

# Musculoskeletal (Shoulder) Ultrasound

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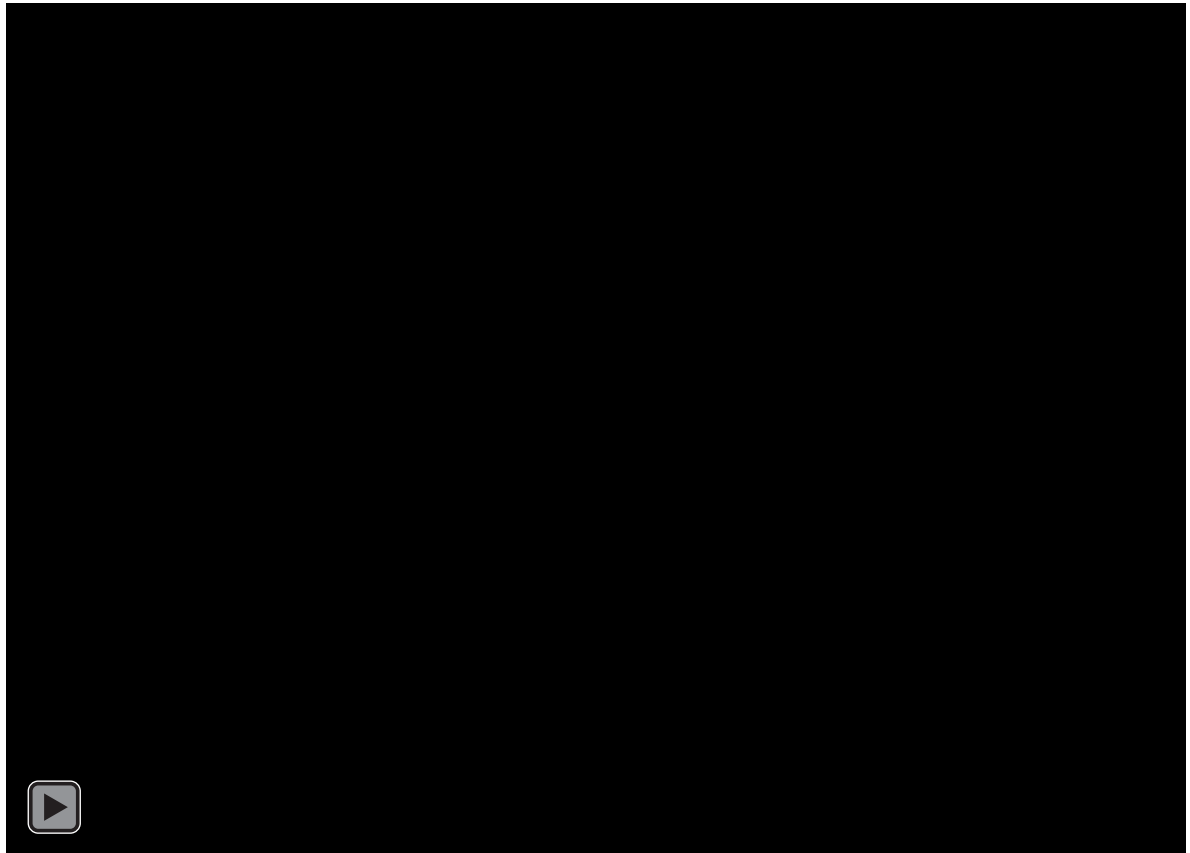
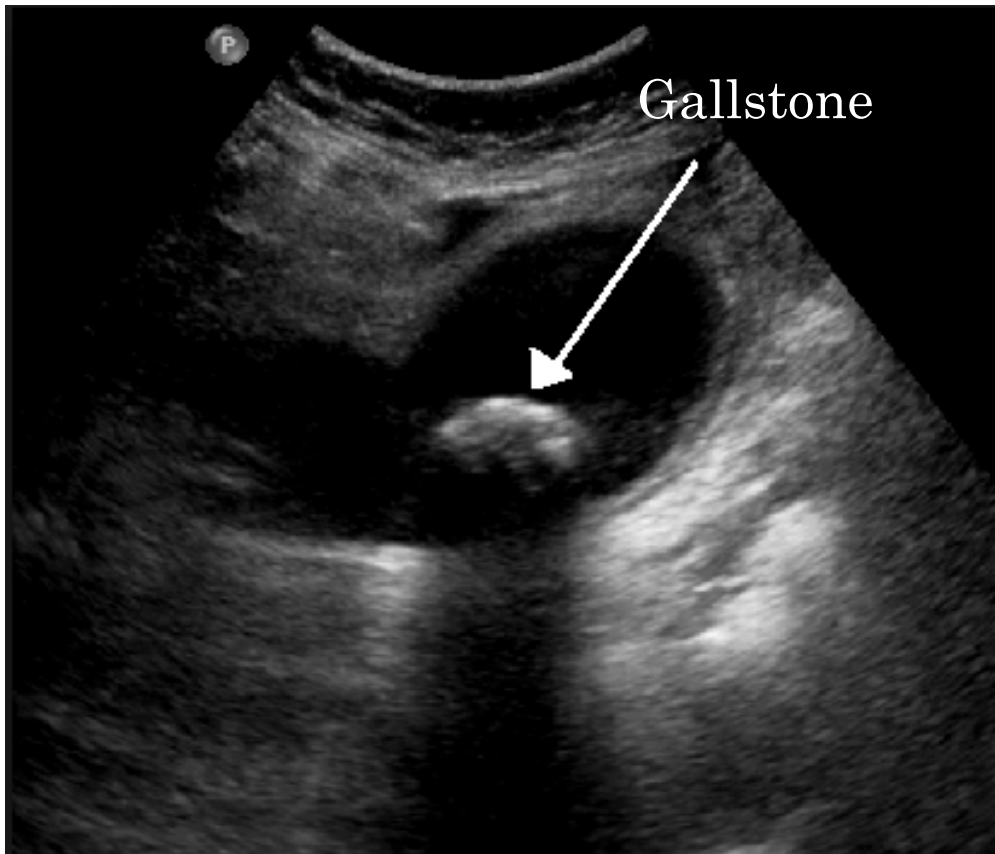
Department of Emergency Medicine

# Getting Started

- What anatomic structure is being scanned?
- Which probe should be used?
- Where should the probe be placed?
- Does depth need to be adjusted?
- Does gain need to be adjusted?

