ANATOMY
Manual Muscle Testing

- Lower Trapezius
  - Patient: prone
  - Fixation: place on hand below the scapula on the opposite side
  - Test: adduction and depression of the scapula with lateral rotation of the inferior angle. The arm is placed diagonally overhead (in “Y” position), in line with the lower fibers of the trapezius. Lateral rotation of the shoulder joint occurs along with elevation, so it usually is not necessary to further rotate the shoulder to bring the scapula into lateral rotation
  - Pressure: against the distal forearm, in a downward direction toward the table
  - Weakness: allows the scapula to ride upward and tilt forward, with depression of the coracoid process. If the upper trap is tight, it helps to pull the scapula upward and acts as an opponent to a weak low trap.

- Middle Trapezius
  - Patient: prone
  - Fixation: place one hand on the opposite scapular area to prevent trunk rotation
  - Test: adduction of the scapula, with upward rotation (lateral rotation of the inferior angle) and without elevation of the shoulder girdle. The test position is obtained by placing the shoulder in 90° abduction and in lateral rotation sufficient to bring the scapula into lateral rotation of the inferior angle. Observe the scapula
- Pressure: against the distal forearm, in a downward direction toward the table
- Weakness: results in abduction of the scapula and a forward position of the shoulder. The middle and low trap reinforce the thoracic spine extensors. Weakness of these fibers of the trapezius increased the tendency toward a kyphosis

- Rhomboids
  - Patient: prone
  - Fixation: none
  - Test: adduction and elevation of the scapula, with medial rotation of the inferior angle. To obtain this position of the scapula and leverage for pressure in the test, the arm is placed with the elbow flexed, the humerus is adducted toward the side of the body in slight extension and slight lateral rotation.
  - Pressure: the examiner applies pressure with one hand against the patient’s arm, in the direction of abducting the scapula and rotating the inferior angle laterally and against the patient’s shoulder, with the other hand in the direction of depression
  - Weakness: the scapula abduction and the inferior angle rotates outward. The strength of adduction and extension of the humerus is diminished by loss of rhomboid fixation of the scapula. Ordinary function of the arm is affected less by loss of the rhomboid strength than by loss of either trapezius or serratus anterior strength
**Serratus anterior**

- **Patient:** sitting
- **Fixation:** subject may hold on to table with other hand
- **Test:** the ability of the serratus to stabilize the scapula in a position of abduction and lateral rotation, with the arm in a position of approximately 120-130° of flexion. This test emphasizes the upward rotation action of the serratus in an abducted position.
- **Pressure:** against the dorsal surface of the forearm, downward in the direction of extension, and slight pressure against the lateral border of the scapula, in the direction of rotating the inferior angle medially.
- **Weakness:** Makes it difficult to raise the arm in flexion. Results in winging of scapula.
Scapular Kinesia

- Motions to consider: Bilateral shoulder abduction, bilateral internal and external rotation, wall push-up with protraction
- Observe for normal scapular kinematics throughout the arc of motion. Also important to note areas of pain and if the patient is able to continue motion past the point of pain.
- Observe for medial or inferior border winging, delayed abduction (or abduction that occurs too quickly), excessive elevation, or upward/downward scapular rotation
• Rhomboid dominance
  o Arms positioned at side with elbow bent to 90 degrees.
  o Instruct patient to laterally rotate the shoulder.
  o Adduction of the scapula within first 35 degrees is considered a positive test

DIFFERENTIAL DIAGNOSIS
VBI (vertebral artery insufficiency) testing:
  • Many fields of thought but it is very difficult to truly elicit these symptoms.
  • Currently we practice the following:
    o Have patient lay in supine
    o Ask them to focus on your nose
    o Fully rotate the head and have them count backwards from 10
    o Any symptoms = a positive test
    o This should also be performed in pre-manipulative holds and post manipulation into newly gained ranges
• How do you differentiate vestibular from VBI?
  o Head on body

  ![Image](image.png)

  o Body on head

  ![Image](image.png)
Neurologic screen:
- Hoffman- flick the middle finger. And okay sign is positive for upper motor neuron lesion

- Babinski

- Clonus: quick stretch to either ankle or wrist. Looking for beating > 3-4 times
Ligament Instability Testing:
- Sharp Purser: for transverse ligament
- Alar Ligament: for alar ligament
- Jefferson Fracture: fracture of C1 vertebrae
Neural testing

