

## Interventional Musculoskeletal US: Upper Extremity

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### Disclosures

- Consultant: Bioclinica
- Book Royalties: Elsevier
- Contractor: POCUS PRO
- Advisory Board: Philips
- Not relevant to this talk

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Fundamentals of Musculoskeletal Ultrasound are copyrighted by Elsevier Inc.*

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### Outline:

- Joint
- Tendon sheath
- Bursa
- Cyst
- Calcific tendinitis
- Miscellaneous

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### Joint Aspiration and Injection

- Aspiration:
  - Infection, crystal disease
- Injection:
  - Anesthetic: Lidocaine, Ropivacaine
  - Steroids
  - Therapeutic or diagnostic

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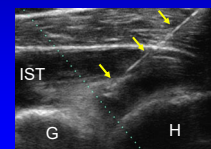
### Joint Aspiration and Injection

- Know which joint recesses become distended and which are accessible
- For joint access:
  - Aim for joint fluid seen at ultrasound
  - Aim for specific joint recess
  - If no recess, aim for joint space

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### Glenohumeral Joint

- Posterior joint recess
  - In plane
  - Transducer: axial
  - Lateral to medial
  - Most reliable site\*



Eur Radiol 2011; 21:1858

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### Acromioclavicular Joint

- In plane
- Transducer: coronal
- Lateral to medial

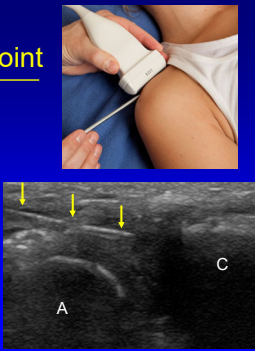


Figure 7 shows a clinical photograph of an ultrasound probe being applied to the acromioclavicular (AC) joint. Below it are two B-mode ultrasound images. Image A shows a coronal view of the AC joint with three yellow arrows pointing to the joint space. Image C shows a lateral-to-medial view of the AC joint.

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### Elbow Joint

- Olecranon recess
- Elbow flexed
- In plane
- Lateral to medial

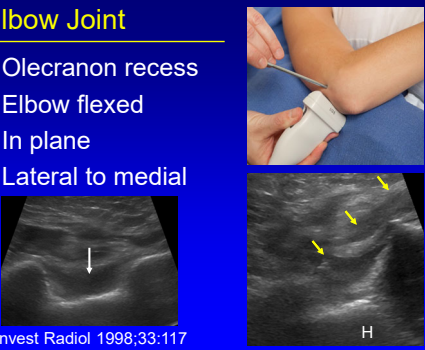


Figure 8 shows a clinical photograph of an ultrasound probe being applied to the olecranon recess of the elbow joint. Below it are two B-mode ultrasound images. The left image shows a reference view with a white arrow pointing to the olecranon. The right image, labeled H, shows a lateral-to-medial view of the olecranon recess with three yellow arrows pointing to the joint space. A citation 'Invest Radiol 1998;33:117' is visible below the images.

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### Wrist Joints

- Dorsal recesses
- In plane
- Transducer: axial
- Medial or lateral

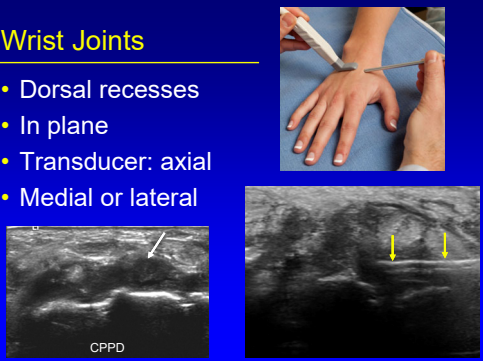


Figure 9 shows a clinical photograph of an ultrasound probe being applied to the dorsal recesses of the wrist joint. Below it are two B-mode ultrasound images. The left image shows a view with a white arrow pointing to a structure, labeled 'CPPD'. The right image shows a medial or lateral view of the wrist joint with two yellow arrows pointing to the joint space.

