PHYSICAL EXAM: SHOULDER

The shoulder derives its mobility from a complex interconnected structure of:

3 large bones + 4 joints + 3 principal muscle groups

often referred to as the shoulder _____.

These structures are viewed as dynamic stabilizers and static stabilizers.

Dynamic stabilizers	Static stabilizers
those capable of movements	those incapable of movements
• SITS muscles of the rotator cuff ▪ supraspinatus ▪ infraspinatus ▪ teres minor ▪ subscapularis	• Bony structures of the shoulder girdle ▪ labrum ▪ articular capsule ▪ glenohumeral ligaments

3 large bones + 4 joints + 3 principal muscle groups

↓

(1) humerus
(2) clavicle
(3) scapula

3 large bones + 4 joints + 3 principal muscle groups

↓

(1) gleno-humeral joint
(2) sterno-clavicular jont
(3) acromio-clavicular joint
(4) scapulo-thoracic joint (not a true joint)

3 large bones + 4 joints + 3 principal muscle groups

↓

(1) Scapulo-humeral group
(2) Axio-scapular group
(3) Axio-humeral gourp

Which of the following does NOT belong to bony structures of the shoulder girdle?

A. manubrium
B. scapula
C. clavicle
D. humerus

Which of the following joints is a ball-and-socket joint which allows the arm its wide arc of movement – flexion, extension, abduction, adduction, rotation, and circumduction?

A. scapulothroacic joint
B. acromioclavicular joint
C. sternoclavicular joint
D. glenohumeral joint

Match the principle muscles groups of the shoulder girdle to the correct muscles.

Scapulohumeral group	■	□	pectoralis major/minor, latissimus dorsi
Axioscapular group	■	□	SITS muscles
Axiohumeral group	■	□	trapezius, rhomboids, serratus anterior, levator scapulae

The bursa is a fluid-filled sac that helps to reduce friction in the shoulder spaces. Shoulder bursitis is an inflamed shoulder bursa. What is the most commonly inflamed shoulder bursa?

A. Subcoracoid bursa
B. Subacromial bursa
C. Subdeltoid bursa

Shoulder Exams

Inspection	Palpation	Range of Motion	Maneuvers

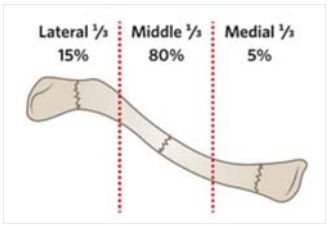
CLAVICULAR FRACTURES

General

- Classification is based on fracture location:
  - Fracture located at medial, middle (most common), or distal third of the clavicle.

Clinical Features

- Pain, swelling, ecchymosis in the shoulder/clavicular region, typically after trauma such as a fall or direct impact. May or may not have an obvious deformity.
- AC joint and sternoclavicular (SC) joints should also be assessed, as they may also be injured.

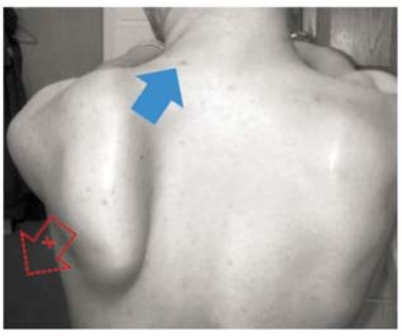
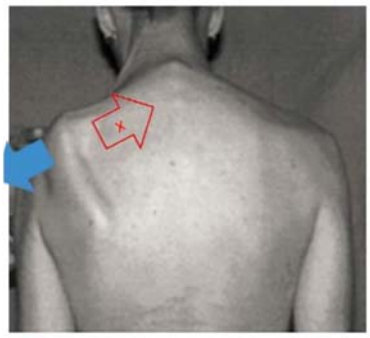


What is the most common site of clavicular fracture?

A. medial third
B. middle third
C. distal third

SCAPULAR WINGING

Medial scapular winging	• Results from serratus anterior weakness. • Often the result of long thoracic nerve palsy. • Bench pressing very heavy weights or wearing heavy pack straps can also impinge the nerve
Lateral scapular winging	• Results from trapezius muscle weakness. • Can be due to spinal accessory nerve lesions. • Nerve injury occurs in the posterior triangle of the neck.

