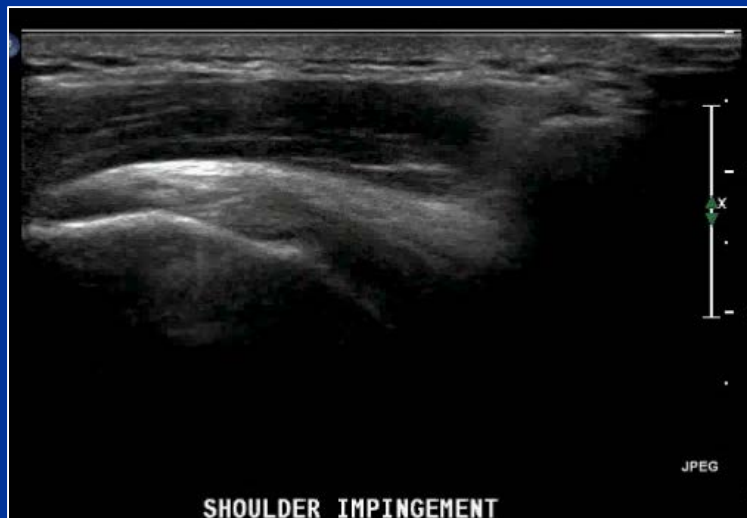


MSK US:

Normal Shoulder Anatomy, Standard Protocol & Technique



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University of Wisconsin School of Medicine
Division of Musculoskeletal Radiology



@kenlee8799

Disclosures

- Grants: NBA/GE and Mitek
- Research: SuperSonic Imagine
- Royalties: Elsevier



- Daily
- Same-day add-ons

9 Sonographers
9 MSK Rads



Objectives

- Review the normal anatomy of the shoulder
 - Bony
 - Soft tissue
- Briefly describe how a shoulder US is performed
- Standard protocol

Background

- Mskl US in the USA
- Henry Ford Hospital
 - 7000 exams/year in 2007
 - Beijing Olympics
 - NASA
- University of Michigan
- HSS
- Thomas Jefferson



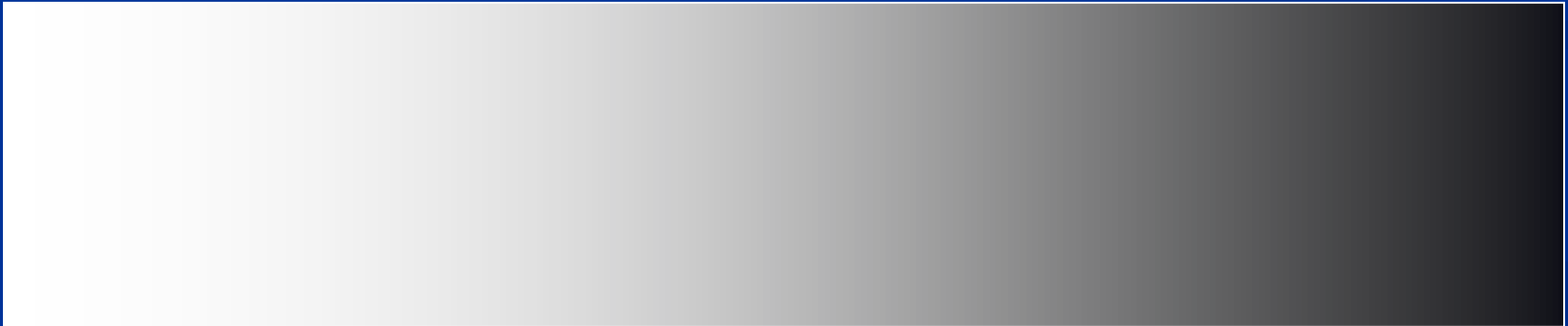
Hyper-Echoic



Hypo-Echoic



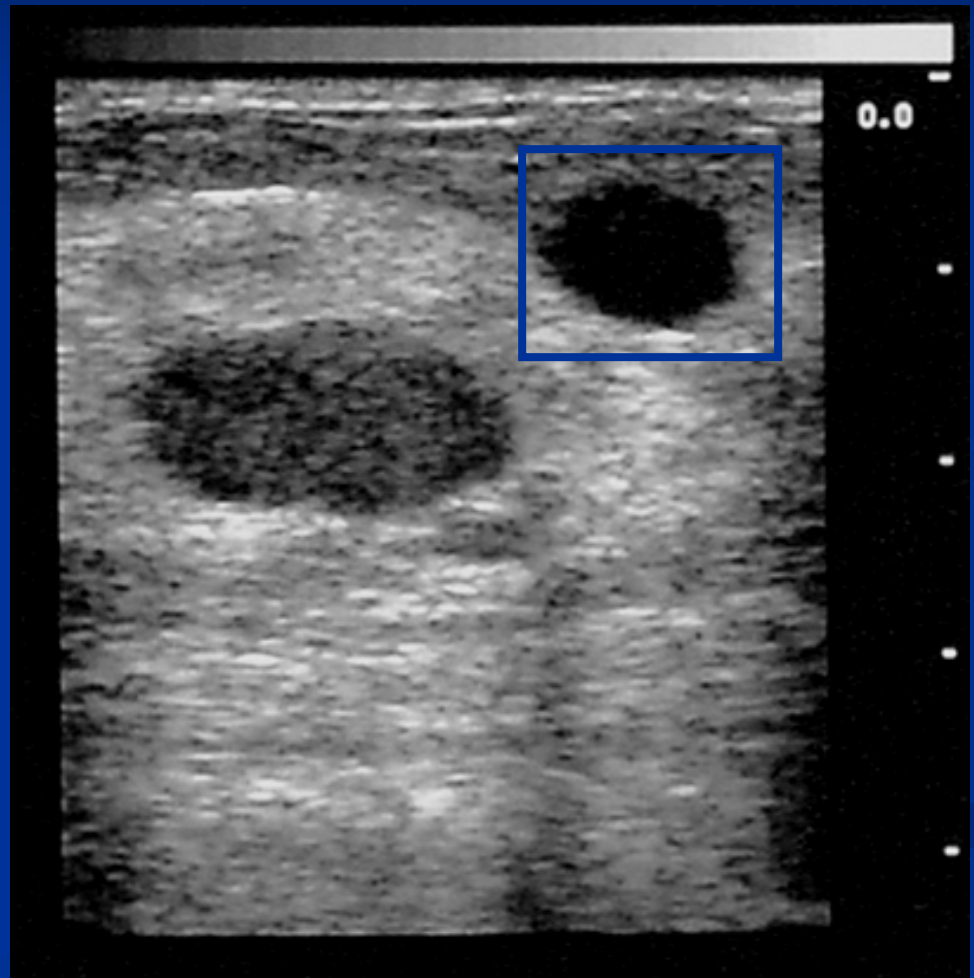
An-Echoic



Gray-Scale Imaging

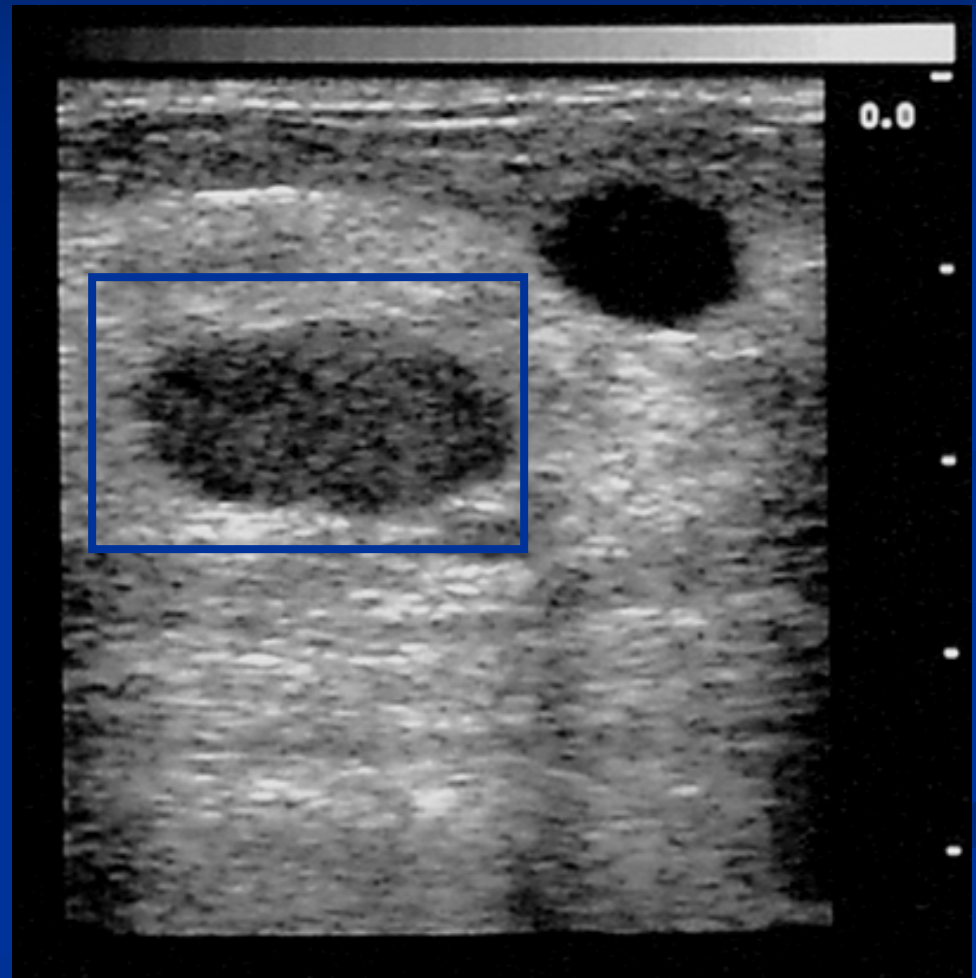
Echogenicity

- Anechoic
- Hypoechoic
- Isoechoic
- Hyperechoic



Echogenicity

- **Anechoic**
- Hypoechoic
- **Isoechoic**
- **Hyperechoic**



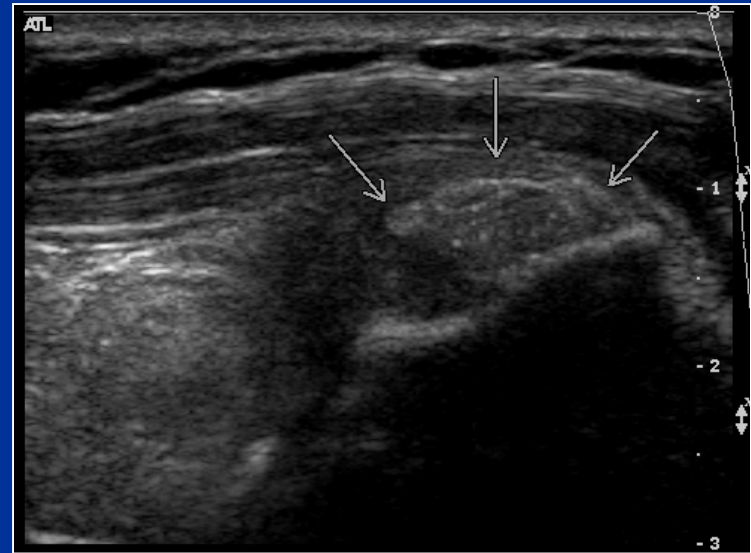
Echogenicity

- **Anechoic**
- **Hypoechoic**
- **Isoechoic**
- **Hyperechoic**



Echogenicity

- **Anechoic**
- **Hypoechoic**
- **Isoechoic**
- **Hyperechoic**



Advantages of Ultrasound

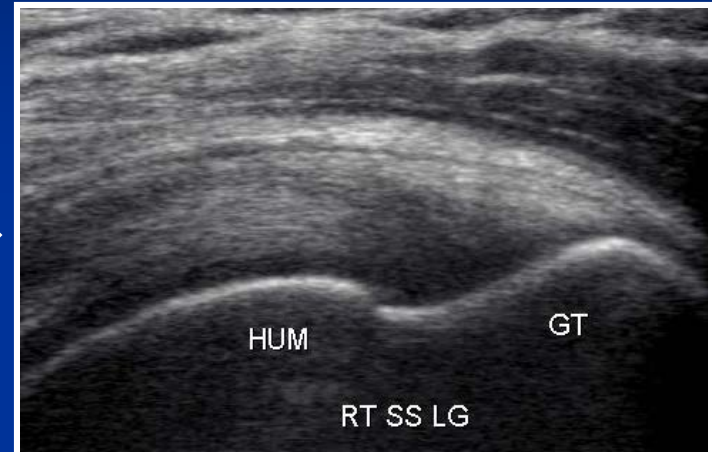
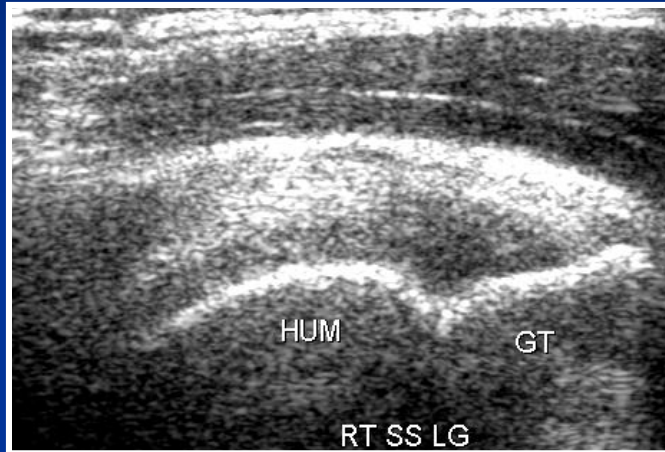
- No radiation
- Directed, real time
- Dynamic
- Contralateral comparison
- No magnet
- Cost effective

