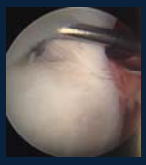
SLAP Tears In Overhead Athletes:
Should We Be Fixing Them? How Do We Fix Them?

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10th Annual Detroit Regional Sports Medicine Symposium
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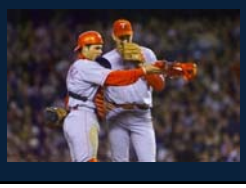


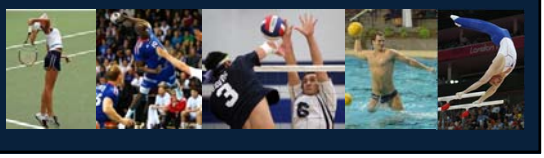
SLAP Tears In Overhead Athletes:
Should We Be Fixing Them? How Do We Fix Them?



SLAP Tears

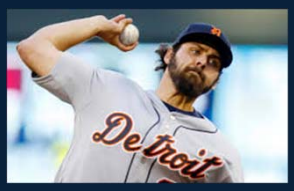
Overhead Athletes:

- Tennis
- Volleyball
- Water polo
- Handball
- Badminton
- Cricket
- Gymnastics
- CrossFit



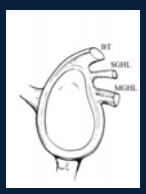
SLAP Tears

Baseball



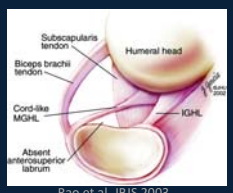
Normal Anatomy

- Fibrocartilage rim around glenoid
- Attachment of biceps
- Ligamentous attachments
- Anatomic variations



Labral Variations

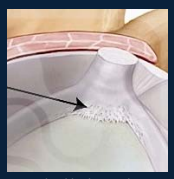
- Sublabral foramen 4%
- Cord like MGHL with absent labral tissue 1.5% (Buford)
- Foramen (present labral tissue) and cord like MGHL 8.6%

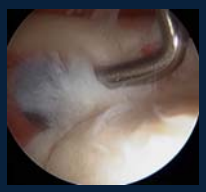


Rao et al. JBJS 2003

SLAP Types

I: Fraying, stable





shoulderdoc.co.uk

SLAP Types

III: Bucket handle tear

Stable biceps tendon

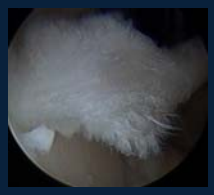
shoulderdoc.co.uk

SLAP Types

IV: Bucket handle tear

Extension into biceps tendon

shoulderdoc.co.uk



SLAP Types

II: Detached biceps anchor

IIA- anterior

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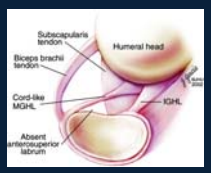

Rao et al. JBJS 2003

SLAP Types

II: Detached biceps anchor

IIB- posterior

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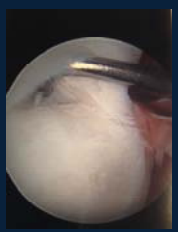
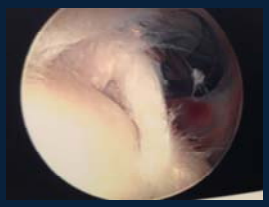


SLAP Types

II: Detached biceps anchor

IIC- anterior/posterior



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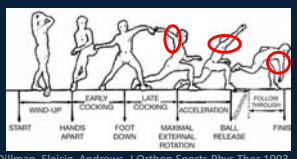
Mechanics

6 phases of pitching

- Wind-up
- Stride
- Cocking
- Acceleration
- Deceleration
- Follow-through



Dillman, Fleisig, Andrews. J Orthop Sports Phys Ther 1993

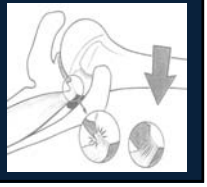
Injury Mechanism

Late cocking:

Internal impingement:

- Pathological contact postsuperior glenoid (labrum) & articular-sided RTC & GT during late cocking

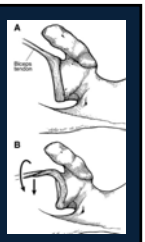
Walch G et al. JSES 1992



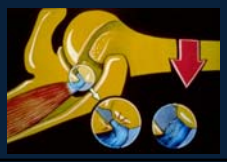
Injury Mechanism

Late cocking:

Internal impingement:



Burkhart, Morgan, Kibler. Arthroscopy 2003 (theory)



