

In Office Ultrasound of the Shoulder

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Shoulder Reconstruction



Disclosures

- No conflicts regarding the content of this talk.
- Special Thanks to:



Outline

- Basics of Ultrasound – Terms and Techniques
- Benefits and Limitations of Ultrasound
- The 13 Point Shoulder Exam – Don Buford MD
- Hands on practice

Basics

- Equipment



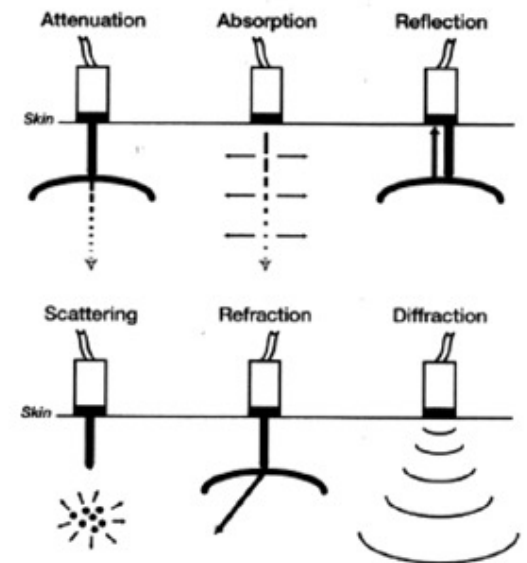
Basics

- Knobs



Basics

- How does it work?
 - Electrical signal to transducer produces sound waves
 - Sound waves “bounce” off of soft tissue and bone back to transducer
 - The more dense and perpendicular the tissue the brighter the appearance on the screen



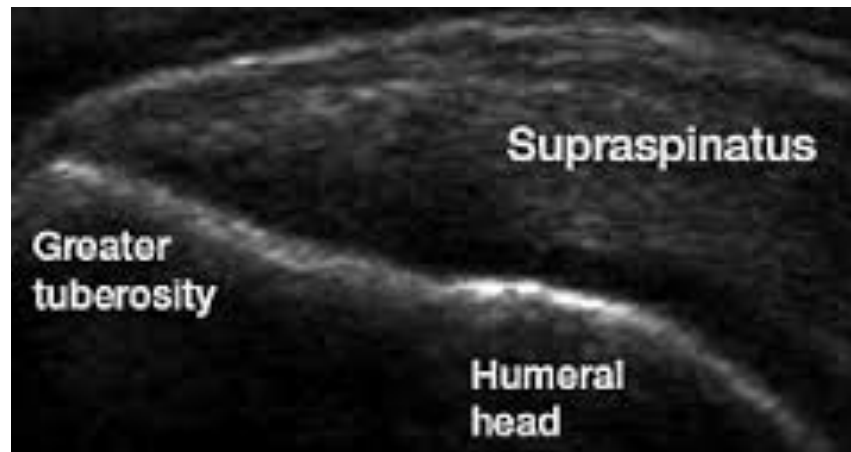
Basics

- Terms
 - Frequency – the range of sound waves produced by a transducer measure in (MHz)
 - Higher frequency = higher image quality but less depth of penetration
 - Deeper structures requires lower frequency to image
 - Echogenicity – how intense an image is on screen
 - Hyperechoic – very bright (dense) bone/calcium
 - Hypoechoic – very dark (less dense) air/fluid



Basics

- Terms
 - Longitudinal – along the length of the structure
 - Transverse – across the width of the structure
 - Anisotropy – Abnormal imaging of a normal structure where it appears hypoechoic but really is hyperechoic – related to not being perpendicular to imaged structure



Basics

- Technique
 - Hold Probe in same hand as the extremity being evaluated (Pt left examiner left) NOT your dominant hand
 - Rest ulnar aspect of examiners hand on extremity being examined



Benefits of Ultrasound

- Immediate results for both patient and physician
- Improved patient satisfaction
- Can use on entire body
- Allows visualization with hardware in place (anchors, hemi, total, reverse)
- Cheaper than MRI and contrast CT
- Patients unable to have MRI (pacer, stents, spinal stimulators, claustrophobia)
- Image guided injections
- Dynamic exams
- No Radiation
- Use on Sideline
- Billable procedure

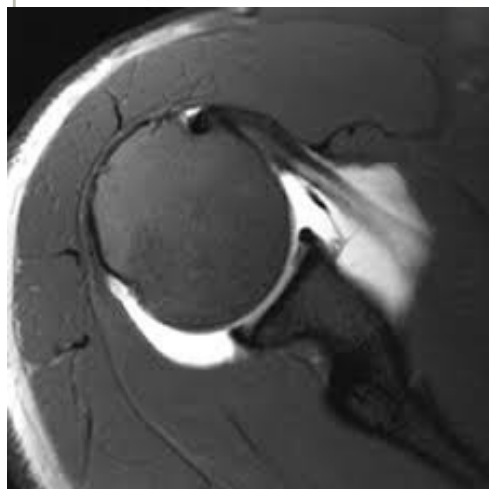
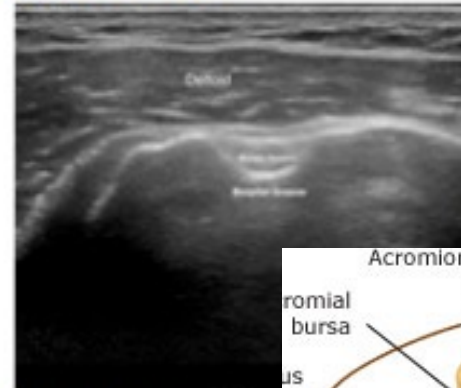
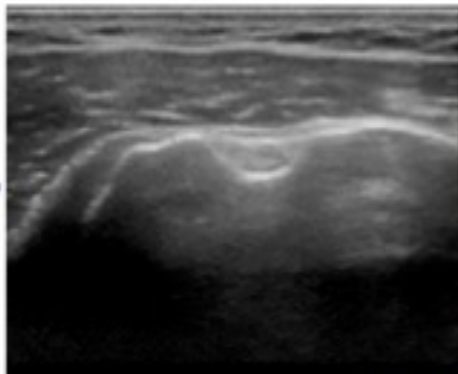
Limitations of Ultrasound