Limitations

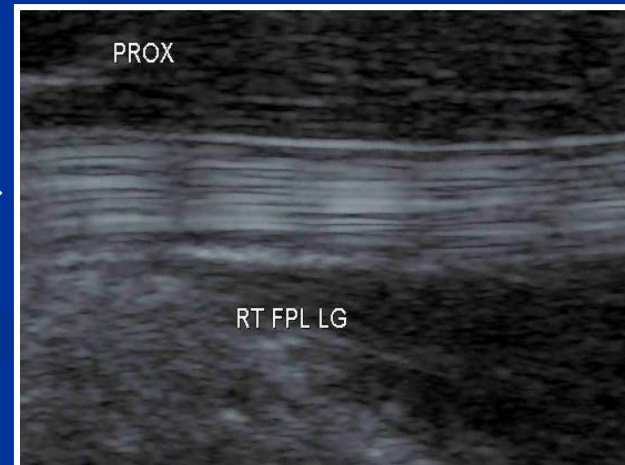
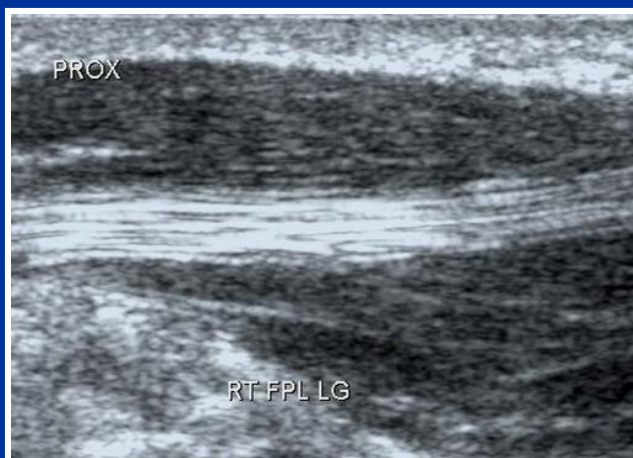
- Operator-dependent
- Training required
- Limited field of view
- Requires patient cooperation
- Body habitus dependent
- Often underused
 - Widely available MRI
 - Few training programs
 - Unaware of potential applications

Advances in Ultrasound Technology

Supraspinatus



FPL



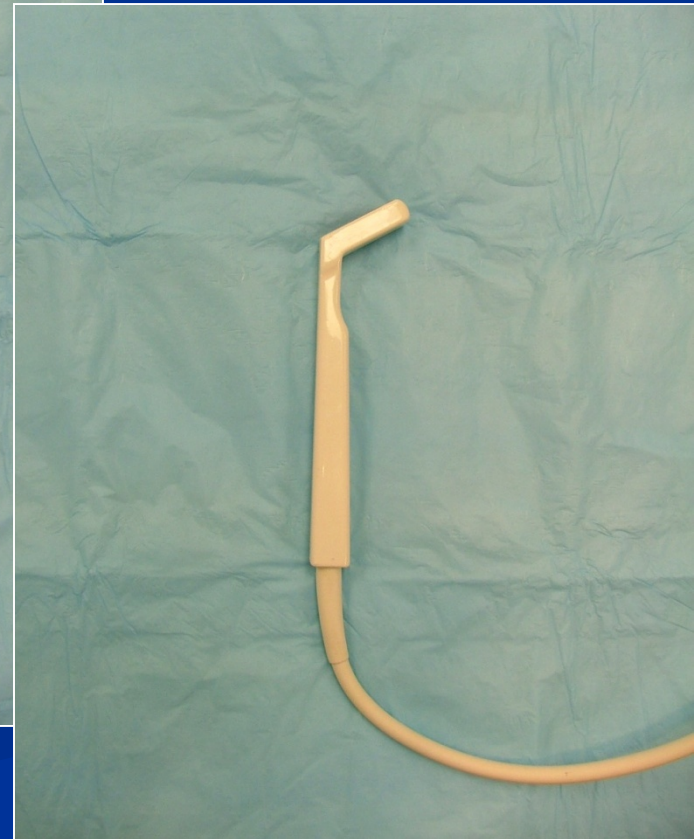
US probes



L 17-5 MHz

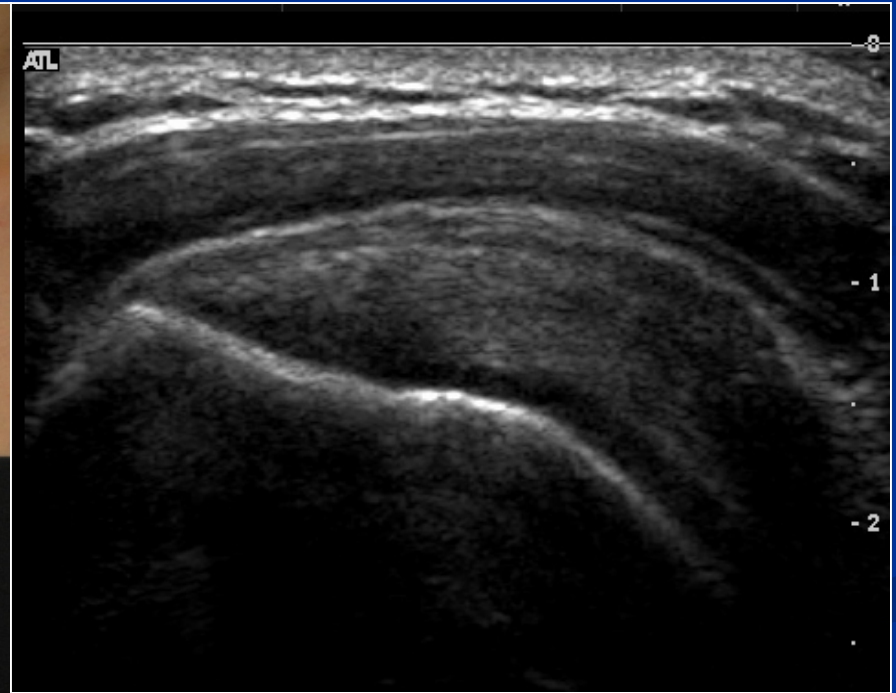


L 12-5 MHz



CL 15-7 MHz

Shoulder Ultrasound: Standard Protocol & Anatomy



Shoulder Ultrasound

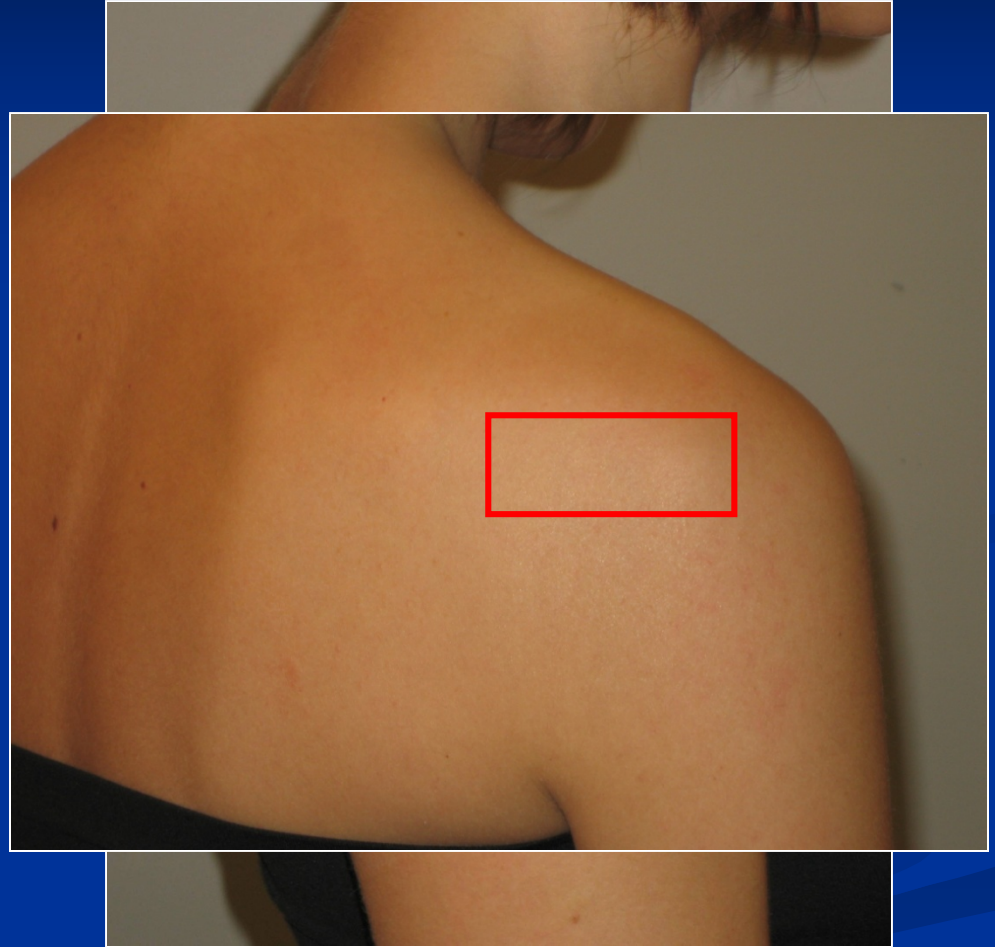
- Skin Surface
- Skeletal Anatomy
- Joint Anatomy
- Shoulder Positions

Shoulder Ultrasound Regions

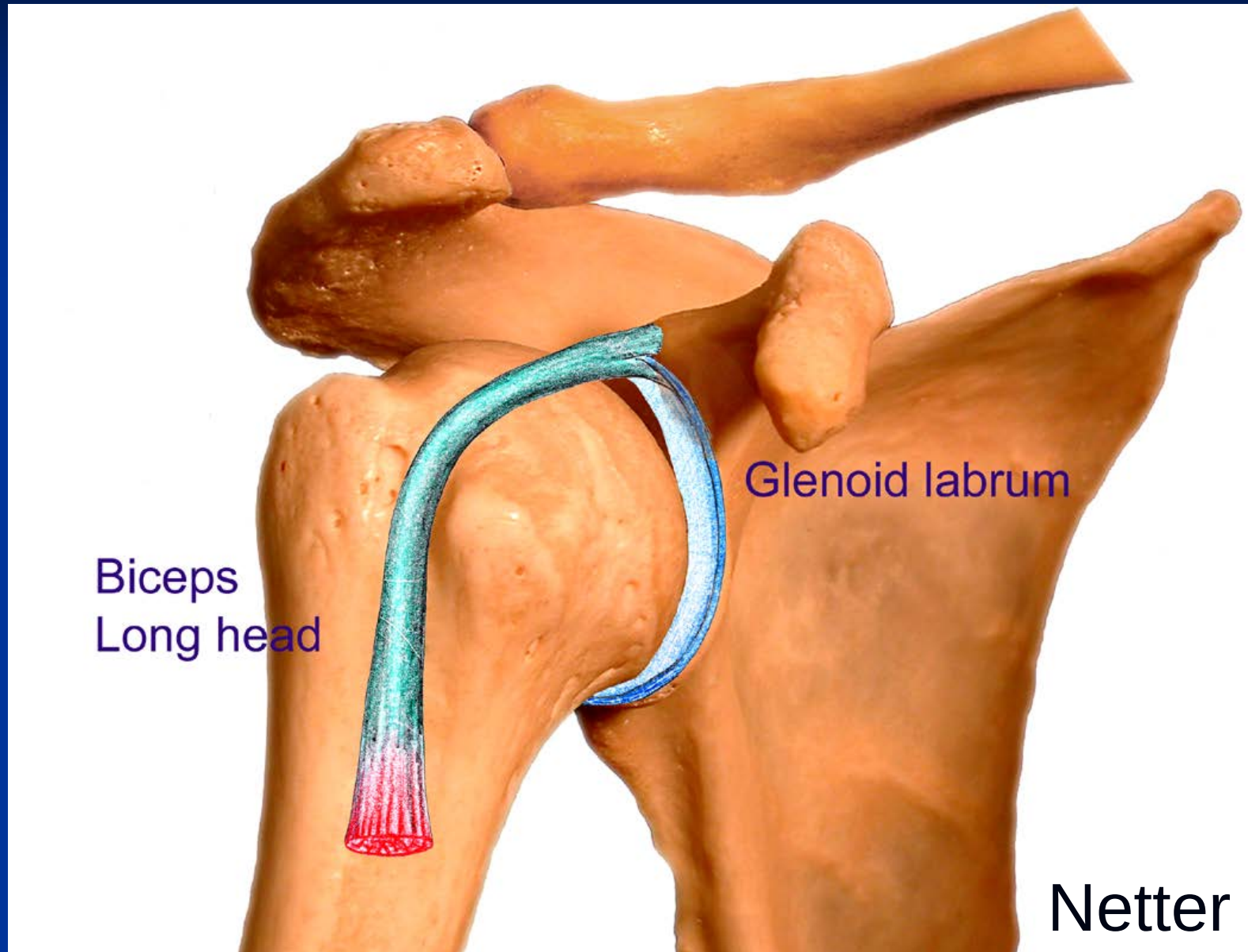
- Anterior
- Superior
- Anterolateral
- Posterior

Shoulder Ultrasound Regions

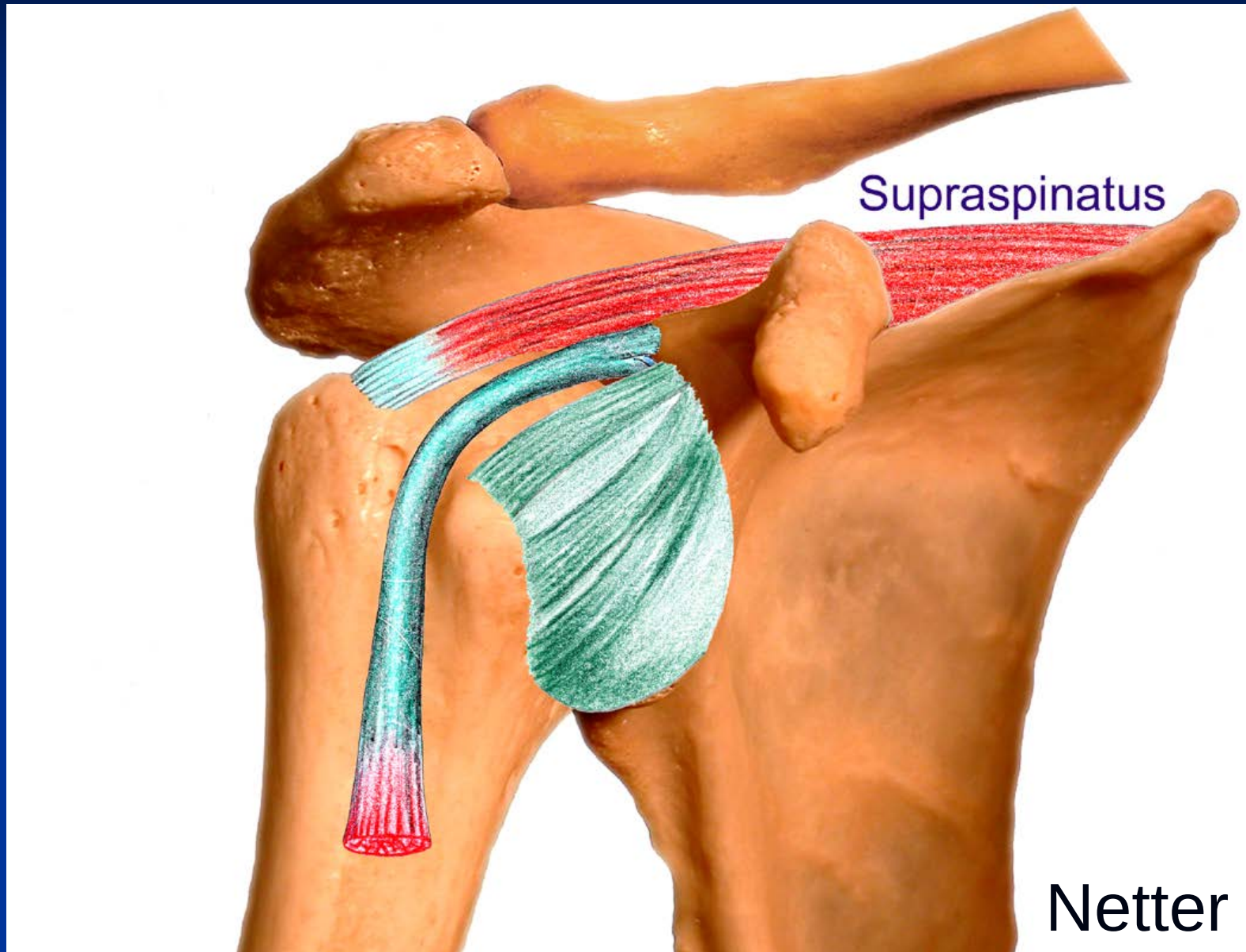
- **Anterior**
- Superior
- Anterolateral
- Posterior



