Shoulder Rehabilitation General Information

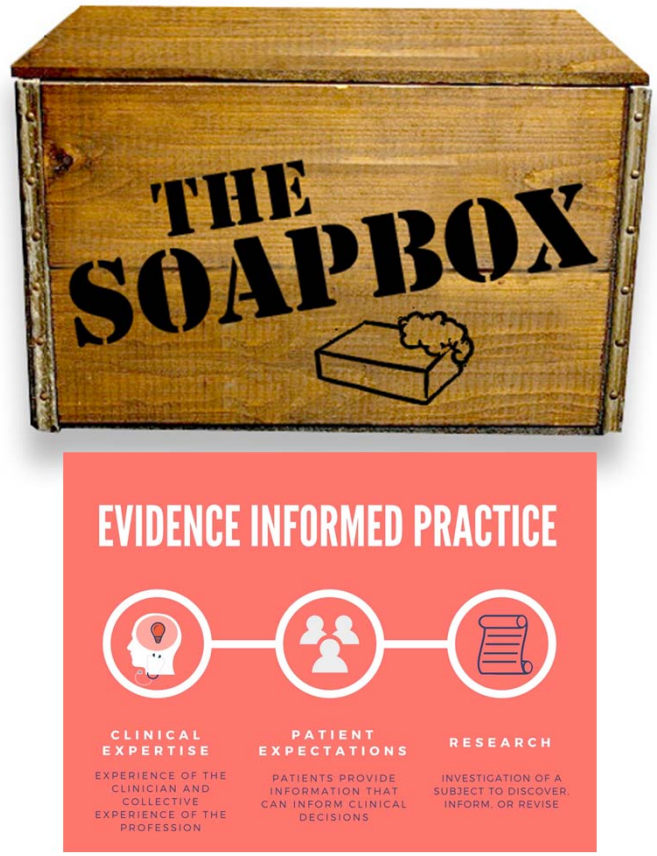
Common Surgical Conditions and Treatment guidelines

2017

Some notes are adapted from from Ron Kochevar and the Kaiser Ortho Residency

Objectives

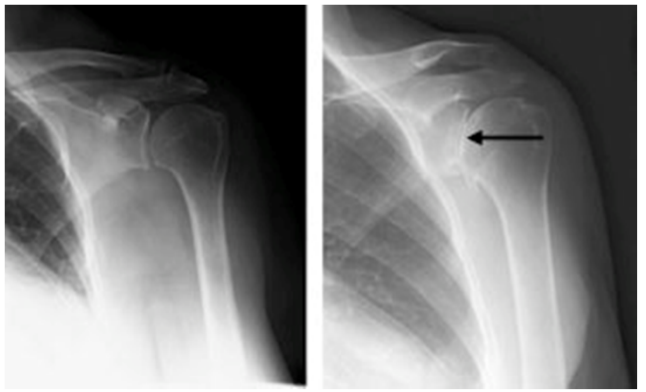
- Post operative care:
  - Total shoulder
  - Reverse total shoulder
  - Labral and Bankart surgeries
  - Rotator cuff repair (RCR)



Total Shoulder and Reverse Total Shoulders

Who gets a TSA?

- Severe GHJ OA



Pre

Post

Other deficits

- GHJ destruction via systemic conditions
- Non-union of proximal humerus fracture
- Severe RTC pathology

What Is A Total Shoulder?

In a total shoulder, the arthritic surface of the ball is replaced with a metal ball with a stem that is press fit in the inside of the arm bone (humerus) and the socket is resurfaced with a high density polyethylene component.

After a general or regional anesthetic, this procedure is performed through an incision between the deltoid and the pectoralis major muscles on the front of the shoulder. It includes release of adhesions and contractures and removal of bone spurs that may block range of motion. Our team of surgeons, anesthesiologists, and surgical assistants usually perform this procedure in less than two hours.

General post-op guidelines: TSA

- May use the arm below waistline for activities and ADL's (except if they had a biceps repair or tenodesis)
- Support arm in the scapular plane
- No lifting or carrying with the involved arm
- No pushing or pulling
- No sleeping on that side
- No leaning on the elbow with full body weight
- No excessive stretching into ER (watch the strain on the anterior capsule)

General post-op guidelines: TSA

- Timeline: 0-3 weeks
- Goals:
  - Patient education
    - Explain precautions and subscap healing
    - Sling worn for 3-4 weeks
    - Elbow propped when in supine
    - Keep incision clean and dry
    - Ice several times a day
  - Allow healing of subscap and anterior capsule
  - Initiate ROM
  - Maintain elbow, wrist and hand AROM

General post-op guidelines: TSA

- POD 1 (4-6 times a day)
  - Precautions
  - Pendulums
  - Elbow AROM
  - Hand squeezes
  - Supine passive scaption
  - Supine passive IR to chest
  - Supine passive ER in the plane of the scapula*

* = will very based on the surgeon's protocol – often 0-30 only

Treatment guidelines

- Continue with passive or AAROM
- Usually flexion 140° / ER 40°
- Pulleys
- Table assisted motion
- Scapula isometrics
- Progress distal exs
- Late phase 1 stretching
- Add phase 2 stretching if tissue has “good” quality
- PROM abduction, ER and IR in the scapular plane
- Frequent icing
- PROM as close to functional by 9 – 10 weeks