Medial winging	Lateral winging
	
 Absent pull of serratus anterior due to Long Thoracic Nerve palsy	 Absent pull of trapezius due to Spinal Assessory Nerve palsy

What type of scapular winging is due to the a deficit in the serratus anterior?

A. Medial scapular winging
B. Lateral scapular winging

Medial scapular winging results from an injury to the serratus anterior muscle itself or an injury to the _____ nerve.

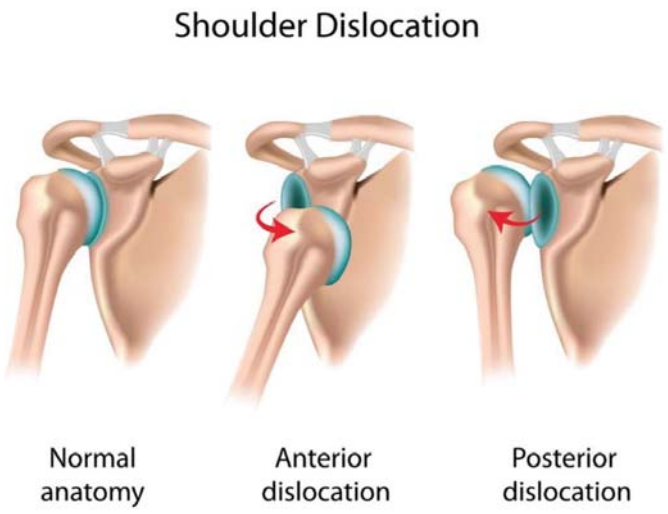
A. Spinal accessory nerve
B. Long thoracic nerve

Which of the following is NOT a characteristic of medial winging?

A. Results from serratus anterior weakness.
B. Often the result of long thoracic nerve palsy.
C. Often results from trapezius muscle weakness.
D. Bench pressing very heavy weights or wearing heavy pack straps can also impinge the nerve

Classification of GHJ Instability

Instability	• A translation of the humeral head on the glenoid fossa. • It may result in subluxation or dislocation	
Subluxation	• An incomplete separation of the humeral head from the glenoid fossa with immediate reduction	→ incomplete separation
Dislocation	• A complete separation of the humeral head from the glenoid fossa without immediate reduction.	→ complete separation



Direction of Instability

Anterior glenohumeral instability	• Most common direction of instability is anterior inferior. • More common in the younger population and has a high recurrence rate. • Mechanism: Arm abduction and external rotation. • Complications may include axillary nerve injury.
Posterior glenohumeral instability	• Less common than anterior instability. • May occur as a result of a seizure. • The patient may present with the arm in the adducted internal rotated position. • Mechanism: Landing on a forward flexed adducted arm.
Multidirectional instability	• Rare with instability in multiple planes. • The patient may display generalized laxity in other joints.

What do you call glenohumeral joint instability if there is a complete separation of the humeral head from the glenoid fossa without immediate reduction?

A. Subluxation
B. Dislocation

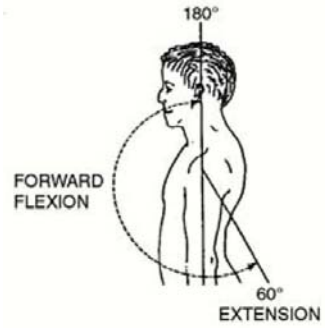
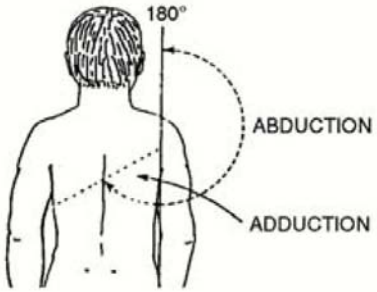
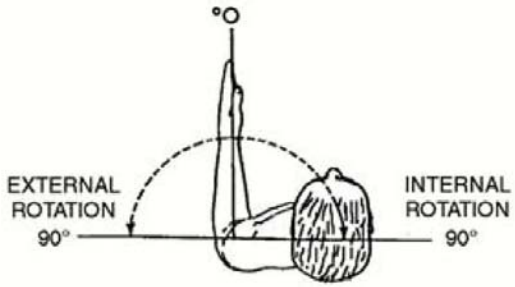
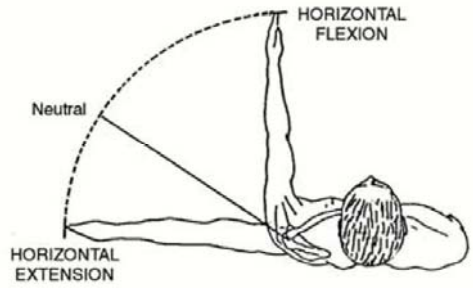
What is the most common direction of shoulder instability?