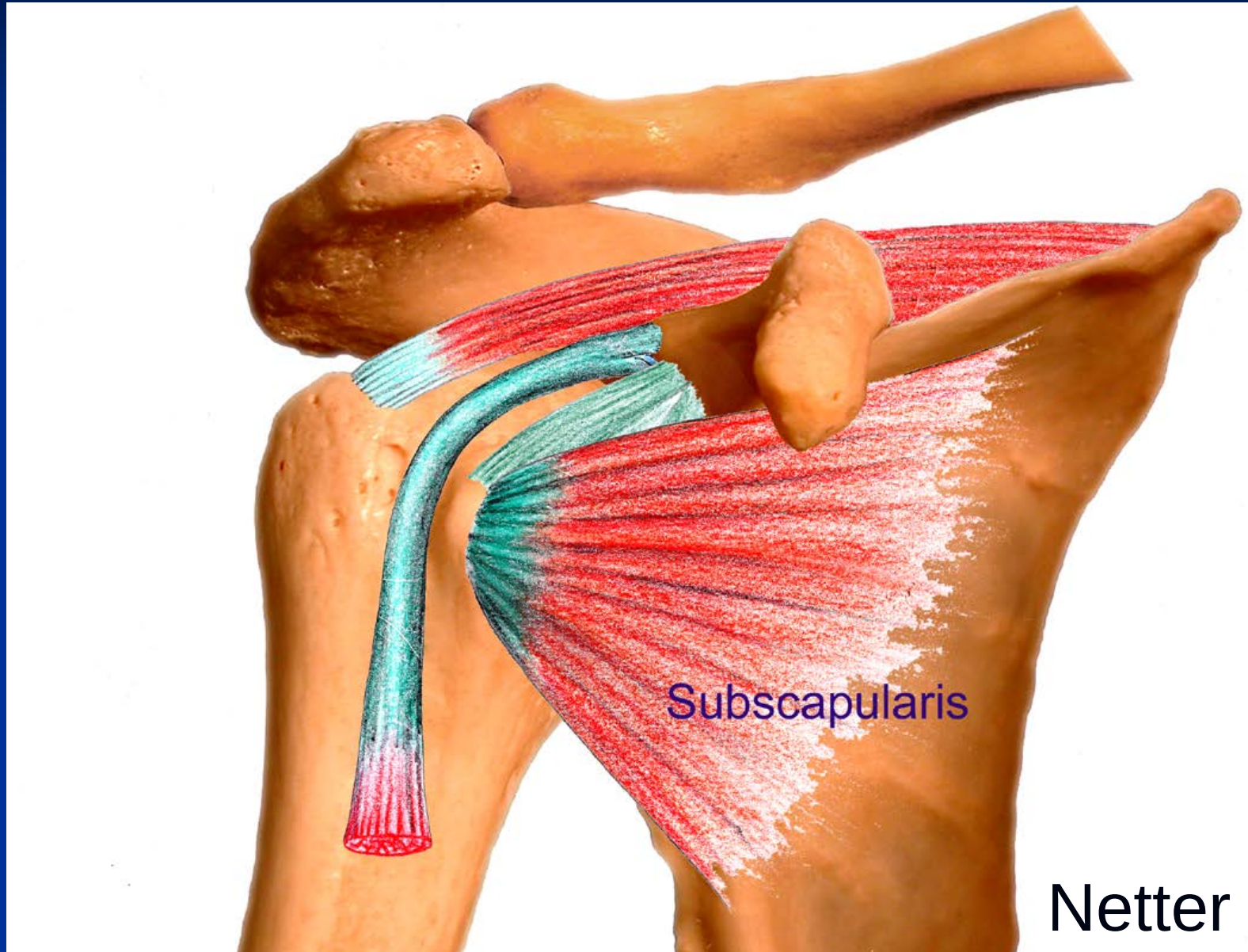
Anterior Shoulder



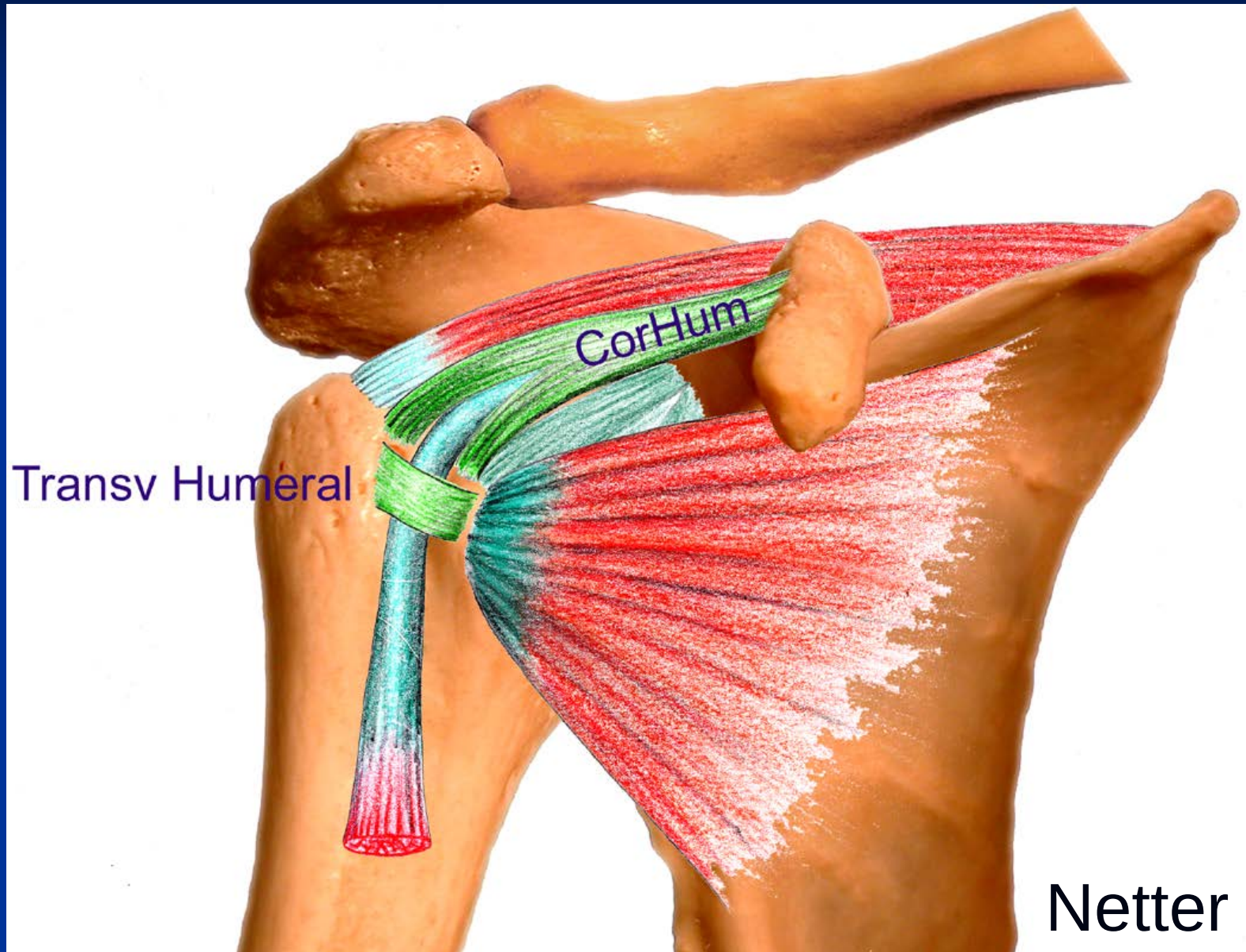
Anterior Shoulder



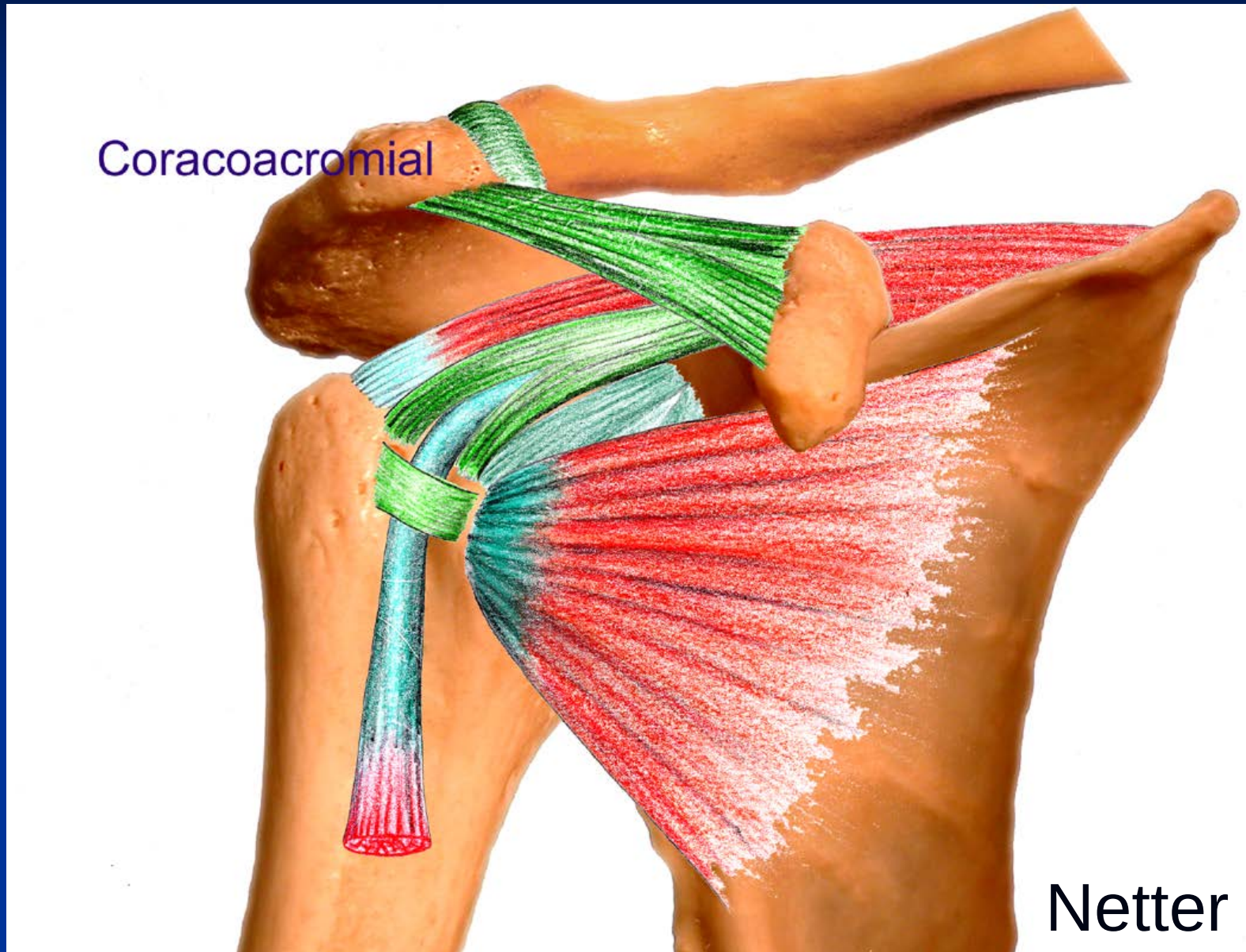
Anterior Shoulder



Anterior Shoulder

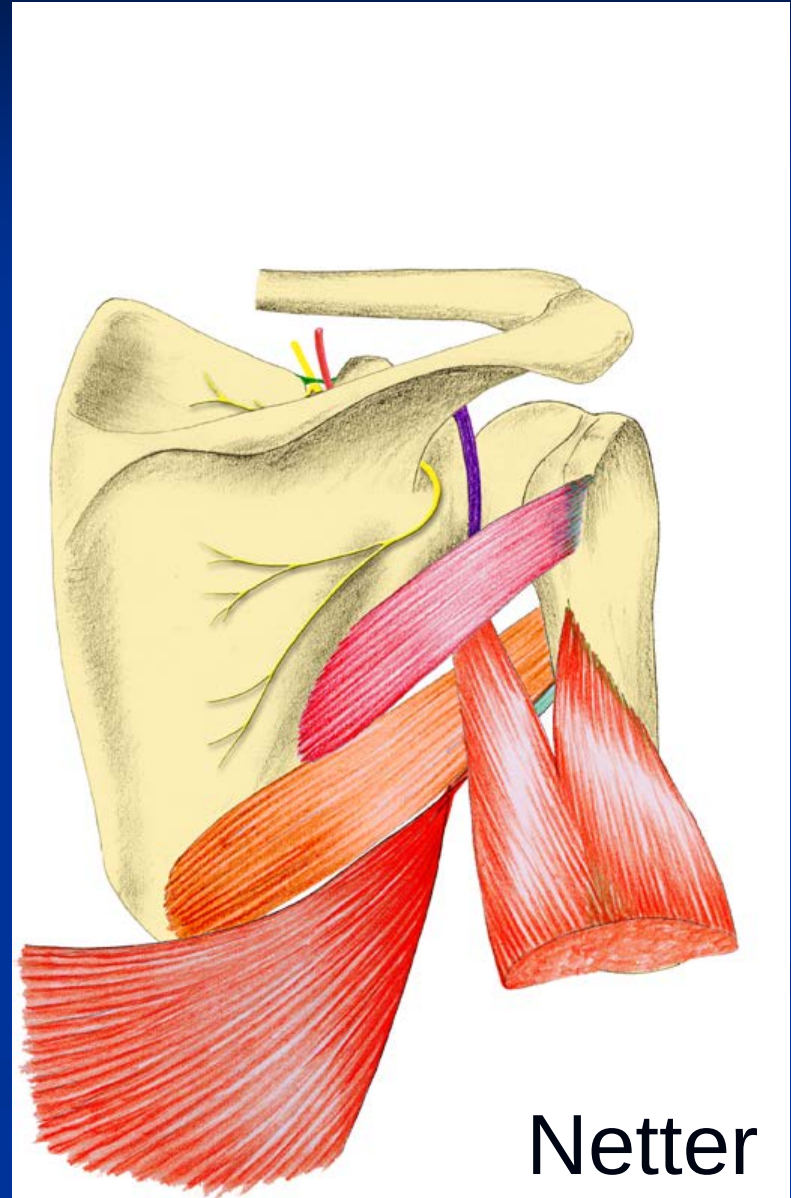


Anterior Shoulder



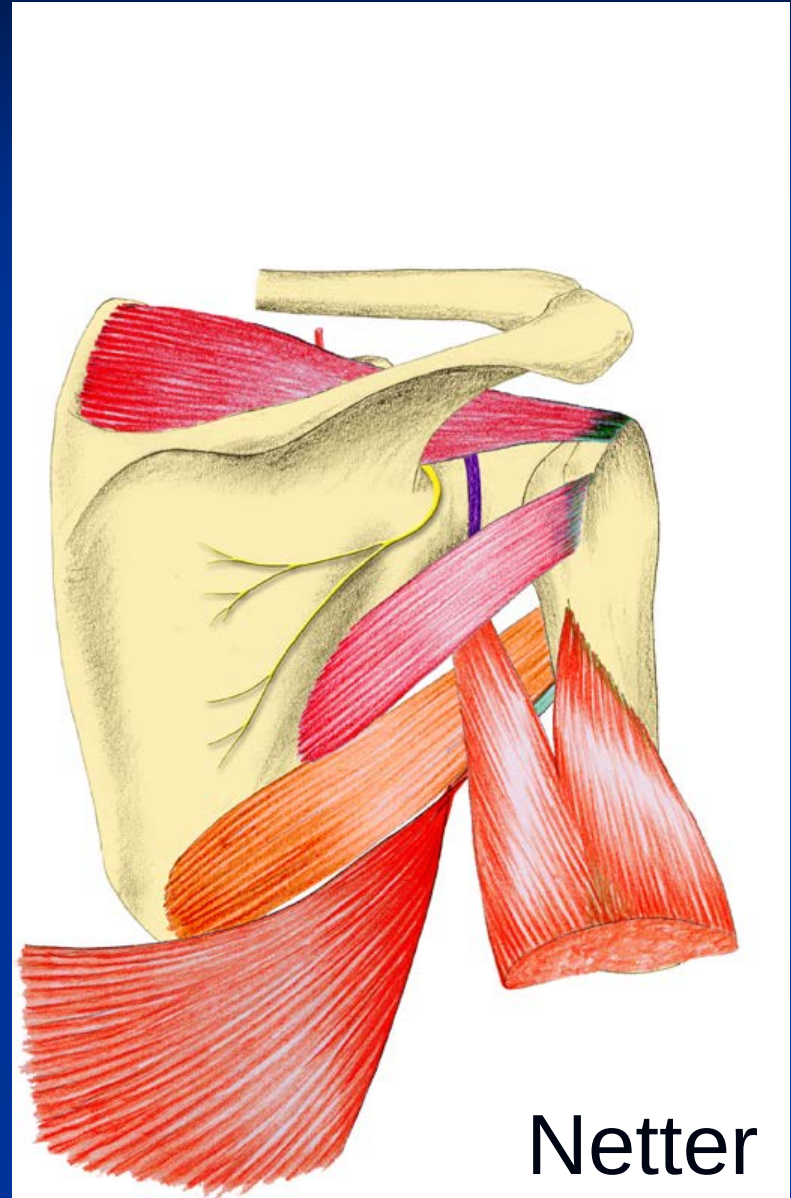
