

Shoulder Impingement

Matthew Murray, M.D.

Orthopaedic Sports Medicine &

Arthroscopy

Ortho San Antonio

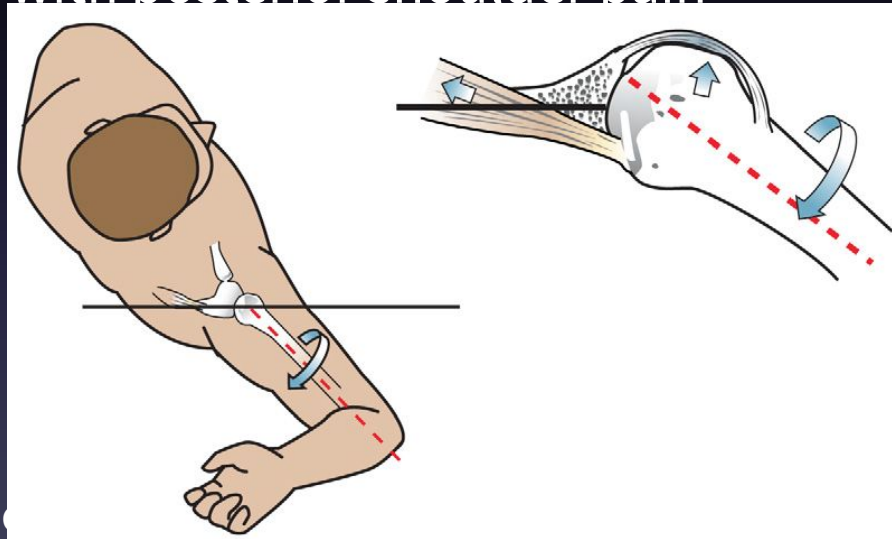


Shoulder Impingement

- Internal vs external impingement

Internal Impingement

- Affects overhead throwing athletes
 - Younger demographic than subacromial impingement
- Patients typically present with posterior shoulder pain



- Pathology
 - In maximum ER and Abdu
 - Posterosuperior labrum contacts articular cuff

Internal Impingement

- Recurrent microtrauma
 - Shoulder girdle muscle fatigue
 - Scapular dyskinesis
 - Over-throwing
- High association with GIRD
- Leads to SLAP & articular-sided cuff tears

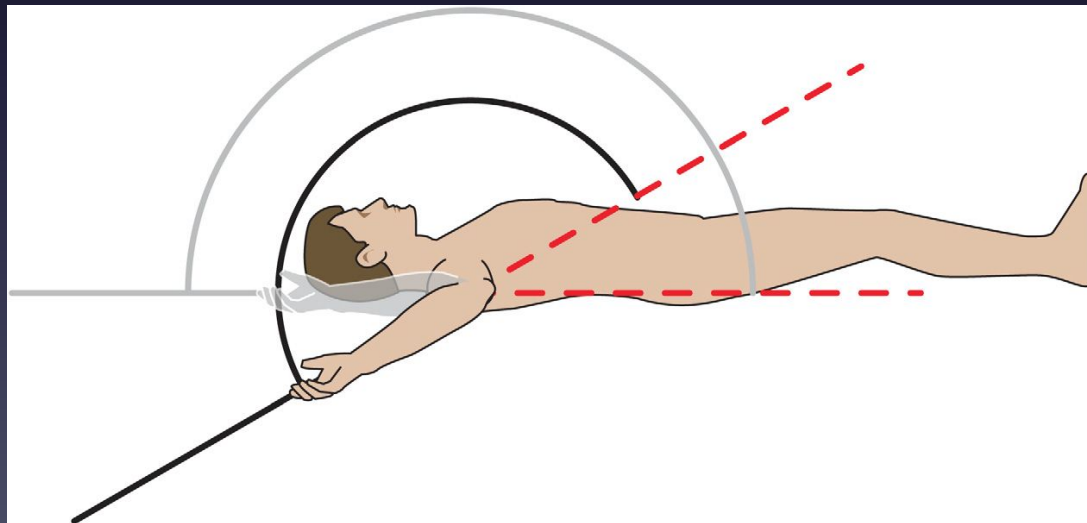


GIRD

- **Glenohumeral Internal Rotation Deficit**
 - 180 deg normal arc of motion
 - Shifted posteriorly in throwing arm
 - Due to osseous and soft tissue adaptations
 - More external rotation/Less internal rotation

GIRD

- Increased external rotation
 - Puts posterosuperior labrum and articular rotator cuff at risk for injury



Shoulder Impingement

- Subacromial Impingement Syndrome (SAIS)
 - Classic impingement
 - 50% of all shoulder pain complaints
 - Older population 30's □ 50's



