


Ultrasound of the Shoulder

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Advanced Concepts in Sports Medicine
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Disclosures

- ▶ Speaker: Sonosite, Arthrex
- ▶ Royalties: None
- ▶ Stock Options: None

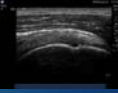

I do not intend to discuss any off-label use/ unapproved use of drugs or devices

Objectives

- ▶ Uses of ultrasound
- ▶ Shoulder anatomy
- ▶ Shoulder sono-anatomy
- ▶ Ultrasound shoulder exam

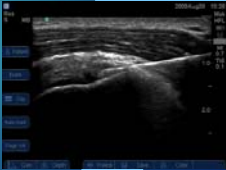
Diagnostic Uses

- ▶ **Soft tissue disorders**
 - ▶ Tears
 - ▶ Muscles, tendon, ligament
 - ▶ Inflammation
 - ▶ Tenosynovitis
 - ▶ Masses
 - ▶ Hematoma, cyst, solid tumors, calcific tendinitis
 - ▶ Nerve disorders
 - ▶ Morton's neuroma, neuropathies, trauma
 - ▶ Foreign bodies
 - ▶ Infections
- ▶ **Joint disorders**
 - ▶ Erosions on bones
 - ▶ Loose bodies
 - ▶ Pannus
 - ▶ Inflammation
 - ▶ Effusion
- ▶ **Bone disorders**
 - ▶ Fractures

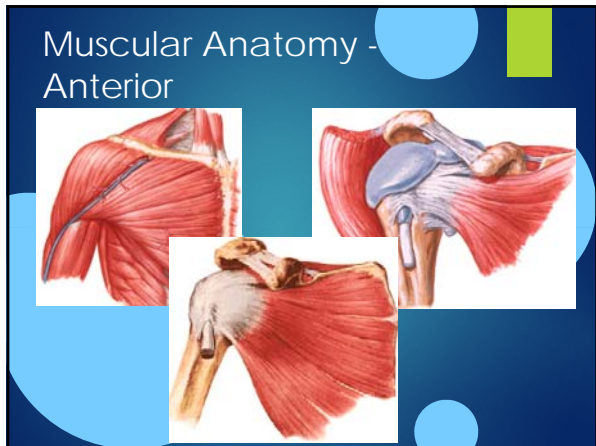


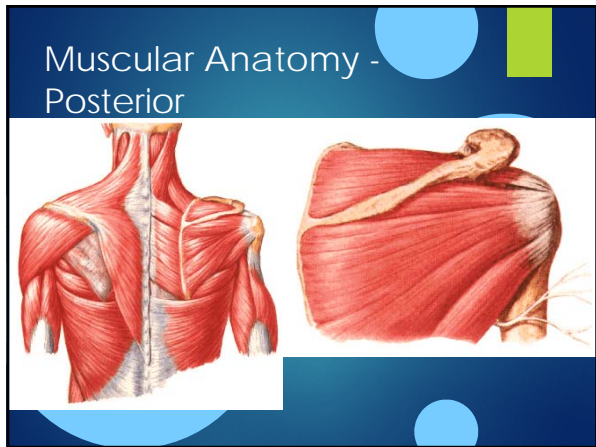
Therapeutic Uses

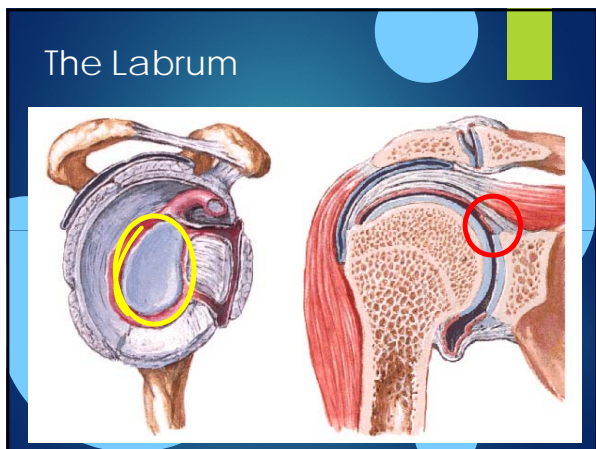
- ▶ **Injections**
 - ▶ Marcaine/Lidocaine
 - ▶ Cortisone
 - ▶ Hyaluronic acid
 - ▶ PRP
 - ▶ Stem Cells
- ▶ **Aspiration**
 - ▶ Drain joints, cysts, hematomas
- ▶ **Surgical adjunct to arthroscopy**
- ▶ **Biopsy**
- ▶ **Removal of foreign bodies**



