Reintegration of Functional Movement of the Upper Quarter

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A significant problem in studying overuse injuries is that there are multiple interactions among the various risk factors making it very difficult to determine the etiology of the injury.
Contributions to NMSK System Function

• Dynamic Stability
  • Requires optimal **local and global stabilizing system** function that ensures vertebral load is optimally distributed to all supportive structures.
  • “provide sufficient stability to the spine to match the instantaneously varying stability demands due to changes in spinal posture, and static and dynamic loads”
Thoracic Stability

• Although the literature is not clear clinically, thorax stability is dependent on lumbopelvic stability and upper extremity and neck stability is dependent on thorax stability.
erector spinae muscle
transmission of force onto the epaxial fascia/vertebral aponeurosis
transmits tension into the serratus posterior superior and inferior, which then lifts the upper four ribs and sternum and lowers the lower ribs, respectively.
in response, a force couple is generated between the rhomboids, serratus anterior, external oblique fascia, and the rectus sheath.
this load then reconnects to the upward moment of the sternum
Panjabi simplified spinal stability into three subsystems: active, passive, and neural.

- The *active subsystem* consists of the muscles that control the neutral range of motion of the spine.
  - These muscles are essentially local stabilizers as they are single-segment controllers within the neutral range with predominately eccentric contraction.
  - These muscles take their cues “arthrokinetically” from the articular and joint surface mechanoreceptors, which signal alteration in the range of segmental motion, length change in muscle, or increased strain on the joint capsule or tendon.
Panjabi simplified spinal stability into three subsystems: active, passive, and neural.

The passive subsystem consists of bone, the joint capsule, intervertebral disk, aponeuroses, fascia and supporting ligaments.

The neural subsystem consists of the mechanoreceptors within the passive subsystem and the proprioceptors within the active subsystem, both of which feedback information to the spinal cord as well as to the active subsystem.
Arthrokineamatically it’s critical to proper alignment and function of the glenohumeral and acromioclavicular (AC) joints.
Muscular Stability

- Lower trapezius
- Rhomboids
- Serratus anterior
Optimal scapular stability; a key component of all upper extremity function, is greatly dependent on thoracic stability.

- Particularly important in “scapulohumeral rhythm”
  - the coupled and coordinated movement between the scapula, the thorax and the arm that allows:
    - placement of the arm in the optimum position
    - achievement of the proper motion to accomplish tasks
Optimal scapular stability is a key component of all upper extremity function.

• Biomechanically
  • the scapula provides a stable base for muscle activation and a moving platform to maintain ball-and-socket kinematics
  • It also serves as an efficient link between the core, which develops force, and the arm, which delivers the force.
Upper Limb Overuse Injuries

Scapular Dyskinesis

- Excessive joint loads (forces and torques) known to be a crucial risk factor causing repetitive microtrauma that are responsible for overuse and upper limb joint injuries

- Alteration of normal scapular physiology, mechanics, and motion
- Found in association with most shoulder injuries
Scapular Dyskinesis

• Reduces the efficiency of shoulder function in several ways:
  • Changes in 3D glenohumeral angulation
  • AC joint strain
  • Decrease in subacromial space dimensions
  • Overuse of intrinsic and extrinsic muscles
  • Increase in anterior glenohumeral capsular strain with arm motion
Disintegration of pelvis, thoracic, cervical and scapular stability.

- Primary etiology of scapular dyskinesis and associated sequelae.
Changes in 3D Glenohumeral Angulation

• Scapular protraction
• Humeral internal rotation
• Inhibition of the rotator cuff musculature
• Reduction of subacromial space
• Increased anterior capsular strain
• Glenohumeral posterior glide deficit
Inhibition of the Scapular Stabilizers

- Lower Trapezius
- Rhomboids
- Serratus Anterior
Typical Treatment Approach

- Strengthen the Rotator Cuff Muscles
- Stretch the Pectoralis Muscles
- Stretch the Levator Scapulae
- Injections
- Surgery
Rational Treatment of the Upper Quarter Syndromes

OMT
- type II dysfunction in the thorax
- motion restriction of the rib cage
- Upper cervical flexion restrictions
- Lower cervical extension restrictions

Integration of pelvic, thorax, cervical and scapular fascial stability.

Reintegration of functional movement of the upper quarter.
Thank You!