Posterior Shoulder

Teres minor



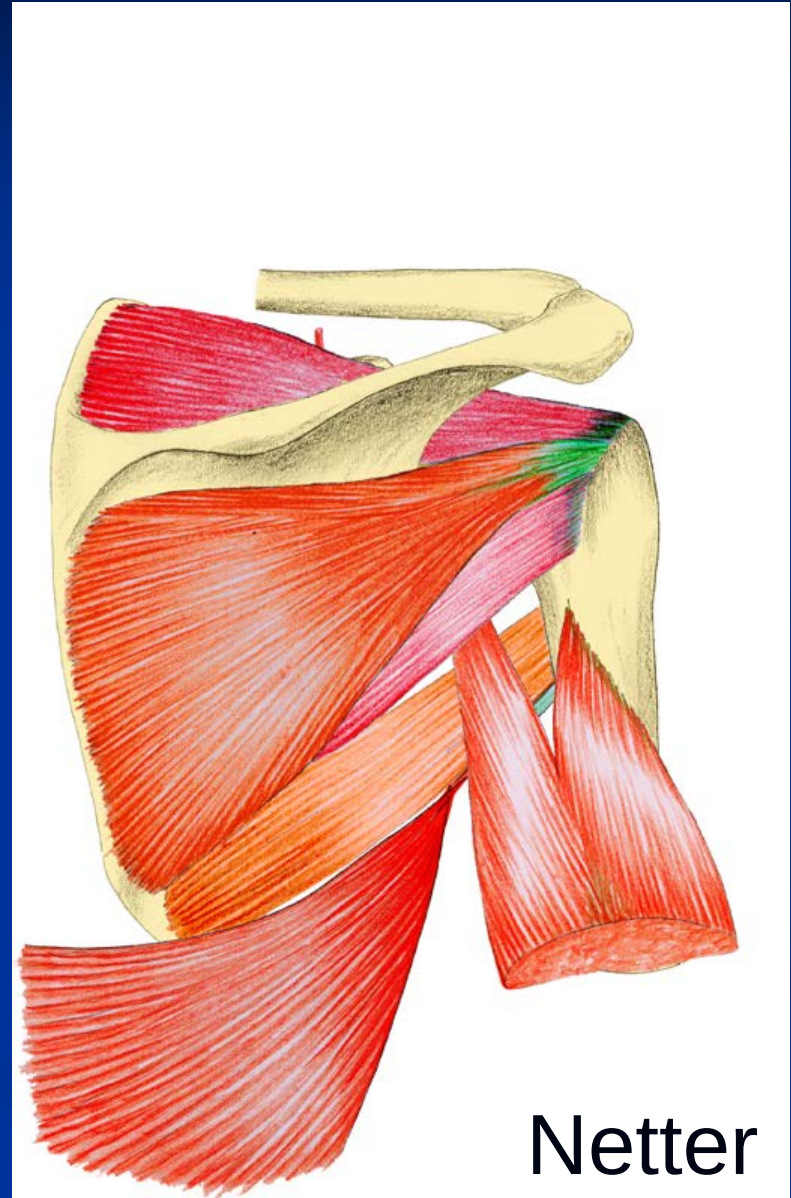
Posterior Shoulder

Supraspinatus



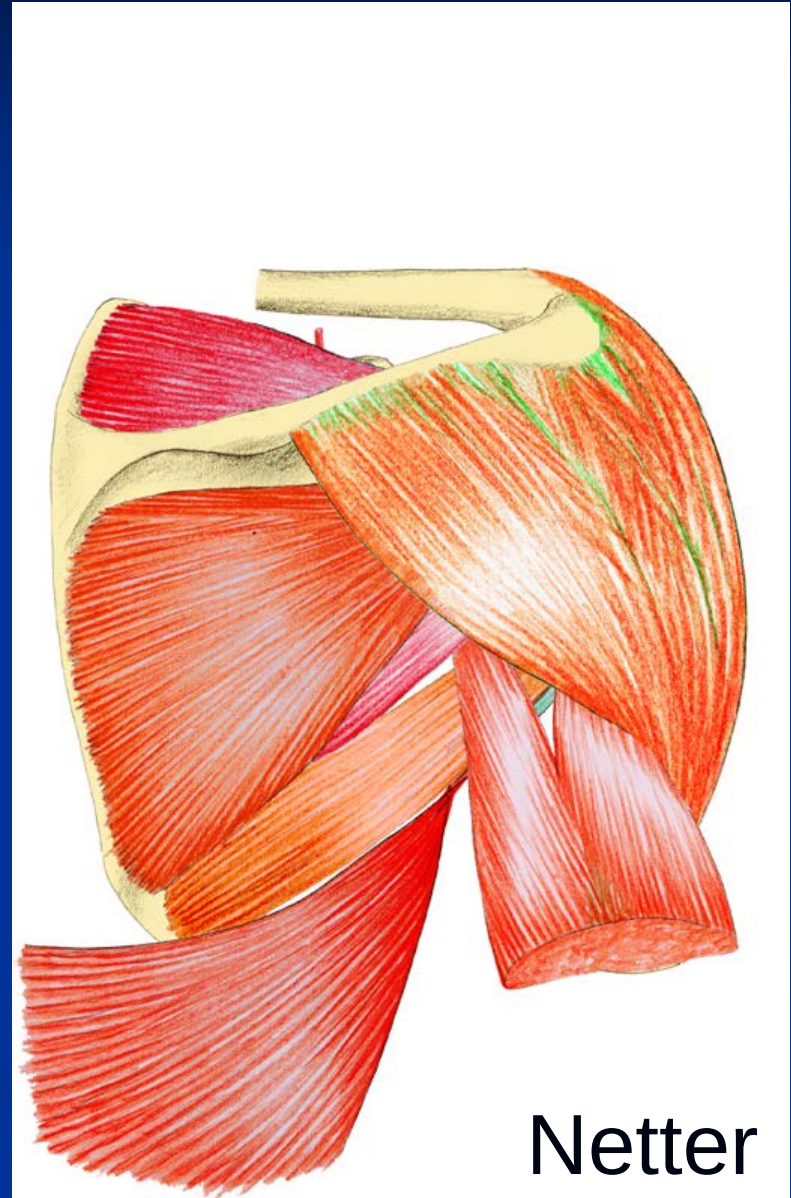
Posterior Shoulder

Infraspinatus



Posterior Shoulder

Deltoid

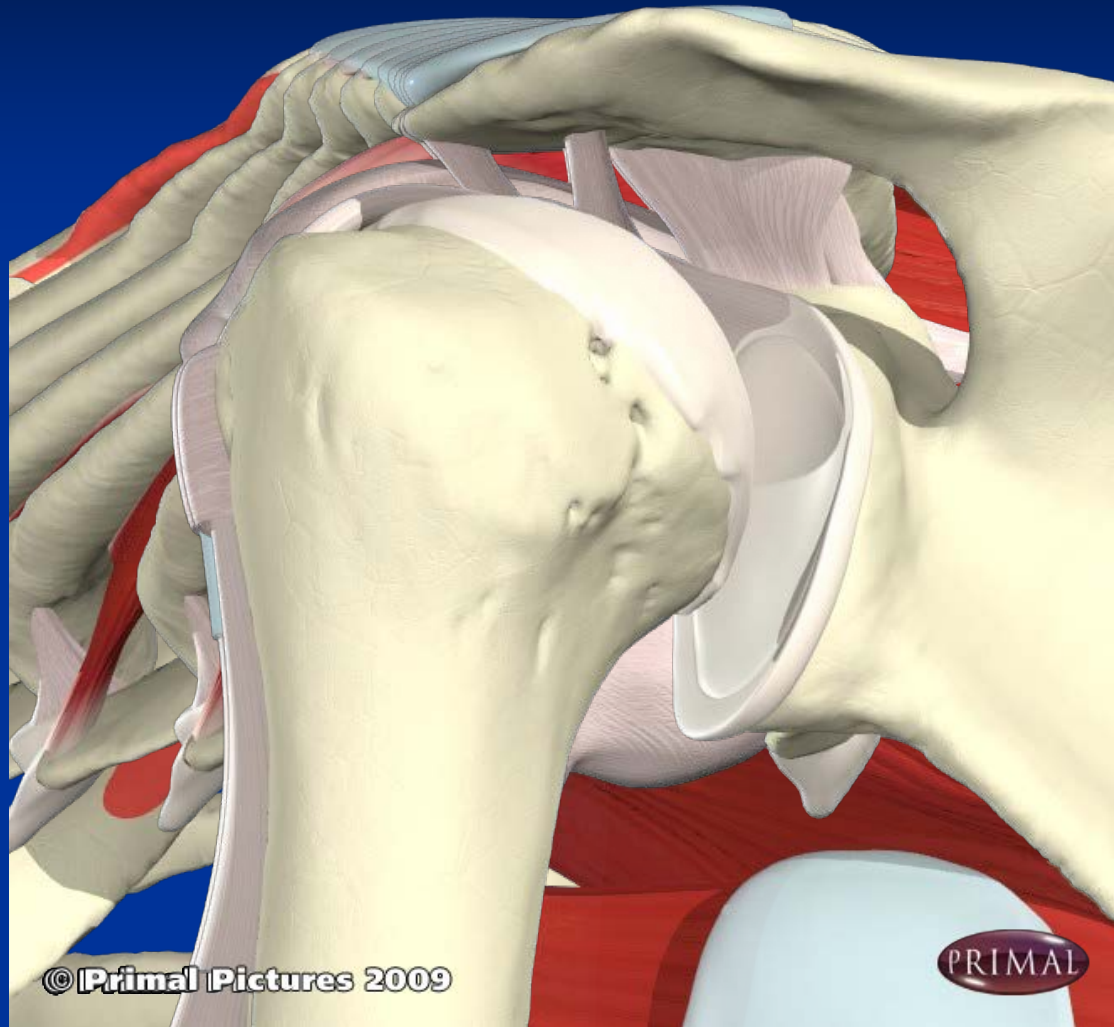


Posterior Shoulder

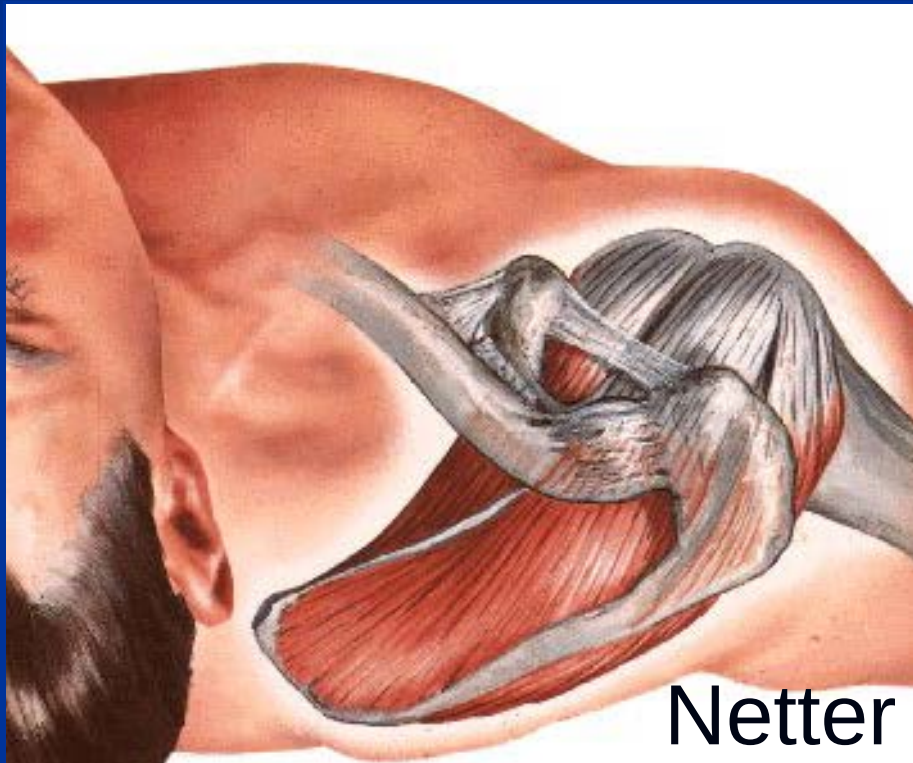