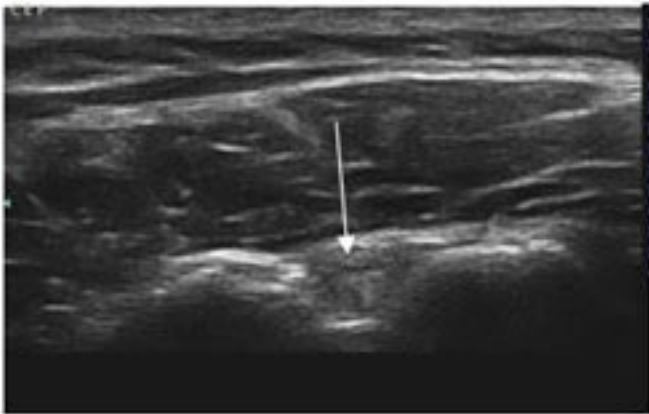
# Relevant Ultrasound Concept: Posterior Acoustic Shadowing

- Shadowing seen posterior to highly dense structures (such as bones or stones).
- Caused by near complete reflection of the ultrasound wave against the surface.



# Relevant Ultrasound Concept: Anisotropy

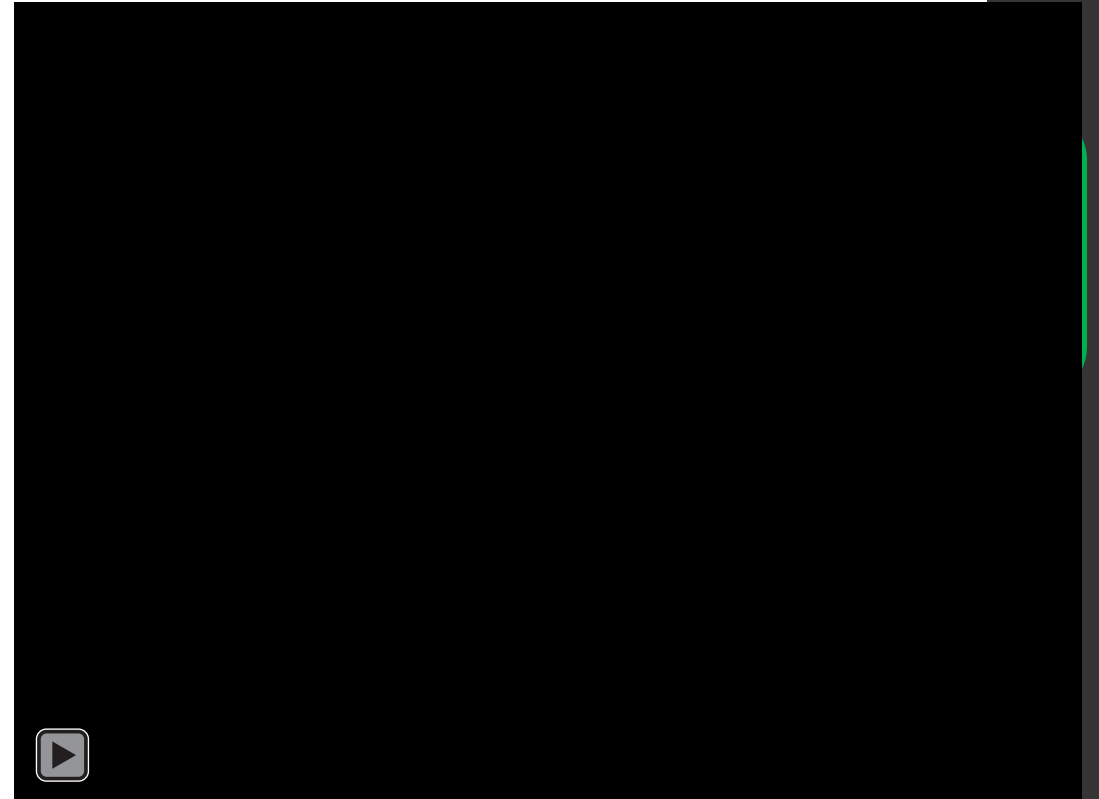
- Change from a hyperechoic to hypoechoic appearance when the transducer angle is not perpendicular to the structure.
- Occurs in tendons; to a lesser extent in muscles, ligaments and nerves.



