

## OAS Class 6

### Shoulder part II

Overhead athletes have higher prevalence of scapular dyskinesia of about 61% as compared with non-overhead athletes. Symptoms of isolated scapula dysfunction: anterior shoulder pain (most common), posterior superior scapular pain, superior shoulder pain, proximal lateral arm pain or any combination of above

### Scapular winging faults

1. Long serratus anterior - on concentric elevation
2. Overactive rotator cuff – on eccentric forward flexion
3. Tight pectoralis minor, weak lower trapezius – winging of inferior angle

### Signs and Symptoms of possible peripheral nerve involvement

1. Spinal accessory nerve – inability to abduct arm beyond 90 degrees, pain on shoulder abduction
2. Long thoracic nerve – winging of scapula at 90 degrees of forward flexion, pain on flexing fully extended arm
3. Suprascapular nerve - Increased pain on forward shoulder flexion, Shoulder weakness (partial loss of humeral control), Pain increases with scapular abduction, Pain increases with cervical rotation to opposite side
4. Axillary nerve - Inability to abduct arm with neutral rotation
5. Musculocutaneous nerve - Weak elbow flexion with forearm supinated

### Scapular stability

- a. Lateral scapular slide test – determines stability of a scapula during humeral movements. Patient sits with arm at the side. Examiner measures distance from spinous processes T2-T3 to medial border of scapula and from T7-T9 to inferior angle of scapula. Patient is then abducting arm to 45, 90, 120, and 150 degrees and distance is measured. The difference should not be more than 1-1.5 cm.
- b. Scapular assistance test - The examiner stands behind the patient, one hand on the superior boarder of the scapula of the involved shoulder with the fingers over the clavicle, and the other hand on the inferior angle of the scapula with the fingers wrapped laterally around the thorax. The

examiner assists the scapula upwards rotation by pushing the inferior angle of the scapula upwards and laterally, and assists posterior tipping of the scapula by pulling the superior angle of the scapula posteriorly, while the patient actively elevates the arm. The test is positive if the symptoms of impingement decrease.

- c. Scapular isometric pinch test: Patient in standing position and is asked to actively squeeze or retract the scapulae together as hard as possible.  
Normal Response: An individual able to hold the squeeze for 15 to 20 sec without any burning pain or noticeable weakness. Positive: Burning pain present.

## 2. Other tests

- a. **Acromioclavicular shear test** – Patient sitting, with arm either at the side of the body or at 90 abduction. Practitioner at the side of tested ACJ. Examiners one hand is over clavicle and another over spine of scapula. Examiner squeezes hands together. Positive test – pain or abnormal movement in ACJ (acromioclavicular joint).
  - **AC joint injury or irritation** – after falling on shoulder or outstretched arm
  - **AC injury** – sharp pain on movements and dull ache during rest. Grating sound at the tip of the shoulder. On observation – step between clavicle and acromion. AROM – decreased abduction and lateral rotation. PROM – pain during abduction, decreased abduction. RIM – normal. Palpation – tenderness over ACJ. Special test – AC shear test positive
  - **AC irritation** – gradual change, osteoarthritis, on palpation – thickening. + AC shear test
- b. **Ellman's Compression Rotation test** – patient lies on the side with affected shoulder up. Examiner compresses the humeral head into joint while the patient rotates the shoulder. Pain or grinding indicates positive test and possible arthritis in glenohumeral joint.
- c. **Paxino's test** - Patient sitting with the affected arm by the side, the examiner's thumb is placed under the posterolateral aspect of the acromion and the index and middle fingers are placed superior to the mid-clavicle. The examiner provides pressure to the acromion in an anterosuperior direction with the thumb, while also applying pressure in an inferior direction to the mid-clavicle with the index and middle fingers. If pain is elicited or increased in the region of the **acromioclavicular joint**, the test is considered positive.

## 3. Ligament pathology

- a. Posterior **inferior glenohumeral ligament** test – patient sitting, examiner flexes arm between 80 and 90 degrees and horizontally adducts arm 40 degrees with medial rotation. While doing movements examiner palpates posterior-inferior part of shoulder joint. Pain over area can indicate damage to posterior inferior GH ligament.

