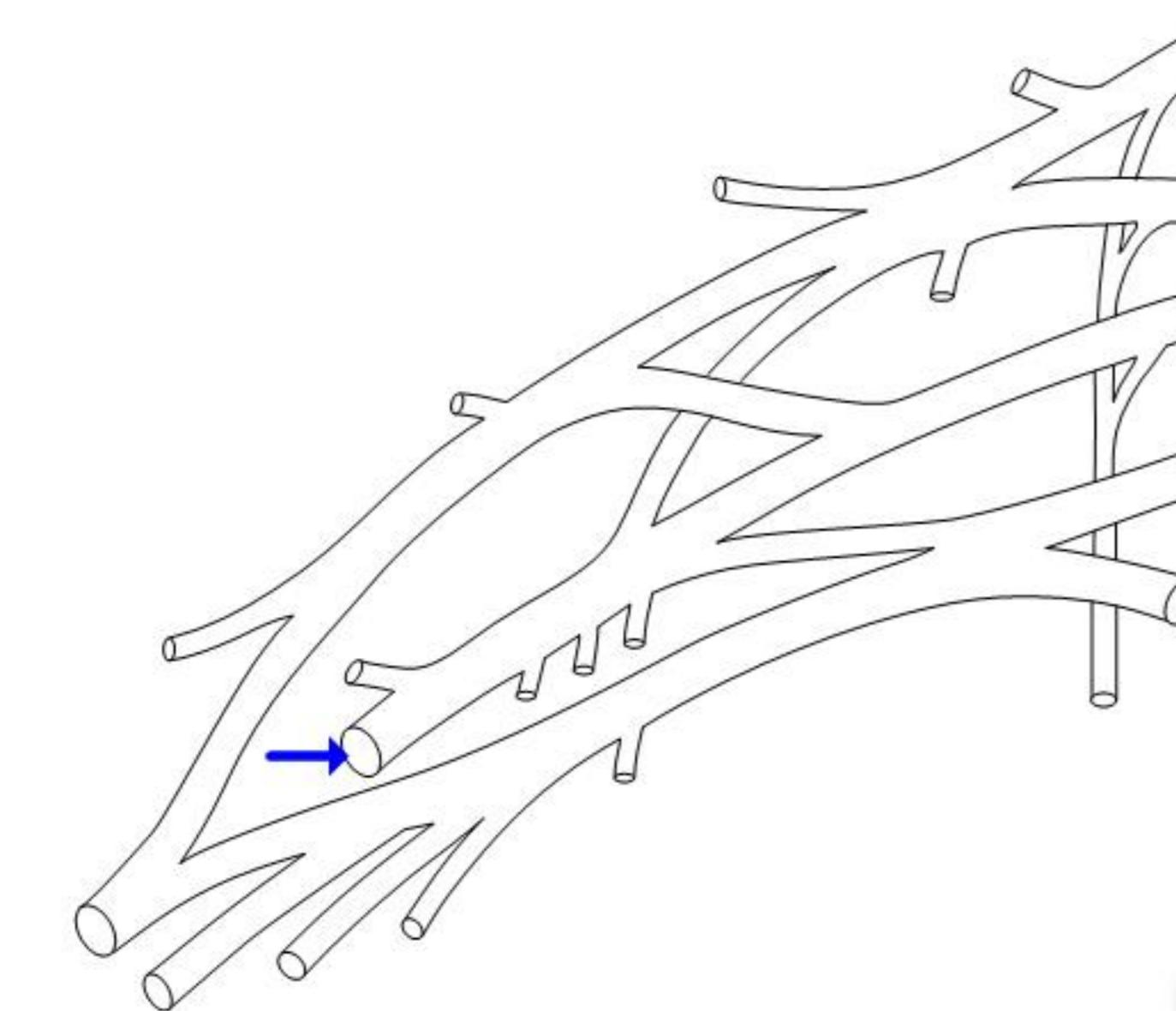


A 23-year-old male is evaluated after sustaining a neck and shoulder injury. The nerve indicated by the blue arrow on the illustration below is injured in this patient.



Which of the following is most likely to be weakened as a result of this injury?

- A. Flexion of the hand [10%]
- B. Abduction of the fingers [4%]
- C. Extension of the hand [73%]
- D. Adduction of the thumb [4%]

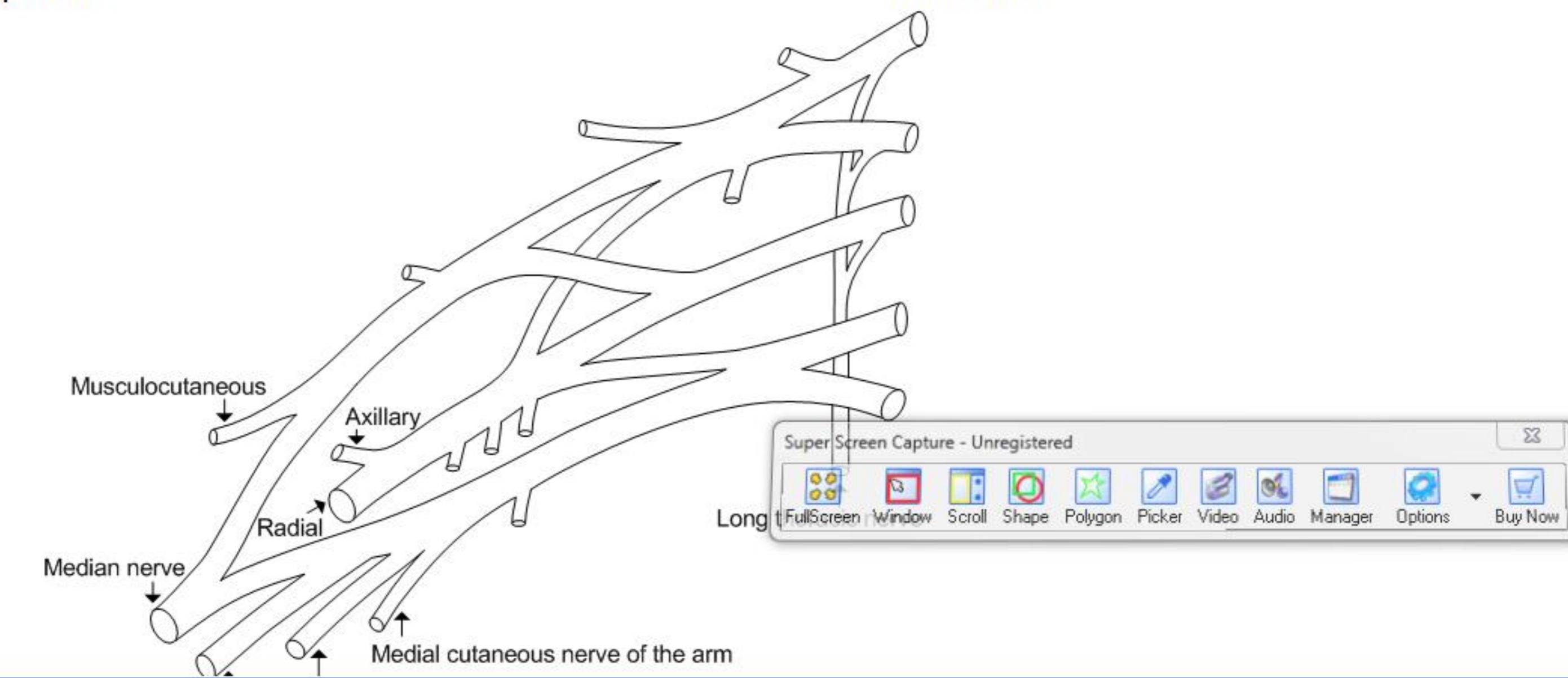


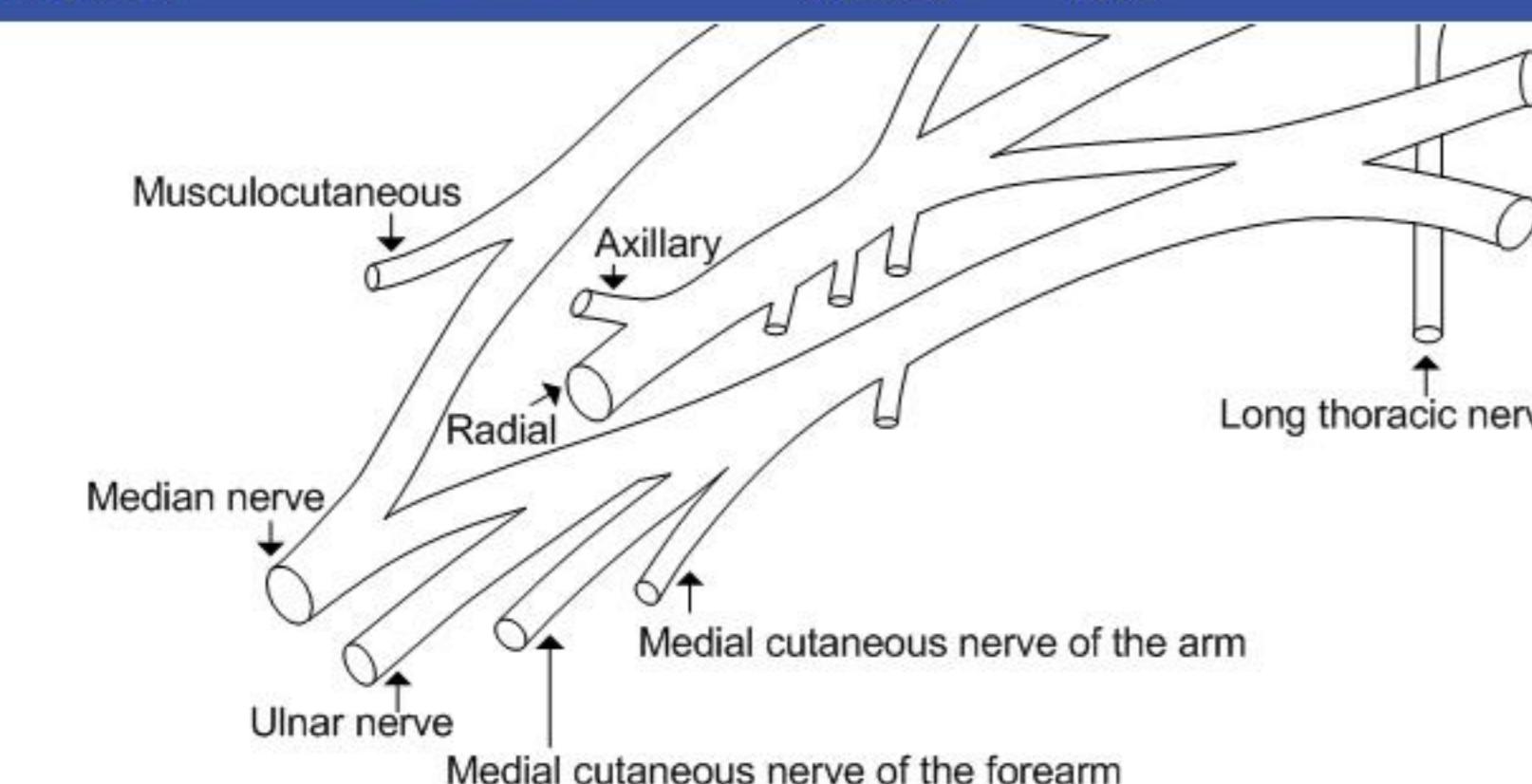
Which of the following is most likely to be weakened as a result of this injury?

