Management of the Proximal Biceps Tendon in Shoulder Pain/Pathology

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Disclosures

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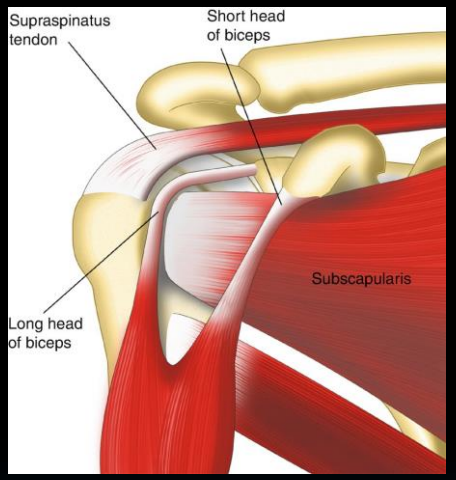
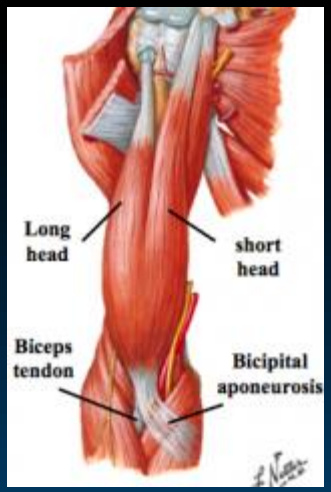
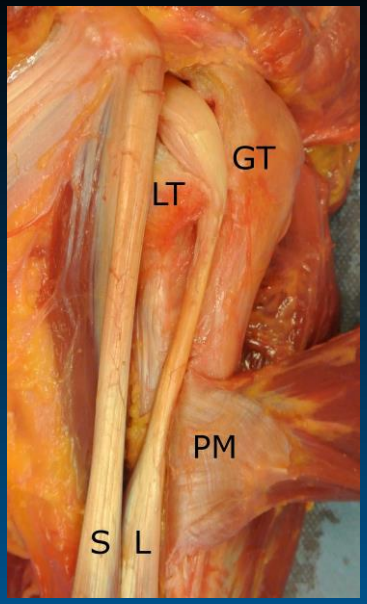
Proximal Biceps

- Short head
  - coracoid
- Long (LHB)
  - Labrum
  - Supraglenoid tubercle
- LHB Intraarticular

