

SLAP Tears: Basic Science, Evaluation, and Management




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Disclosures

- I have no disclosures relevant to this topic or any topic that we might discuss.

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Outline

1. Labrum – Basic Science, Anatomy, Physiology
2. SLAP pathology
3. Classification
4. Clinical Evaluation
5. Imaging
6. Management
7. Review of evidence

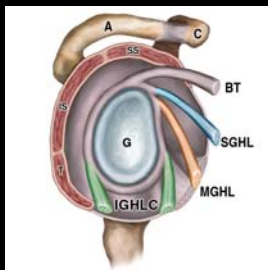
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Labrum Basic Science

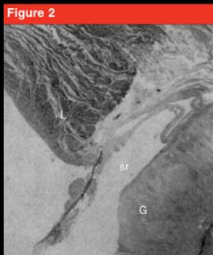
- Fibrous tissue with sparsely intertwined elastin fibers
- Attached to glenoid & articular cartilage via a fibrocartilaginous zone
- Vascular supply from branches of the suprascapular artery, circumflex scapular branch of the subscapular artery, & the posterior humeral circumflex artery



Labrum Anatomy



Labrum Anatomy



Labrum - Physiology

- Deepens glenoid by ~50%
 - Bumper effect?
 - Labral resection decreased stability by only 10%
- Attachment site for GH ligaments
- Contributes to concavity compression effect
 - Increased congruity leading to neg intra-articular pressure
 - leading to increased stability



Biceps Tendon Physiology

- Humeral head depressor – resection results in superior shift of GH articular contact point
- Shoulder stabilizer?
 - loss of biceps tendon results in increased strain in IGHL
 - Pagnani et al – biomech study found that application of force to biceps tendon reduced both anterior-posterior & superior-inferior translation

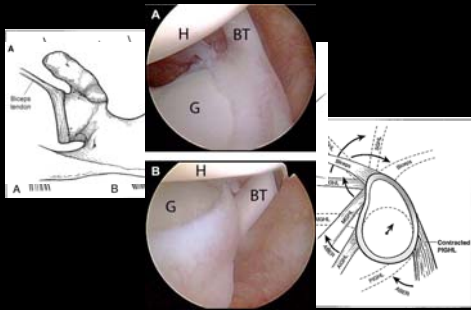


Pathology

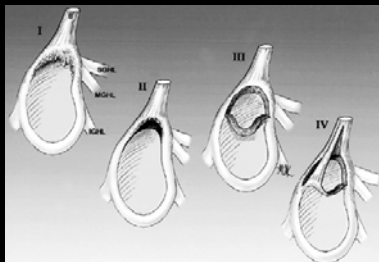
- Either a forceful traction load or repetitive overhead activity (throwing)
- Internal Impingement Syndrome
 - Overhead athlete
 - Pathologic manifestation of SLAP & partial articular sided RTC tear
 - Other conditions often associated
 - GIRD
 - Scapular dyskinesia



Internal Impingement



Classification of SLAP tears





Classification of SLAP tears

Table 1	
Expanded Classification of Superior Labrum Anterior-Posterior (SLAP) Tears	
Tear type	Tear Morphology
II ²³	
Anterior	Predominant anterior detachment of the superior labrum and biceps anchor
Posterior	Predominant posterior detachment of the superior labrum and biceps anchor
Combined anterior and posterior	Combined anterior and posterior detachment of the superior labrum and biceps anchor
V ²⁴	SLAP tear combined with a Bankart lesion
VI ²⁴	SLAP tear combined with an unstable flap tear of the labrum
VII ²⁴	SLAP tear with continuation to the middle glenohumeral ligament origin





Clinical Evaluation

- Complete history
 - Precipitating event
 - Traumatic
 - Insidious
 - Pain characteristics – often nonspecific
 - Classically worse w/ overhead motions & lifting





Clinical Evaluation

- Overhead Athlete
 - Typically insidious onset
 - Pain typically w/ late cocking or early acceleration
 - Initial symptoms may be loss of velocity & control
 - Constellation called “dead arm syndrome”
 - 88% in one study have coexistent pathology
 - Internal Impingement Syndrome
 - Ganglion cyst

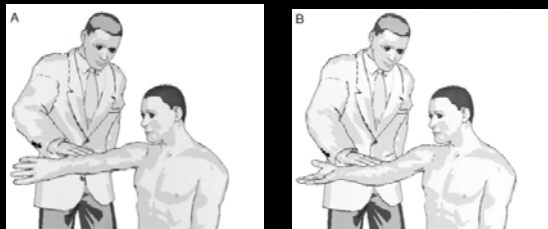


Clinical Evaluation

- Physical Exam:
 - ROM
 - Strength
 - Special tests - unreliable
 - O'Briens – most studied – Sens 32-99%; sp 11-98%
 - Biceps Test I
 - Biceps Test II



