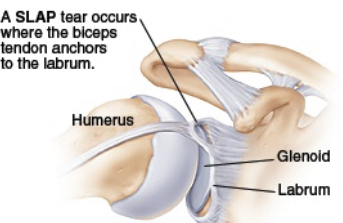
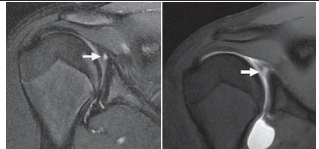


Mechanisms proposed for superior labrum anterior to posterior (SLAP) lesions include:

- A. Falling on an outstretched arm
- B. Overhead throwing motion
- C. Pulled elbow
- D. Answers A and B



- SLAP lesions occur as a result of falling on an outstretched hand (**FOOSH**) causing a traction and compression injury related to the fall.
- **Overhead throwing motion** in the deceleration phase causes traction on the superior labrum by the biceps muscle.
- The cocking phase of the overhead throw causes a torsional peeling-back stress to the glenoid labrum leading to a SLAP lesion.



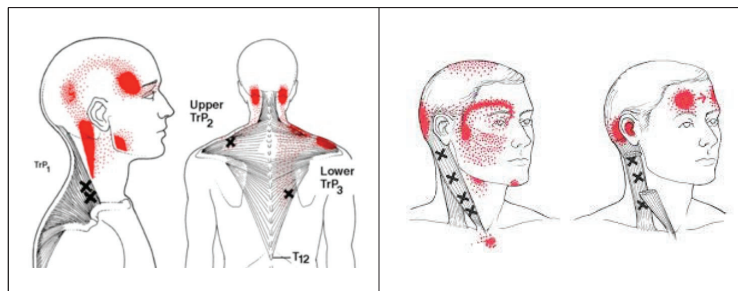
- **MR arthrogram** is the test of choice when evaluating for labral pathology. This exam has 2 parts. One would first have an arthrogram and then an MRI. This 2-part exam shows more details of the joint than an MRI by itself.

Nursemaid elbow

- a.k.a. “_____ head subluxation” or simply “pulled elbow”, is the most common upper-limb injury in children under the age of 6. It is typically an easily treatable condition.
- The etiology is movement of the head of the radius under the annular ligament. The distal attachment of the annular ligament covering the radial head is weaker in children than in adults, allowing it to be more easily torn

Myofascial pain syndrome is characterized by:

- A. Widespread tenderness
- B. Tender points
- C. Trigger points
- D. No change in muscle tension

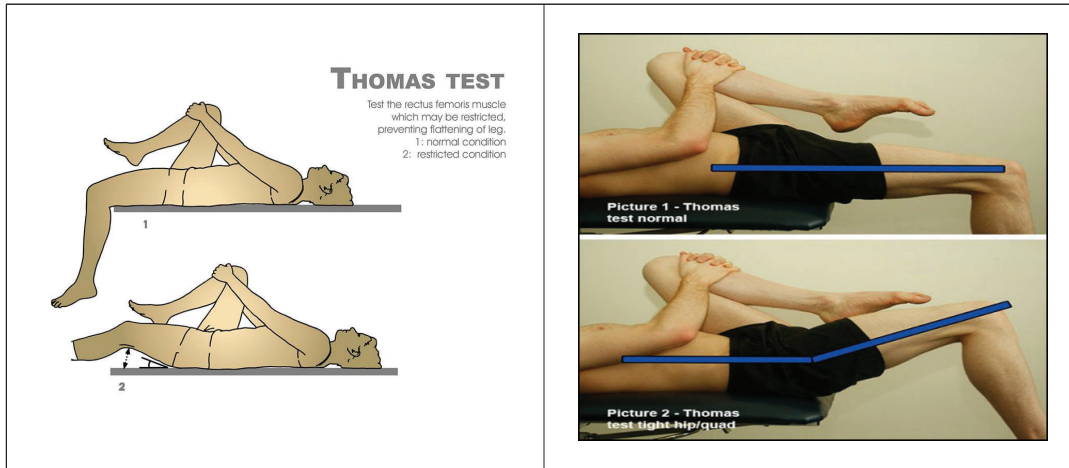


- Trigger points can develop due to a variety of factors, including direct or indirect trauma, overuse, or stress.
- A trigger point is an area of tautness, which on compression can cause local or referred manifestations. Trigger points can refer symptoms to more remote regions.
- In contrast, palpation of a tender point causes local discomfort without referred pain.

