

Ultrasound of the Post-operative Shoulder

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Disclosures

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



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Fundamentals of Musculoskeletal Ultrasound
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Objectives:

- Understand the appearances of the rotator cuff after surgery
- Recognize rotator cuff re-tear
- Familiar with ultrasound appearances after biceps tenodesis and arthroplasty

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Outline:

- Rotator cuff repair
- Biceps tenotomy and tenodesis
- Shoulder replacement

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Rotator Cuff Repair: surgery

- Arthroscopy
- Open surgery
 - Deltoid detachment and reattachment
- Mini-open
 - Arthroscopy-assisted
 - Split deltoid for access without detachment

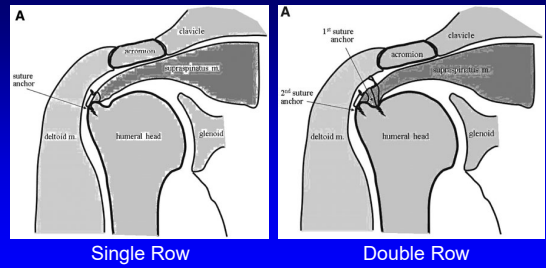
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Rotator Cuff Repair: surgery

- Partial tear repair:
 - Articular <50% and bursal: debridement
 - Articular >50%: repair or convert to full tear
- Full-thickness repair:
 - Trans-osseous fixation + trough
 - Decorticated tuberosity + direct apposition

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Rotator Cuff Repair Techniques



From: Am J Sports Med 2008; 36: 1310

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Rotator Cuff Repair: surgery

- Subacromial-subdeltoid bursa:
 - Debrided or resected
- AC joint:
 - Subacromial enthesophyte spur resection
 - AC joint osteophyte resection
 - Coracoacromial ligament release from acromion
 - Distal clavicle resection: Mumford procedure

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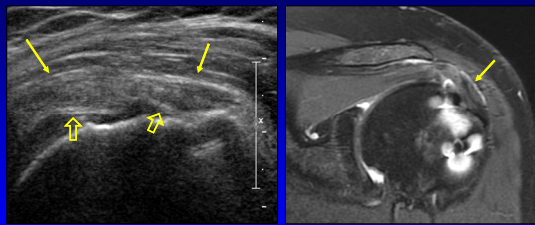
Repaired Cuff: ultrasound

- Post-op intact tendon:
 - Variable and heterogeneous echogenicity
 - Variable thickness
- Reimplantation trough
- Echogenic sutures & anchors

