

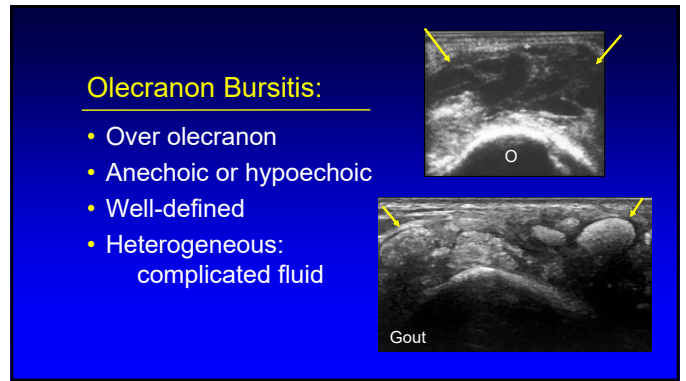
- Both may appear hypo- or isoechoic
- *Findings that suggest effusion:*
- Displacement with transducer pressure
- Joint recess collapse w/ joint movement
- Negative flow on color Doppler imaging
- Swirling with transducer pressure



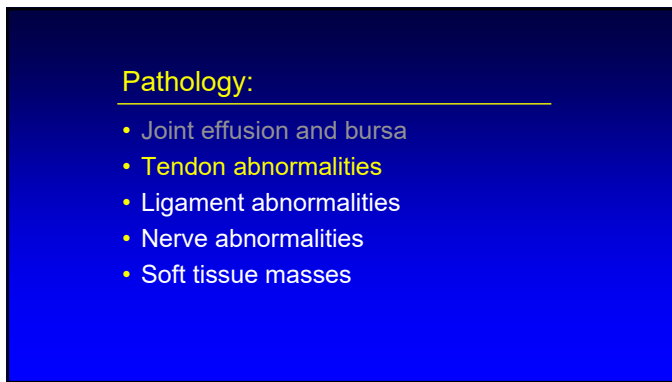
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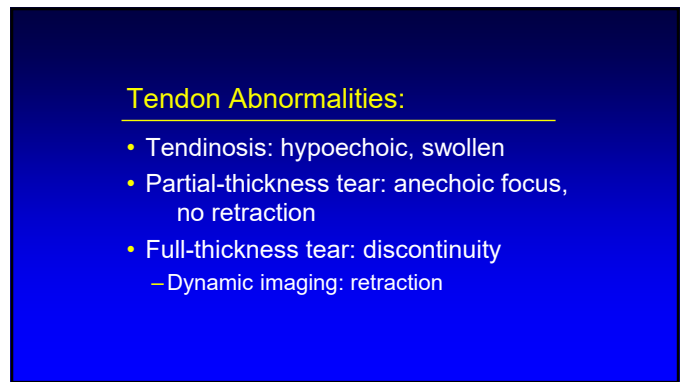
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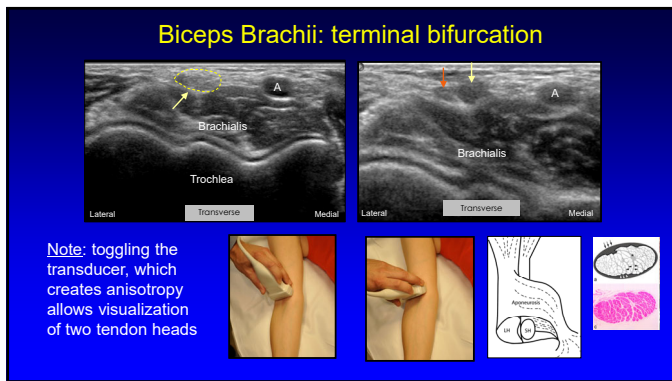