A. Anterior glenohumeral instability
B. Posterior glenohumeral instability
C. Multidirectional instability

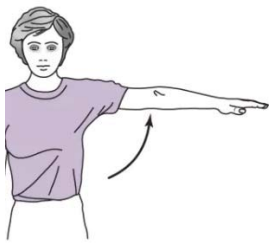
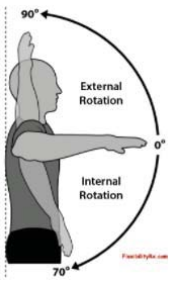
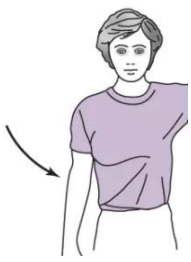
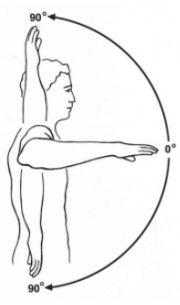
Which of the following shoulder instabilities is less common but may occur as a result of a seizure?

A. Anterior glenohumeral instability
B. Posterior glenohumeral instability
C. Multidirectional instability

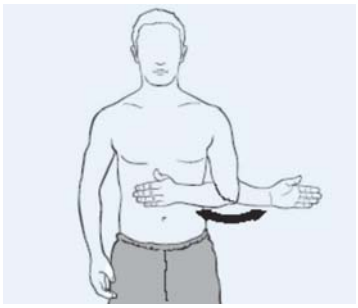
Ranges of Motion of the Shoulder

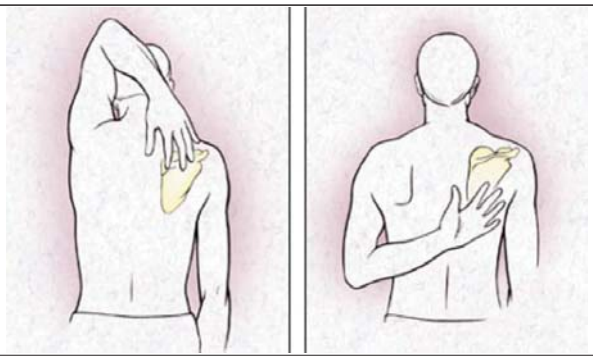
Flexion 180, Extension 60	Abduction 180, Adduction 60
	 *Shoulder abduction of 120 is seen in normals with the thumb pointed down*
External rotation 90, Internal rotation 90 (with arm abducted)	**Horizontal Flexion, Horizontal Extension**
	

SHOULDER

Abduction: 150-180°	Flexion: 150-180°	Internal rotation: 70-90°
Bring arm up sideway	Raise arm straight forward	Abduct arm → internally rotate
		
Adduction: 30-40°	**Extension: 50-60°**	**External rotation: 80-90°**
Bring arm toward the midline	Raise arm straight backward	Abduct arm → externally rotate
		

Other ways to measure Internal and External rotation of Shoulder





↓

_____ test

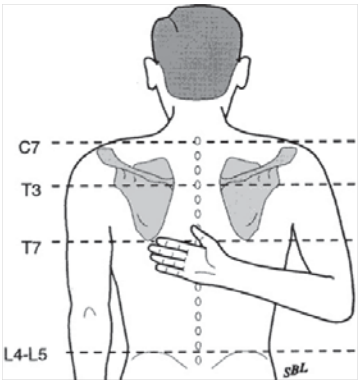
What do you tell a patient when you want him to perform internal rotation of the shoulder?