Treatment outcomes

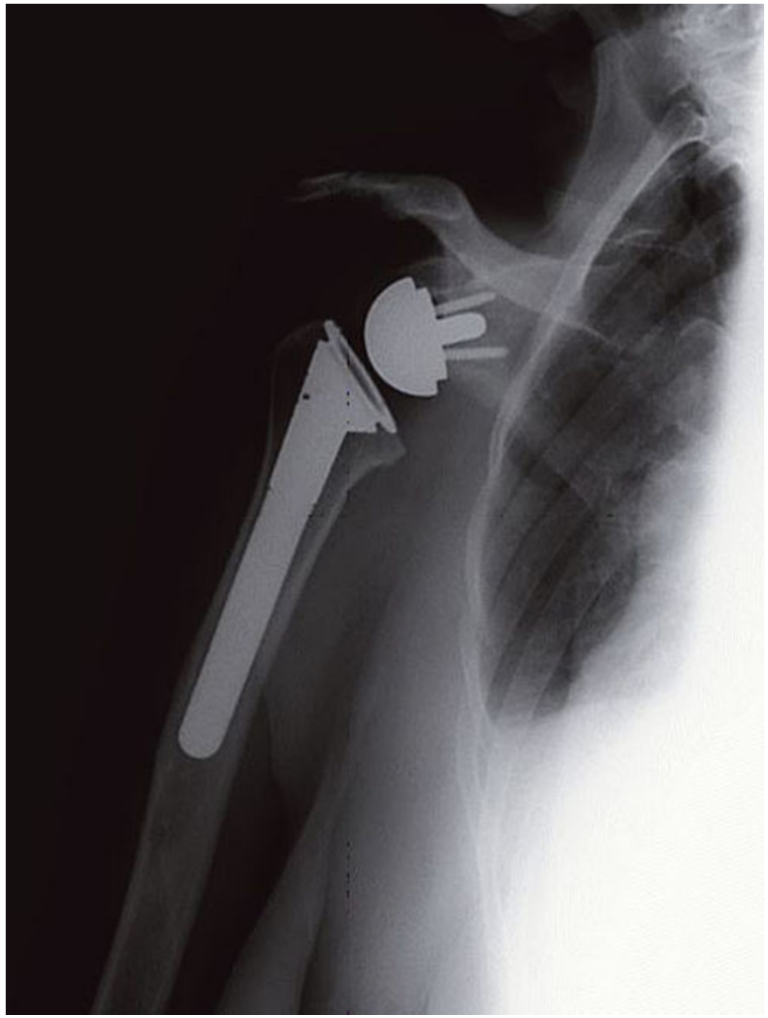
- Sperling et al (2008)
  - 15 patients underwent TSA
  - ROM and STR testing at 6 and 12 months
  - **ROM TESTING** = From 0 – 6 months
    - Flexion 104° to 147°
    - Abduction 86° to 145°
    - IR 43° to 54°
    - ER 25° to 50°
  - From 6 to 12 months
    - Minimal to no improvement for all ranges

Treatment outcomes

- Sperling et al (2008)
  - **STR TESTING** = From 0 – 6 months
    - Minimal in general
  - From 6 to 12 months
    - Large improvements (may not be functional)
    - Extension 18.3 to 22.4 kg
    - Abduction 11.3 to 12.8 kg
    - ER 8.8 to 10.1 kg
    - Despite these “changes” there was still overall shoulder weakness observed

Who gets a Reverse TSA?

- Severe RTC pathology
- A previously failed TSA
- Failure of conservative treatment
- Deltoid is predominant “mover” of the shoulder

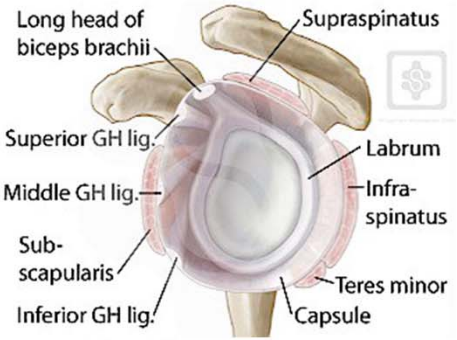


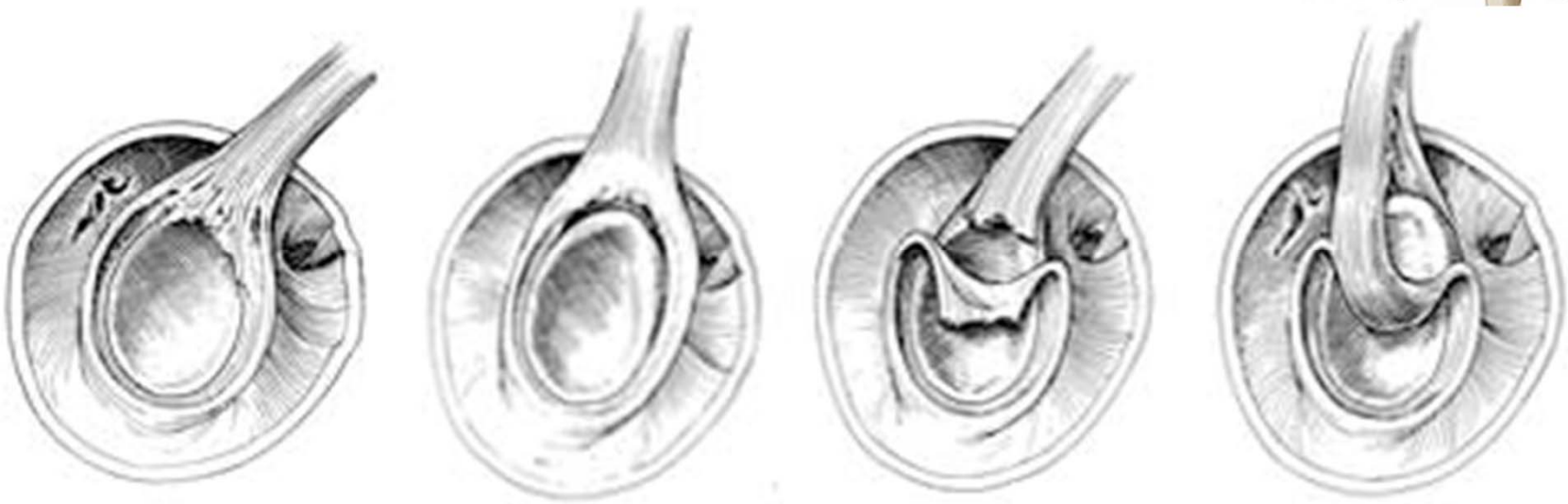
General post-op guidelines: rTSA

- 4th day to 3 weeks
  - Immobilization often up to 3-4 weeks
  - Submax pain free deltoid
  - No HE to void dislocation
  - Isometrics and periscapular isometrics
  - Humerus protected in the scapular plane
- 3 – 6 weeks
  - Passive forward flexion and elevation in the scapular plane to 120°

SLAP Lesions

What is a SLAP tear?





