Conservative Management of SLAP/Internal Impingement/Instability

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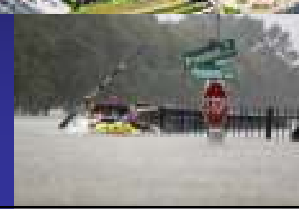
ASTROS!

Disclosures

- mTrigger
- Litecure

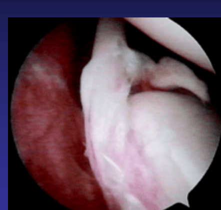
Texas Medical Center Houston

- 21 academic institutions 14 hospitals
- 33.8 million sq. ft. patient care
- 20K MD's, scientist, advanced degreed
- 25 billion GDP
- 25K babies delivered
- 106K employees
- 10.0 million patient visits annually



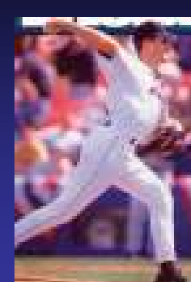
SLAP Lesion Instability

- Arthroscopic surgery = identified SLAP lesions –
- Prior to repair techniques, labral tear surgical tx = debridement
- Altchek AJSM '92 – 72% relief at 1 yr. = deterioration over time 2 yrs.
- May lead to instability due to incr. strain IGHL complex
- Current tx = repair SLAP = better long term results…
- Short term = ?



MRI findings Overhead Athlete

- Miniaci '02 AJSM
- Plain MRI = 79% of *asymptomatic* baseball players displayed *abnormal* signal
- May be normal finding, but arthrogram MRI contrast is more definitive
- Most thrower's w/SLAP have no pain unless throwing



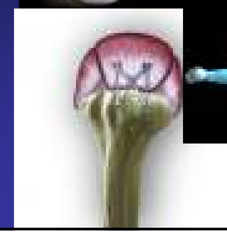
SLAP Repair Trends

- ***Zhang 2012 AJSM*** increase in SLAP repairs 2004-2009 (105%)
- 2013 Clinically see decrease in repairs increase in conservative management
- *Baseball pitcher* SLAP much different than any other SLAP patient

SLAP & RC Tear

- Klunen, Savoie AJSM 2012
- Return to high level throwing
- SLAP, *RC*, Posterior Capsular Release (GIRD)
- 35% Returned to previous level



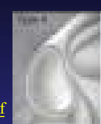
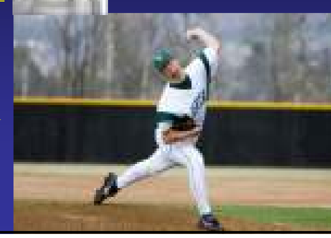


Concomitant SLAP Repairs

- **AJSM 07 Voos, Warren, MD**
- Repair of both RC & SLAP = ROM = WNL
- Must monitor ROM with concomitant SLAP Repairs
- 6 Mos. Bankhart/SLAP
- Don't forget about ***Horiz. ABD***, ***Extension***
- AJSM 2011 Neri, ElAttrace – 24 Throwers, *57% return to play without pain.*
- Inability to play = *correlation to partial RCT w/SLAP*

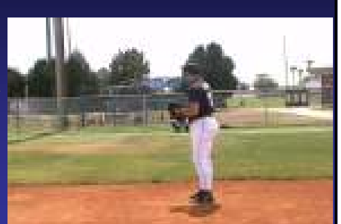
Type II SLAP Return to previous level of Throwing

- ADL's excellent results – 90's%
- *Neuman AJSM 2011* Throwing using KJOC scoring dropped from 88-72% for overhead
- *Brockmeier JBJS 09* 97% success ASES but return to pre-injury was 74%
- *Kim JBJS 2002* 94% success but 22% return to same level of sport
- *Cohen Sports Health 2011* 32% return to previous level 4 seasons
- *Sayde CORR 2012* 63% overhead athletes prior level
- *Enad JSES 2007* 77% returned to *recreational* sports
- ***Knesek,Altchek AJSM 2012***
- Conservative management of SLAP better results *Lintner et al AJSM 2014*

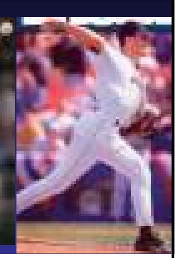
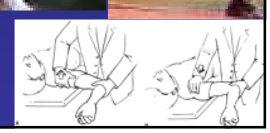
Cohen Sports Health 2011