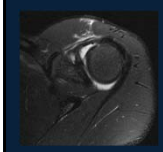
Injury Mechanism

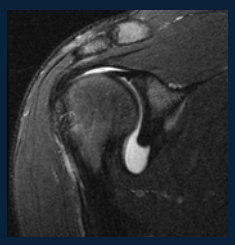
Deceleration:

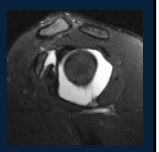
Most harmful (violent) phase as most muscles are in eccentric mode attempting to slow arm down

(chiefly the smaller RTC muscles- supra, infra, teres minor)

Imaging







Imaging

Athletes:

- MRI- 20 asymptomatic elite overhead athletes
  - 40% small full or partial-thickness tears
  - 25% Bennett's lesions
  - No findings non-dominant arm
  - Follow-up to 5 yrs (80% of subjects)
  - 0 had shoulder trouble

Connor P et al. AJSM 2003

22 y/o pitcher
PTRTC

31 y/o pro-pitcher
FTRTC

Tear or No Tear?

Analysis of Interobserver and Intraobserver Variability in the Diagnosis and Treatment of SLAP Tears Using the Snyder Classification

Reuben Gobezie,[*†] MD, David Zurakowski,[‡] PhD, Kyle Lavery,[§] Peter J. Millett,[*] MD, MSc, Brian J. Cole,[*] MD, MBA, and Jon J. P. Warner,[*] MD
From [*]The Case Shoulder & Elbow Service, Department of Orthopaedic Surgery, Case Western Reserve University School of Medicine, University Hospitals of Cleveland, Cleveland, Ohio, [†]Department of Orthopaedic Surgery, Children's Hospital, Boston, Massachusetts, [‡]Shoulder Service, The Steadman Hawkins Clinic, Vail, Colorado, [§]Rush University Medical Center, Chicago, Illinois, and [¶]The Harvard Shoulder Service, Massachusetts General Hospital, Boston, Massachusetts

2008

- 22 vignettes, 15 seconds
- 73 members AANA, ASES, AOSSM
- Difficulty distinguishing Type III from IV lesions
- Treatment of Type II more variable than other subtypes
- Difficulty distinguishing normal shoulders from Type II tears

Tear or No Tear?

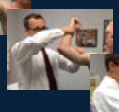
Tear or No Tear?

- Hemorrhage or granulation tissue
- Space between labrum and glenoid
- Arching with traction
- Presence of cartilage beneath labrum

Tear or No Tear?

Examination

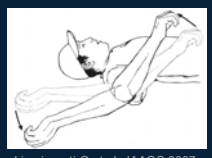
- SLAP
  - O'Brien's
    - Thumb up/down- pain mildly worse down
  - Mayo Shear
  - Savoie



Treatment

Non-operative management:

- Scapula dyskinesia
- GIRD



Limpisvasti O et al. JAAOS 2007

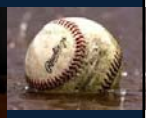
Treatment

Non-operative management:

- Rest from throwing
- NSAIDs
- Injection
- Plyometrics/proprioception
- 6 weeks for response (minimum)

Courtesy Xavier Duralde MD

SLAP Surgical Outcomes



SLAP Surgical Outcomes

Return to Play After Type II Superior Labral Anterior-Posterior Lesion Repairs in Athletes

A Systematic Review

William M. Sayde MD, Steven B. Cohen MD, Michael G. Ciccotti MD, Christopher C. Dodson MD

Clinical Orthopaedics and Related Research 2012

- Systematic review
- 506 athletes overall
  - 198 overhead athletes
- 73% overall return to previous level of play
- 63% in overhead athletes
- Anchor repair 63% vs tack 57%

Surgical Treatment

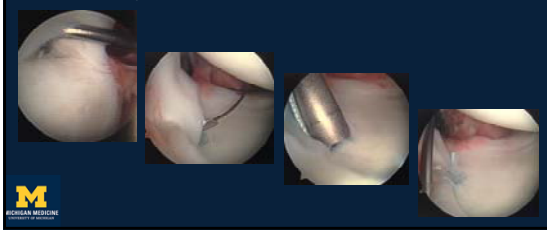
Diagnostic Arthroscopy
- Identify tear

Types I and III
- Debridement alone

Type IV
- Biceps tenodesis

Techniques & Thoughts

Type IIB- thrower/overhead athlete
- Rotator interval
- Perhaps trans-rotator cuff?