Anatomy

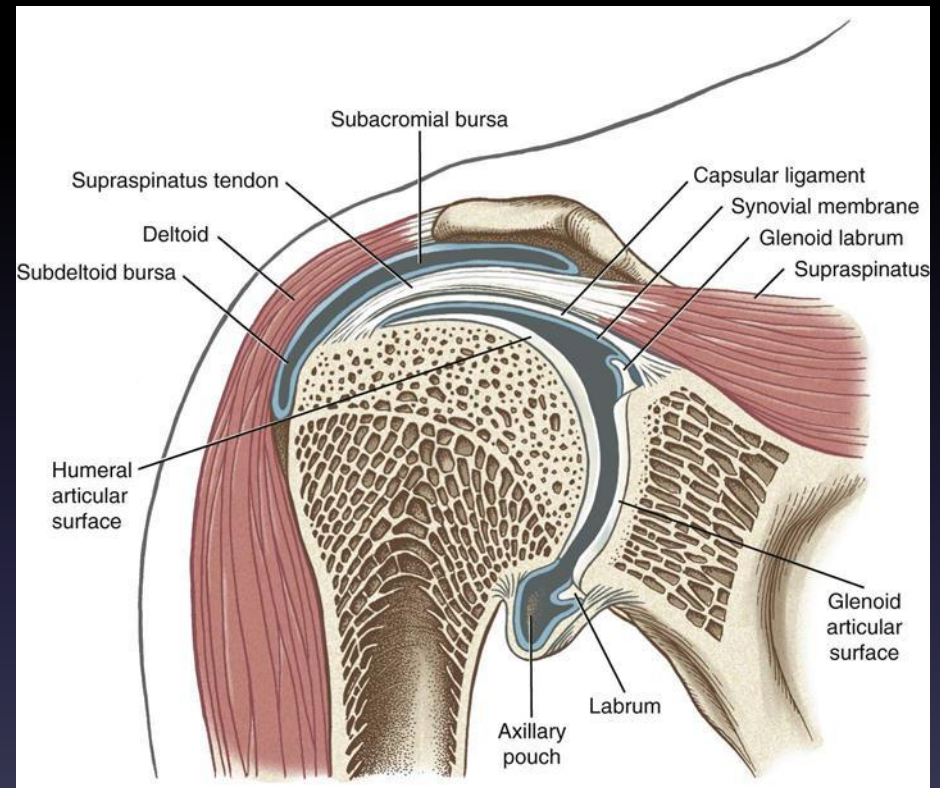
- Subacromial Space

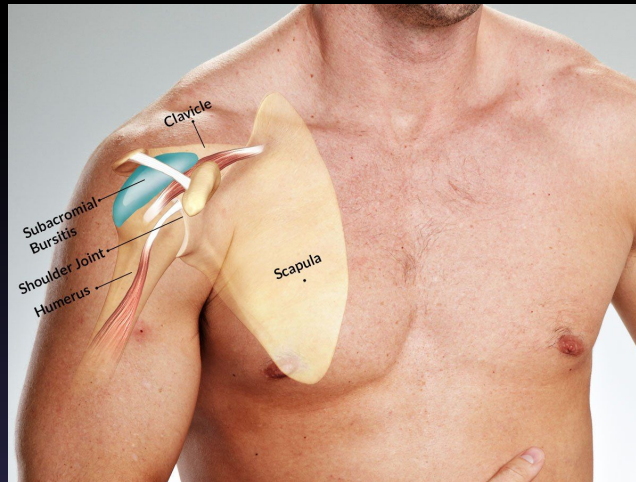
- Inferior

- Humeral head
- Rotator Cuff

- Superior

- Acromion
- CA Ligament
- AC Joint



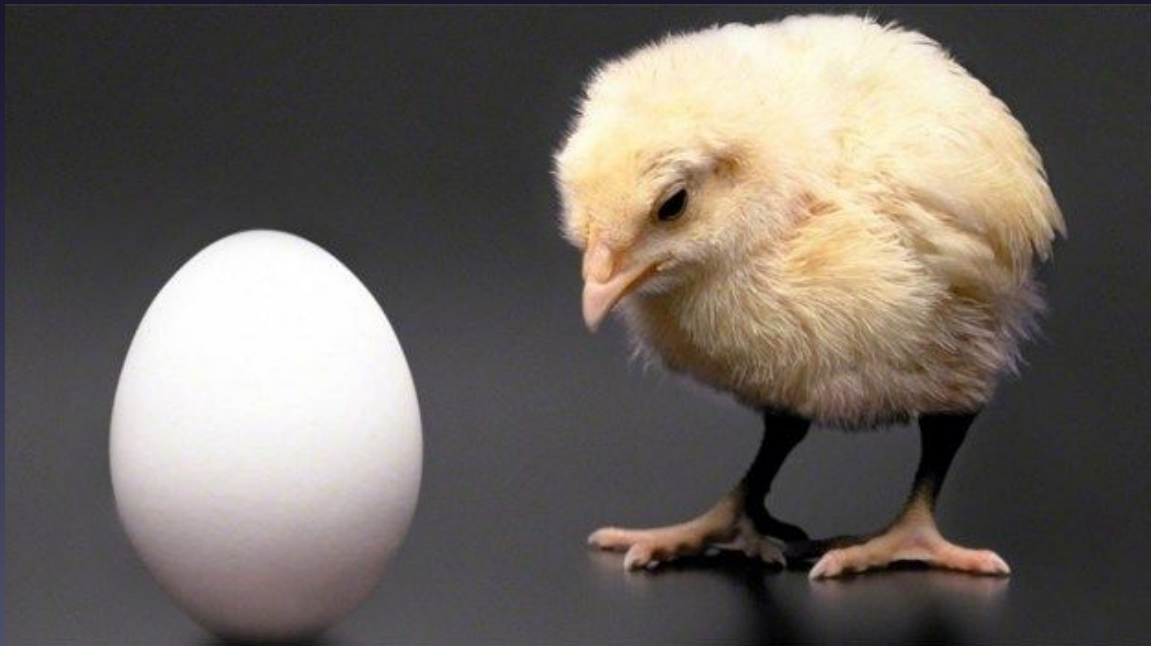


- SAS – 1.0-1.5cm

- Space decreases with abduction/ER

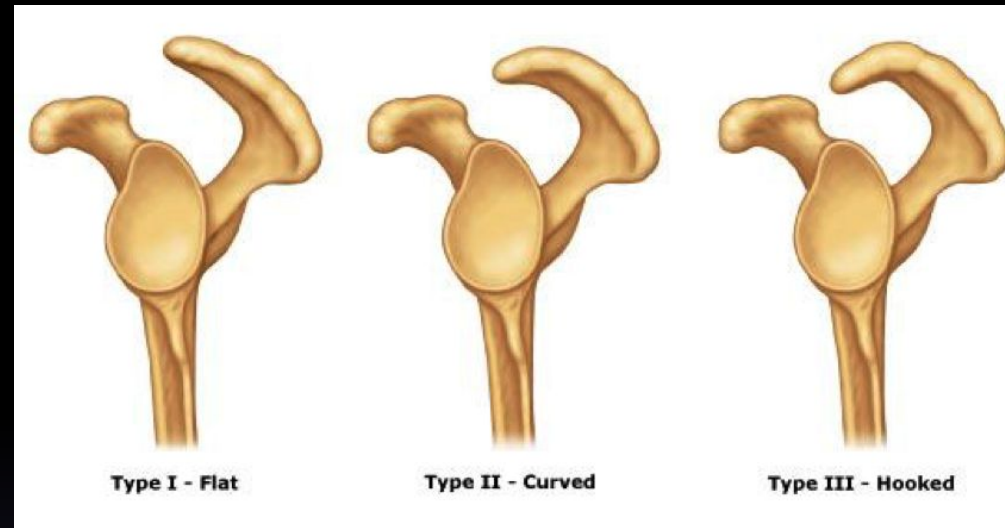
Pathology

- What causes subacromial impingement?
 - Theory is changing



Pathology

- Extrinsic Compression Theory
 - SAIS causes rotator cuff damage
 - Prevailing theory for years
 - Neer defined Impingement
 - Focus on anterior acromion and CAL
 - » I – acute bursitis
 - » II – RC tendinopathy
 - » III – partial or full thickness RCT
 - Bigliani defined acromial morphology
 - Type I, II, III acromion



Pathology

- Intrinsic Theory

- Rotator cuff degeneration causes SAIS

- Diminished blood supply, hypovascular zone on supraspinatus tendon
 - Aging
 - Tensile forces



Pathology



– Why the new hypothesis?