- A. Flexion of the hand [10%]
- B. Abduction of the fingers [4%]
- C. Extension of the hand [73%]
- D. Adduction of the thumb [4%]
- E. Opposition of the thumb [8%]

Explanation:

User Id: 477875





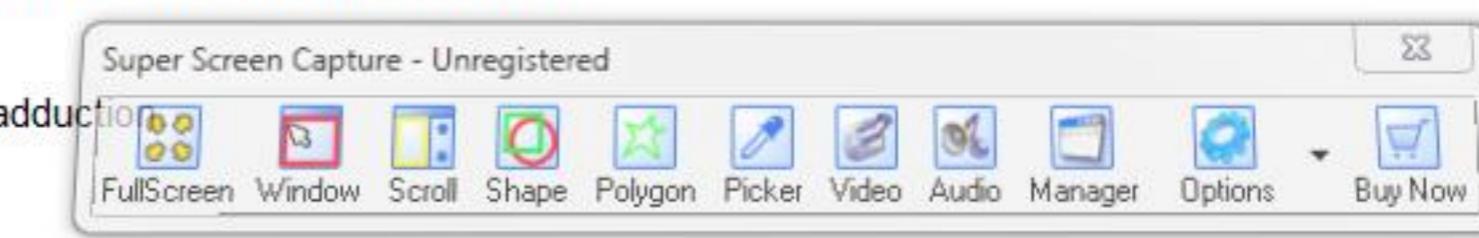
The structure identified in this illustration is the radial nerve, which receives fibers from C5-C8 and T1. The radial nerve is the largest branch of the brachial plexus. In addition to supplying the skin of the posterior arm and forearm, the radial nerve innervates the extensor muscles of the upper limb. Because this nerve tracks within the radial groove on the humerus, it is vulnerable to injury should the humerus fracture. Damage to the radial nerve results in "wrist drop," a condition in which the wrist and fingers cannot be extended.

(Choice A) Damage to the median nerve would limit hand flexion.

(Choice B) Damage to the recurrent branch of the median nerve or deep branch of the ulnar nerve would limit finger abduction.

(Choice D) Damage to the deep branch of the ulnar nerve would limit thumb adduction.

(Choice E) Damage to the median nerve affects opposition of the thumb.



Educational Objective:

The radial nerve is responsible for extension of the hand. Damage to the radial nerve results in wrist drop.

Time Spent: 18 seconds

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Last updated: [11/10/2011]

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A young athlete presents to your office after sustaining an injury to the right upper extremity. Physical examination reveals weak right forearm flexion and an absent biceps reflex. Given these findings, sensation loss in which of the following areas is most likely to be found in this patient?

- A. Posterior arm [8%]
- B. Posterior forearm [7%]
- C. Lateral forearm [51%]
- D. Medial forearm [24%]
- E. Thenar eminence [8%]

Explanation:**User Id: 477875**

This patient has symptoms suggestive of injury to the musculocutaneous nerve. The musculocutaneous nerve is derived from the C5-C7 ventral rami. As its name implies, the musculocutaneous nerve provides both motor innervation and somatic sensory innervation to the arm. It innervates the major upper arm flexors including the biceps brachii, coracobrachialis, and brachialis muscles. After innervating these muscles, the remaining fibers continue as the lateral cutaneous nerve of the forearm, providing sensory innervation to the skin of the lateral forearm.

(Choice A) The posterior arm is innervated by a branch of the radial nerve (posterior cutaneous nerve of the arm).

(Choice B) The posterior forearm is innervated by a branch of the radial nerve (posterior cutaneous nerve of the forearm).

(Choice D) The medial forearm is innervated by a branch of the ulnar nerve (medial cutaneous nerve of the forearm).

(Choice E) The thenar eminence is innervated by the recurrent branch of the median nerve.

Educational objective:

The musculocutaneous nerve innervates the flexor muscles of the upper arm and provides sensory innervation to the lateral forearm. The musculocutaneous nerve is derived from the upper trunk of the brachial



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examination reveals weak right forearm flexion and an absent biceps [Next](#). Given these findings, sensation loss in which of the following areas is most likely to be found in this patient?

- A. Posterior arm [8%]
- B. Posterior forearm [7%]
- C. Lateral forearm [51%]
- D. Medial forearm [24%]
- E. Thenar eminence [8%]

Explanation:

User Id: 477875

This patient has symptoms suggestive of injury to the musculocutaneous nerve. The musculocutaneous nerve is derived from the C5-C7 ventral rami. As its name implies, the musculocutaneous nerve provides both motor innervation and somatic sensory innervation to the arm. It innervates the major upper arm flexors including the biceps brachii, coracobrachialis, and brachialis muscles. After innervating these muscles, the remaining fibers continue as the lateral cutaneous nerve of the forearm, providing sensory innervation to the skin of the lateral forearm.

(Choice A) The posterior arm is innervated by a branch of the radial nerve (posterior cutaneous nerve of the arm).

(Choice B) The posterior forearm is innervated by a branch of the radial nerve (posterior cutaneous nerve of the forearm).

(Choice D) The medial forearm is innervated by a branch of the ulnar nerve (medial cutaneous nerve of the forearm).

(Choice E) The thenar eminence is innervated by the recurrent branch of the median nerve.

**Educational objective:**

The musculocutaneous nerve innervates the flexor muscles of the upper arm and provides sensory innervation to the lateral forearm. The musculocutaneous nerve is derived from the upper trunk of the brachial plexus and can be injured by forceful injuries that cause separation of the neck and shoulder.

Time Spent: 3 seconds

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Last updated: [1/4/2013]

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A 34-year-old woman comes to the physician complaining of easy fatigability. She lives alone and works as an accountant. Her menstrual cycles are regular and her last menstrual period was 2 weeks ago. She does not smoke or consume alcohol. Her blood pressure is 150/90 mm Hg and pulse is 82/min. During her physical examination, she sits up from the supine position without using her hands. Which of the following muscles contributes most to the described movement?

- A. Adductor magnus [2%]
- B. Biceps femoris, long head [6%]
- C. Gluteus medius [16%]
- D. Obturator externus [4%]
- E. Psoas major [67%]
- F. Vastus medialis [5%]

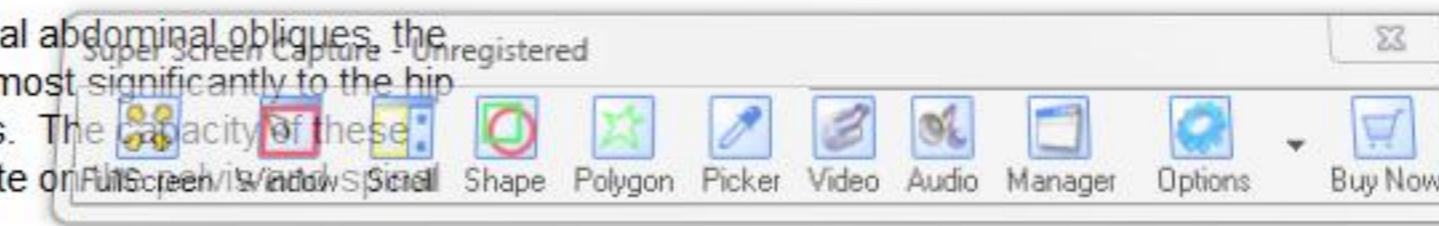
Explanation:

User Id: 477875

Major muscles responsible for motion at the hip			
Flexion	Extension	Abduction	Adduction
<ul style="list-style-type: none"> • Iliopsoas • Rectus femoris • Tensor fascia lata 	<ul style="list-style-type: none"> • Gluteus maximus • Semitendinosus • Semimembranosus • Biceps femoris - long head 	<ul style="list-style-type: none"> • Gluteus medius • Gluteus minimus 	<ul style="list-style-type: none"> • Adductor brevis • Adductor longus • Adductor magnus

Major muscles used when sitting up from the supine position include the external abdominal obliques, the rectus abdominis, and the hip flexors. The psoas major and iliacus contribute most significantly to the hip flexion; they, along with the psoas minor, are collectively known as the iliopsoas. The capacity of these muscles to carry out this motion can be deduced from the fact that they originate on the ilium, cross the hip joint, and insert on the femur.

The psoas major muscle arises from the bodies and intervertebral discs of the inferior-most thoracic and all of the lumbar vertebrae. The iliacus originates from the iliac fossa, a large concave surface found on the inner aspect of the ilium. Both muscles insert via the common iliopsoas tendon into the lesser trochanter of the femur.



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• Iliopsoas	• Semitendinosus	• Gluteus medius	• Adductor brevis
• Rectus femoris	• Semimembranosus	• Gluteus minimus	• Adductor longus
• Tensor fascia lata	• Biceps femoris - long head		• Adductor magnus

Major muscles used when sitting up from the supine position include the external abdominal obliques, the rectus abdominis, and the hip flexors. The psoas major and iliacus contribute most significantly to the hip flexion; they, along with the psoas minor, are collectively known as the iliopsoas. The capacity of these muscles to carry out this motion can be deduced from the fact that they originate on the pelvis and spinal column, cross the hip joint, and insert on the femur.

The psoas major muscle arises from the bodies and intervertebral discs of the inferior-most thoracic and all of the lumbar vertebrae. The iliacus originates from the iliac fossa, a large concave surface found on the inner aspect of the ilium. Both muscles insert via the common iliopsoas tendon into the lesser trochanter of the femur.

(Choice A) The adductor portion of the adductor magnus originates from the inferior ramus of the ischium and inserts into the proximal two-thirds of the posteromedial femur. It is a powerful adductor of the thigh.

(Choice B) The long head of the biceps femoris originates from the ischial tuberosity and inserts into the lateral head of the fibula; it functions as a thigh extensor and leg flexor.

(Choice C) The gluteus medius abducts the femur and is important in keeping the hip level during gait when the body's weight rests on one leg.

(Choice D) The obturator externus arises from the anteromedial surface of the obturator foramen and inserts near the greater trochanter of the femur. This muscle is a lateral rotator of the thigh.

(Choice F) The vastus medialis is a component of the quadriceps femoris. It arises from the proximal femur and ultimately inserts into the tibial tuberosity by means of the patella. It functions as a knee extensor.

Educational objective:

Muscles used when sitting up from the supine position include the external abdominal obliques, the rectus abdominis, and the hip flexors. The iliopsoas muscle is the most important of the hip flexors and includes the psoas major, psoas minor, and iliacus. The rectus femoris, sartorius, tensor fascia lata, and the medial compartment of the thigh also contribute to hip flexion.



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A 33-year-old male slips while working in his yard and falls on outstretched hands. He later presents to the emergency room complaining of right shoulder pain. On physical examination, there is flattening of the right deltoid muscle and insensitivity of the overlying skin to pinprick. Which of the following injuries is most likely responsible?

- A. Anterior dislocation of the humerus [65%]
- B. Acromioclavicular joint subluxation [13%]
- C. Clavicular fracture [5%]
- D. Spiral fracture of the humeral midshaft [7%]
- E. Fracture of the coracoid process [4%]
- F. Rotator cuff tear [6%]

Explanation:

User Id: 477875

The glenohumeral joint is the most commonly dislocated joint in the body owing to the shallow articulation between the humeral head and the glenoid fossa of the scapula. The shoulder may dislocate anteriorly, inferiorly or posteriorly, but anterior dislocations are by far the most common. Anterior dislocations of the humerus classically follow injuries involving forceful external rotation and abduction of the arm at the shoulder. When the head of the humerus is displaced anteriorly, there is flattening of the deltoid prominence, protrusion of the acromion, and anterior axillary fullness (due to the humeral head's movement into this location). The axillary nerve is the nerve most commonly injured by anterior shoulder dislocations. It innervates the deltoid and teres minor muscles and provides sensory innervation to the lateral arm, including the skin overlying the deltoid.

(Choice B) Acromioclavicular joint subluxation typically results from a downward blow on the tip of the shoulder and produces swelling and upward displacement of the clavicle. It is not associated with specific major nerve injuries or sensory deficits.

(Choice C) Clavicular fractures usually occur following direct trauma to the clavicle. Most fractures are in the middle third of the clavicle and produce local swelling and tenderness. Associated neurovascular damage is rare.



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Explanation:

User Id: 477875

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(Choice C) Clavicular fractures usually occur following direct trauma to the clavicle. Most fractures are in the middle third of the clavicle and produce local swelling and tenderness. Associated neurovascular damage is rare.

