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## Introduction

- The glenohumeral joint is the most mobile joint in the body with a large degree of range of motion. Along with this increased mobility comes a higher degree of instability due to a shallow and smaller glenoid as compared with the humeral head, which can lead to subsequent shoulder injuries. Pathology related to the rotator cuff is the leading cause of shoulder pain and can often present with pain, weakness, and loss of range of motion. However, the differential diagnosis of shoulder pain can be broad and includes labral tears, glenohumeral ligament tears or sprains, acromioclavicular ligament tears, osteoarthritis, adhesive capsulitis, peripheral neuropathy, and cervical radiculopathy. As a result, a thorough examination should include the cervical spine and the contralateral shoulder.

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## Physical Examination

- **Inspection** should include the muscle bulk, position of the scapula, and the position of the neck in relation to the shoulders. Patients may commonly present with rounded shoulders and a forward head posture which can subsequently lead to humeral internal rotation and scapular protraction. In cases of chronic massive rotator cuff tears, the humeral head can be superiorly displaced and abut the acromion.
- **Scapula:** Important anatomical landmarks include the superior angle of the scapula which corresponds to the 2nd rib, the spine of the scapula to the third thoracic vertebrae (T3) and the inferior border of the scapula to T7.
  - The scapula can be tilted or “winged” depending on the etiology of weakness. As the patient resists forward flexion of the shoulder or does a wall push-up, weakness of the serratus anterior secondary to a long thoracic nerve injury may cause the scapula to wing medially. However, when there is weakness of the upper trapezius secondary to spinal accessory nerve injury, the scapula may wing laterally with resisted arm abduction. This can be measured by the distance from the spinous processes to the medial border of the scapula with side to side comparison

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- **Palpation**
  - Biceps tendon: palpation of the long head of the biceps tendon is performed in the bicipital groove between the lesser and greater tuberosity of the humeral head. Pain with internal and external rotation during palpation indicates potential tendinosis of the biceps tendon.
  - The acromioclavicular (AC) joint: is palpated for tenderness by following the distal end of the clavicle to the AC joint, palpating for tenderness along the joint, which indicates potential AC joint sprain or osteoarthritis.
- **Range of motion** of the shoulder includes forward flexion, extension, internal/external rotation, abduction, and adduction. Active range of motion (AROM) should be performed first in order to observe which particular movements are painful for the patient. The Apley Scratch test is a functional way to assess internal range of motion. The patient is asked to reach behind their back in internal rotation and the examiner assesses the highest level the patient can reach with their thumb. This degree of internal rotation can be correlated with the level of the spinous process that can be reached based on the landmarks mentioned above. Pain with decreased ROM may indicate rotator cuff pathology, glenohumeral joint osteoarthritis, and adhesive capsulitis.
- **Strength testing** can be performed by the examiner exerting resistance to a particular movement.
  - External rotation is predominantly exerted by the infraspinatus muscle
  - Internal rotation is predominantly exerted by the subscapularis muscle
  - Abduction is predominantly exerted by the supraspinatus muscle
- There are over 25 **special tests** described for examination of the rotator cuff, the discussion of which is beyond the scope of this text [1]. Please refer to the suggested reading section

below for discussion on how to perform these individual tests.

- Subscapularis
  - Lift-off test, belly press test, bear hug test
- Supraspinatus
  - Empty Can test (Jobe test), Drop Arm test, Full can test
- Teres Minor
  - Hornblower sign
- Biceps tendon
  - Speed's test, Yergason's test
- Impingement Tests
  - Neer's sign, Hawkins's test
- Shoulder instability
  - Apprehension test, Load and shift test, Jerk test
- Labral pathology
  - O'Brien's test (Active compression test), Crank test, Anterior slide test
- AC joint
  - Cross arm adduction test, Active compression test

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## Questions

1. What are the two different types of scapular winging and what peripheral nerve is involved? Medial and lateral winging secondary to Long Thoracic and Spinal Accessory nerve palsy respectively.
2. The spine of the scapula and inferior border of the scapula correspond to which spinous process? T3 and T7 respectively.
3. What causes loss of active and passive range of motion? Adhesive capsulitis and glenohumeral joint osteoarthritis

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## Reference

1. Jain NB, Wilcox III RB, Katz JN, Higgins LD. Clinical examination of the rotator cuff. *PM&R*. 2013;5(1): 45–56.

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## Suggested Reading

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Malanga GA, Nadler S, editors. Musculoskeletal physical examination: an evidence-based approach. Elsevier Health Sciences; 2006. p. 59–118.

Moen MH, de Vos RJ, Ellenbecker TS, Weir A. Clinical tests in shoulder examination: how to perform them. Br J Sports Med. 2010;44(5):370.