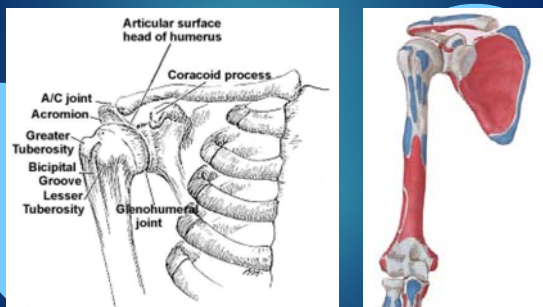
Shoulder Anatomy



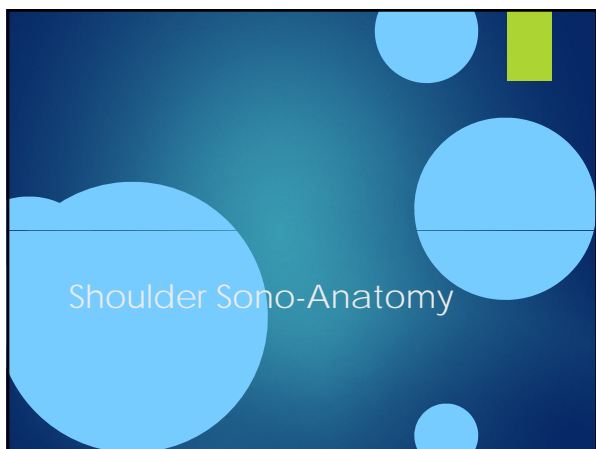




Shoulder Bony Anatomy

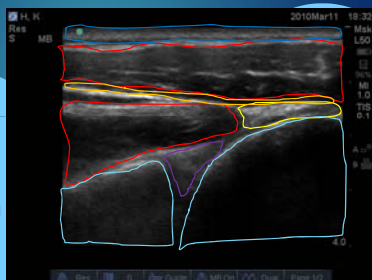


Shoulder Sono-Anatomy



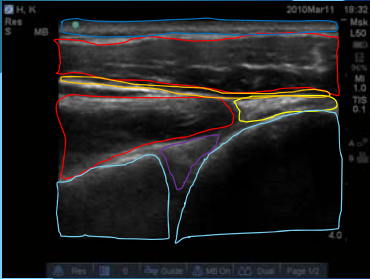
Shoulder U/S Tissue Types

- ▶ Bone
- ▶ Fat
- ▶ Tendon
- ▶ Muscle
- ▶ Labrum
- ▶ Bursa



Shoulder U/S Tissue Types

- ▶ Bone
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- ▶ Muscle
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Other Signals

- ▶ Synovial fluid
- ▶ Foreign Body
- ▶ Air




Ultrasound Shoulder Exam

Shoulder Ultrasound: Terminology

- ▶ **Long Axis (Longitudinal) view**
 - ▶ Transducer parallel to the long axis of the structure of interest
- ▶ **Short Axis (Transverse) view**
 - ▶ Transducer perpendicular to the structure of interest


Shoulder Ultrasound: Approaches

- ▶ Anterior
- ▶ Anterolateral
- ▶ Posterior
- ▶ Shoulder osteology creates challenges



Shoulder Ultrasound: Anterior exam

- ▶ **Biceps tendon**
 - ▶ Long & Short Axis
 - ▶ Superior & Inferior
- ▶ **Subscapularis**
 - ▶ Long & Short Axis
- ▶ **Anterior Labrum**
- ▶ **Coracoid**
 - ▶ Subcoracoid impingement
- ▶ **AC Joint**
- ▶ **Clavicle**



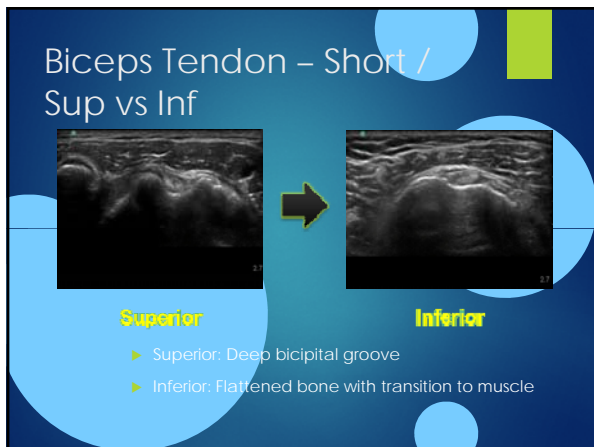
Biceps Tendon – Short Axis



This slide illustrates the biceps tendon in a short-axis view. It includes a clinical photo of a patient's shoulder, an ultrasound image, an MRI image, an arthroscopic view, and a schematic diagram. A yellow arrow in the MRI image points to the biceps tendon. A list of key points is provided below the images.