- **Type 1:** isolated fraying of the labrum with a firm attachment of the labrum and BLHT to the glenoid – typically degenerative in nature
- **Type 2:** detachment of the BLHT and the labrum from the glenoid – usually surgically repaired
- **Type 3:** bucket handle tear of the labrum but the BLHT insertion is intact – like a meniscus tear where the labrum flips onto itself
- **Type 4:** combination of Type 2 and Type 3

Clinical Info Regarding SLAP Tears

- **Types 1 and 3:**
  - Labrum only
  - No bicep involvement / anchor intact
  - Therefore they are “stable”
  - Sx treatment: debridement only
- **Types 2 and 4:**
  - Labrum and bicep involvement (detached anchor)
  - Often surgical candidates due to this instability
  - Sx treatment: stabilization and debridement

- **Type 2 note:**
  - Most common
  - Usually the ones that get surgery

https://mikereinold.com/what-exactly-is-slap-lesion-top-5/

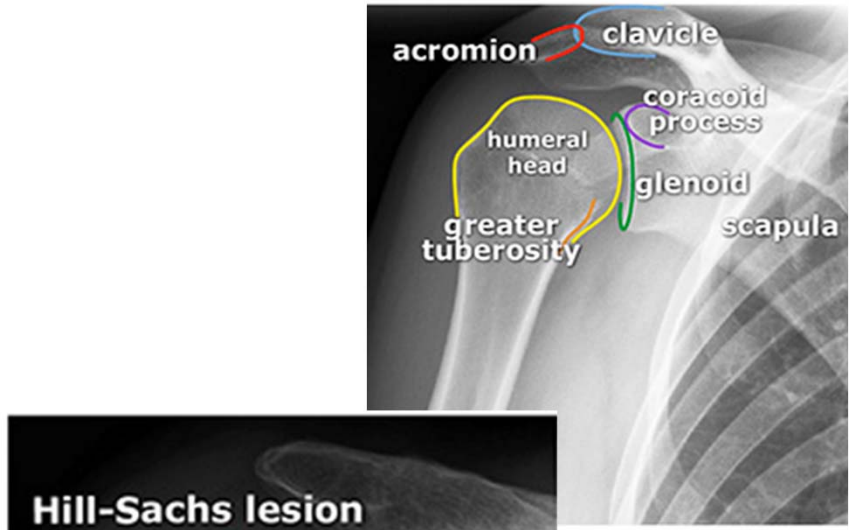
Clinical Picture SLAP Tears

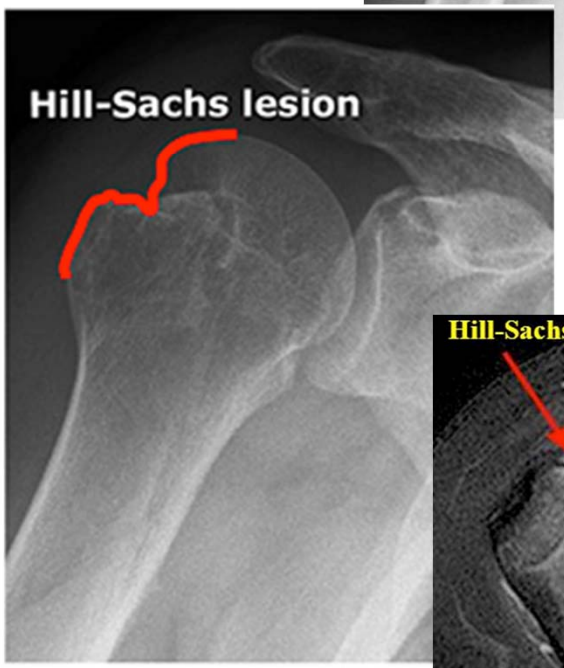
- Fraying and degenerative findings may be incidental for Type 1

- MOI for Type (s) 2,3,4:
  - Acute traction to the arm or sudden pull
  - Repetitive overhead motion
  - History of “micro-instability”
  - Fall on an outstretched hand

Associated Findings

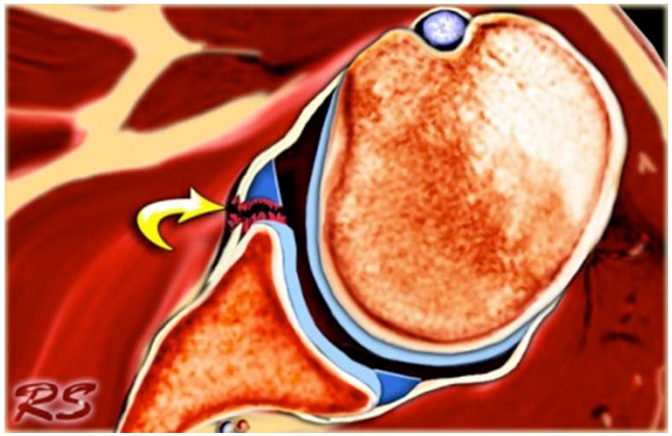
- **Hill-Sachs Deformity**
  - Depression in the cortical bone in the posterolateral head of the humerus
  - Caused by forceful impaction of the humeral head when the shoulder dislocates anteriorly
  - Can contribute to increased shoulder “instability”

