Management of Shoulder Multi Directional Instability
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Stability Principles
What makes shoulder stable?
• GHL Complex taught at different positions of shoulder
• Labrum – “chock block” of shoulder
• Adhesion/Cohesion
• Negative Joint Pressure
• MDI = X sectional area may limit joint congruency

MDI with Labral Tear
• Pagnani et al JBJS 05 6 mm anterior translation 55N anterior force, 55N 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: MDI 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

Ligaments
• Inferior GHL: • most consistent • avulsed in Bankart lesion

Scapula
• Glenoid – Nearly perpendicular to scapular plane
• 7.4 retroversion (75%)
• MDI may have increased retroversion = postero-inferior humeral head motion
Rodeo AJSM ‘98 Collagen Profile

MDI, Revision MDI

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

MDI History

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

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 Upward Rotation in Pitchers

• Laudner, Stanek, Meister, AJSM 2007
• Decreased elevation in pitchers versus position players
• Causes: increased ER, Laxity? – passive insufficiency Normal 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
Swimming technique
Lack of Trunk Rotation

Wall Push Isometric 45 degrees
- Both “fingertips” pushing into wall
- Observe unilateral backward winging: downward rotation, anterior tipping, internal rotation of scapula

Force Couples
Scapula
- 2 forces acting in opposite directions to produce rotation about an axis
- S3 Spine, scapula stabilizing

Scapular Stability

Scapular Control Exercises

Kibler AJSM 2008
EMG Early Phase Exercises
- Robbery – scapular retraction move elbows toward back pockets
- Lawnmower – Lower trap, Serratus Anterior
Strengthening Techniques

- Rhomboids: Seated Rows, Cable Column Cocking, Manual Resisted Sideling
- Dynamic Hug: Serratus, Subscapularis JOSPT

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Scapular Strengthening Safe

- Try single arm rowing isolated rhomboids
- Trunk/Serratus row with metal bar

Strengthening Techniques:

- On all fours: Wt. Bearing extremity is involved, resist flexion extension of NWB extremity to force scapular stabilization
- Seated Pike, Prone scaption, lower trap.

Function of RC

Humeral Head Centering

- Normal position of RC = humeral head center varies only 0.3mm
- Fatigue of RC = 2.5mm superior migration of hhead.
- Chen JSES ’99

Stability Principles

Strengthening Dynamic Stability RC

- Rotator cuff functions to compress humeral head into glenoid Focus on IR/ER
- Scapular muscles position glenoid
- More compression = less shear = less stress to labrum
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

Stability Principles
Co-contraction Proprioception

- Reflexive Muscle Activation Alterations in Shoulders With Anterior Glenohumeral Instability
- Joseph B. Myers, PhD, ATC*, Yanti-Fing 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 Closed Chain Routine – be aware of direction of applied external force

- Bear crawl swiss ball
- Standing plyoball stabs - Wilk

Closed Chain
DS2 Gradual Progression

- Roland Ramirez
Houston Texans PT/ATC
- Allows external compression to facilitate joint compression
- Stimulates co-contraction and endurance of UE.

Super 6
Tubing Routine

- Allows most specific form of training to mimic throwing motion
- 2 sets of 30 sec. each position
**MR Systems Computerized Muscle Control**

- Provides RC recruitment, proprioceptive input, endurance
- Allows specific positioning of arm/shoulder

**Advanced Stabilization Routine**

OTIS 3 sets of 30 sec.

**Upper Extremity Functional Test: Frisbee release**

- Allows full muscle relaxation
- Quick efficient treatment

**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

**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

**Posterior Shoulder Tightness Anterior Instability**

- Laudner/Meister AJSM 2012
- Increased G-H laxity = IR IPST
- "Partial Predictor" Increased Laxity in Normal Throwers
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
- MDI? Symptoms PST restriction
- Reinold AJSM Loss or IR 24 Hrs.

Stretching Techniques
Posterior Cuff Tightness
- Sleeper Stretch
- “Genie” Stretch cross body ADD
- Allows control of IR
- Door Stretch

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

Shoulder Instability
Weight Lifting Guidelines
- Exercise can be helpful or harmful
- Pt./personal trainer education following shoulder pathology part of rehab. process

Anterior shoulder instability in weight lifters
Michael L. Gross, MD, Stephen L. Brenner, MD, IRA ESFORMES, AND JOHN J. GONZAGA, MD
- 13 shoulders responded well to conservative measures
- 10 shoulders underwent stabilization procedures
- All were able to resume lifting

Bench Modifications
- Keep elbows to side, less than 45 deg. ABD
- Maintain extension less than 15 deg.
- Excessive bench = A/C DJD
- Fees AJSM ’98
Push-ups

- No different than bench press
- O.K. if keep 45d. ABD and limit shoulder extension to 15d
- Be careful during rehab process w/closed chain exercises

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

Conclusion MDI

- Strengthen Scapula
- Fire-up RC
- Stabilization Drills
- Focus on specific weakness of individual
- Look for PST Scapular/RC
- Education – key

Guerrero JOSPT 2009

Scapular position hyperangulation