Trans-rotator cuff approach

The Trans-Rotator Cuff Approach to SLAP Lesions: Technical Aspects for Repair and a Clinical Follow-up of 31 Patients at a Minimum of 2 Years

Stephen J. O'Brien, M.D., Answorth A. Allen, M.D., Struan H. Coleman, M.D., Ph.D., and Mark C. Drakos, B.A.

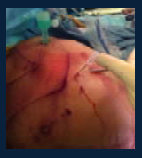
Arthroscopy

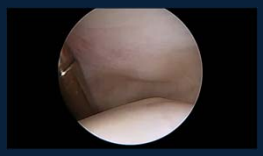
2002

- 3.7 yrs mean avg f/u
- All trans-rotator cuff approach SLAP repairs
- 0% symptoms RTC pathology

Techniques & Thoughts

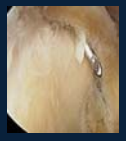
- Trans-rotator cuff
  - Medial to rotator cable
  - Smooth cannula
  - Better positioning anchors
    - Especially posterior





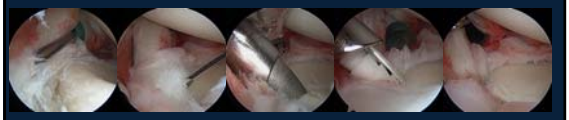
Techniques & Thoughts

- Suture passing
  - Rotator interval
  - Nevaiser if needed



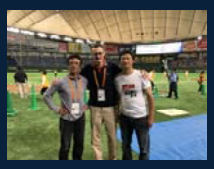
Techniques & Thoughts

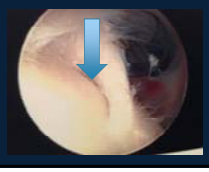
Type IIB- thrower/overhead athlete
- Trans-rotator cuff if needed
- Knotless



Missing the mark?

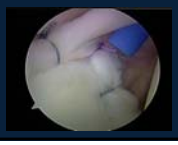
Fixation Reconsideration?





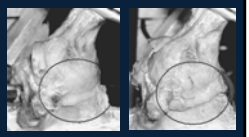
Hiro Sugaya
Why Repair SLAP so Rigid?

- Most surgeons prefer rigid repair
  - Gartsman, Morgan, Burkhart, Snyder, etc…
  - – Prevent instability during throwing
  - – Biomechanical studies
    - Translation @ GHJ increases in throwers with SLAP
      - Pagnani, JBJS 77A, 1995
      - McMahon, JSES, 2004
      - Burkart, AJSM, 2003



Anterior Laxity

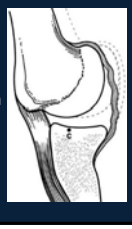
- Insufficiency anterior capsuloligamentous structures:
  - – Significant anterior translational forces
    - Late cocking/early acceleration
      Jobe et al. Orthop Review 1989
  - – 18° increase ER
    - Capsular elasticity increase 30%
      Schneider et al. JSES 2005
  - – Anterior IGHL elongates w/ excessive ER
    Mihata et al. AJSM 2004



Anterior Laxity

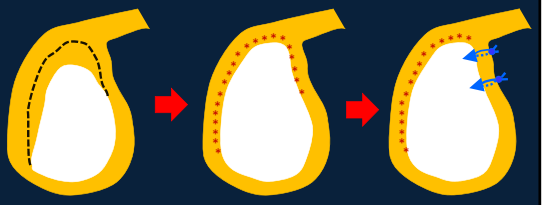
Injury:

- – HH translates anteriorly w/ late cocking
  - Increased tension of RTC
    - – Draping/abrasion of RTC on glenoid
- – Deceleration
  - Abrasion/degeneration/delamination
    Andrews et al. AJSM 1995



SLAP Surgery in Throwers

- Antero-superior corner need be stabilized for extensive lesion



Courtesy: Hiro Sugaya

History

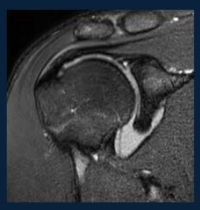
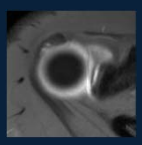
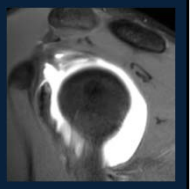
- Rt shoulder pain
- 20 y/o M varsity gymnast
- Cannot perform all 6 events (desire)
- 1 year deep pain in shoulder
- Conservative treatment
- GH intra-articular injx
  - Could compete all 6 events following
- Symptoms returned
- SSV= 50%

