

# Common Orthopaedic Conditions of the Shoulder in Weekend Warriors

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A PA's Guide to the Musculoskeletal Galaxy  
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# Disclosures

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# PERSEVERANCE

THE COURAGE TO IGNORE THE OBVIOUS WISDOM OF TURNING BACK.

# Objectives

- Know how to properly evaluate a patient with a shoulder injury or other symptoms
- Formulate an appropriate differential diagnosis based on history and PE findings
- Recommend initial treatment plans for patients with shoulder impingement, rotator cuff disease, adhesive capsulitis, and glenohumeral arthritis

# Introduction

- Shoulder anatomy
- Shoulder impingement
- Rotator cuff disease
- Rotator cuff arthropathy
- SLAP lesions
- Adhesive capsulitis
- Glenohumeral arthritis

“Life may not begin at 40, but it certainly doesn’t have to end there”



# Rotator Cuff

- Four muscles/tendons covering scapula
  - ❖ Supraspinatus
  - ❖ Infraspinatus
  - ❖ Subscapularis
  - ❖ Teres minor





# Case #1

- 56yo RHD male avid tennis player presents with a 4 month h/o right shoulder pain
- Localized deep and lateral
- Increased with overhead serves
- Minimal weakness
- Partially relieved by rest and NSAIDs

# Case #1

- Exam reveals painful arc of motion in forward elevation and abduction
- No rotator cuff atrophy
- TTP over lateral subacromial bursa
- Positive Neer and Hawkins signs
- Mild weakness in abduction and ER

# Case #1



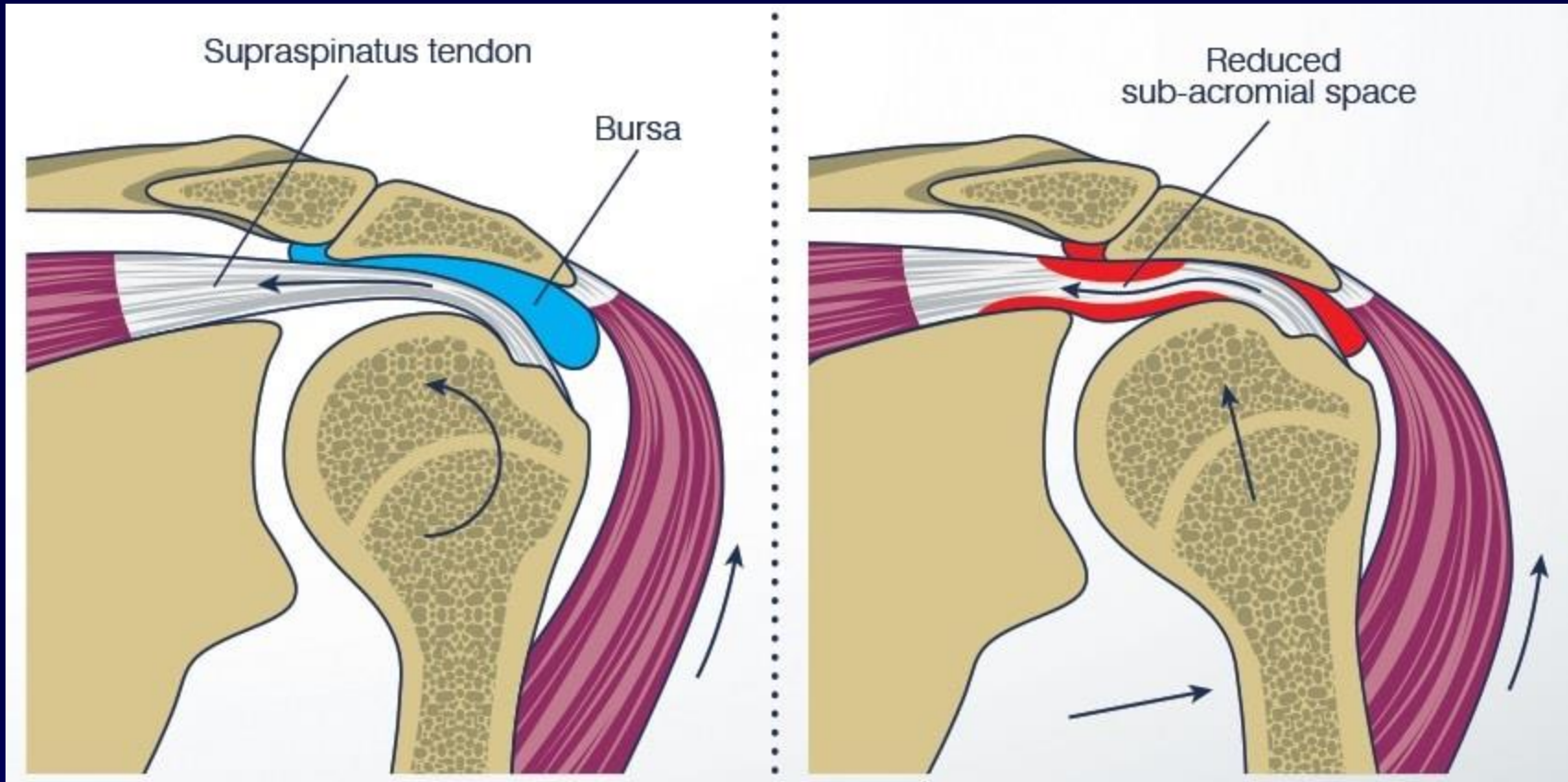
# Case #1

- Diagnosis?

# Impingement Syndrome

- Most common overuse problem in the shoulder in the older overhead athlete
- Compression of subacromial bursa and/or rotator cuff tendons between humeral head and undersurface of the acromion
- Subacromial bursitis
- Rotator cuff tendinitis

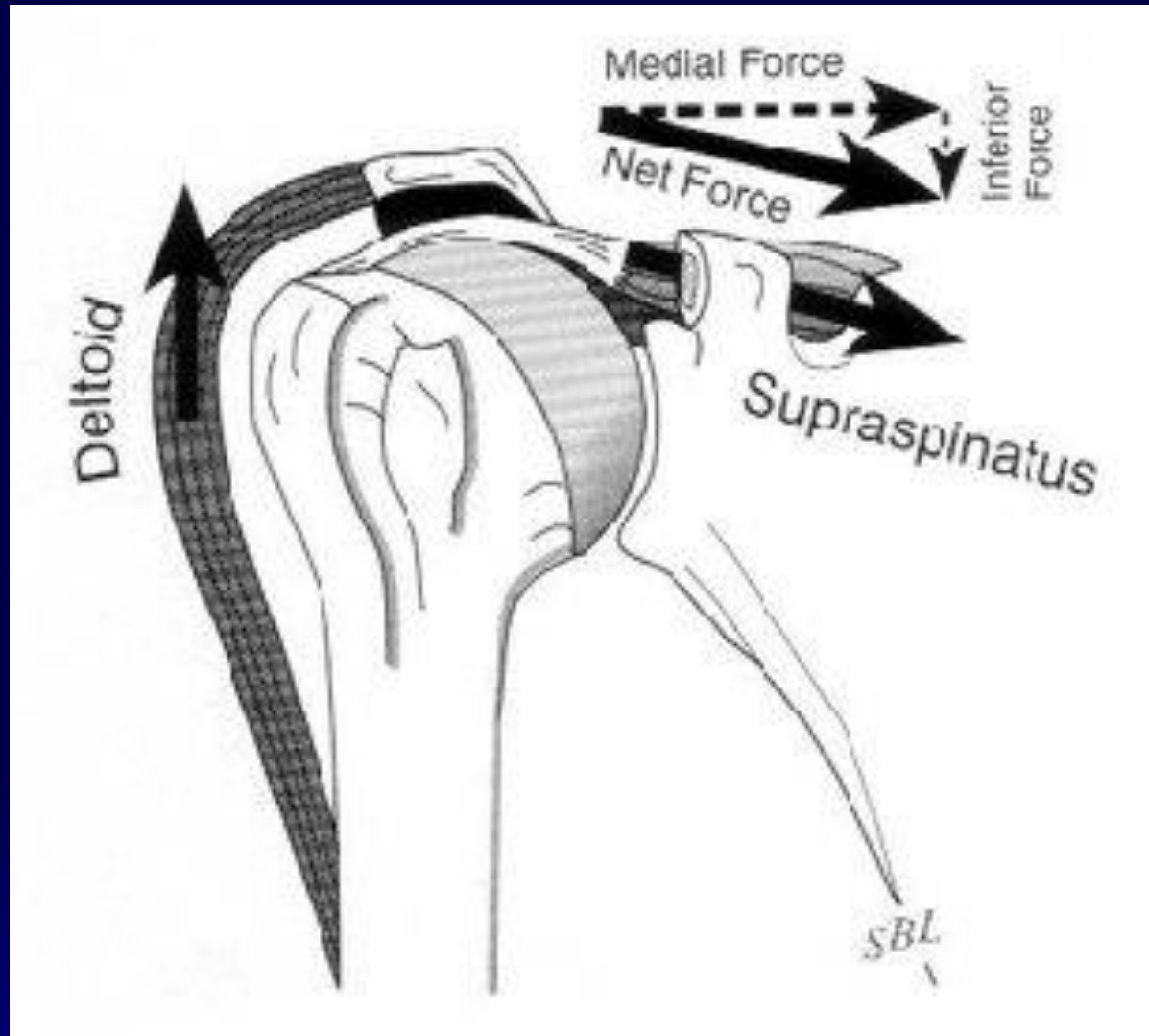
# Impingement Syndrome



# Impingement Syndrome

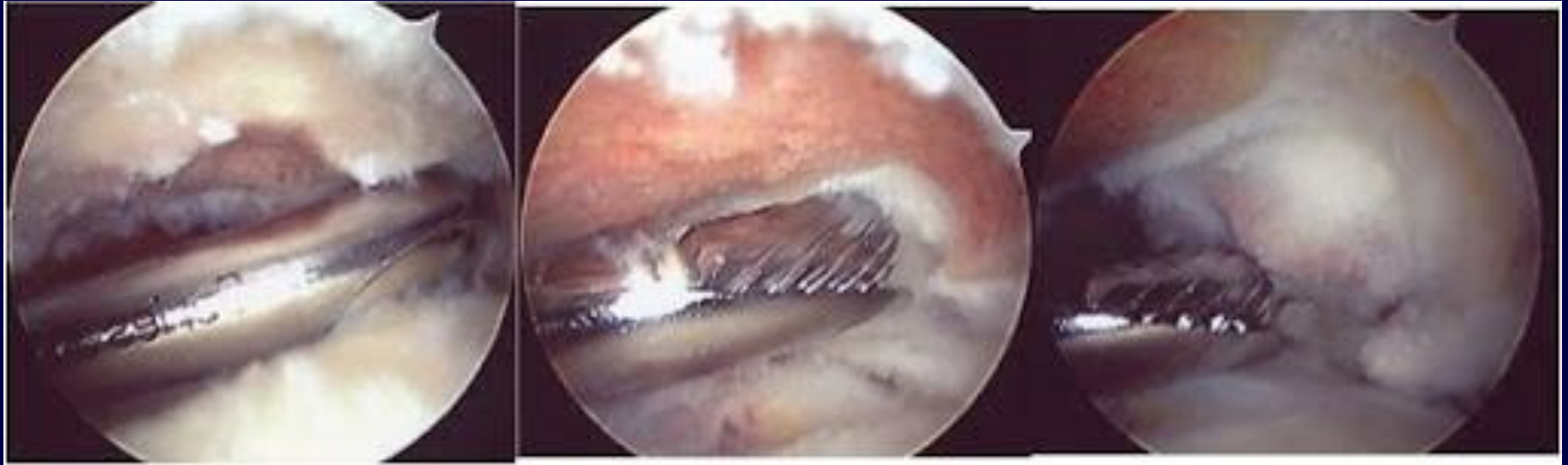
- Treatment
  - ❖ Rest from aggravating factors
  - ❖ NSAIDs
  - ❖ Consider cortisone Injection
  - ❖ Physical therapy for RC strengthening
- Surgical decompression
  - ❖ Partial bursectomy
  - ❖ Acromioplasty