A. "Place one hand behind your back and touch your shoulder blade."

B. "Raise your arms out to the side and overhead."

C. "Raise your arms in front of you and overhead."

D. "Raise your arm to shoulder level; bend your elbow and rotate your forearm toward the ceiling."



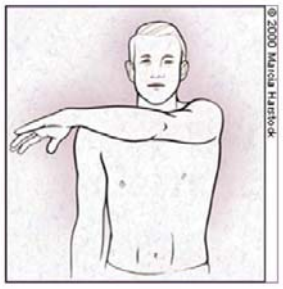
What is the normal value for range of motion in shoulder flexion?

A. 150-180°
B. 80-90°
C. 50-60°
D. 0-10°

How many degrees is the normal value for range of motion for shoulder abduction?

A. 150-180°
B. 80-90°
C. 50-60°
D. 0-10°

- Patient raises affected arm to 90°
- Actively adducts arm across body
- Forces acromion into distal end of clavicle
- Isolates AC joint & painful if positive

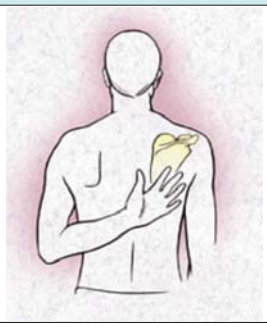


Localized tenderness or pain with adduction suggests inflammation or arthritis of the acromioclavicular joint. What is the name of the test for the acromioclavicular joint disorder?

A. Apley scratch test
B. Crossover test
C. Neer's impingement sign
D. Hawkin's impingement sign

The Apley scratch test specifically tests range of motion and in a normal exam. The patient attempts to touch the _____ scapula to test range of motion of the shoulder. Each motion is performed bilaterally to compare.

A. same
B. opposite

abduction + external rotation	adduction + internal rotation
	

Adhesive capsulitis is a benign, self-limiting condition of unknown etiology characterized by painful and limited _____ glenohumeral range of motion of ≥ 25% in at least two directions most notably shoulder abduction and external rotation.

A. active
B. passive
C. active and passive

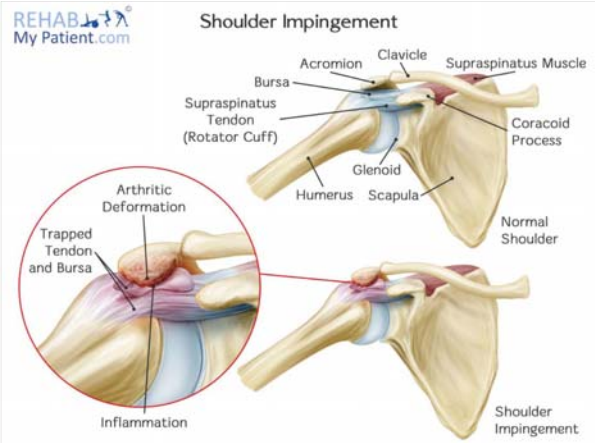
IMPINGEMENT SYNDROME AND ROTATOR CUFF TEAR

General

- Impingement syndrome
  - Most likely the most common cause of shoulder pain.
  - A narrowing of the subacromial space causing compression and inflammation of the subacromial bursa, biceps tendon, and rotator cuff (most often involving the supraspinatus tendon).
  - Impingement of the tendon, most commonly the supraspinatus, under the acromion and the greater tuberosity occurs with arm abduction and internal rotation.
  - Impingement syndrome often leads to chronic tendinopathy, which can progress to a rotator cuff tear (complete or partial).

  - Stages of subacromial impingement syndrome (Neer)

Stage 1	Edema or hemorrhage—reversible	(age <25)
Stage 2	Fibrosis and tendonitis	(ages 25–40)
Stage 3	AC spur and rotator cuff tear	(age >40)



Which of the following rotator cuff tendons is the most commonly impinged under the acromion and the greater tuberosity upon arm abduction and internal rotation?