Trapezius



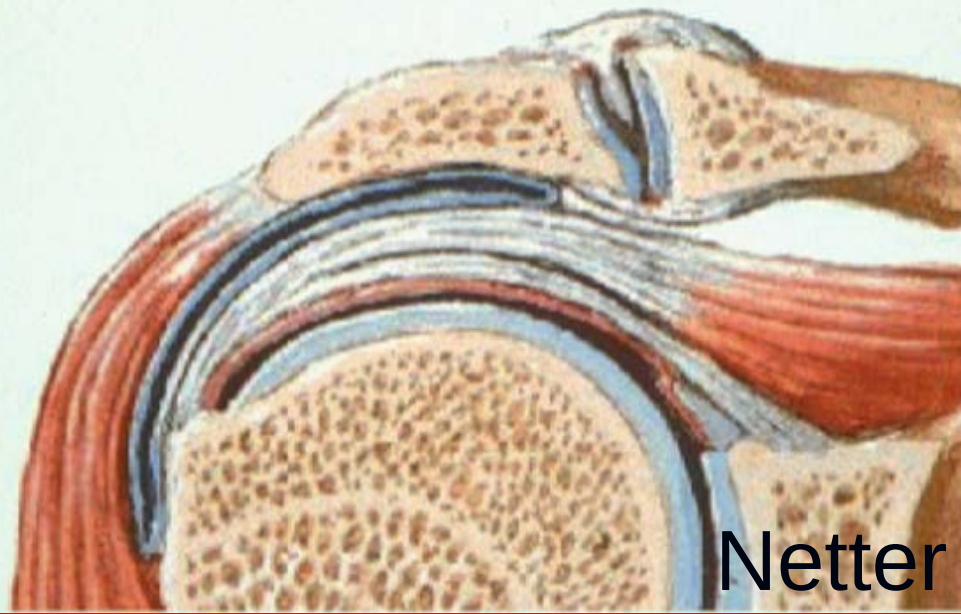
Soft Tissue Structures



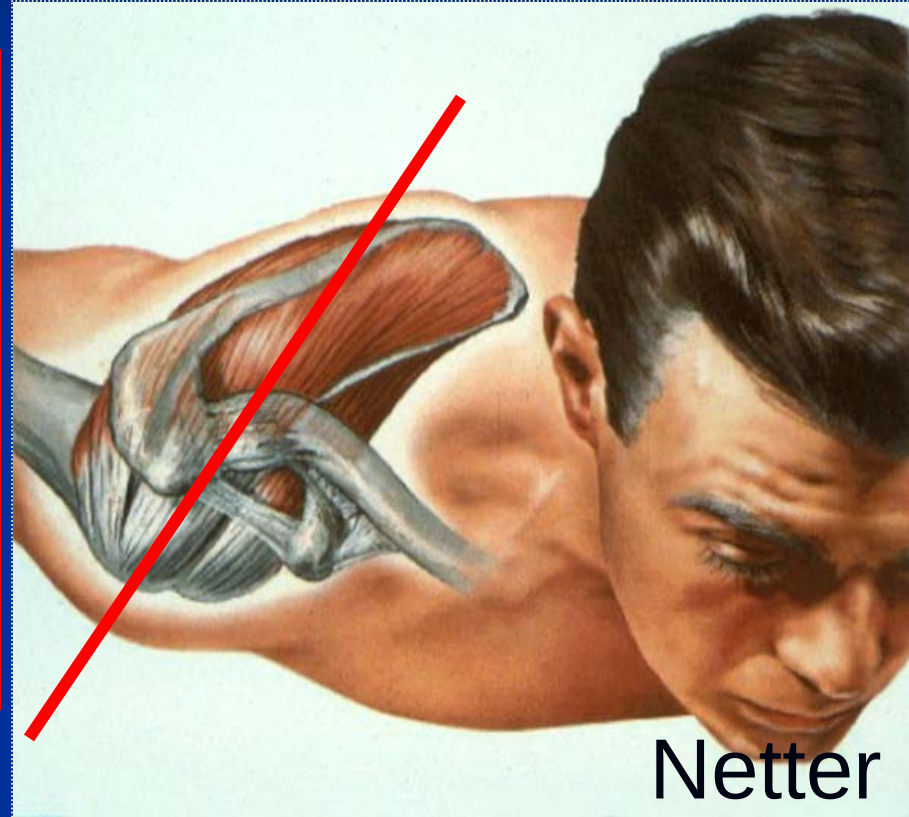
Shoulder Ultrasound



Shoulder Ultrasound Technique

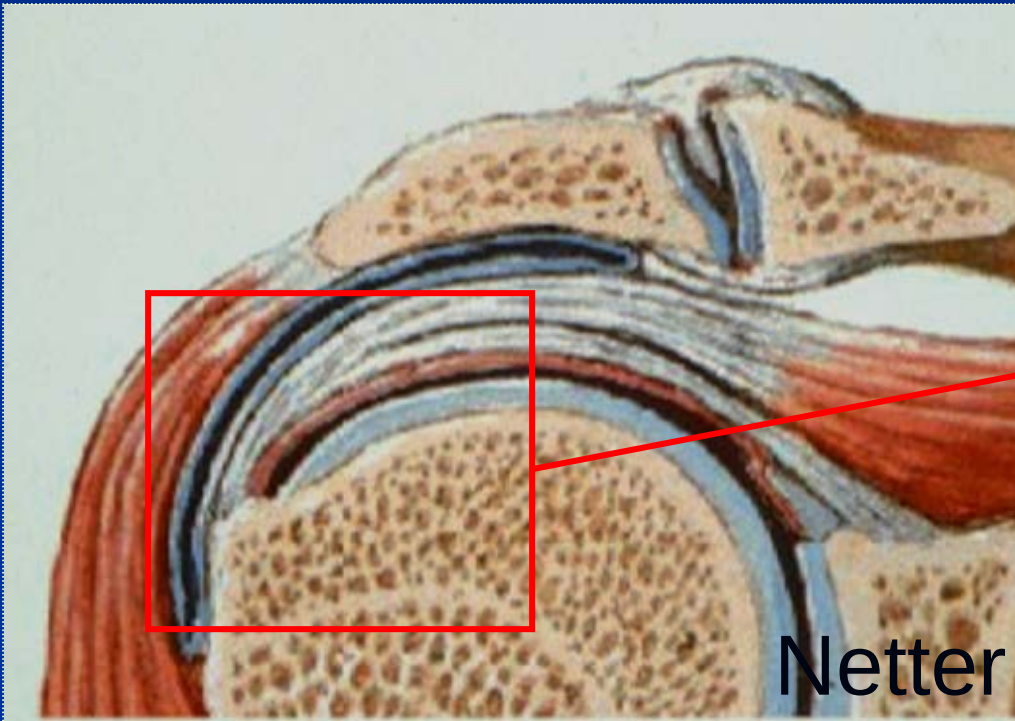


Netter

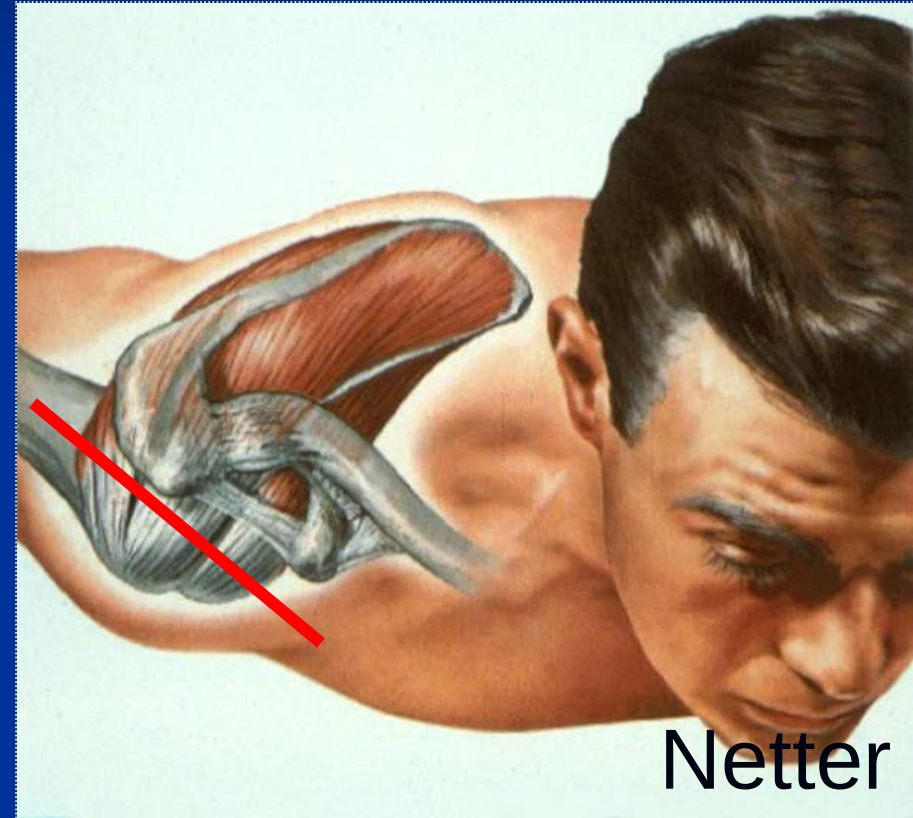
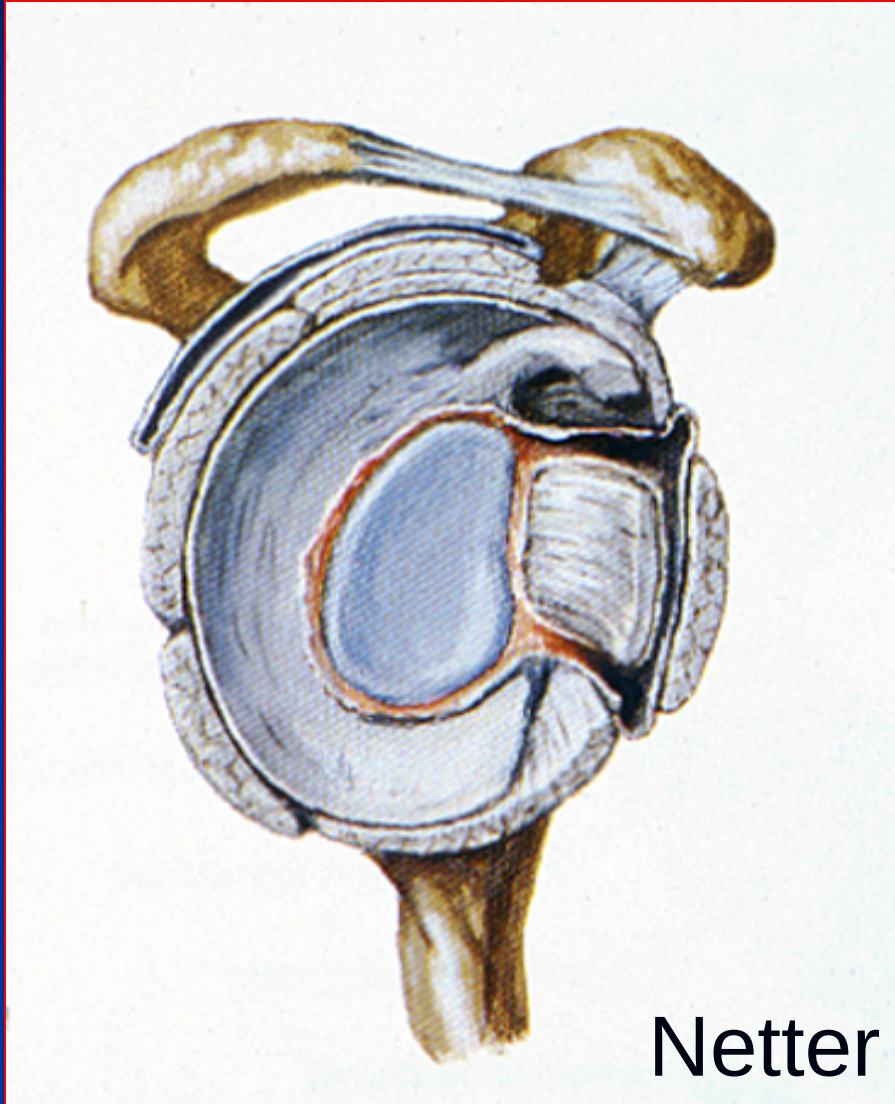