- Incidence and severity of cuff tears increases with age
- Acromial degeneration does not increase with age
- SAS degenerative changes identified in 86% of shoulders with articular sided cuff tears
- No difference in clinical outcomes after rotator cuff repair with or without acromioplasty

Pathology

- Intrinsic Degeneration

- Acromion does play a role
- “Surgical findings observed in the SAS during shoulder arthroscopy are hard to be explained if not for contact between the rotator cuff and acromion”



Pathology

- Intrinsic Degeneration

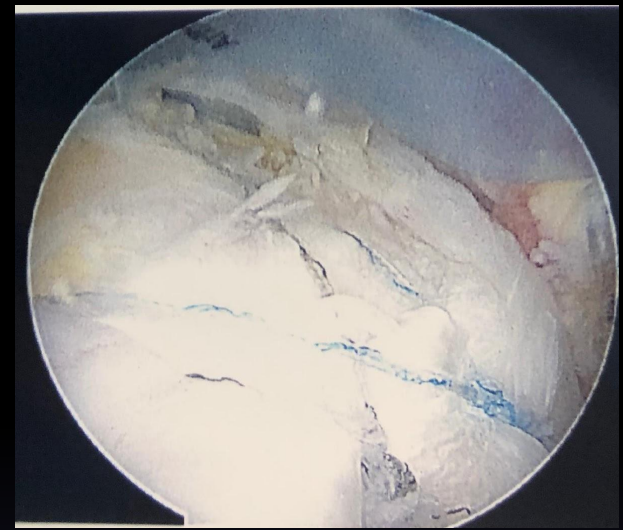
- But the inciting factor is Supraspinatus weakness/damage

- » Humeral head migration

- » SAS narrowing

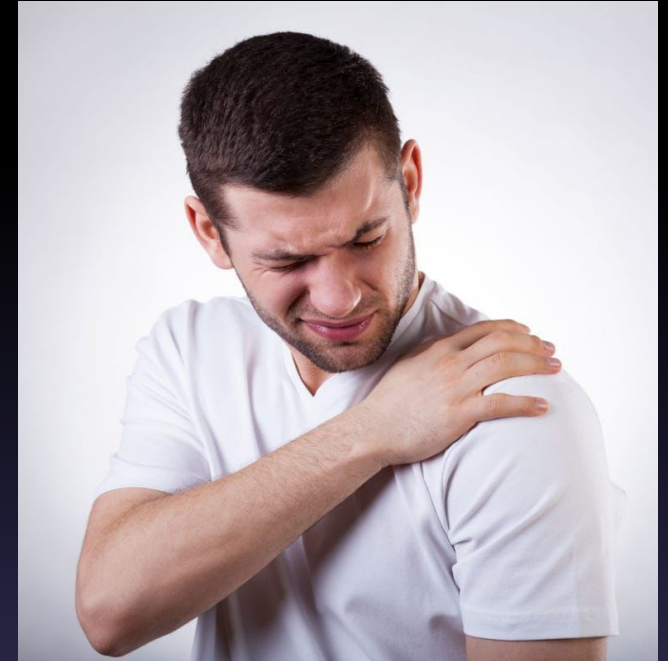
- Osteophytic spurring
- Tuberosity erosion/cystic changes
- Bursitis, subacromial

- “Rotator cuff failure occurs by eccentric tension overload rather than impingement from aberrant acromial morphology”
- Recent push to change name to “**anterolateral shoulder pain**”