(Choice D) A spiral humeral midshaft fracture may result from torsion produced during a fall on an outstretched hand. Patients present with swelling, crepitus and ecchymoses of the arm. The radial nerve is commonly injured in fractures of the humeral midshaft.

(Choice E) Fracture of the coracoid process of the scapula is rare. Most commonly affected are individuals who engage in shotgun or rifle-related sports.

(Choice F) Rotator cuff tears may occur in shoulder dislocations, but do not cause nerve injury. The rotator cuff is made up of the subscapularis, supraspinatus, infraspinatus and teres minor muscles and tendons.

Educational Objective:

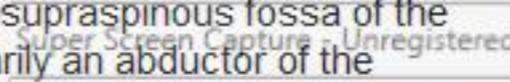
Flattening of the deltoid muscle after a shoulder injury suggests anterior shoulder dislocation. This injury most commonly results from forceful external rotation and abduction at the shoulder joint. Axillary nerve injury, resulting in deltoid paralysis and loss of sensation over the lateral arm, is often associated.



A 52-year-old golfer presents to your office with right shoulder pain that has started to interfere with his daily activities, such as getting dressed. Imaging studies suggest calcification of the supraspinatus tendon. Which of the following is most likely to provoke pain in this patient?

- A. Flexion of the humerus [3%]
- B. Extension of the humerus [5%]
- C. Adduction of the humerus [7%]
- D. **Abduction of the humerus** [75%]
- E. Medial rotation of the humerus [10%]

Explanation:**User Id: 477875**

The rotator cuff is made up of the tendons of the supraspinatus, infraspinatus, subscapularis, and teres minor muscles. These tendons, along with the tendon of the long head of the biceps brachii muscle and the ligaments of the glenohumeral joint, contribute to the stability of the joint. In rotator cuff syndrome, the most commonly injured tendon is the supraspinatus because this tendon is prone to repeated impingement trauma between the humeral head and the acromion. The supraspinatus originates on the supraspinous fossa of the scapula and inserts on the superior portion of the head of the humerus and is primarily an abductor of the arm. Therefore, rotator cuff syndrome is most commonly associated with pain during  abduction of the humerus.

(Choice A) Flexion of the humerus at the shoulder is not accomplished by any of the rotator cuff muscles. The anterior segment of the deltoid is an important flexor of the humerus.

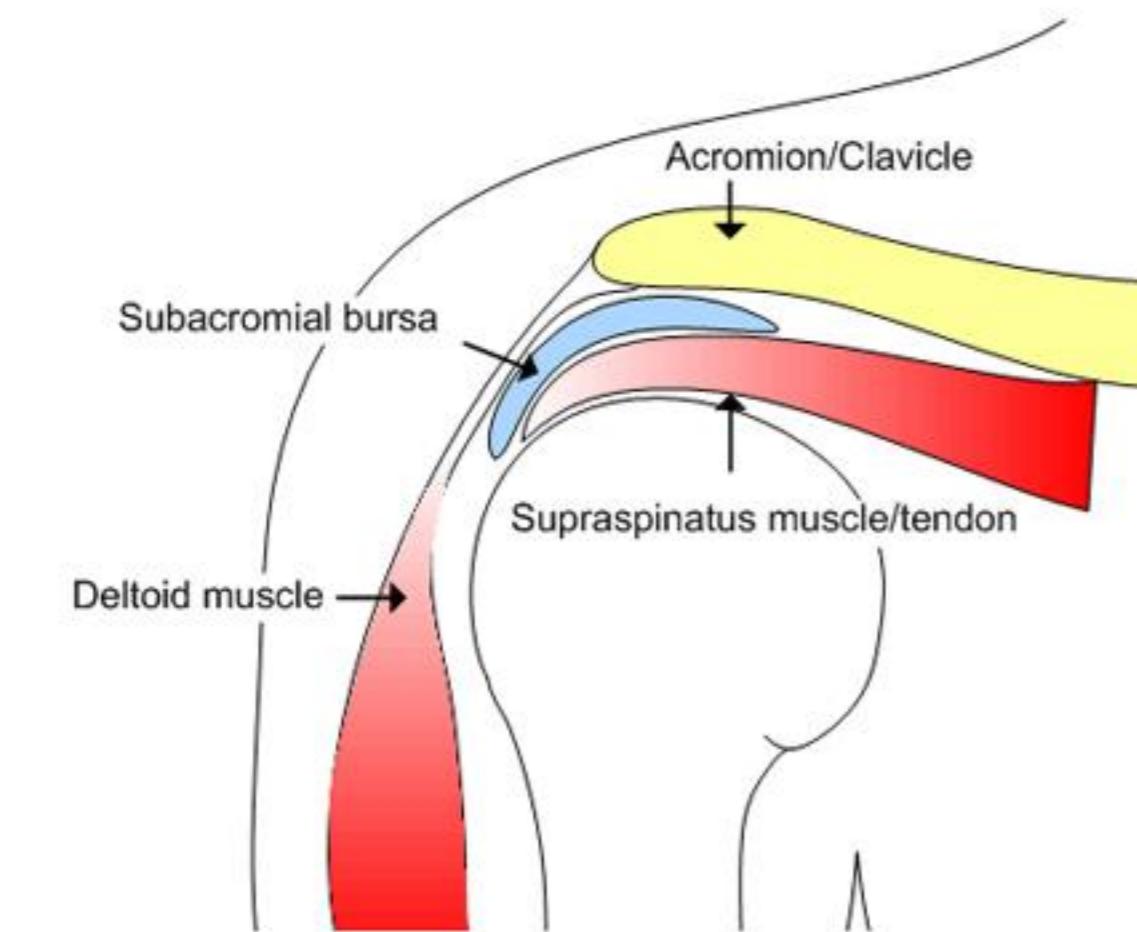
(Choice B) Extension of the humerus is not accomplished by any of the rotator cuff muscles.

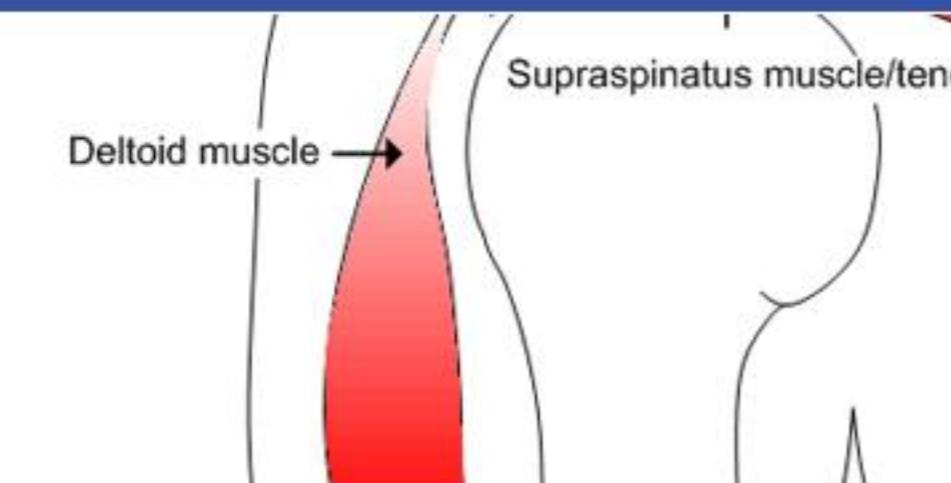


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A 52-year-old golfer presents to your office with right shoulder pain that has started to interfere with his daily activities, such as getting dressed. Imaging studies suggest calcification of the supraspinatus tendon. Which of the following is most likely to provoke pain in this patient?

- A. Flexion of the humerus [3%]
- B. Extension of the humerus [5%]
- C. Adduction of the humerus [7%]
- D. **Abduction of the humerus [75%]**
- E. Medial rotation of the humerus [10%]

Explanation:**User Id: 477875**



The rotator cuff is made up of the tendons of the supraspinatus, infraspinatus, subscapularis, and teres minor muscles. These tendons, along with the tendon of the long head of the biceps brachii muscle and the ligaments of the glenohumeral joint, contribute to the stability of the joint. In rotator cuff syndrome, the most commonly injured tendon is the supraspinatus because this tendon is prone to repeated impingement trauma between the humeral head and the acromion. The supraspinatus originates on the supraspinous fossa of the scapula and inserts on the superior portion of the head of the humerus and is primarily an abductor of the arm. Therefore, rotator cuff syndrome is most commonly associated with pain during abduction of the humerus.

(Choice A) Flexion of the humerus at the shoulder is not accomplished by any of the rotator cuff muscles. The anterior segment of the deltoid is an important flexor of the humerus.

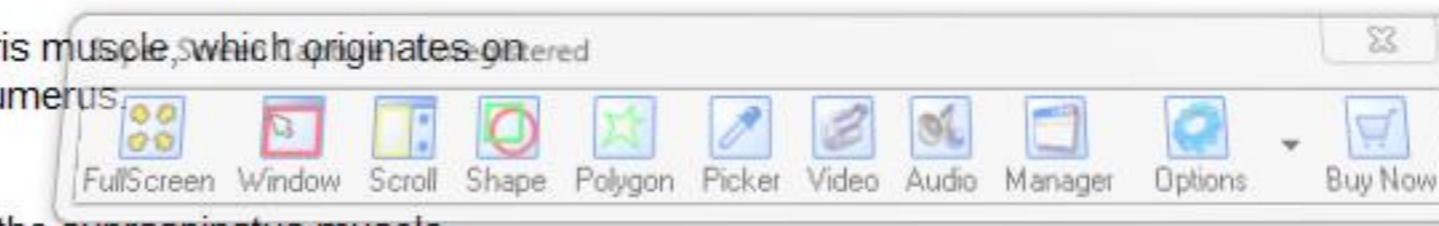
(Choice B) Extension of the humerus is not accomplished by any of the rotator cuff muscles.

(Choice C) Adduction of the humerus is not accomplished by any of the rotator cuff muscles. The main adductor of the humerus is the latissimus dorsi muscle.

(Choice E) Medial rotation of the humerus is accomplished by the subscapularis muscle, which originates on the subscapular fossa and inserts onto the lesser tubercle of the head of the humerus.

Educational Objective:

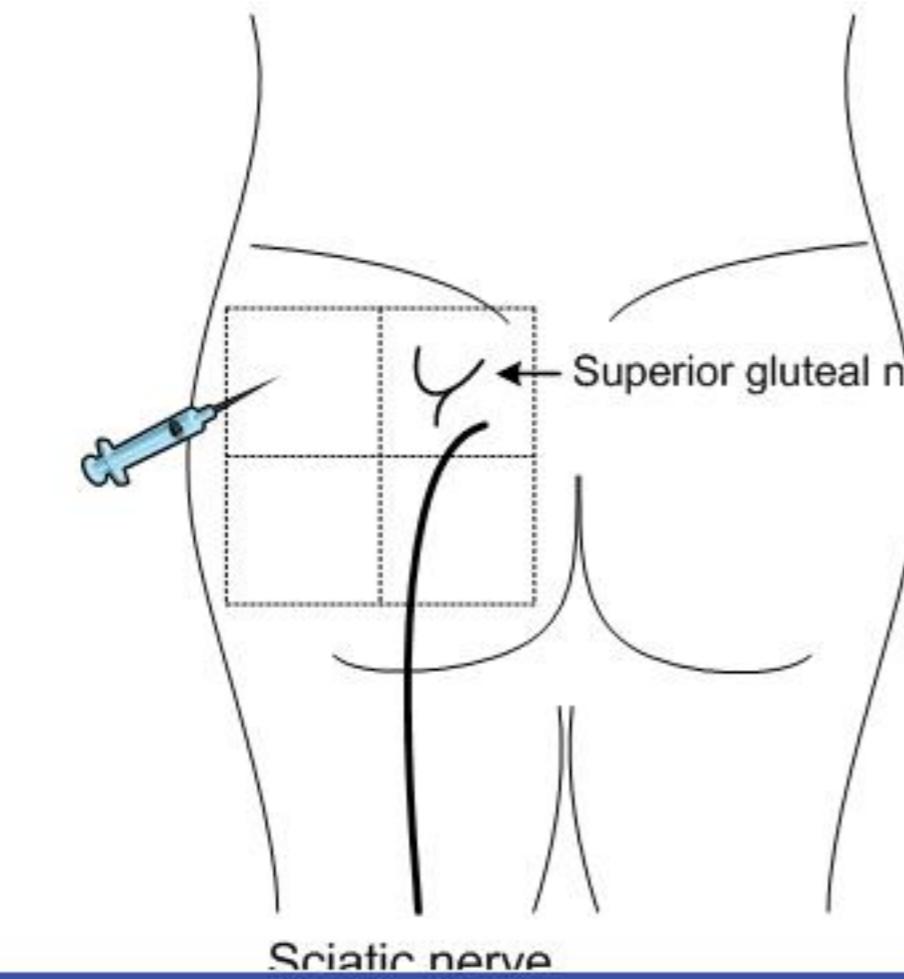
The most commonly injured structure in rotator cuff syndrome is the tendon of the supraspinatus muscle. Because the supraspinatus is an abductor of the humerus, injury to its tendon causes pain on abduction of the arm.