Trigger points	Tender points
Referred pain	No Referred pain

Thomas' test is used to assess:

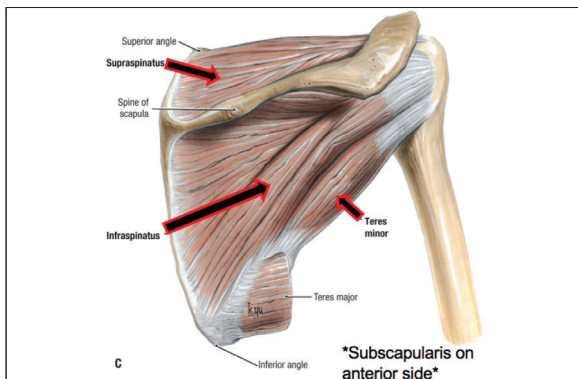
- A. Lumbar lordosis
- B. Hip flexion contracture
- C. Sacroiliac joint dysfunction
- D. Iliotibial band contracture



- Thomas' test is used to assess for a hip flexion contracture.
- With the patient supine, flex one hip to obliterate the lumbar lordosis. The angle between the affected thigh and the table reveals the fixed flexion contracture of the hip.

The rotator cuff muscles include all of the following except:

- A. Teres minor
- B. Supraspinatus
- C. Rhomboids
- D. Infraspinatus



- The rotator cuff muscles include:
 - A. supraspinatus
 - B. infraspinatus
 - C. teres minor
 - D. subscapularis
- These muscles are dynamic stabilizers of the shoulder.

S I t S

Which finger is commonly affected in Dupuytren's contracture?

- A. The index finger
- B. The middle finger
- C. The ring finger
- D. The pinky finger



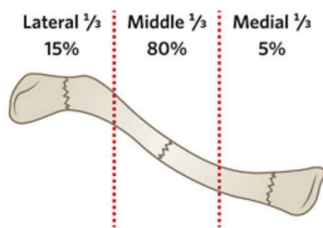
Dupuytren's contracture

- Most commonly involves the _____ finger.
- **Risk factors:** This condition appears in the fourth to sixth decade of life and is more severe in males of northern European descent.
- **Pathophysiology:** collagen type III hyperproliferation affecting the palmar fascia.
- **Treatment:** serial triamcinolone injections in early stages, collagenase injections, and surgery.

- Dupuytren's contracture is a condition in which one or more fingers become permanently bent in a flexed position.
- It usually begins as **small hard nodules just under the skin of the palm**. It then worsens over time until the fingers can no longer be straightened. While typically not painful some aching or itching may be present.
- The ring finger followed by the little and middle fingers are most commonly affected. It can interfere with preparing food, writing, and other activities.

What portion of the clavicle is most commonly fractured?

- A. Distal 1/3
- B. Middle 1/3
- C. Proximal 1/3
- D. Distal 1/3 and proximal 1/3 fractures are equally most common



- Clavicle fractures are one of the most common bony injuries.
- The most common location is the middle third (80%).
- 15% occur in the distal third and 5% occur in the proximal third.

Lateral	Middle	Medial
15%	80%	5%



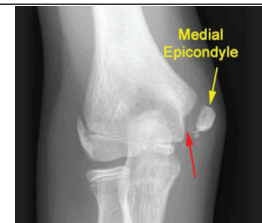
Little League elbow:

- A. Involves the lateral elbow region
- B. Is an acute dislocation of the elbow
- C. Occurs most commonly between the ages of 18-20
- D. Occurs in athletes complaining of medial elbow pain