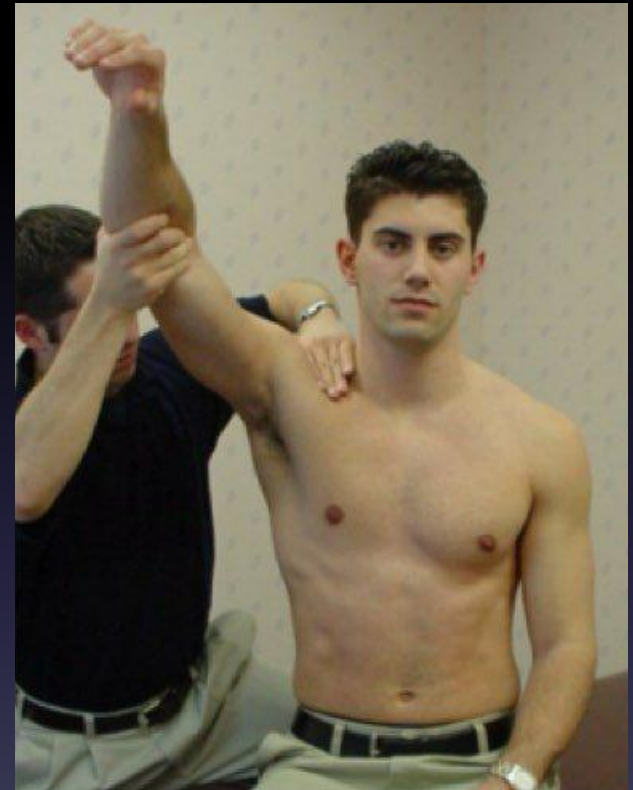
Diagnosis

- History
 - No injury or trauma
 - Referred anterolateral pain
 - Pain with:
 - Flexion beyond 90 deg
 - Behind the back movements
 - Sleeping



Diagnosis

- Physical Exam
 - Palpation
 - Subacromial space
 - AC joint
 - Biceps
 - ROM
 - Cuff strength testing
 - Provactive tests
 - Neer and Hawkin's Tests
 - Both sensitive, but no specific



Diagnosis

- Physical Exam
 - Hawkins Impingement Test



Imaging

- Radiographs
 - AP, true AP, axillary lateral, outlet view
 - Outlet – acromial morphology
 - Axillary – os acromiale
 - Impingement findings
 - AC arthritis with inferior osteophytes
 - Acromial enthesophytes/sclerlosis
 - Cystic changes on humeral head



Imaging

- MRI
 - Rule out concomitant pathology
 - Impingement findings
 - Ossification of CA ligament
 - Subacromial spurring
 - Subacromial/subdeltoid bursitis



Management

- Nonsurgical
 - 70-90% Successful
 - Physical Therapy
 - Injections

Rehabilitation

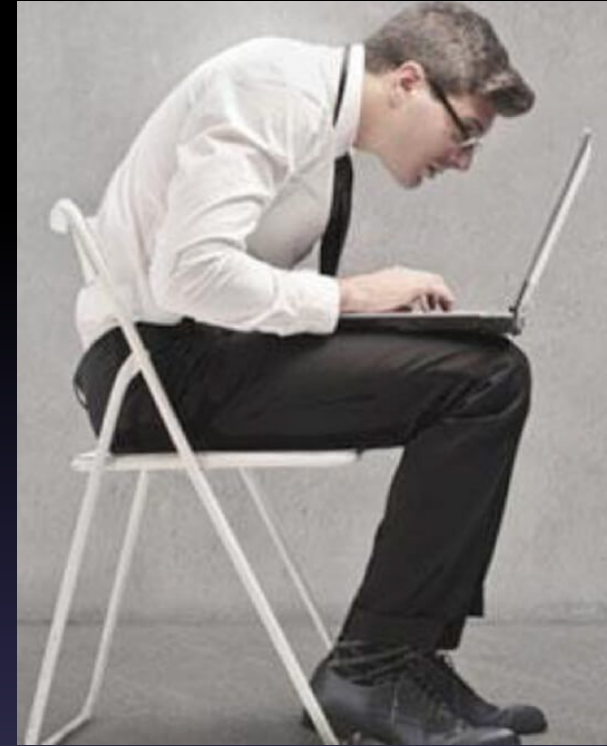
- Primary dysfunction

- Periscapular weakness

- Late activation of lower trapezius and serratus anterior
 - Early recruitment of upper traps
 - Makes scapula protract at rest

- » Decreased ER and upward rotation during abduction/ER movements

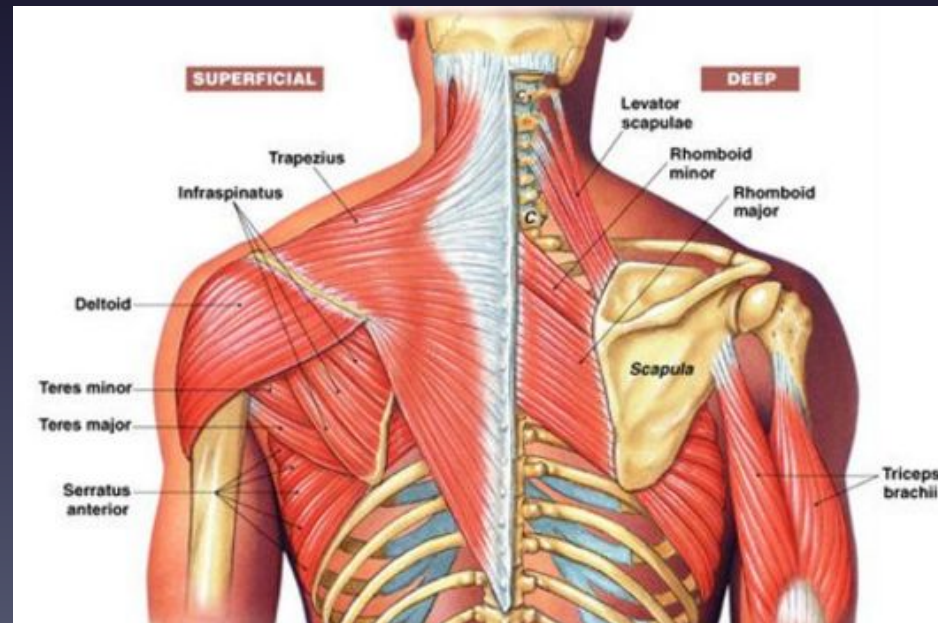
- Migration of humeral head
 - Compression of subacromial space