Jacobson et al. Sem Musculo Radiol 2011; 15:320

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Post-operative cuff: intact



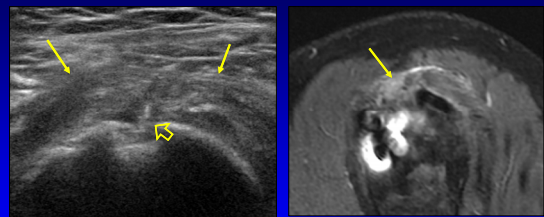
Long Axis
Open arrows = suture

T1w fat-sat coronal
MR arthrogram

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Post-operative cuff: intact

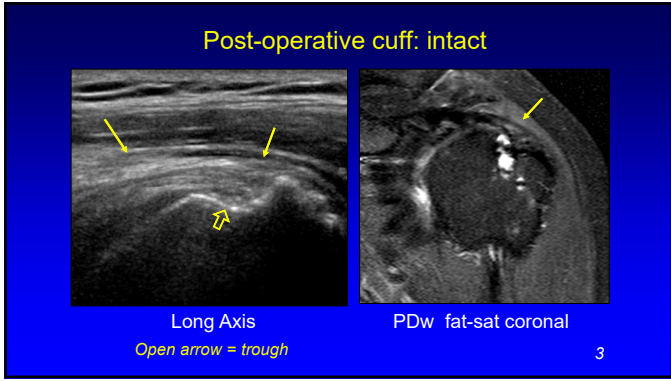


Short Axis
Open arrow = suture

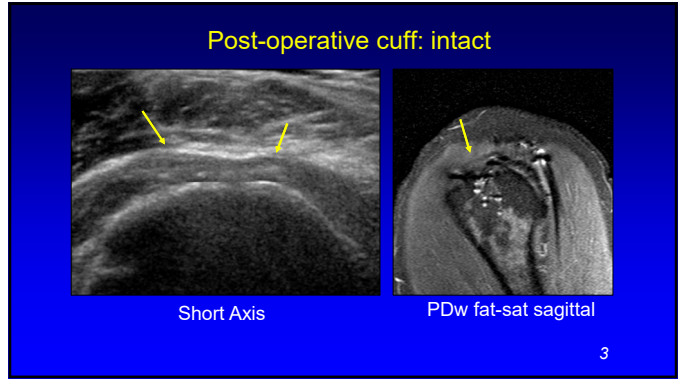
T1w fat-sat sagittal
MR arthrogram

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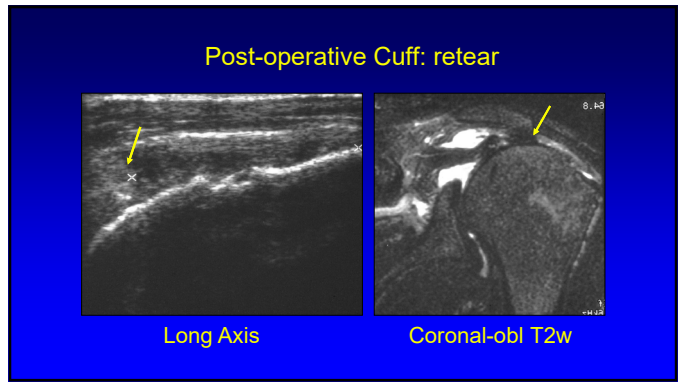


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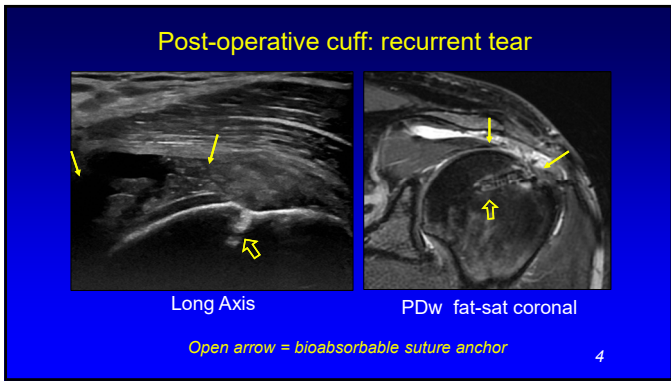
Post-operative Rotator Cuff

- Recurrent tear:
 - Defined tendon defect
 - Ultrasound: anechoic or hypoechoic
 - MRI: fluid or contrast signal
 - Tendon non-visualization (ultrasound)
 - Tendon retraction

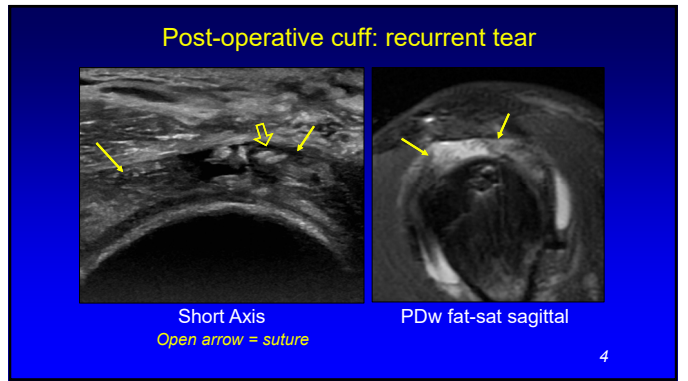
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Recurrent Cuff Tear: ultrasound results

- Sensitivity = 95%, specificity = 90%, accuracy = 94%¹
- Tendon defects at 1 year may heal²
- Defects increase in size with decreased strength but may be asymptomatic³
- Structural integrity does not correlate with pain or function⁴