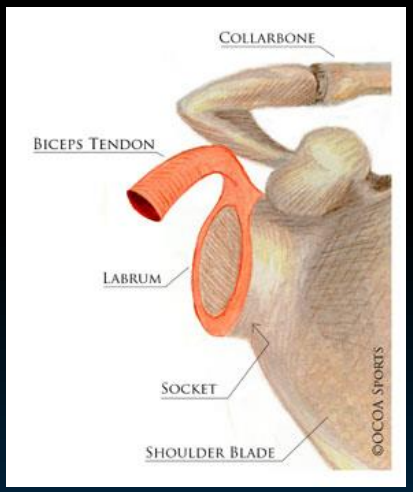


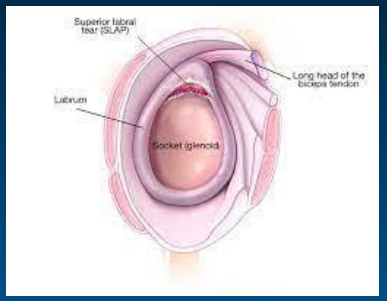




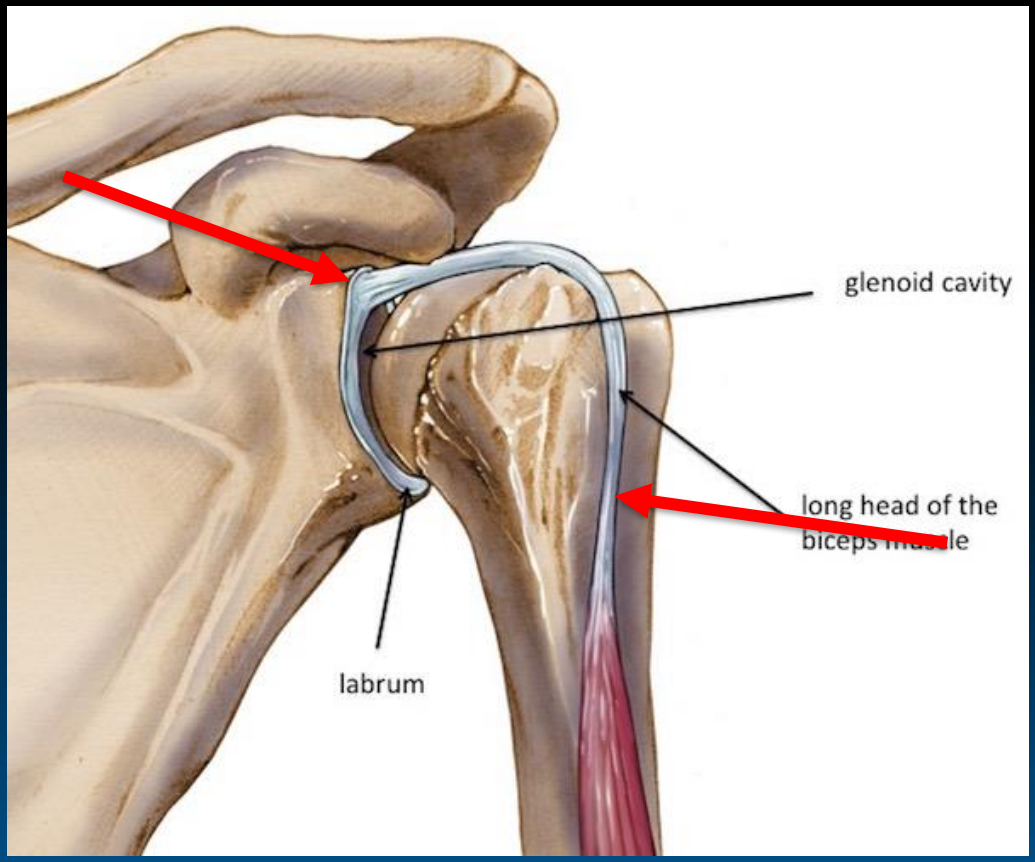
LHB/Superior Labral Complex

- Long Head Biceps inserts onto superior labrum (not directly onto glenoid).
- Superior Labral pathology and Proximal LHB pathology are anatomically intertwined





LHB Biceps Pathology



Functional Importance

- Long head of the biceps acts as a humeral head depressor

- Role in anterior stability in throwing athletes

  -With ER/ABD biceps contraction increases the torsional rigidity of the anterior capsule

  – Helps diminish forces on IGHL

Incidence of Biceps Pathology with Rotator Cuff Tears

- 200 Shoulders
- SAD + Rotator cuff repair
- ----------
- Incidence related to extent of cuff disease
- 82% + Pathology!
- 50% not seen with scope

Murthi, Vasburgh, Neviaser. JSES 2000:382-5.

Bicep Tendon Pathology

- **Inflammatory/Degenerative**
  - + Rotator Cuff
  - "Primary"

- Instability - subluxation & dislocation
  - Supraspinatus tear
  - SGHL/CHL complex
  - Subscapularis tear

  - Biceps subluxation highly associated with cuff tears, especially subscapularis

- Can occur within the bicipital groove and/or at the attachment (superior labrum)

Biceps Pathology in Bicipital Groove

- Not truly a tendinitis

- Tendinosis
  - Collagen atrophy
  - Irregular collagen fiber patterns
  - Fissuring
  - Necrosis
  - Fibrocyte proliferation

Pathology at the Anchor
Superior Labrum Anterior Posterior Tears (SLAP Tears)

- Andrews first described in 1985
- Classified into 4 types in 1990 by Snyder and termed “SLAP lesion”
- Further types added by Maffet
- These are injuries that involve anchor of the LHB

SLAP Tear
(Superior Labral Anterior and Posterior)

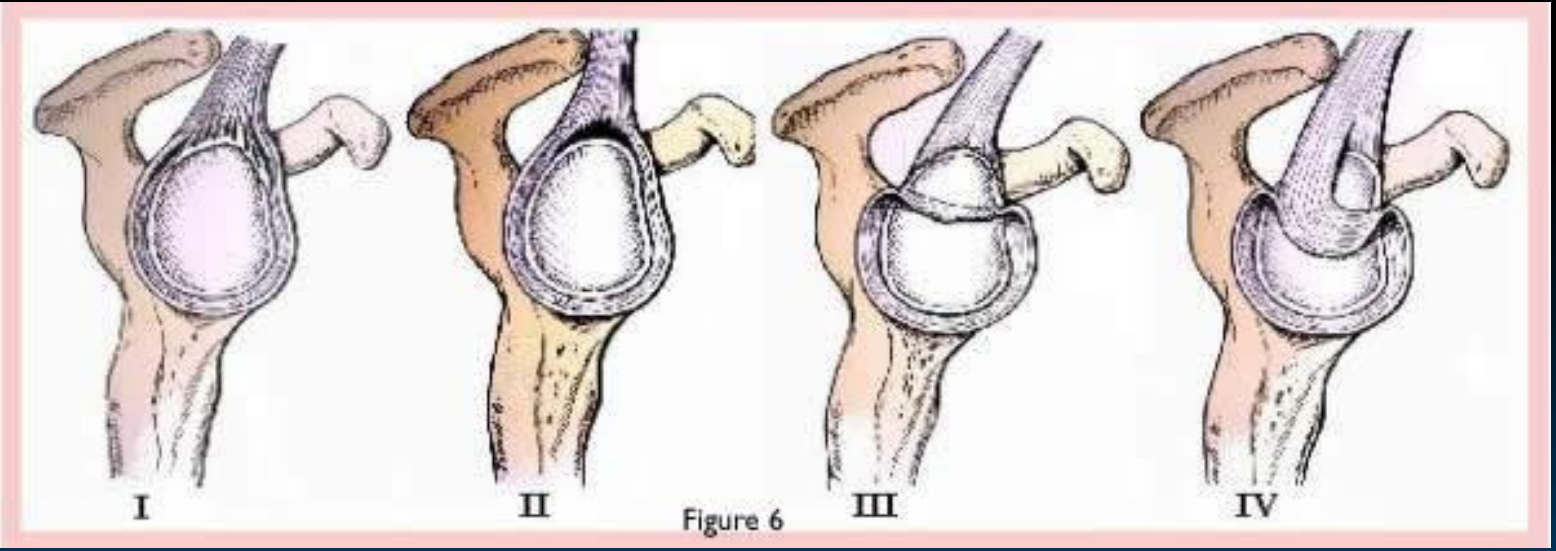


Figure 6

I	II	III	IV
Fraying, stable anchor	Fraying, unstable anchor	Flap/Bucket Handle tear, stable anchor	Flap/Bucket Handle tear, unstable anchor