Netter

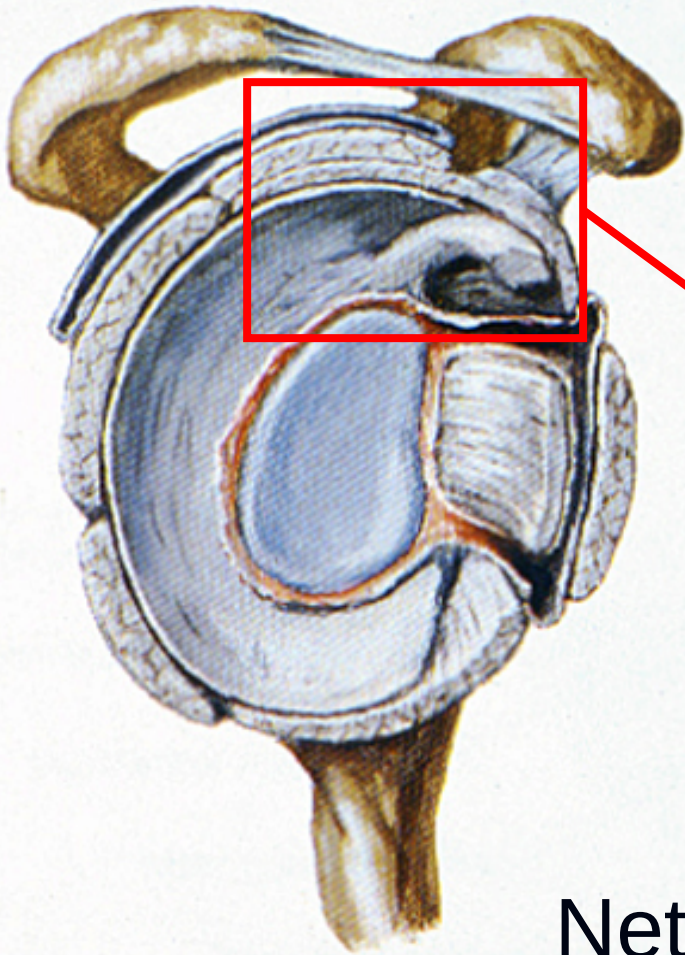
Shoulder Ultrasound Technique



Shoulder Ultrasound Technique



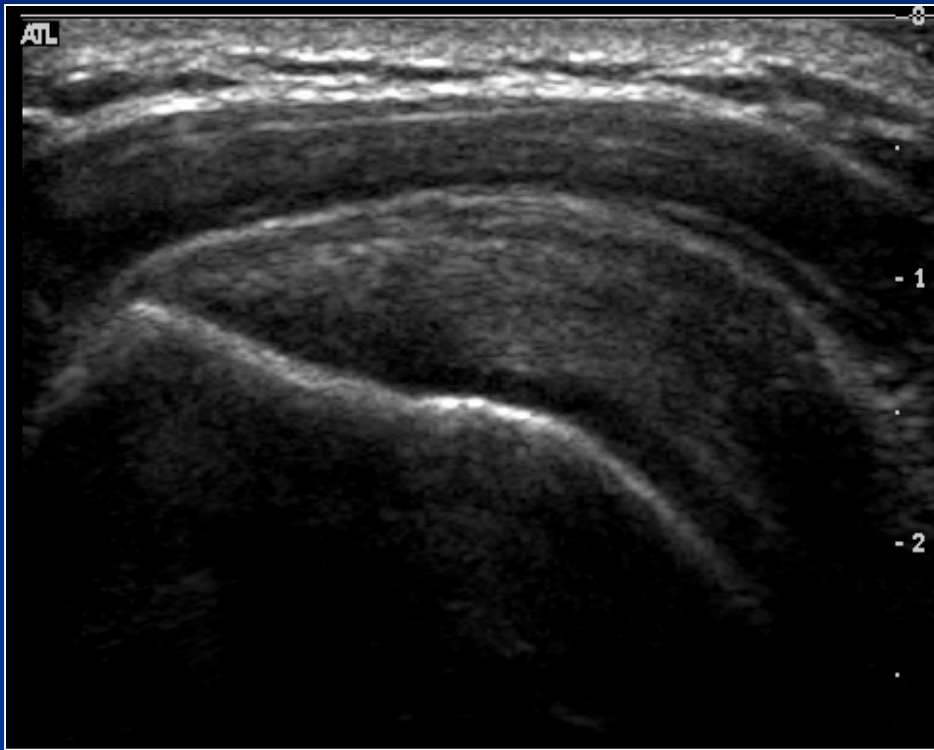
Shoulder Ultrasound Technique



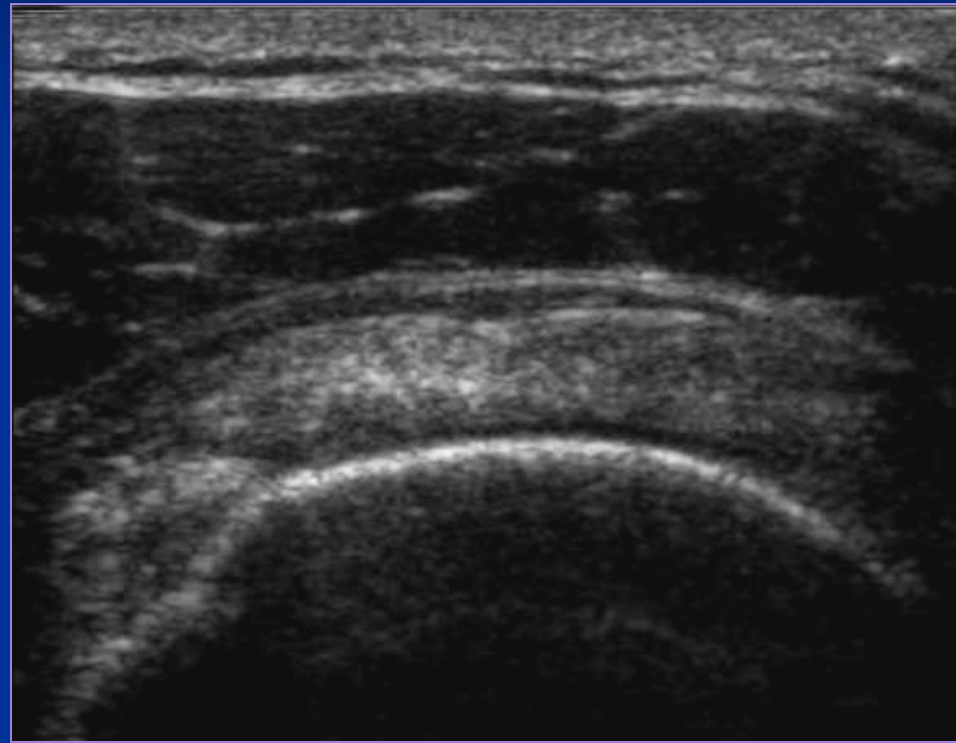
Netter



Orthogonal planes



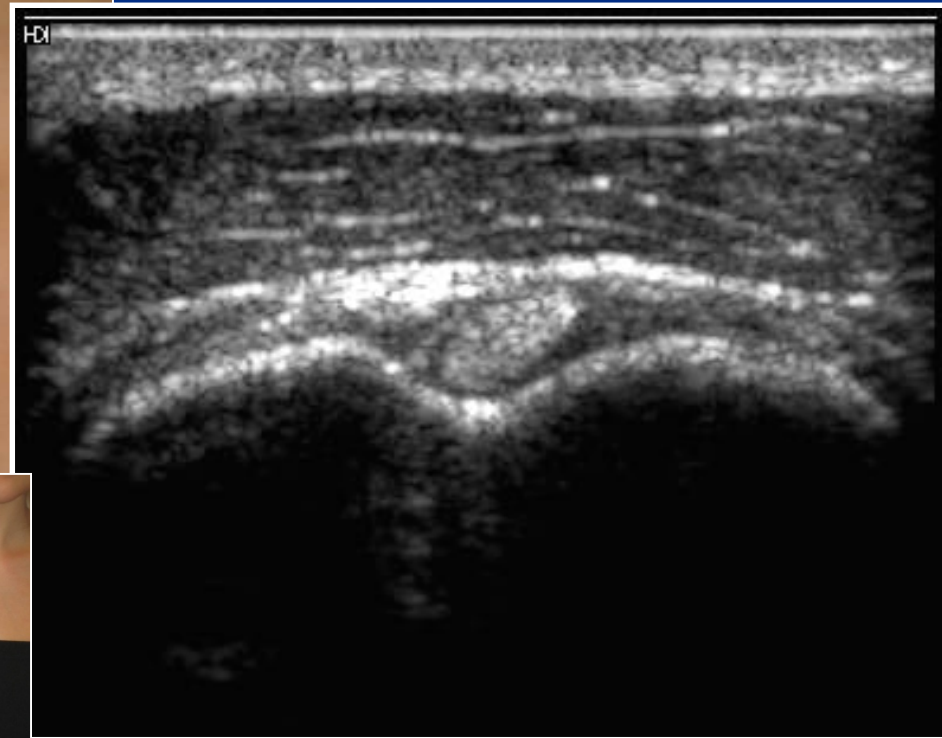
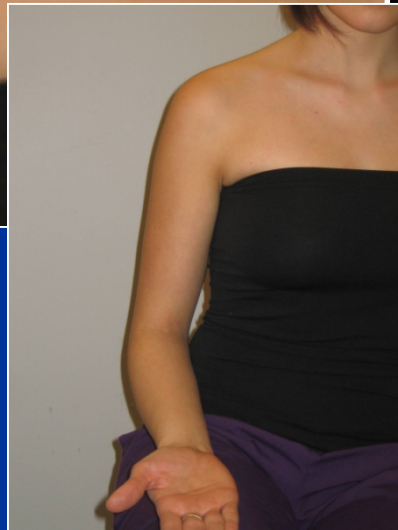
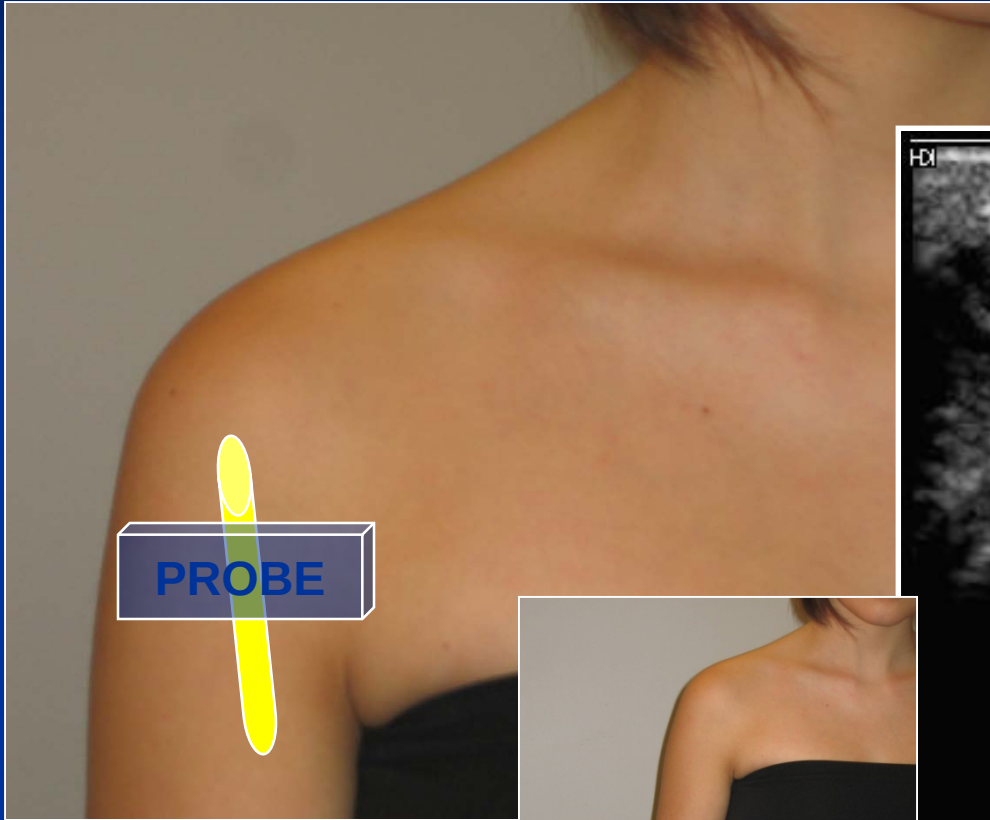
Long Axis



