Training for the Scapulothoracic Joint and Thoracic Spine

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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 14 billion annual economic impact 93,500 employees

10 million patient visits





Stability Principles Dynamic Stability

- Rotator cuff functions to compress humeral head into glenoid
- <u>Scapular muscles</u> <u>position glenoid</u>
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- Scapular positioning changes muscle force vectors





Scapular Muscles Stabilization & Rotation

- Serratus Anterior
- Rhomboids
- Levator Scapulae
- Trapezius



Scapular Muscles Extrinsics

Deltoid

- **Biceps**, Triceps
- Pectoralis Minor
- Lack of scapular strength may lead to reverse contraction: deltoid *downwardly* rotates scapula instead of lifting humerus
- Action counteracted by rhomboids lower trap



- Scaffold for attachments
- Positions glenoid
- Allows UE
- movement
- Thoracic.
- spine
 - interplay

Function of Scapula

Why Thoracic Spine Extension?

- Decreased thoracic extension may lead to compensation
- Increased arm extension required placing more stress on anterior shoulder
- Possible increase in lumbar spine extension to compensate
- Incr. T-rot towards non throwing side – *pitchers* (follow through)
- Laudner IJSPT 2013 Ericcreessey.com



Golf Swing and Injury

Body must follow F direction If body follows altered position of *ground* F, postural alterations lead to injury Finds anatomic weakest link Not an easy game Kevin Kirk!















Thoracic Spine Rotation Strengthening

Now have extension

- improvement
- Begin Thoracic
- Rotation Strengthening
- If imbalance may
- elect to de-rotate
- Both directions









Dyskineses: Kibler JSES '02

- I. Tilting of inferior angle (anterior tipping)
- II. Internal rotation • III. Excessive
- elevation superior border (downward rotation)
- Ellenbecker CORR '11 Low reliability





ubiective





Decreased Scapular Upward Rotation in Normal Pitchers Laudner, Stanek, Meister,

- AJSM 2007 Downward rotation in
- pitchers versus position players
- Causes: increased ER, Laxity? passive insuffiency 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





Scapular Position in Throwing Versus Non-Throwing Athletes

- Myers AJSM 2005 <u>Not</u>
 measured while throwing
 Throwing athletes showed
- increased <u>retraction</u>, elevation, internal rotation No difference in a/p tipping
- Nondominant limb not assessed



HS versus Collegiate Baseball Players Div I throwers had increased protraction, downward rotation (posture) than HS Thomas JATA 2010 Also increased GIRD, TRD Measurements using digital inclinometer, and Kibler lateral slide Test re-test reliability by same tester Lateral slide not reproducible between examiners Ellenbecker CORR 2011

Normal Preadolescent and Adolescent Hip and Scapula

- Beckett AJSM 2014
- Adolescents had positive scapular dyskinesis (y/n) 50% versus 26%
- Poor SL squat (hip) both grps. 0, 13% 3.5x more mos. of throwing in adolescents (9.2 mos total)
- Skeletal maturation

position

• Scapular pull

- Increased forward shoulder
- May have increased risk



Coracoid Measurement Increased distance from table Tight Pec. Minor Upward tilt scapula

Posterior Shoulder Tightness Forward Scapular Posture Laudner AJSM 2010 Posterior shoulder tightness = forward scapular





Scapulo-Humeral Relationship

- Upward arm movement: Ratio
- 2:1 GH/ST = Overall
- Popen & Walker JBJS
- 1st 25 deg. Elev = 4:1
- Beyond 25 deg. = 5:4
- Dynamic 3# dumbbell lift, view lowering phase to assess











Muscle Functions Scapula Proximal Stability Promotes Distal Mobility

Rhomboids - provide retraction = brake of shoulder

Eccentric control of medial border during acceleration Scapular Control allows NM switches to take over relaxed performance

Core stability shares load of UE







Muscle Functions Scapula

- Rhomboids provide retraction = brake of shoulder
- Eccentric control of medial border during acceleration
- Golfer: <u>Trail Shoulder</u> requires maximum scapular retraction plus eccentric control















EMG mTrigger biofeedback

 Channel 1 (L) = posterior cuff
 Channel 2 (R) = Serratus lower

fibers





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.









Super 6 Tubing Routine

Allows most specific form of training to mimic throwing motion

2 sets of 30 sec. each position Role of the Scapula

IJSPT 2013 Paine Voight





Standing "snow angels"

- Begin with no resistance, 3x20
- · Working on scapular synchrony
- Attempt to keep back of hand/forearms against
 wall
- Progress to 2# cuff weights
- Demanding routine



Adjustable Cable Column

Allows adjustment

for various positions

Lower trap

strengthening,

elbows down to back pockets



Closed Chain Exercises

- Be careful if you do it
- Loads RC, not good for posterior instability
- Load in Scapular





Advanced Closed Chain Routine – be aware of direction of applied external force • Bear crawl swiss ball • Standing plyoball stabs • Wilk



Summary Scapular Function • Scapular muscles help propel & position • Base of support = crucial to prevent injuries, improve performance • Look for shoulder soft tissue restrictions • Include scap in all shoulder rehabilitation & conditioning routines • Handouts: mTrigger.com

Contraction of the local division of the loc