THE SHOULDER COMPLEX

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- Logan College of Chiropractic (faculty)
- Motion Palpation Institute (faculty)
- Dynamic Neuromuscular Stabilization (faculty)
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- Throwing Consultant owner

ASSESSMENT
Do within-session changes in pain intensity and range of motion predict between-session changes in patients with low back pain?
Andrew J. Hahne, Jennifer L. Keating, Simon C. Wilson

Within-Session Reassessment

- Maitland
- Cyriax
- Kaltenborn
- Mennell
- Mulligan
- Butler
- McKenzie

Each profession or group presumably has something to offer and surely they all can’t be correct. Somehow we need to extract what is common and beneficial from the various groups.”

David Butler, The Sensitive Nervous System

The Exam or Playbook

- Posture Evaluation
- Gait Evaluation
- Neurologic Examination
- Joint Assessment
- TrP Assessment
- Soft-Tissue Assessment
- Mechanical Diagnosis (Mckenzie)
- Functional Testing
FUNCTIONAL TRIAGE

EXAMINATION & ASSESSMENT

- Pt Classification Directional Preference (McKenzie)
- Neuro-Muscular Assessment (Janda, Sahrmann, Kendall)
- Dynamic Stabilization (Kolar, McGill, Hodges)
- Tri-planar Strengthening and Stretching (Gray)
- Neuro-Dynamics (Butler, Elvey, Shacklock)
- Soft-Tissue Assessment and Tx (Lewit, Hammer, Leahy)
- Joint Motion Palpation (Faye, Gillet, Mennel)

TREATMENT PRIORITIZATION

(an example)

Joint Restriction
Mckenzie
Spine Stability

The Exam or Playbook

- Posture Evaluation
- Gait Evaluation
- Neurologic Examination
- Joint Assessment
- TrP Assessment
- Soft-Tissue Assessment
- Mechanical Diagnosis (Mckenzie)
- Functional Testing
Have a Plan!

Simon Sinek: How great leaders inspire action

Clinical Reasoning (Butler, 2000)

EVIDENCE INFORMED CARE
Shoulder Proprioception

- Efficient movement function, control of alignment and balance of the dynamic body is more complex than force production from muscles
- Lephart found significant deficits in kinaesthetic sense and repositioning accuracy in unstable shoulders
- Requires sensory, biomechanical, and motor-processing strategies (Jagr)
- Gandevia states 3 key sensations
  - Sensation and position and movement of joints
  - Sensation of force, effort, heaviness of workload
  - Sensation of perceived timing of muscle contraction
Short-Term Effect of Spinal Manipulation on Pain Perception, Spinal Mobility, and Full Height Recovery in Male Subjects with Degenerative Disc Disease: A Randomized Controlled Trial.


Conclusion: An HVLA SM in the lumbosacral joint performed on male subjects with degenerative disc disease immediately improves self-perceived pain, spinal mobility in flexion, hip flexion during the passive SLR, and subject's full height. Future studies should include female subjects and should evaluate the long-term results.

- Spinal afferentation as a result of Manipulation
  (Korr 1979, Sato 1992, Chu & Wright 1996)

- Suprasegmental changes, especially in brain function, have demonstrated the central influence of altered afferentation of spinal levels
Sensory and Motor functions are very closely inter-related"  
(Pavel Kolar, 2013)

- Correct sensation is the foundation for good quality of any desired movement
- Assessment of sensory function is very significant in rehabilitation and should a routine part of a complete examination of a patient

Cortical Function

Sensory Integration – processing all information at the level of the cortex (taste, sight, hearing, touch, smell, proprioception, interoception, vestibular apparatus, etc)

- Altered multi-sensory CNS integration may result in poor motor planning, poor motor re-education (Polatajko and Cantin, 2005),
- Insufficient uni- or multi-sensory integration at the cortical level may lead to painful syndromes within the locomotor system (Flor et al., 1997; Imamura et al., 2009).
- Injuries, degenerative joint disorders, enthesopathies, orthopedic problems resulting from chronic overload and repetitive stress injuries including focal dystonia are typical consequences (Harris, 1999, Byl NN 1996, Topp 1999).
**Graphesthesia**

Reading numbers and letters on the skin with detection of their direction

**Topognosis**

Skin perception influences our motion (Edin and Johansson, 1995)

Skin input contributes to both dynamic position and velocity sense (Cordo et al., 2001)

**Stereognosis**

The ability to recognize the characteristics of a certain object is being tested (size, temperature, hardness, shape, weight) while placed on the skin (in the palm of the hand) without visual control.

