Scapular Dyskinesia

Normal Anatomy
- The scapular makes up the glenohumeral and acromioclavicular joints
- Also part of the scapulothoracic ‘joint’
- Provides an attachment point for many muscles of the shoulder required for stability
- The movement of the scapular in relation to the humerus and thorax affects the mobility and stability of the shoulder

Scapular Movement

Elevation/ Depression
- Elevation
  - Movement of the entire scapula in a superior direction
- Depression
  - Movement of the entire scapula inferiorly back to neutral

Upward Rotation/ Downward Rotation
- Named in relations to the moving glenoid in a anteroposterior axis
- Upward rotation
  - Glenoid faces upwards
- Downward rotation
  - Glenoid faces down

Anterior Tilting/Posterior Tilting
- Tilting or tipping in the mediolateral axis (coronal)
- Anterior Tilting
  - Superior portion of scapula and glenoid fossa move anteriorly, inferior angle moves posteriorly
- Posterior Tilting
  - Superior portion of scapula and glenoid fossa move posteriorly, inferior angle moves anteriorly

Protraction/Retraction
- Made up of two movements
  - Abduction/ Adduction
    - Movement of scapula away from the midline of spine (abduction) or towards the spine (adduction)
  - Internal Rotation/ External Rotation
    - Medial border of scapula moves posteriorly and glenoid anteriorly (internal rotation)(medial border winging) or medial border moves anteriorly with glenoid moving posteriorly (external rotation)
Pathology
- Scapular Dyskinesis is the alteration in movement of the scapula during shoulder motion
- Scapular Dyskinesis is considered a ‘cause’ or an ‘effect’ of many other shoulder pathologies, rather than a pathology itself

Causes

Postural Abnormality
- Increased cervical lordosis or excessive thoracic kyphosis alters the resting position of the scapula

Nerve Palsy
- Injury to the following nerves will affect the motor output of muscles around the scapula, altering its movement patterns
  1. Spinal Accessory Nerve (CN XI) – Trapezius weakness
  2. Long Thoracic Nerve (C5,6,7) – Serratus Anterior weakness
  3. Dorsal Scapular Nerve (C4,5) – Rhomboids weakness

Soft Tissue Mobility
- Pectoralis minor or short head of biceps contracture can cause anterior tilt of the scapular
- Levator scapular contracture can cause increased downward rotation of the scapular
- The scapular may compensate if glenohumeral capsule adhesions are present to allow full range of movement i.e shrug sign (scapular elevation) to achieve full elevation in frozen or stiff shoulders

Muscle Weakness
- Weakness of serratus anterior may lead to increased scapular internal rotation and decreased scapular upward rotation
- Weakness of lower trapezius may lead to increased scapular anterior tilt

Classification

Type 1 – Inferior Angle Winging
- The inferior medial scapular angle is more prominent dorsally at rest or during arm motion
- This is due to increases anterior tilt
- Usually due to lower trapezius weakness, increase thoracic kyphosis or tight anterior structures
Type 2 – Medial Border Winging
- The entire medial border of the scapula is prominent dorsally at rest or during arm motion
- This is due to increased internal rotation
- Usually due to serratus anterior weakness

Type 3 – Superior Medial Border Winging
- The superior medial angle of the scapula is more prominent with the scapula being in a particularly elevated position during rest and arm motion

Associated Pathologies

External Impingement
- Altered scapular motion can narrow the sub acromial space or space below the coracoacromial arch

Internal Impingement
- Decreased scapular upward rotation and increased internal rotation increase the contact of the posterior rotator cuff with the posterior superior aspect of the glenoid

Rotator Cuff Tears
- It is not clear whether scapular dyskinesis is a ‘cause’ or an ‘effect’
- Increased upward rotation can be an attempt to increase shoulder elevation with reduced activation of the rotator cuff
- Increased anterior tilt and internal rotation can cause increased fraying of the rotator cuff tendons against the acromion or glenoid

SLAP Lesions
- Increased positions of internal rotation and anterior tilt put more stress on the anterior ligamentous structures of the shoulder leading to anterior laxity or instability

Shoulder Instability
- The muscles that provide stability to the glenohumeral joint attach onto the scapula
- If the scapula cannot provide a stable base, these muscles will not be able to provide stability around the glenohumeral joint

Examination

Objective and Special Testing
- There are a vast amount of tests described within the literature
- A consensus was made at the 2nd International Conference on the Scapula in 2012 to the following assessment procedure

Observation
• Perform flexion and abduction with a 2kg weight in each hand
• Look for
  1. Winging or prominence of scapular borders
  2. Lack of co-ordination between movements
  3. Fast downward rotation with eccentric lowering
• Any deviation from ‘normal’ or ‘asymptomatic’ side is ‘Yes’ or ‘No’

**Scapular Assistance Test**
• Manually assisting scapular upward rotation with painful shoulder movements
• Decrease in symptoms is noted as scapular dyskinesis present

**Scapular Repositioning Test**
• Manually assisting the scapular into posterior tilt and external rotation at rest and during painful shoulder movements
• Decrease in symptoms is noted as scapular dyskinesis present

**Management**

**Conservative**
• Management is taken into context of whatever pathology the scapular dyskinesis is associated with
  1. Posture Correction
     ▪ Reduce thoracic kyphosis
       • Thoracic mobilisation or manipulation
       • Foam roller extensions
       • Soft tissue work
       • Diaphragmatic Breathing
  2. Restore Normal Mobility
     ▪ Lengthen pectoralis minor, levator scapular, rhomboids, glenohumeral posterior capsule
       • Soft tissue work
       • Dry needling
       • Joint mobilisations
  3. Restore Stability
     ▪ Motor control and Strength
       • Serratus Anterior
       • Lower Trapezius

**Plan B**
• Further investigation may be appropriate for the associated pathology (see separate hand outs)
• If scapular dyskinesis is due to a potential neurological deficit a full neurological examination is required with a Neurologist
References

(Cools et al., 2013; Kibler et al., 2013; Ludewig & Braman, 2011; Ludewig & Reynolds, 2009; Pluim, 2013)