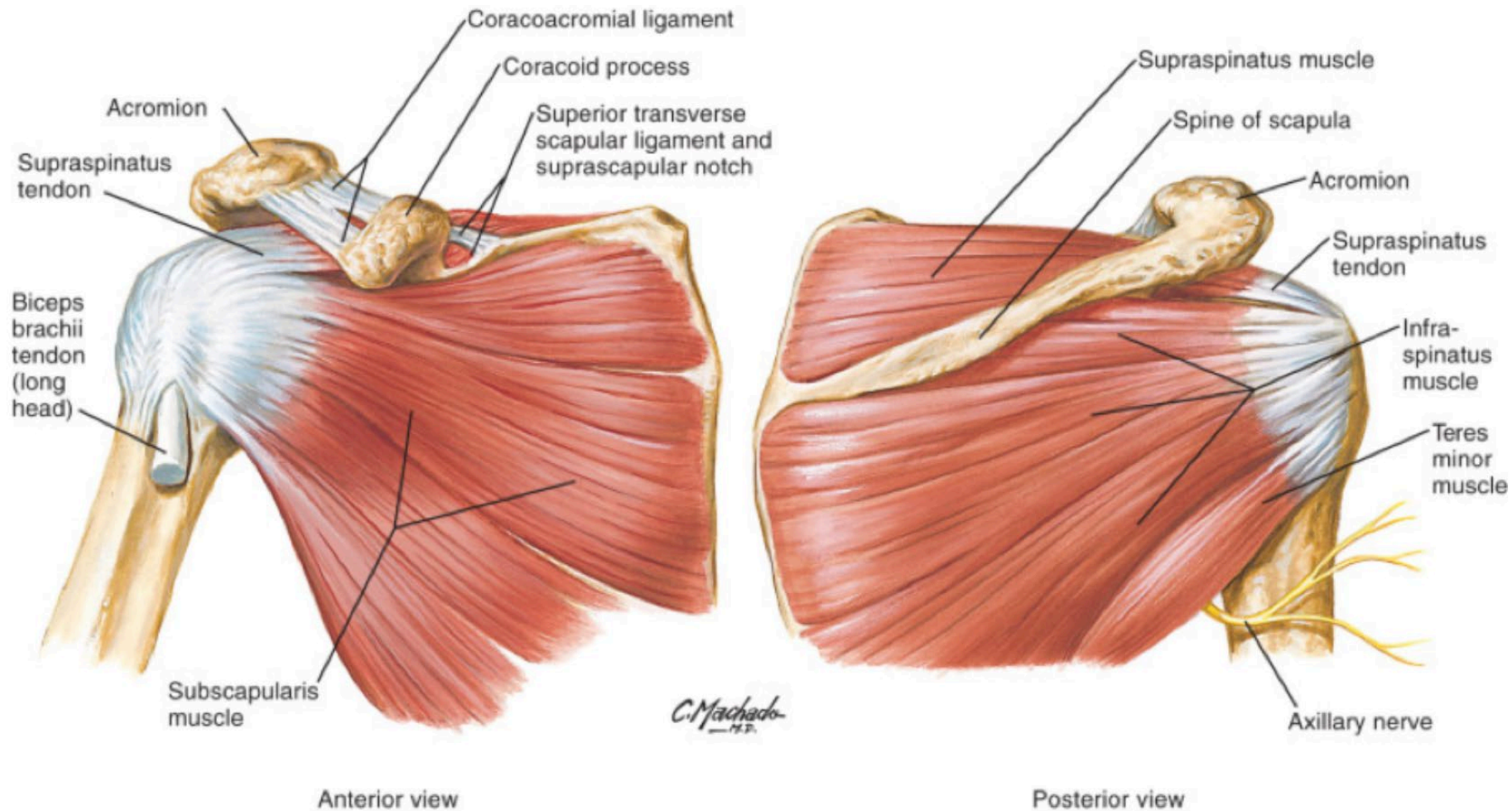
Normal Bicep Tendon: Hyperechoic



Bicep Tendon: Anisotropy (hypoechoic)

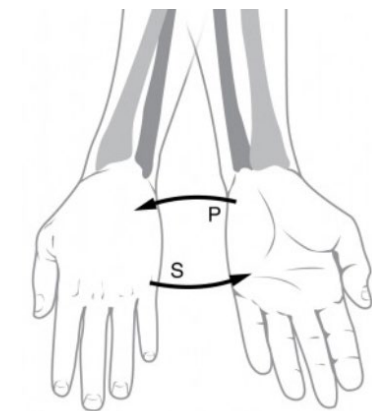
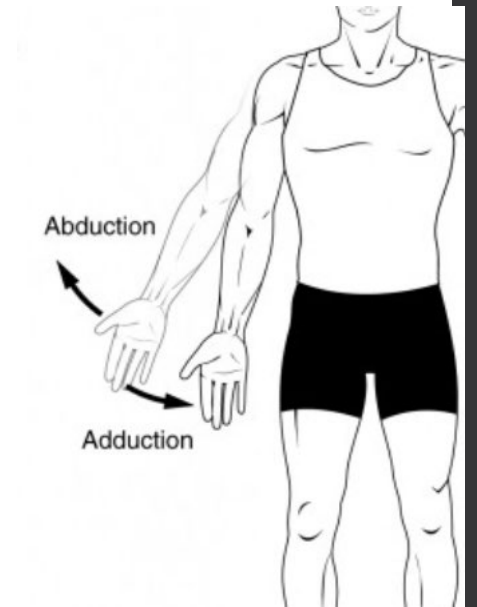


# Refresher on Anatomic Structures



# Shoulder Scanning Protocol

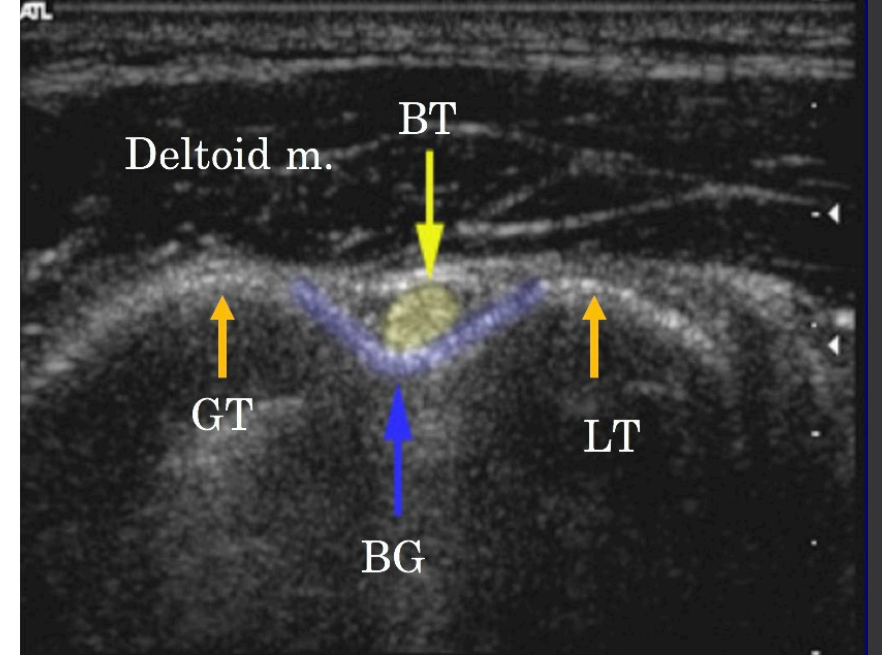
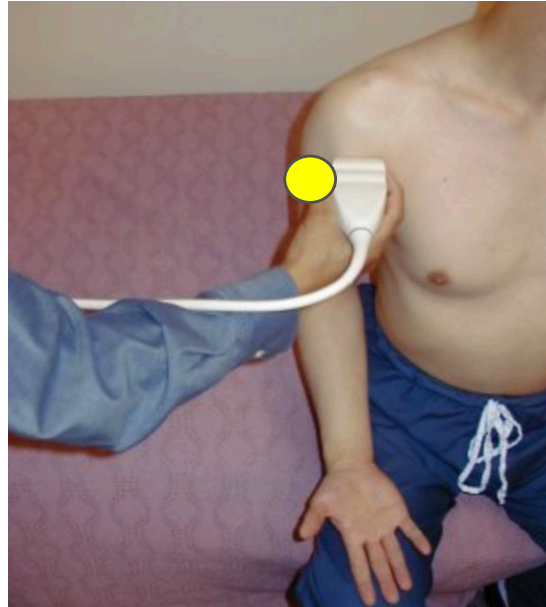
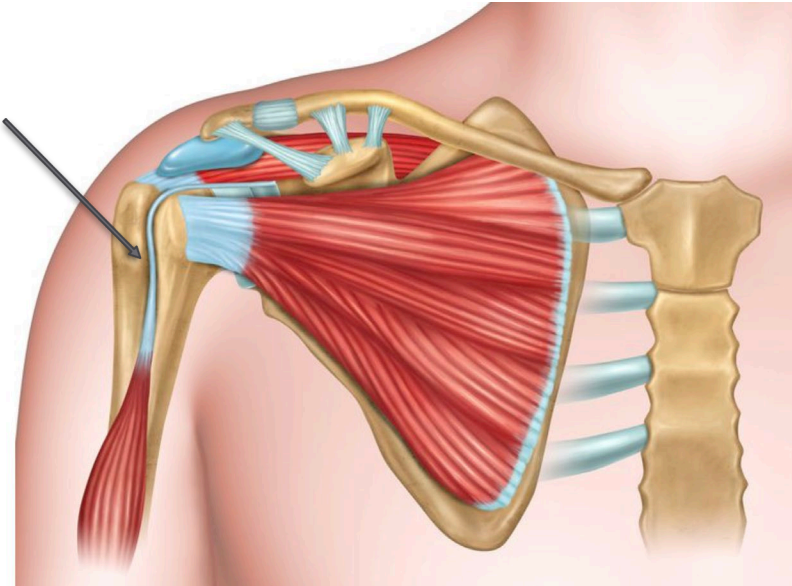
- Probe Selection:
  - Linear
  - Curvilinear (may be required depending on patient's body habitus)
- Probe Positioning – Maintain perpendicular to the skin while scanning
  - Transverse: Probe marker pointing to patient's right
  - Longitudinal: Probe marker pointing to patient's head
- Patient Positioning
  - Supine, sitting upright on a bed or chair
  - Patient's arm adducted (towards midline) and supinated (palm upward)
  - Hand resting on the thigh