**Pallesthesia**

**Vibration**

- graduated C128 Hz tuning fork
- Can the patient feel it, and for how long?
- the interphalangeal joints, ankles, knee, ASIS, or the styloid process of the radius
Two-Point Discrimination

<table>
<thead>
<tr>
<th>Body Region</th>
<th>Threshold (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingers</td>
<td>2</td>
</tr>
<tr>
<td>Palm of hand</td>
<td>10</td>
</tr>
<tr>
<td>Upper arm</td>
<td>45</td>
</tr>
<tr>
<td>Back</td>
<td>40</td>
</tr>
<tr>
<td>Thigh</td>
<td>45</td>
</tr>
<tr>
<td>Sole of foot</td>
<td>20</td>
</tr>
<tr>
<td>Big toe</td>
<td>10</td>
</tr>
</tbody>
</table>

Assessment: Proprioception

Sense of position & Motion

Position perception
- We passively put a segment into certain position
- The patient’s eyes are closed
- He/she is asked to put the corresponding contralateral segment in the same symmetrical position
Summation of Force (Kibler)

Figure 13.1 The summation of speed principle illustrated by a throwing example. Each increasingly distal segment begins accelerating when the cephalic proximal one matches its maximum.

Summation of Force

Sequence

Ground reaction force

Wrist
Elbow
Shoulder
Trunk and Back
Hips
Lags
Ground
• Dr. James Andrews, a widely known sports medicine orthopedist in Gulf Breeze, Fla., wanted to test his suspicion that M.R.I.’s, the scans given to almost every injured athlete or casual exerciser, might be a bit misleading. So he scanned the shoulders of 31 perfectly healthy professional baseball pitchers

• The pitchers were not injured and had no pain. But the M.R.I.’s found abnormal shoulder cartilage in 90 percent of them and abnormal rotator cuff tendons in 87 percent. “If you want an excuse to operate on a pitcher’s throwing shoulder, just get an M.R.I.,” Dr. Andrews says.

Potential Pitfalls

• Neuromuscular Control/Functional Movement/Jt Motion (platform)
• Functional Performance (athleticism)
• Task Skill (ex. Pitching)
The Problem

- Keep the humerus and scapula as congruent as possible during all movements
- Have neuromuscular stability and anchoring
- Scapula can load at end-range all 3 planes
- Hip can assist scapula in all 3 planes

The Solution
Exercise and Treatment

- Establish ROM with Wall Slides, Scap Matrix
- Soft Tissue Treatment for adhesions
- Manipulation to upper-t-spine, gh, sc
- Quadruped exercises for Scapular Stability
- Train Rotator Cuff for endurance
- Kinetic Chain Landmines

* 2-3 times a week for 3 weeks and re-evaluate

Conducting the “non-shoulder” shoulder examination

- Alterations in Kinetic Chain drive GH problems (50-100%)
  - Core instability
  - Scapular Dyskinesis
  - Hip Mobility & Strength
  - GIRD
    - Glenohumeral
    - Internal
    - Rotation
    - Defect

- Ben Kibler, MD

(TrP's, Fixations, Subluxations are a result of poor stabilization in the locomotor system)

Karel Lewit, 2008
14 times disabled list

- 1999: ucl, tommy john
- 2004: strained tricep
- 2005: shoulder surgery, knee (hot-tub), back on dl for shoulder, partially torn rotator cuff
- 2007: 60 day dl shoulder soreness
- 2008: upper back muscle strain