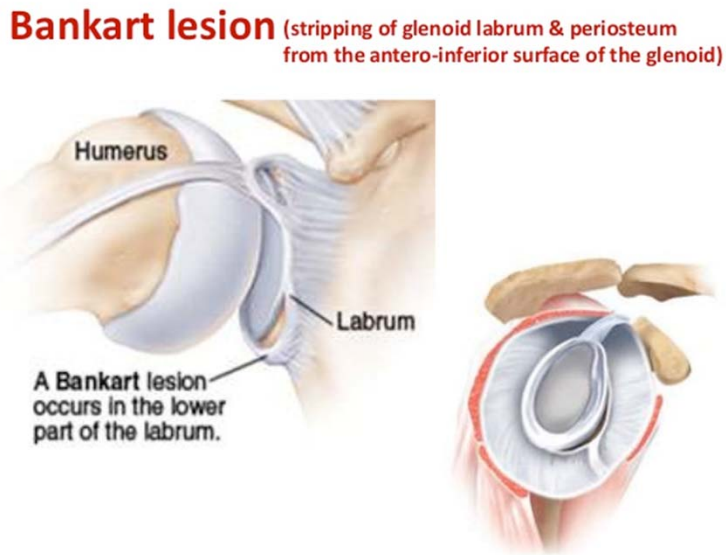




Associated Findings

- **Bankart Lesion**
  - Repeated dislocations cause damage to the anteroinferior aspect of the labrum
  - Creates a small “pocket” where the shoulder can dislocate into anteriorly
  - Can contribute to increased shoulder “instability”





Return to Play and Prior Performance in Major League Baseball Pitchers After Repair of Superior Labral Anterior-Posterior Tears

- 24 players returned to sport (62%)
- Average age 27
- Average days on the DL: 338
- Chance of full recovery 86%
- Return to pitching though = 54%
- Innings pitched from 101 to 65
- SLAP reconstructive surgeries increase each year
- ERA and WHIP remained about the same only difference was in innings pitched

Smith et al (2016) Orthopedic Journal of Sports Medicine

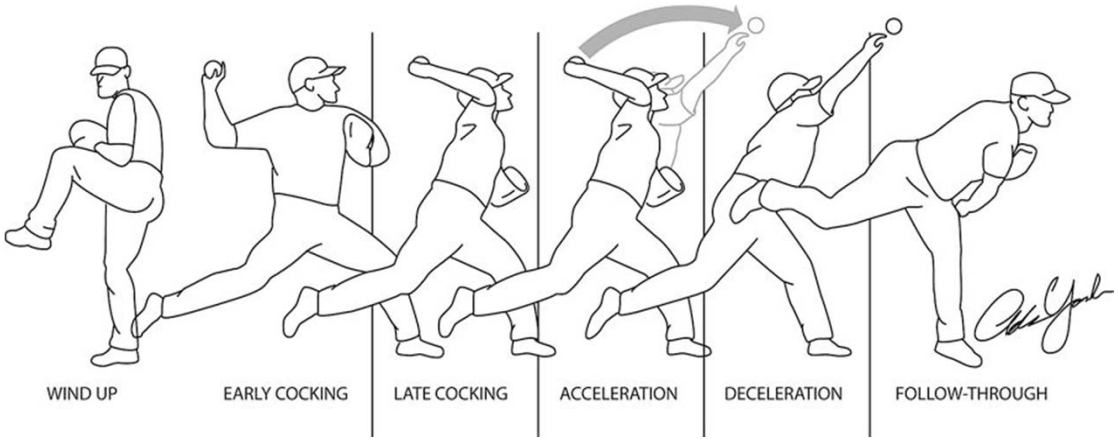
IJSPT

INVITED CLINICAL COMMENTARY

THE RECOGNITION AND TREATMENT OF SUPERIOR LABRAL (SLAP) LESIONS IN THE OVERHEAD ATHLETE

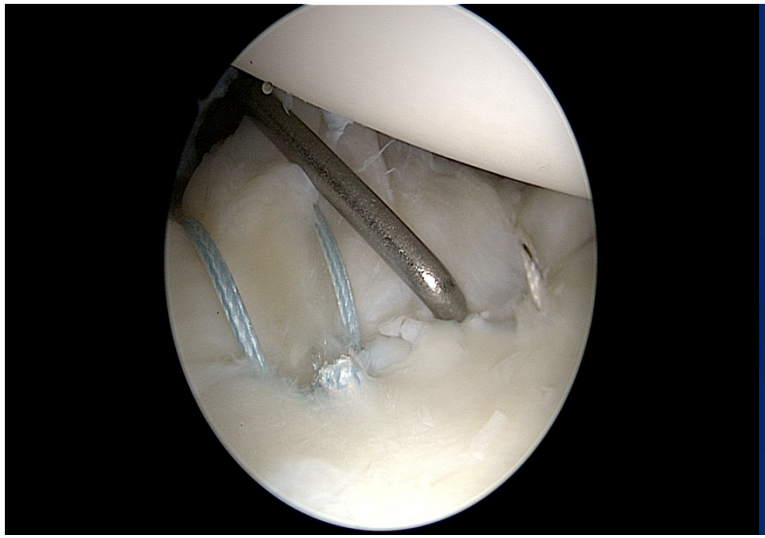
Kevin E. Wilk, PT, DPT, FAPTA[1]
Leonard C. Macrina, MSPT, SCS, CSCS[1]
E. Lyle Cain, MD[2]
Jeffrey R. Dugas, MD[2]
James R. Andrews, MD[2]

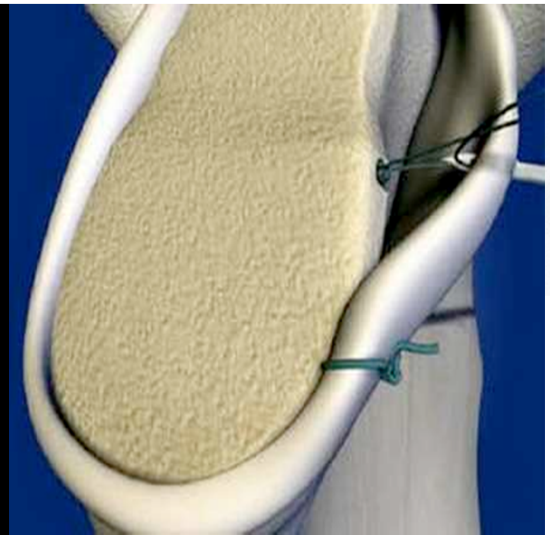
- Repetitive overhead throwing motion
- High **eccentric activity** of the biceps during arm deceleration and follow through (raising the labrum off the glenoid rim)
- **Peel back mechanism** where in the later stages of the throw = maximal ABD and ER creates a torsional stress at the biceps anchor on the labrum/glenoid