<p>LITTLE LEAGUE ELBOW Caused when an adolescent baseball player pitches too frequently or without adequate rest, Little League Elbow injuries range from soreness to fractures and ripped ligaments.</p> <p>SOURCES: The Hughston Clinic, Journal of Athletic Training THE VIRGINIAN-PILOT</p>	<ul style="list-style-type: none"> • Little League elbow: Little League elbow is suspected in a throwing athlete between the <u>ages of 9 and 12</u> with medial elbow pain and a recent history of throwing. • S/Sx: There is tenderness over the medial epicondyle and pain with resisted flexion of the wrist and valgus stress testing of the elbow. There may also be a slight elbow flexion contracture. • Pathology: irritation and inflammation of the _____ on the medial epicondyle.
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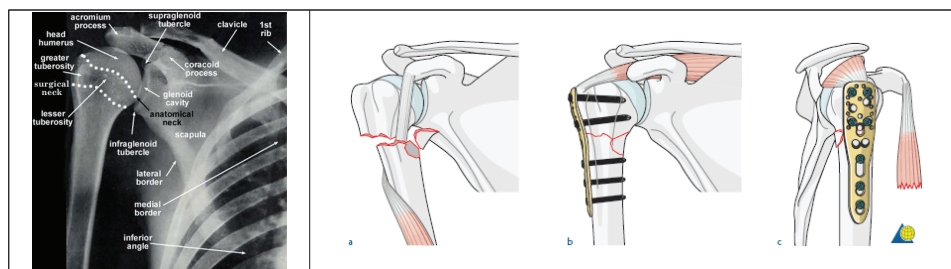
Growth Plate

- A.k.a. the epiphyseal plate or physis, is the area of growing tissue near the end of the long bones in children and adolescents.
- Each long bone has at least two growth plates: one at each end. The growth plate determines the future length and shape of the mature bone.

**What is the most common site for humeral fractures?**

- A. Surgical neck
- B. Anatomical neck
- C. Mid-shaft
- D. Humeral head

<p>Proximal Humerus</p> <p>BoneAndSpine.com</p>		<ul style="list-style-type: none"> • The _____ is called so because of frequent fractures which occur here. This area lies below the head and tubercle and is narrow. • The anatomical neck is located at the junction point of the head with the shaft, and is between the head and tubercles.
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Scoliosis can be classified as structural or functional. Which one of the following is NOT characteristic of structural scoliosis?

- A. Most cases are idiopathic
- B. It is reversible
- C. Subtype of structural scoliosis includes idiopathic
- D. Subtypes of structural scoliosis include congenital or acquired

Scoliosis	
Structural scoliosis	Functional scoliosis
<ul style="list-style-type: none"> Structural scoliosis is not reversible. Subtypes include idiopathic, congenital, or acquired. Idiopathic scoliosis accounts for 80% of structural scoliosis. The spine curvature is not flexible and does not go away with a change in position. 	<ul style="list-style-type: none"> It is a curvature due to a problem that does not involve the spine, such as having legs that are different lengths or muscle spasms caused by pain. The curvature is flexible and will go away if the problem that causes to lean to the side goes away.

	<p>Functional scoliosis</p> <ul style="list-style-type: none"> Nonstructural scoliosis involves a temporary change of spinal curvature. This is caused by an underlying condition such as a difference in leg length, muscle spasms, or inflammatory conditions, (e.g. appendicitis), which may produce muscle spasm. Functional scoliosis is treated by correcting the underlying problem.
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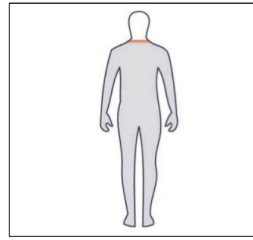
Medial winging of the scapula is caused by which of the following nerve injuries?