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### MCP Joints

- Dorsal recesses
- In plane
- Parasagittal or transverse
- Sterile gel stand off

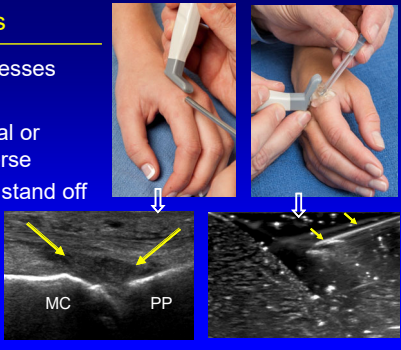


Figure 10 shows two clinical photographs of an ultrasound probe being applied to the MCP joints. Below are two B-mode ultrasound images. The left image shows a parasagittal or transverse view of the MCP joint with two yellow arrows pointing to the joint space, labeled 'MC' and 'PP'. The right image shows another view of the MCP joint with two yellow arrows pointing to the joint space.

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### Tendon Sheath

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- Injection:
  - Anesthetic: Lidocaine, Ropivacaine
  - Steroids
  - Therapeutic or diagnostic

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## Tendon Sheath

- Axial versus longitudinal to tendon
- Aspiration: look for fluid collection
- Injection with steroids:
  - Do not inject steroids into tendon
  - Risk of tendon rupture
  - Test needle location with Lidocaine first

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## Biceps Brachii: sheath injection

- Ultrasound-guided: highest accuracy<sup>1</sup>
  - Statistically significant difference in pain relief compared with blind injection at 33 weeks<sup>2</sup>
- In plane, lateral to medial:
  - Deep to tendon: avoid SA-SD bursa
  - Avoid anterior circumflex humeral artery
- Glenohumeral joint extension: if 5 ml injected<sup>3</sup>

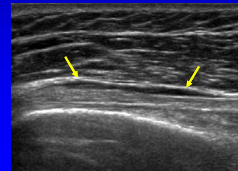
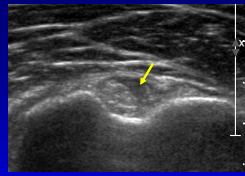
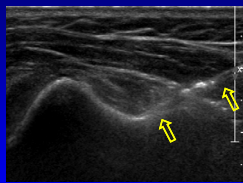
<sup>1</sup>Hashiuchi et al. J Sho Elb Surg 2011; 20:1069

<sup>2</sup>Zhang et al. Ultrasound Med Bio 2011; 37:729

<sup>3</sup>Nwawka et al. AJR 2016; 206:337

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## Biceps Tendon Sheath Injection



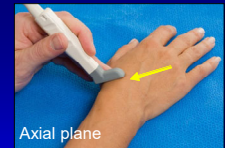
\*Injection should surround tendon

\*Confirm post-injection in short and long axis

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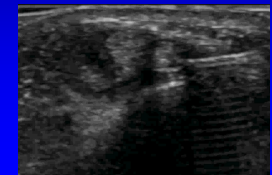
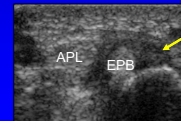
## De Quervain's Tenosynovitis

- Inject short axis: dorsal
- Between EPB & radius
- Possible septation
- Inject around abnormal tendons
- Avoid superficial branch of radial nerve



Axial plane

Bing J-H, et al. Skeletal Radiol 2018; 47:1483



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## Bursa

- Aspiration:
  - Infection, crystal disease
- Injection:
  - Steroids
  - Therapeutic

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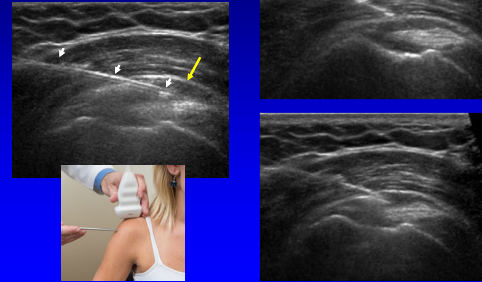
### Subacromial-subdeltoid Bursa