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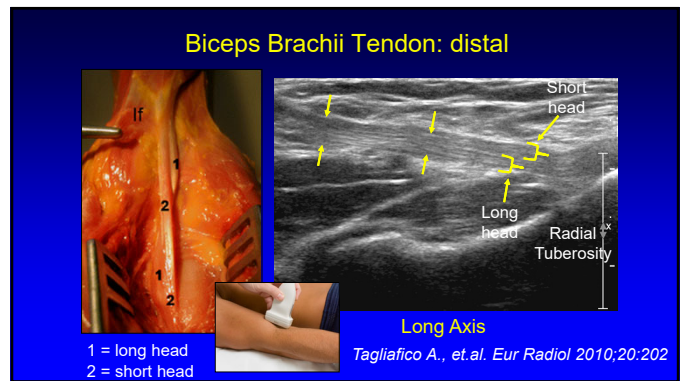
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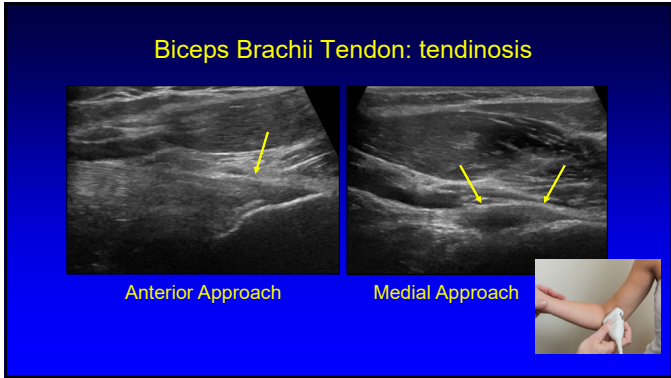
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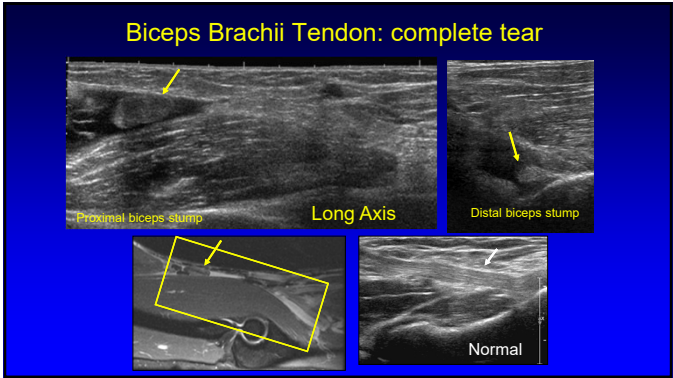
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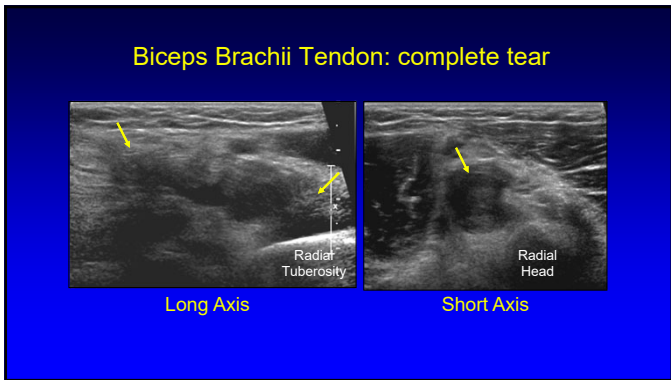
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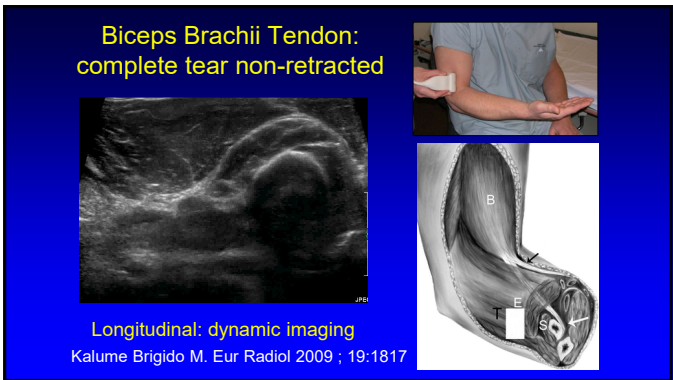