A. Supraspinatus

B. Infraspinatus

C. Subscapularis

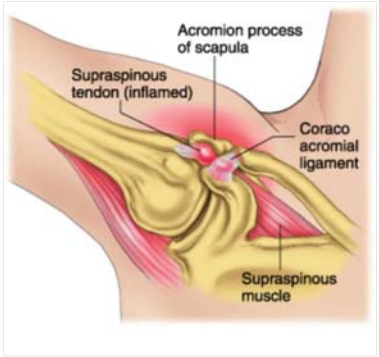
D. Teres minor

Rotator Cuff Tears

- **The rotator cuff is composed of four muscles (S.I.T.S.)**

1. Supraspinatus	2. Infraspinatus	3. Teres minor	4. Subscapularis

- **These muscles form a cover around the head of the humerus whose function is to rotate the arm and stabilize the humeral head against the glenoid.**
- **Rotator cuff tears occur primarily in the supraspinatus tendon, which is weakened as a result of many factors, including injury and subacromial impingement. Poor blood supply to the tendon also makes it prone to injury, especially at the critical zone of hypovascularity about 1 cm from the insertion site.**
- **May be as a result of direct trauma or as an end result from chronic impingement. This injury rarely affects people younger than age 40 years.**



Which of the following muscles does NOT compose the rotator cuff?

A. Supraspinatus

B. Infraspinatus

C. Subscapularis

D. Teres major

SItS

Which of the following muscles is NOT part of the rotator cuff?

A. Supraspinatus

B. Infraspinatus

C. deltoid

D. Teres minor

Rotator cuff tears occur primarily in the:

A. Supraspinatus tendon

B. Infraspinatus tendon

C. deltoid tendon

D. Teres minor tendon

Acromion Morphology and Association to Rotator Cuff Tears

- **The anatomic shape of the patient's acromion has been linked with occurrence rates of rotator cuff tears.**
- **Patients with curved or hooked acromions have a higher risk of rotator cuff tears.**
- **Acromion types**

Type I	Type II	Type III
Flat	Curved	Hooked
 Type 1: Flat 17%	 Type 2: Curved 43%	 Type 3: Hooked 40%

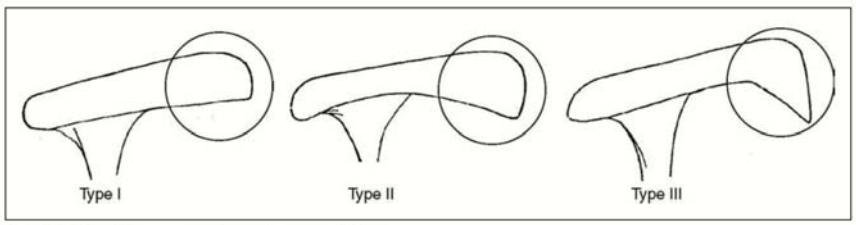
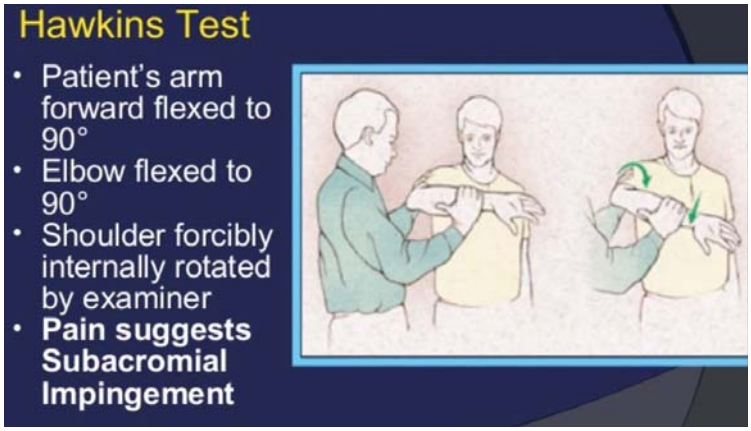


FIGURE 4–20 Three types of acromion morphology.

Clinical Features

- Pain during range of motion specifically in repetitive overhead activities, such as
  - Throwing a baseball.
  - Swimming
    - Phases of the swim stroke include the catch, propulsive pull and push, and recovery phases.
    - Occurs at the "catch" phase of the overhead swimming stroke.
    - Mechanism: Flexion, abduction, internal rotation.
    - More common strokes: Freestyle, backstroke, and butterfly.
    - Less common stroke: Breast stroke.