- 28 players underwent shoulder surgery
- 21 labral repairs
- Results: 9 returned to pre-op level, 2 advanced to higher level, 5 returned at lower level, 11 retired from professional baseball
- 32% returned to previous level (4 seasons)



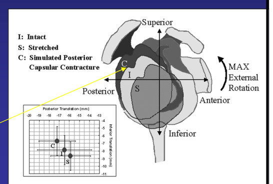
Throwers with SLAP/Internal Impingement

- Only have pain with extreme ER
- May be able to throw with lower velocity
- Symptoms occur with increased velo
- Evaluation tool = reduced posterior discomfort during manual extreme ER
- Additional eval = throwing program – 3 weeks
- MLB player = SLAP/internal impingement retirement = returned to play 5 > years

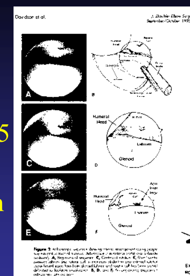
Posterior Shoulder Pain With Extreme ER/ABD

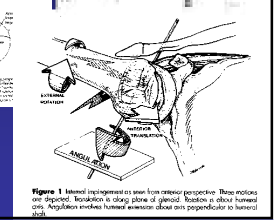
- Jobe FW AJSM '91 instability = posterior pain relocation
- Jobe CM *Arthroscopy '95* Posterior pain = impingement of RC-Greater Tub./Post.Sup. Glenoid & Labrum
- Davidson,Elattrache,Jobe *'95 JSES* Internal Impingement
- Burkhart *Clin Sports Med '2000* Measured 44 pitchers SLAP = Decreased IR by 25 deg = GIRD
- Grossman *JBJS '05* cadaveric replication of PCC



Internal Impingement

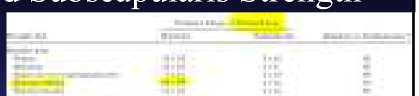
- Davidson, Jobe, Elatttrache '95 JSES
- ER/ABD with PST causes impingement of RC via Labrum

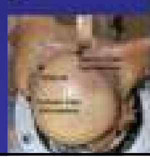


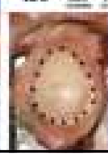


Internal Impingement Decreased Subscapularis Strength

- Baseball players fatigue = subscapularis(18%) hhead migration? <u>*Mullaney AJSM 2005*</u>
- <u>*Highest EMG throwing Jobe AJSM '84*</u>
- RC imbalance (decreased IR) = may lead to peal back = labral tear? <u>*Mihata AJSM 2009*</u>

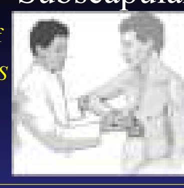


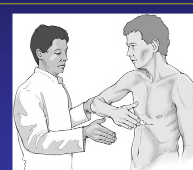




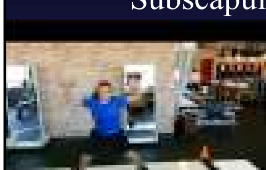
Subscapularis Firing

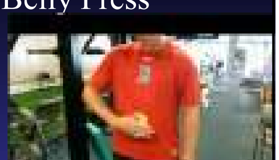
- Subscapularis testing, exercise
- Manual resisted belly off for subscapularis weakness. *Scheibel JORS '05*
- Belly Press = *Gerber JBJS '96, Burkhart Arthroscopy '02, Tokish JSES '03*
- <u>***IR=low activity for subscapularis***</u> – pect. Major, Latissimus, *Hintemeister AJSM '98, Moseley AJSM '92*
- Best Subscap exercise: Belly Press Manual Eccentrics
- DiGiovine = 90d During throwing Upper subsc.JSES'92

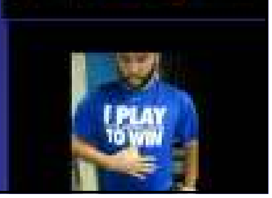




Rotator Cuff Strengthening Subscapularis Belly Press







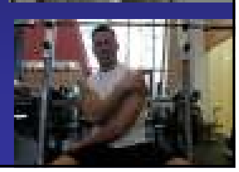
Testing – Rotator Cuff and Pain

- Testing procedure: Subjects were tested prior to injection of cortisone and xylocane, then 5 minutes after injection
- Results: <u>*% Deficit*</u>