- Intraarticular anatomy
 - Labrum (Limited posterior only)
 - Cartilage
 - Biceps anchor
- If using in multiple areas in body need multiple probes
- May slow clinic times especially in beginning
- Dependent on examiner experience

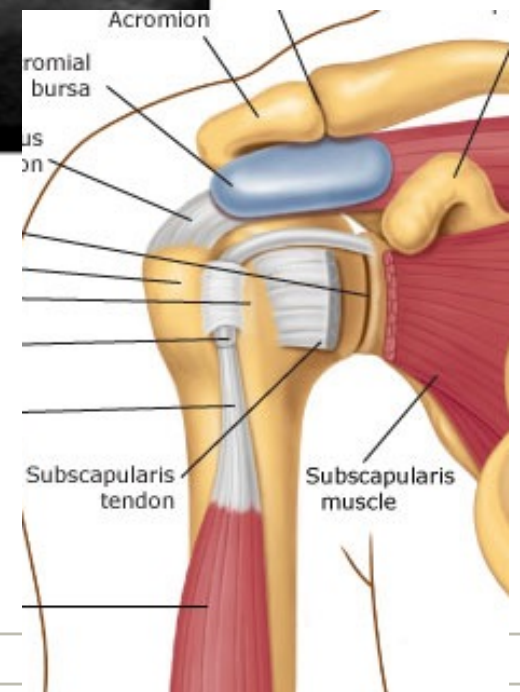
Don Buford's "13 Point Exam"

Point 1

Primary Structure - transverse long head biceps tendon



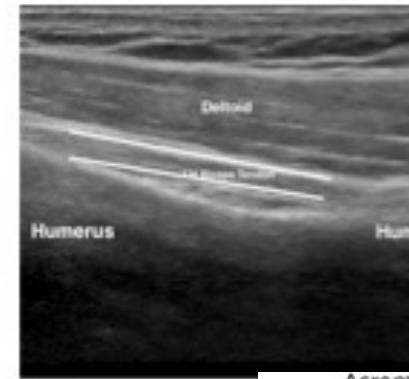
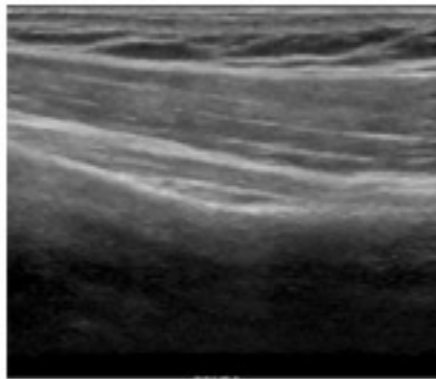
Patient Position: shoulder neutral, hand on thigh, palm up
Ultrasound depth range: 2-5 cm
MRI Equivalent = Axial bicipital groove



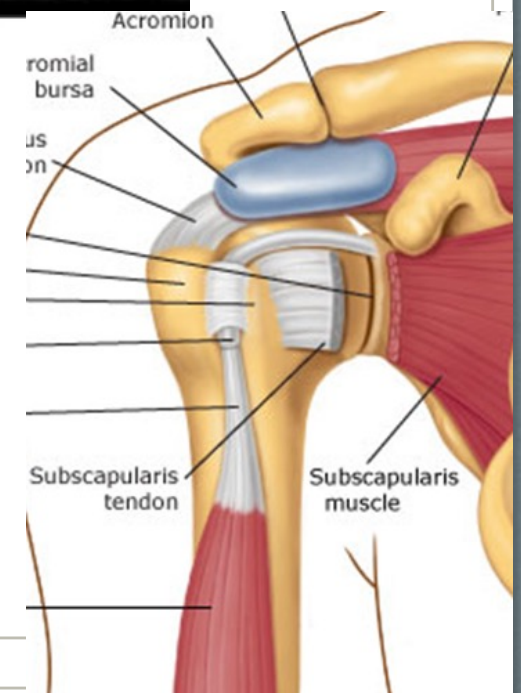
The Exam

Point 2

Primary Structure - longitudinal long head biceps tendon



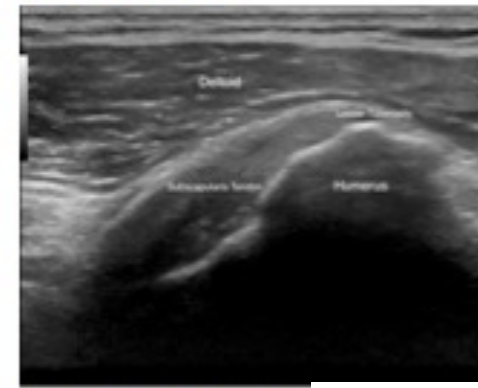
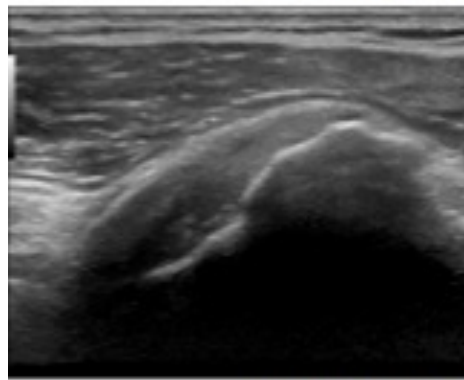
Patient Position: hand on thigh, palm up
Ultrasound depth range: 2-5 cm
MRI Equivalent = Sagittal biceps tendon