- A. Weakness of serratus anterior due to spinal accessory nerve injury
- B. Trapezius weakness due to long thoracic nerve injury
- C. Serratus anterior weakness due to long thoracic nerve injury
- D. Trapezius weakness due to spinal accessory nerve injury

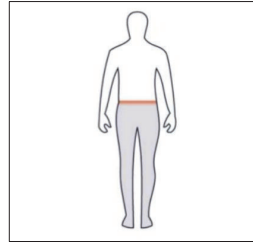
SCAPULA WINGING	
A dysfunction involving the stabilizing muscles of the scapula resulting in imbalance and abnormal motion of the scapula	
Medial Scapular Winging	Lateral Scapular Winging
deficit in Serratus anterior muscle	deficit in Trapezius muscle
dysfunction of Long thoracic nerve	dysfunction of Spinal accessory nerve (CN XI)
↓	↓
weak protraction of the scapula	weak superior and medializing force on the scapula
young athletic patient, more common than lateral	usually iatrogenic (history of neck surgery)

Match each spinal cord injury to the correct diagram.

Tetraplegia (Quadriplegia) ■



Paraplegia ■



Tetraplegia	<ul style="list-style-type: none"> Replaced the term _____ in 1992. Impairment or loss of motor and/or sensory function in the cervical segments of the spinal cord due to damage of neural elements within the spinal canal. Results in impairment of function in arms, trunk, legs, and pelvic organs. Does not refer to peripheral nerve or brachial plexus injuries (i.e., refers only to UMN injuries).
Paraplegia	<ul style="list-style-type: none"> Impairment or loss of motor and/or sensory function in thoracic, lumbar, or sacral (but NOT cervical) segments of the spinal cord. Trunk, legs, and pelvic organs may be involved, but arm function is spared. Also refers to cauda equina and conus medullaris injuries but not to LMN injuries outside the neural canal such as lumbosacral plexus lesions or peripheral nerve injury.

Match each item to the definition.

Dermatome ■

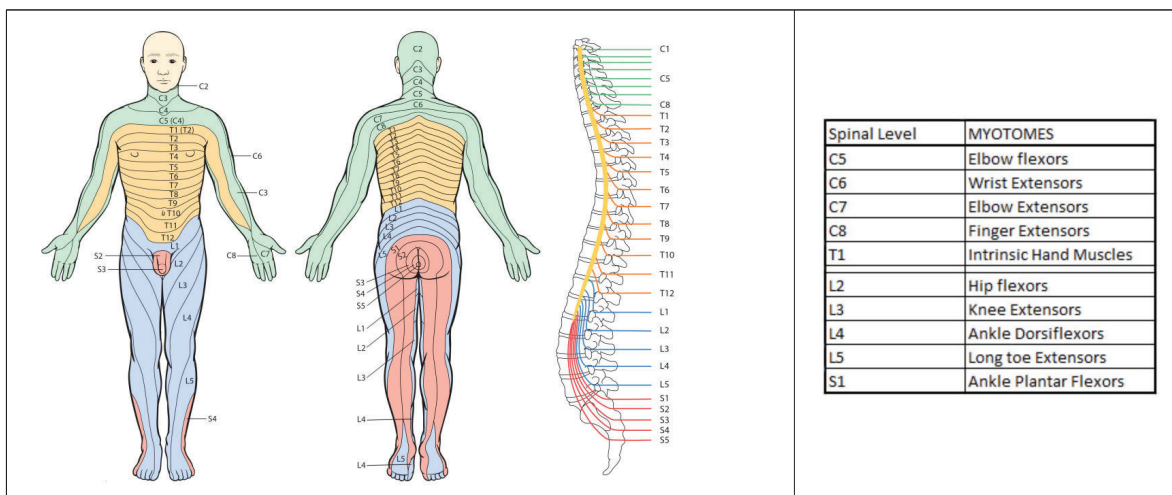


Collection of **muscle** fibers innervated by the **motor** axons within each segmental nerve (root)