- Supraspinatus and biceps tendon are commonly affected secondary to their location under the acromion.
  - Patients may feel crepitus, clicking, or catching on overhead activities.
  - Pain may be referred anywhere along the deltoid musculature.
  - Weakness in forward flexion, abduction, and internal rotation indicating impingement (Hawkins' sign).
  - Inability to initiate abduction may indicate a rotator cuff tear.
  - Pain may be nocturnal. Patients often report having difficulty sleeping on the affected side.
  - Tenderness over the greater tuberosity or inferior to the acromion on palpation.
  - Atrophy of the involved muscle resulting in a gross deformity at the respective area, usually seen in chronic tears.



Provocative Tests

- Impingement tests

Neer's impingement sign	• Stabilize the scapula and passively forward flex the arm >90°, eliciting pain. • Pain indicates the supraspinatus tendon is compressing between the acromion and greater tuberosity.
Hawkins' impingement sign	• Stabilize the scapula and passively forward flex (to 90°) the internally rotated arm eliciting pain. • A positive test indicates the supraspinatus tendon is compressing against the coracoacromial ligament.
Painful arc sign	• Abducting the arm with pain occurring roughly between 60° and 120°.

FIGURE 4–21 Neer's impingement sign. (Photo courtesy of JFK Johnson Rehabilitation Institute, 2000.)

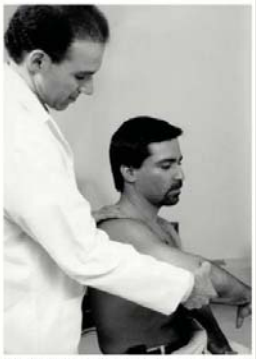
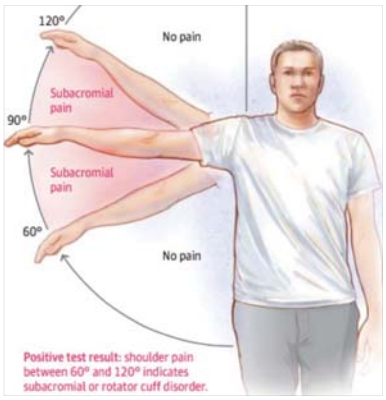


FIGURE 4–22 Hawkins' impingement sign. (Photo courtesy of JFK Johnson Rehabilitation Institute, 2000.)



Which of the following tests are indicative of an impingement of all structures that are located between the greater tubercle of the humerus and the coracohumeral ligament?

A. Neer's impingement sign
B. Hawkin's impingement sign
C. Painful arc sign
D. All of the above

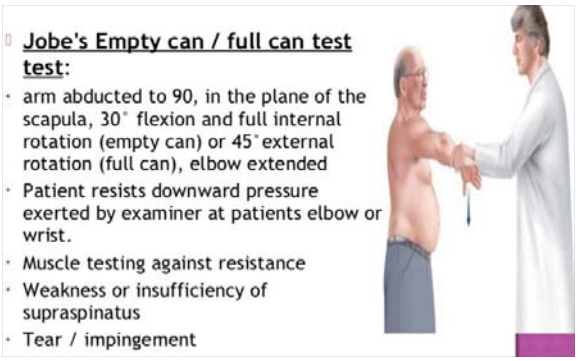
The examiner will passively flex the shoulder forward in which of the following provocative tests?

A. Neer's impingement sign
B. Hawkin's impingement sign
C. Empty can test
D. Drop arm test

A patient is examined while sitting with his shoulder flexed to 90° and his elbow flexed to 90°. The examiner grasps and supports proximal to the wrist and elbow, the examiner and the patient then quickly rotate the arm internally. Pain located below the acromioclavicular joint with internal rotation is considered a positive test result. What is this test called?

A. Neer's impingement sign
B. Hawkin's impingement sign
C. Empty can test
D. Drop arm test

Empty can (supraspinatus) test	• Pain and weakness with arm flexion abduction and internal rotation (thumb pointed down). • With abduction the humerus will naturally externally rotate. In assessing the integrity of the supraspinatus, the patient should internally rotate the humerus, forcing the greater tuberosity under the acromion. In this position, the maximum amount of abduction is to 120°.
Drop arm test	• The arm is passively abducted to 90° and internally rotated. • The patient is unable to maintain the arm in abduction with or without a force applied. • Initially the deltoid will assist in abduction but fails quickly. • This indicates a complete tear of the cuff.