Short Axis

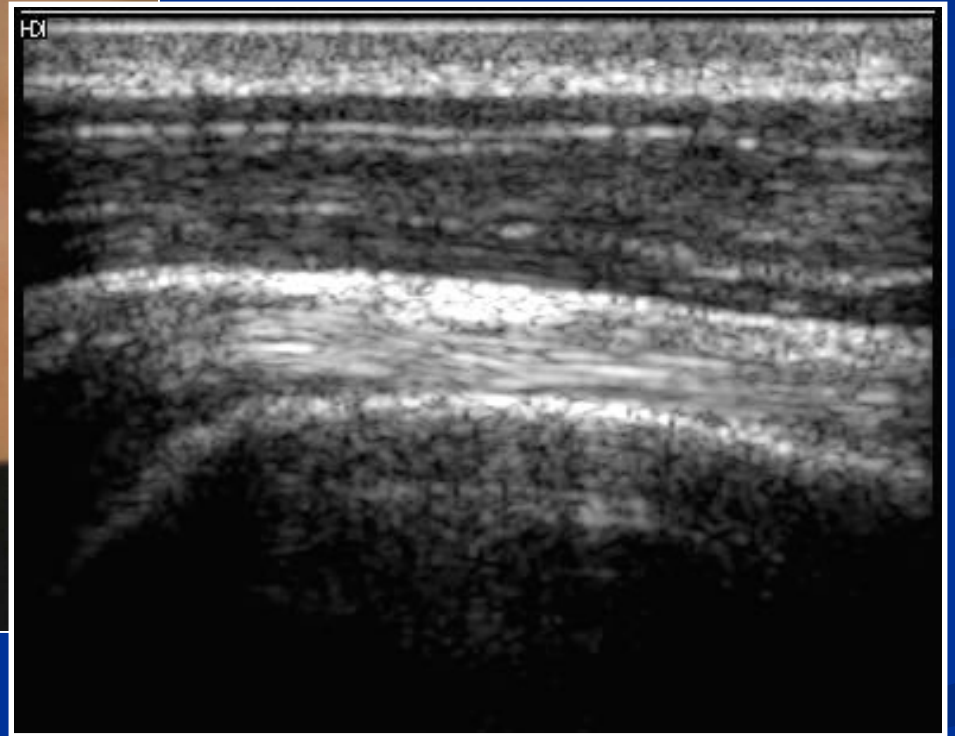
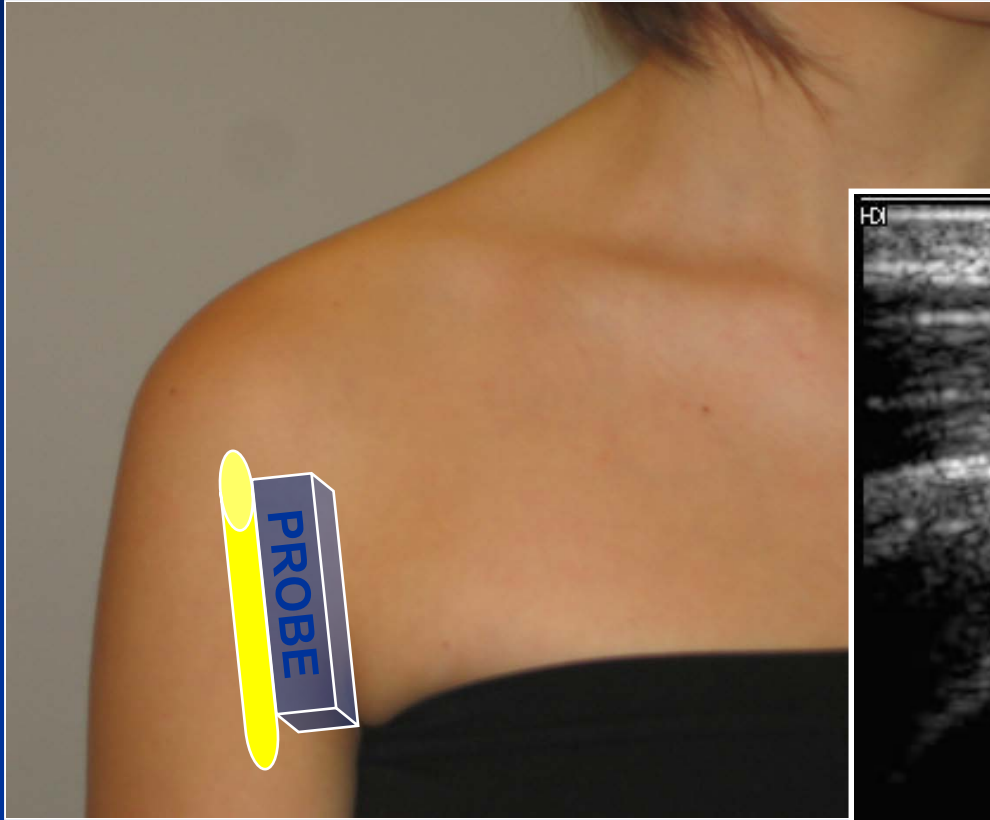
Biceps tendon

Short Axis



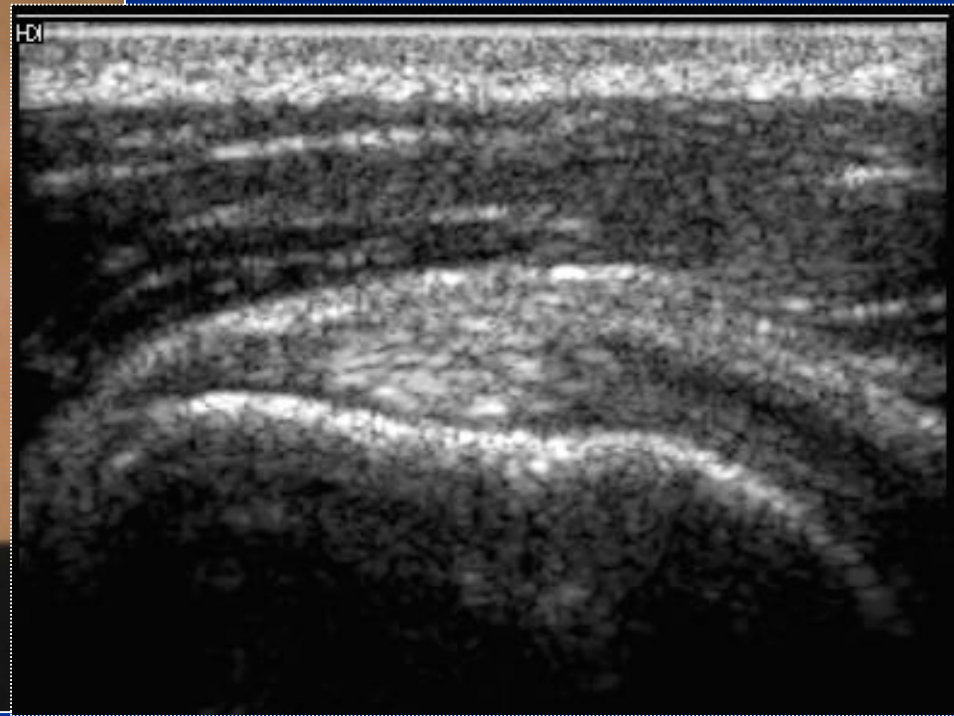
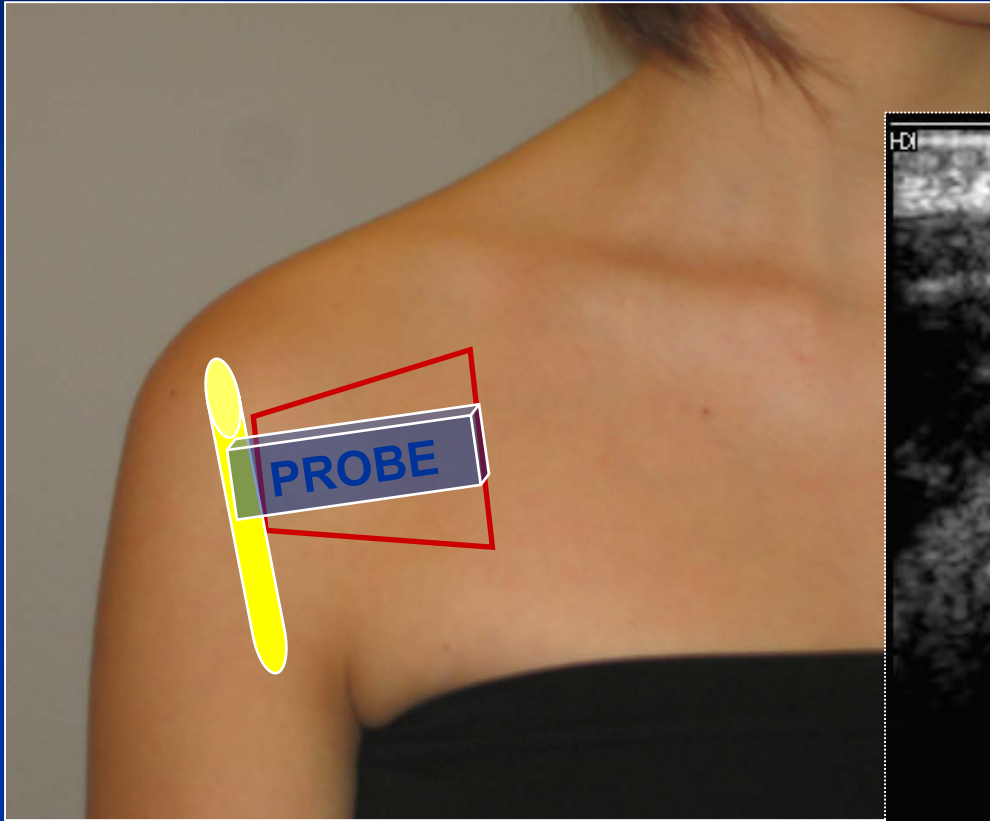
Biceps tendon

Long Axis

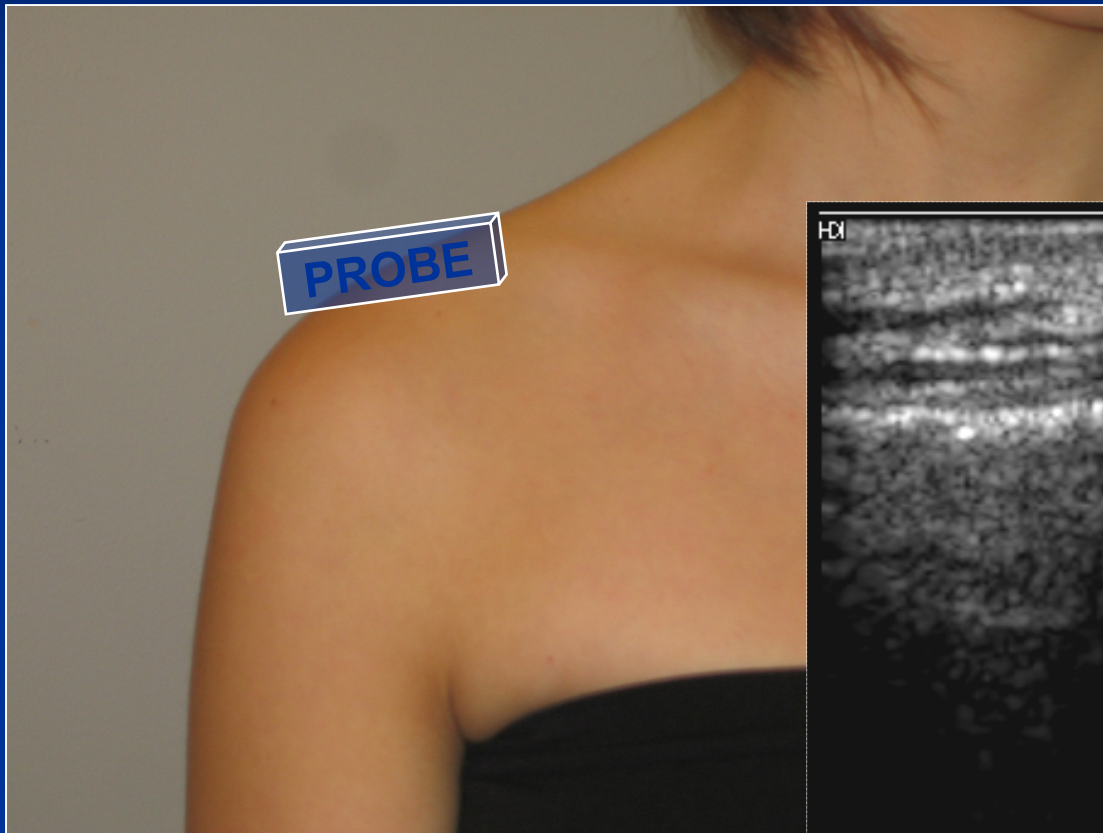


Subscap tendon

Long Axis

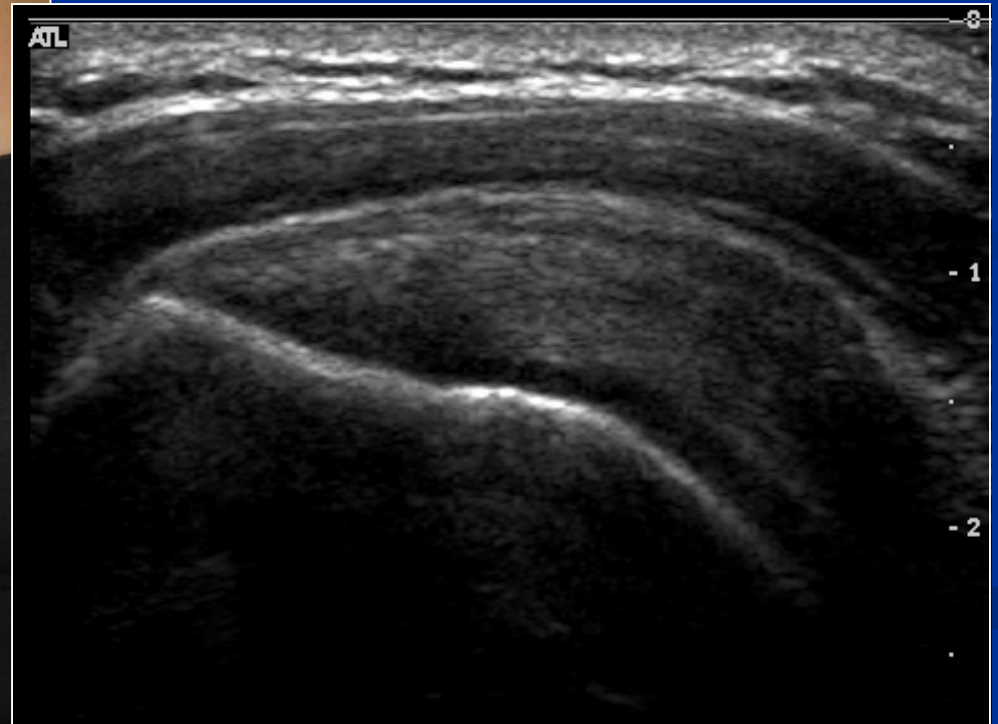
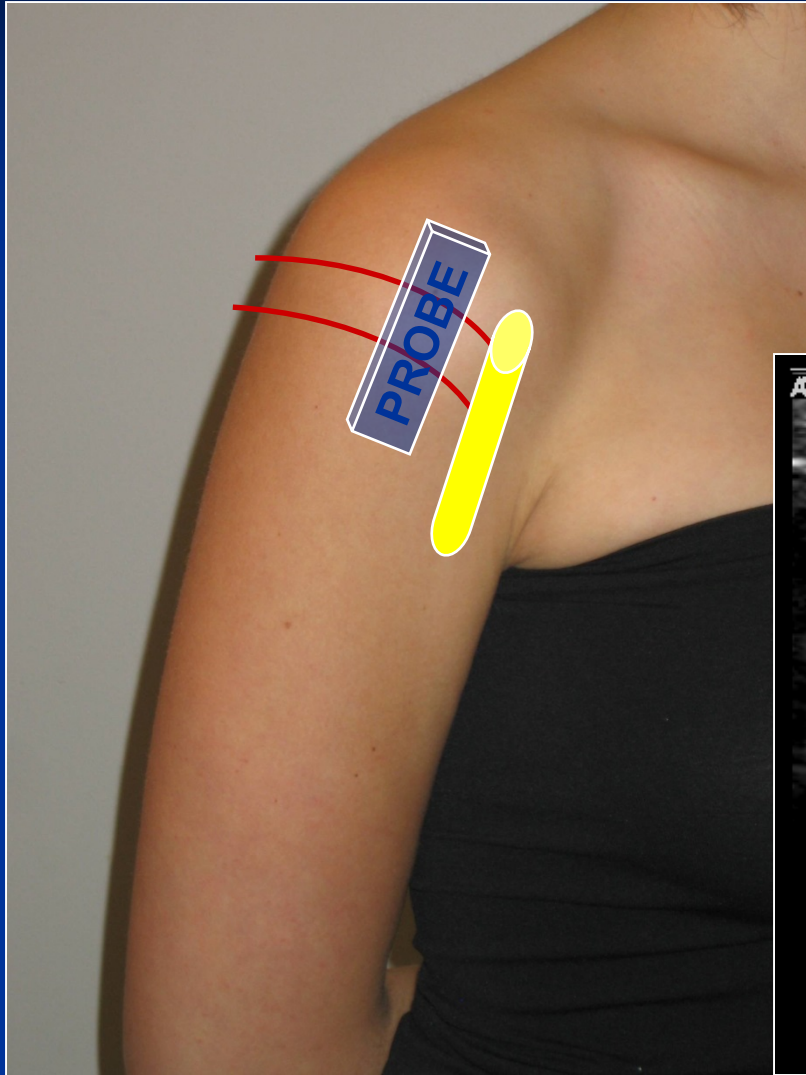