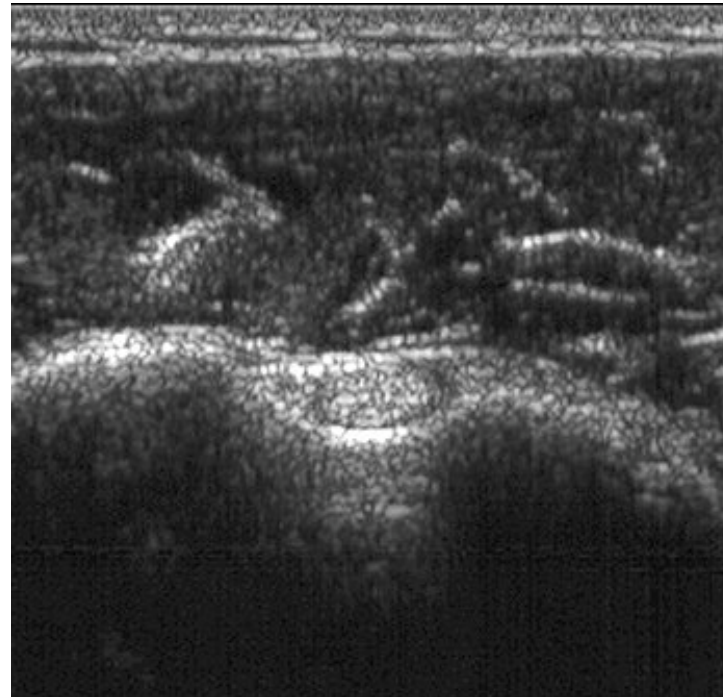
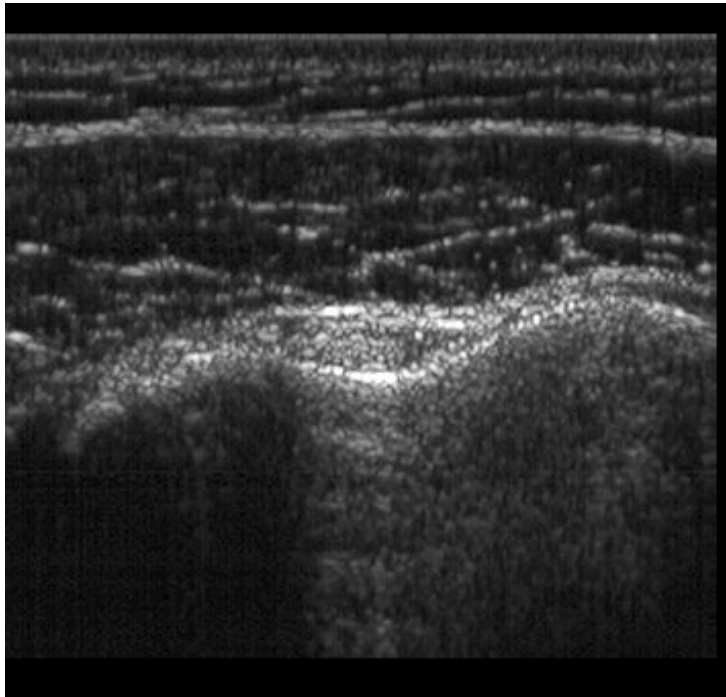
# Biceps Tendon – Transverse View

- The long head of the bicep brachii tendon can be visualized in this view, located in the intertubercular (bicipital) groove.
- Note the orientation of the greater and lesser tuberosities on the screen relative to the probe marker orientation (towards patient's right).
  - Greater = lateral on body = left side of screen
  - Lesser = medial on body = right side of screen