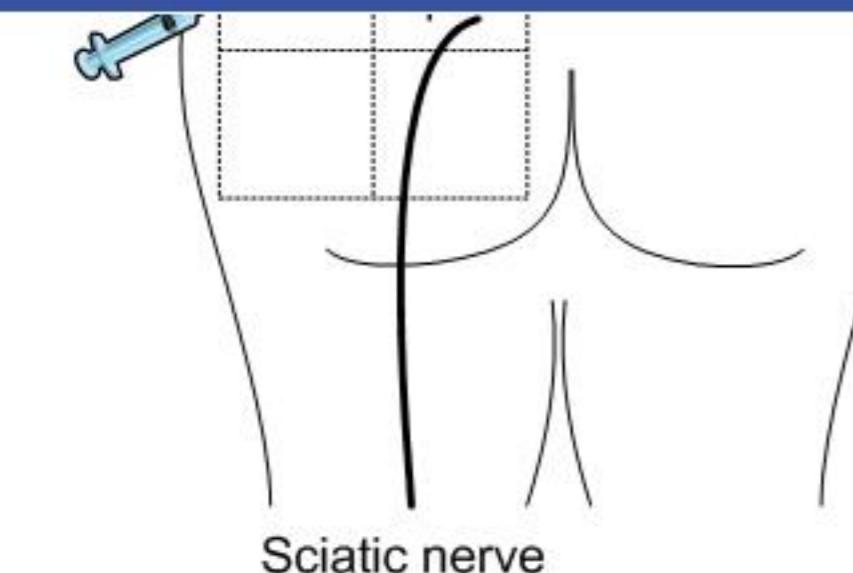


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A 43-year-old male received a deep intramuscular injection two days ago and now presents with difficulty walking. You note that his right hip drops every time he raises his right foot. At which location did this patient most likely receive his injection?

- A. Superomedial quadrant of the buttock [43%]
- B. Superolateral quadrant of the buttock [19%]
- C. Inferomedial quadrant of the buttock [23%]
- D. Inferolateral quadrant of the buttock [12%]
- E. Posterior thigh [3%]

Explanation:**User Id: 477875**



Sciatic nerve

All injections into the gluteal region should target the superolateral quadrant, to avoid damage to the gluteal nerves and sciatic nerve. This patient is exhibiting the classic "gluteus medius gait," i.e. the hip dips downward when the ipsilateral foot is lifted off of the ground. This gait is observed when there is injury to the superior gluteal nerve or to the gluteus medius muscle itself. The superior gluteal nerve is derived from the L4-S1 ventral rami and leaves the pelvis through the greater sciatic foramen above the level of the piriformis. Injection in the superomedial quadrant of the buttock is likely to injure this nerve.

(Choice B) The superolateral quadrant of the buttock is a safe site for intramuscular injections.

(Choice C) The sciatic nerve courses through the inferomedial quadrant of the buttock, thus nerve damage can occur with injections to this site.

(Choice D) The inferolateral quadrant of the buttock is the site where many of the muscles of the gluteal region have their tendinous insertions.

(Choice E) The sciatic nerve courses just below the biceps femoris muscle in the posterior thigh. The sciatic nerve innervates all of the knee flexors (hamstrings) with the exception of the short head of the biceps femoris.

Educational Objective:

Injections given in the superomedial part of the buttock risk injury to the gluteal nerves. Injections given in the inferomedial part of the buttock risk injury to the sciatic nerve. The superolateral quadrant of the buttock is a safe site for intramuscular injections.



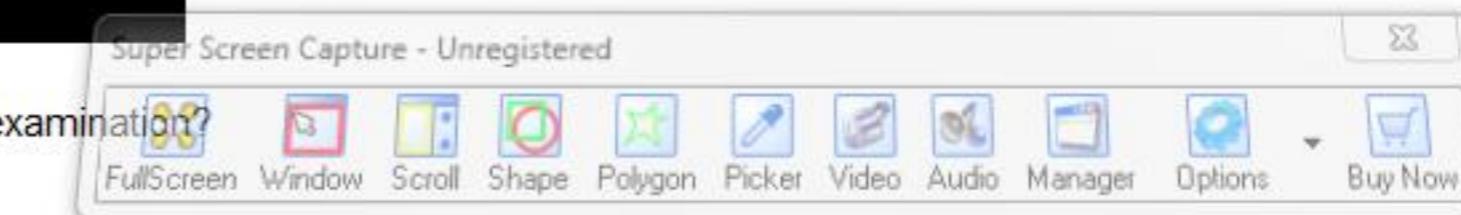
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A 65-year-old man comes to the physician because of right lower abdominal and groin pain and difficulty walking for the past week. Climbing stairs has been particularly difficult for him, and he has fallen several times due to "knee buckling." His past medical history is significant for diabetes mellitus, hypertension, and atrial fibrillation. He takes warfarin for chronic anticoagulation. On physical examination, the right patellar reflex is decreased compared to the left. His abdominal CT is shown below.



Which of the following additional findings would you most expect on physical examination?

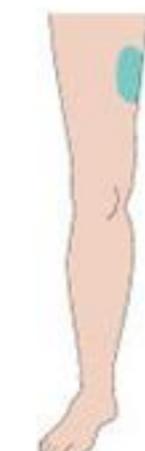
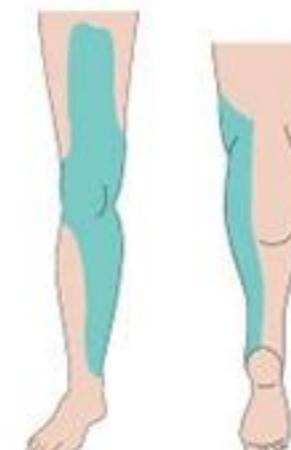
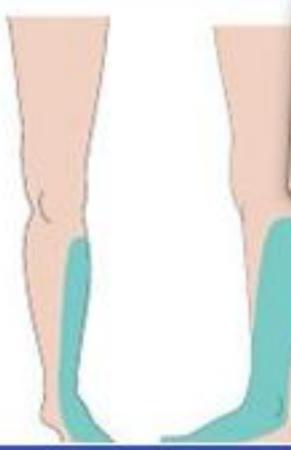
- A. Impaired adduction of the right thigh [14%]
- B. Loss of sensation on the anterior aspect of the right thigh [46%]
- C. Loss of sensation on the dorsum of the right foot [14%]
- D. Loss of sensation on the sole of the right foot [9%]



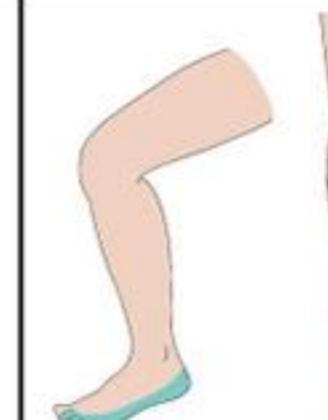
EXPLANATION

USER IN. 77/77

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Lower extremity nerve	Nerve roots	Cause of injury	Sensory deficit	Motor deficit
Obturator	L2-L4	Anterior hip dislocation, iatrogenic (eg, pelvic surgery)		Thigh adduction (Choice A)
Femoral	L2-L4	Pelvic fracture or mass involving iliopsoas/iliacus muscle (eg, hematoma or abscess)		Flexion of thigh, extension of leg
Common peroneal	L4-S2	Fibula neck fracture or nerve compression at fibular neck		Foot eversion, dorsiflexion, toe extension



			(Choice C)	
Tibial	L4-S3	Trauma to the knee	 (Choice D)	Foot inversion, plantar flexion & toe flexion
Superior gluteal	L4-S1	Iatrogenic (eg, posterior hip dislocation or buttocks injection)	None	Thigh abduction (Choice E)
Inferior gluteal	L5-S2		None	Thigh extension

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The [CT image](#) reveals a large fluid collection in the right retroperitoneum lying anterior to the psoas muscle. The fluid is isodense with muscle and displaces the right kidney anteriorly. These findings are consistent with a spontaneous retroperitoneal hematoma, most likely secondary to warfarin use. The risk of bleeding while on warfarin therapy is greatest in patients with risk factors such as increased age, diabetes mellitus, hypertension, and alcoholism.

The femoral nerve descends through the fibers of the psoas major muscle, emerges laterally between the psoas and iliacus muscle, and then runs beneath the inguinal ligament into the thigh. Femoral nerve mononeuropathy can occur due to trauma (eg, pelvic fracture), compression from [abdominal aortic aneurysm](#), stretch injury, or ischemia. Patients with femoral neuropathy develop weakness involving the quadriceps muscle group and may have weakening of the iliopsoas with more proximal nerve injury. They complain of difficulty with stairs and frequent falling secondary to "knee buckling." The reflex is generally diminished. In addition, sensory loss over the anterior and medial thigh and medial leg is typical. Acute, severe pain in the groin, lower abdomen, or back may also occur if the neuropathy is caused by a retroperitoneal hematoma.

**Educational objective:**

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Tibial	L4-S3	Trauma to the knee		Foot inversion, plantar flexion & toe flexion (Choice D)
Superior gluteal	L4-S1	Iatrogenic (eg, posterior hip dislocation or buttocks injection)	None	Thigh abduction (Choice E)
Inferior gluteal	L5-S2		None	Thigh extension

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Educational objective:

Lesions of the femoral nerve can occur due to trauma, nerve compression, stretch injury, or ischemia.

Patients develop weakness of the quadriceps muscle, loss of the patellar reflex, and loss of sensation over the anterior and medial thigh and medial leg.