Rehabilitation

– Shoulder impingement syndrome

- Overall increased activity of upper trapezius
- Decreased activity of lower trapezius and serratus anterior



Rehabilitation

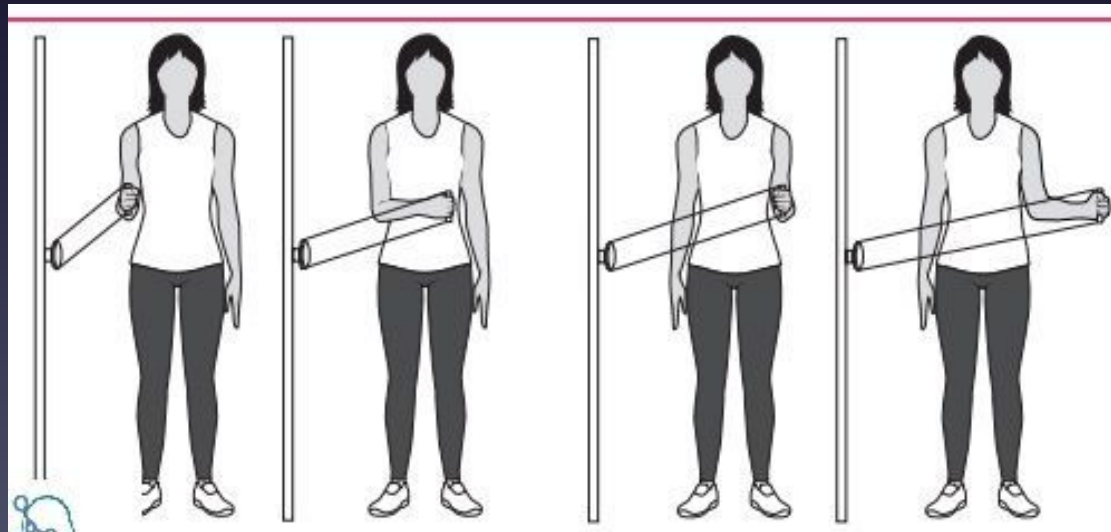
- Focus on lower trapezius and serratus anterior
 - Scapular retraction
 - Decompress subacromial space
 - Prone trap raise, lower trap liftoff, prone lift off



Rehabilitation

- Intrinsic Theory

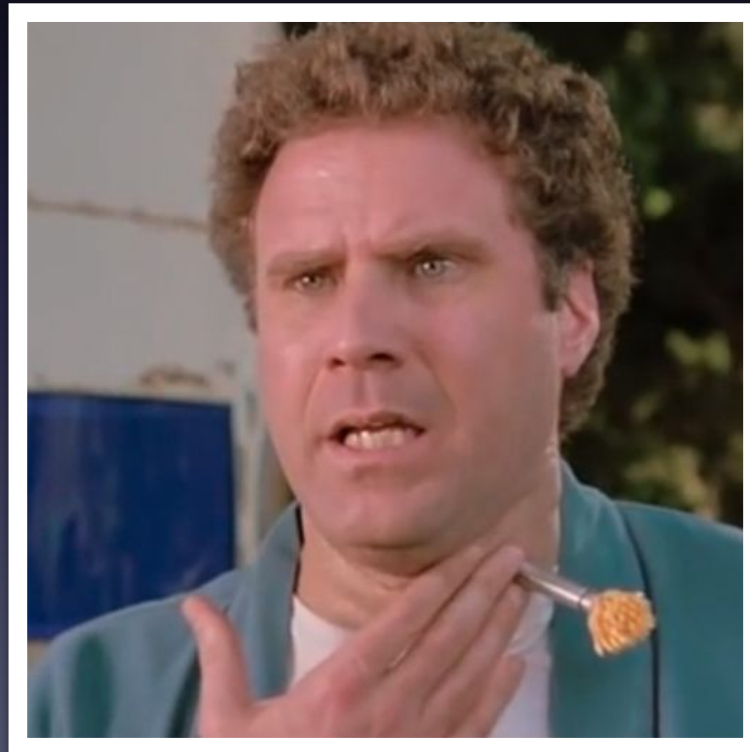
- Poor vascularity of supraspinatus – insertional rotator cuff damage
- SO – don't neglect rotator cuff rehabilitation



Management

– Injections

- 70% accurate whether anterior, anterolateral, or posterior
- No correlation with clinical improvement