# Biceps Tendon – Transverse View

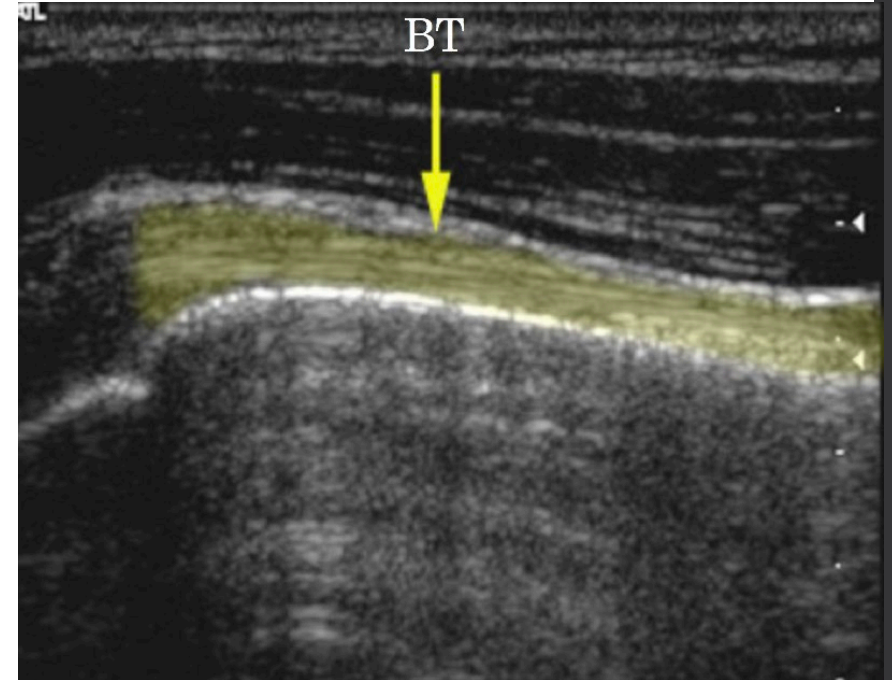
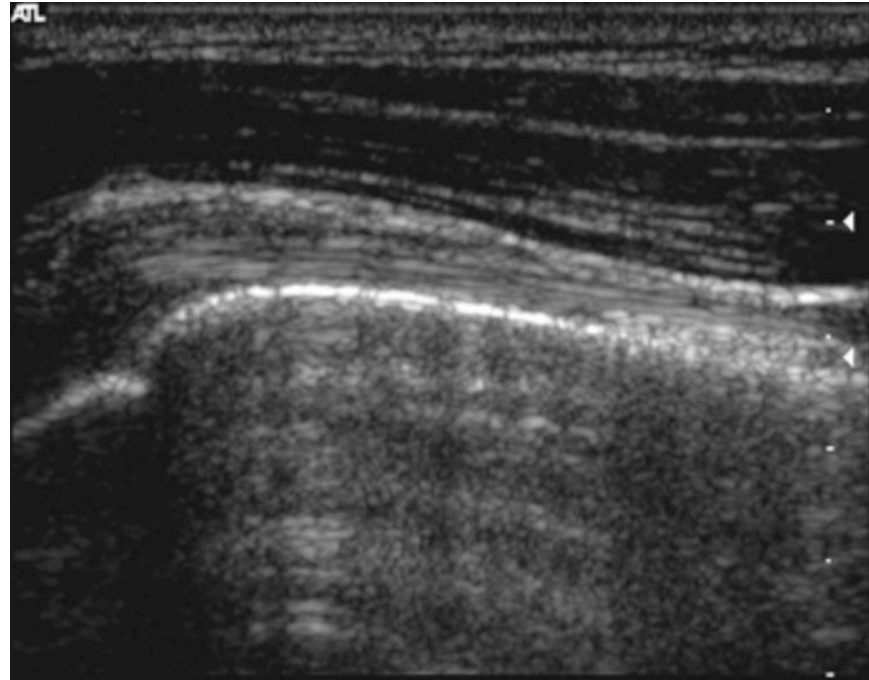
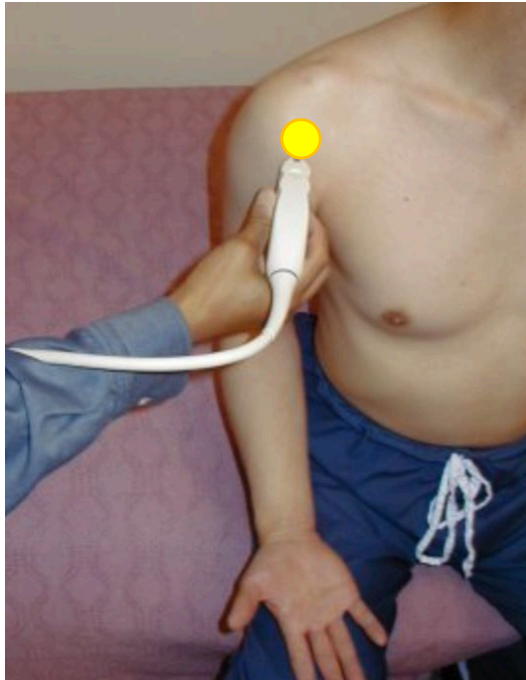
- Additional Examples
- Bone appears as a well demarcated, bright echogenic line with no visible structures beneath.





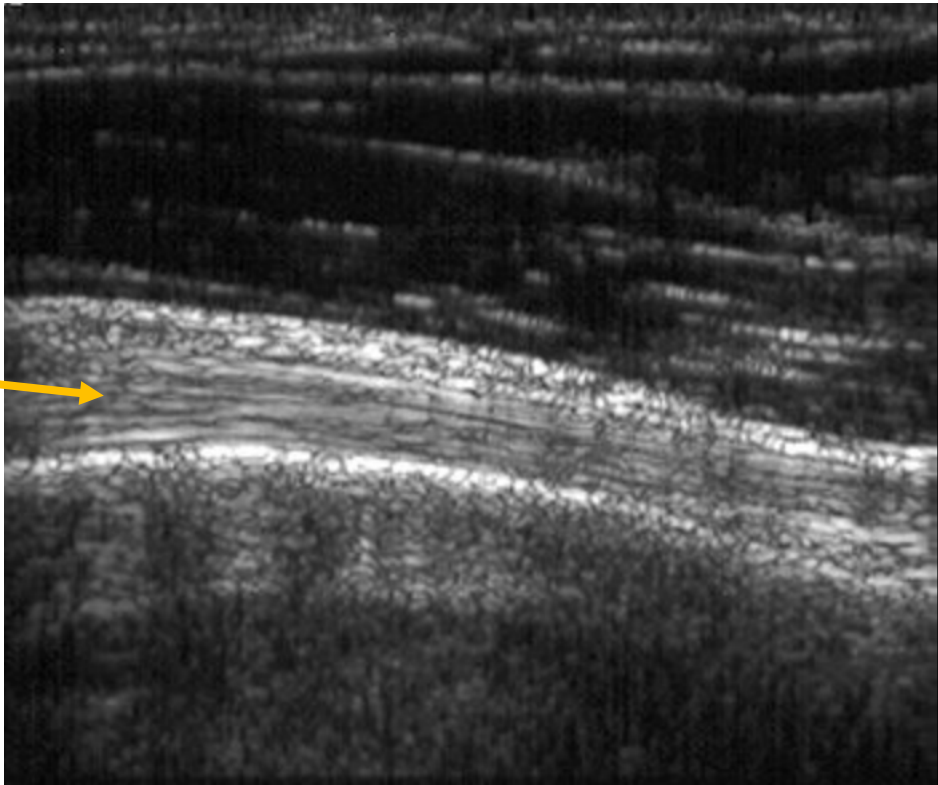
# Biceps Tendon – Longitudinal View

- From the transverse plane, rotate the probe 90 degrees clockwise while maintaining view of biceps tendon.
- Tendons appear as compacted parallel lines that are echogenic and striated.