300 game winners

1. Cy Young — 511
2. Walter Johnson — 417
3. Grover Alexander — 373
3. Christy Mathewson — 373
5. Jim Gallivan — 365
6. Warren Spahn — 363
7. Kid Nichols — 361
8. Greg Maddux — 355
9. Roger Clemens — 354
10. Tim Keefe — 342
11. Steve Carlton — 329
12. John Clarkson — 328
13. Eddie Plank — 326
14. Nolan Ryan — 324
15. Don Sutton — 324
16. Phil Niekro — 318
17. Gaylord Perry — 314
18. Tom Seaver — 311
19. Charley Radbourn — 309
20. Mickey Welch — 307
21. Tom Glavine — 305
22. Lefty Grove — 300
22. Early Wynn — 300
22. Randy Johnson — 300

“W” or “M” (Paul Nyman)

The only thing that Dr. Fleisig has said about Stephen Strasburg is: “What makes [Strasburg] good is that he doesn’t have a weak link in his chain of events or a mistimed motion.”
Great Scapular Loading

• Notice the elbow is below the shoulder during scapular loading
• Also notice 7 no-hitters, 27 year career, 65,000 pitches, 100.9 mph recorded fast-ball
Inverted “W”

• More than 90 deg of arm abduction with the elbow higher than the shoulder
• Combined with 5 or more degrees of shoulder adduction

Footwork

• Controlled valgosity of the front knee is a necessary loading mechanism
• This is a natural loading mechanism, as you see the forefoot abduction to drive pronation/eversion/loading
Calcaneal Eversion

Gravity and Ground Reactive Forces
(Gary Gray)

- Hip internal rotation
- Knee Valgus
- Tibia internal rotation
- Dorsiflexion
- Subtalar eversion
- Midfoot dorsiflexion
- Hallux extension

Josh Beckett requires a considerable amount of dorsiflexion range-of-motion to get the job done (push-off without the heel leaving the ground).

Eric Cressey
http://ericcressey.com/the-importance-of-ankle-mobility
8 inch step-down (sagittal plane)

- All athletes should be able to do this for normal functioning of foot and ankle complex
- Some can accomplish this, but notice the compensation strategies
- Heel down
- No foot flare

Tri-Planar Balance Reaches (when in doubt)
**Hip Internal and External Rotation**

**Follow Through**

- Non-dominant hip goes through significant flexion and internal rotation after ball release.

**Anterior Hip Extensibility**

**Leg/Hip Strength**
The low back is stabilized via intra-abdominal pressure

Food For Thought

- Notice how respiratory diaphragm and pelvis (pelvic floor) are directly over each other
- Compressed cylinder (IAP)

“I can see how he won 25 games,” Yankees catcher Yogi Berra said. “What I don’t understand is how he lost five.”
“Upper-limb activation has an excitatory effect on lower limb activation during locomotor tasks”  
Ferris, Huang, Kao 2006
Discussion and Conclusion

The CPR provides the ability to a priori identify patients with neck pain who are likely to experience early success with thoracic spine thrust manipulation. However, future studies are necessary to validate the rule.
T4 Extension

- Upper T-spine extension is required to accommodate the later range of bilateral flexion of shoulders, while ipsilateral flexion of the upper T-spine is observed during unilateral shoulder elevation (Culham & Peat 1993)
- Changes in upper T-spine mobility may lead to sub-acromial pathology due to the effects on scapula and glenohumeral mechanics (Sobel et al 1996)
- Restriction of upper rib mobility may produce symptoms of impingement (shoulder) or TOS (Lindgren & Leino 1988, Boyle 1999)

**T4 Extension- A Necessary Prerequisite**

- To activate DNF
- To efficiently load scapula
- To eccentrically activate anterior abdominal wall

**T4 Mobility Screen**

- Test
- Stand with arms externally rotated and supinated & feet slightly forward
- Try to flatten back
- Record
  - Does back flatten
  - Where does pt feel tension
**Wall Angel Slide**

- All encompassing
- Gives clinician a starting point
- Educates pt on function and gives endpoint to tx
- AUDIT (before and after tx)

**T4 Extension Functional Assessment**

- **Procedure**
  - Stand with back against wall (feet slightly forward)
- **Fail if:**
  - Lumbo-Pelvic jtc hyperextends
  - Arms do not reach vertical plane
  - T-Spine kyphosis remains

**Articular T4 Extension**
Clinically based observations suggest that most syndromes involving the shoulder arise from impairments in the timing and control of scapular motion (Sahrmann, 2002).