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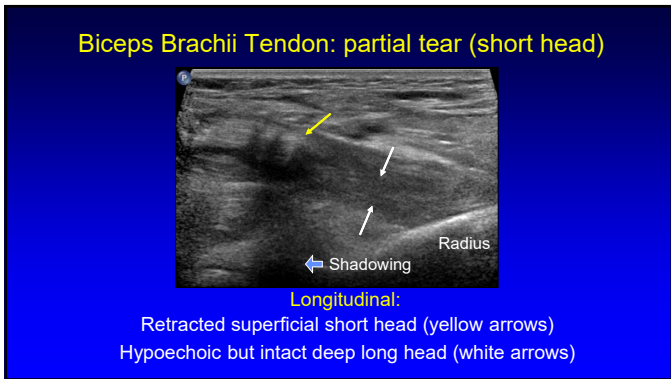
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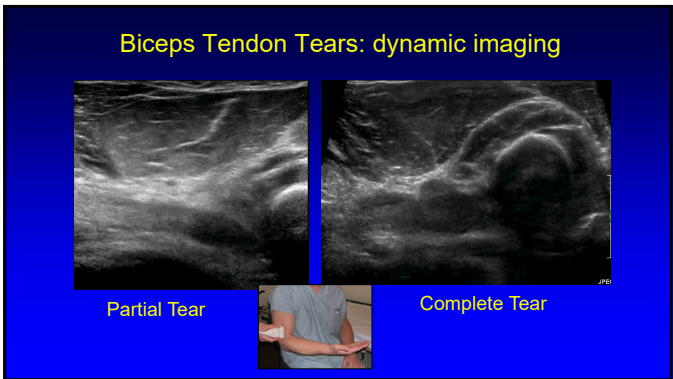
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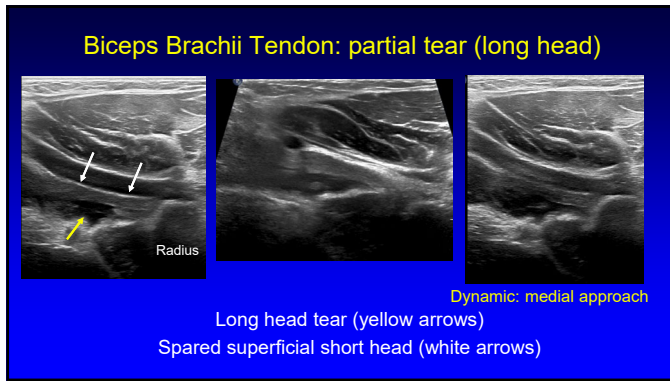
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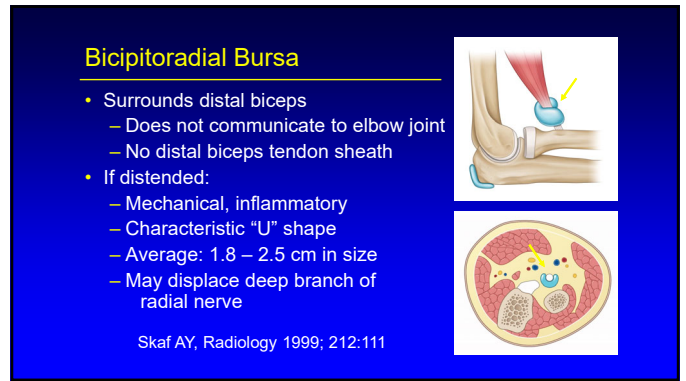
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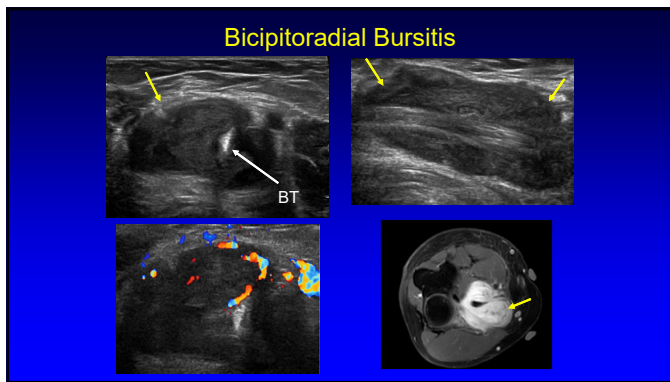