Elevate the arms to 90° and internally rotate the arms with the thumbs pointing down, as if emptying a can. Ask the patient to resist as you place downward pressure on the arms.

The above test is the description of:

A. Neer's impingement sign
B. Hawkin's impingement sign
C. Jobe's test
D. Drop arm test

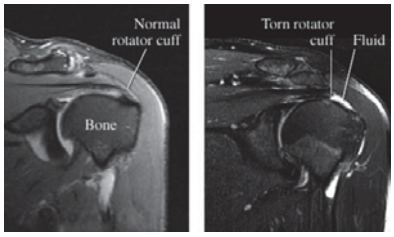
Which muscle is tested by the above maneuver?

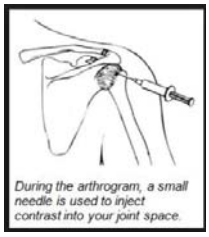
A. Deltoid strength
B. Supraspinatus strength
C. Infraspinatus strength
D. Subscapularis strength

The drop arm test is described as having a patient fully abduct the arm to shoulder level (or up to 90°) and lower it slowly. This test is indicative of rotator cuff tears, particularly of the:

A. supraspinatus strength
B. infraspinatus strength
C. teres minor
D. subscapularis strength
E. deltoid strength

- MRI is the gold standard to evaluate the integrity of the rotator cuff.
  - Full thickness tears and partial tears can be delineated.
  - Gadolinium may be added to evaluate the labrum.





Which of the following imaging tests is the gold standard to evaluate the integrity of the rotator cuff?

A. X-ray
B. MRI
C. Arthrogram
D. Ultrasound

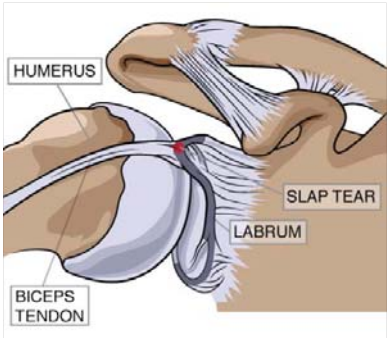
Which of the following treatments is most appropriate for full thickness rotator cuff tears or partial tears that fail conservative treatment?

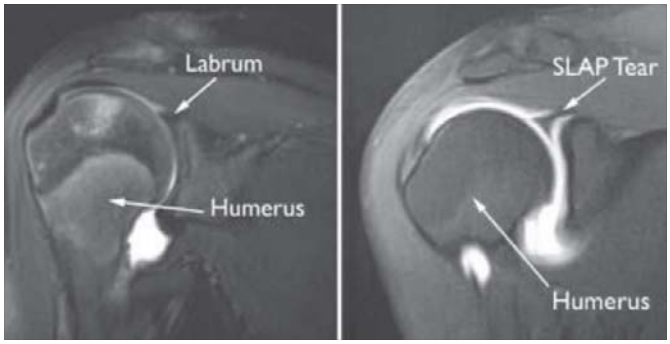
A. Acupuncture
B. Cupping
C. Cortisone injection
D. Surgery

GLENOID LABRUM TEARS

General

- The labrum encircles the periphery of the glenoid fossa. Tendons (rotator cuff and biceps) insert on the labrum. As a result, any tear or instability of the labrum may be accompanied by rotator cuff or biceps tendon pathology.
- Repetitive overhead sports (baseball, volleyball) or traumas are causative factors.
- Tears may occur through the anterior, posterior, or superior aspect of the labrum.
- SLAP lesion
  - Superior glenoid Labral tear in the Anterior-to-Posterior direction.





Clinical Features

- Signs and symptoms are similar to that of shoulder instability (clicking, locking, pain).