	ABD	Scaption	ER	IR
<u>***Pre Injection***</u>:	35%	12%	<u>***37%***</u>	12%
<u>***Post Injection:***</u>	19%	8%	<u>***13%***</u>	8%
<u>***Improvement***</u>:	16%	4%	<u>***24%***</u>	4%

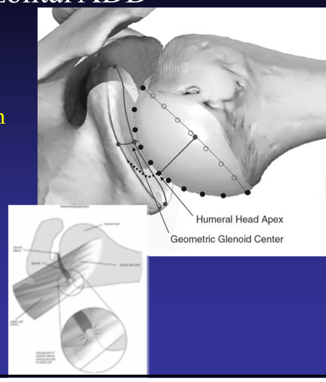
<u>Primary initial goal: control pain</u>

Posterior Cuff = Greatest Inhibition



Importance of Restoring Normal IR/Horizontal ADD

- Normal Humeral Head Position ***With ER*** is Postero-inferior position
- Tight posterior cuff/capsule = Postero-superior position
- Progression with lifting and strengthening combined with GIRD = loading of labral tear/repair

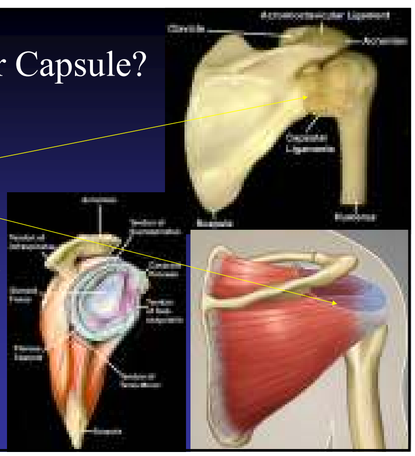


Common Clinical Natural History Posterior Cuff Shortening "Silent" Stiff Shoulder

- 12-14 y/o throwers
- Initial symptom = loss of power
- Progression = pain and loss of power
- Medical referral = no power severe pain
- Reinold AJSM Loss or IR 24 Hrs.

Cuff or Capsule?

- Determination of capsule or cuff?
- How does it alter treatment approach?
- Does it matter?



Determination of Hhead Translation

- Non-scientific
- Posterior Glide Assessment
- Lack of glide may be capsular restriction

Measurement of Horizontal Adduction

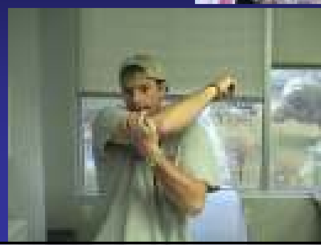
- *Laudner JATA 2006, Myers AJSM 2007*
- Supine assessment more reliable method
- Laudner AJSM 2010 = correlation between LOM Horiz. ADD & forward scapular posture

Soft Tissue Heating, Release

- Apply US, manual release to teres minor, infraspinatus tendons
- Release along muscle belly
- Palpate below posterior deltoid to "find" teres minor tendon

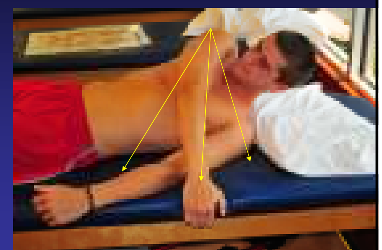
Stretching Techniques Posterior Cuff Tightness

- Sleeper Stretch
- "Genie" Stretch cross body ADD Allows control of IR ***The Athlete's Shoulder* , *Paine 2009***
- Door Stretch
- Moore *JOSPT 2011* MET (muscle energy techniques) immediate incr. IR/ADD



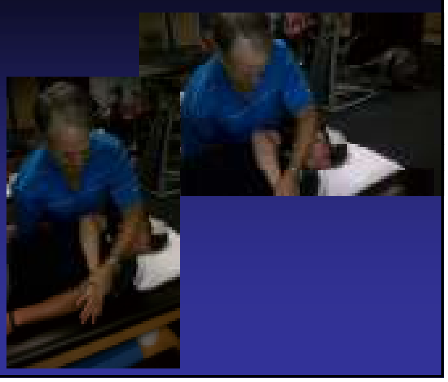
Additional Posterior Cuff Stretching Techniques

- Table Stretch
- Hold table, rotate trunk under arm
- Use body weight to mobilize posterior soft tissue restriction



Use Body for MET's

- Allows greater control



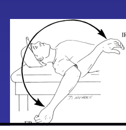
Posterior Cuff Tightness Internal Impingement/GIRD