Myotome ■

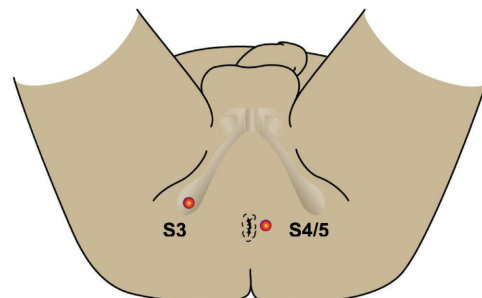
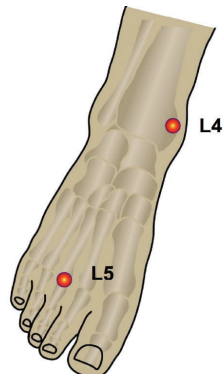
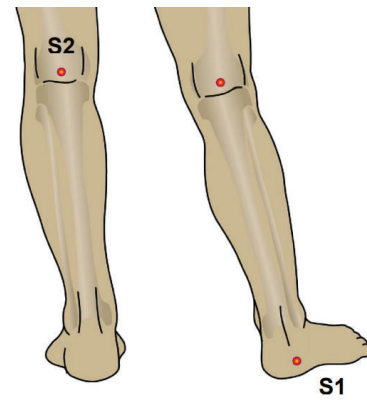
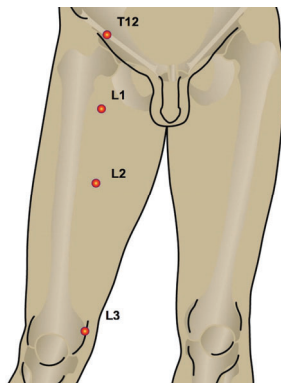
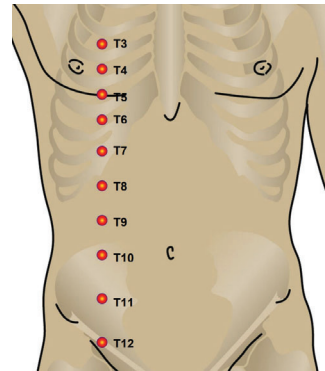
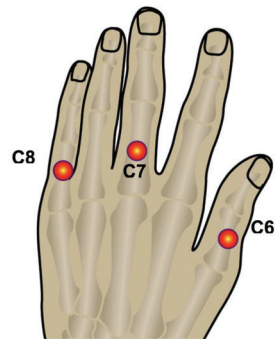
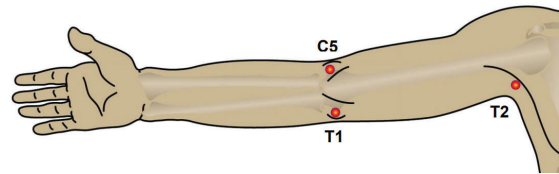
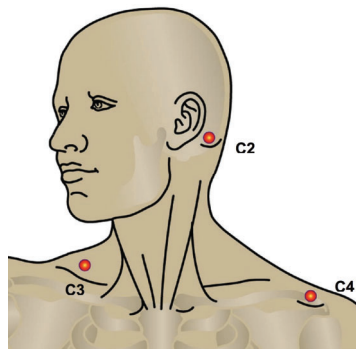


Area of **skin** innervated by the **sensory** axons within each segmental nerve (root)



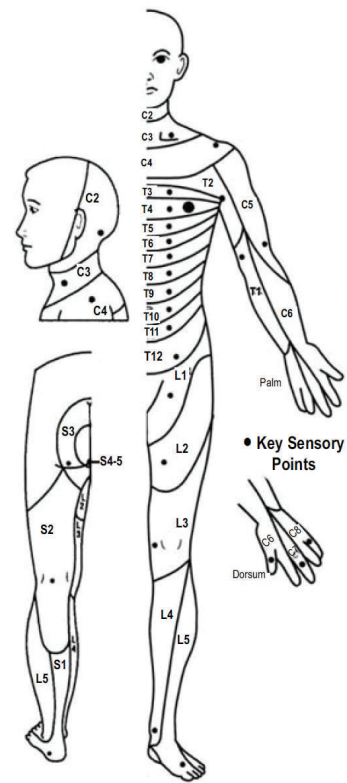
International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) - Key Sensory Points