- ▶ Arm position: Neutral
- ▶ Tip: Find bicipital groove
- ▶ Milequivalent: Axial plane

Biceps Tendon – Short / Sup vs Inf



This slide compares the superior and inferior views of the biceps tendon in a short-axis view. Two ultrasound images are shown, with an arrow indicating the transition from superior to inferior. The superior view shows a deep bicipital groove, while the inferior view shows a flattened bone with a transition to muscle.

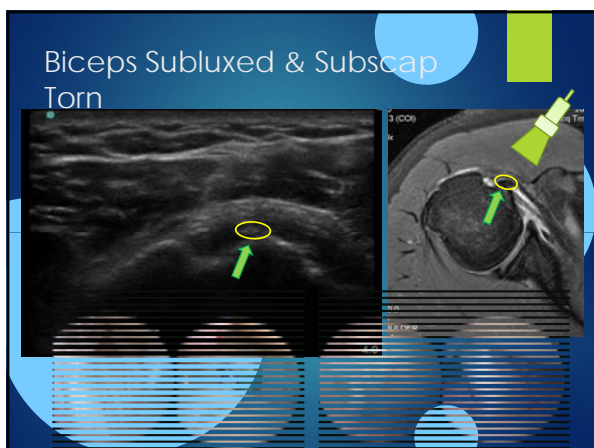
Superior

- ▶ Superior: Deep bicipital groove

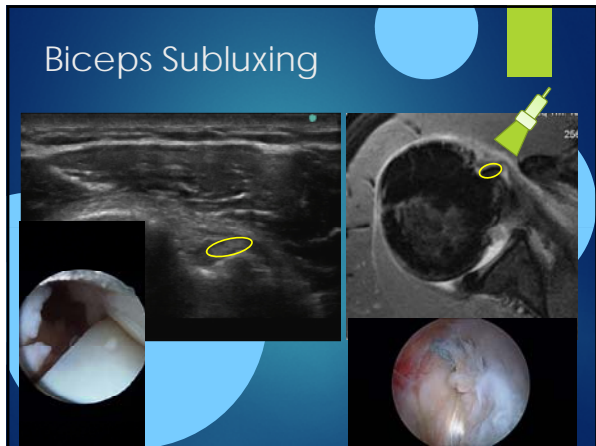
Inferior

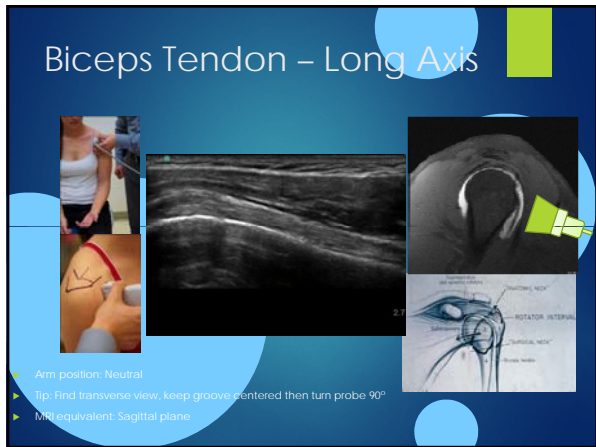
- ▶ Inferior: Flattened bone with transition to muscle

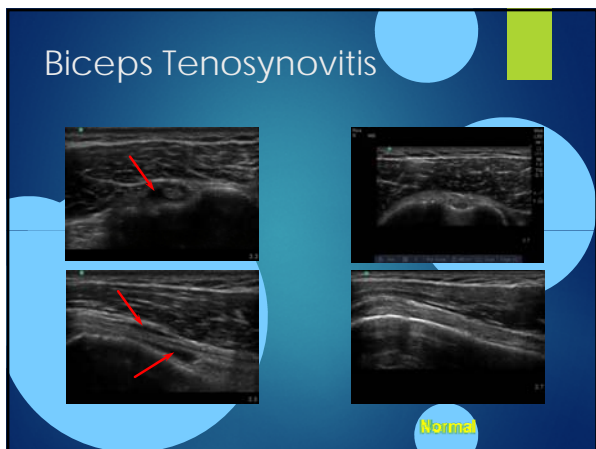
Biceps Subluxed & Subscap Torn



This slide shows imaging of a biceps tendon subluxation and a subscapularis tear. It includes an ultrasound image and an MRI image. A yellow circle and a green arrow in the ultrasound image highlight the subluxation. A yellow circle and a green arrow in the MRI image highlight the subscapularis tear. A yellow arrow in the MRI image points to the biceps tendon.