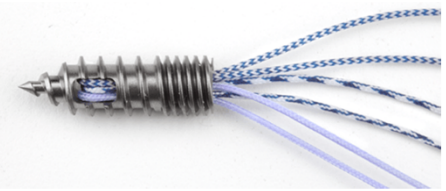


Type 2 Surgical Repairs

- Much more common
- Beneficial to know the exact location of lesion and number of anchors used
  - Slower progression: 3 anchors versus 1 anchor
  - Slower progression: Type II versus I and III







Phase 1

- **Goals:**
  - Protect anatomical repair
  - Protect negative effects of immobilization
  - Promote dynamic stability
  - Diminish pain and inflammation
- **Weeks 0-2 (4-6x/day)**
  - Sling x 4 weeks
  - Abduction sling while sleeping x 4 week
  - Elbow / hand PROM
  - Hand grip exercise
  - Sub maximal isometrics
  - No isolated biceps contractions
  - Cryotherapy

Phase 1 ROM

- Passive and gentle shoulder active assistive ROM exercises
  - Flexion to 60° (Week 2 Flexion to 75°)
  - Elevation in scapular plane to 60°
  - ER/IR with arm in scapular plane
  - ER to 10-15°
  - IR to 45°

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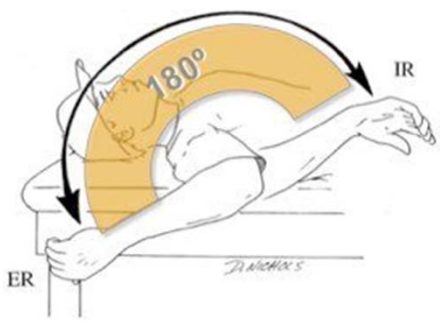
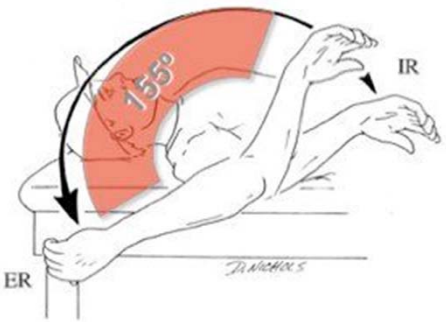
Use this article for both types 1 and III and more importantly type 2

GIRD Concept

- GHJ IR deficit
- Normal for throwers – they should have less IR
- Adaptation over time – analogy of wringing a towel and what happens to the humerus
- CAREFUL – think about should you really be stretching the posterior capsule?