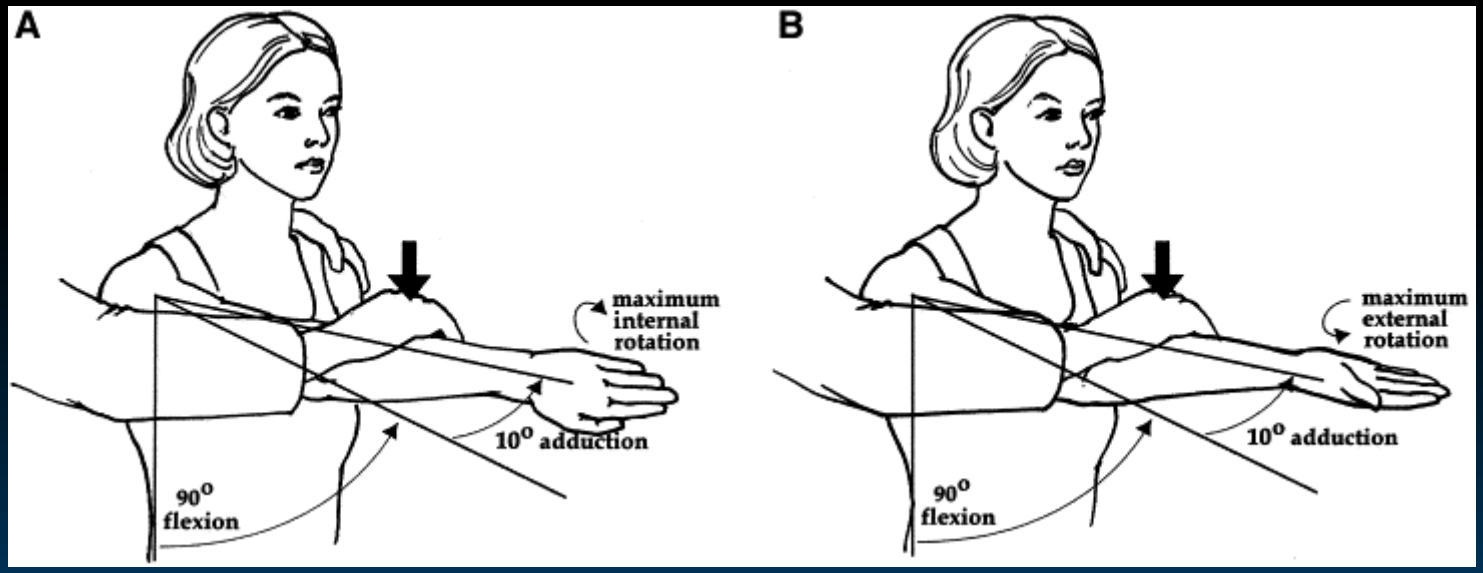
Signs and Symptoms of Biceps Pathology (Both Anchor and Tendon)

- Pain
  - Typically deep anterior worse with overhead activities
- Mechanical Symptoms
  - Catching, locking, popping, and grinding especially with SLAP tear
- Decreased motion and/or strength

Clinical Exam

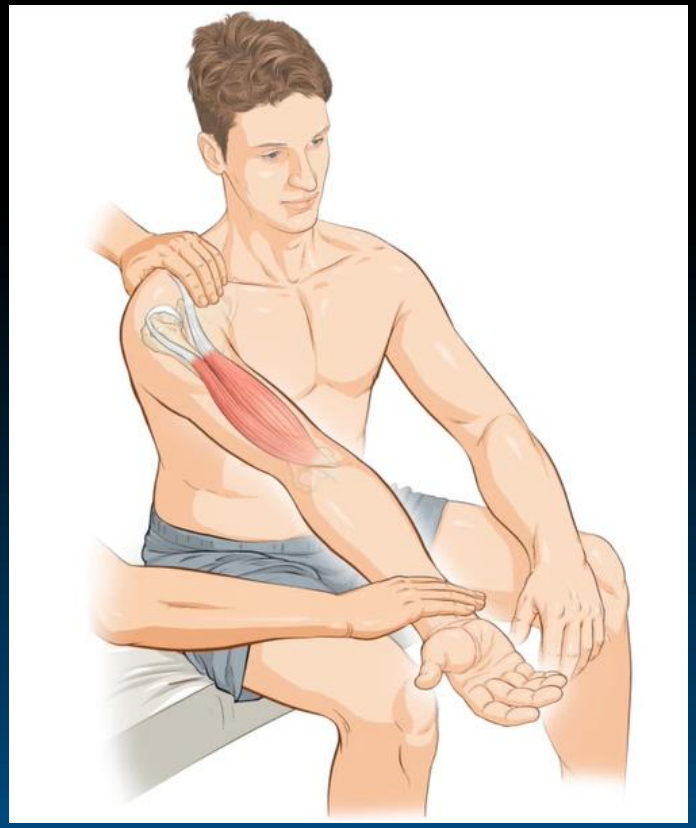
- Reproducible painful click/clunk with motion
- Obrien's test
- Biceps tension tests (Speed's and Yergason's)
- Biceps load test
- Subscap testing