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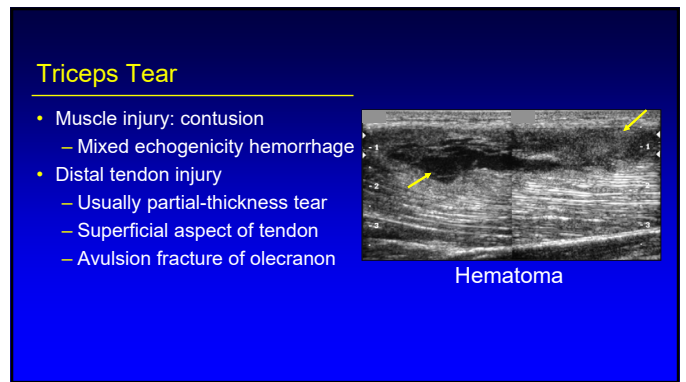
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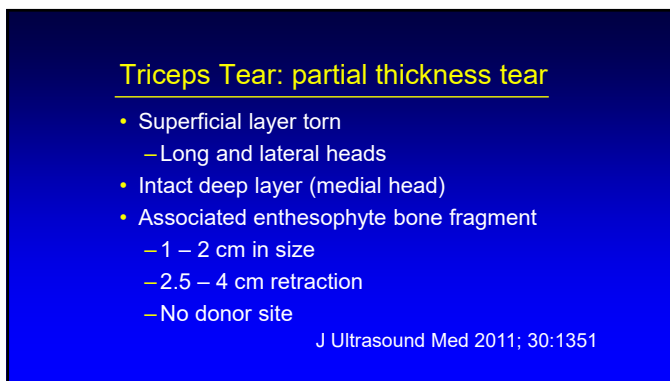
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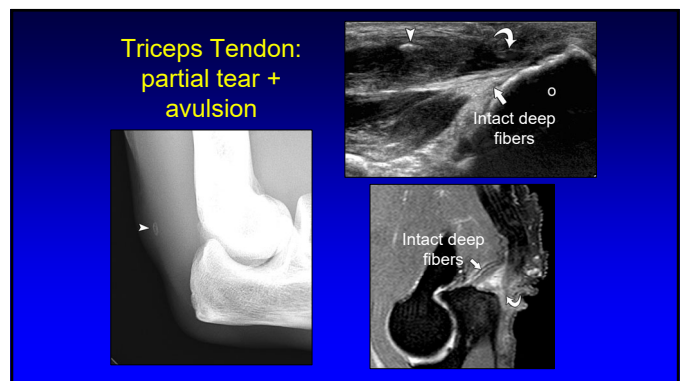
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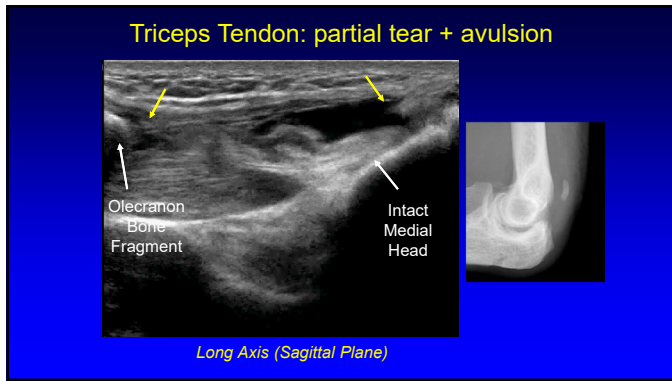
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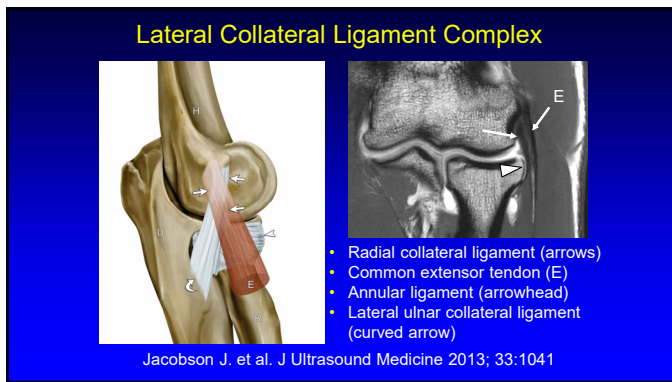
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### Epicondylitis:

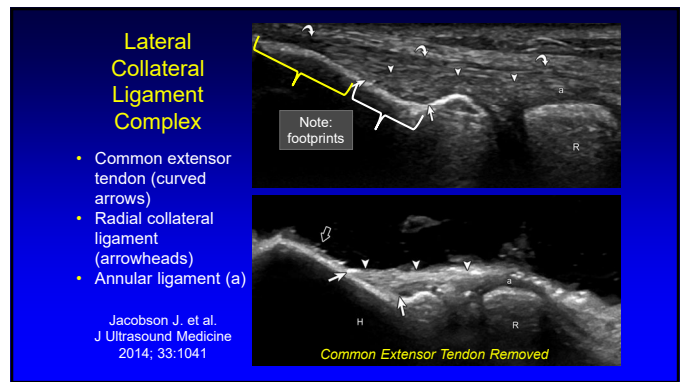
- Common flexor and extensor tendons
- Abnormal hypoechogenicity
  - Mucoïd degeneration, tendinosis
- Anechoic: partial-thickness tear
- No inflammatory cells\*

Potter, Radiology 1995; 196:43  
Connell, AJR 2001; 176:777

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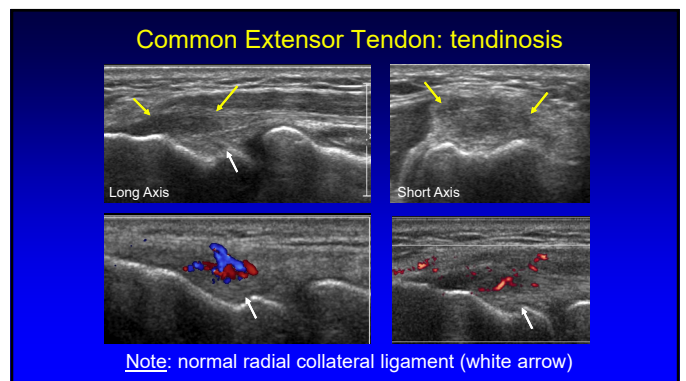


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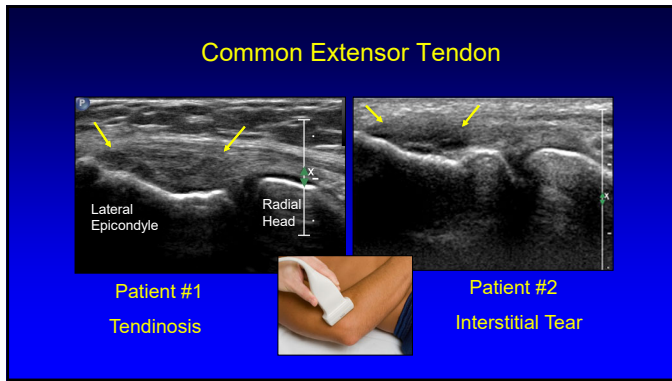
### Common Extensor Tendon: elbow

- Often called “tennis elbow” or “lateral epicondylitis” or “epicondylosis” or .....
- All terms are misnomers
- Those inflicted usually do not play tennis (professionally or correctly)
- It is not inflammatory
- It is not a primary problem of the epicondyle