- Tyler AJSM 2010
- Mobilization & Posterior Cuff stretching effective in resolving Sx's
- Aleviated PST(H.ADD),IR, Sx's correlated to PST improvement not GIRD

- Manske *SportsHealth* 2010 Cross Body Stretching/Mobs = increase IR

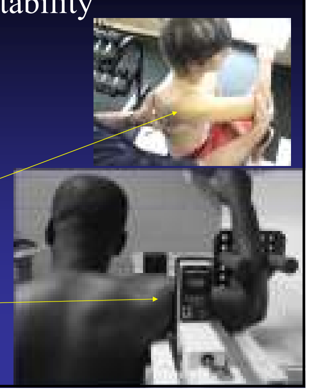
Shoulder Health

- Maintain flexibility of posterior cuff & Symmetrical Total Shoulder Rotation Meister AJSM'05 = humeral retrotorsion = ER ↑
- Wilk *AJSM '11*: 5 deg. Or more of TRM (total rotation motion) 27% >5 TRM injured 2.5x inj
- Total Rotation = IR + ER: 136 + 48 = 184NT, 129 + 59 = 188
- 28% GIRD (13d) = injured 17% (0d) GIRD injured. 78% of injured = outside the 176 TRM. Measure?



Posterior Shoulder Tightness Anterior Instability

- Laudner/Meister *AJSM 2012*
- Increased G-H laxity = Decreased PST/IR
- "Partial Predictor" Increased Laxity in Normal Throwers

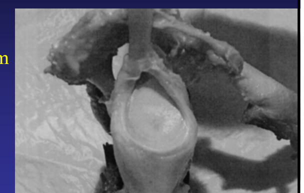


Stability Principles
What makes shoulder stable?

- GHL Complex taught at different positions of shoulder
- Labrum – "chock block" of shoulder
- Adhesion/Cohesion
- Negative Joint Pressure

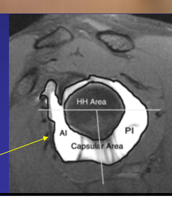
Labral Tear

- Pagnani et al JBJS 95 ***6 mm anterior translation*** 55N anterior force, 50N compressive force, 55N LHB force
- ***Partial*** tear of the superior labrum has (-) significant effect upon superoinferior or anteroposterior translation;
- ***Complete*** SLAP lesion results in significant increases in anterior and inferior translation at all arm elevations.



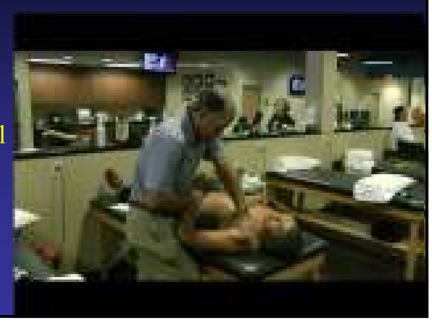
Profile: Acquired Instability Patient

- Global increased ligamentous *laxity*
- Often exceptional athlete
- Poor posture, elbow, P-F
- Scapular Control is different w/MDI *Ogston AJSM '07 upward rot)*
- ↓RC weakness
- Posterior soft tissue restriction?
- Collagen, elastic fibrils? MDI = significant decrease in collagen fibril diameter – revision MDI ***Rodeo AJSM '98***
- X Section area of capsule increased *Dewing AJSM '08*



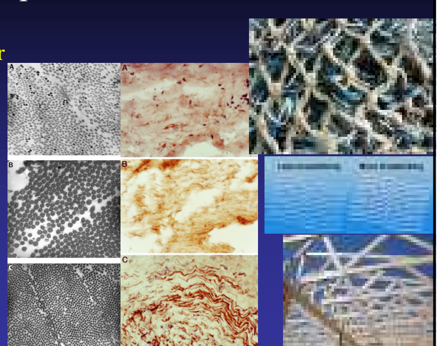
Careful With Overaggressive Stretching

- Increase in normal physiological motion



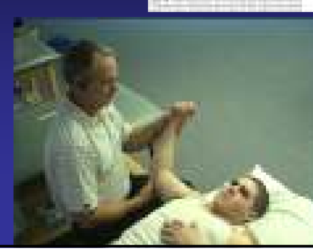
Rodeo AJSM '98 Collagen Profile
Post-op Hands-on assessment

- Decreased fibril diameter
- Decreased fibril density
- Elastin ↑ density
- Reducible ↑ (unstable) intermolecular cross links