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A 45-year-old Caucasian female presents to your office with numbness of the right palm. After taking a detailed history and doing a physical examination, you suspect a median nerve lesion at the wrist. Before reaching the wrist, the median nerve courses between the:

- A. Biceps and coracobrachialis muscles [10%]
- B. Flexor carpi ulnaris and flexor digitorum profundus muscles [18%]
- C. **Flexor digitorum superficialis and flexor digitorum profundus muscles** [51%]
- D. Olecranon and the medial epicondyle of the humerus [10%]
- E. Supinator muscle and the head of the radius [10%]

Explanation:

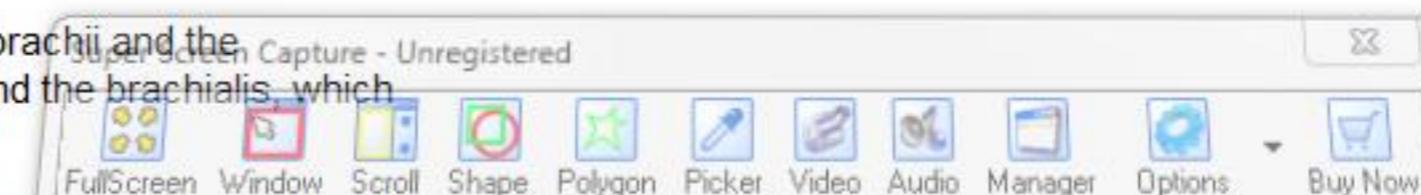
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The median nerve receives contributions from the C6 through T1 spinal nerves and emerges as a distinct structure from a combination of fibers from the lateral and medial cords of the brachial plexus. From this location, the median nerve courses with the brachial artery in the groove between the biceps brachii and the brachialis muscles. It gains access to the forearm in the medial aspect of the antecubital fossa and immediately courses between the humeral and ulnar heads of the pronator teres muscle. It then courses between the flexor digitorum superficialis and the flexor digitorum profundus muscles before entering the wrist and hand within the flexor retinaculum. Injury of the median nerve at the wrist can result from suicide attempts, carpal tunnel syndrome, and other traumatic insults to the anterior wrist. Denervation atrophy leads to loss of the thenar eminence and an "ape hand" deformity. Sensation is also lost on the palmar surface of the first three and one-half fingers (including the thumb).

(Choice A) The musculocutaneous nerve courses directly between the biceps brachii and the coracobrachialis muscles. Injury to this nerve leads to paralysis of the biceps and the brachialis, which results in an inability to flex the forearm.

(Choice B) The ulnar nerve courses between the flexor carpi ulnaris and flexor digitorum profundus in the forearm. Injury to this nerve leads to a "claw hand" deformity due to paralysis of most of the intrinsic muscles of the hand.

(Choice D) The ulnar nerve also courses between the olecranon and the medial epicondyle of the humerus. This is the location of the "funnybone" and is a common site of injury to the ulnar nerve due to the superficial



E. Supinator muscle and the head of the radius [10%]

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Explanation:

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(Choice D) The ulnar nerve also courses between the olecranon and the medial epicondyle of the humerus. This is the location of the "funnybone" and is a common site of injury to the ulnar nerve due to the superficial location of the nerve in this region.

(Choice E) The radial nerve courses through the supinator muscle near the head of the radius. Injury to this nerve causes "wrist drop" due to the fact that the radial nerve innervates the extensors of the hand at the forearm.

Educational Objective:

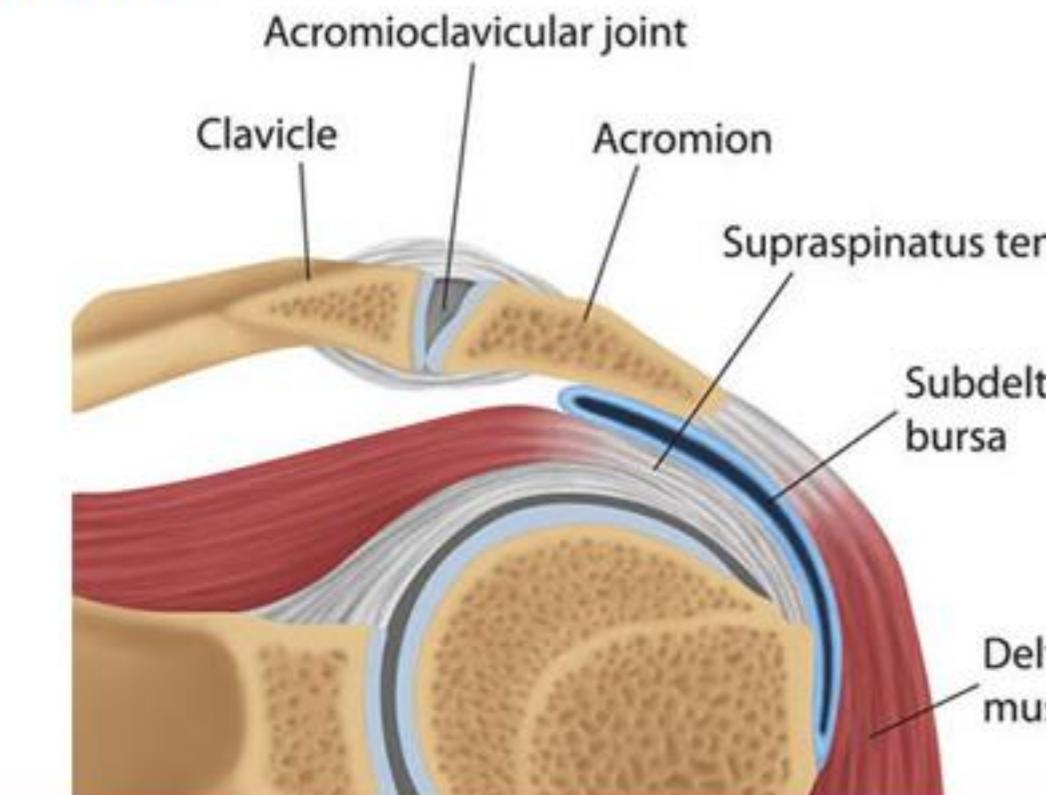
The median nerve courses between the humeral and ulnar heads of the pronator teres muscle and then runs between the flexor digitorum superficialis and the flexor digitorum profundus muscles before entering the wrist and hand within the carpal tunnel.



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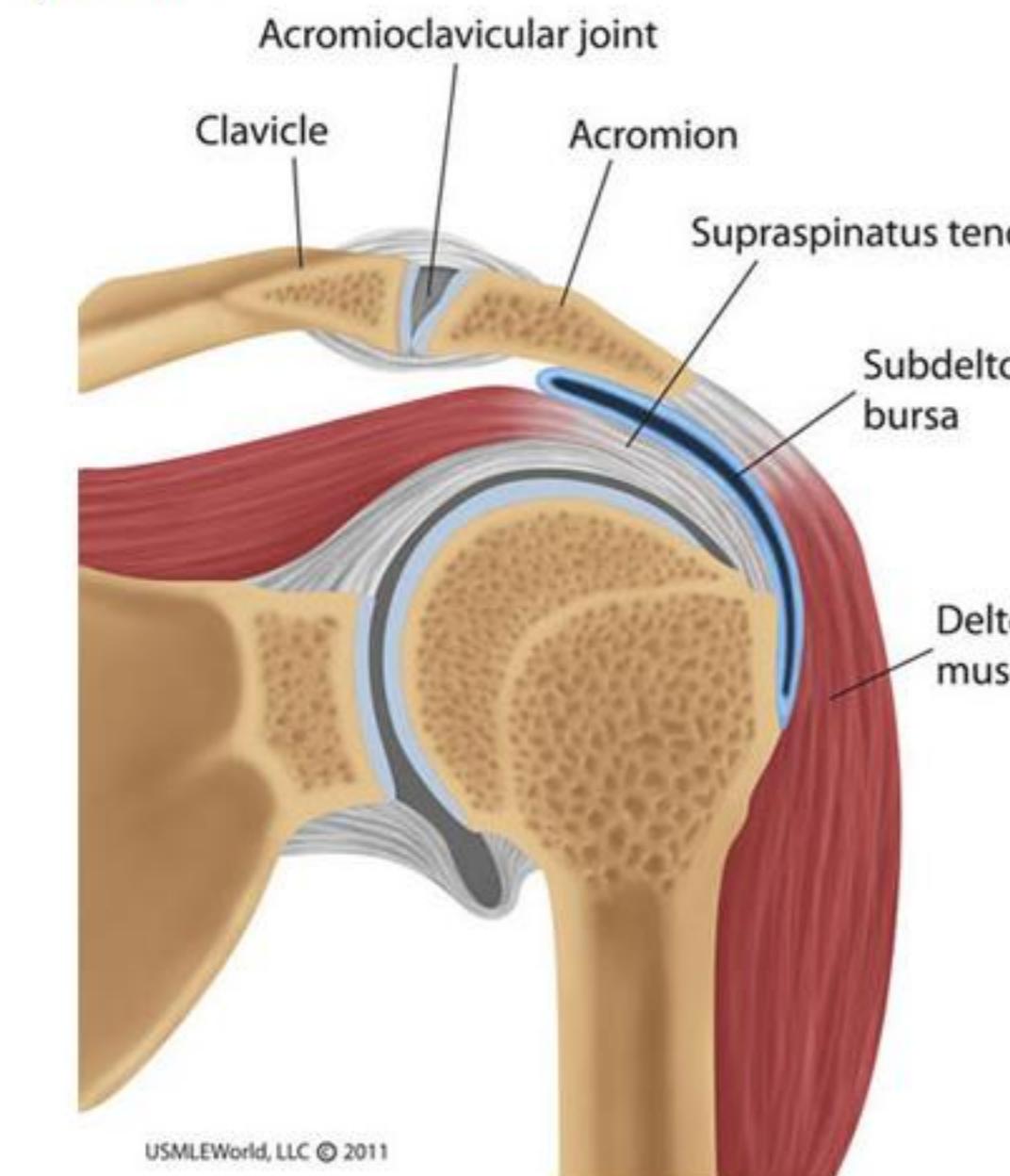
A 53-year-old man presents to his physician's office with a dull ache in his right shoulder. He states that his pain is worse with movement and that it often interferes with his sleep. The patient cannot recall any traumatic events prior to the start of the pain, but does report that he experienced increased discomfort after helping his daughter move into her college dorm room one week ago. His past medical history includes dyslipidemia and hypertension, for which he takes the appropriate medications. Physical examination reveals localized tenderness just below the acromion. The physician asks the patient to abduct his arms to 90 degrees and flex them to 30 degrees with his thumbs pointing to the floor. She then applies downward force to his arms. This maneuver elicits pain in the patient's right shoulder and reveals right-sided weakness as compared to the left. A tendon of which of the following muscles is most likely inflamed in this patient?

- A. Biceps brachii [7%]
- B. Deltoid [23%]
- C. Levator scapulae [4%]
- D. Serratus anterior [4%]
- E. Supraspinatus [61%]

Explanation:**User Id: 477875**

Explanation:

User Id: 477875



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The rotator cuff is made up of the tendons of the following muscles: **supraspinatus**, **infraspinatus**, **teres minor**, and **subscapularis (SITS)**. The tendons of these rotator cuff muscles, along with the **glenohumeral joint** ligaments and the tendon of the long head of the biceps brachii muscle, contribute to the stability of the glenohumeral joint. The supraspinatus muscle is the main agonistic muscle responsible for the first 10 to 15 degrees of arm abduction. Above 30 degrees, the deltoid muscle becomes the main propagator of further abduction, while the supraspinatus muscle stabilizes the glenohumeral joint.

Of the rotator cuff structures, the tendon of the supraspinatus muscle is most commonly affected in rotator



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Of the rotator cuff structures, the tendon of the supraspinatus muscle is most commonly affected in rotator cuff syndrome. Due to its superior location, this tendon is vulnerable to chronic repeated trauma from impingement between the head of the humerus and the acromioclavicular joint. Motions that typically cause inflammation of this tendon are simultaneous abduction and flexion of the arm at the shoulder, but a traumatic fall laterally on an outstretched hand can also cause injury. Inflammation is followed by fibrosis, which worsens the problem by increasing friction between the head of the humerus and the acromion, as well as causing inflammation of the subacromial bursa. The physical exam maneuver described in the question stem is known as the "empty-can supraspinatus test," and is 90% specific for supraspinatus pathology.

(Choice A) The tendon of the long head of the biceps brachii muscle passes through the glenohumeral joint to insert on the supraglenoid tubercle of the scapula. The short head of the tendon inserts directly onto the anterior tip of the coracoid process of the scapula.

(Choice B) The deltoid originates on the clavicle, the acromion, and the spine of the scapula as the anterior, lateral, and posterior parts of this muscle, respectively. Together, these parts of the deltoid insert by a common tendon on the lateral surface of the humerus.