Obrien's Active Compression Test

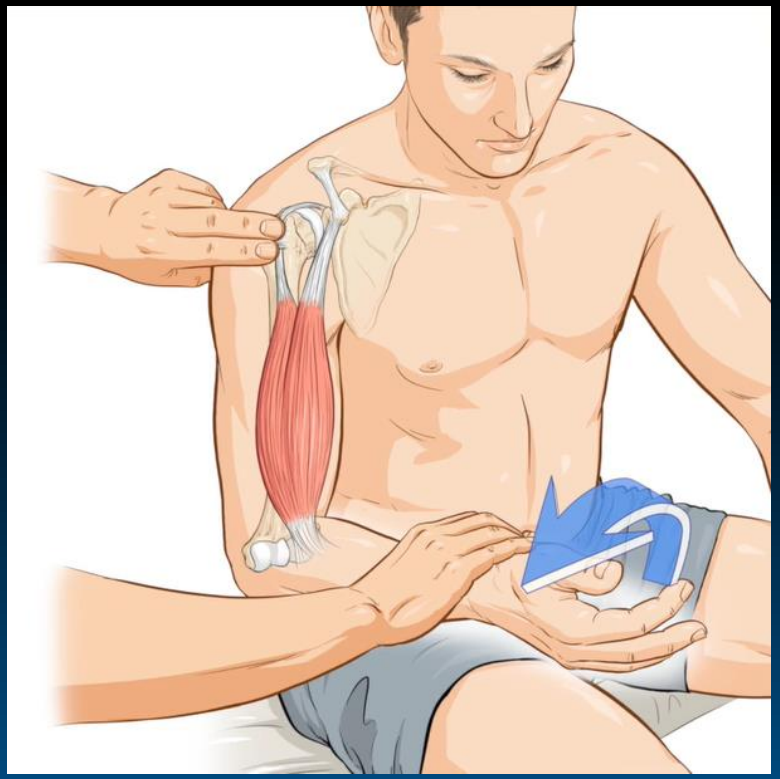


Evaluate for SLAP Tear

Biceps Tension Tests

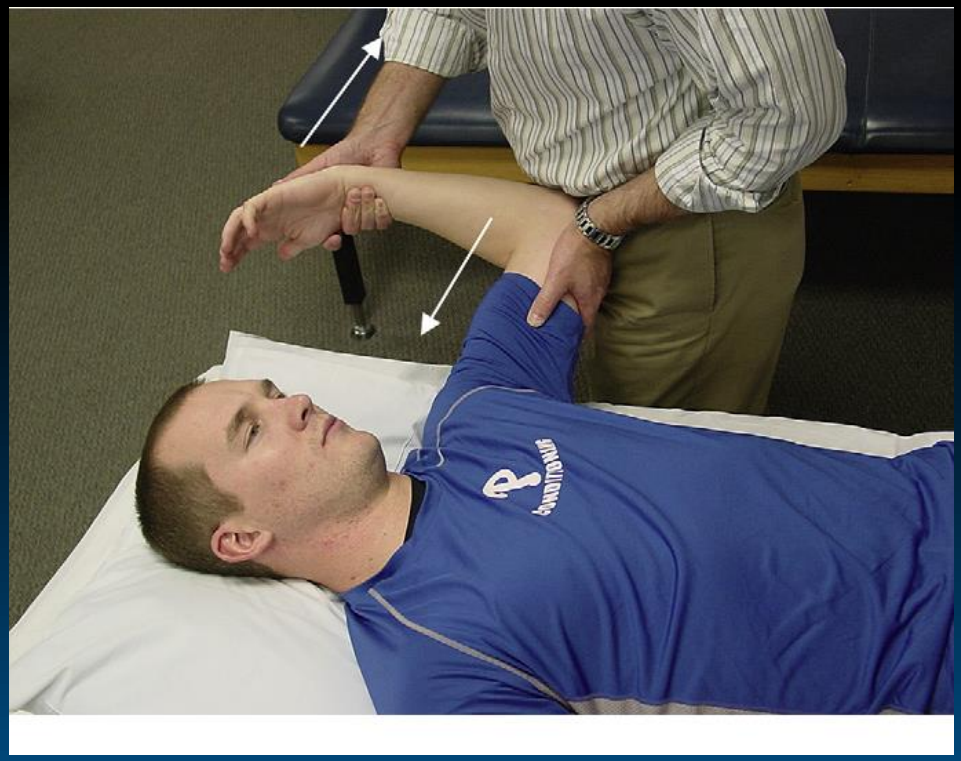


Speed's



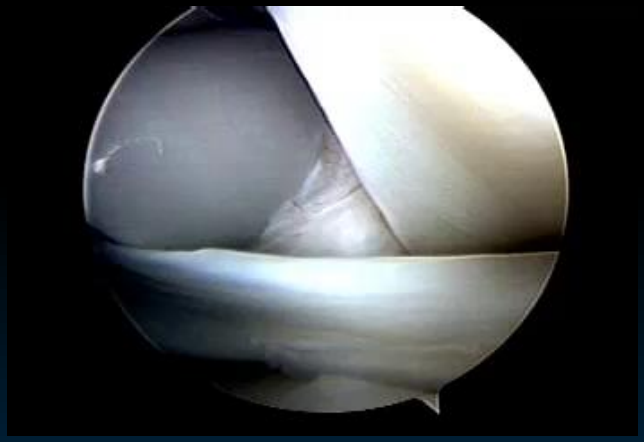
Yergason's

Biceps Load Test

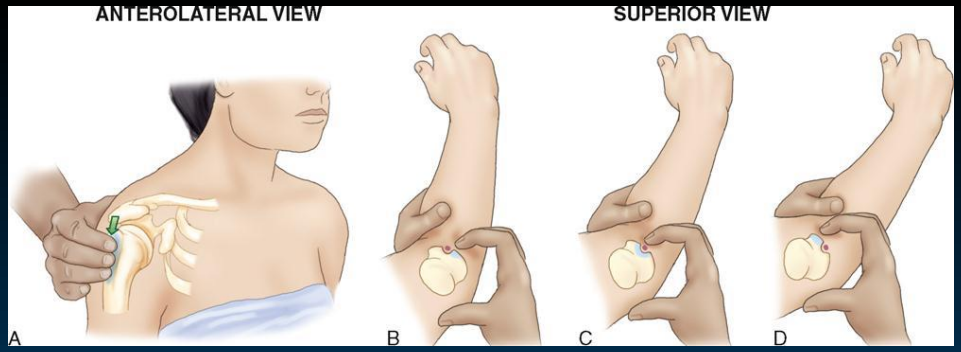


Can be more than one pathology…

- Associated with other painful, dysfunctional shoulder conditions:
  - Rotator Cuff Tear
  - SLAP lesions
  - Arthritis



Bicipital Groove Palpation



Diagnosis

TEST	SENSITIVITY	SPECIFICITY	PPV	NPV
SPEEDS	32%	75%	50%	58%
YERGASON	43%	79%	60%	65%

Holtby R, Razmjou H. Arthroscopy 2004:
Accuracy of the Speed's and Yergason's test in detecting biceps pathology and SLAP lesions: comparison with arthroscopic findings.

An Evaluation of the Provocative Tests for Superior Labral Anterior Posterior Lesions