Physical examination

- FF 165/170 bilat
- ER 45/55 bilat
- Abd 155/160 bilat
- IR T12 bilat
- Deltoid 5/5
- Jobes 5/5
- ER 5/5
- O'Brien's +
- Mayo Shear +
- Savoie +
- Speeds- equivocal
- Biceps groove- neg
- Balanced scapula

Imaging


Imaging

What to do

- Continue PT
- PRP
- Debridement only
- SLAP repair
- Biceps tenodesis
- SLAP repair + Biceps tenodesis

Biologics

- PRP
  - Leukocyte Rich
  - Leukocyte Poor
- Stem Cells
  - Bone Marrow Aspirate
  - Adipose Tissue

No studies reporting effectiveness in SLAP lesions

Arthroscopic Debridement of Glenoid Labral Tears in Athletes

Robert J. Tomlinson, Jr., M.D., and Ronald E. Glousman, M.D.

1995

- N= 46 (30 baseball)
  - Not all SLAP
  - 54% good to excellent
  - No sport specific outcomes

Courtesy Hiro Sugaya

Some debridement, some strategic fixation points?

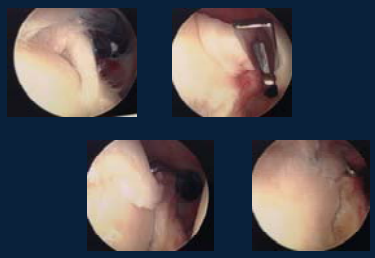
Biceps Tenodesis

- Revision for failed SLAP repair
- Index procedure?
  - rigidity of suture anchor fixation
  - loss of physiologic motion (postero-superior labrum)
  - highly innervated proximal LHB
    - primary pain generator
  - low rates of return to play w/ SLAP repair

The Future in Overhead Throwers?

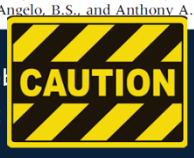
2015-2017

Tenodesis + SLAP Fixation



Incidence and Return to Play After Biceps Tenodesis in Professional Baseball Players

Peter N. Chalmers, M.D., Brandon J. Erickson, M.D., Nikhil N. Verma, M.D., John D'Angelo, B.S., and Anthony A. Romeo, M.D.



2018

- 17 pro basel
- RTP at least
- RTP all 35%
  - Pitchers 17%
  - Position players 80%
- BT alone
  - RTP 44%
- BT + SLAP repair
  - RTP 25%

Tenodesis to Conjoined Tendon

No published studies in overhead athletes

Technical Note

Arthroscopic Transfer of the Long Head Biceps to the Conjoint Tendon

Nikhil N. Verma, M.D., Mark Drakos, M.D., and Stephen J. O'Brien, M.D.

2005

SLAP Repair

Technique
- Knotless?
- Knots?

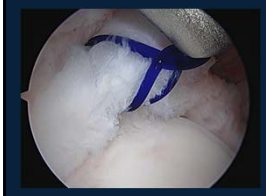
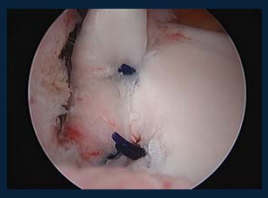
Anchor Material
- All-suture?
- PEEK?
- Biocomposite?

Suture Material
- Heavy Non-Absorbable Suture?
- Suture Tape?
- PDS?

Position
- All posterior?
- Any Anterior?

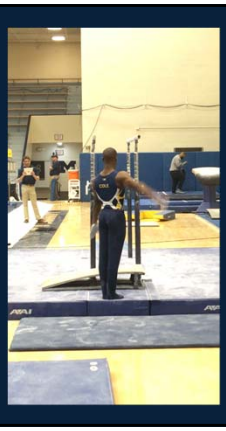
Old Technique

Case- SLAP Repair
Current Technique

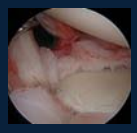
Postoperative PT

- ER sling 4 weeks
- Limited PROM for 4 wks
- AAROM < AROM starting at 4 weeks
- Strengthening exercises
  - 7 weeks
- Initiate throwing/sport specific
  - 4 mos
- Unrestricted throwing/sport specific
  - 6-9 mos



9 months out

Conclusion



- Exhaust conservative management
- SLAP repair still gold standard
  - Are we missing the mark?
- Technique Critical
  - Utilize trans-rotator cuff for optimal anchor placement
  - Do not over-constrain
  - Consider PDS
- Tenodesis in throwers/overhead athletes
  - Caution
  - Revision acceptable



Thank you