- In plane
- Posterior to anterior or lateral to medial
- Patient supine
- Test inject
- Avoid rotator cuff



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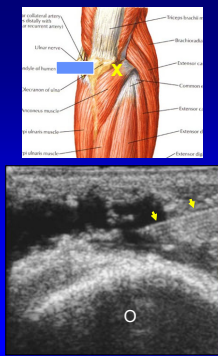
### Subacromial-subdeltoid: injection



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### Olecranon Bursa

- Arm extended
- Axial plane
- Lateral to medial
- Avoid cubital tunnel



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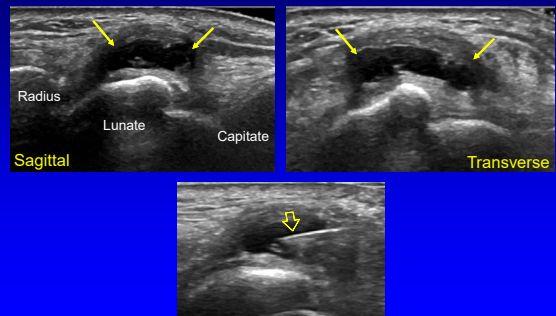
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### Cyst Aspiration

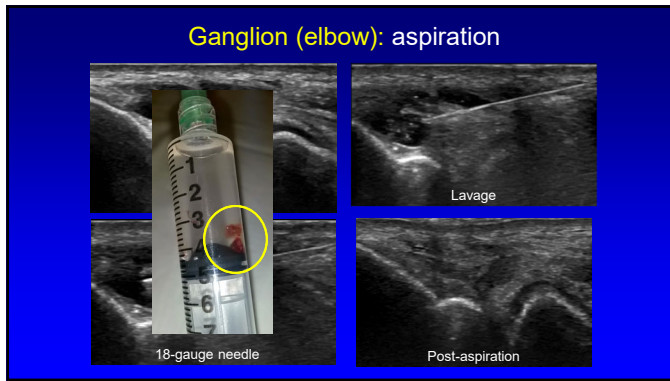
- Ganglion:
  - Multilocular, non-compressible
  - Large bore needle
  - Fenestrate neck
- Other cysts:
  - Paralabral cysts: shoulder and hip labrum
  - Parameniscal cysts

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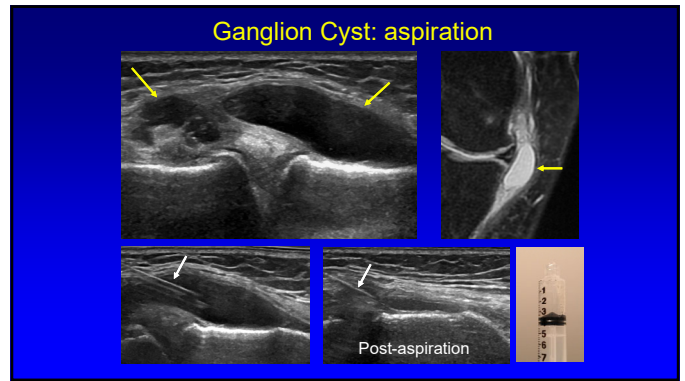
### Ganglion: dorsal + aspiration