4. Muscle or tendon pathology

Rotator cuff (SITS muscles), biceps origin tendons (Long head more than short head tendon), pectoralis major – tendonitis, rupture (Tears)

**Acute rotator cuff tendonitis**

- Patient 25-40 years old, gradual onset due to overuse. Dull pain in the anterior shoulder after activity and anteriolateral aspect of acromion rim
- Supraspinatus and infraspinatus pain may be felt in upper lateral arm
- Pain increases on overhead activities
- AROM – limitation on abduction (supraspinatus), on rotation (Infraspinatus or subscapularis)
- PROM – the same
- Palpation – tenderness over greater tubercle, for subscapularis – lesser tubercle
- RIM – normal
- Pain between 60-120 of abduction (supraspinatus)
- Special tests - +

**Bicep's tendinitis**

- Patient 25-50
- Sharp pain on the movement of the arm in the bicipital groove
- AROM – pain of flexion and lateral rotation
- PROM – pain on extension
- RIM – pain on flexion at the shoulder joint
- Palpation – tenderness in bicipital groove
- + Speeds test

**Rotator cuff tear**

- Age 45-65
- Sudden due to trauma
- Sharp pain on movements in the posterior and upper aspects of the shoulder and in the area of deltoid insertion (upper lateral arm)

- Inspection – normal, or can be bruising over the muscle belly if there is larger tear, if the muscle is fully torn there will be noticeable defect.
  - AROM: painful abduction and rotation, limited medial rotation
  - PROM: full and substantially pain free, some discomfort at the end of the range
  - RIM – pain on abduction, lateral rotation
  - Special test - +
- b. **Speed's test (biceps or straight arm test)** – examiner resist arm flexion with patients forearm is supination/pronation. Positive – increased tenderness in bicipital groove.
  - c. **Yergason's test** – patient elbow flexed at 90 degrees and stabilized against thorax. Patient resists supination and lateral rotation performed by examiner. Positive – tenderness in bicipital groove, **biceps or SLAP lesions is suspected.**
  - d. **Ludington's test** – patient places both hands behind head with fingers interlocked. Patient contracts and relaxes biceps muscles. On affected side no biceps tendon. Examiner palpates the long head of biceps tendon. Positive – absence of tendon on affected side (ruptured tendon)
  - e. **Supraspinatus test (empty can test)** – patients' shoulder is abducted to 90 degrees and examiner provides resistance to abduction, then arm is moved forward 30 degrees (horizontal adduction) and rotated medially with thumb facing down and resistance is applied. Positive – pain or weakness indicating supraspinatus problem.
  - f. **Drop arm (Codman's) test** – practitioner abducts patients arm passively to 90 degrees then asks the patient to hold and then slowly lower the arm. Supraspinatus damage (also infraspinatus full tear) – arm drops.
  - g. **Lift-off sign (Gerbers test)**– arm behind the back hand over gluteal area. Patient attempts to lift of the hand from the body, if cannot do it **subscapularis damage.**
  - h. Pectoralis major contracture test – patient supine with both hands placed behind head and arms are lower until elbows touch the examining bed. Positive – elbows do not touch the table.
  - i. **Abdominal compression (Belly-Press) test** - The belly-press test is used to isolate the subscapularis muscle, to test the subscapularis muscle for tear or dysfunction. It is often used as an alternative to the lift-off test, when the lift-off test cannot be performed because of pain or limited internal rotation range of motion of the shoulder. The patient sits or stands with the elbow flexed to 90 degrees, with the palm of the hand on

the upper abdomen, just below the xyphoid process. The patient is asked to press the palm of the hand against the abdomen, through shoulder internal rotation. The test is positive for subscapularis muscle dysfunction if the patient compensates the movement through started wrist flexion, shoulder adduction and shoulder extension.

- j. **Bear hug test** - The patient places the palm of the affected side on the opposite shoulder, with the fingers extended and the elbow anterior to the body. The patient is asked to maintain the arm position. The therapist then applies an external rotation resisting force perpendicular on the patient's forearm, the patient resists the therapist by performing internal rotation. The test is positive if the patient could not maintain the position of the hand against the shoulder or showed weakness in resisted internal rotation greater than 20% compared to the opposite side. Positive – subscapularis muscle dysfunction or tear.
- k. Lateral rotation lag sign (Spring back test) - Patient is seated with examiner behind patient. The affected arm is brought into maximal internal rotation behind the back (dorsum of patient's hand is against the lumbar region). Examiner controls patient's arm at the elbow and hand which is passively brought into 20 degrees of extension taking the forearm and hand away from the back. Instruct patient to actively maintain this position as examiner releases the hand but maintains support at the elbow. A lag is indicative of a subscapularis tendon tear.
- l. **Infraspinatus test** - The patient should be standing, with the arm in a neutral position and the elbow flexed to 90 degrees. The therapist will apply a medially directed force to the forearm while the patient is instructed to resist. The test is considered positive if the patient reports pain or weakness when resistance is applied.
- m. **Teres minor test (Homblower's sign)**– The patient is seated or standing. The examiner places the patient's arm to 90 degrees in the scapular plane and flexes the elbow to 90 degrees. The patient is then asked to externally rotate against resistance. The test is positive if the patient is unable to perform external (lateral) rotation.
- n. Trapezius weakness – patient shrugs the shoulders against resistance
- o. Serratus anterior weakness (Punch out test, push up test) - Patient in standing or sitting position, forward flexes arm to 90 degrees, examiner applies backward pressure to the arm. Winging of scapula at medial border shows positive sign. This happens when serratus anterior is weak or paralyzed. This test also can be done by asking patient to do wall push up and for more harder ask patient to do regular floor push up.