# Shoulder Force Couple



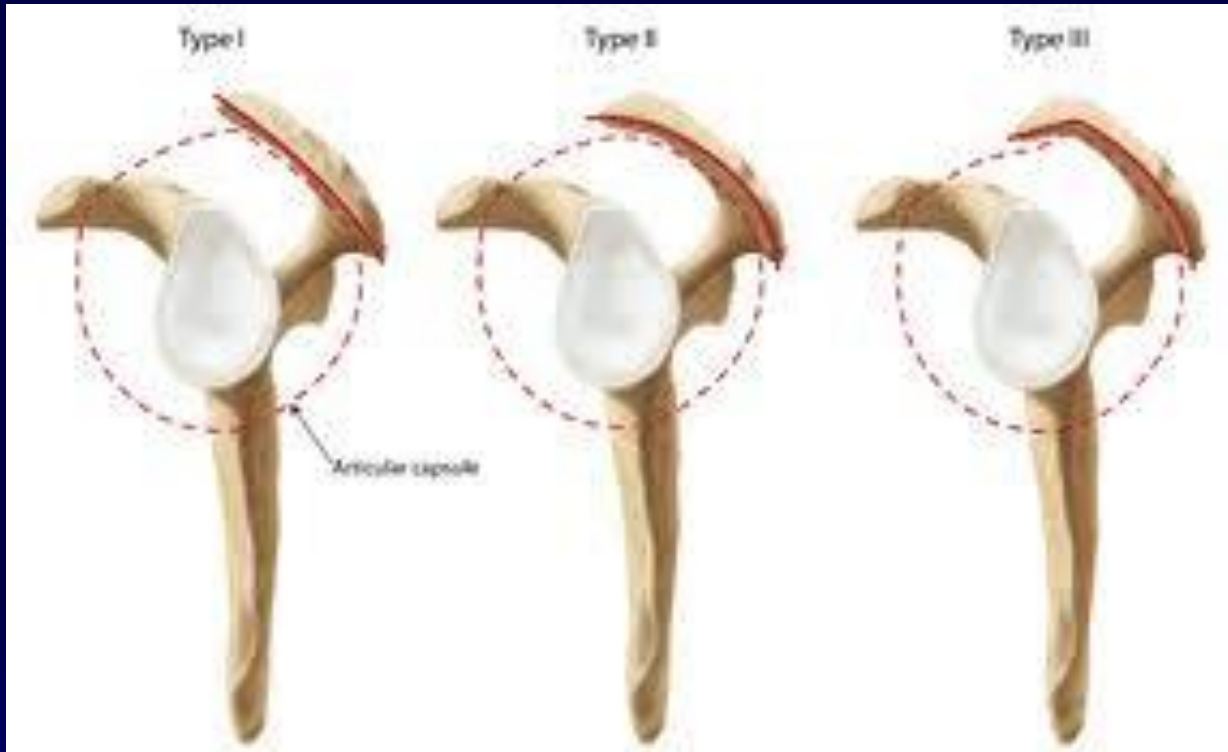


# Subacromial Decompression



# Impingement Syndrome

- Increased risk of rotator cuff disease



*Neer, 1972 and Bigliani et al., 1986*

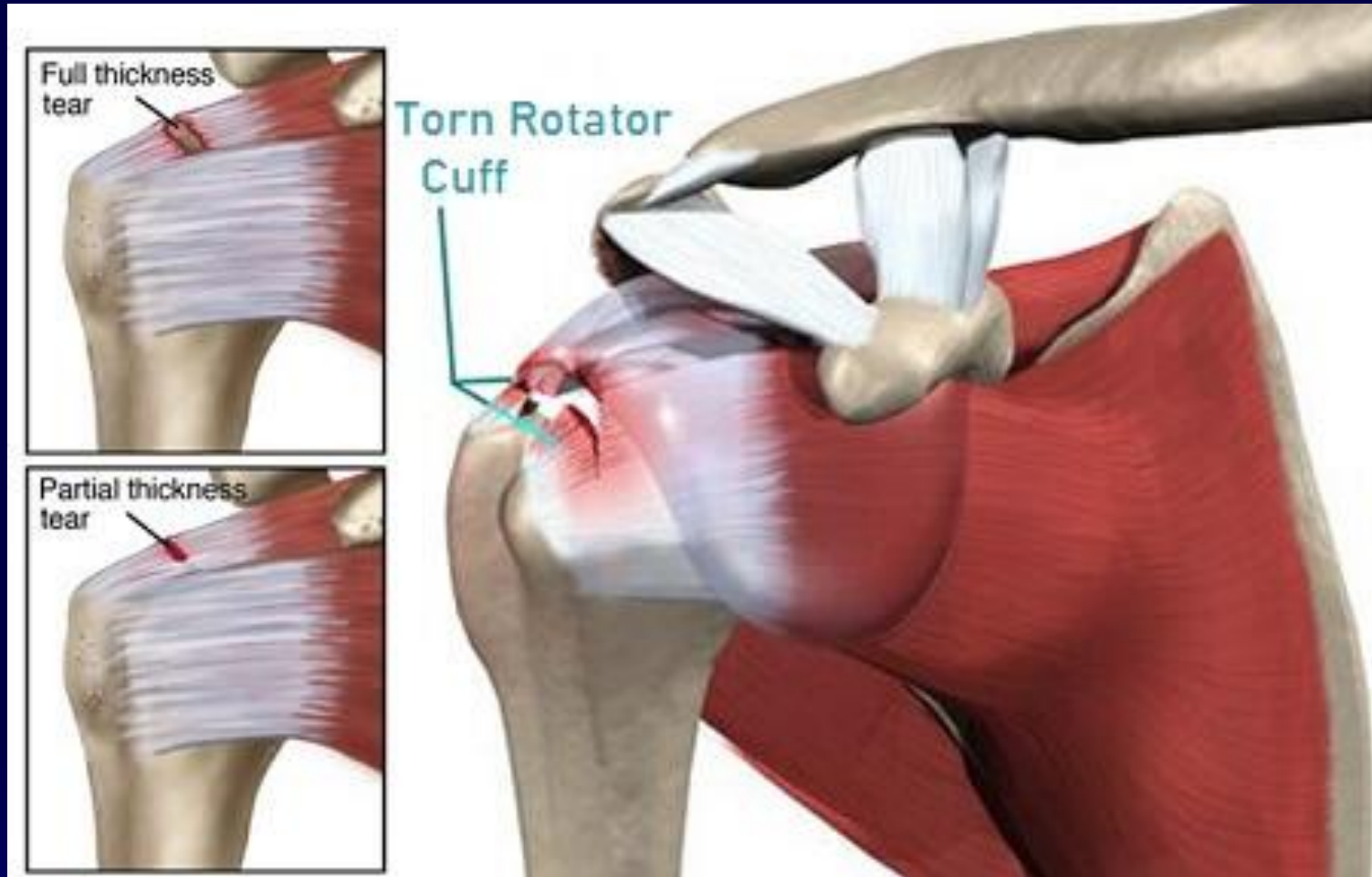
# Rotator Cuff Tears

- Most often chronic, degenerative tears or acute-on-chronic presentations
- Initial symptom may be pain only
- Many have few other symptoms
- Ultimately results in weakness as tear worsens and RC muscle atrophy occurs

# Rotator Cuff Tears

- What is the most common cause of rotator cuff tears?
- Degenerative tissue?
- Chronic impingement?
- Trauma?

# Rotator Cuff Tears

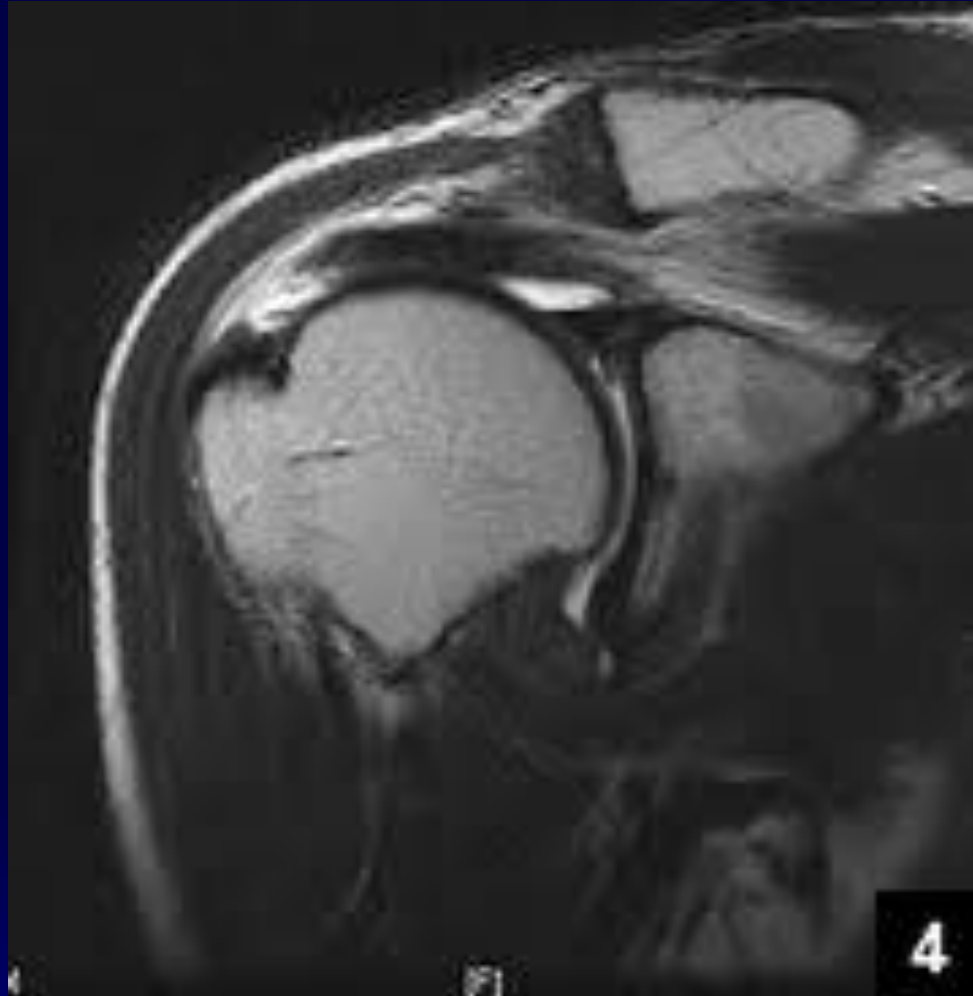


# Rotator Cuff - Exam

- Painful ROM, especially ABER
- Positive Neer and Hawkins signs
- Muscle atrophy
- Weakness in ABER
- Drop arm sign
- ER lag
- Hornblower's sign