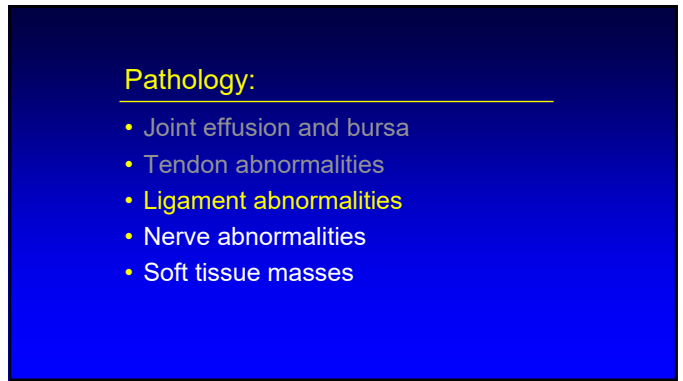
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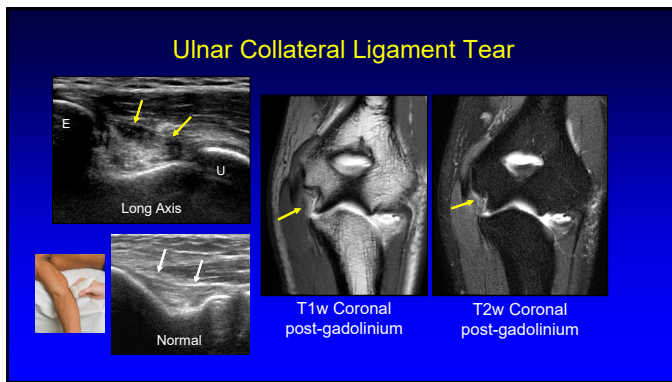
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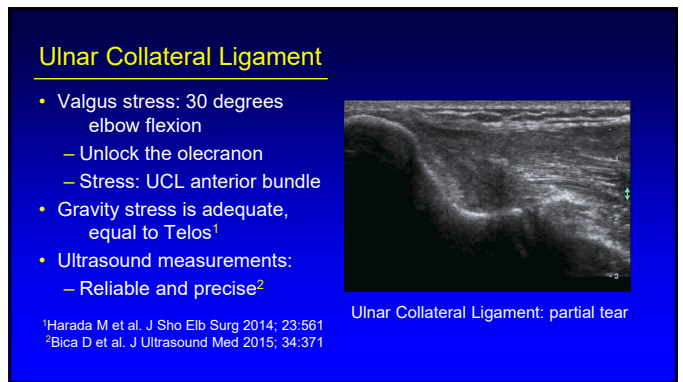
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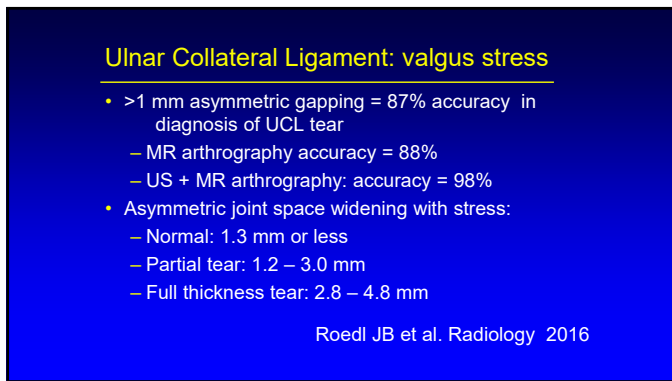
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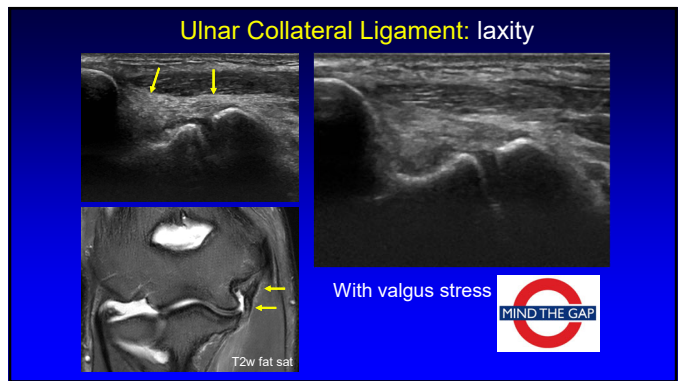
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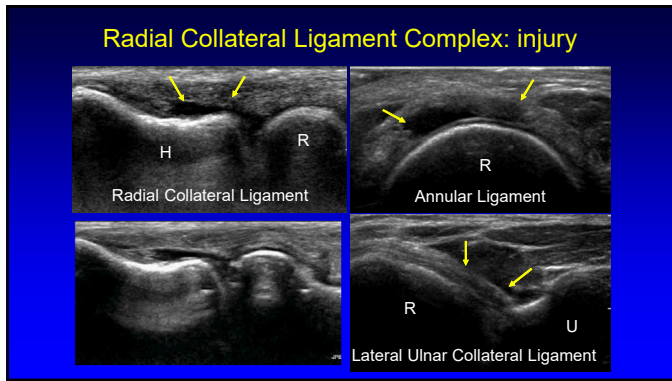
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### Pathology:

- Joint effusion and bursa
- Tendon abnormalities
- Ligament abnormalities
- **Nerve abnormalities**
- Soft tissue masses

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### Ulnar Nerve: anatomy

- Behind medial epicondyle of humerus:
  - Cubital tunnel retinaculum or Osborne fascia
- Distal to epicondyle:
  - True cubital tunnel
  - Between ulnar and humeral heads: flexor carpi ulnaris
  - Under arcuate ligament

Martinoli, C. et al. Radiographics 2000;20:S199-S217

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### Ulnar Nerve: cubital tunnel syndrome

- Hypoechoic and enlarged
  - > 9 mm<sup>2</sup> area<sup>1</sup>
  - 2.8x area compared to proximal<sup>2</sup>
- Mild hypoechoogenicity alone: may be normal
- Causes:
  - Idiopathic, overuse, joint process
  - Anconeus epitrochlearis: compression
    - Normal variant accessory muscle

<sup>1</sup>Thoirs K et al. J Ultrasound Med 2008; 27:737  
<sup>2</sup>Yoon JS et al. Muscle Nerve 2008; 38:1231

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### Anconeus Epitrochlearis

- Normal variant: 34% of population
- Roof of cubital tunnel:
  - Residual muscle
  - In absence of normal attrition forming Osborn fascia
- Secondary ulnar nerve entrapment
- **Diagnose in elbow extension!**

Sem Musculoskel Radiol 2000; 14:814:473

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### Isolated Ulnar Nerve Dislocation

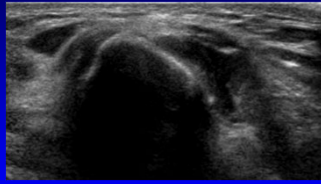
Okamoto, J Hand Surg 2000; 25B:85

\*Asymptomatic finding in 20%

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## Snapping Triceps Syndrome

- Ulnar nerve and medial triceps dislocate over apex of medial epicondyle
- Ulnar nerve and medial triceps remain in contact with each other
- Palpable snap felt through transducer

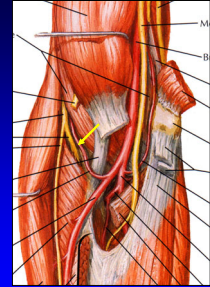


Jacobson JA et al. Radiology 2001; 220:601

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## Radial tunnel

- Radial nerve: deep branch
  - Originates from radial nerve between brachioradialis and brachialis
  - Passes between deep and superficial layers of supinator muscle
  - Exits as posterior interosseous nerve

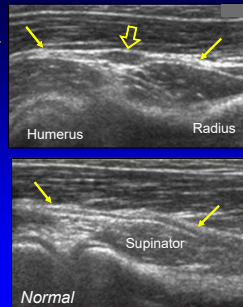


Jacobson JA. et al. Sem Musculoskel Rad 2010; 14:473

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## Radial Nerve: deep branch

- Supinator syndrome:
  - Motor deficits (wrist, finger extension)
  - Abnormal electrodiagnostic studies
  - Nerve enlargement: entrapment
- Radial tunnel syndrome:
  - Pain, no motor deficits, normal EMG
  - Muscle denervation on MRI
  - No nerve enlargement



Ferdinand BD et al. Radiology 2006; 240:161

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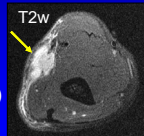
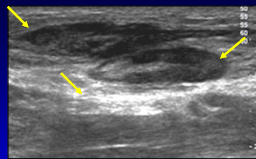
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## Cat scratch disease

- Animal scratch: usually a cat
  - Bartonella henselae
- Child or adolescent:
  - Most common
- Elbow:
  - Lymphadenopathy
  - Epitrochlear lymph node (medial)



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## Take-home Points:

- Joint: aspirate if concern for infection
- Biceps and triceps:
  - Anatomy explains partial-thickness tears
- Nerves: don't forget to look
- Dynamic imaging
  - Ulnar nerve dislocation, snapping triceps
  - Ulnar collateral ligament evaluation

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Syllabus on line and other educational material:  
[www.jacobsonmskus.com](http://www.jacobsonmskus.com)  
Twitter handle: @jjacobsn