AC Joint



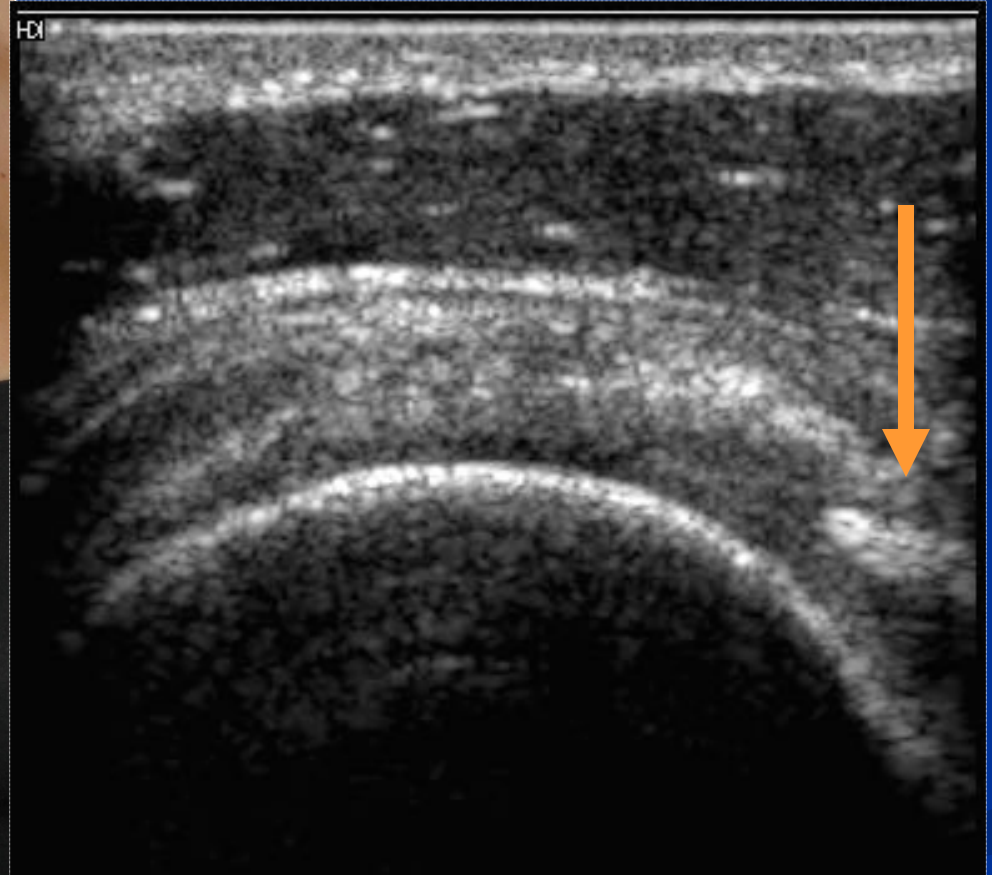
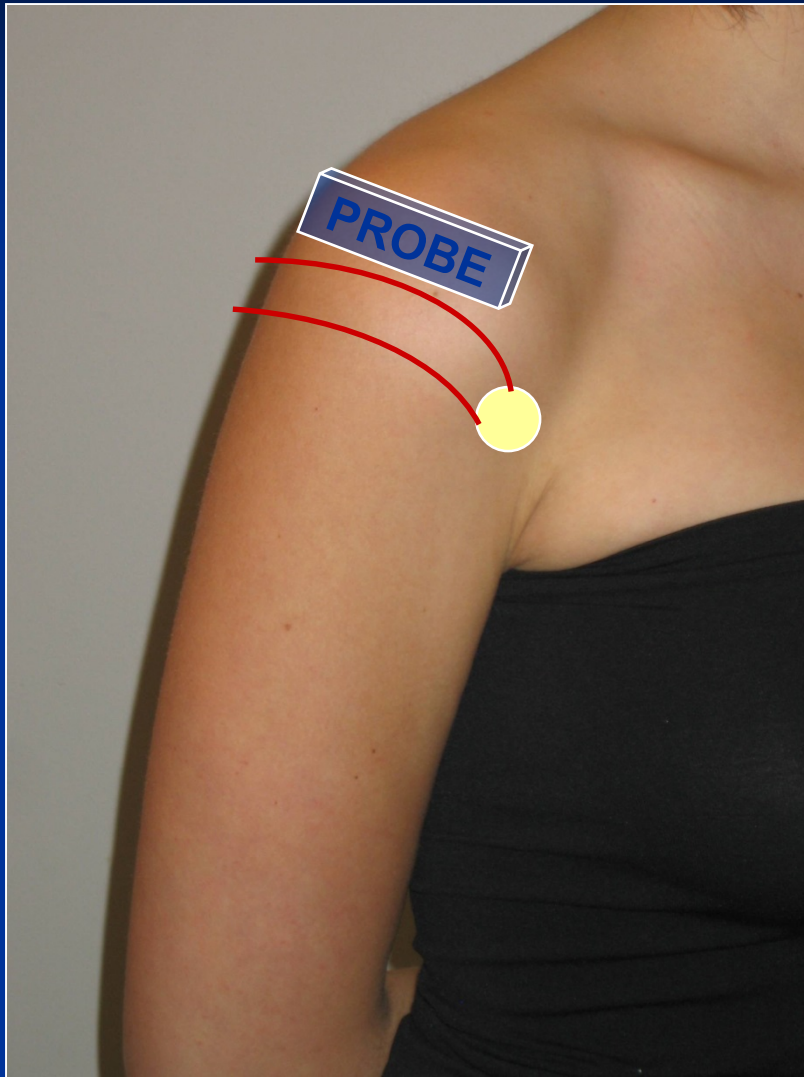
Supraspinatus

Long Axis



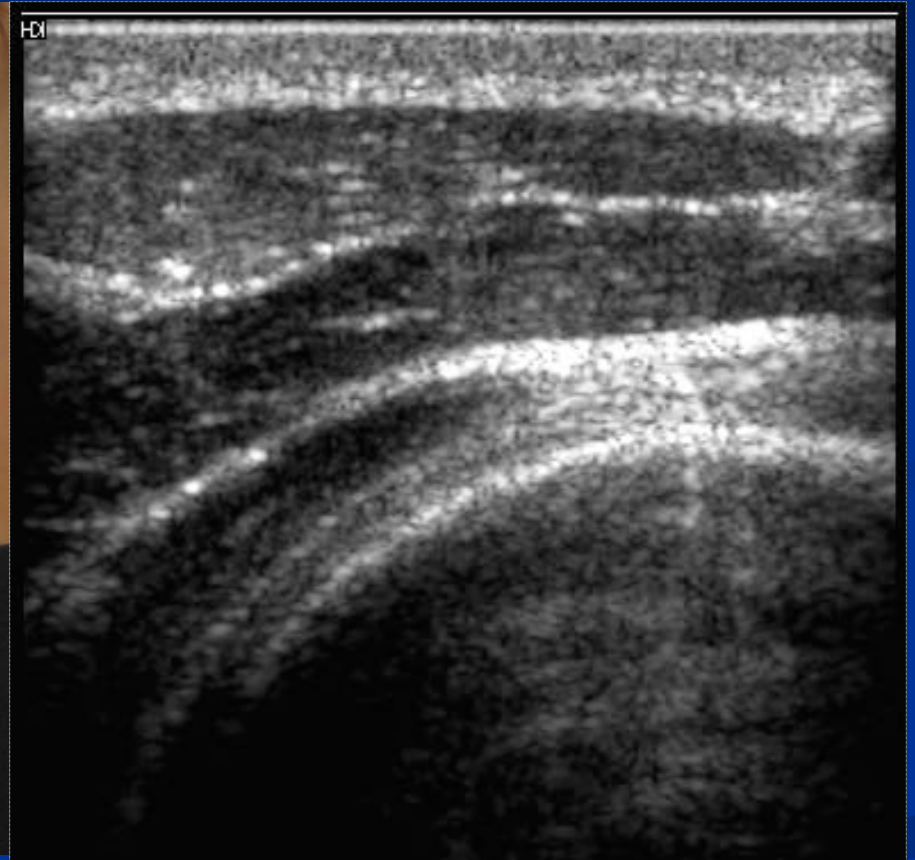
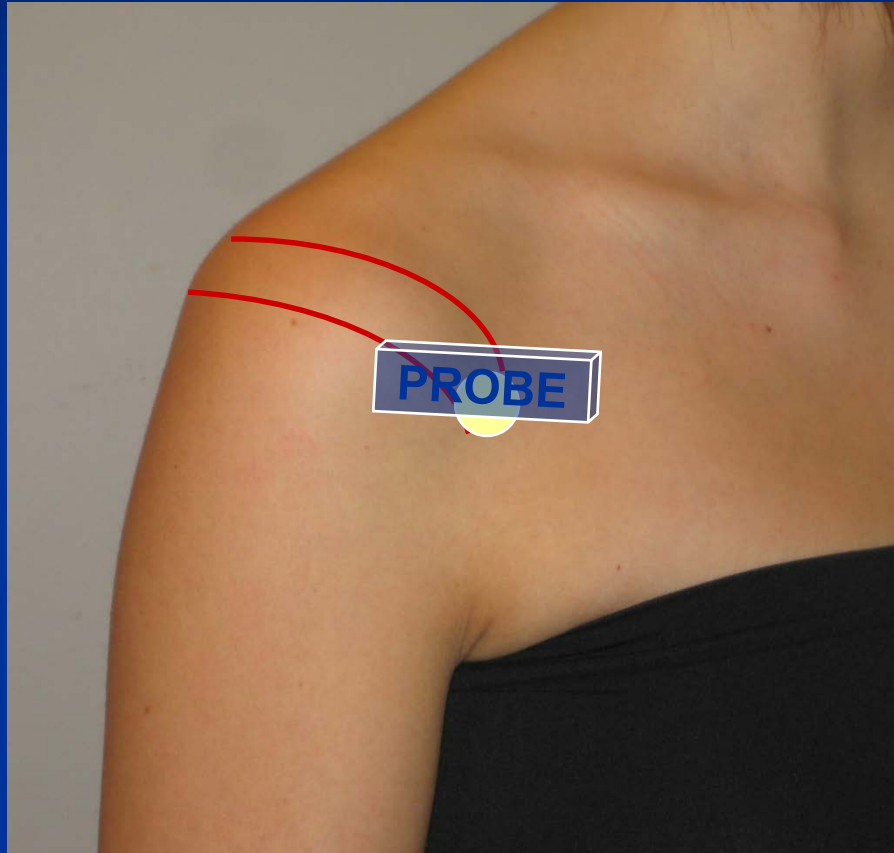
Supraspinatus

Short Axis



Infraspinatus

Long Axis



Posterior Labrum

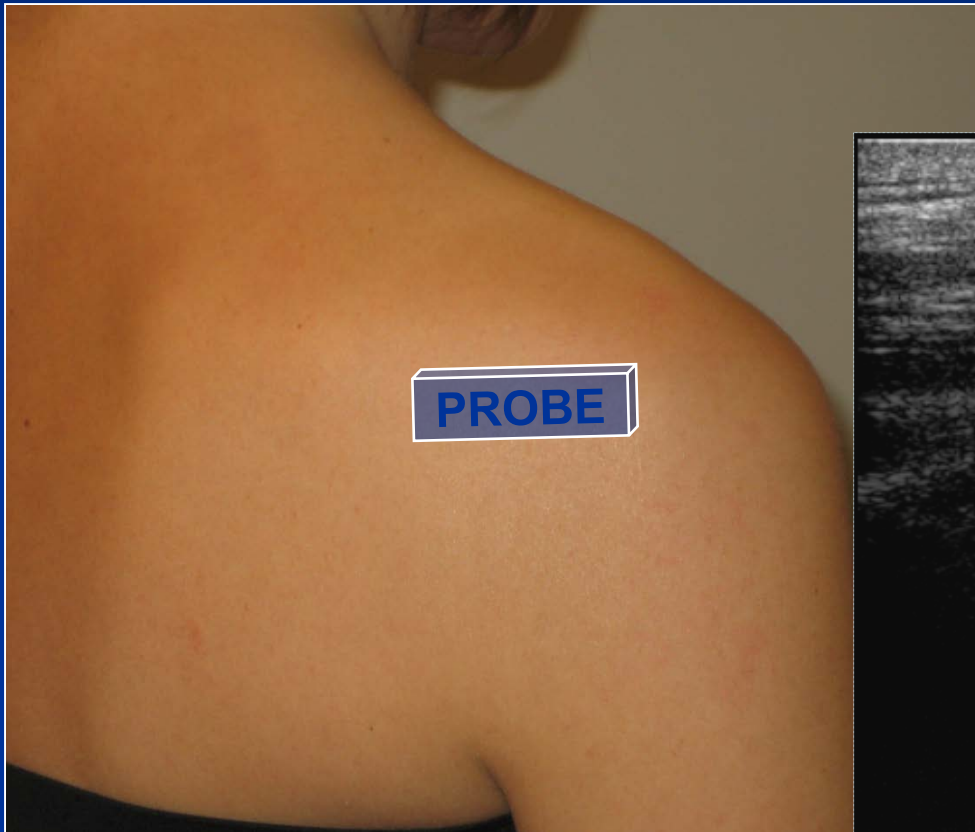


Dynamic Maneuver



Spinoglenoid notch

Long Axis



US shoulder Technique & Protocol

- Topographical spots
 - Bony acoustic landmarks
 - Soft tissue structures
- Standard protocol
- Review in next session

Shoulder US Technique