Michael Andrew Parentis,*† MD, Ronald E. Glousman,‡ MD, Karen S. Mohr,‡ PT, SCS, and Lewis A. Yocum,‡ MD
From †The Knee Center of Western New York, Amherst, New York, and the ‡Kerlan-Jobe Orthopaedic Clinic, Los Angeles, California

Sensitive: O'Brien, Hawkins, Speed, Neer, Jobe

Specific: None

"There is no single maneuver that can accurately diagnosis SLAP lesions"

Physical Exam for Partial Biceps Tear

Gill et al AJSM 2007

- **847 consecutive patients**
- 40 with partial biceps tendon tears by arthroscopy

- Results:
  - Prevelance: 5%
  - 85% with RCT (most common association)
  - 7.5% with anterior instability

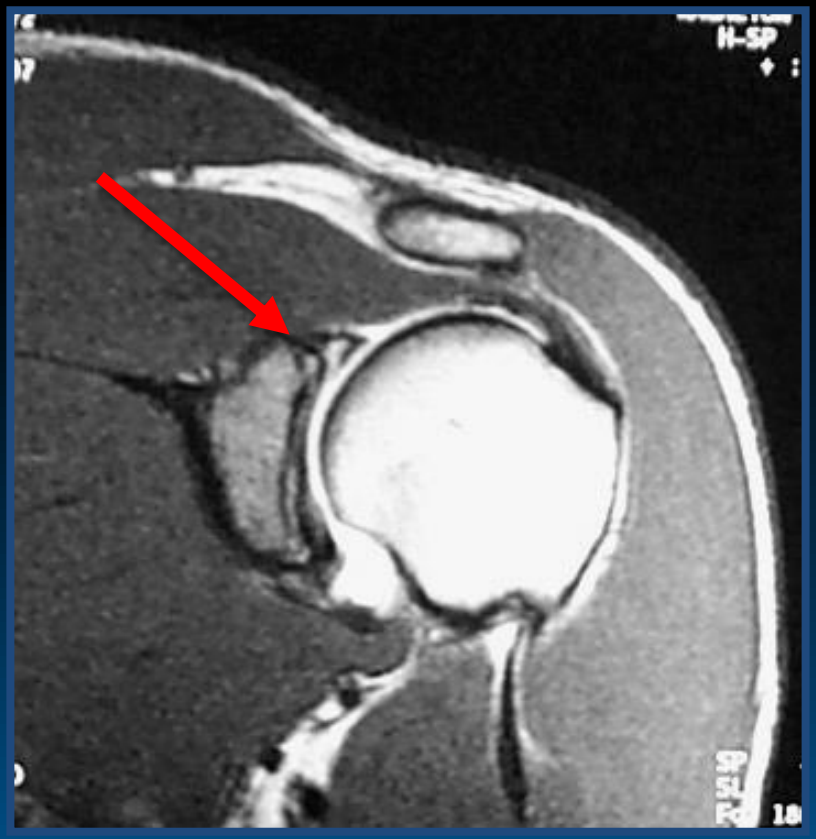
- ***Biceps tenderness:***
  - ***Sensitivity: 53% / Specificity: 54%***
- ***Speed's Test***
  - ***Sensitivity: 50% / Specificity: 67%***
  - ***PPV: 8% / NPV: 96%***