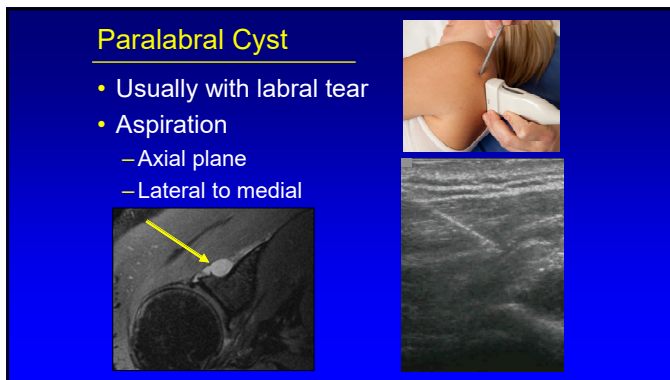
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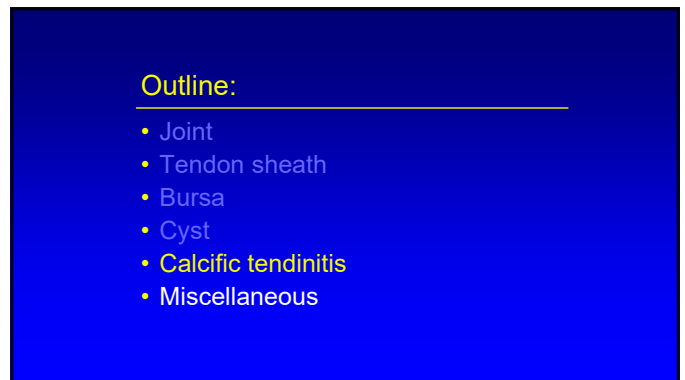
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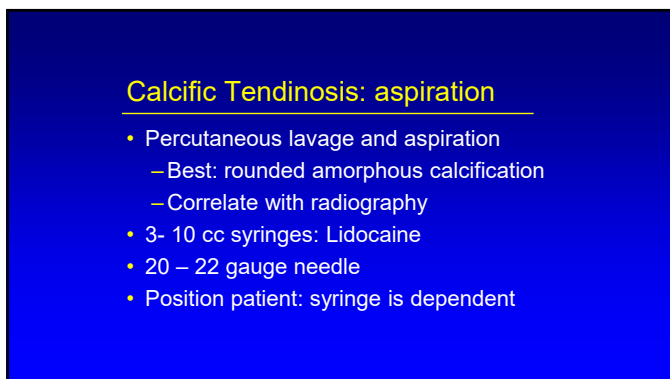
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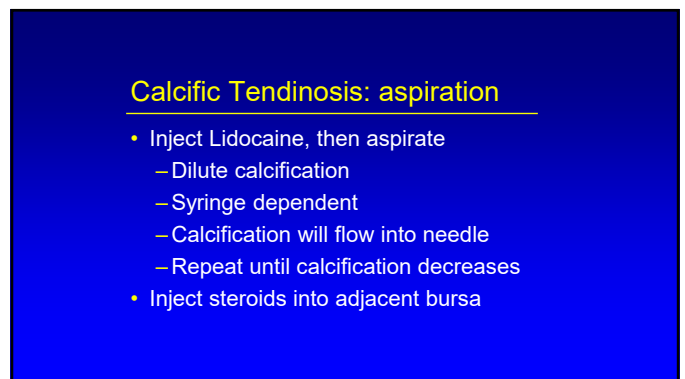
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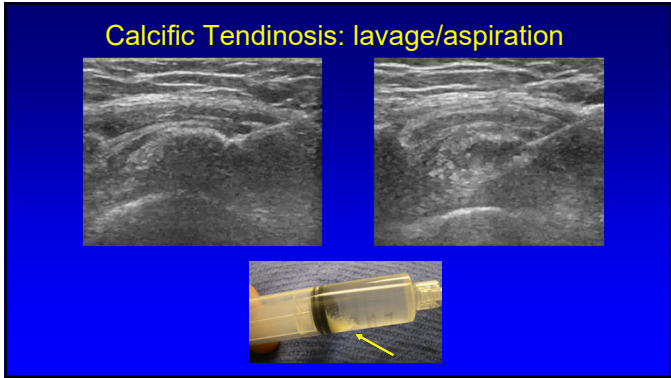
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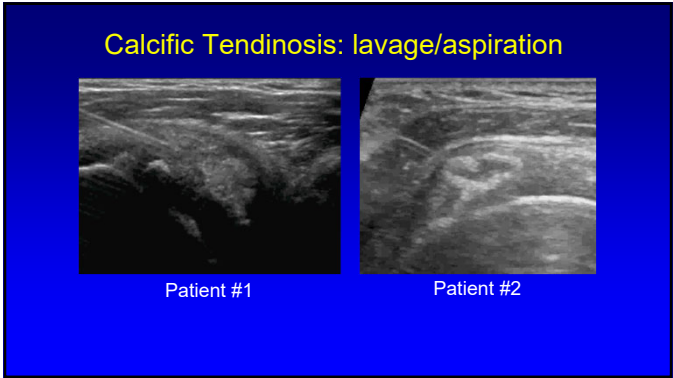
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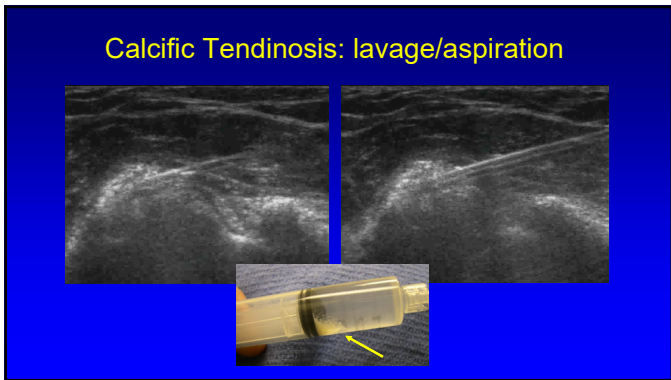
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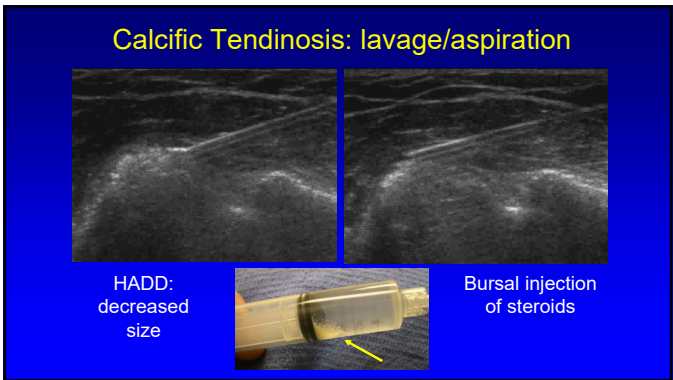
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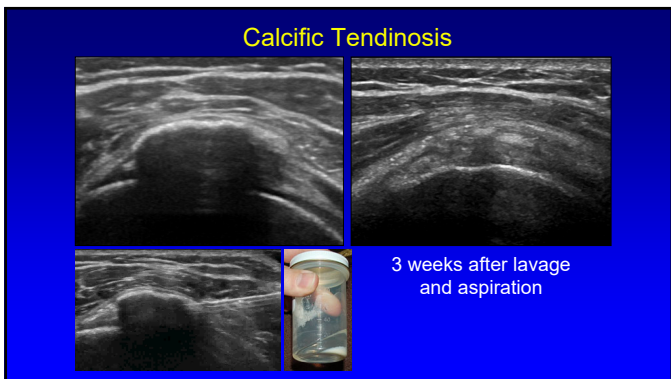
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Calcific Tendinosis: results

- Calcium decrease correlates with symptom improvement
- Improvement: 91% at 1 year\*
  - Calcium gone in 89%
  - Transitory recurrence at 15 weeks: 44%
  - Improved symptoms at 1 year
- No difference at 5, 10 years\*\*

\*del Crura, AJR 2007; 189:W128  
 \*\*Serafini G, Radiology 2009; 252:157

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**A1 Pulley Injection**

- In or out of plane
- 10 mg triamcinolone, 2% lidocaine
- 90% success rate: 1 year

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**Carpal Tunnel Injection**

- Axial plane: ulnar to radial
- Sterile gel stand-off
- Begin over ulnar nerve and stay superficial
- Inject adjacent to median nerve
- Cross-sectional area may decrease within 1 week after steroid injection<sup>1</sup>

<sup>1</sup>Cartwright MS et al. Muscle Nerve 2011; 44:25.

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**Take Home Points:**

- Joint:
  - Aim for recess
- Bursa:
  - Know anatomic locations
- Cyst:
  - Large bore needle
- Calcific tendinitis:
  - One puncture, lavage and aspiration

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

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