Don't Forget About Horiz ABD
Pect. Minor Release for Elevation

- Plane of Scapula – Good for IR, ER
- Consider allowing elbow to drift into extension to achieve full cock position
- Avoid anterior soft tissue contracture
- Must restore elevation in throwers

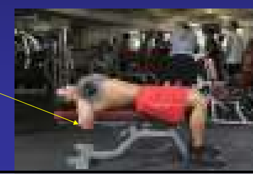


Active Standing

- Hold and lift

Acquired History

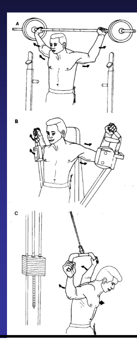
- Instability often acquired in individuals with excessive *Laxity*
- How? Sports..***swimming,*** volleyball, baseball, weightlifting
- AMBRI – *Matsen JBJS '89*

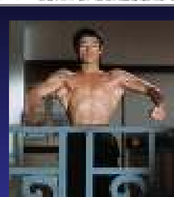


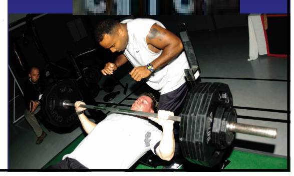
Anterior shoulder instability in weight lifters

MICHAEL L. GROSS,* MD, STEPHEN L. BRENNER, MD, IRA ESFORMES, AND JOHN J. SONZOGNI, MD

- 13 shoulders responded well to conservative measures
- 10 shoulders underwent stabilization procedures
- All were able to resume lifting







Physical Exam: Instability vs Laxity MDI

- *Laxity* = Asymptomatic hypermobility – voluntary subluxation but have ability to center humeral head
- *Instability* = pain, discomfort, fatigue – inability to maintain humeral head centering, subluxation/dislocation
- MDI symptoms = often vague, sometimes bilateral
- MDI = instabilities in 2 or 3 directions (AI, PI, I)

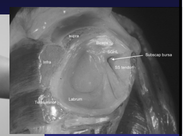
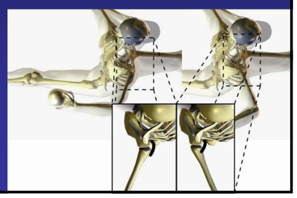
Evaluation of MDI Imbalance

4 Areas of Focus

- *Scapular* Control/Posture/Core
- *RC* strength
- *Neuromuscular* enhancement program
- *Posterior soft tissue* restriction

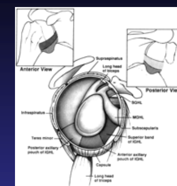
Decreased Scapular Upw Rotation in Pitchers

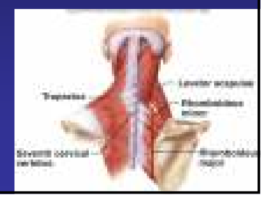
- Laudner, Stanek, Meister, AJSM 2007
- Decreased elevation in pitchers versus position players
- Causes: increased ER,Laxity – passive insuffiency Norma IGHL complex may elevate scapula when taught w ER
- Causes: Muscular tightness – pect. Minor
- Causes: Muscular fatigue
- Tight post. Soft tissue = pulls scapula creating winging

Stability Principles Dynamic Stability

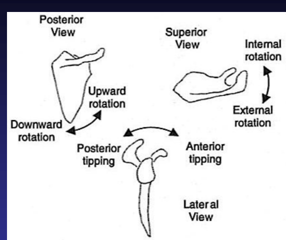
- Rotator cuff functions to compress humeral head into glenoid
- ***Scapular muscles position glenoid***
- Scapular positioning changes muscle force vectors

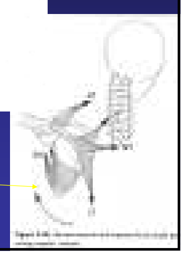




Biomechanics of Scapular Motion

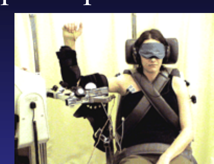
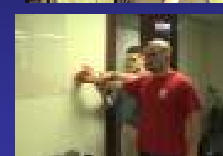
- Upward & Downward Rotation
- Anterior & posterior Tilting/Tipping
- Internal & External Rotation
- Which is predominate motion?