# Rotator Cuff - MRI

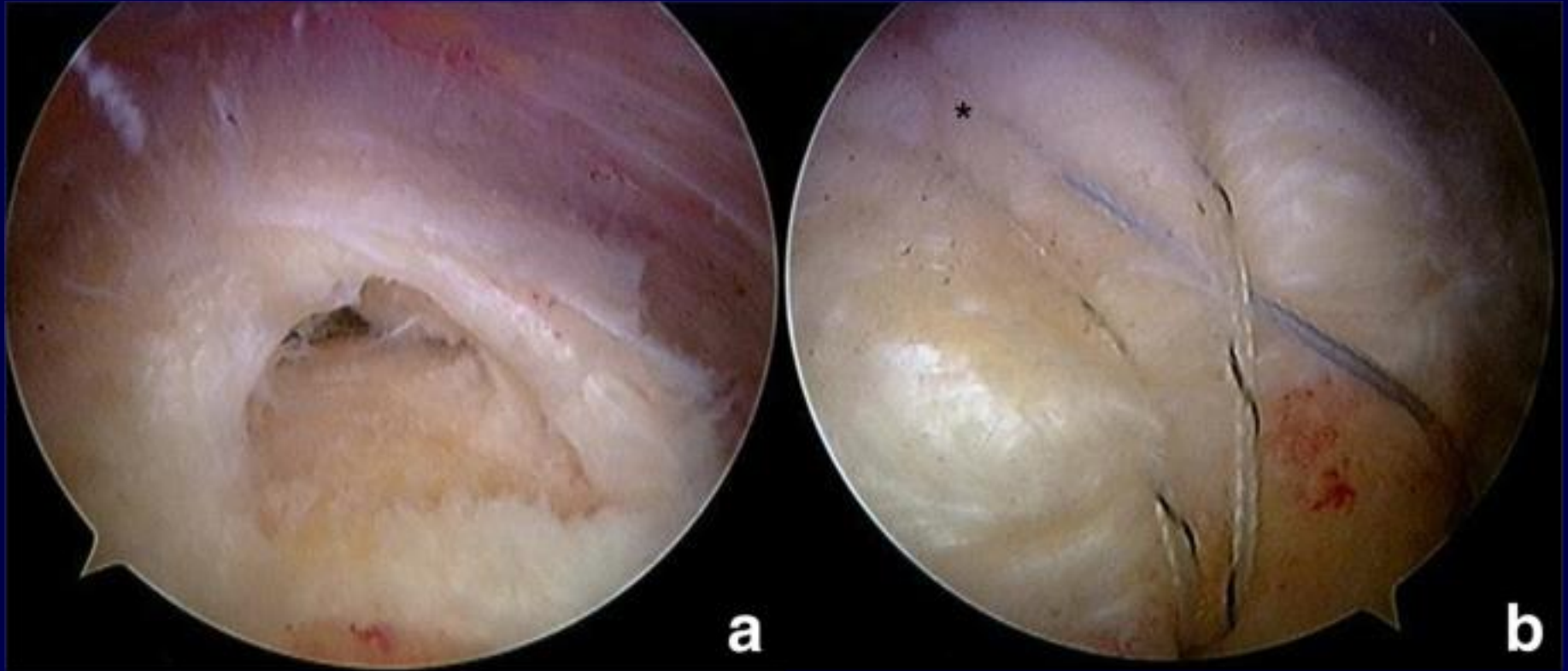


# Rotator Cuff Tears

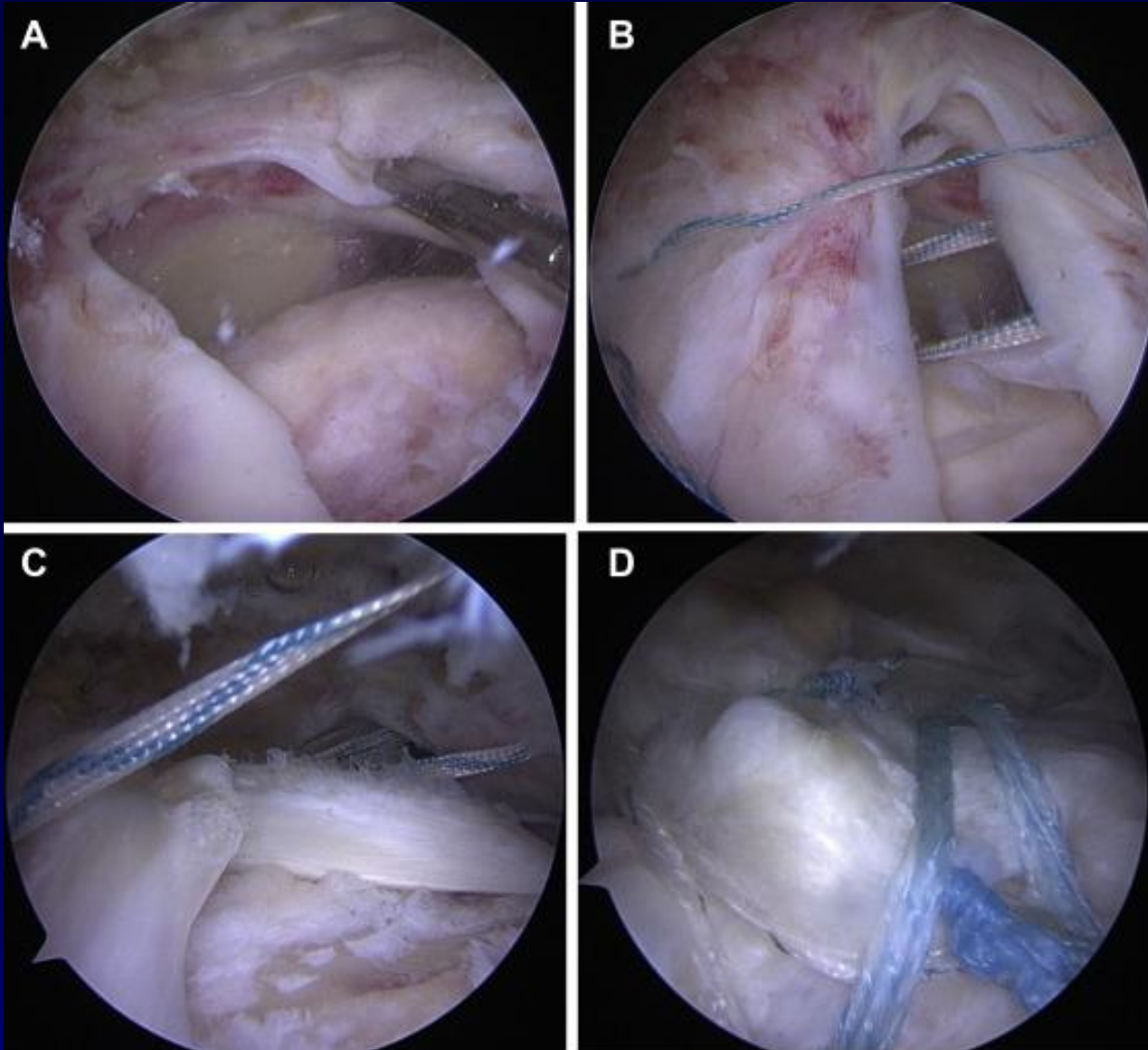
- Initial treatment may be the same as that for subacromial impingement
- Many tears slowly progress and worsen
- Arthroscopic or mini-open rotator cuff repair is often the treatment of choice
- Advanced RC disease often results in secondary glenohumeral DJD
- Rotator cuff arthropathy



# Rotator Cuff Repair



# Rotator Cuff Repair



# Rotator Cuff Tears

“Hey Doc, if I don’t get my rotator cuff tear fixed, will it get bigger or cause me more pain in the future?”

# RCT Progression

- Does every patient with a full thickness RCT need a repair?
- Do rotator cuff tears get bigger over time?
- What factors suggest tears will worsen?
  - ❖ 47% total over 2 years ( $\geq 2$ mm)
  - ❖ Full thickness
  - ❖ Medium tears
  - ❖ Smokers, Males, Hand dominance, Trauma

*Yamamoto et al. Am J Sports Med, 2017.*

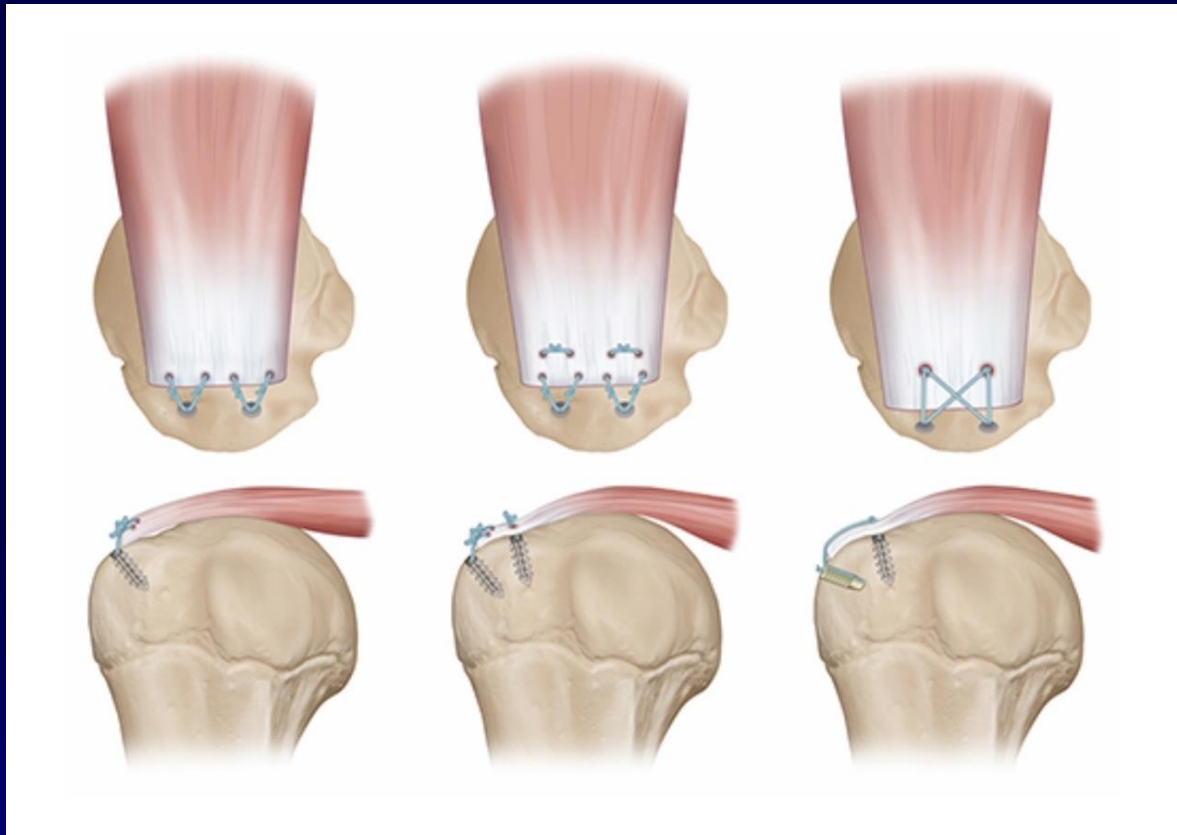
# RC Repair Techniques

- Suture Anchors
  - ❖ Metal
  - ❖ PEEK
  - ❖ PGA/PLA
  - ❖ Suture



# RC Repair Techniques

- Single row suture anchor repair
- Double row (transosseous equivalent)



# RC Repair Techniques

- Single row
  - ❖ Easier
  - ❖ Faster
  - ❖ Less expensive
- Double row (transosseous equivalent)
  - ❖ Multiple anchors
  - ❖ Improved footprint restoration
  - ❖ Less creep/failure in lab studies
  - ❖ Clinically superior?

# Single vs. Double Row RCR

- Meta-analysis with 14/18 RCTs included
- 2010-2020
- 1231 cases (571 SRR and 660 TOE)
- Mean F/U 34.6 months
- No SSD in pain scores, ASES scores, ROM, or retear rates

*Ponugoti et al. JSES Int 6(1); 2022*



# Biologics

- Growth factors (Platelet-rich plasma)
- Interpositional grafts
- Scaffolds
- Patches

# Platelet-Rich Plasma

- Peripheral blood drawn from patient, centrifuged, plasma buffy coat collected
- Re-injected at site of injury
- Growth factors present in supraphysiologic concentrations
- Some studies have shown improved healing rates
- Others show no SSD vs. saline injections

# Platelet-Rich Plasma

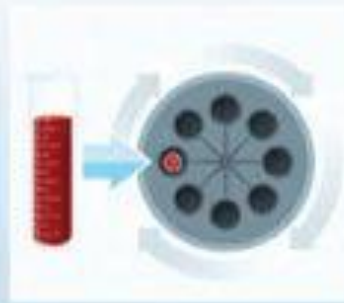
## STEP 1



### **Collecting Blood**

A small amount of blood (30-60ml) is drawn from the patient's arm.

## STEP 2



### **Separating the Platelets**

The blood goes for a "spin" in a centrifuge separating the platelets from the rest of the blood.

## STEP 3



### **Platelet-Rich Plasma**

The patient's own platelet-rich plasma is now extracted from the test tube.