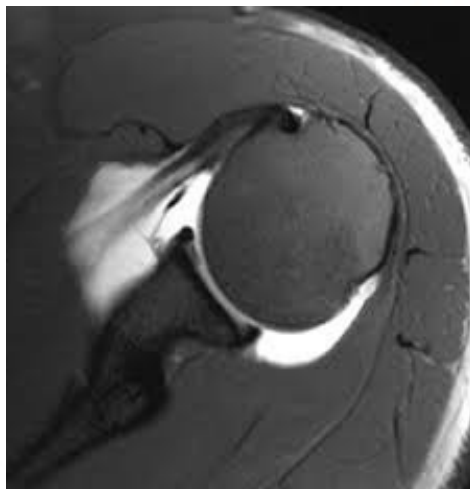
The Exam

Point 3

Primary Structure - longitudinal subscapularis tendon



Patient Position: shoulder externally rotated, hand on thigh, palm up
Ultrasound depth range: 3-5 cm
MRI Equivalent = Axial subscapularis

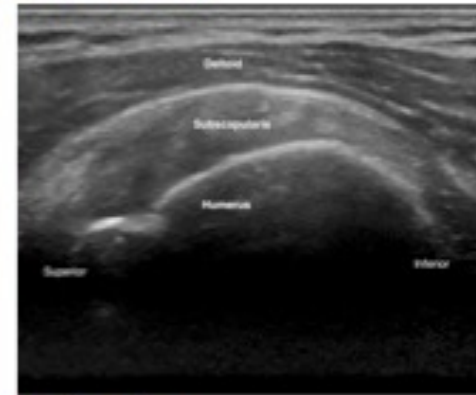
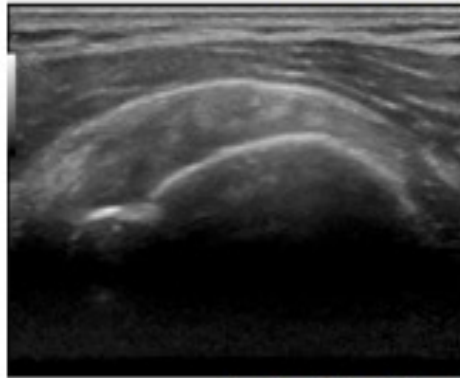


Front View

The Exam

Point 4

Primary Structure - transverse subscapularis tendon



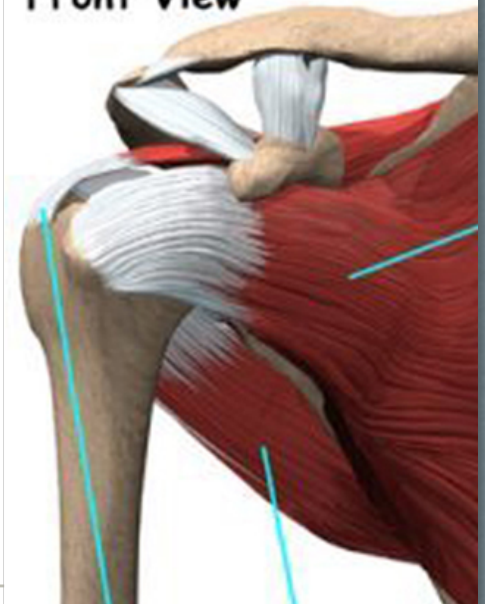
Patient Position: shoulder externally rotated, hand on thigh, palm up

Ultrasound depth range: 3-5 cm

MRI Equivalent = Sagittal subscapularis



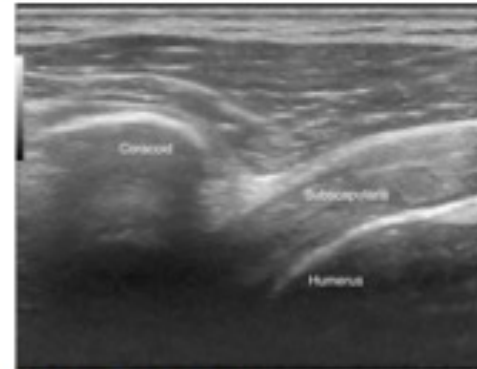
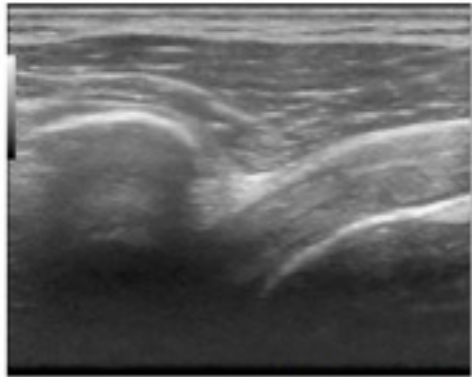
Front View