- Median Nerve ULTT
• Ulnar Nerve ULTT
• Radial Nerve ULTT
Nerve palpation

<table>
<thead>
<tr>
<th>Median nerve</th>
<th>Radial nerve</th>
<th>Ulnar nerve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper arm</td>
<td>Upper arm</td>
<td>Upper arm</td>
</tr>
<tr>
<td>Wrist</td>
<td>Distal radius</td>
<td>Cubital tunnel</td>
</tr>
<tr>
<td>Snuff box</td>
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</tbody>
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Cervical radiculopathy clinical prediction rule
- Rotation less than 60 degrees to the affected side
- Positive ANTT- median nerve
- Positive Spurling’s

- Positive Distraction
Postural

- Plumb line
  - Sagittal view - plumb line is placed just anterior to the lateral malleolus and should pass through:
    - ear lobe
    - bodies of cervical vertebrae
    - acromion
    - mid-axillary line (divide thorax in half)
    - bodies of lumbar vertebrae
    - slightly posterior to the hip joint
    - slightly anterior to the axis of the knee joint
    - slightly anterior to the lateral malleolus

- Postural assessment
  - Postural assessment starts the moment you call the patient in from the waiting room
  - Assess posture both in standing and in sitting
  - Look at overall posture then start from the top down:
    - What main postural category do they fall in?
      - Forward head, rounded shoulders
      - Kypho-lordosis
      - Hyperlordosis
      - Flatback
      - Swayback
    - Head posture
      - Forward head?
      - Flat cervical spine?
      - Laterally flexed or rotated to one side?
    - Shoulder height
      - Equal?
      - Downsloping?
    - Scapular position
      - Abducted/adducted
      - Upward/downward rotation
      - Elevation/depression
      - Anteriorly/posterior tilted
    - Winging present?
      - Inferior angle winging indicates pec weakness
      - Medial border winging indicates serratus weakness
    - Humeral position
      - Medially or laterally rotated?
      - Sulcus sign present?

Shoulder tests
• Cluster 1
  o Hawkins Kennedy: Pain reproduction with resisted internal rotation with glenohumeral joint in 90 degrees of elevation indicated rotator cuff dysfunction/impingement syndrome
  o
  o Neers: Pain reproduction with overpressure in full elevation indicates rotator cuff dysfunction/impingement syndrome.
  o Empty/ Full can: Resist elevation in 90 degrees of scaption in alternately externally and internally rotated positions. A difference in symptoms can indicate rotator cuff dysfunction/impingement syndrome. (ER can implicate supraspinatus, IR can implicate infraspinatus, although little supporting evidence exists for this)
• Clusters 2
  o Resisted ER:

  o Painful arc: A pattern of shoulder pain between 45 and 120 degrees of neutral abduction indicates impingement syndrome
- Hawkins Kennedy: Pain reproduction with resisted internal rotation with glenohumeral joint in 90 degrees of elevation indicated rotator cuff dysfunction/impingement syndrome

- Instability testing:
  - Load/Shift: With axial loading, glide the humerus anteriorly and posterity. Symptom reproduction or crepitus is a positive test for labral derangement of other interarticular pathology.

- Apprehension: Apprehension of the patient with external rotation of the shoulder at 90 degrees abduction
- **Relocation**: Relief of apprehension with external rotation of the shoulder at 90° abduction corroborates a positive apprehension test for instability.

- Internal derangement/labral pathology testing:
  - **Crank**: In supine, with the shoulder flexed to 110°, apply long-axis pressure simultaneously with ER/IR. Symptom reproduction or crepitus is a positive test for labral derangement of other interarticular pathology.
o **Clunk:** With axial loading, glide the humerus anteriorly and posterity. Symptom reproduction or crepitus is a positive test for labral derangement of other interarticular pathology.

![Image of physical therapy](image1.png)

o **O’Brien’s:** Pain reproduction with resistance to elevation in horizontally adducted position can indicate AC joint or anterior labral dysfunction.

![Image of physical therapy](image2.png)
- **Biceps dysfunction testing:**
  - **Biceps Load:** Resisted biceps flexion in elevation is associated with LHBT dysfunction or SLAP lesion.
  - **Speeds:** Resist elevation in 90 degrees of scaption and external rotation. Pain reproduction associated with LHBT dysfunction.