## STEP 4



### **Return of PRP to the Patient**

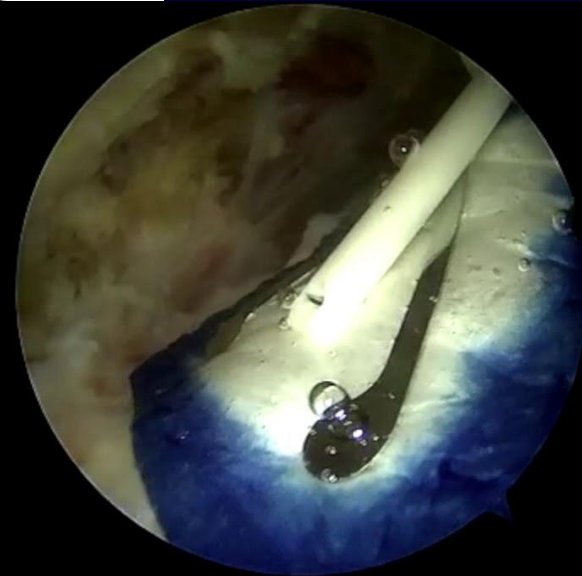
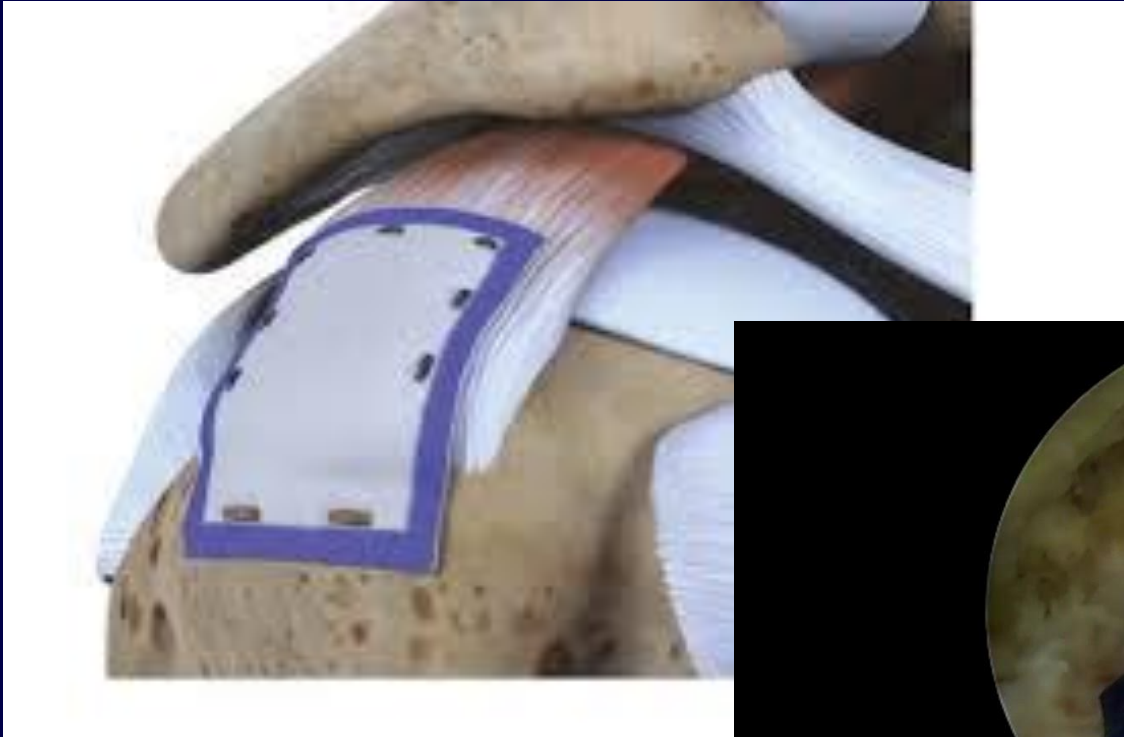
The plasma is injected into the injured area or inflamed tissue.

# Bioinductive Collagen Implants

- 33 Pts with chronic, degenerative PTRCTs
- ASAD with no traditional RCR
- Implant placed on bursal surface of SS
- Clinical outcomes at 3 months, 1 and 2 yrs
- ASES/CMS scores improved at 2 years
- MRI evidence of tissue fill-in in 100% of intermediate and 95% of high grade tears

*Schlegel et al. JSES 30:8, 2021*

# Biologics



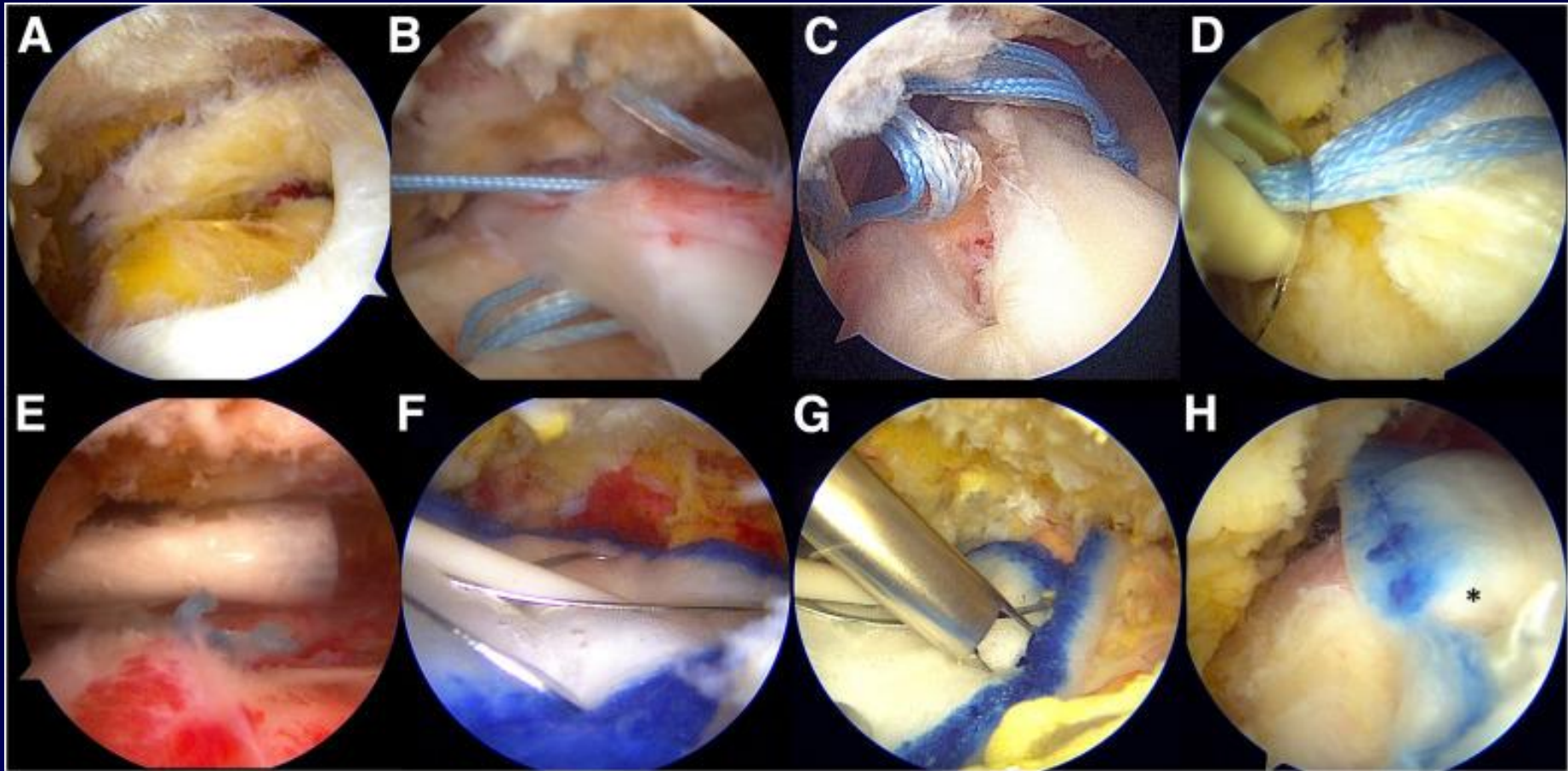
# Bioinductive Collagen Implants

- Level 1 RCT, 124 Pts
- Full thickness medium to large RCTs
- Randomized TOE repair vs. TOE+BCI
- MRIs at 12 months post-op
- Retear rate: 8.3% TOE+BCI vs. 25.8% TOE
- $p < 0.01$ ; no differences in complications

*Ruiz Iban et al. Arthroscopy 40(6), 2023*



# Bioinductive Collagen Implants



# Case #2

- 78yo RHD retired male presents with a 6 month h/o worsening right shoulder pain
- Associated weakness
- Interfering with ADLs including dressing
- Not sleeping well; left side only