The Exam

Point 5

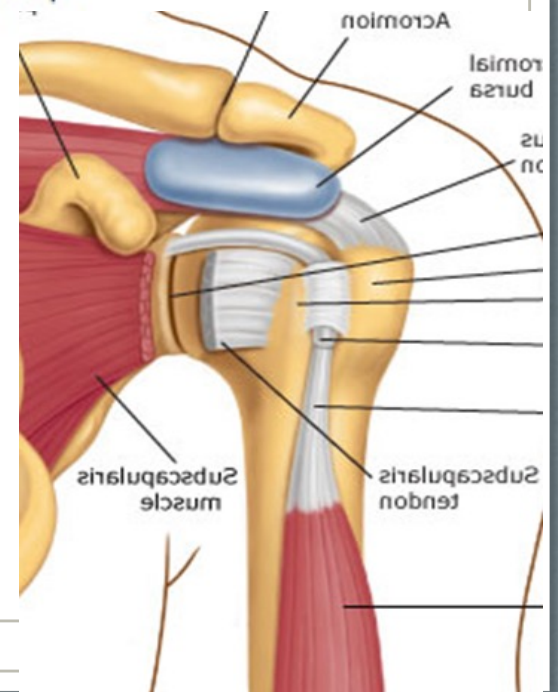
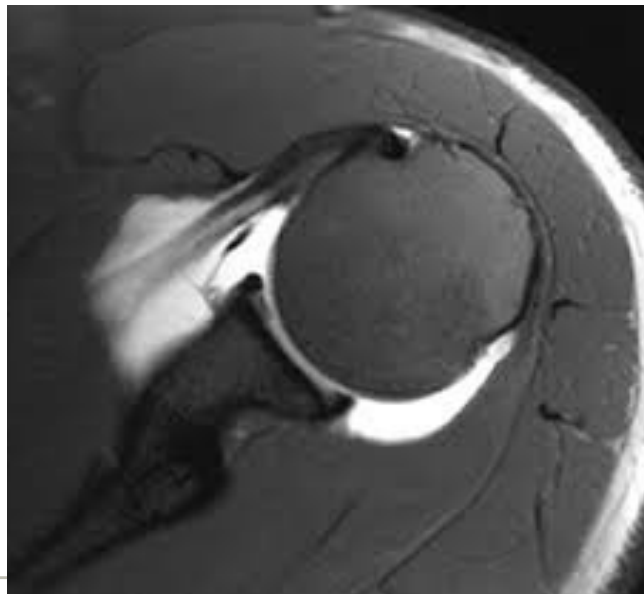
Primary Structures - coracoid, longitudinal subscapularis tendon



Patient Position: shoulder externally rotated, hand on thigh, palm up

Ultrasound depth range: 3-6 cm

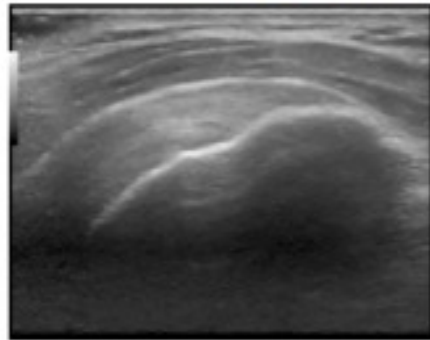
MRI Equivalent = axial subscapularis



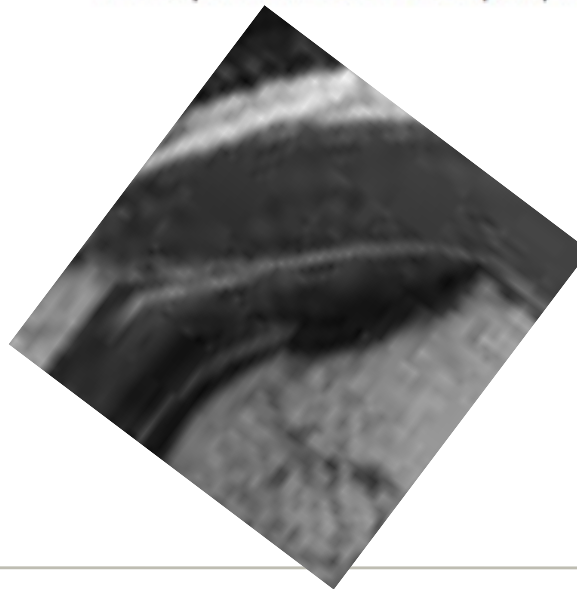
The Exam

Point 6

Primary Structure - longitudinal anterior supraspinatus tendon



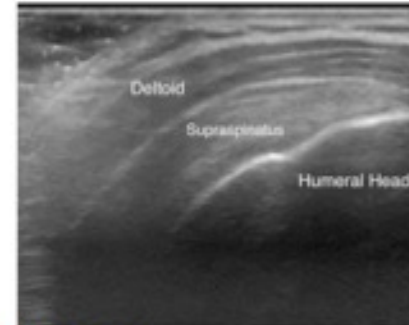
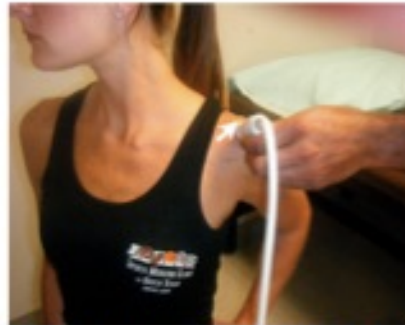
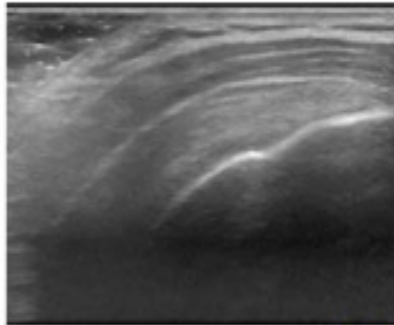
Patient Position: hand on posterior hip, elbow adducted
Ultrasound depth range: 3-5 cm
MRI Equivalent = Coronal supraspinatus