(Choice C) The tendons of the levator scapulae insert on the superomedial border of the scapula and on the transverse processes of the C1 through C4 vertebrae. The levator scapulae does not contribute to the stability of the glenohumeral joint.

(Choice D) The serratus anterior muscle courses from the medial border of the scapula to insert onto the lateral surfaces of the first eight ribs. Injury to the long thoracic nerve causes paralysis of this muscle and "winging" of the scapula.

Educational objective:

The supraspinatus muscle assists in abduction of the arm and stabilization of the glenohumeral joint. The most commonly injured structure in rotator cuff syndrome is the tendon of the supraspinatus muscle. This tendon is vulnerable to injury due to impingement between the acromion and the head of the humerus.



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Educational objective:

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Super Screen Capture - Unregistered



References:

1. [Chronic shoulder pain: part I. Evaluation and diagnosis.](#)
2. [Rotator cuff disorders: recognition and management among patients with shoulder pain.](#)

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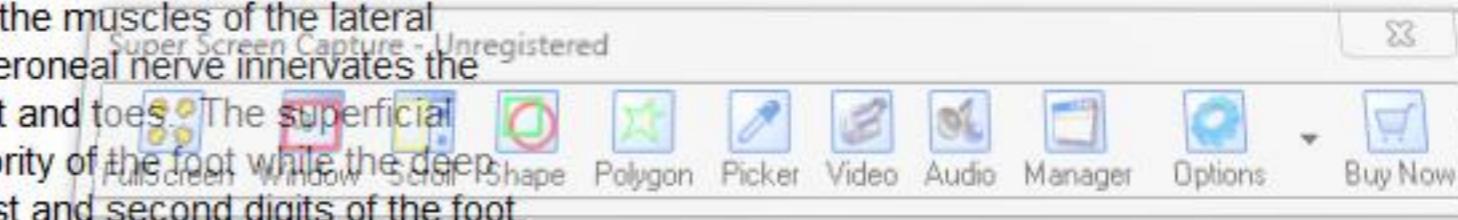
A 7-year-old male has a right leg cast after a bicycle accident. After wearing the cast for some time, he complains of pain and numbness of the dorsum of his right foot and cannot dorsiflex his right ankle. Which of the following is the most likely site of nerve compression in this patient?

- A. Popliteal fossa [7%]
- B. Fibular head [55%]
- C. Lateral compartment of the leg [18%]
- D. Anterior compartment of the leg [15%]
- E. Medial malleolus [5%]

Explanation:**User Id: 477875**

The common peroneal (fibular) nerve is the most commonly injured nerve in the leg due to its superficial location where it courses laterally around the neck of the fibula. This location makes this nerve susceptible to trauma resulting from lateral blows to the knee as well as from tightly applied plaster casts and other devices. The sciatic nerve branches into the common peroneal nerve and the tibial nerve posteriorly in the thigh just proximal to the popliteal fossa. After coursing around the neck of the fibula, the common peroneal nerve divides into superficial and deep branches. The superficial branch innervates the muscles of the lateral compartment of the leg, which function primarily to evert the foot. The deep peroneal nerve innervates the anterior compartment of the leg, whose muscles act as dorsiflexors of the foot and toes. The superficial peroneal nerve gives off branches that provide sensory innervation to the majority of the foot while the deep peroneal nerve provides sensory innervation only to the region between the first and second digits of the foot. Injury to the common peroneal nerve would cause a clinical presentation of foot drop due to weakness of the dorsiflexors. The foot would also be held in inversion due to weakness of the muscles of the lateral compartment.

(Choice A) The popliteal artery and vein, as well as the tibial nerve, course through the middle of the popliteal



E. Medial malleolus [5%]

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(Choice A) The popliteal artery and vein, as well as the tibial nerve, course through the middle of the popliteal fossa. The tibial nerve provides plantar flexion and inversion; therefore, injury to the tibial nerve would result in unopposed dorsiflexion and eversion of the foot.

(Choices C and D) The lateral and anterior compartments of the leg are innervated by the superficial and deep peroneal nerves, respectively. These nerves lie deep within their respective compartments and are unlikely to be injured by superficial pressure.

(Choice E) Several important structures course near the medial malleolus. The saphenous nerve and great saphenous vein lie anteriorly while the posterior tibial artery, the tibial nerve, and the tendons of the flexor digitorum longus, flexor hallucis longus, and tibialis posterior course posteriorly.

**Educational Objective:**

Trauma or sustained pressure to the neck of the fibula can cause injury to the common peroneal nerve as it courses superficially and laterally to this structure.

Time Spent: 1 seconds

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Last updated: [7/7/2010]

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A 34-year-old male has difficulty walking after sustaining a traumatic injury to his right leg. Physical examination reveals a right foot that is dorsiflexed and everted. The patient is unable to stand on his tiptoes. What is the most likely area of sensory loss in this patient?

- A. Anterior thigh [3%]
- B. Medial leg [15%]
- C. Medial foot [9%]
- D. Dorsal foot [18%]
- E. Plantar foot [55%]

Explanation:**User Id: 477875**

The tibial nerve is the large medial branch of the sciatic nerve that descends through the popliteal fossa together with the popliteal vein and artery. Injury to this nerve can occur after deep penetrating trauma to the popliteal fossa and can cause a number of different deficits due to its numerous functions. The tibial nerve innervates the gastrocnemius, soleus and plantaris muscles, which are responsible for plantar flexion of the foot. It also supplies the flexor digitorum longus and flexor hallucis longus, which are responsible for toe flexion. The tibial nerve also innervates the tibialis posterior muscle, which is responsible for inversion of the foot. (Patients with injury to the tibial nerve often hold their lower extremity in a calcaneo-ovalgocavus position – the foot is dorsiflexed and everted.) After delivering its motor innervation, the tibial nerve terminates by dividing into the medial and lateral plantar nerves to provide sensory innervation to the skin of the plantar surface of the foot.

(Choice A) The cutaneous branch of the femoral nerve innervates the majority of the skin of the anterior thigh.

(Choice B) Cutaneous branches of the saphenous nerve innervate the skin of the medial leg. The saphenous nerve is a branch of the femoral nerve and courses to the medial leg together with the great



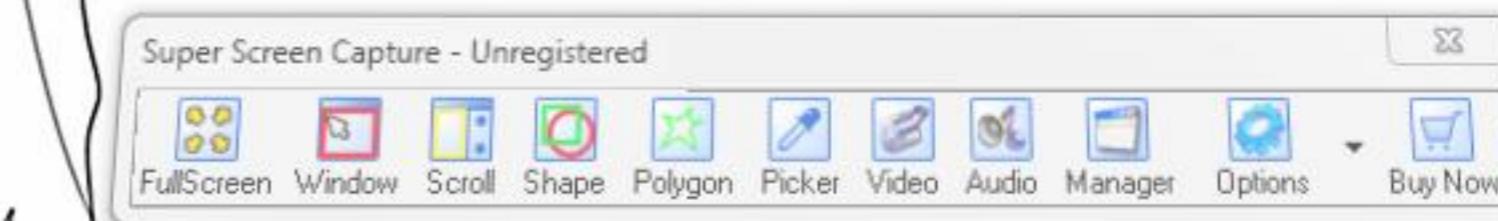
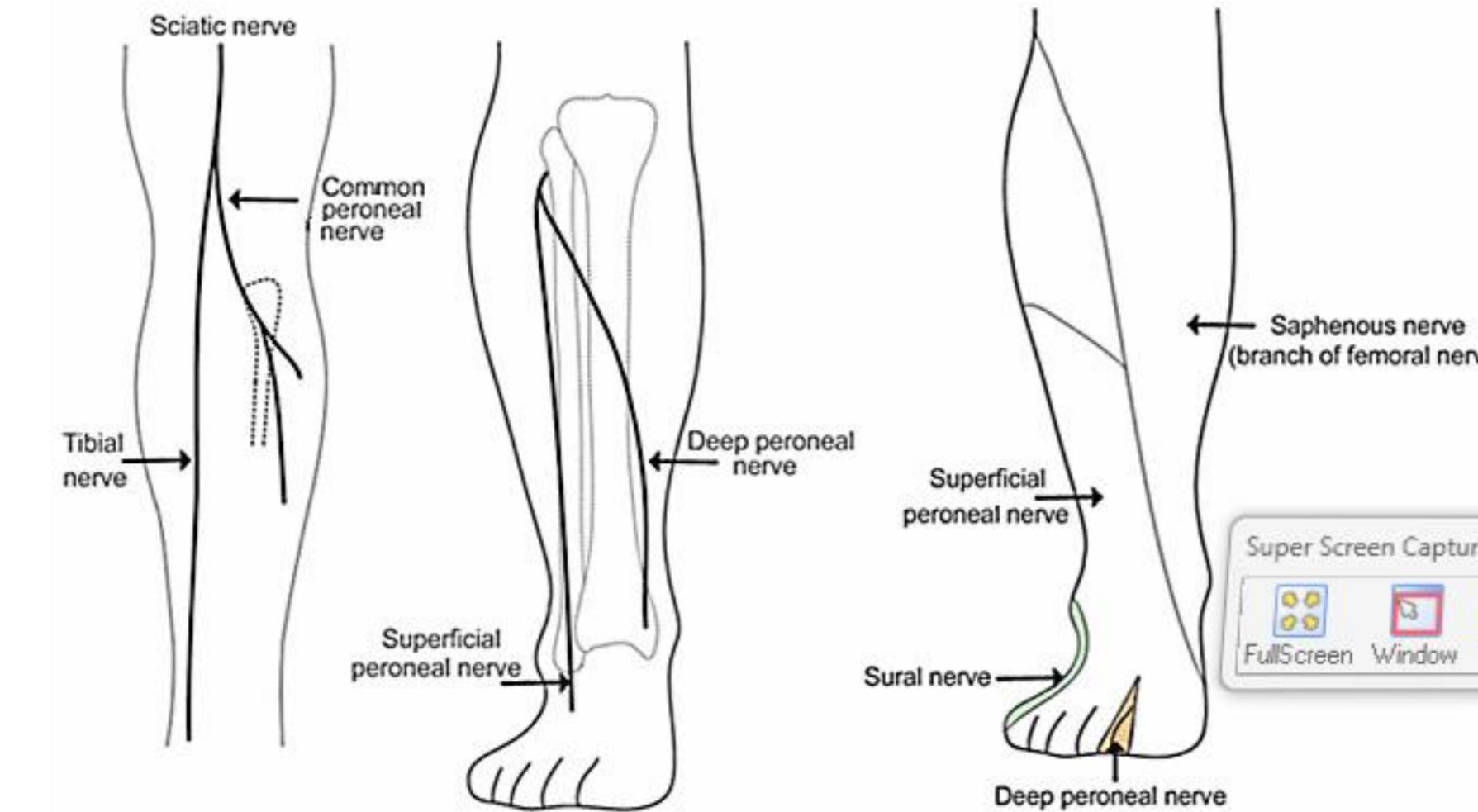
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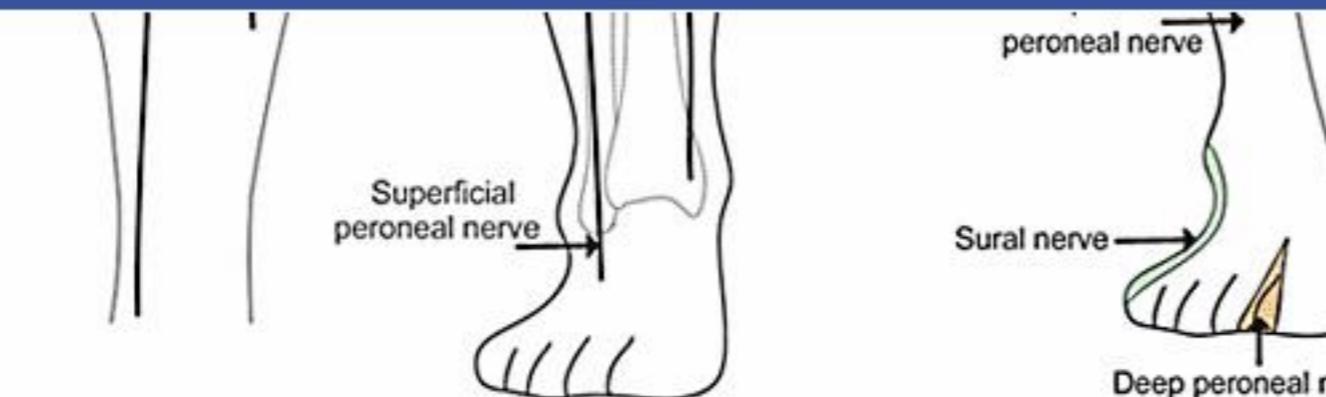
- A. Anterior thigh [3%]
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- C. Medial foot [9%]
- D. Dorsal foot [18%]
- E. Plantar foot [55%]

Explanation:

User Id: 477875



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(Choice A) The cutaneous branch of the femoral nerve innervates the majority of the skin of the anterior thigh.