Conclusion: The diagnosis of partial biceps tears cannot be made reliably with physical examination alone

Imaging – SLAP/Biceps Anchor

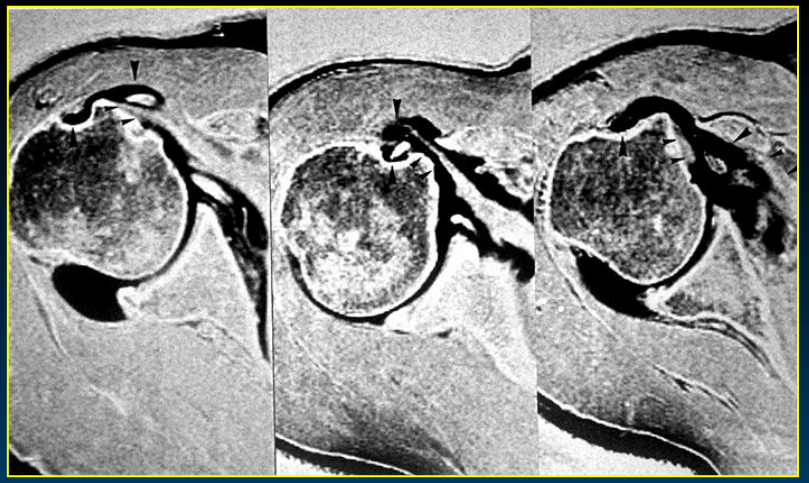
- MR arthrogram sensitive and specific for SLAP evaluation
- Superior glenoid cyst
- Cysts extending into suprascapular and spinoglenoid notch almost ALWAYS labral lesions and frequently SLAP

SLAP Lesion



Biceps Imaging extraarticular

- Axial views- biceps groove
- MRI
  - Subluxation
  - Dislocation
  - Rotator cuff pathology
  - Capsular pathology



Imaging Pearl

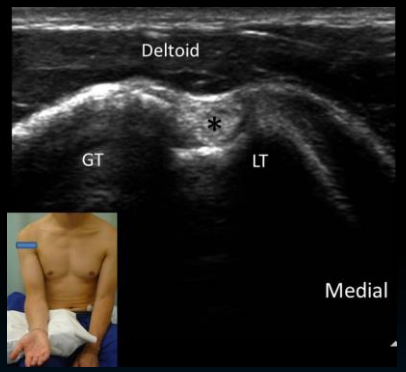
- MRI notoriously overcalls Superior Labrum/SLAP tears

- MRI notoriously undercalls LHB pathology in the bicipital groove

Nonoperative Treatment

Will work for majority

- Rest
- Ice
- NSAIDS
- PT
  - Stretching (Posterior Capsule / Internal Rotation)
  - Strengthening parascapular muscles
  - Anterior Shoulder stretching and Biceps stretching



- US guided corticosteroid injection (to GHJ vs LHB Sheath). Dx and Rx. ***No more than 2 total***

Arthroscopic Diagnosis

- Suspected if traction on biceps causes labrum to separate > 5mm
- Beware of variants
  - Often there is a cleft under superior labrum
  - Presence of cartilage suggests normal cleft
- If the anterior labrum is tensioned with pull to the biceps, a SLAP tear is suspected

SLAP Tear Treatment

Based on status of Biceps Anchor…

- Type I (Anchor stable) - Debride
- Type II (Anchor unstable) - Repair
- Type III (Anchor stable) - Debride
- Type IV (Anchor Unstable) - Repair/Tenotomy/Tenodesis

If over 40 yrs of age and unstable biceps anchor:

LHB Tenotomy vs Tenodesis

Surgical Treatment of Symptomatic Superior Labrum Anterior-Posterior Tears in Patients Older Than 40 Years

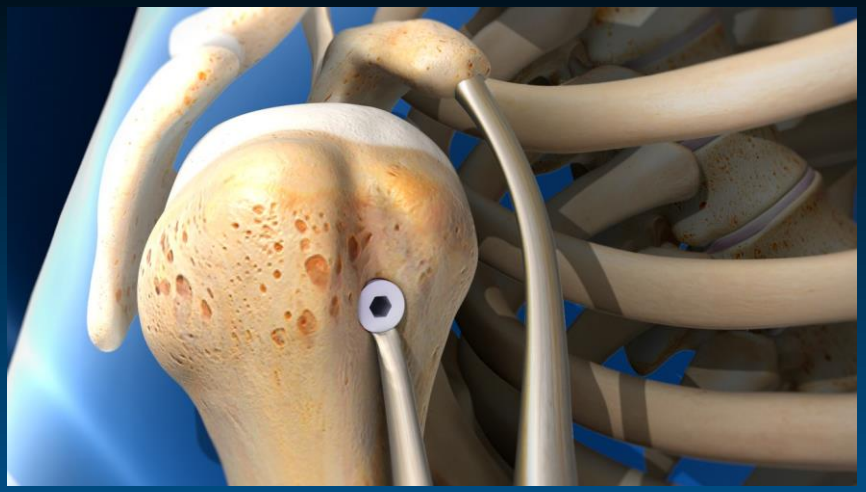
A Systematic Review

John Erickson,*† MD, Kyle Lavery,† MD, James Monica,† MD, Charles Gatt,† MD, and Aman Dhawan,† MD