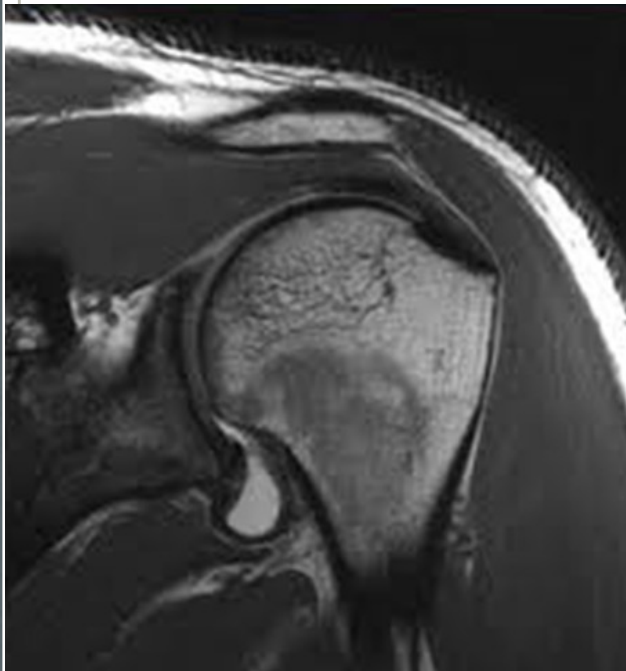
The Exam

Point 7

Primary Structure - longitudinal posterior supraspinatus tendon



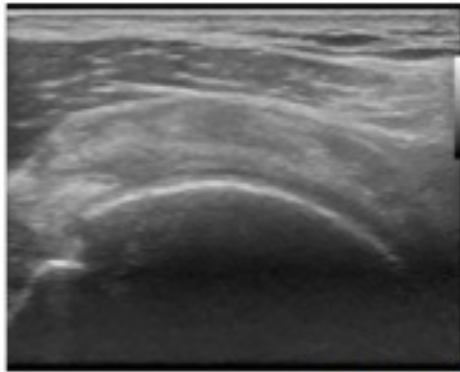
Patient Position: hand on posterior hip, elbow adducted
Ultrasound depth range: 3-5 cm
MRI Equivalent = Coronal supraspinatus



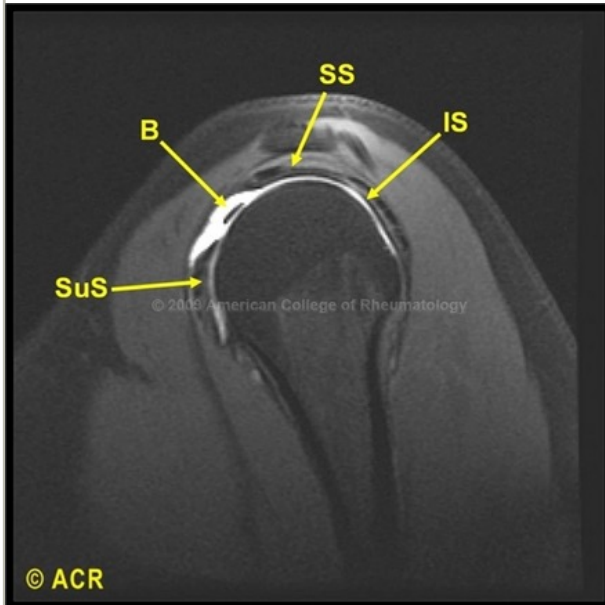
The Exam

Point 8

Primary Structure - transverse anterior supraspinatus tendon



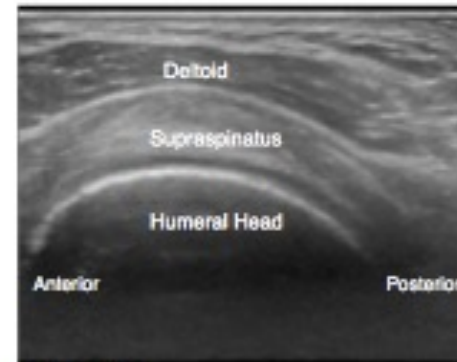
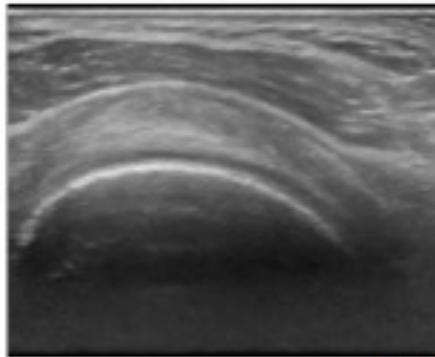
Patient Position: hand on posterior hip, elbow adducted
Ultrasound depth range: 3-5 cm
MRI Equivalent = Sagittal supraspinatus