*Source: asia-spinalinjury.org



ASIA Key Sensory Levels

- C2: Occipital protuberance
- C3: Supraclavicular fossa
- C4: Superior acromioclavicular (AC) joint
- C5: Lateral side of the antecubital fossa
- C6: Thumb—dorsal surface, proximal phalanx
- C7: Middle finger—dorsal surface, proximal phalanx
- C8: Little finger—dorsal surface, proximal phalanx
- T1: Medial (ulnar) side of antecubital epicondyle
- T2: Apex of axilla
- T3: Third intercostal space (ICS) at mid-clavicular line
- T4: Nipple line—fourth ICS at mid-clavicular line
- T5: Fifth ICS—midway between T6 and T8
- T6: Xiphoid—sixth ICS (at mid-clavicular line)
- T7: Seventh ICS—at mid-clavicular line
- T8: Eighth ICS—midway between T6 and T10
- T9: Ninth ICS—midway between T8 and T10 (at mid-clavicular line)
- T10: Tenth ICS—at umbilicus (at mid-clavicular line)
- T11: Eleventh ICS—at mid-clavicular line
- T12: Inguinal ligament at midpoint
- L1: Half the distance between T12 and L2
- L2: Mid-anterior thigh
- L3: Medial femoral condyle
- L4: Medial malleolus
- L5: Dorsum of foot at third metatarsophalangeal (MTP) joint
- S1: Lateral heel
- S2: Popliteal fossa in the midline
- S3: Ischial tuberosity
- S4-5: Perianal area (taken as one level)



Source: American Spinal Injury Association

Sensory information that covers the area of skin over middle finger (dermatome) is subserved by afferent fibers from which dorsal root?

- A. C5
- B. C6
- C. C7
- D. C8

Sensory information that covers the area of skin over the nipple line is subserved by afferent fibers from which dorsal root?

- A. C7
- B. T4
- C. T10
- D. S1

A dermatome is an area of skin that is mainly supplied by a single spinal nerve. What is the T10 dermatome?

- A. Supraclavicular fossa
- B. Nipple line
- C. Umbilicus line
- D. Ischial tuberosity

Which provocative test is useful in detecting rotator cuff impingement?

- A. Drop arm test
- B. O'Brien test
- C. Apley scarf test
- D. Neer's test



- Four muscles (infraspinatus, supraspinatus, subscapularis, and teres minor) form the rotator cuff.
- The insertion point of these four muscles is subject to repetitive microtrauma and impingement between the acromion and greater tuberosity of the humerus.
- Impingement syndrome, supraspinatus syndrome, and bursitis are terms commonly used.
- **Neer's test** will be positive in the setting of impingement. **Hawkins' test** can also be performed to further confirm impingement.
- **Neer's test:** Stabilizes the scapula while passively elevating the shoulder, in effect jamming the humeral head into the acromion.

- **Drop arm test** is used to detect rotator cuff tears.
- **O'Brien test** can be used to detect SLAP lesions or AC joint abnormalities.
- **Apley scarf test** is also used to detect AC joint pathology.

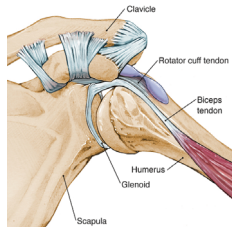
Which one of the following is not a branch of the facial nerve (cranial nerve VII)?

- A. Temporal branch
- B. Zygomatic branch
- C. Mandibular nerve branch
- D. Marginal mandibular branch

Cranial nerve V (Trigeminal)	Cranial nerve VII (Facial)
<ul style="list-style-type: none"> • Motor + Sensory. Sensory from face and mouth; Motor to muscles of mastication (chewing) 	<ul style="list-style-type: none"> • Motor + Sensory. Serves the muscles of facial expression, lacrimal glands, and salivary glands

What physical exam maneuver is used to detect biceps tendonitis?