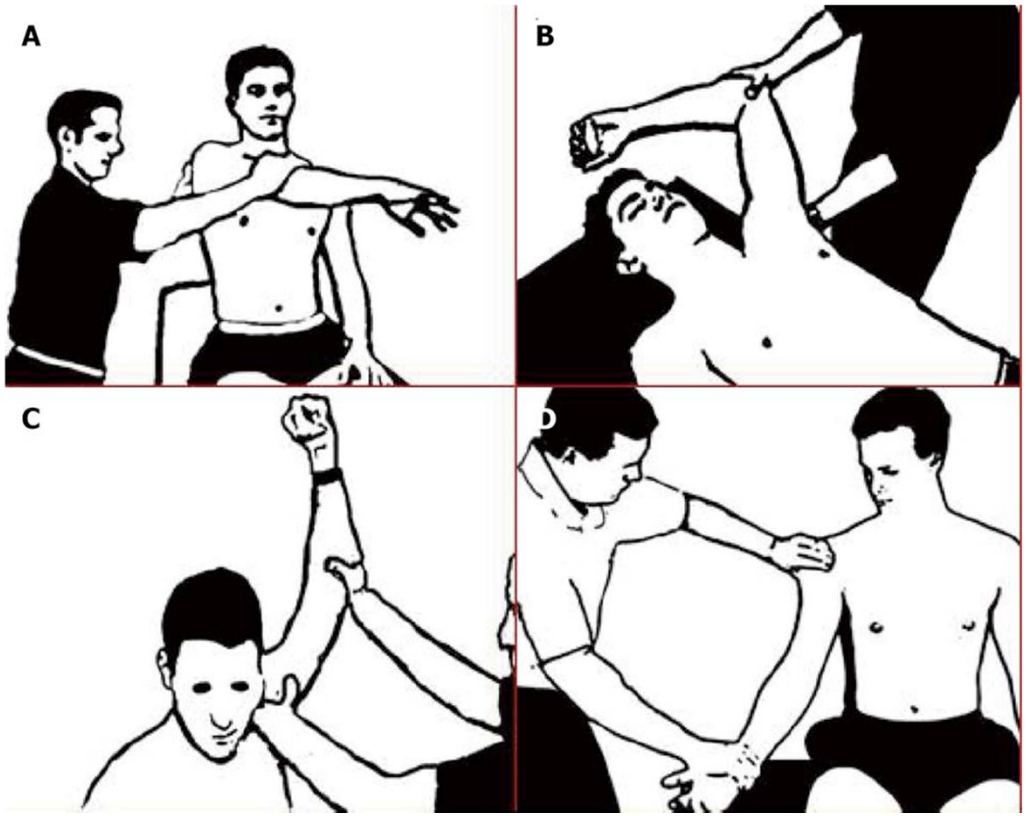




Bankart Lesions

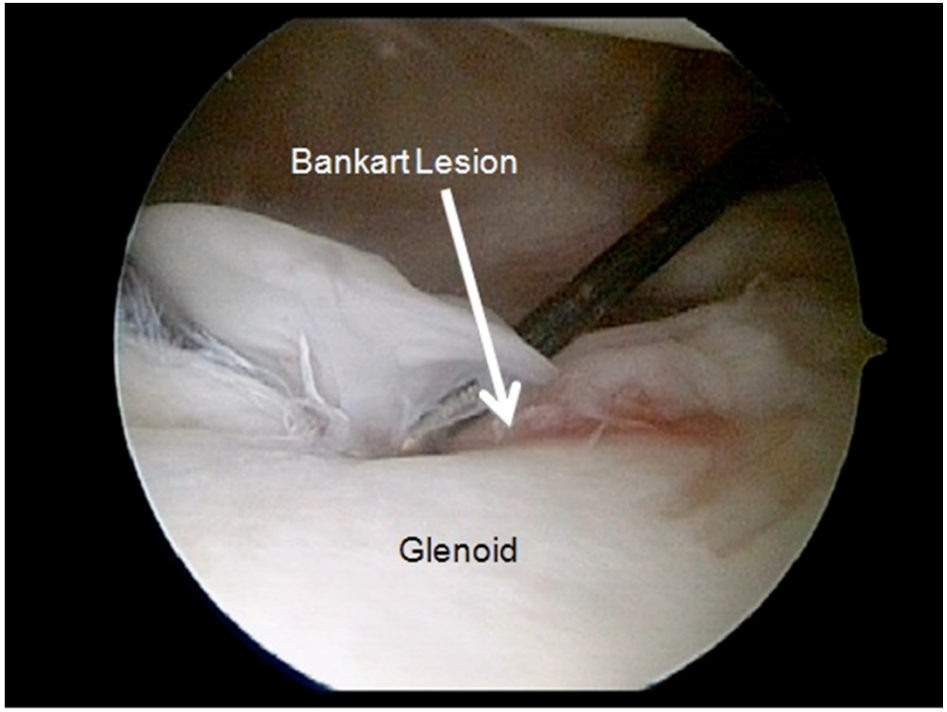
Bankart Clinical Picture

- Anterior sitting humeral head (lab demo)
- Poor SA recruitment
- Limited GHJ IR
- Pectoral dominance with all shoulder movements
- History of dislocation and or bouts of anterior instability



Bankart Lesion Repair

- Tear of the glenoid labrum
- Reattachment and tightening of the torn capsule / labrum and ligaments of the shoulder to the glenoid
- Usually done arthroscopically but can be done open
- Occurs in ~ 22% of SLAP tears



Phase 1 (Arthroscopic)

- **Goals:**
  - Patient education
  - Permit capsuligamentous – labral healing
  - Initiate ROM
  - Diminish pain and inflammation
- **Weeks 2-4 (4-6x/day)**
  - Modalities for pain
  - Initiate isometrics
  - AROM / PROM
    - IR: full in the plane of the scapula
    - ER: 45° in plane of scapula
    - Flex/Abduction: 90° pure plane
    - Full GHJ mobility – inferior and posterior glides to start – avoid anterior or AP glides initially

Rotator Cuff Repairs (RCR)

Imaging Facts from Jeremy Lewis

We are very fortunate to live in a time where imaging is available and imaging is important to assist in the diagnosis of problems such as; fractures, cancer and in the case of the shoulder; problems involved with trauma, such as dislocations and some tendon tears.

However, there are some **really big problems** when imaging is used to diagnose where the symptoms are coming from. Just a few of these are:

- **Imaging findings such as; tendon tears and bursal thickening** (sometimes diagnosed as bursitis) **are just as common in people with no shoulder pain, as they are in people with shoulder pain.** In fact, in one study 96% of people **without any shoulder pain** or loss of function, were found to have imaging changes, such as tears, bursal thickening, and many other problems.
- **This can also be the case even in elite international level athletes, and tennis players, and baseball pitchers. The tears don't stop these athletes functioning at an incredibly high level.** Even when followed up after 5 years, the tears were still not causing problems.

- This means **what is seen in imaging is usually not the cause of the problem**, and **in most cases the findings of imaging investigations cannot tell you where your pain is coming from.**
- In some studies, **even really large tendon tears** were found **not to cause any pain** or have a negative effect on movement.
- In fact, tendon tears in your shoulder, relate more to your age, than whether you have pain or not.

Getting better usually has got nothing to do with 'fixing' what was found on imaging, and in most situations, you should not worry about what the imaging has found.

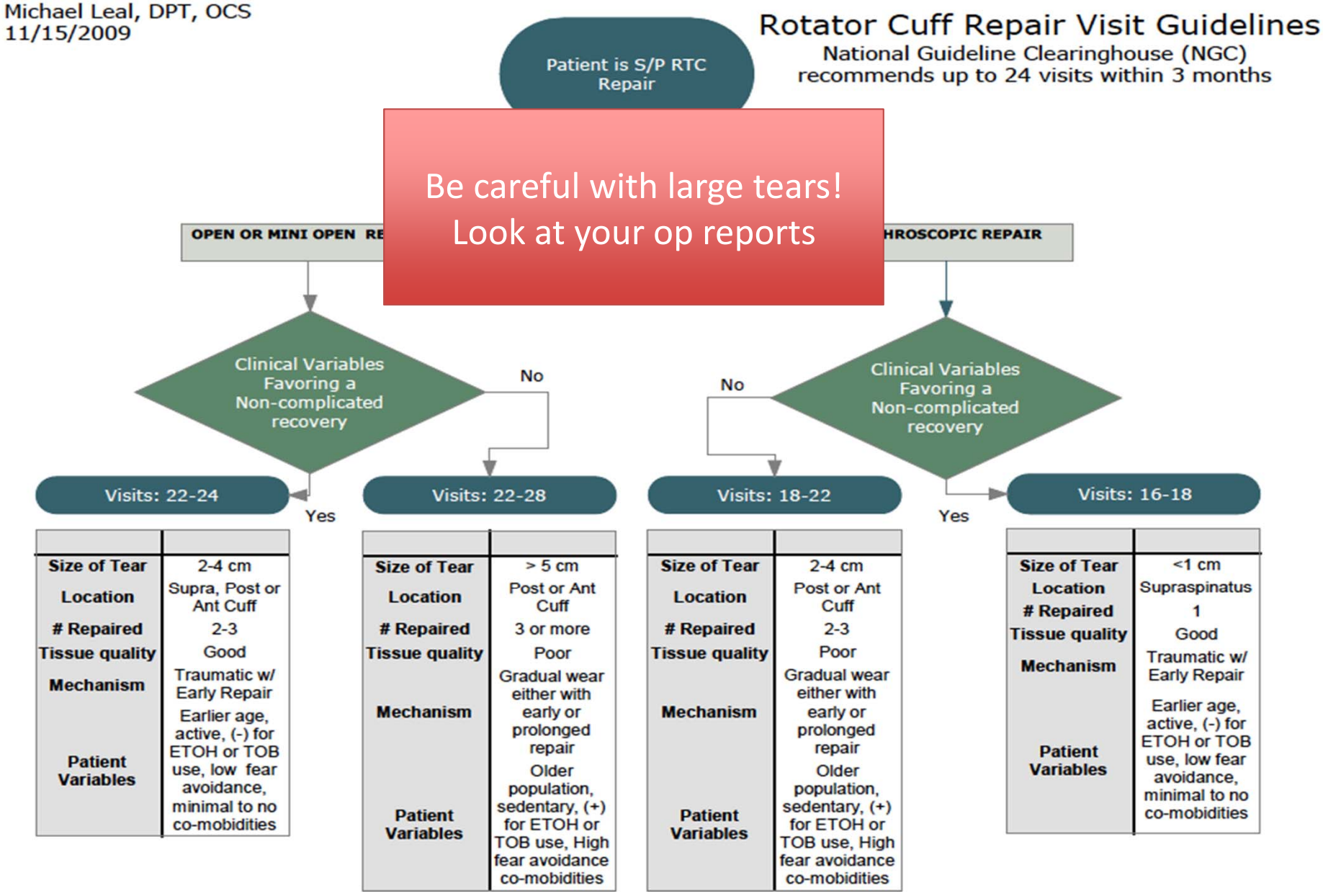
You can discuss this further with your clinician.