## 5. Neurological function

- a. Upper limb tension test (brachial plexus tension test or Elvey test)
- b. Tinel's sign – tapping over area above clavicle over scalene triangle.  
Positive – tingling sensation in one or more nerve root.

### Thoracic outlet syndrome

- 1. Compression of brachial plexus and/or subclavian artery/vein
- 2. Gradual onset, no known cause, may continue for weeks
- 3. Diffuse symptoms in the arm in C8 and T1 dermatomes, pain, paresthesia, weakness of muscles
- 4. Subclavian artery compression leads to coldness, numbness, loss of pulse, tingling
- 5. Inspection – poor posture, straight neck, rounded shoulders, wasting hand muscles
- 6. AROM – normal
- 7. PROM – normal
- 8. RIM – hand muscle weakness
- 9. Palpation – normal
- 10. Special tests - + Thoracic outlet syndrome tests

Test for thoracic outlet syndrome

#### 6. Thoracic outlet syndrome tests

- a. **Wright test** - Patient's arm is passively brought into abduction and external rotation to 90 degrees without tilting the head. The elbow is flexed no more than 45 degrees. The arm is then held for 1 min and the tester measure radial pulse and monitor patient symptoms onset. Then examiner monitors the patient's symptom onset and the quality of the radial pulse. The test is repeated in full elevation through abduction. A decrease in the radial pulse and/or reproduction of the patient's symptom indicated TOS. **Detects compression in costoclavicular space** (Pectoralis minor)
- b. **Costoclavicular syndrome test (Military brace test)** – palpate pulse then draw shoulder down and back. Positive test – absence of pulse. Good test for patients who complaint of pain wearing backpack or coat.

- c. **Adson test (maneuver)** - find the patient's radial pulse, the patient's head is rotated to the test shoulder side. Patient extends the head while practitioner extends and laterally rotates the patient's arm. Patient takes a deep breath and holds it. Positive test - no pulse.
- d. **Halstead maneuver** – examiner finds the radial pulse and applies downward traction to the extremity while patient extends and rotates head to the opposite side. Positive test – no pulse
- e. **Allen test** – examiner finds radial pulse, shoulder is taken into horizontal abduction (extension) and lateral rotation with elbow flexed at 90 degrees. Pulse disappears when patient rotates head to the opposite side.

### **Reflexes and cutaneous distribution**

- 1. Biceps reflex (C5, C6)
- 2. Triceps reflex (C6, C7)

### **Referred pain to the shoulder**

- 1. R shoulder – lung, gallbladder, elbow, neck
- 2. L shoulder – heart, lung, diaphragm, spleen, neck

### **Subacromial bursitis**

- 1. Bursa separates supraspinatus from acromion
- 2. Gradual onset
- 3. Deep ache at the acromial rim
- 4. Cannot bring the hand above the head
- 5. Inspection – normal
- 6. AROM – the most pain is in movements in mid range between flexion and abduction, stiffness and end of the medial rotation range
- 7. PROM - pain during mid range between flexion and abduction
- 8. Palpation – tenderness
- 9. Special test – arm elevated to 90 degrees, between abduction and flexion produces pain during medial rotation

### **Pectoral muscle tear**

- 1. Weight lifting, demanding activities
- 2. Sharp pain on movements in the anterior chest
- 3. Inspection swelling over anterior shoulder with large tears also bruising of pectorals major
- 4. AROM: pain increases on extension and lateral rotation

5. PROM: same as active
6. RIM: pain on adduction
7. Palpation – tenderness
8. Special – test + PM contracture test