Subscapularis – Long Axis

This slide illustrates the subscapularis muscle in the long axis view. It includes a clinical photo of a patient's shoulder with a red line indicating the muscle's location, an ultrasound image showing the muscle fibers, and an MRI axial view with a green arrow pointing to the muscle. A yellow probe icon is also present.

- ▶ Arm position: External rotation
- ▶ Tip: Find bicipital groove @ neutral then ER
- ▶ MRI equivalent: Axial plane

Subscapularis – Short Axis

This slide illustrates the subscapularis muscle in the short axis view. It includes a clinical photo of a patient's shoulder with a red line indicating the muscle's location, an ultrasound image showing the muscle fibers with a green arrow pointing to the bicipital groove, and an MRI axial view with a yellow circle highlighting the muscle. A yellow probe icon is also present.

- ▶ Arm position: External rotation
- ▶ Tip: Find longitudinal view, then turn probe 90°
- ▶ MRI equivalent: Sagittal plane

Partial Subscapularis Tear

This slide illustrates a partial tear of the subscapularis muscle. It includes a clinical photo of a patient's shoulder with a red line indicating the muscle's location, an ultrasound image showing a gap in the muscle fibers with a green arrow, and an MRI axial view with a green arrow pointing to the tear. A yellow probe icon is also present.


Coracoid-Subscapularis



▶ Arm position: ER <-> IR, with Flex/Add/IR
▶ Tip: Move medial once found Longitudinal Subscap
▶ MRI equivalent: Axial plane

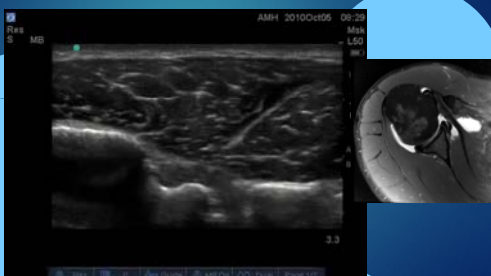
This slide features a blue background with white and green circular accents. It includes a clinical photograph of a patient's shoulder, a longitudinal MRI scan of the subscapularis tendon, and a 3D anatomical model of the shoulder joint with a green arrow pointing to the tendon's location.

Coracoid-Subscapularis



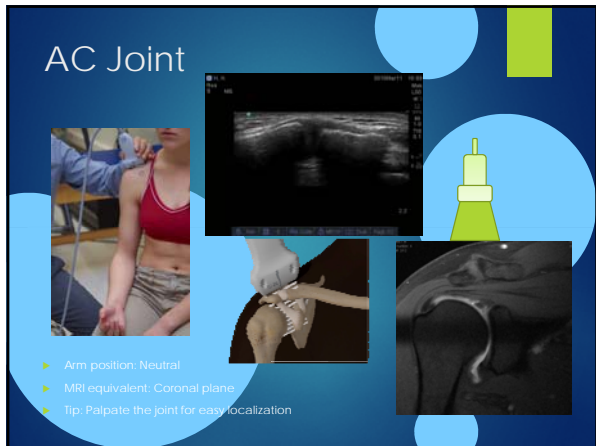
This slide shows a longitudinal MRI scan of the subscapularis tendon. The image includes technical details such as '2010Mar11 17:44', 'Mask L50', 'E 40%', 'MR 1.0', 'TIS 0.1', and '2.7'. A small inset photograph shows a patient's arm in a specific position.

Subscapularis Cyst



This slide displays a longitudinal MRI scan of the subscapularis tendon with a visible cystic lesion. Technical details include 'AMH 2010Oct05 09:29', 'Mask L50', and '3.3'. An inset photograph shows the patient's arm.