**SCAPULAR STATICS**

- The vertebral border of the scapula is parallel to the spine
- Medial border is approximately 3 inches from spine
- Between the 2nd and 7th thoracic vertebrae
- Flat against the thorax and is rotated 30 degrees anterior to the frontal plane

(Sahrmann, 2002)

**Static Scapular Marking**

- Put dots or draw lines on scapular medial border (3 spots)
- Helpful landmarks are inferior border and spine of scapula
- Look for left to right asymmetries
- Lennie Test (Magee)

**“SICK” SCAPULA** (Kibler, 2003)

- S = Scapular malposition
- I = Inferior medial border prominence
- C = Coracoid pain and malposition
- K = Dyskinesis of the scapula
"SICK" SCAPULA

- Postero-superior scapular pain
- Anterior shoulder pain
- Proximal lateral arm pain
- C-spine pain
- TOS

Posterior Scapular Tilt

- Impingement patients have been shown to have reduced scapular posterior tilt during shoulder elevations when compared to asymptomatic individuals
- Lukasiewicz, 1999

Anterior Tilt of Scapula

- The inferior angle protrudes away from the rib-cage
- Most often caused by shortness in the pec minor (could also be coroco-brachialis or bicep brachii)
- Find corocoid and go inferior and medial and palpate
- Don't forget TOS!!!!
OPEN OR CLOSED SCAPULAR TRAINING?

Ipsilateral pattern

Scapular Rehabilitation

Start Open

Start Closed

Serratus Anterior (functional)

- What is its functional job?
- Is your rehab helping or hurting
- Criteria for successful therapy
Kibler on CKC exercises

1. Closed-chain exercise protocols are used extensively in rehabilitation of knee injuries and are increasingly used in rehabilitation of shoulder injuries.
2. They are felt to be preferable to other exercise programs in that they simulate normal physiologic and biomechanical functions, create little shear stress across injured or healing joints, and reproduce proprioceptive stimuli.
3. Because of these advantages, they may be used early in rehabilitation and have been integral parts of "accelerated" rehabilitation programs.

4 Point Scapular Rock
- Have pt rock forward and back and side to side
  - Look for scapular protraction
  - Maintain chin in slight retraction
  - See if upper scapular fixators and lats can relax

Closed Chain Exercise
- Failed 4 point Exam
- Maybe use contact points of elbow
- Pt "is aware" of stability points
- Returns pt to early developmental stages when phasic muscle activation is paramount
- Functional DX!!!
- Functional Exercise!!!
Pathological stereotype:
The loading of the palm disproportional
The ulnar part overloaded
The thenar not sufficiently loaded

Closed Chain Scapula
- Elbows pushed toward knees and scapula toward pocket
- DNF/Upper T-Spine Ext
- Upper Scap relaxed
- Then add external rotation

Open Chain Exercise
- Failed upward rotation of Arm Abd Screen
- Restricted Scapula
- Hypoxic Upper Scapular stabilizers
- Finish all with Open? (more functional for sport and life)

Tri-Planar Scapular Loading
Scapula Reaction

- Goal:
- Get Scapula to move in 3 planes on the thorax at end-range
- Get the Hip to assist the scapula in 3 planes
- Educate patient
- Most common finding is a pt who does not know how to move hips
- Ex. Window Washer

*capture, release or load to unload

PEL-TRUNK-ULA

- We must be able to load in opposite direction first, to get efficient movement in desired direction (happens everywhere in body)
- Eccentric to Concentric
- Protraction-Retraction
- Load before Unload
- Sub-conscious reflexive movements to load in all 3 planes

Gary Gray (Seminar, 2005)

Scapular Matrix

Scapular Matrix (assisted)
GIRD or Posterior Capsule Tightness

- A common finding in over-head athletes
- Associated with GH and Scapulo-Thoracic Def.
- Significantly associated with Rotator Cuff tears and Labral pathology in over-head athletes
- Less than 25 deg of internal rotation
- Difference from left and right greater than 25 deg when combining internal and external rotation
- One week of stretching improved GIRD by 5 – 15 degrees

Causative Factors

- Bony changes due to humeral retro-torsion (Kibler feels this will not effect longevity of a thrower)
- Developmental Abnormalities
- Capsular tightness (overload, tissue damage, scaring)
- Why?.................Scapulo-Thoracic Instability
Most throwers with arthroscopically proven posterior type 2 SLAP lesion
admit to a cascade of symptoms before seeking help.
During this prodromal phase, the thrower sensed tightness in the back
of the dominant shoulder (inability to get loose).
This tightness in the posterior-inferior capsule will eventually lead to
mechanical failure.
Intra-articular structural damage then occurs, unfortunately; this is
usually surgery for a thrower at his point.