(Choice B) Cutaneous branches of the saphenous nerve innervate the skin of the medial leg. The saphenous nerve is a branch of the femoral nerve and courses to the medial leg together with the great saphenous vein.

(Choice C) The medial aspect of the foot is innervated by the superficial peroneal nerve, a branch of the common peroneal nerve, as well as by the saphenous nerve.

(Choice D) The superficial peroneal nerve innervates the dorsum of the foot, except for the skin between the great toe and the second toe, which is innervated by the deep peroneal nerve.



Educational Objective:

The tibial nerve innervates the flexors of the lower leg, the extrinsic digital flexors of the toes, and the skin of the sole of the foot.

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A 43-year-old male presents to your office with difficulty walking. On gait examination, you note that he leans to the right side while walking. When he is asked to stand on his left foot, his right hip tilts significantly downward. Which of the following nerves is most likely injured in this patient?

- A. Superior gluteal [63%]
- B. Inferior gluteal [21%]
- C. Obturator [8%]
- D. Femoral [2%]
- E. Sciatic [5%]

Explanation:**User Id: 477875**

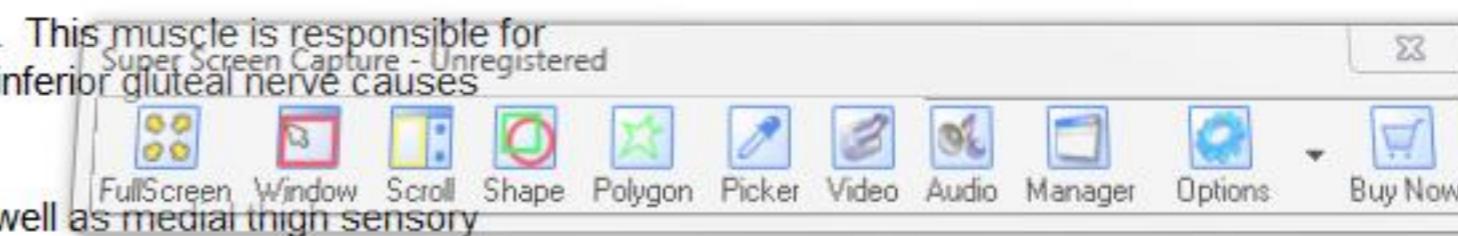
This patient demonstrates a positive Trendelenburg sign. The Trendelenburg test involves observing a patient standing facing away from the examiner while lifting each foot off of the ground. The sign is positive when the hip dips toward the unaffected side when the patient stands on the affected leg. This can occur due to weakness of the gluteus medius and gluteus minimus muscles because these muscles function to pull the pelvis down and abduct the thigh. These muscles are supplied by the superior gluteal nerve.

Patients with injury of the superior gluteal nerve may exhibit a waddling gait or a characteristic limp known as the "gluteus medius limp." The Trendelenburg sign and gluteus medius limp can also be seen in patients with injuries to the gluteus medius and gluteus minimus muscles themselves as well as in patients with injuries to the hip joint.

(Choice B) The inferior gluteal nerve innervates the gluteus maximus muscle. This muscle is responsible for extension of the thigh at the hip and external rotation of the thigh. Injury of the inferior gluteal nerve causes difficulty rising from the seated position and climbing stairs.

(Choice C) Injury of the obturator nerve causes deficits of thigh adduction as well as medial thigh sensory loss.

(Choice D) The femoral nerve innervates the muscles responsible for flexion of the thigh at the hip (iliacus and sartorius muscles) and extension of the leg at the knee (quadriceps femoris). It also supplies sensory innervation to the skin on the anterior thigh and medial leg. Injury results in loss of the knee reflex and anterior



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Explanation:

User Id: 477875

This patient demonstrates a positive Trendelenburg sign. The Trendelenburg test involves observing a patient standing facing away from the examiner while lifting each foot off of the ground. The sign is positive when the hip dips toward the unaffected side when the patient stands on the affected leg. This can occur due to weakness of the gluteus medius and gluteus minimus muscles because these muscles function to pull the pelvis down and abduct the thigh. These muscles are supplied by the superior gluteal nerve.

Patients with injury of the superior gluteal nerve may exhibit a waddling gait or a characteristic limp known as the "gluteus medius limp." The Trendelenburg sign and gluteus medius limp can also be seen in patients with injuries to the gluteus medius and gluteus minimus muscles themselves as well as in patients with injuries to the hip joint.

(Choice B) The inferior gluteal nerve innervates the gluteus maximus muscle. This muscle is responsible for extension of the thigh at the hip and external rotation of the thigh. Injury of the inferior gluteal nerve causes difficulty rising from the seated position and climbing stairs.

(Choice C) Injury of the obturator nerve causes deficits of thigh adduction as well as medial thigh sensory loss.

(Choice D) The femoral nerve innervates the muscles responsible for flexion of the thigh at the hip (iliacus and sartorius muscles) and extension of the leg at the knee (quadriceps femoris). It also supplies sensory innervation to the skin on the anterior thigh and medial leg. Injury results in loss of the knee reflex and anterior thigh sensory loss.

(Choice E) The sciatic nerve innervates all of the knee flexors (hamstrings) except the short head of the biceps femoris. It subsequently divides into the tibial and common peroneal nerves, which each go on to provide motor and sensory innervation to the leg and foot.

Educational Objective:

- 1) Injury to the superior gluteal nerve causes weakness of the gluteus medius and gluteus minimus muscles producing a positive Trendelenburg test.
- 2) The inferior gluteal nerve innervates the gluteus maximus muscle. Injury of the inferior gluteal nerve causes difficulty rising from the seated position and climbing stairs.



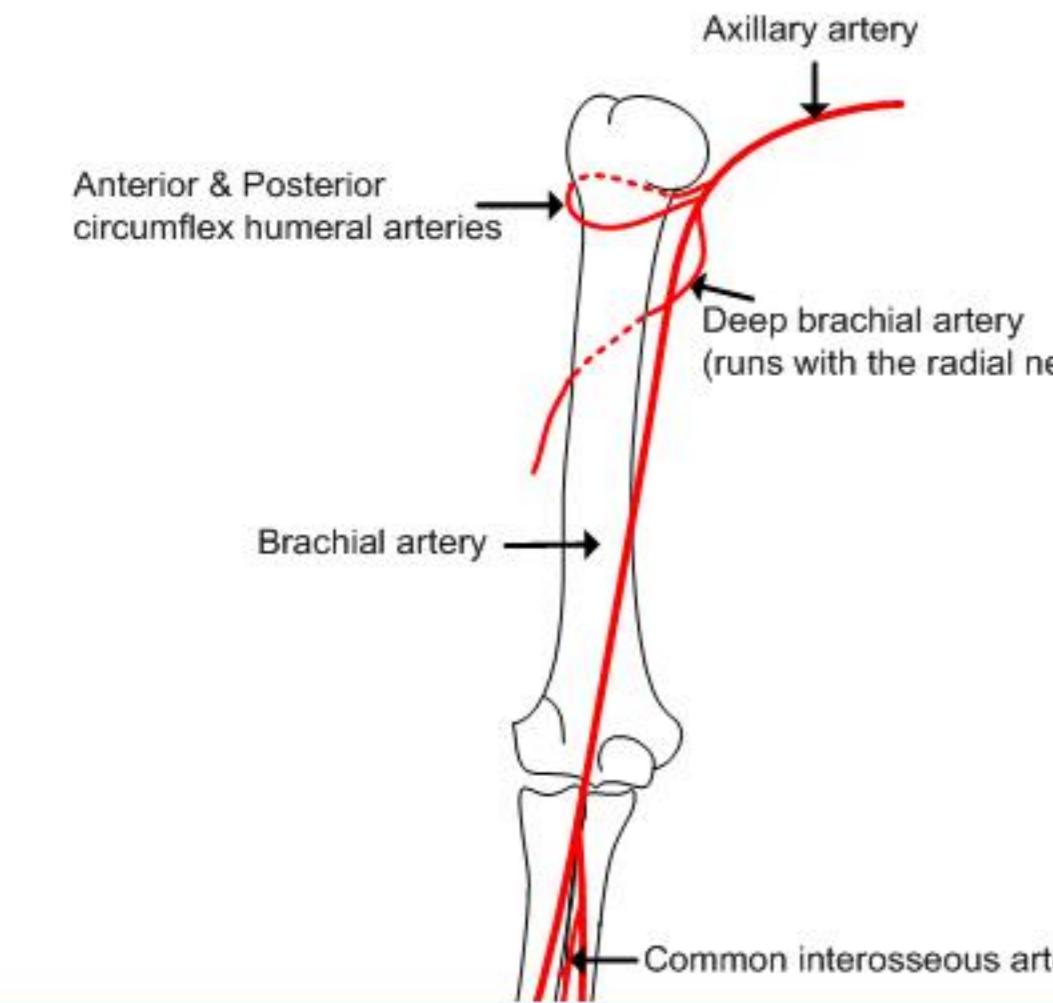
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A 24-year-old mountain climber presents to the emergency room with right shoulder pain following a fall. He was climbing a cliff at a nearby national park when he lost his grip and fell approximately 5 meters onto the boulders below. He says that he "landed on his right arm and heard the bone snap". Physical examination reveals total inability to extend the right wrist. X-ray reveals a fracture of the right humeral shaft. Which of the following arteries is most likely to be injured in this patient?