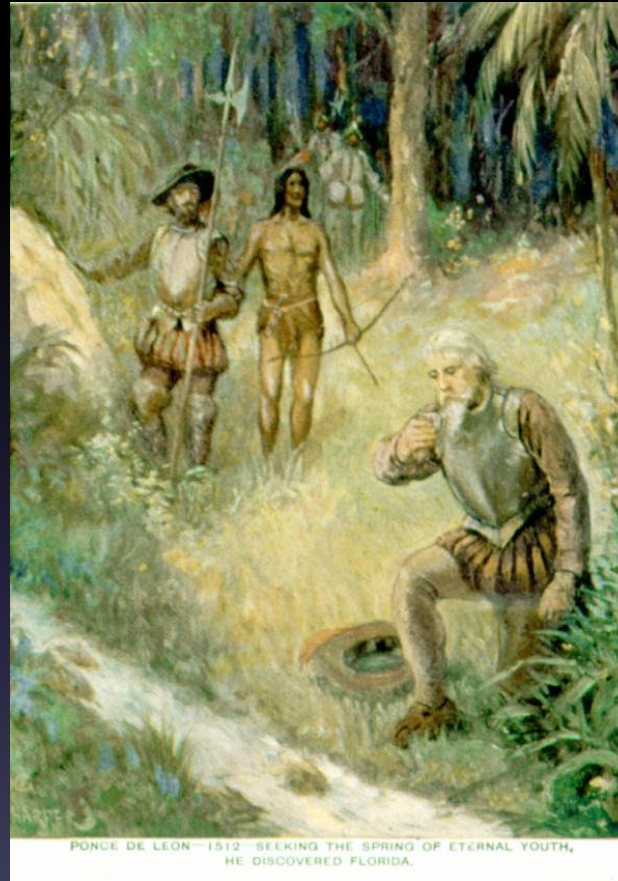


Management

- Injections
 - Corticosteroids are effective at improving pain and function
 - Therapeutic and diagnostic
 - Clinically equivalent results with blind vs ultrasound guided (Cole, AJSM 2015)

Injections

- PRP, stem cells???



PONCE DE LEON—1512—SEEKING THE SPRING OF ETERNAL YOUTH, HE DISCOVERED FLORIDA.

- High level evidence regarding biologics remains limited

Injections

- But there are a few RCTs
 - PRP no more effective than placebo in patients with rotator cuff tendinopathy (Kesikburun AJSM 2013)
 - Adding PRP with acromioplasty shows no long-term benefit over performing acromioplasty alone (Carr et al AJSM 2015)
 - PRP injections reduce pain in SAIS but exercise therapy alone is more effective (Nejati OJSM 2017)

Injections

- PRP works for cuff tears , right???
- Will help for intrinsic degeneration
- Schwitzguebel AJSM 2019
- Level I PRCT
- PRP for interstitial Supraspinatus tears
- No improvement in healing or clinical outcome scores compared to placebo
- So the answer is NO

Management

- Surgical
 - Must exclude underlying pathology
 - AC Arthritis/Osteolysis
 - SLAP/Biceps tearing
 - Rotator Cuff tearing
 - Adhesive Capsulitis



Management

- Surgical
 - Open acromioplasty and bursectomy – Neer



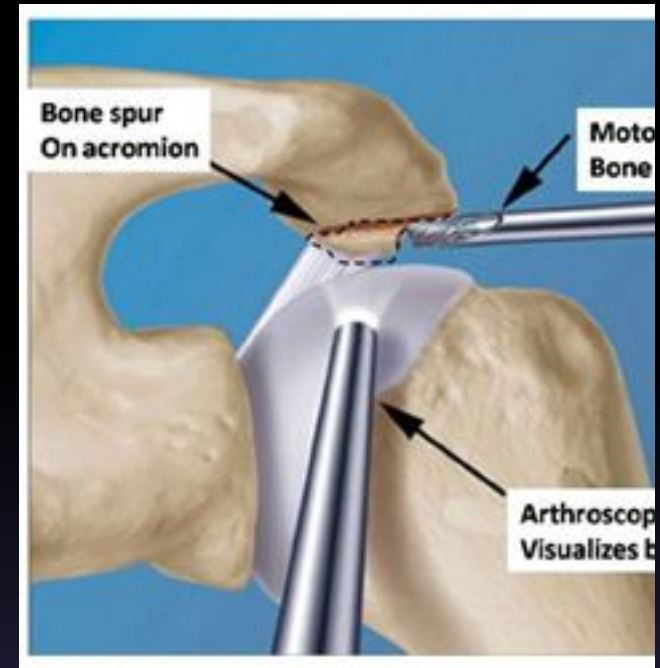
Surgery

- Arthroscopic technique



Surgery

- “Subacromial Decompression”
 - Traditional
 - Debridement of subacromial bursa
 - Resection of CA ligament
 - Resection of anterolateral edge of acromion
 - Resection of underhanging osteophytes from AC joint
 - Bursectomy alone?
 - Bursectomy + Acromioplasty
 - Is acromioplasty necessary with Rotator cuff repair?



Surgery

- Does Subacromial decompression really work?
 - Studies show no sig difference between bursectomy alone versus SAD
 - Studies show no sig difference between diagnostic arthroscopy versus SAD
 - Supports Intrinsic Theory
 - Pathology originates from rotator cuff itself
 - Not caused from contact between acromion and cuff
 - Abrams et al 2014 AJSM
 - No difference in clinical outcomes after rotator cuff repair with or without acromioplasty
 - No association between outcome scores and acromion morphology

Surgery

- Multiple RCTs
 - SAD shows no superiority to physiotherapy alone
 - Henkus et al 2009
 - No difference between SAD and bursectomy alone
 - Placebo effect
 - Ketola et al 2017
 - SAD + supervised exercises vs supervised excises alone
 - No difference at 10 years
 - Farfaras et al 2018 ajsm
 - Better clinical results for surgical group (open or arthroscopic) than therapy group at 10 years
 - Protective effect of SAD – fewer rotator cuff tears at long term follow-up (not significant result)
 - So, SAD is not all Bad!!!!