AC Joint

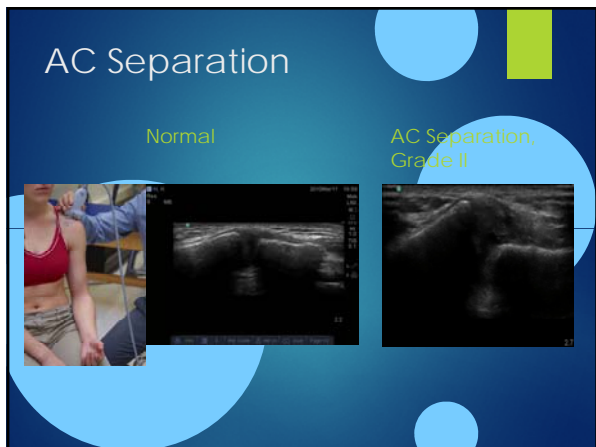


This slide features a blue background with white and green circular accents. It includes a photograph of a patient's arm being examined, an ultrasound image of the AC joint, a 3D anatomical model of the shoulder girdle, and an MRI image of the AC joint. A yellow highlighter icon is also present.

- ▶ Arm position: Neutral
- ▶ MRI equivalent: Coronal plane
- ▶ Tip: Palpate the joint for easy localization

AC Separation

Normal AC Separation, Grade II



This slide compares a normal AC joint with a Grade II AC separation. It includes a photograph of a patient, an ultrasound image of a normal AC joint, and an ultrasound image of a Grade II AC separation. The text 'Normal' and 'AC Separation, Grade II' is placed above their respective images.


Clavicle Fracture



This slide features a blue background with white and green circular accents. It includes a photograph of a patient's arm, a 3D anatomical model of the clavicle, and an X-ray image of a clavicle fracture. Technical details on the X-ray include: AMH 2011Apr20 16:02, 16x, 150, 40, 7, 3.5, 1.0, 0.1, A-17, 4.8, and 2.7.

Shoulder Ultrasound: Anterolateral exam

- ▶ **Supraspinatous**
 - ▶ Long & Short Axis
 - ▶ Anterior & Posterior
- ▶ **Subacromial Bursa**

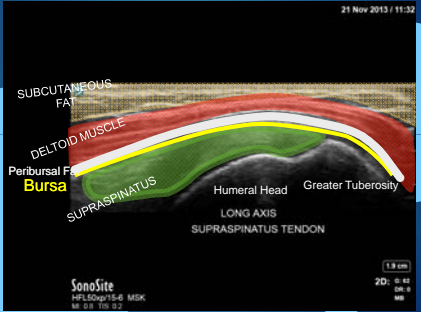


Supraspinatous – Long Axis



- ▶ Arm position: Extended
- ▶ Tip: Probe parallel plane (Contralateral shoulder : Ipsilateral hip)
- ▶ MRI equivalent: Coronal plane

Supraspinatous



Supraspin. – Long / Ant vs Post

Anterior

Posterior

- ▶ Anterior: Step off pronounced on tuberosity
- ▶ Posterior: Flatter transition of head to tuberosity