- A. Hawkins' test
- B. Neer's test
- C. Speed's test
- D. Empty can test

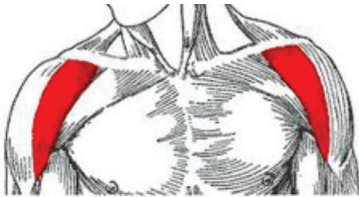




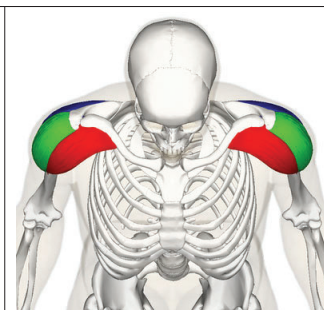
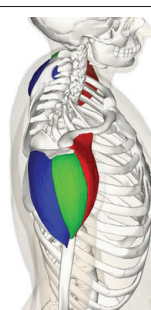
- To perform the Speed's Test, the examiner places the patient's arm in shoulder flexion, external rotation, full elbow extension, and forearm supination; manual resistance is then applied by the examiner in a downward direction.
- The test is considered to be positive if pain in the **bicipital tendon**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

- Hawkins'** and **Neer's** both test for rotator cuff impingement.
- Empty can** test is used to detect supraspinatus tendinopathy.

Which part of the Deltoid is responsible for arm abduction?

- A. Anterior Deltoid
- B. Medial Deltoid
- C. Posterior Deltoid

Anterior Deltoid	Medial Deltoid	Posterior Deltoid
⊙ clavicle	⊙ acromion of scapula	⊙ spine of scapula
① _____ of humerus		
		
Flex + IR arm	Abducts arm	Extend + ER arm



Which of the following muscles initiates shoulder abduction?

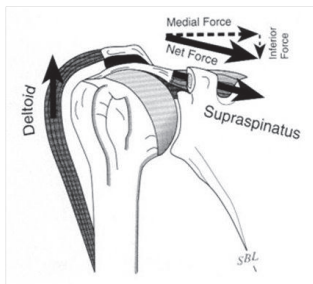
- A. Supraspinatus
- B. Deltoid
- C. Serratus anterior
- D. Trapezius

Shoulder Abduction

0° - 30° (first 15°)	0° - 90° (up to 90°)	90° - 180° (beyond 90°)
	Deltoid (middle fiber)	Trapezius & Serratus anterior

Shoulder abduction – Two motions

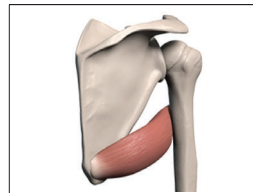
True abduction of the arm at the shoulder	Upward rotation of the scapula
Supraspinatus	Serratus anterior Trapezius



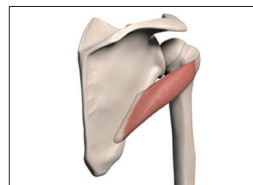
Abduction	Adduction
<ul style="list-style-type: none"> Supraspinatus Deltoid (middle fiber) Trapezius Serratus anterior 	<ul style="list-style-type: none"> Pectoralis major Latissimus dorsi Teres major Coracobrachialis Biceps (short head)

Match each Teres muscle to the correct diagram.

Teres Minor



Teres Major



Match each Teres muscle to the correct set of facts.

Teres Minor



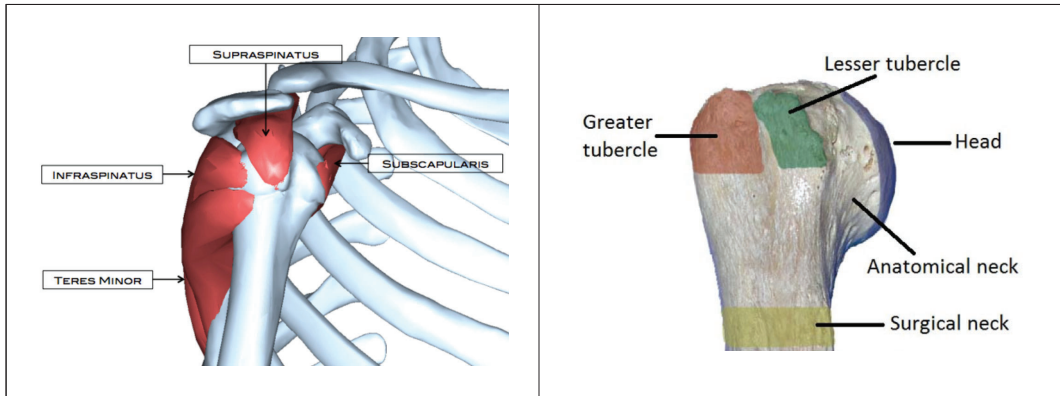
Origin	lateral border of scapula
Insertion	greater tuberosity of humerus
Action	externally rotation