O'Briens Test



Biceps Load Test 1



Biceps Load Test 2

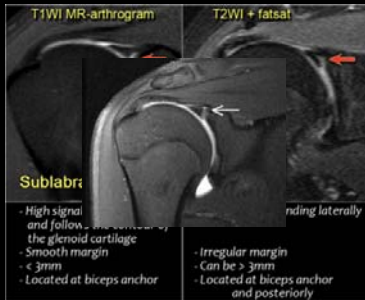


Imaging

- X-rays - 4 view shoulder series
- MRI
 - Varied rates of sensitivity (84-98%) & specificity (63-91%)
 - MRA supposedly better
 - Sens (50-92%) & Sp (69-98%)
 - Very dependent on experience of radiologist



Imaging - MRI



Arthroscopic Diagnosis?

- Gold Standard?
 - Gobezie et al. AJSM 2008
 - Sent 22 videos to 73 shoulder surgeons & asked them to classify SLAP tear & recommend treatment.
 - 52-60% got correct diagnosis
 - 52% for Type 2
 - 66% for normal
 - 60% for Type 1



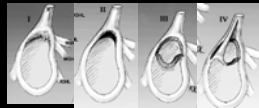
Treatment

- Non-operative
 - Rest & Anti-inflammatories
 - PT to address other possible causes of pain
 - Scapular dyskinesia
 - GIRD
- Operative
 - Arthroscopic fixation or debridement
 - Biceps Tenotomy or Tenodesis



Treatment

- Type I – Debridement
- Type 2
 - Repair
 - Biceps Tenotomy or Tenodesis
- Type 3 – Debridement of Bucket handle tear
- Type 4 –
 - Debridement if <30% of biceps tendon involved
 - Biceps tenodesis if > 30% of tendon involved



Treatment

- Type 2 repair – Suture anchors
 - Configurations
 - 1 anterior anchor – weakest construct
 - 1 anterior & 1 posterior or mattress – highest load to failure
 - 2 anchors posteriorly – equal to 1 posterior & 1 anterior for peel-back tears



Post-op Protocol

- Sling w/ ROM exercises for 3-6 weeks
- Start strengthening exercises at 6 weeks
- Throwing athletes – start throwing program on level surface at 4 months; from a mound at 6 months
- Non-throwing athletes – can return to sport as early as 4 months.

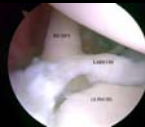


Evidence

- Most studies evaluate young athletes with Type 2 tears
 - Morgan et al. Arthroscopy 1998
 - Evaluated 102 isolated type 2 SLAP repairs (avg age 33)
 - 97% good to excellent results: 84% return to sport
 - Brockmeier et al. JBJS 2009.
 - 47 type 2 SLAP repairs at avg f/up of 2.7 yrs (avg age 36)
 - ASES scores increased from 62 to 97; 87% G to E results
 - 71% of overhead athletes returned to preinjury level of competition



Evidence – Age?



- Boileau et al. AJSM 2009
 - Compared 10 pts (avg age 37) who had SLAP repair to 15 patients (avg age 52) w/ biceps tenodesis
 - Both groups had increase in Constant score
 - 65-83 in repair & 59-89 tenodesis
 - 60% of repair unhappy due to persistent pain or inability to return to previous level of sport
 - 87% of tenodesis group able to return to sport



Evidence – Age?

- Schroder et al. Arthroscopy 2012
 - Evaluated 107 pts who underwent SLAP repair avg 5.3 yrs f/up
 - Avg age 43 w/ 58% > 40; Compared pts >40 w/ those < 40
 - No statistical difference in Rowe Score (93 vs 90)
 - Post-op stiffness in 14 patients – 11/14 > 40 (24% vs 5%)
- Alpert et al. AJSM 2010
 - 52 pts reviewed at min of 2 yrs (21 pts < 40; 31 pts > 40)
 - No statistical diff in ASES scores (93 vs 86 p=0.07)
 - No diff in ROM (but not given)
 - Similar subjective rating (89 vs 87, % of normal)



Evidence – Age?

- Provencher et al. AJSM 2013
 - Prospective study of 179 pts who underwent SLAP repair
 - 66 (37%) patients had failed repair
 - 50 patients had revision surgery
 - Age >36 associated w/ increased risk of failure (RR 3.45)



Conclusion

- Labrum is a fibrous ring around the glenoid that contributes to GH stability.
- Be aware anatomic variants
- SLAP tears can be difficult to diagnose – no reliable clinical test & MRI very dependent on radiologist.
- Fixation in patients over 40-45 is controversial with both good & poor results in literature.