RTC Tears and post-op guidelines

- Why use a sling?
- Increased tension on the RTC especially suprsapinatus from 0-30°
- Tension ↓ from 34N to 0N when moving from 0° to 30°
- 9mm gap forms in 24 hours in cadavers when loading the cuff to 34N with arm at side

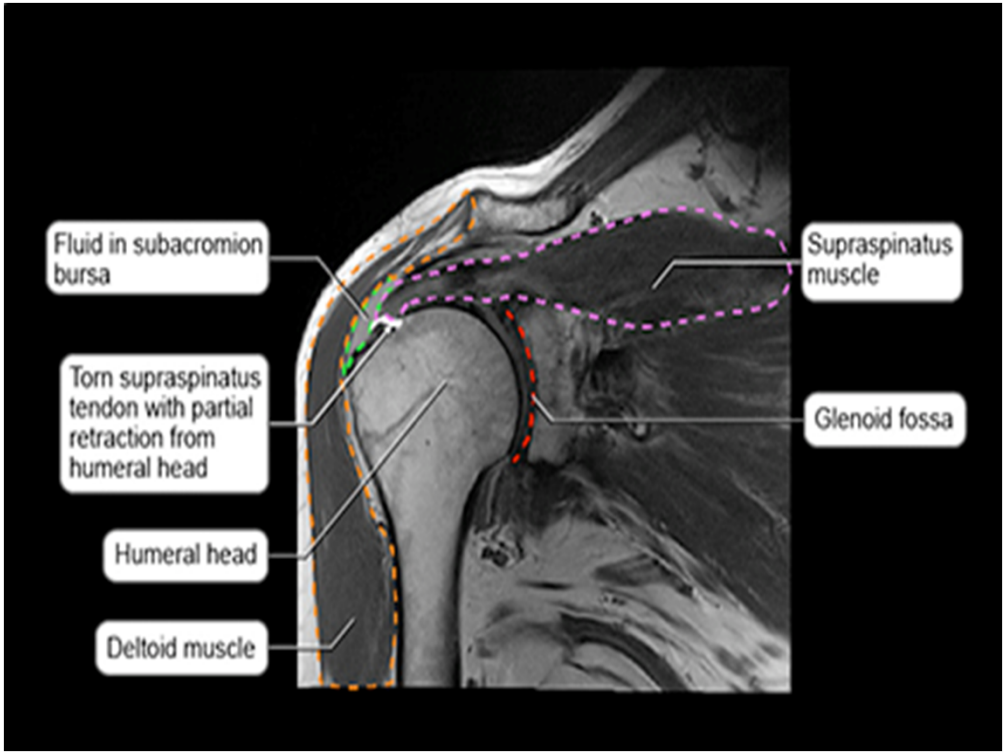
Zuckerman et al 1991, Reilly et al 2004

What's the rehab plan?



General Considerations To Think About

- Miller et al (2011) re-tear rates amongst shoulder RTC repairs
- 22 patients > 3cm tear
- Measured via MSK US at different intervals – 2 days, 2 weeks, 6 weeks, 3 months, 6 months and 12 months
- 9 failed (41%) = 78% of those that failed occurred within the first 3 months



"Do No Harm"

So what about stiffness?

Does slower rehabilitation after arthroscopic rotator cuff repair lead to long-term stiffness?

Bradford O. Parsons, MD[a,*], Konrad I. Gruson, MD[b], Darwin D. Chen, MD[a], Alicia K. Harrison, MD[a], James Gladstone, MD[a], Evan L. Flatow, MD[a]

- All immobilized x 6 weeks
- 10/43 (23%) considered "stiff" at 6-8 weeks if flexion was < 100° and ER <30°
- Then underwent regular PT post surgical intervention
- At 1 year no difference (FF 166° vs 161°, ER 62° vs 58°, IR T7 vs T8)
- Prolonged immobilization did not result in "stiffer" shoulder even in those that were classified as "stiff" at 6-8 weeks

Parsons et al 2011, JSES

What about agg vs. early passive exs?

Effect of Two Rehabilitation Protocols on Range of Motion and Healing Rates After Arthroscopic Rotator Cuff Repair: Aggressive Versus Limited Early Passive Exercises

- 64 patients: randomized to aggressive or passive exs
- Both groups improved at 3 months at 1 year
- Faster improvements noted in FF, ER and IR in the aggressive group at 3 months but no significant differences at 1 year – IR at 90° ABD showed significance for the aggressive group
- 23% re-tears in the aggressive group and 8% in the passive group at 1 year

Lee et al 2012, JSRS

Evidence summary Part 1

CLINICAL FEATURE
REVIEW

Early versus delayed rehabilitation following arthroscopic rotator cuff repair: A systematic review

- Early rehabilitation after arthroscopic cuff repair is associated with some initial improvements in ROM and function.
- Ultimately, similar clinical and anatomical outcomes between groups existed at 1 year.
- While there was no significant difference between groups in anatomic failure of the repaired cuff, there may be a trend towards increased re-tear with larger tears.