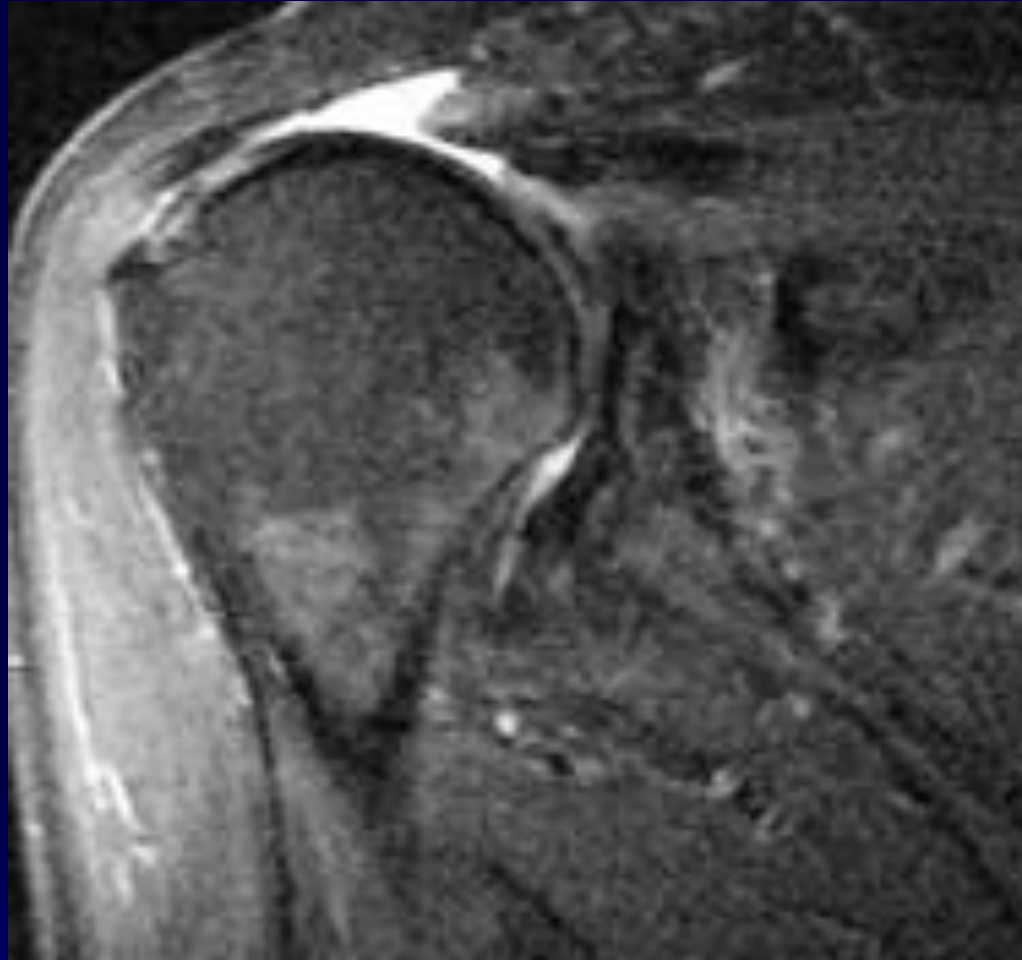




# Diagnosis?



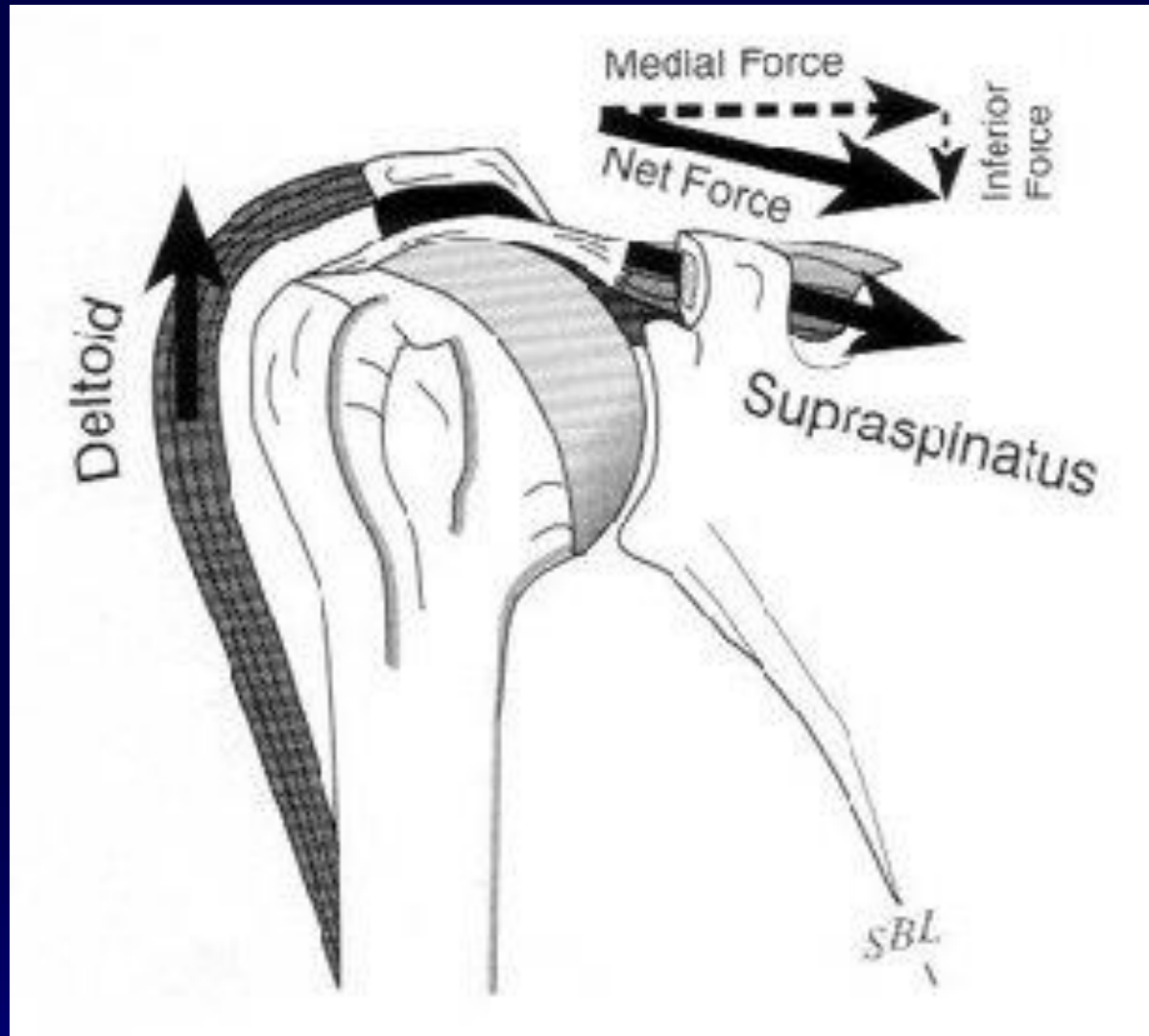
# Rotator Cuff Arthropathy



# Rotator Cuff Arthropathy

- Growing problem
- Failed RC repair
- Neglected RC tear
- Loss of depressing force of cuff
- Superior migration of humeral head
- Deltoid shortens, becomes weak
- Pseudoparalysis

# Shoulder Force Couple



# Rotator Cuff Arthropathy

- Conservative treatment
  - ❖ PT
  - ❖ Pain management
  - ❖ Cortisone injections
  - ❖ Activity modification
- Surgical Management
  - ❖ Reverse TSA
  - ❖ SCR
  - ❖ Biceps tenotomy!

*Boileau et al. J Bone Joint Surg, 2007.*

# Superior Capsular Reconstruction

- Described by Mihata with fascia lata
- Recent use of acellular dermal allograft
- Arthroscopic procedure
- Restores tether/fulcrum to prevent superior migration of humeral head
- Limited experience
- May reverse pseudoparalysis over time!

*Burkhart et al. Arthroscopy, 2019.*

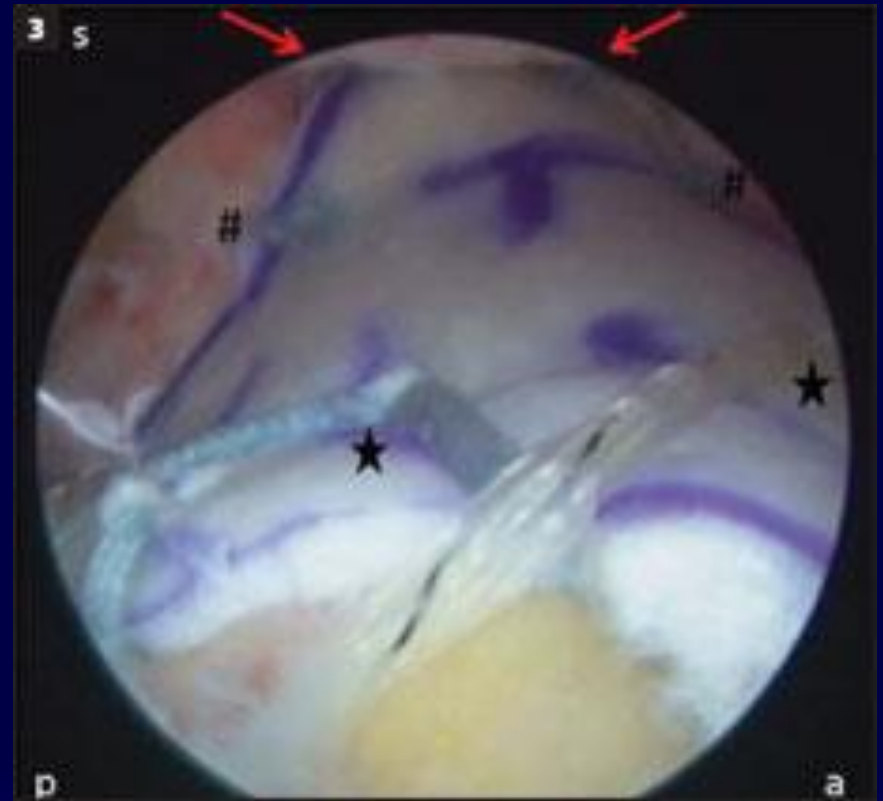
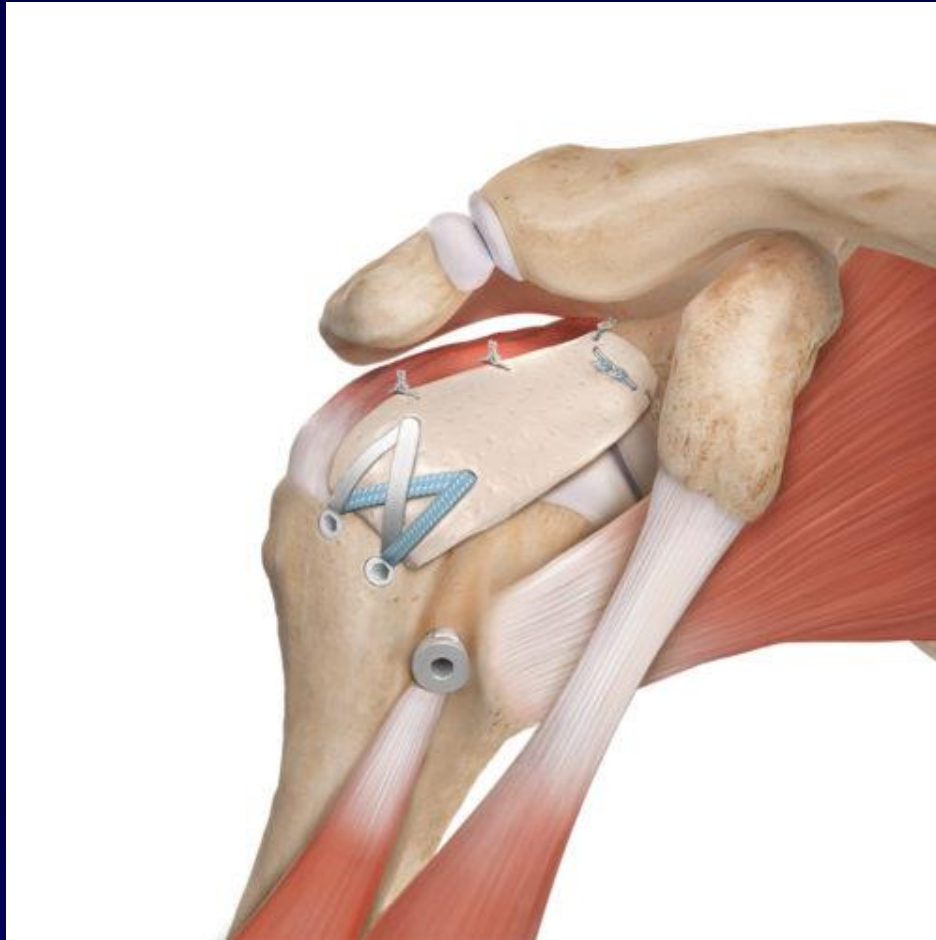
# Superior Capsular Reconstruction

- 10 Pts with complete SS/IS tears
- Tears > 5cm
- AFE <45 degrees
- Full PFE
- F/U at 1 year
- Avg AFE 159 degrees!
- Improved pain, AER, ASES scores

*Burkhart et al. Arthroscopy 2019*



# Superior Capsular Reconstruction



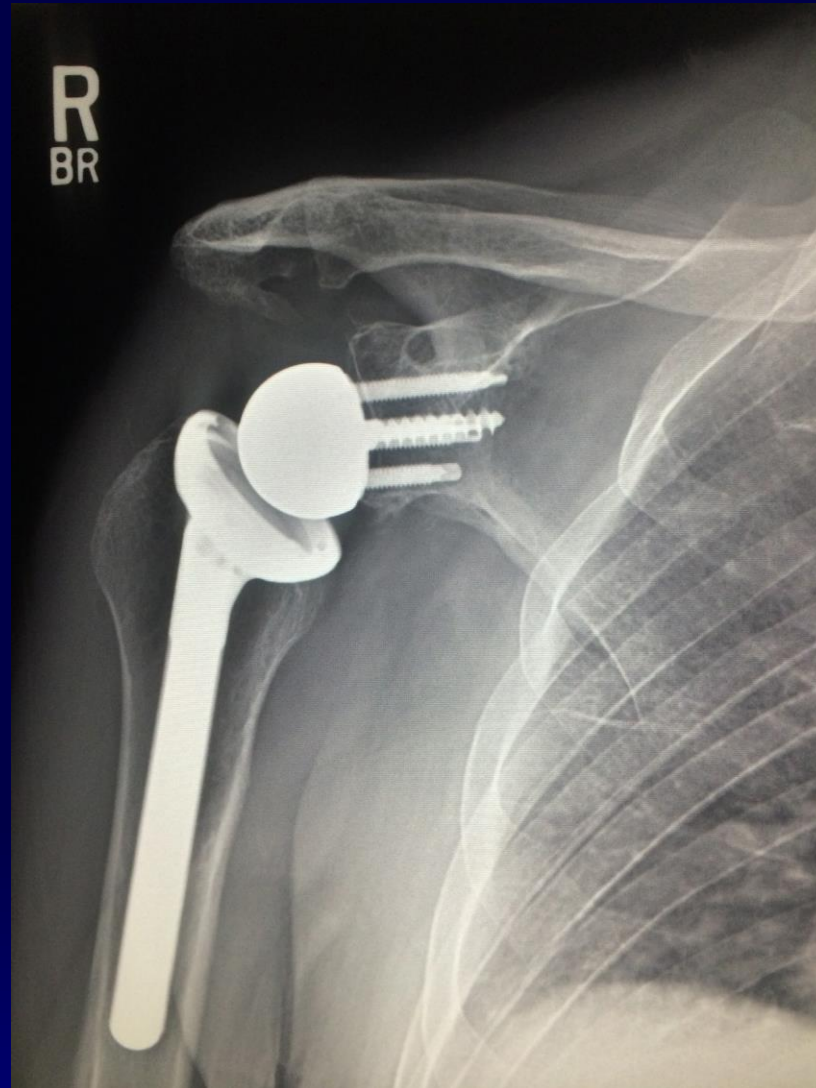
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# LIMITATIONS

UNTIL YOU SPREAD YOUR WINGS,  
YOU'LL HAVE NO IDEA HOW FAR YOU CAN WALK.