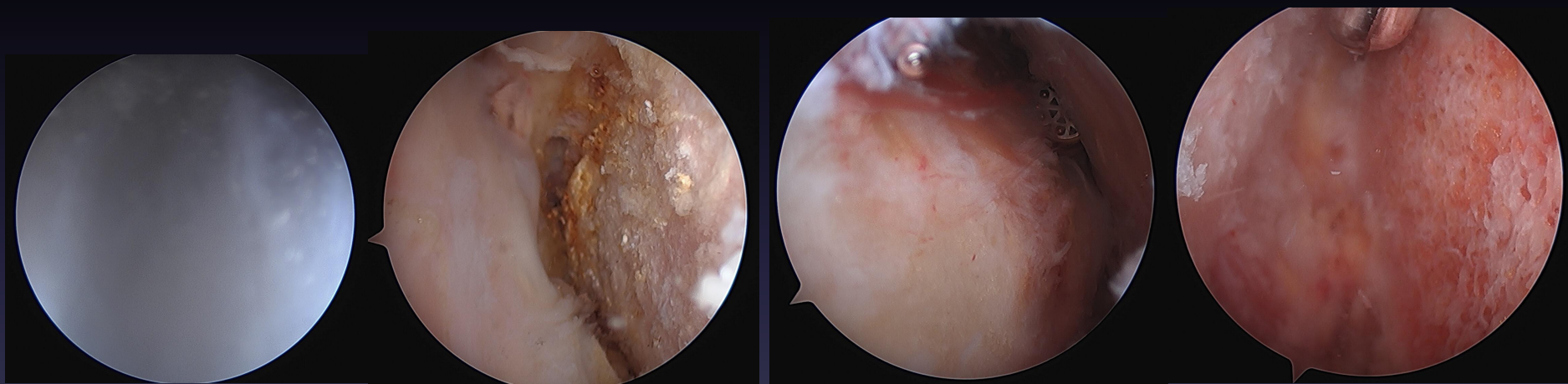
Surgery

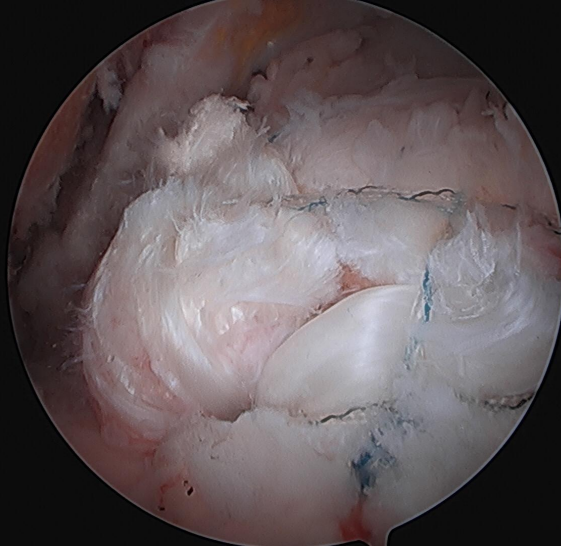
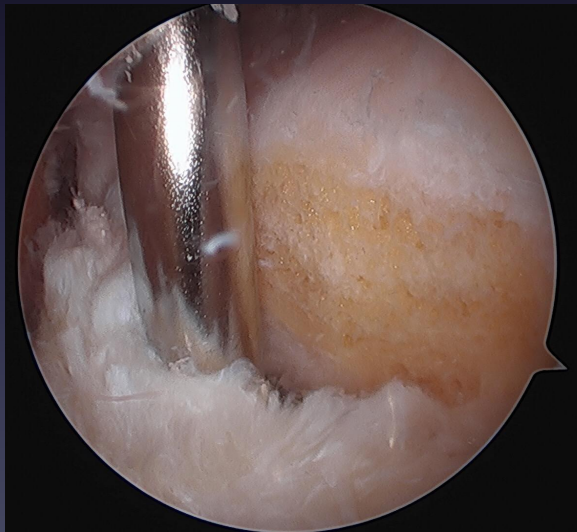
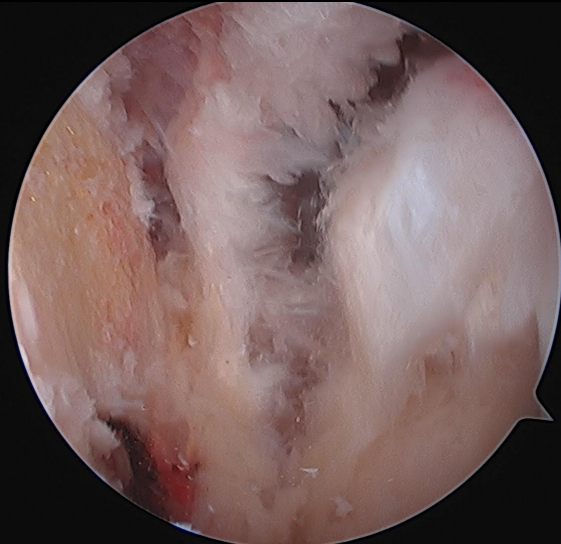
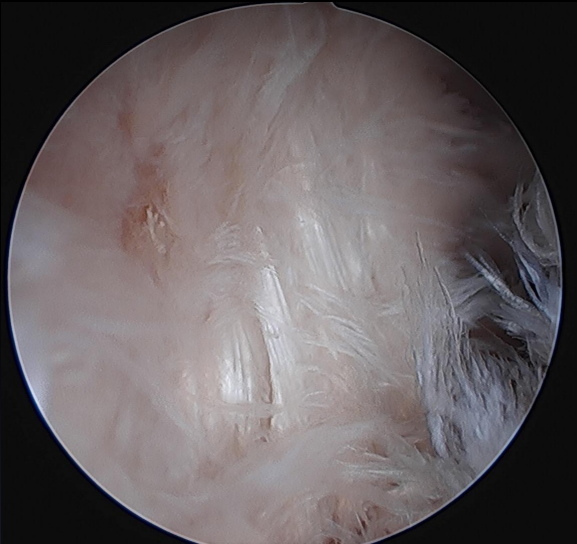
– Prevailing Theory regarding improvement after Surgery