Gallagher et al 2015, PhySM

Evidence summary Part 2

Early Versus Delayed Passive Range of Motion Exercise for Arthroscopic Rotator Cuff Repair

A Meta-analysis of Randomized Controlled Trials

CME

- Early ROM exercise after arthroscopic cuff repair improved postoperative stiffness but was not superior to a delayed protocol in regards to shoulder function.
- Early ROM exercise may contribute to improper healing with large size tendon tears.
- A proper rehabilitation program must consider the risks associated with post-operative stiffness vs. re-tearing of the surgically involved tendon.

Chang et al 2014, AJSM

Treatment guidelines

- Good resource: https://www.physio-pedia.com/Rehab_Protocols:_Musculoskeletal_/_Orthopaedics

- These have been uploaded
- Facilities may have their own protocols
- Clinical Reasoning is REALLY Important!!!!!

FOWLER KENNEDY stay active fowlerkennedy.com

SMALL ROTATOR CUFF REPAIR PROTOCOL

The intent of this protocol is to provide the clinician with instruction, direction, rehabilitative guidelines and functional goals for all rotator cuff repair procedures. It is not intended to be a substitute for clinical decision-making regarding the progression of a patient's post-operative course based on physical exam/findings and individual progress. The physiotherapist must exercise their best professional judgment to determine how to integrate this protocol into an appropriate treatment plan. The general treatment for a variety of shoulder procedures involves protection of the repair, stretching/mobilizing tight or restricted structures, strengthening the rotator cuff and strengthening and retraining the scapular musculature.

This particular protocol divided into 4 phases and the timeline can vary from 4 months to 1 year: Phase I: Passive range of motion; Phase II: Active assisted→active range of motion; Phase III: Resisted exercises/strengthening; Phase IV: Advanced strengthening/dynamic stability. Therefore, decisions to advance patients through the phases of rehabilitation should be based on achieving the appropriate level of soft tissue healing, as well as clinical presentation and response to treatment. As an individual's progress is variable and each will possess various pre-operative deficiencies, this protocol must be individualized for optimal return to activity. Some exercises may be adapted depending on the equipment availability at each facility. There may be slight variations in this protocol or additional restrictions placed by the surgeon post-operatively depending on findings at the time of the surgery. If a clinician requires assistance in treatment progression please contact the referring physician or the physiotherapy department.

GENERAL CLASSIFICATION OF ROTATOR CUFF TEAR SIZE[1]

Small: <1cm in length ***Medium:*** 1-3 cm ***Large:*** 3-5 cm ***Massive:*** >5 cm

Also, tears are described as either partial or full thickness depending on the amount of tissue damage. Partial tears do not go all the way through the cuff, although a large surface area may be involved either on the bursal side or, more commonly, on the articular side of the tendon(s). Full tears are completely through the tendon(s) (similar to a button-hole on a shirt) creating a gap/hole in the cuff.

GENERAL CONSIDERATIONS FOR ROTATOR CUFF REPAIR

1. Quality of tissue and integrity of repair[2] (stronger tissue if <50 years old). This includes the quality of the tendon, muscular tissue, and bone. Rehabilitation for the patient with good or adequate tissue would be a slightly more aggressive program, whereas the patient with poor tissue quality would follow a more conservative approach.
2. Acute vs. chronic tears/duration. Longer duration of symptoms has been correlated with histological changes in the muscle that are often progressive and irreversible and potentially increase the difficulty of repair.[3] As a result, active ROM can be more difficult to achieve with chronic tears.
3. Trauma vs. degenerative tear (traumatic tears tend to have better outcomes)[4]
4. Tear size (large/massive tear or >1 tendon repair difficult to achieve full ROM, caution with AROM and resisted exercises with chronic/large tears). Functional outcome is directly related to size of the tear[4]. Therefore, the rate of progression for post-surgical rehabilitation should vary based on the size and extent of the tear. The rate of progression following rotator cuff repair surgery is often determined by the amount of retraction present prior to repair, with the more retracted tendon requiring a slower rehabilitation course because of a higher postoperative failure rate.
5. First vs. revision surgery (revisions can be more prone to fibrosis and pain)[2]
6. Use pain as in indicator of progression. Pain should decrease over time.
7. The early focus of physiotherapy is on achieving ROM before emphasizing strengthening. Early PROM of GH joint is essential to prevent capsular adhesions and fibrosis. This is done with muscles in a shortened position. (Supraspinatus repair: avoid passive IR, Hor Add, Ext. SubScapularis repair: avoid passive ER, Hor Add, Ext). It

Clinical Reasoning Part 1

- **So what really matters?**
  - Quality of tissue integrity
    - < 50 years old vs. > 50 years old
  - Co-morbidities
    - DM, + Tobacco other “healing” issues
  - Size of the tear
    - Small: < 1 cm, medium: 1-3 cm, large: 3-5 cm, massive: > 5cm
    - Functional outcome related to size of tear
    - “Retraction matters” and is the foundation for progression
  - Acute vs. chronic
    - More difficult with longer standing tears (ROM) due to changes in the muscle over time (histological changes in muscle)
  - Traumatic vs. degenerative
    - Traumatic > degenerative in regards to outcomes

Clinical Reasoning Part 2

- **So what really matters?**
  - Pain
    - Let it be your guide
  - Impairments
    - ROM first then strengthening
    - Strength recovery correlated to size of tear
      - Small and medium = almost complete during the first year
      - Large and massive – much slower and less consistent
  - Stretches
    - Supraspinatus repair: open pack position important (0-30 degree concept) avoid excessive IR stretching, horizontal adduction and extension
    - Subscapularis repair: avoid excessive ER stretching, horizontal adduction and extension