# Reverse Shoulder Arthroplasty





# Case #3

- 59yo LHD female golfer presents with 1 year h/o left shoulder pain
- Localized deep and radiates down the front of her upper arm
- Aggravated by driving golf balls
- Pain with lifting objects in front and over her head

# Case #3

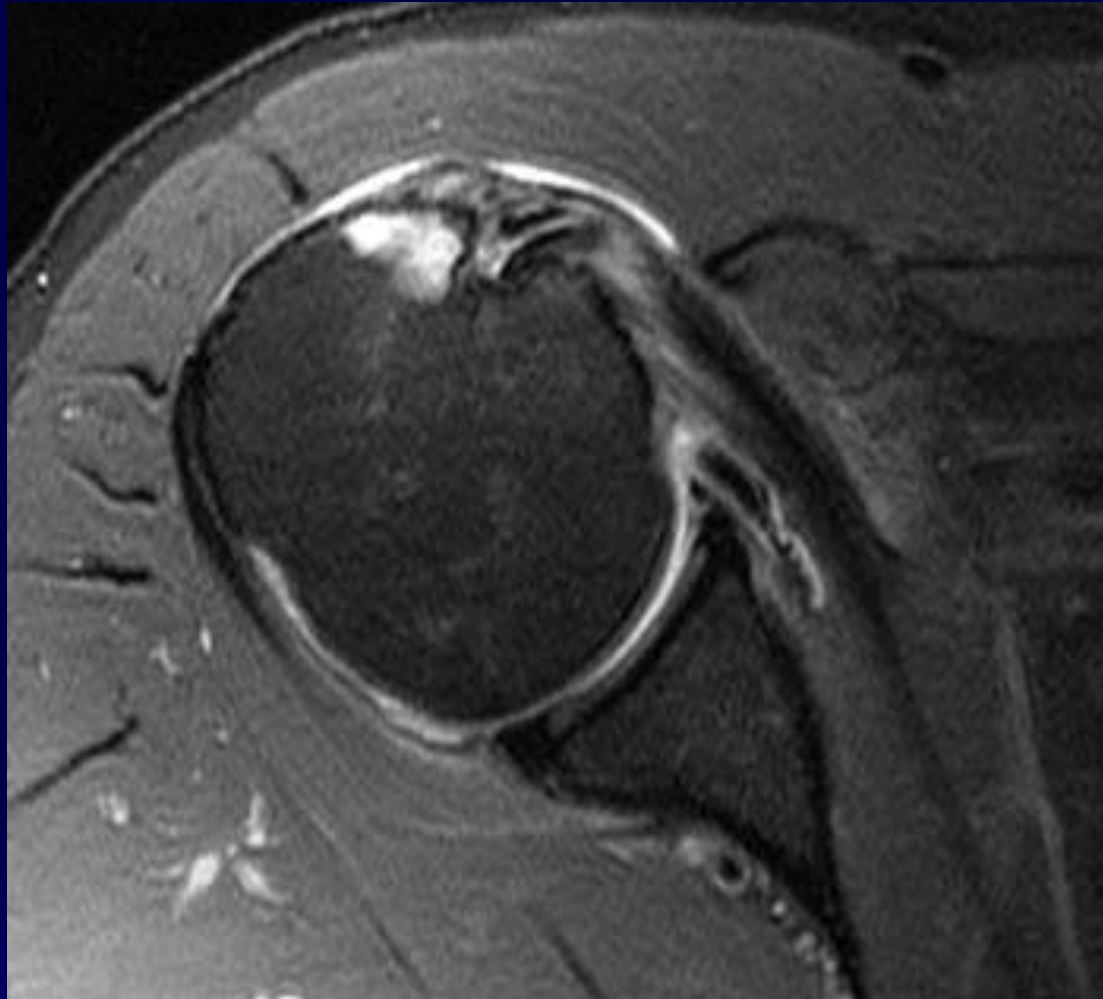
- Exam reveals a positive O'Brien's test and positive biceps load test
- No significant weakness
- Plain x-rays normal
- Any other studies?

# Case #3





# Case #3





# Case #3

- Diagnosis?

# SLAP Lesion/Biceps Tendinitis

- Commonly associated in Pts > 40
- Treatment options
  - ❖ SLAP repair
  - ❖ Biceps tenodesis
  - ❖ Biceps tenotomy

# SLAP Lesion/Biceps Tendinitis

- SLAP Repair
  - ❖ Can achieve good results
  - ❖ Higher complications-Stiffness!!!
  - ❖ Lower healing rates
  - ❖ Pain from associated biceps pathology
  - ❖ Cumulative evidence supports labral debridement and/or biceps tenotomy

*Abbot et al. Am J Sports Med 2009*

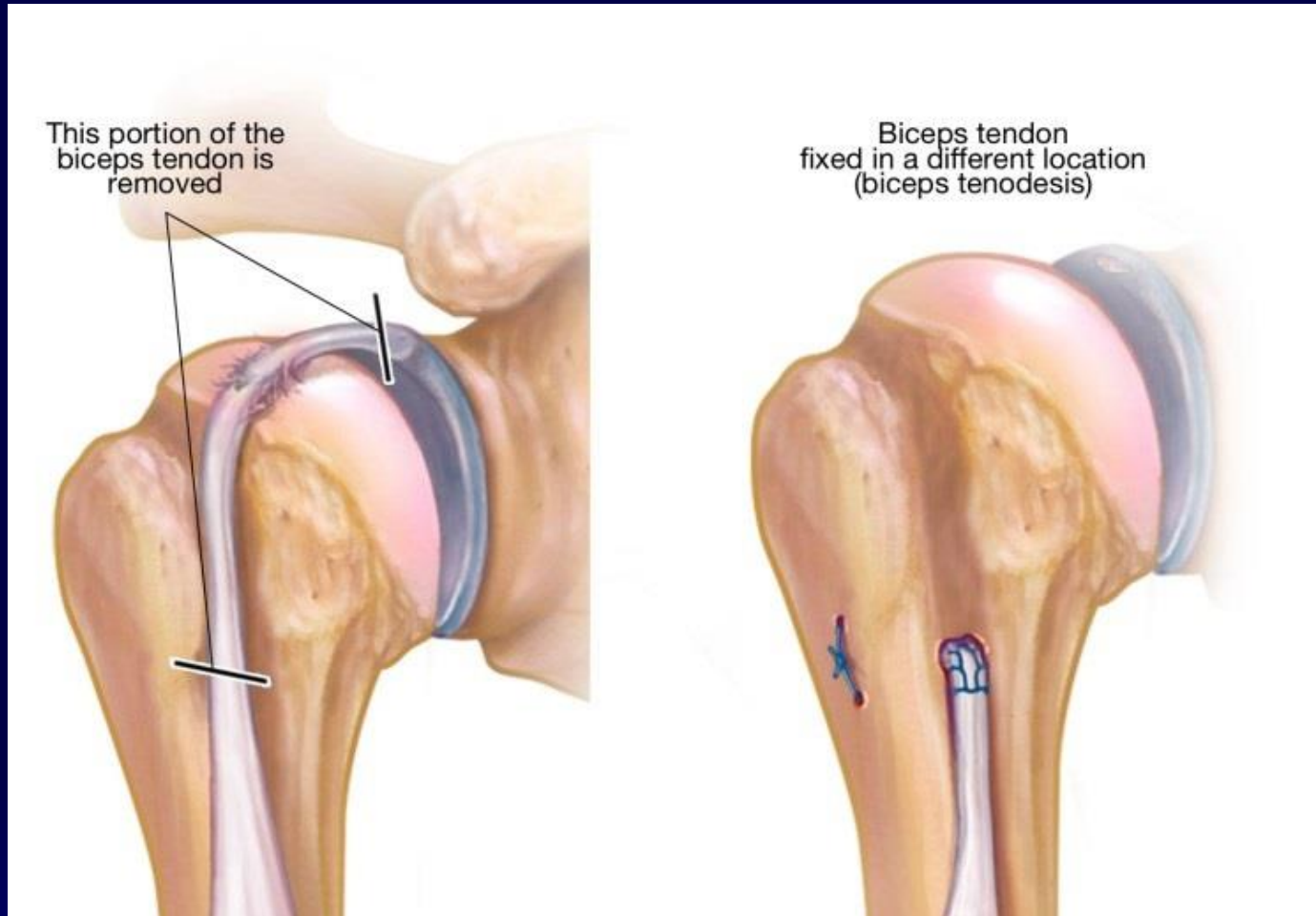
*Erickson et al. Am J Sports Med 2015*

# SLAP Lesion/Biceps Tendinitis

- Biceps Tenodesis
  - ❖ Detach long head of biceps from glenoid
  - ❖ Debride SLAP lesion
  - ❖ Reattach LHB to humerus
    - In bicipital groove
    - Subpectoral humerus