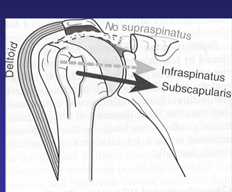
Stability Principles Co-contraction Proprioception

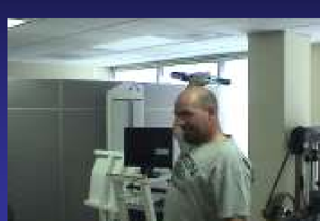
- **Reflexive Muscle Activation Alterations in Shoulders With Anterior Glenohumeral Instability**
- **Joseph B. Myers, PhD, ATC*, , Yan-Ying Ju, PhD, PT, ATC , Ji-Hye Hwang, MD, PhD , Patrick J. McMahon, MD , Mark W. Rodosky, MD and Scott M. Lephart, PhD, ATC**
- AJSM 2004
- Strength ***PLUS*** Smart RC

Advanced Stabilization Routine

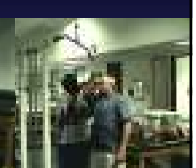
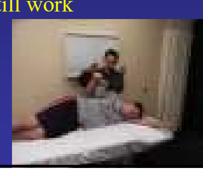
OTIS 3 sets of 30 sec.





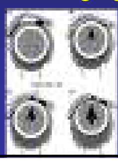
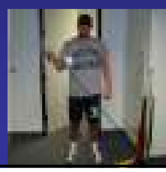
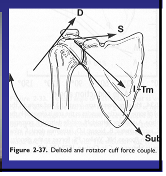
Advanced/Combo RC Strengthening

- Combination deceleration
- 90/90 good if have no shrug
- Isokinetics still work

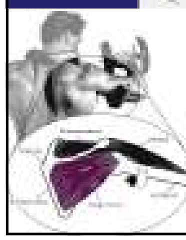





Improving Dynamic Compression

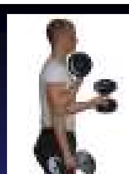
- Effective use of RC forces
- "Power Up" RC engine
- Begin lifting light weight proper technique – 2 sec. hold "up fast, down slow"
- Avoid Shrug sign

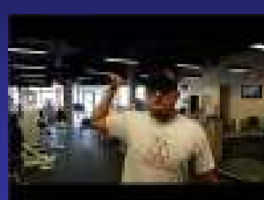
Avoiding Shrug Sign
Slow Down Deltoid to Isolate RC

Biceps Curls

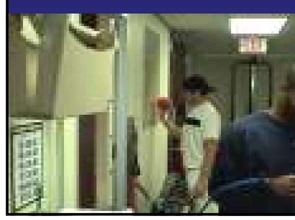
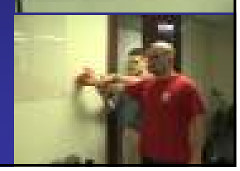



- Preacher curls – can be painful for shoulder with pathology
- Arm is fixed, doesn't allow normal shoulder function
- Reverse contraction could cause anterior translation of humeral head
- Standing curls with supination during curl is safer

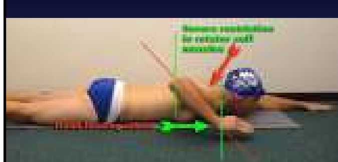
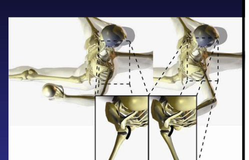


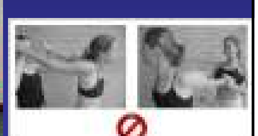
Advanced Closed Chain Routine – be aware of direction of applied external force

- Bear crawl swiss ball
- Standing plyoball stabs - Wilk

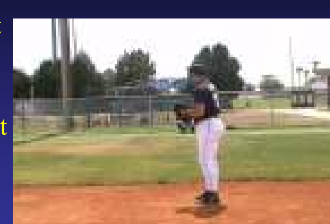
Swimming technique
Lack of Trunk Rotation



Success of Conservative SLAP

- 2-3 mos of treatment begin throwing program
- Lack of advancement in throwing program = *conservative thrower failure*



Conclusion Posterior Shoulder Tightness

- Evidence supports stretching when unilaterally decreased
- Cuff or Capsule – rehab – mobs. or not
- Reduction of PST improves internal impingement symptoms, may help instability symptoms
- Associated with decreased RC strength – focus on posterior cuff/scapula for improved hhead position
- Hands-on treatment approach
- Often alleviates posterior pain but biceps tendon pain with throwing persists