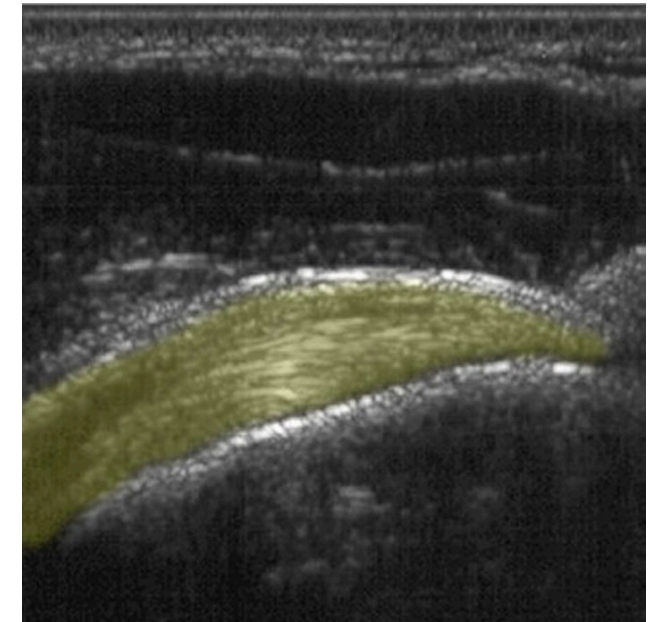
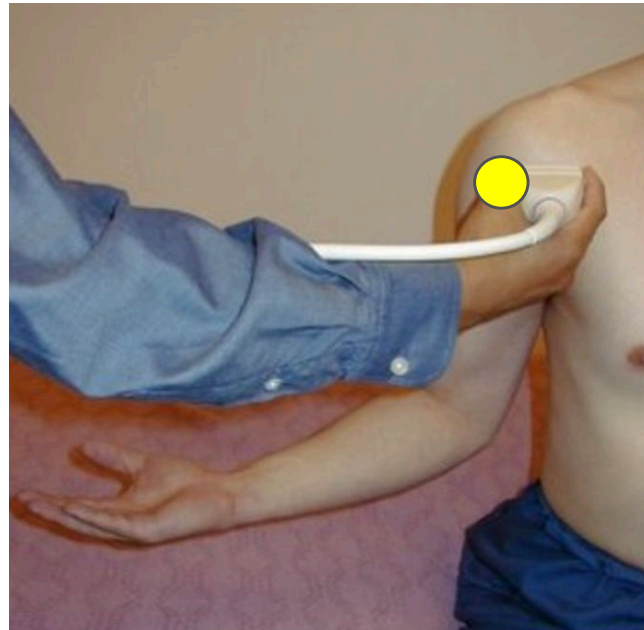
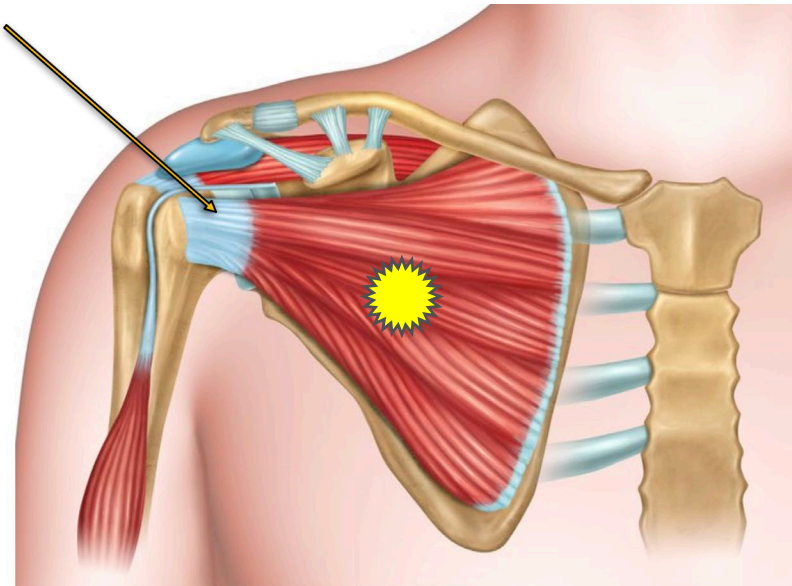
# Biceps Tendon – Longitudinal View

- Additional Examples



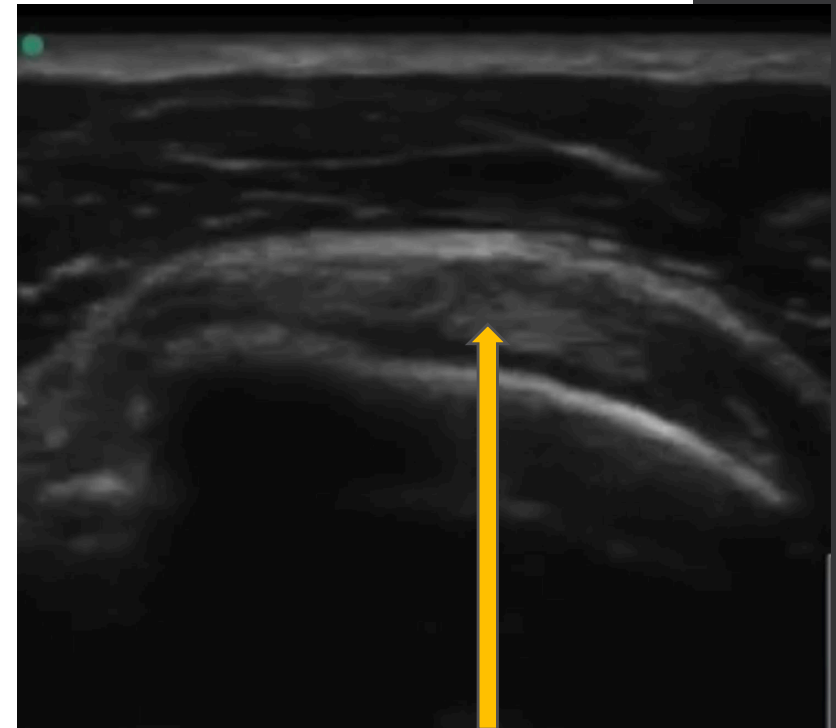
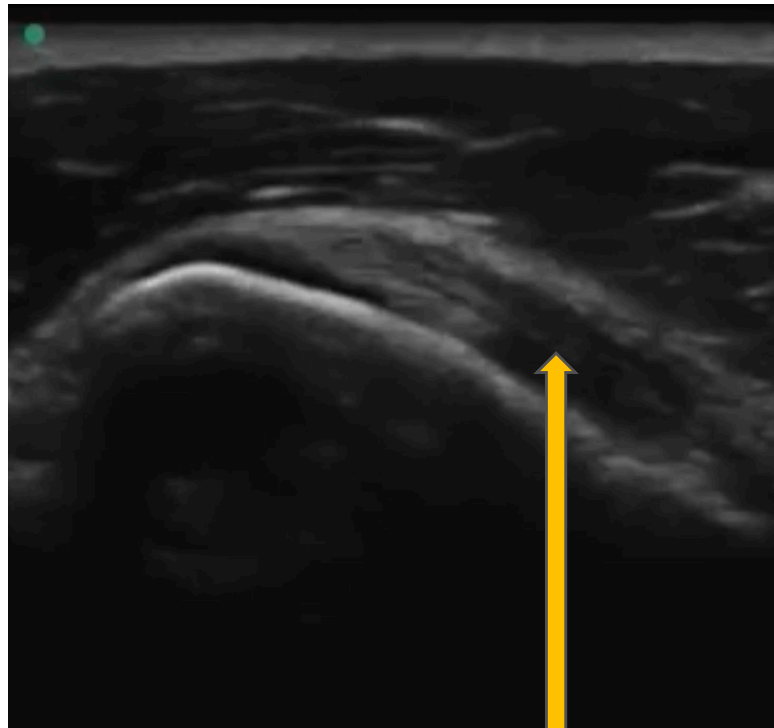
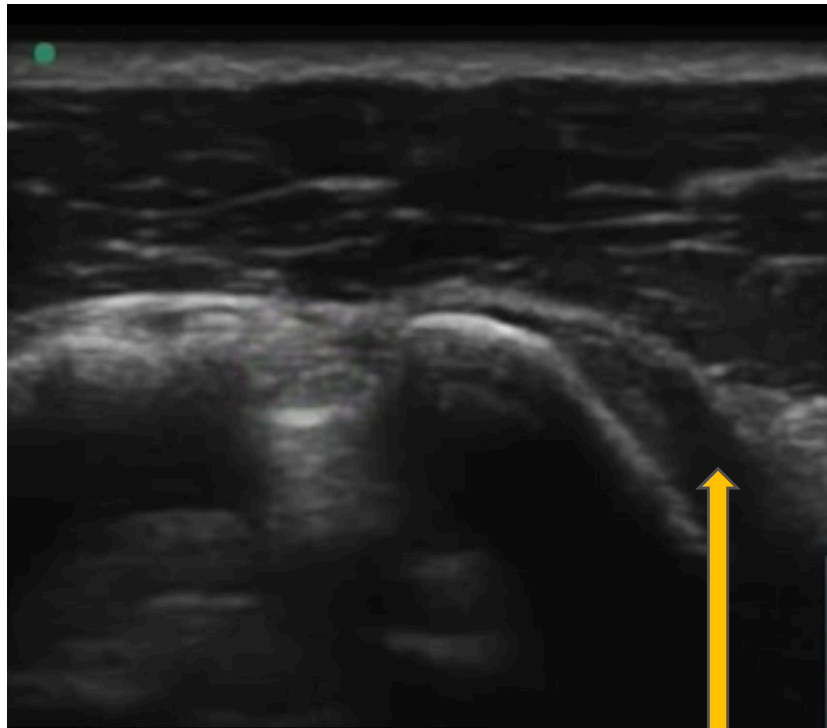
# Subscapularis Tendon – Transverse View