*Gottschalk et al. Am J Sports Med 2014*

# Biceps Tenodesis

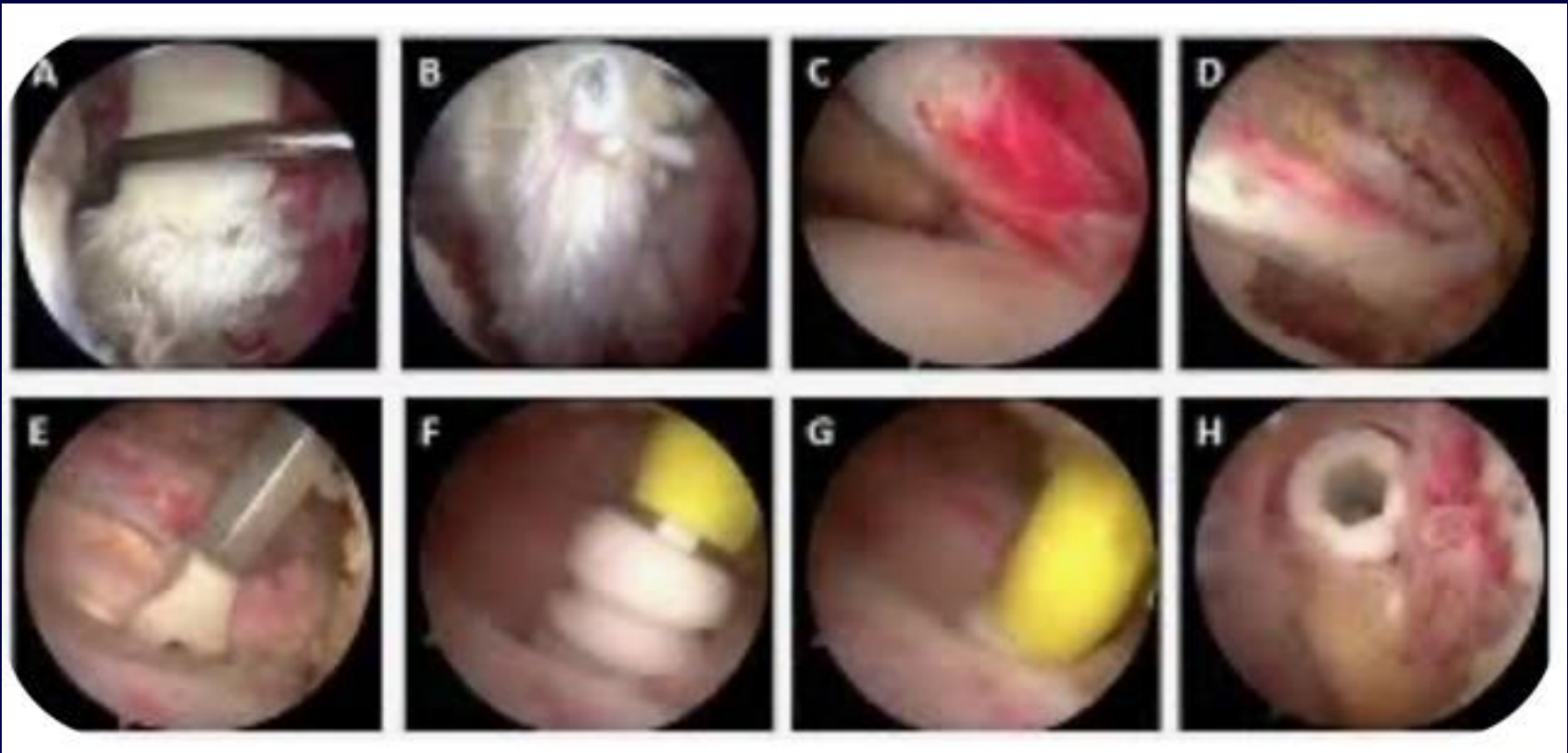


# Biceps Tenodesis

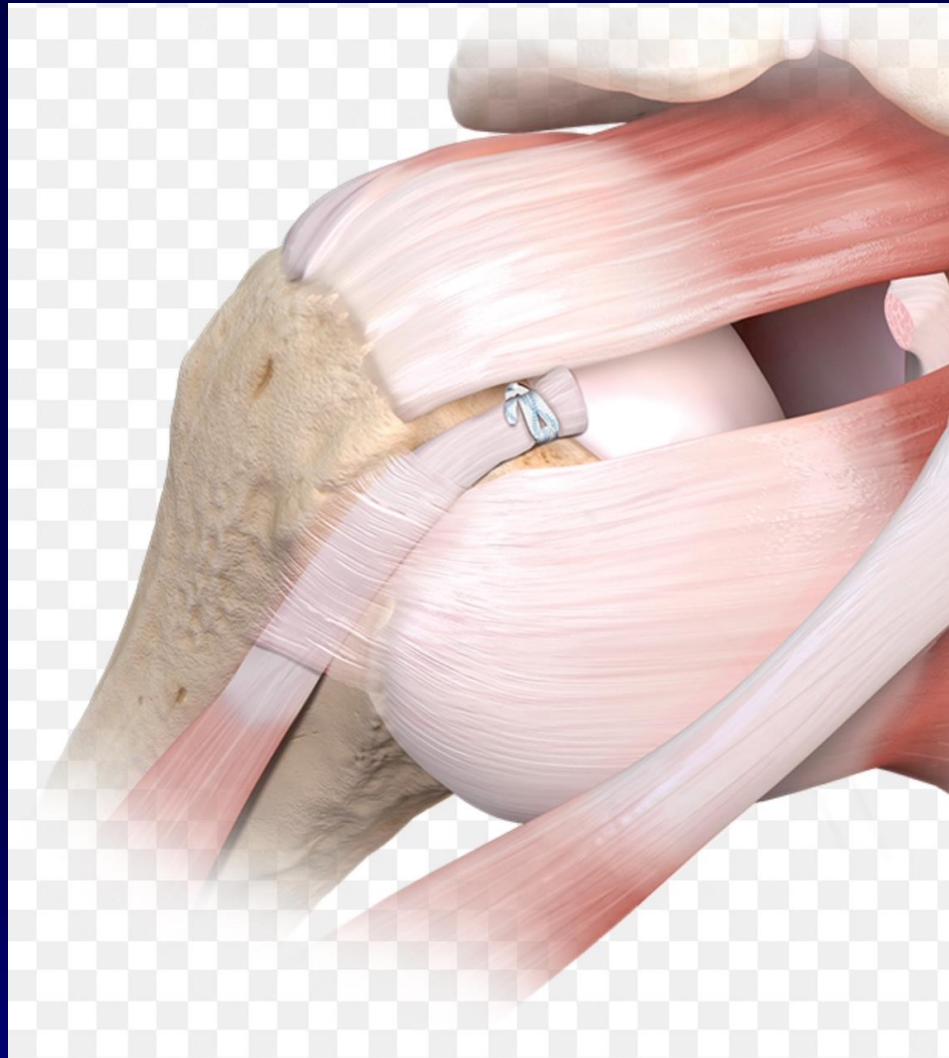
- Time consuming
- Additional incision
- Additional implant
- Complications
- Is it really necessary?



# Arthroscopic Supraperectoral Biceps Tenodesis



# Arthroscopic Supraperectoral Biceps Tenodesis





# Biceps Tenodesis

All-arthroscopic suprapectoral vs. open subpectoral tenodesis

- ❖ 49 Pts
- ❖ No interference screws
- ❖ Average F/U 4.5 years post-op
- ❖ No SSD between groups in VAS, ASES scores, and satisfaction rates

*Green et al. Arthroscopy 33(1): 2017*

# Biceps Tenotomy

- Faster
- No extra costs
- Minimal weakness
  - ❖ 20% supination loss
  - ❖ 8-20% flexion loss
- Popeye deformity
- “Biceps Killers”



*Boileau et al. J Bone Joint Surg 2007*

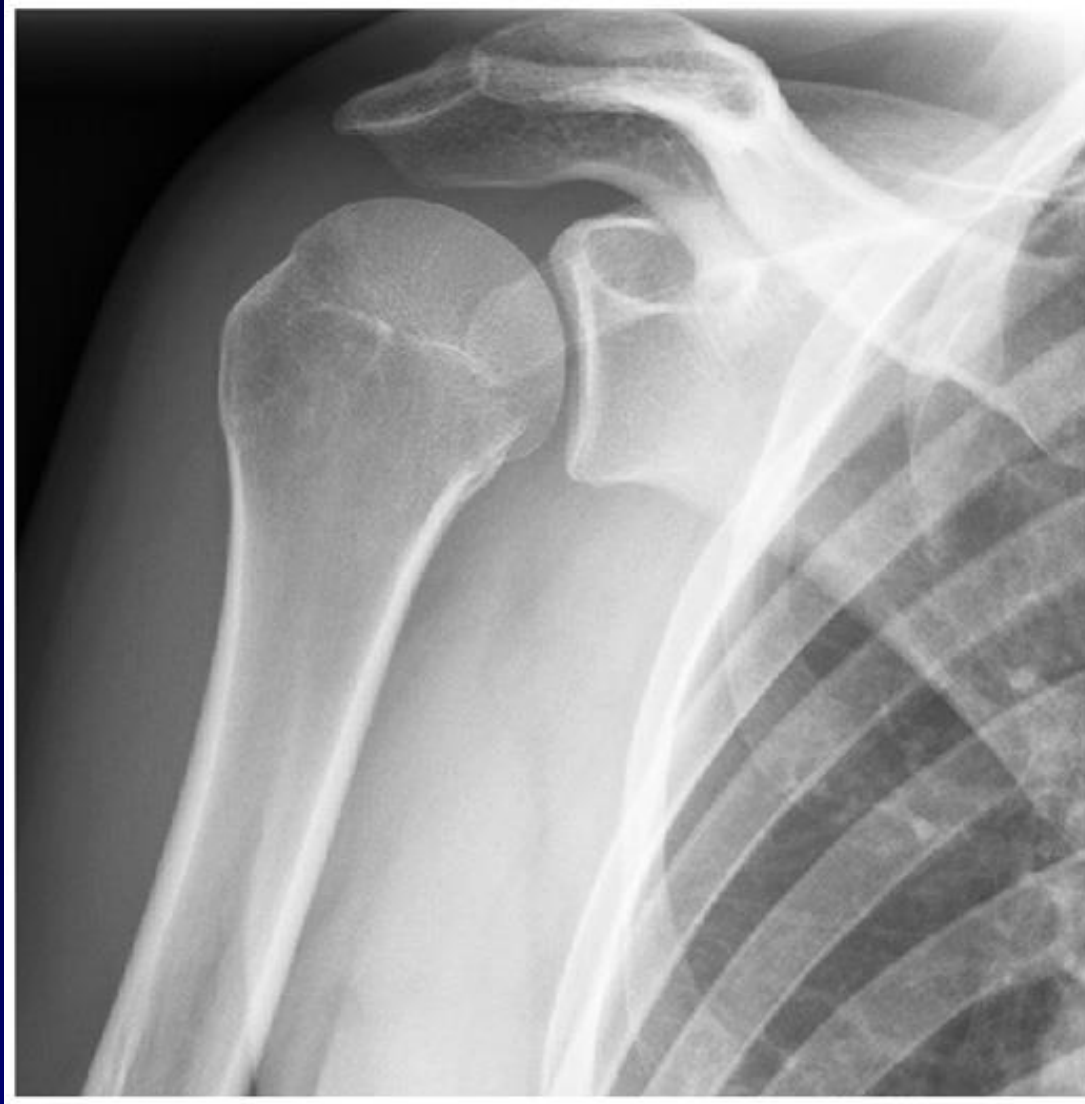
# Case #4

- 65yo RHD retired female presents with 6 month h/o right shoulder pain
- Gradual worsening after a fall on right side
- Associated stiffness
- Pain at end of day not as bad as 3 mo. ago
- Difficulty dressing herself

# Case #4

- Physical Exam
  - ❖ AROM: FE 100, ER 30, AER 45, AIR 30
  - ❖ PROM nearly the same
  - ❖ Pain primarily at end points
  - ❖ Positive O'Briens
  - ❖ No instability
  - ❖ Motor and sensory exams normal

# Case #4



# Case #4

- Any other studies?
- Diagnosis?

# Adhesive Capsulitis

- Common cause of pain and stiffness
- Posttraumatic
- Diabetic
- Stroke Pts
- Idiopathic
- Pain, stiffness, resolution phases
- Self limiting

# Adhesive Capsulitis

- Conservative Management
  - ❖ Physical Therapy
  - ❖ NSAIDs vs. steroids
  - ❖ Cortisone injection
- Operative Management
  - ❖ Manipulation under anesthesia
  - ❖ Arthroscopic capsular release
  - ❖ Address associated pathology



# Case #5

- 67yo RHD retired male presents with 6-8 month h/o right shoulder pain
- Localized deep and has associated stiffness as well as grinding sensation
- Pain at end of day, after yard work
- Difficulty sleeping

# Case #5

- Physical Exam
  - ❖ AROM: FE 140, ER 30, AER 60, AIR 45
  - ❖ Moderate crepitance
  - ❖ Slight cogwheeling
  - ❖ No instability
  - ❖ Motor exam normal

# Case #5



# Glenohumeral Arthritis

- Conservative Management
- Surgical Options

# Conservative Management

- NSAIDs
- Physical therapy
- Cortisone injections
- Activity modification

# Case #6



A chance to cut is a chance to cure.  
The only way to heal is...

A chance to cut is a chance to cure.  
The only way to heal is...  
Surgical steel!