- Increasing age a risk factor for complications (Esp Postoperative stiffness).
- SLAP repair should be used judiciously in age > 40 with patient education regarding risk of postoperative complications.
- Tenodesis results in better patient reported outcomes and lower risk of complications.

Surgical Treatment for LHB Bicipital Groove Symptoms

Tenotomy vs Tenodesis

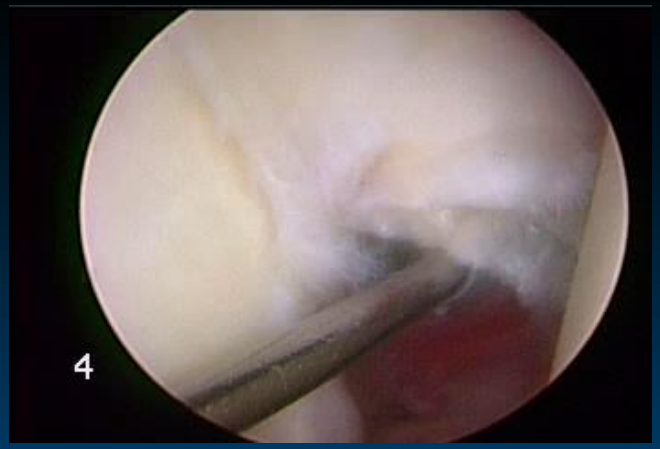


Tenotomy versus Tenodesis

- ***Frost, Zafar, Maffulli: AJSM 2008***
  - Systematic Review of Literature
  - 1 RCT, 7 Prospective Cohort Studies, 11 Retrospective Cohort Studies
  - Increase incidence in Popeye sign with Tenotomy
  - ***No difference in pt satisfaction or outcomes***

Tenotomy vs Tenodesis?

- The choice between biceps tenotomy and tenodesis for pathology of the proximal biceps should be based on surgeon and patient preference



Friedman et al, OJSM 2015

I recommend Tenotomy for:

- Age >65
- BMI > 40
- Any patient that cannot afford to be immobilized for 1 month in sling
- History of RSD/CRPS
- Worker's Comp or Pending Litigation

****Almost all others get Tenodesis****

Tenodesis Technique

Arthroscopic (Suprapectoral)

VS

Open (Subpectoral)

I perform mini-open subpec tenodesis with suture anchor because…

- Stress Fracture through stress riser proximal humerus with interference screw

  Dein et al, AJSM 2014

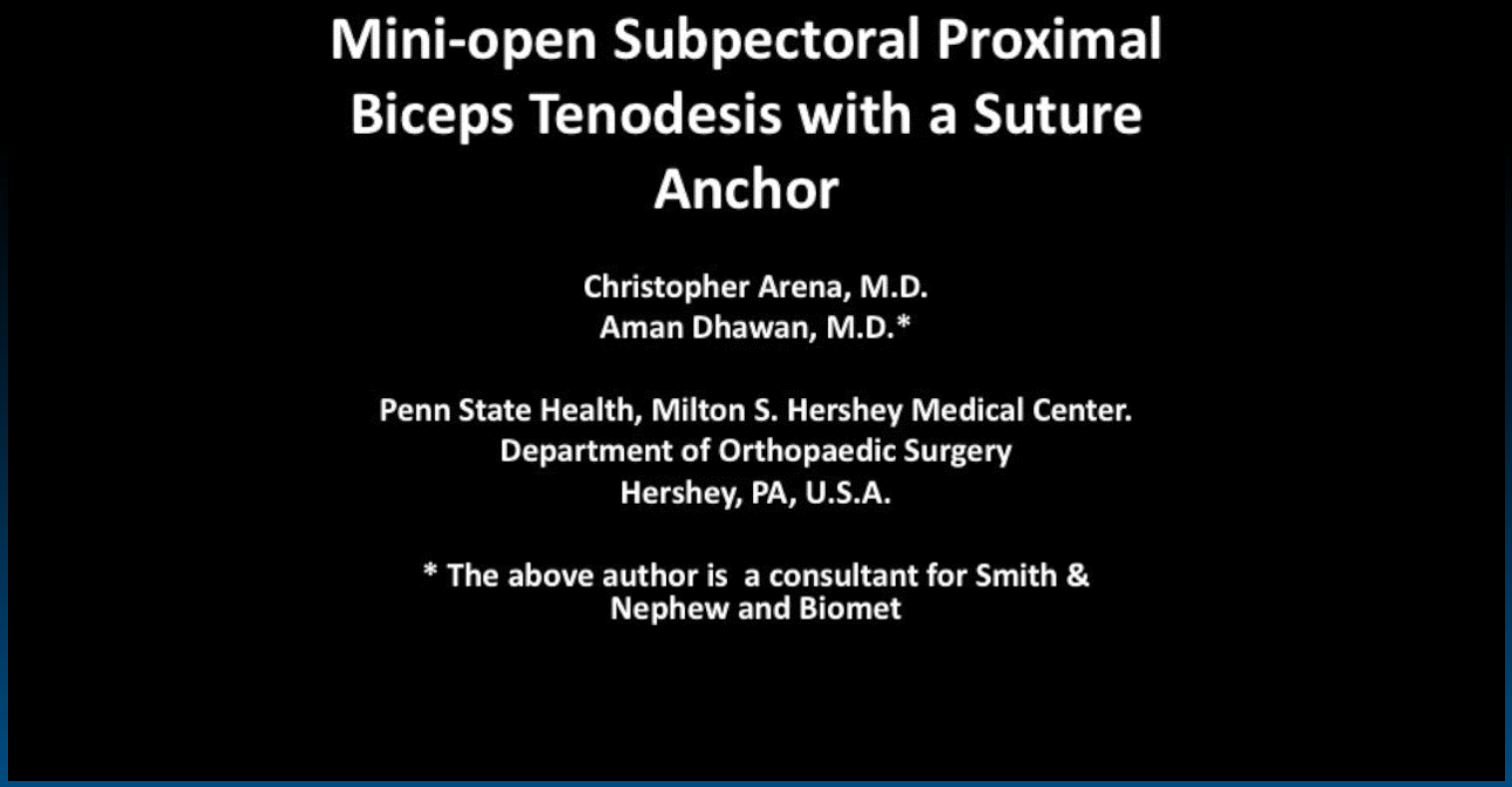
- Reaction with use of a PLLA resorbable screw