Treatment for Tight Posterior Capsule

Functional Posterior Capsule

Sleeper Stretch
(TrP's, Fixations, Subluxations are a result of poor stabilization in the locomotor system)

Karel Lewit, 2008

Non-Throwing Arm

- Typically will be mirror image opposite of the throwing arm

Sabick et al. also determined in *Humeral Torque of Professional Baseball Pitchers* that “pitchers who elbows were more extended at stride foot contact tended to have lower peak humeral torque.” You can see above that Strasburg’s glove side foot is nearly planted yet his elbow is fairly flexed; this is common in pitchers who exhibit the “Inverted W”.

http://www.drivelinebaseball.com/tag/pitching-mechanics/

**Correlation of Throwing Mechanics With Elbow Valgus Load in Adult Baseball Pitchers**

Arnel L. Aguinaldo, MA, ATC* and Henry Chambers, MD

**Conclusion**

Valgus torque at the elbow during baseball pitching is associated with 6 biomechanical variables of sequential body motion. A condition of late trunk rotation, reduced shoulder external rotation, and increased elbow flexion appeared to be most closely related to valgus torque. Sidearm pitchers appeared to be more susceptible than overhand pitchers to reduced elbow valgus torque.

*Am J Sports Med October 2009 vol. 37 no. 10 2043-2048*
Exercise and Treatment

- Establish ROM with Wall Slides, Scap Matrix
- Soft Tissue Treatment for adhesions
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* 2-3 times a week for 3 weeks and re-evaluate

McKenzie Institute

- Diagnostic and Treatment
- Rule out C-spine 1st
- Predict Non-Responder
Test Movements: Sitting Retraction

Anatomy & Orthopedic Testing (finding the culprit)

Ligaments/Capsule
Glenoid Labrum

- Fibrous and Cartilaginous
- Deepens the glenoid socket 5-10 mm
- Torn or deficient labrum will allow 20% more translatory movement of humeral head in glenoid

Biceps Labral Complex

- Long head of the biceps inserts onto the superior portion of the glenoid labrum.
- Often injured in overhead athletes, “SLAP” Tear.
- O’Brien Test
- Surgery Absolute
- Bicep Tendonitis

General Labral Tests

- Clunk
- Compression-Rotation

Biceps Labral Complex

- O’Brien Test
- Surgery Absolute
- Bicep Tendonitis

SLAP Lesion

- Normal Superior Labrum
- Type II SLAP
**SLAP Tests**

- **O’Brien Test**
  - 90° abduction with 0° adduction
  - Pain deep in shoulder with pronation but not supination = Biceps-Labral Complex
  - Pain top of joint in both positions = AC joint

- **Andrew’s Supine SLAP**
  - 180° abduction, internally rotate
  - Produces Complaint = SLAP

- **Biceps Load Test**
  - Pain with Biceps Contraction = Biceps-Labral Complex
  - Pain with Contraction = Anterior Instability

**Rotator or “Compressor” Cuff**

- **Rotator Cuff Tear**
  - Shoulder MRI

- **Supraspinatus Testing**
  - **Empty Can**
  - Drop Arm
  - Scapular Plane @ 60-75° Abduction
  - Resisted Ext. Rotation
  - Abrasion Sign
  - Passive INT/EXT Rotate at 90°; crepitus/grating under acromion suggests cuff fraying
Roof of the coracoacromial arch.

Only 10mm or 1 cm of space available

Compromise of space leads to impingement, bursitis, tendonitis, and supraspinatus tears.

Impingement

Most often the onset of symptoms is related to an episode of overuse.

In many patients, the principle injury (sometimes minor) occurred some time in the past and the shoulder has failed to return to normal.

Impingement symptoms are marked by pain:

The pain is sharp and intermittent in its early stages.