# Surgical Options

- Arthroscopic debridement
- Meniscal Allograft
- Hemiarthroplasty
- “Ream and Run”
- Total Shoulder Arthroplasty

# Arthroscopy

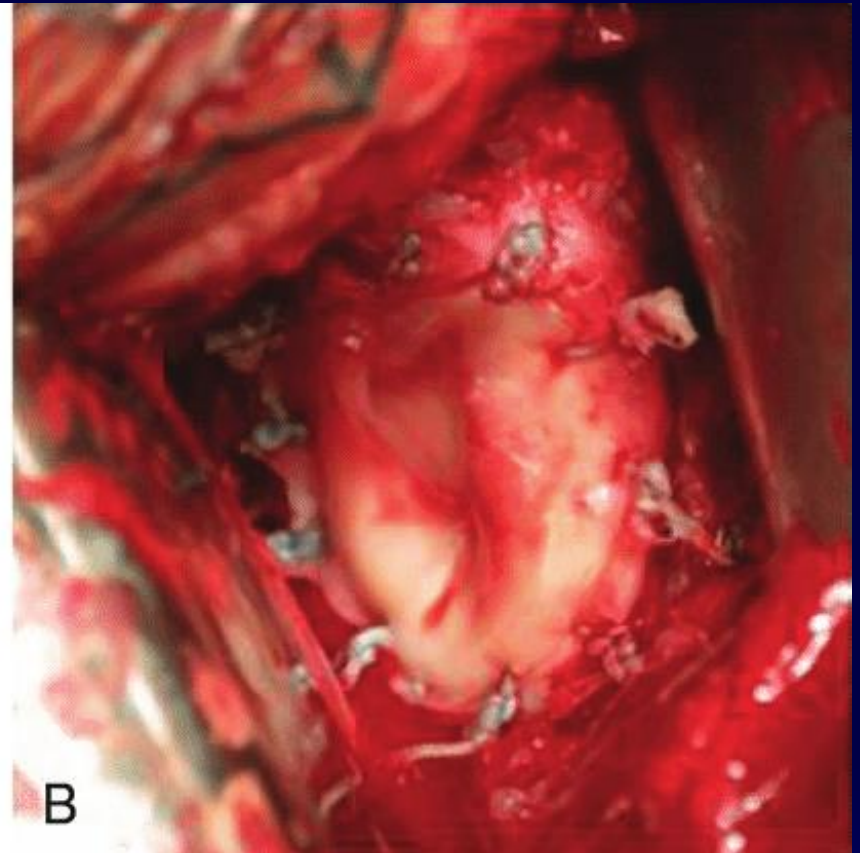
- Limited role in advanced DJD
- Loose body removal
- Rotator cuff tears
- Debridement of osteophytes
- Short term relief
- Recurrent pain

# Meniscal Allograft

- Technically challenging
- Less invasive than arthroplasty
- Partial pain relief
- Does not address humeral side unless combined with hemiarthroplasty

*Ball et al. Tech Shoulder Elbow Surg, 2001.*

# Meniscal Allograft

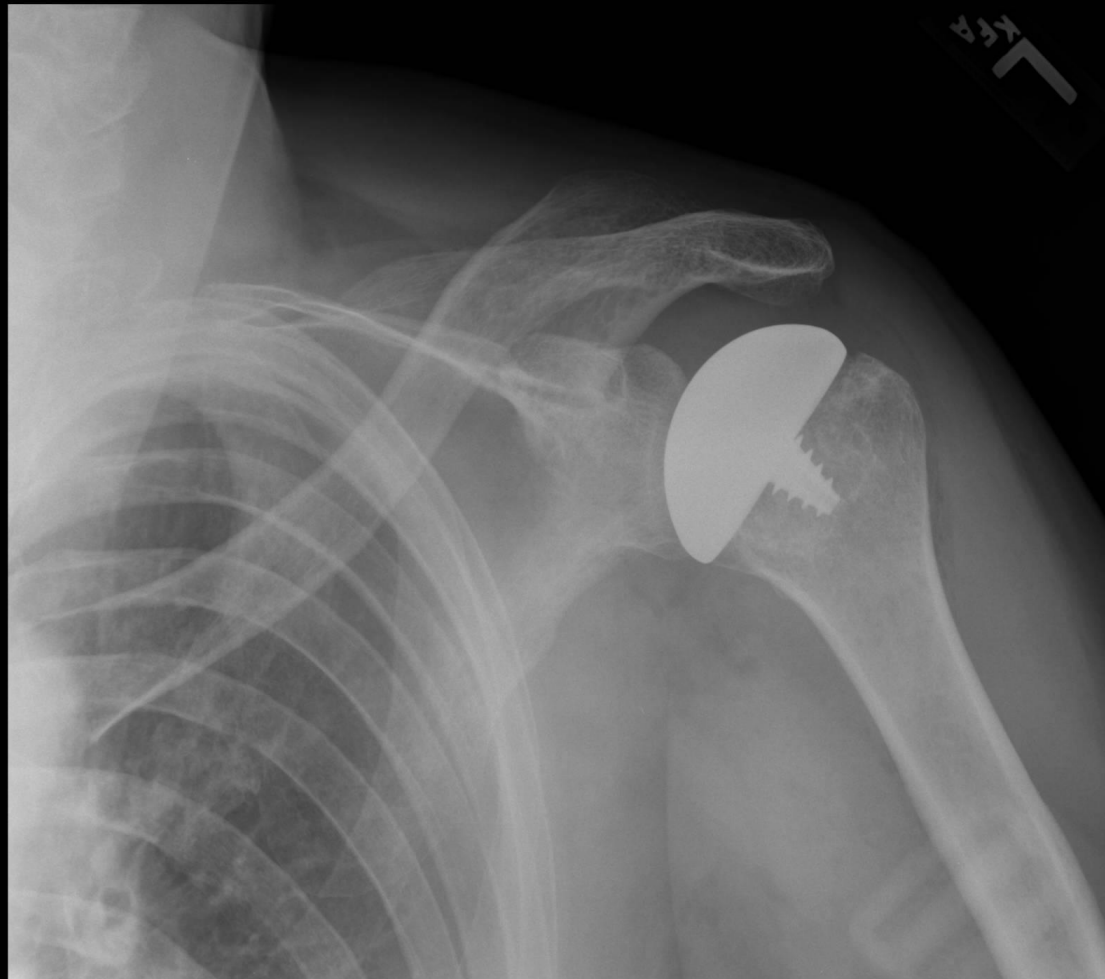


# Hemiarthroplasty

- Resurface humeral side
- Easier, less invasive than TSA
- Lower complication rate
- Doesn't address glenoid side
- Higher reoperation rate vs. TSA

*Aldinger et al. Int Orthop, 2010.*

# Hemiarthroplasty

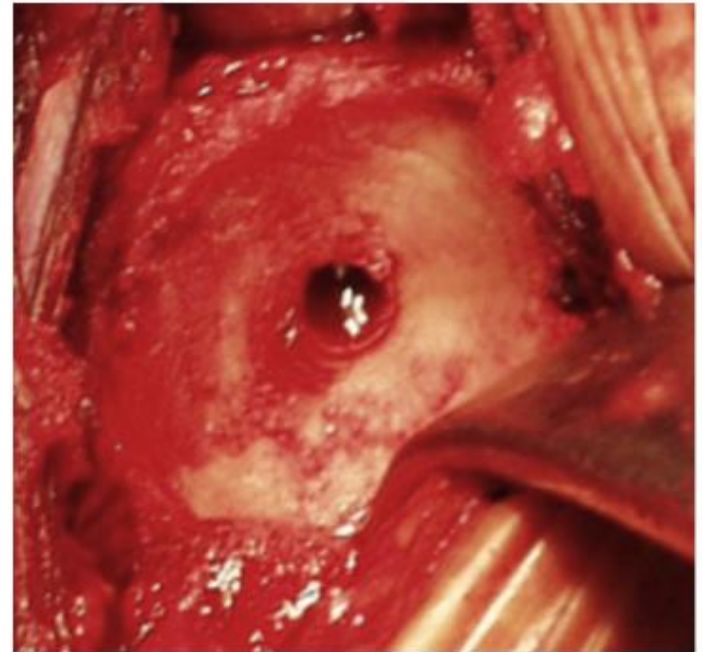
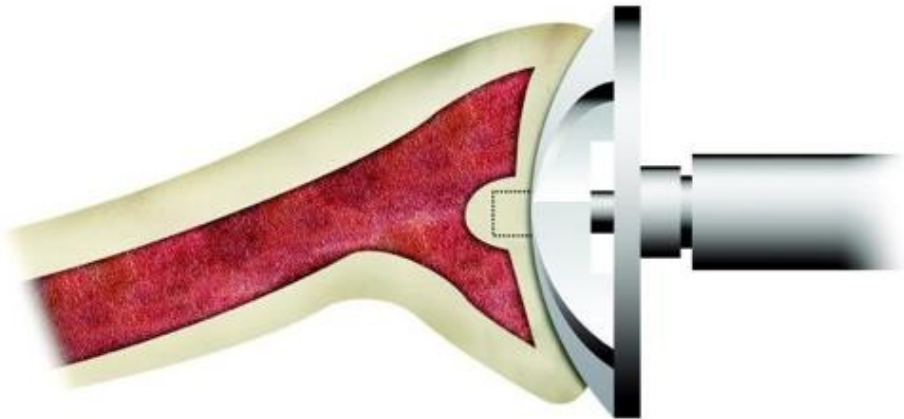


# Ream and Run

- Hemiarthroplasty
- Ream glenoid to remove cartilage, spurs
- Creates smooth concavity
- Option for higher demand Pts

*Matsen et al. Int Orthop, 2019*

# Ream and Run

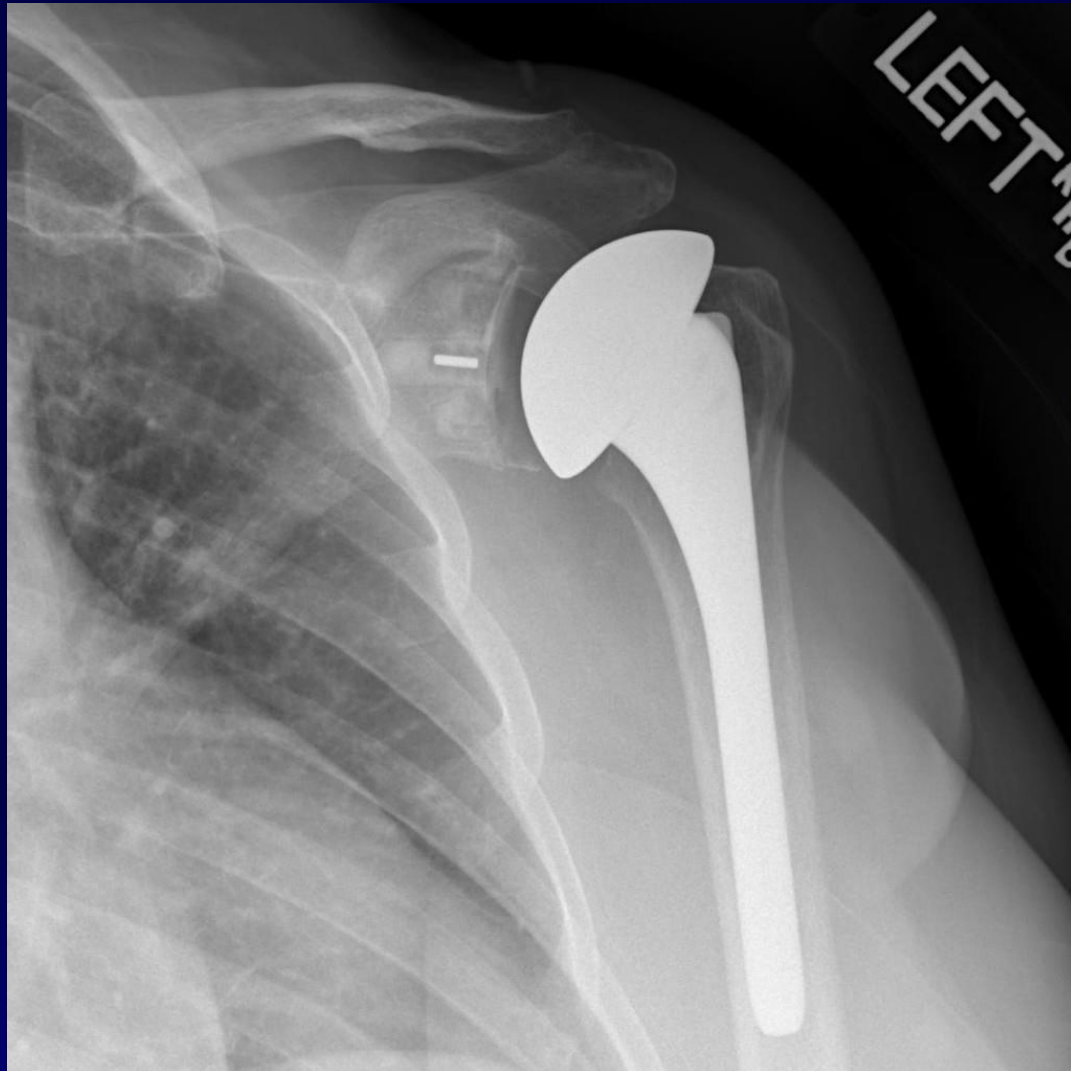




# Total Shoulder Arthroplasty

- Remains gold standard for advanced DJD
- Best pain relief
- Glenoid loosening concerns

# Total Shoulder Arthroplasty



Questions?



**Thank You!**

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