The Exam

Point 9

Primary Structure - transverse posterior supraspinatus tendon



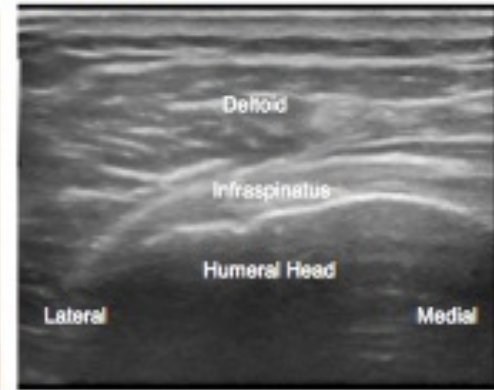
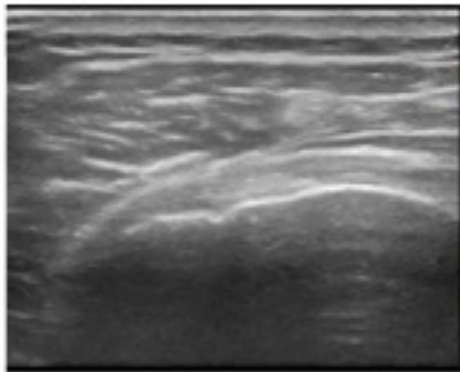
Patient Position: hand on posterior hip, elbow adducted
Ultrasound depth range: 3-5 cm
MRI Equivalent = Sagittal supraspinatus



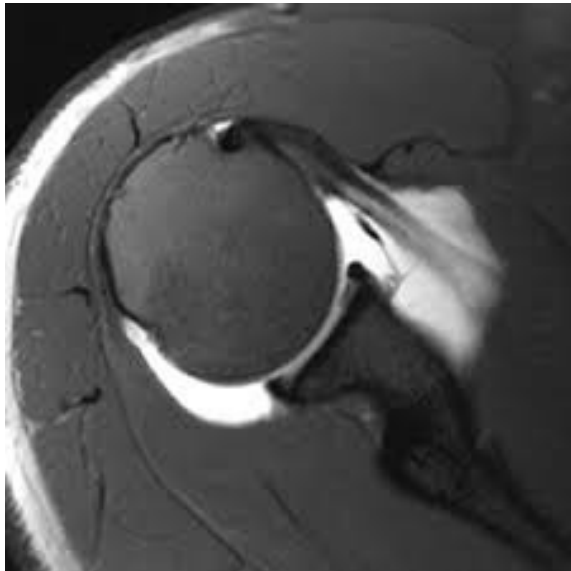
The Exam

Point 10

Primary Structure - longitudinal infraspinatus tendon



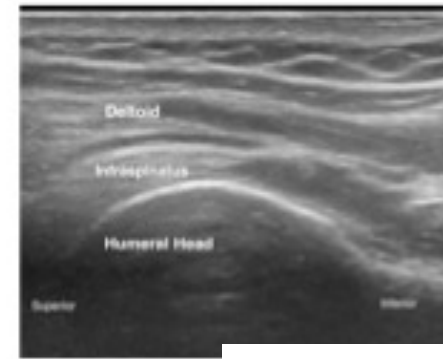
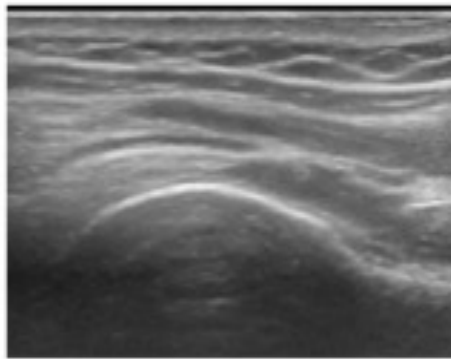
Patient Position: hand on medial thigh
Ultrasound depth range: 3-5 cm
MRI Equivalent = Axial infraspinatus



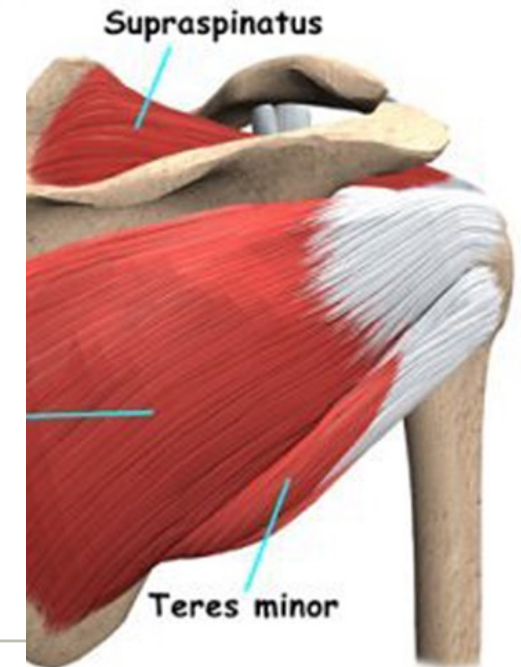
The Exam

Point 11

Primary Structure - transverse infraspinatus tendon



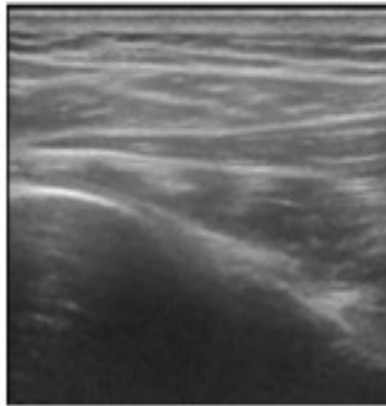
Patient Position: hand on medial thigh
Ultrasound depth range: 3-5 cm
MRI Equivalent = Sagittal infraspinatus