As impingement progresses, the pain becomes more of a constant ache.

Overhead motions tend to increase the pain, due to increased compression.

Pain usually increases at night.

Symptoms of Impingement

Stages of Impingement

Impingement is classified in three grades:

Grade I is marked by inflammation of the bursa and tendons

Grade II has progressive thickening and scarring of the bursa

Grade III occurs when rotator cuff degeneration and tears are evident

Primary Structural Impingement

Three types of anterior lateral acromions

• Type I Flat
• Type II Curved
• Type III Hooked

Morrison & Bigliani found 80% of patient cuff tears on bursal side were associated with hooked Type III acromion.

No tears with Type I

Calcific Deposits

Acromion Spurs

Degenerative Cuff tear, allowing humeral head to shift superiorly

Variations in Acromion Shape

Type I Type II Type III

Shoulder Impingement Syndrome

Primary Structural Impingement

• Calcific Deposits
• Acromion Spurs
• Degenerative Cuff Tear

Variations in Acromion Shape

Type I Type II Type III
Impingement Tests

Neer

Flexion from 0-180° with Scapula Stabilized

Hawkins-Kennedy

Internally Rotate at 15° Adduction

Palpation of the sternoclavicular joint in the seated position. This can be done in the supine position also. Dr’s L hand is palpating movement at the right S/C joint while moving the pt’s arm in rotation, abd/adduction, and flexion/extension.

Initial positioning for seated adjustment of the sternoclavicular joint. Dr’s 2nd and 3rd or 3rd and 4th fingers contact the proximal end of the clavicle.
Final positioning for adjustment of the sternoclavicular joint in the seated position. Dr will long axis distract along the line of the clavicle and thrust with both hands.

Adjustment for the sternoclavicular joint in the supine position on the speeder board, standing on opposite side. Dr. stabilizes with L hand, and thrusts with R hand along line of the clavicle.

Adjustment for the sternoclavicular joint in the supine position on the speeder board, standing on the same side. Dr. distracts pt’s R arm and thrusts along the line of the clavicle.

Manual Care for Glenohumeral Joint

- This joint is inherently unstable
- Prone to uni-directional and multi-directional instabilities (Sahrmann, 2002) (Comerford 2001)
- Should not be manipulated in the direction of the instability
Manual Care for Glenohumeral Joint

- Toggle board may be safest bet
- Don’t forget about mobilizations!
- 3 joints that you should rarely use HVLA
  - Shoulder
  - Knee
  - TMJ

Palpation of the glenohumeral joint in the seated and supine positions for post shear. Make sure pt is not vulnerable to shoulder dislocations.

Palpation of the glenohumeral joint in posterior shear and adduction in the seated and supine positions. Try to stabilize the pt’s scapula with Dr’s sternum or the table.

Palpation of the glenohumeral joint in posterior shear and adduction in the seated and supine positions with external rotation. Make sure pt. is not too uncomfortable with this palpation.
165 Palpation of the glenohumeral joint in posterior shear and adduction in the seated and supine positions with internal rotation.

166 Adjustment for posterior shear of the glenohumeral joint on the speeder board in the supine position.

167 Adjustment for posterior shear with adduction and internal rotation of the glenohumeral joint in the supine position on the speeder board.

168 Palpation in 10 degrees of flexion for the A-C and G-H joints.
Palpation of the glenohumeral joint in the supine position for lateral glide with posterior shear. Dr. must get proximal on the humerus.

Initial patient placement for palpation and mobilization of the scapula in the side lying position. Dr. stabilizes the front of the GH joint with his right hand.

Mobilization of the scapula in the lateral to medial direction in the side lying position.

Prone Scapular Mobilization

Initial patient placement

Doctor hand placement on lateral border of scapula. Dr. can assist pt with his knee to help hold arm in place.