- Placing the probe in transverse view to visualize the biceps tendon, externally rotate the arm.
- The subscapularis tendon, which attaches to the medial aspect of the bicipital groove, can be seen moving into view over the lesser tuberosity.
- It will enter from the right side of the screen towards the left side of the screen.



# Subscapularis Tendon – Transverse View

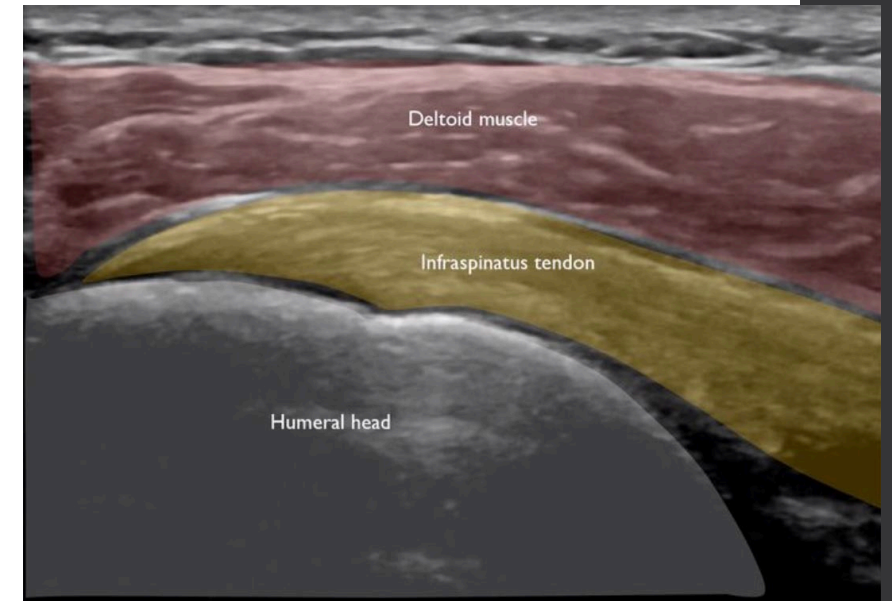
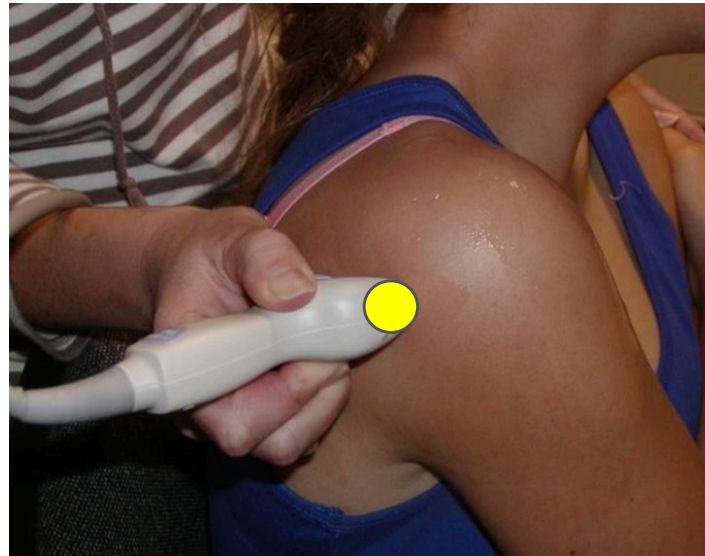
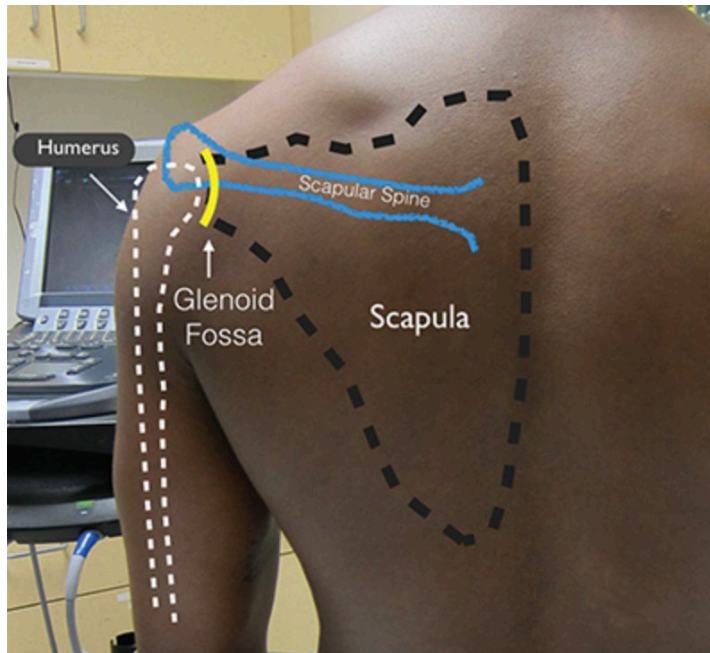
- View of the subscapularis tendon as the arm is externally rotated