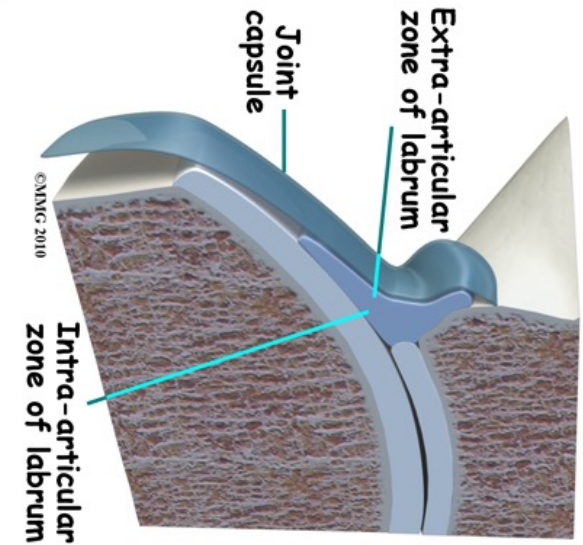
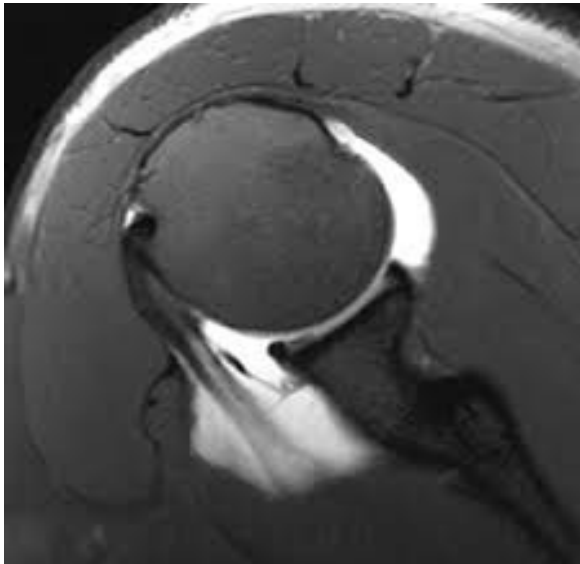
The Exam

Point 12

Primary Structures - posterior G-H joint, longitudinal infraspinatus tendon



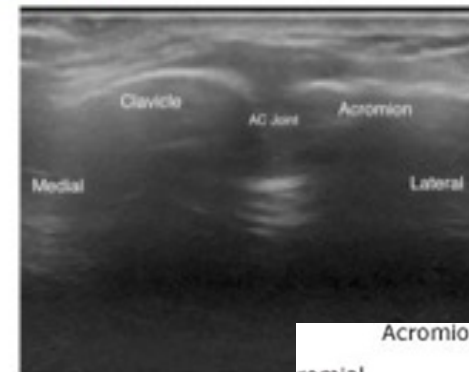
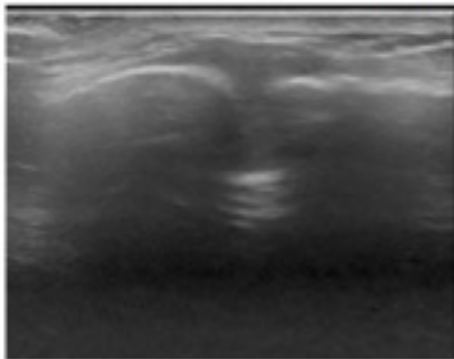
Patient Position: hand on medial thigh
Ultrasound depth range: 3-5 cm
MRI Equivalent = Axial infraspinatus