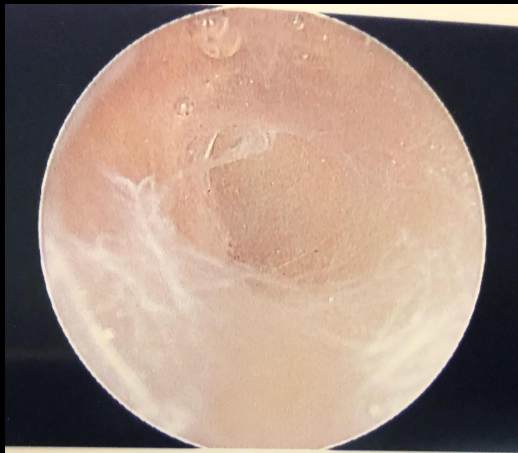
- Placebo effect
- Prolonged rest
- Bleeding from acromion
- Postoperative therapy



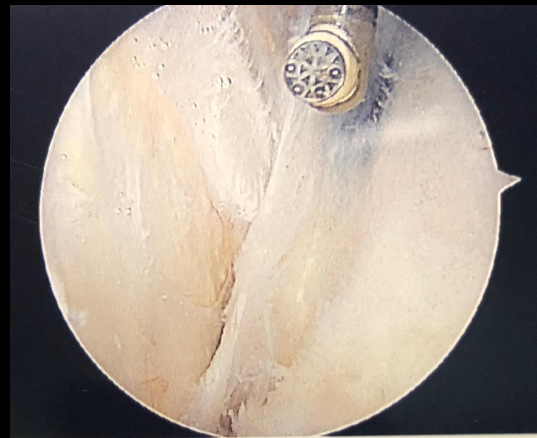
Surgical Cases



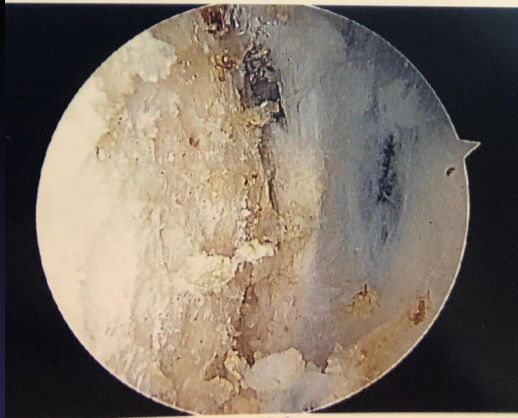




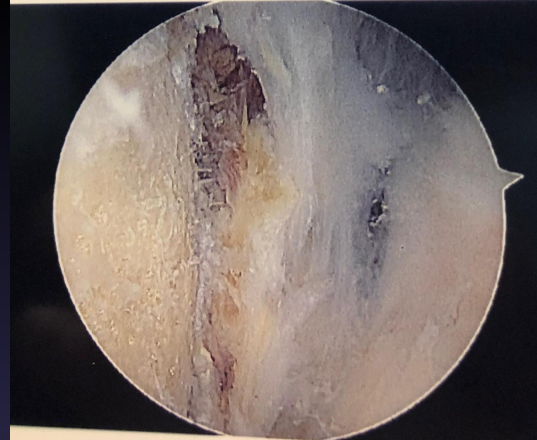
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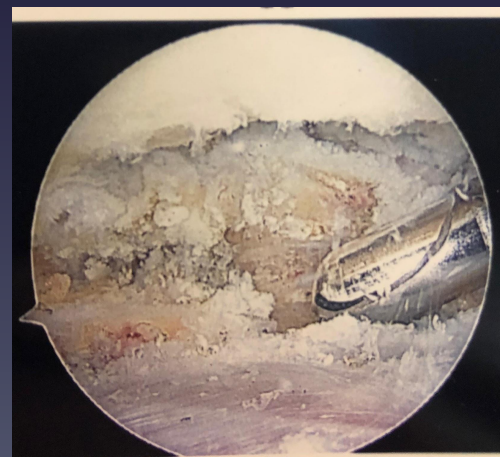
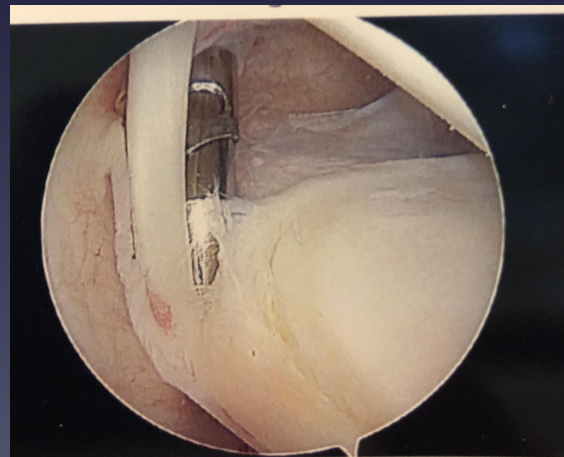
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Take home points

- Subacromial impingement syndrome is likely the result of intrinsic rotator cuff degeneration that causes superior migration of the humeral head
- Initial management should be nonoperative and is largely successful
 - Concomitant pathology is common and must be ruled out
 - SLAP/biceps tears
 - AC joint
 - Rotator cuff tearing
- Currently no evidence to support use of biologics over traditional steroid injections and physical therapy
- Surgical management for isolated impingement is rare, but has evolved to an arthroscopic decompression with limited anterior acromioplasty
- Routine acromioplasty with rotator cuff repair has fallen out of favor and shows no long-term benefits over performing rotator cuff repair alone