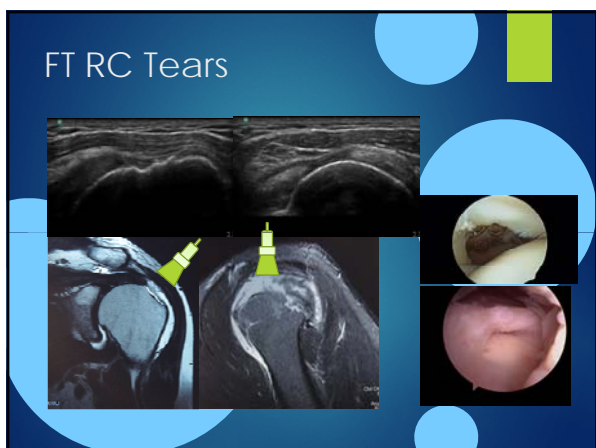
Subacromial Bursitis

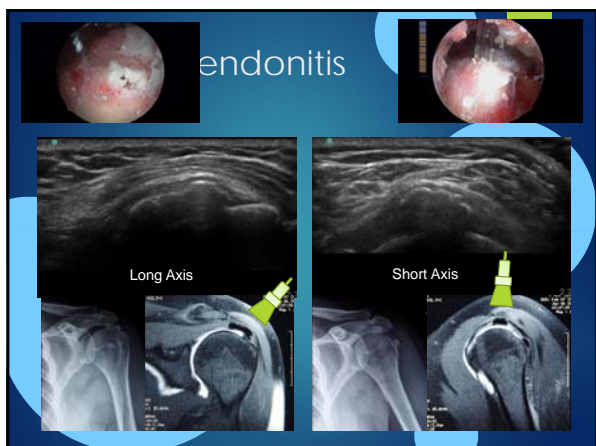
MB

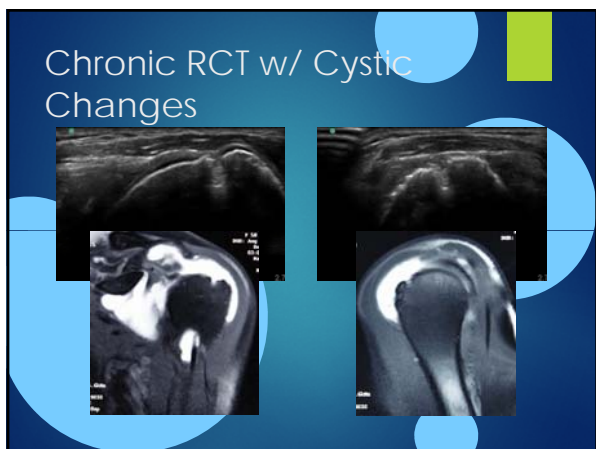


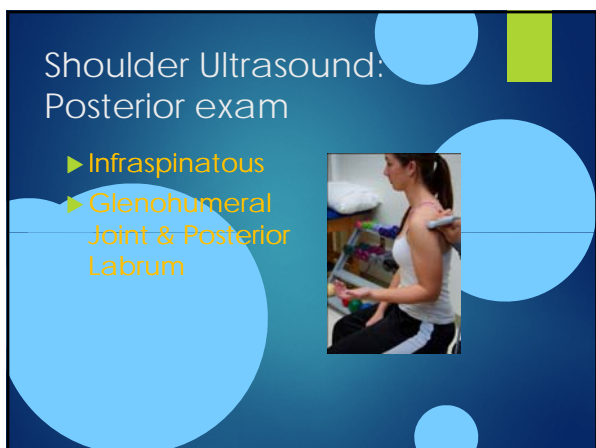












Infraspinatous – Long Axis



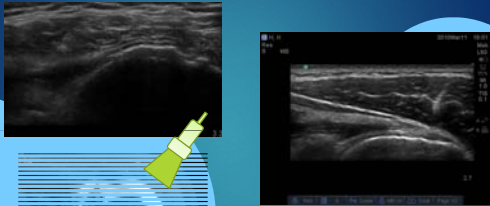
- ▶ Arm position: Neutral
- ▶ Tip: Stay more lateral and find edge of humeral head
- ▶ MRI equivalent: Axial plane

Infraspinatous – Short Axis



- ▶ Arm position: Neutral to flexed
- ▶ Tip: Find longitudinal view, then turn probe 90°
- ▶ MRI equivalent: Sagittal plane

Infraspinatous - Tear



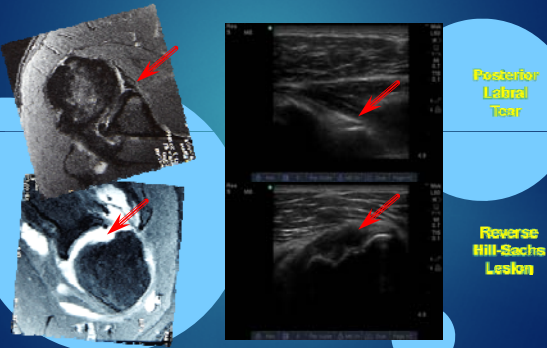
Normal

Posterior Glenohumeral Joint



- ▶ Arm position: Neutral
- ▶ Tip: Find longitudinal view infraspinatus, then move medial, rotating arm
- ▶ MRI equivalent: Axial plane

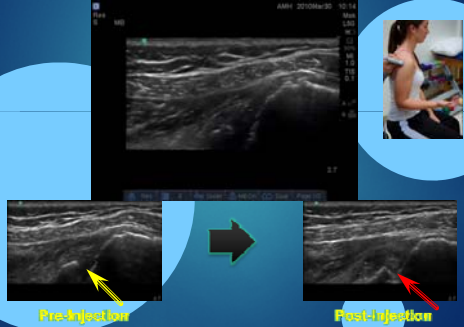
Posterior Instability



Posterior Labral Tear

Reverse Hill-Sachs Lesion

Posterior Labral Tear USA: Ultrasound Arthrogram



Pre-Injection

Post-Injection