  McCarty et al JBJS 2013, Park et al AJO 2011

- Arthrofibrosis with arthroscopic technique

  Werner et al, Arthroscopy 2014

Mini-Open Subpectoral LHB Tenodesis

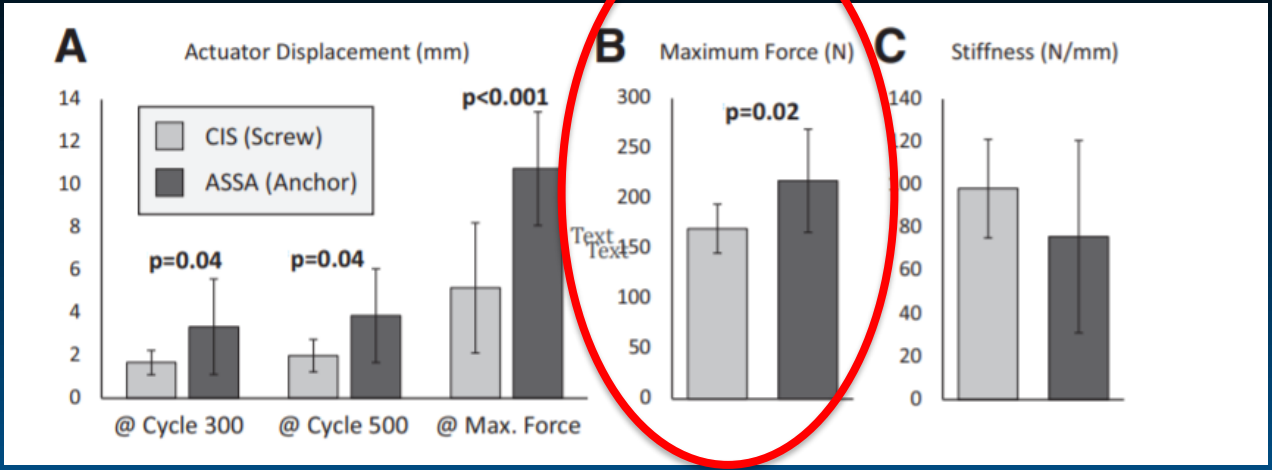


Arena and Dhawan Arthr Tech 2017

Increased Load to Failure in Biceps Tenodesis With All-Suture Suture Anchor Compared With Interference Screw: A Cadaveric Biomechanical Study

Dallas M. Smuin, M.D., Emily Vannatta, B.S., Brittany Ammerman, B.A., M.B.S., Christopher M. Stauch, B.S., Gregory S. Lewis, Ph.D., and Aman Dhawan, M.D.

Arthroscopy 2021



Complications associated with subpectoral biceps tenodesis: Low rates of incidence following surgery

Nho S, Reiff S, Verma N, Slabaugh M, Mazzocca A, Romeo A
JSES 2010

- ***2.0% Complication Rate (7 / 353)***
- Mean age of patient: 45 years old
- 57% Male / 43 % Female
- Complications:
  - 2 patients: persistent pain
  - 2 patients: Failure of fixation
  - 1 patient: infection
  - 1 patient: Musculocutaneous neuropathy
  - 1 patient: RSD

Summary

- Proximal Biceps pathology can present as Superior Labral pathology vs intertubercular pathology, and/or both
- Use composite data (Hx/PE/Imaging) to formulate dx
- Non-op tx first, most patients will do well with this
- If surgery, repair only in young, active with unstable biceps anchor and mechanical symptoms
- Open Subpec Biceps Tenodesis with suture anchor for the majority

Thank You