# Infraspinatus Tendon – Transverse View

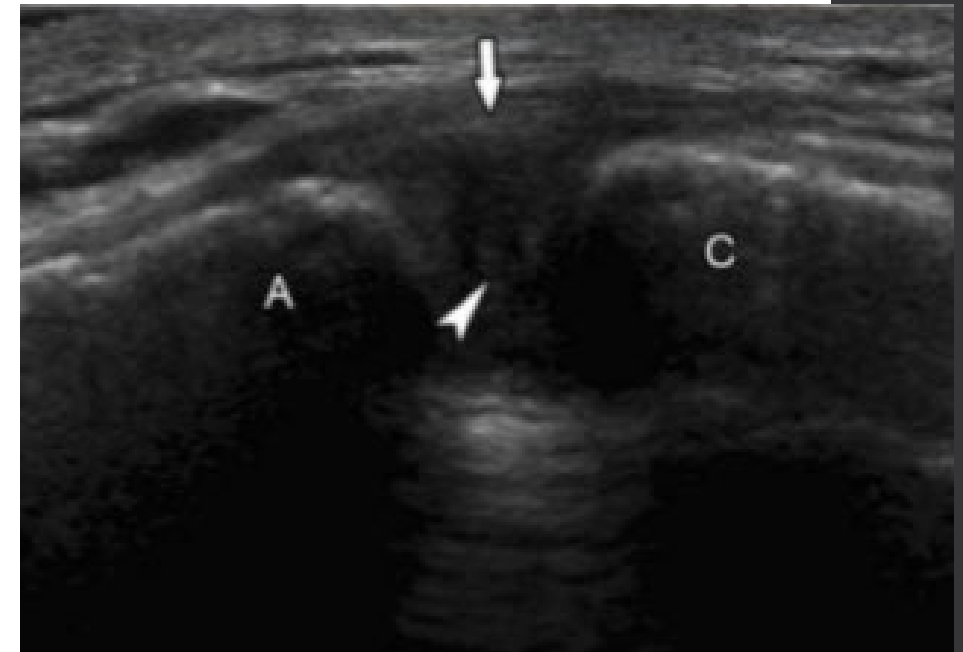
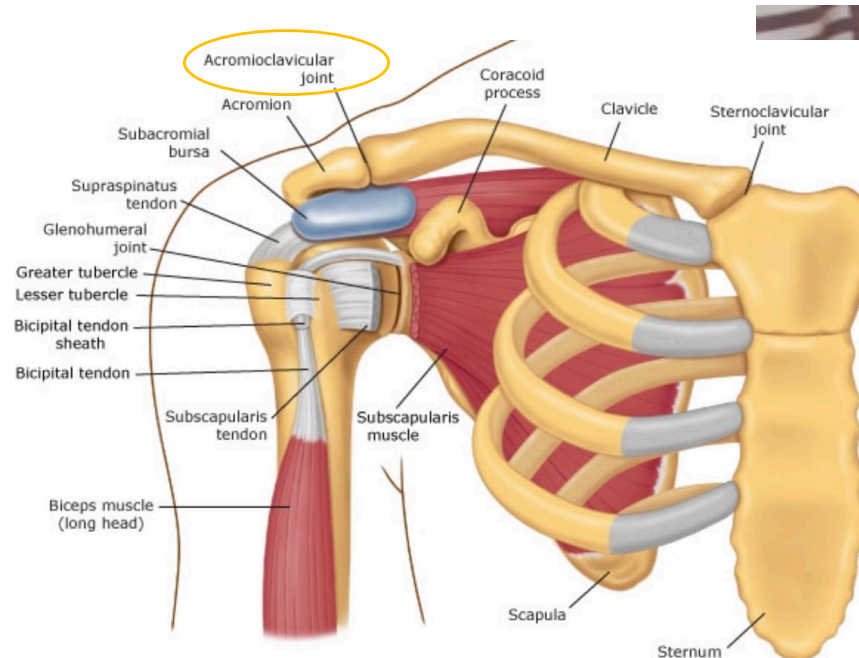
- Patient to place hand on contralateral shoulder
- Place the probe in transverse view, posterior shoulder at or below the scapular spine
- The infraspinatus attaches at the postereolateral aspect of the humerus





# Acromioclavicular (AC) Joint

- To locate the acromioclavicular joint, palpate the clavicle and laterally locate the acromion. Place the transducer in a coronal plane.
- As the probe marker is directed to the patient's right, the acromion will be towards the left side of the screen and the clavicle towards the right.
- The AC joint space is seen between the acromion and the clavicle.



# Questions?

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Quiz

# Additional Resources

- US of the Bicep Tendon (1:26)
  - [https://www.youtube.com/watch?time\\_continue=24&v=Lu8vcQQS0VY](https://www.youtube.com/watch?time_continue=24&v=Lu8vcQQS0VY)
- US of the Subscapularis Tendon (0:00 to 1:28)
  - <https://www.youtube.com/watch?v=81XRvOWGekM>
- US of the Infraspinatus Tendon (1:06)
  - <https://m.youtube.com/watch?v=uWR9Of93A58>
- US of the AC Joint (1:02)
  - [https://www.youtube.com/watch?time\\_continue=15&v=BoSkci5FZhk](https://www.youtube.com/watch?time_continue=15&v=BoSkci5FZhk)
- Live Shoulder US Scan (0:00 to 8:36)
  - [https://www.youtube.com/watch?v=gZbE\\_VeXhcY&list=PL3Zty8IubWpexaYymphlUdPrnl sVBR-Oi&index=9](https://www.youtube.com/watch?v=gZbE_VeXhcY&list=PL3Zty8IubWpexaYymphlUdPrnl sVBR-Oi&index=9)

# References

- [J Clin Ultrasound](#). 1987 Nov-Dec;15(9):591-7.
- <http://library.open.oregonstate.edu/aandp/chapter/9-5-types-of-body-movements>
- <http://www.med.umich.edu/radiology/mskus/>
- <https://www.ultrasoundpaedia.com/normal-shoulder/>
- <http://ultrasoundcases.info/>
- <https://www.acep.org/sonoguide/musculoskeletal.html>
- <https://www.slideshare.net/sahilchaudhry89/ultrasound-shoulder-and-knee-joints>
- <https://www.sonosite.com>