¹Yen, Clin Imaging 2004; 28:69
²Nho, Am J Sports Med 2010; 37:1938
³Dodson, Am J Sports Med 2010; 38:35
⁴Russell RD et al. JBJS 2014; 96A:265

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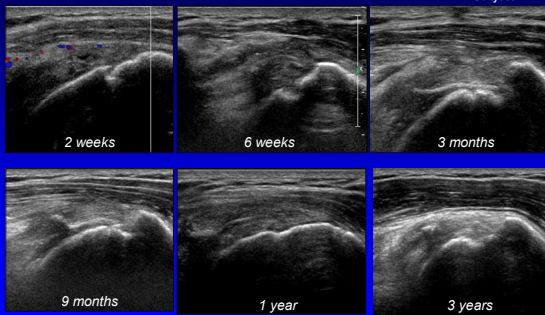
Rotator Cuff Repair:

- How does the repaired tendon appear at specific time points after surgery?
- How does the appearance change over time?
- When should the tendon appear "normal"?

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Post-operative Cuff: Intact

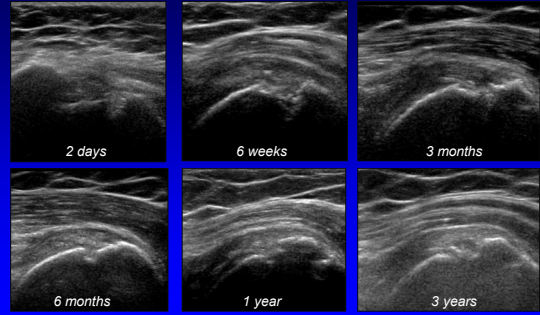
Subject B.A.



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Post-operative Cuff: Intact

Subject J.C.



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Rotator Cuff Repair:

- Most recurrent tears: within 3 months
- Tendons start to look "normal" by 6 to 9 months
- Focal defects are equivocal, may be post-surgical, may disappear
- Recurrent tears tend to be larger or get larger
- If unsure, get follow-up scan

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Rotator Cuff Repair:

- Patients with intact tendons may have continued symptoms
- Patients with recurrent tears may be asymptomatic
- Large recurrent tears are more likely symptomatic

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Gossypiboma

- Retained surgical sponge or cotton
 - Textiloma
 - Latin "gossypium" = cotton
 - Swahili "boma" = place of concealment
- Complications:
 - Foreign body response
 - Infection
- May remain silent for years

AJR 2009; 193:S94

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Outline:

- Rotator cuff repair
- Biceps tenotomy and tenodesis
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Biceps Tendon:

- Tenotomy: surgical transection of intra-articular aspect of long head biceps brachii tendon
- Tenodesis: surgical transection + fixation of proximal stump to intertubercular groove

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Biceps Tendon: tenodesis

Long Axis Short Axis

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Biceps Tendon: failed tenodesis

Long Axis Short Axis

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Outline:

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Shoulder Arthroplasty:

- Total shoulder arthroplasty or hemiarthroplasty
 - Rotator cuff normally inserts onto tuberosities
- Reverse total shoulder arthroplasty:
 - Used when tear of rotator cuff
 - No cuff or tuberosities

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Shoulder Arthroplasties

Total Hemi Hemi Reverse Total

Note: normal tuberosities and cuff attachments

Do not do US here

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Arthroplasty: Intact Cuff

Arthroplasty Arthroplasty

Long Axis Short Axis

Conventional Total Arthroplasty

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Arthroplasty: Intact Cuff

Arthroplasty Arthroplasty

Long Axis Short Axis

Resurfacing Hemiarthroplasty

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Arthroplasty: Cuff Tear

Arthroplasty GT

Long Axis

Conventional Total Arthroplasty

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Take-home Points

- Repaired rotator cuff:
 - Most recurrent tears: within 3 months
 - Appears somewhat normal by 6 – 9 months
 - Diagnose retear if obvious defect
 - If equivocal, follow-up scan
- Tenodesis
 - Suture anchor in bicipital groove
- Arthroplasty:
 - Use greater tuberosity landmarks

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Thank you!



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www.jacobsonmskus.com

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