Teres Major



Origin	inferior angle of scapula
Insertion	bicipital groove
Action	internal rotation + adduction

Rotator Cuff	Origin (Scapula)	Insertion (Humerus)	Nerve	Action
Supraspinatus	Supraspinatus fossa	Greater tuberosity (superior)	Suprascapular	Abduct arm (initiate)
Infraspinatus	Infraspinatus fossa	Greater tuberosity (middle)	Suprascapular	ER arm, stability
Teres Minor	Lateral scapular	Greater tuberosity (inferior)	Axillary	ER arm, stability
Subscapularis	Subscapular fossa	Lesser tuberosity	Upper & Lower Subscapular	IR, abduct arm, stability



Rotator cuff is a common name for the group of four distinct muscles and their tendons that provide strength and stability during motion of the shoulder. The muscles arise from the scapula and connect to the head of the humerus, forming a cuff at the glenohumeral joint. Which rotator cuff tendon inserts to the lesser tuberosity?

- A. Supraspinatus
- B. Infraspinatus
- C. Teres minor
- D. Subscapularis

Which muscle is the most commonly involved in a rotator cuff tear?

- A. Supraspinatus
- B. Infraspinatus
- C. Teres minor
- D. Subscapularis

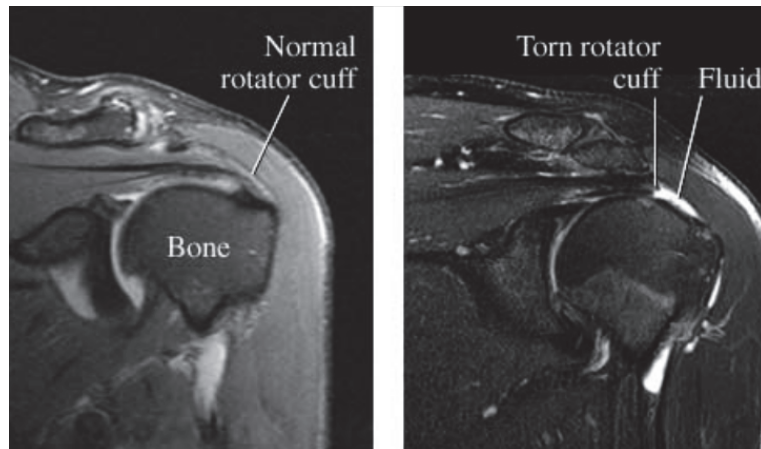
Which rotator cuff externally rotates the humerus?

- A. Infraspinatus
- B. Teres minor
- C. Subscapularis
- D. A and B
- E. B and C

What diagnostic test is the “gold standard” for evaluation of the rotator cuff?

- A. Plain x-ray
- B. Physical exam of the shoulder
- C. MRI
- D. Ultrasound

- MRI has replaced arthrography as the gold standard test for rotator cuff injuries.
- MRI offers high sensitivity and specificity that can be used to identify size, location, and quality of injury.
- MRI is relatively expensive and requires lack of motion by the patient in order to avoid artifact.



Which activity will most likely aggravate patellofemoral pain syndrome?

- A. Ambulation
- B. Climbing stairs
- C. Stationary cycling
- D. Swimming



Patellofemoral pain syndrome (PFPS)

- A.k.a. **runner's knee**, is a condition characterized by knee pain ranging from severe to mild discomfort seemingly originating from the contact of the posterior surface of the patella (back of the kneecap) with the femur (thigh bone).
- It is anterior knee pain involving the patella and retinaculum that excludes other intra-articular and peri-patellar pathology.
- The patellofemoral joint is under high levels of compression during **stair climbing** due to significantly ↑quadriceps activity.

- As patellofemoral pain syndrome is the **most common cause of anterior knee pain** in the outpatient, a variety of treatments for patellofemoral pain syndrome are implemented.
- Most patients with patellofemoral pain syndrome respond well to conservative therapy.