Provocative Tests

Load-and-shift test	• The examiner grasps the humeral head and pushes it into the glenoid while applying an anterior and posterior force. A positive test indicates labrum instability and is displayed by excess translation.
O'Brien's test	• Used to detect SLAP lesions; it is performed in two parts. • The arm is internally rotated, forward flexed, and adducted about 15°. The examiner applies a downward force to the patient's pronated arm initially. Then the examiner applies a downward force to the patient's supinated arm. • A positive test results in deep shoulder pain that improves when the downward force is applied with hand in supination.

Which of the following maneuvers test for a Superior glenoid Labral tear in the Anterior-to-Posterior? direction.

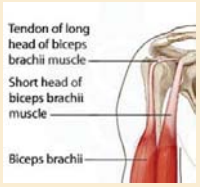
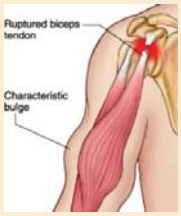
A. Neer's impingement sign
B. Hawkin's impingement sign
C. Empty can test
D. O'Brien's test

The positive O'Brien's test is indicates a SLAP tear. Which of the following is the best description of a positive test?

A. Pain or painful clicking elicited with thumbs down
B. Decreased or eliminated with thumbs up
C. Pain increased with thumbs down and decreased with thumbs up
D. Pain decreased with thumbs down and increased with thumbs up

BICEPS TENDONITIS AND RUPTURE

General

Biceps tendonitis  	• Origin of the long head of the biceps tendon is the supraglenoid tuberosity. • Origin of the short head of the biceps tendon is the apex of the coracoid process. • Typically inflammation of the long head of the biceps tendon occurs at bicipital groove of the humeral head. • This tendon may be impinged between the head of the humerus, acromion, and CC ligaments with elevation and internal rotation of the arm.
Biceps rupture  	• Most common site of rupture is at the proximal end of the long head of the biceps tendon. • "Popeye sign" noted with retracted biceps muscle. ♥ • Distal rupture is rare, typically occurring in people performing significant physical activities (e.g., bodybuilders, heavy manual workers). • Seen in adults >40 years old with a chronic history of impingement syndrome. • Also associated with rotator cuff tears in the elderly.

Clinical Features

- Point tenderness in the bicipital groove.
- Positive impingement signs if associated with shoulder impingement syndrome.
- Sharp pain, audible snap, ecchymosis, and visible bulge ("Popeye muscle") in the upper arm with tendon rupture.

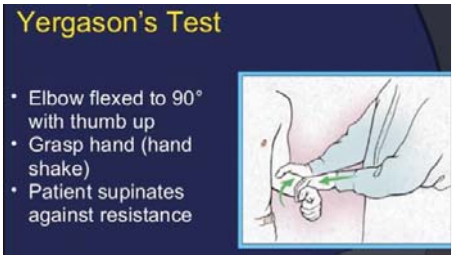
FIGURE 4–28 Point tenderness of biceps tendon in bicipital groove. (From Snider, 1997, with permission.)

The diagnosis of complete biceps tendon rupture is often obvious because of the deformity of the arm muscle. What is this called?

A. Hercules muscle
B. Popeye muscle
C. Viking muscle

Provocative Tests

Biceps tendonitis	• Yergason's test determines the stability of the long head of the biceps tendon in the bicipital groove. □ Pain at the anterior shoulder with flexion of the elbow to 90°, and supination of the wrist against resistance. • Speed's test □ Pain at the anterior shoulder with flexion of the shoulder, elbow extended and supinated against resistance.
Biceps rupture	• Ludington's test □ With the patient's hands resting on top of his/her head (finger interlocked), the patient is asked to contract and relax the biceps muscles on each side. □ With palpation of the long head biceps groove during biceps contraction, contraction of the biceps tendon will be absent on the affected side, while it can be felt on the unaffected side.



Which of the following tests may indicates bceps tendonitis?

A. Yergason's test
B. Speed's test
C. Empty can test
D. A and B
E. B and C

The examiner places the patient's arm in shoulder flexion, external rotation, full elbow extension, and forearm supination; manual resistance is then applied by the examiner in a downward direction. The test is considered to be positive if pain in the bicipital tendon or bicipital groove is reproduced. What is this test called?

A. Yergason's test
B. Speed's test
C. Ludington's test
D. Jobes test