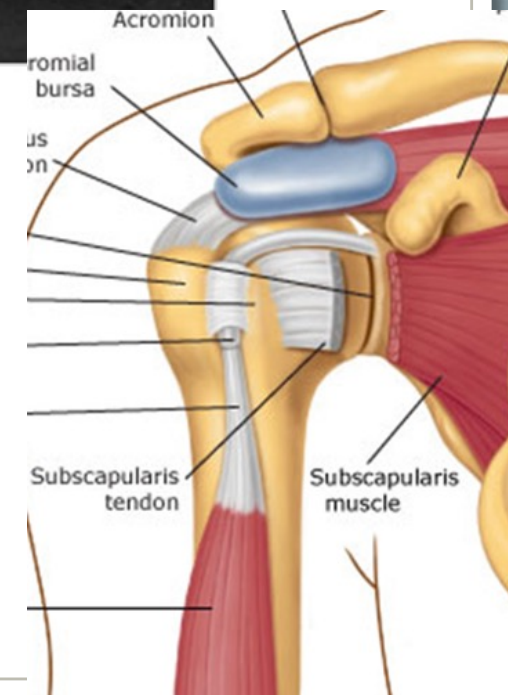
The Exam

Point 13

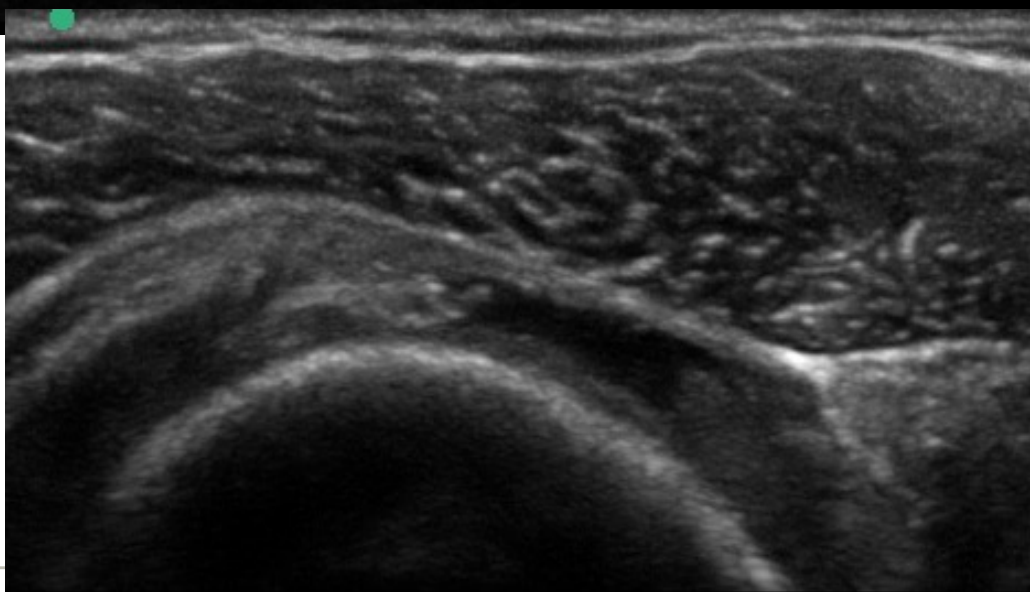
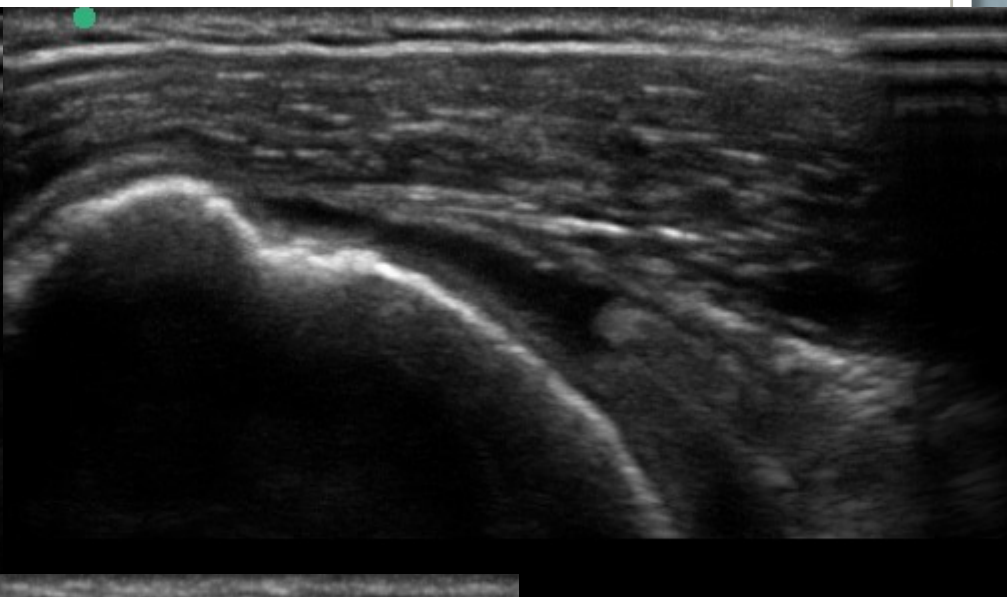
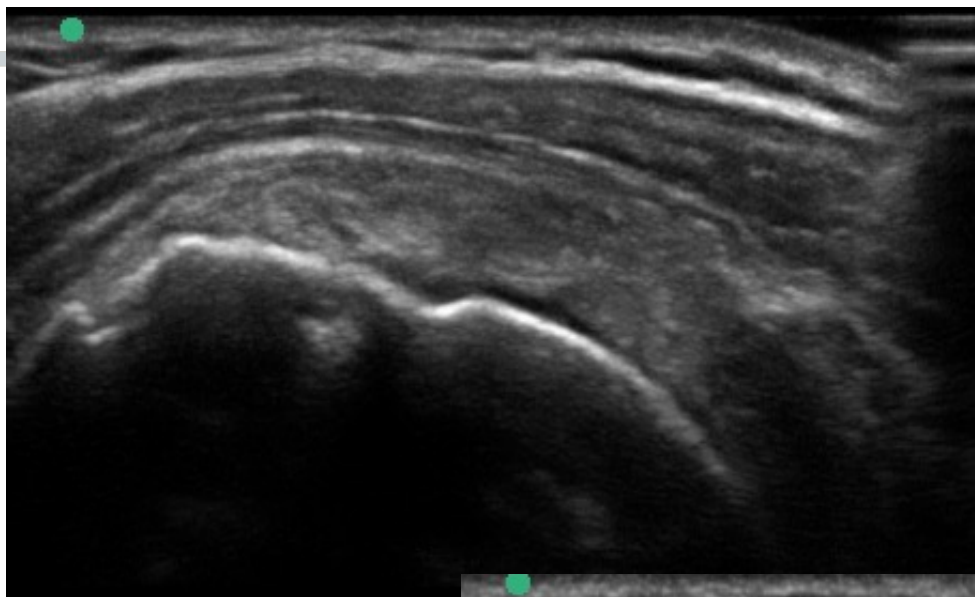
Primary Structure - Acromioclavicular Joint



Patient Position: hand on thigh, palm up
Ultrasound depth range: 2-4 cm
MRI Equivalent = Coronal AC joint



Clinical Images



References

- Recommended Text
 - “Fundamentals of Musculoskeletal Ultrasound” Jon A. Jacobson 2007
- Course available by Don Buford M.D.
 - www.sonosite.com
 - Shoulder, elbow, hip, knee, ankle

Thanks



Nicola Geller