This is an alternate Dr. positioning for lateral to medial mobilization of the scapula when pt is in side lying position. Dr’s right hand is stabilizing the GH joint anteriorly and mobilizing scapula with his left hand.
Muscle Length Assessment

- Posterior Capsule
- Upper Trap
- Levator Scapulae
- Latissimus Dorsi
- Pec Major (3 divisions)
- Pec Minor
- Bicep
- Subscapularis (check adhesions)
Upper Trap and Levator Scap (PIR)

Latissimus Dorsi/Abd Control
- Should be able to flex humerus 180 deg into flexion without low-back extension or upward rotation of rib-cage

3 Different Portions of Pectoralis Major
- Lower Sternal
- Mid Sternal
- Clavicular
Pec Major/Minor Screening

Posterior Scapular Tilt

• Impingement patients have been shown to have reduced scapular posterior tilt during shoulder elevations when compared to asymptomatic individuals
  • Lukasiewicz, 1999

Pectoralis Minor

• Distance From Posterior Acromion to table should be 1 inch
Functional testing for Upper Quarter

- Respiration
- 4 pt scapular rock
- Arm Abduction/Flexion
- T4 extension
- Tri-planar scapula/hip motion

1. The Diaphragm Test

- Visually observe the patient’s normal relaxed breathing pattern
- Manually palpate the intercostal space of lateral 12th rib and abdominals from behind and observe normal breathing. Breathing should be lateral, not superior.
- Have patient push out against your fingers
- Observe quality and symmetry of firing

Correct Activation

- Symmetrical activation against the therapist’s fingers
- Expansion of the lower ribs in a lateral direction
- Widening of the intercostal spaces
- The position of the ribs in transverse plane remains the same
  - Ribs should not move superiorly (cranial direction)

Insufficient Activation

- Absent or very weak activation
- Cranial movement of the ribs
- Insufficient widening of the lower chest and intercostal spaces
- Poor stabilization of the L seg.
- Flexion of the T spine
Insufficient activation

- Clavicles or shoulders elevate
- Lower rib cage doesn’t widen in the horizontal plane
- If the diaphragm doesn’t fire symmetrically upon push out command
- Flexion of the lumbar spine

2. The test on all fours

Evaluate:
- Support on palms (triratomioum)
- Scapular stability
- Symmetry of T/L paraspinals
- Hypertonus of upper fixators?

Wrong stereotype:
- Hypothenar hand support (ulnar side of hand)
- "WINGING" position of scapula (cranial, and lateral direction)
- Hypertonus of PV T/L, hypertonus of upper fixators = elevation of the lower leg

Quadruped Position

Performance
- The patient slightly shifts the head and trunk forward (rockingforward)

Assessment
- Hand support
- Position of the shoulder-blades
The scapula should be fixed, adhering to the trunk, almost parallel to spine.

Pathological stereotype:
The loading of the palm disproportional
The ulnar part overloaded
The thenar not sufficiently loaded

NO 🎉

YES 🎉
3. Arm Abduction/Flexion Screen

- Over-active Upper Trap and Levator Scapulae (Gothic Shoulder)
- Early rotation of Scapula (should be motionless until 30 to 60 degrees of humeral movement)
- Often cervical spine cases, but GH instabilities are common because local muscle system is dormant
- Reversing the role of the trap (tight upper will inhibit lower)

Wall-Washing for ROM

4. T4 Mobility Screen

- Test
- Stand with arms externally rotated and supinated & feet slightly forward
- Try to flatten back
- Record
  - Does back flatten
  - Where does pt feel tension
Wall Angel Slide

- All encompassing
- Gives clinician a starting point
- Educates pt on function and gives endpoint to tx
- AUDIT (before and after tx)

T4 Extension Functional Assessment

- Procedure
  - Stand with back against wall (feet slightly forward)
- Fail if:
  - Lumbo-Pelvic jtc hyperextends
  - Arms do not reach vertical plane
  - T-Spine kyphosis remains

5. Tri-Planar Scapular Loading

- Get Scapula to move in 3 planes on the thorax at end-range
- Get the Hip to assist the scapula in 3 planes
- Educate patient
- Most common finding is a pt who does not know how to move hips
- Ex. Window Washer

*capture, release or load to unload

Scapula Reaction
PEL-TRUNK-ULA

- We must be able to load in opposite direction first, to get efficient movement in desired direction (happens everywhere in body)
- Eccentric to Concentric
- Protraction-Retractoin
- Load before Unload
- Sub-conscious reflexive movements to load in all 3 planes
- Gary Gray (Seminar, 2005)

Scapular Matrix

Thank You
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