- A. Anterior circumflex humeral artery [15%]
- B. Brachial artery [26%]
- C. Common interosseous artery [2%]
- D. Deep brachial artery [43%]
- E. Radial collateral artery [14%]

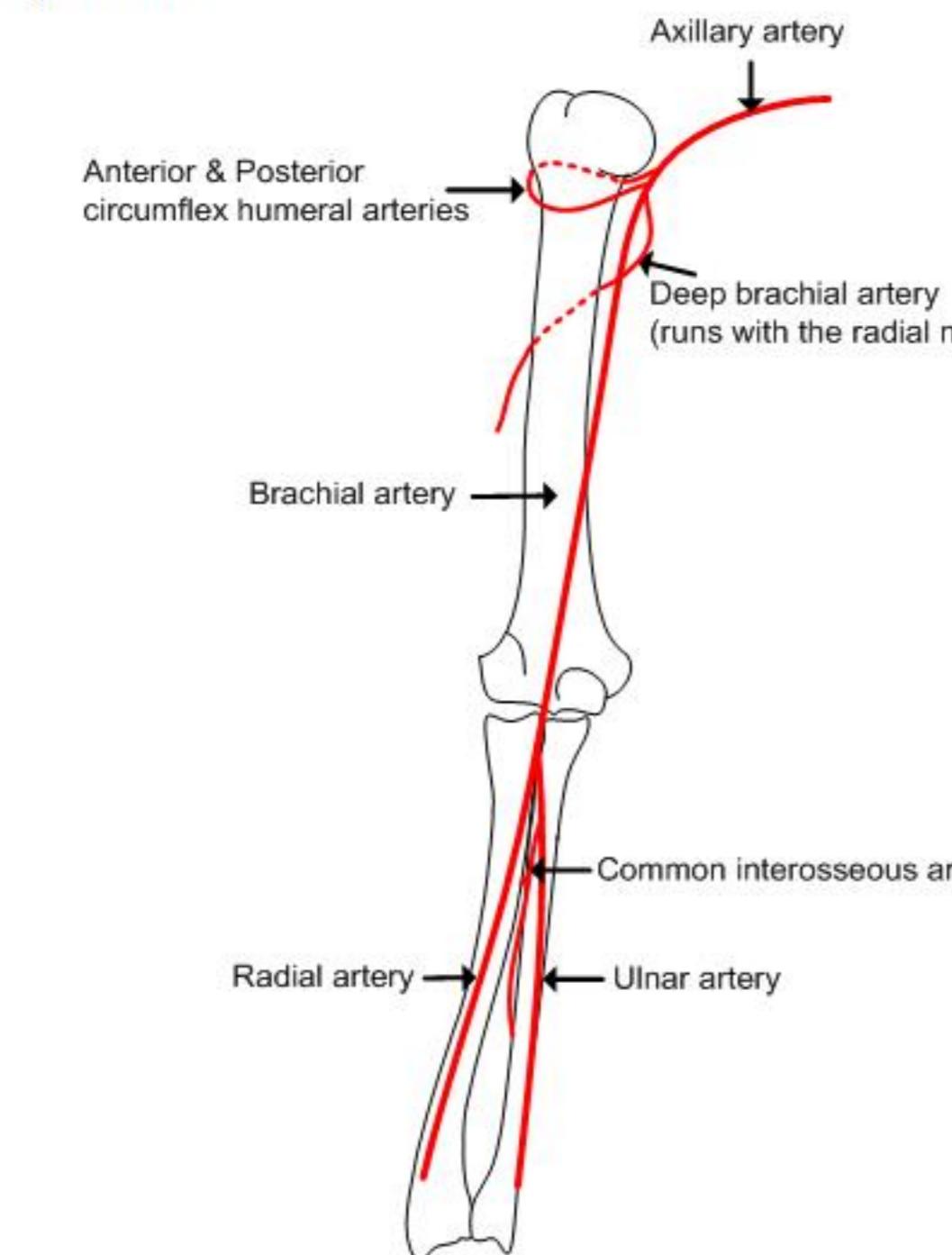
Explanation:

User Id: 477875



Explanation:

User Id: 477875



When the midshaft of the humerus is fractured, there is significant associated risk of injury to the radial nerve and deep brachial artery. The radial nerve innervates most of the forearm extensors at the elbow and most of the hand extensors at the wrist. It also innervates the extrinsic extensors of the digits, and the brachioradialis



When the midshaft of the humerus is fractured, there is significant associated risk of injury to the radial nerve and deep brachial artery. The radial nerve innervates most of the forearm extensors at the elbow and most of the hand extensors at the wrist. It also innervates the extrinsic extensors of the digits, and the brachioradialis and supinator muscles. The radial nerve also provides cutaneous sensory innervation to the dorsal hand, forearm and upper arm. The deep brachial artery branches off of the brachial artery high in the arm, passes inferior to the teres major muscle, and courses posteriorly along the humerus in close association with the radial nerve.

The patient described above is exhibiting signs of radial nerve injury. The combination of radial nerve deficits with radiographic evidence of a humeral fracture should raise concern for an associated injury to the deep brachial artery.

(Choice A) The anterior circumflex humeral artery is a branch of the axillary artery that passes anterior to the surgical neck of the humerus and anastomoses with the posterior circumflex humeral artery. A fracture to the surgical neck of the humerus may damage this vessel and the axillary nerve.

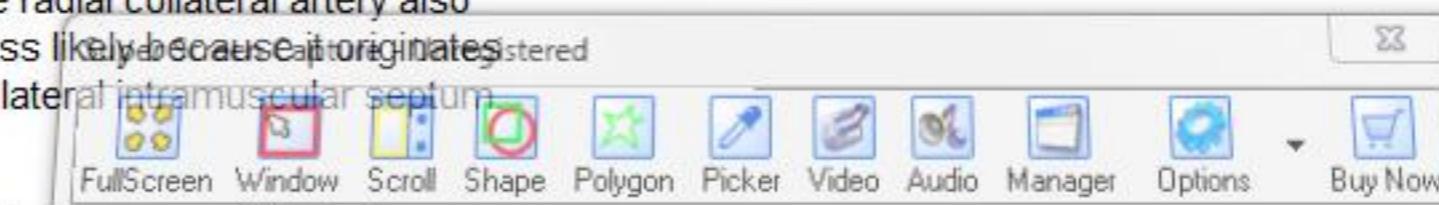
(Choice B) The axillary artery gives off the posterior circumflex humeral artery and becomes the brachial artery. The brachial artery courses anteromedially in the arm within the bicipital groove and branches into the radial and ulnar arteries after entering the forearm. Supracondylar fractures of the humerus may injure this artery.

(Choice C) The common interosseous artery is a short branch of the ulnar artery that gives rise to anterior, posterior and recurrent branches within the proximal forearm.

(Choice E) The deep brachial artery divides into the radial collateral artery (the continuation of the deep brachial artery) and middle collateral artery at the midpoint of the humerus. The radial collateral artery also courses with the radial nerve. However, injury to the radial collateral artery is less likely because it originates at the lower end of the spiral groove where the deep brachial artery pierces the lateral intramuscular septum.

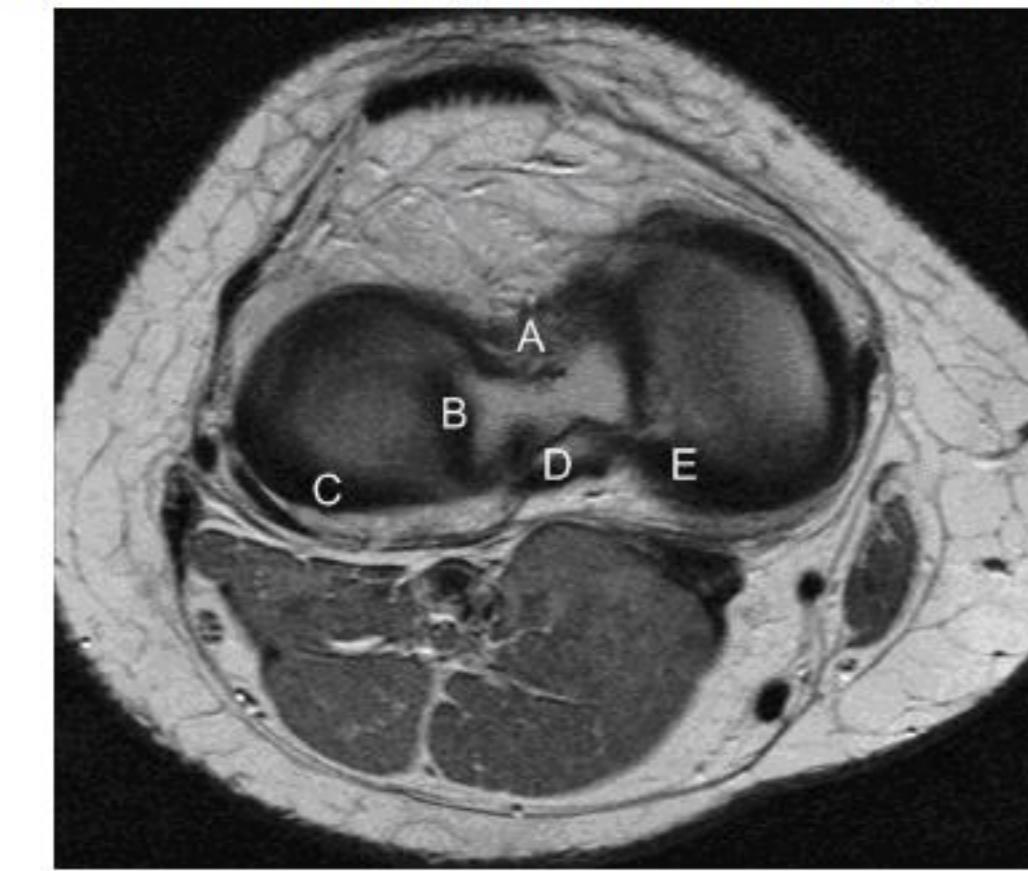
Educational Objective:

The deep brachial artery and radial nerve course along the posterior aspect of the humerus. Midshaft fractures of the humerus risk injury to these structures. Supracondylar fractures are associated with injury to the brachial artery.



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A 20-year-old man comes to the physician with right knee pain following a soccer game. When asked how he sustained the injury, he says, "I fell to the ground after colliding with my teammate and then an opponent fell on my shin." On physical examination, his knee appears slightly swollen, and there is excessive posterior displacement of the tibia when pressure is applied to his anterior tibia with the knee in the flexed position. The physician orders an MRI to confirm the diagnosis. An axial MRI cross section of the right knee is shown below. Which of the following structures is most likely injured in this patient?



- A. A [25%]
- B. B [4%]
- C. C [2%]
- D. D [64%]
- E. E [4%]

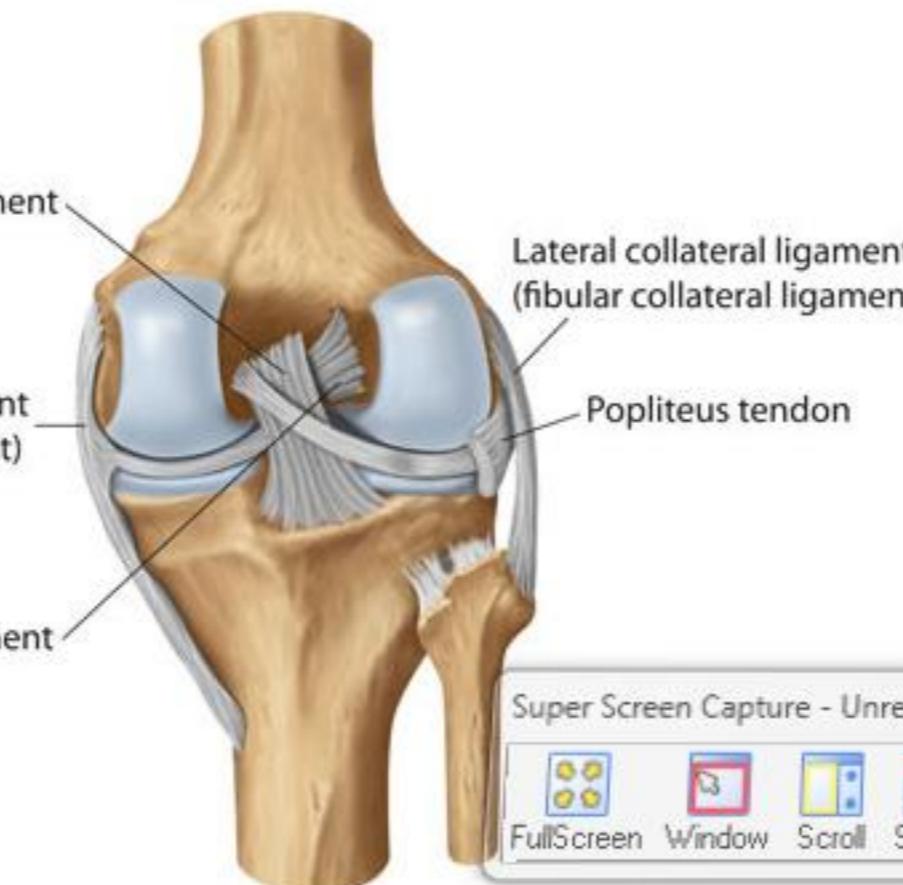


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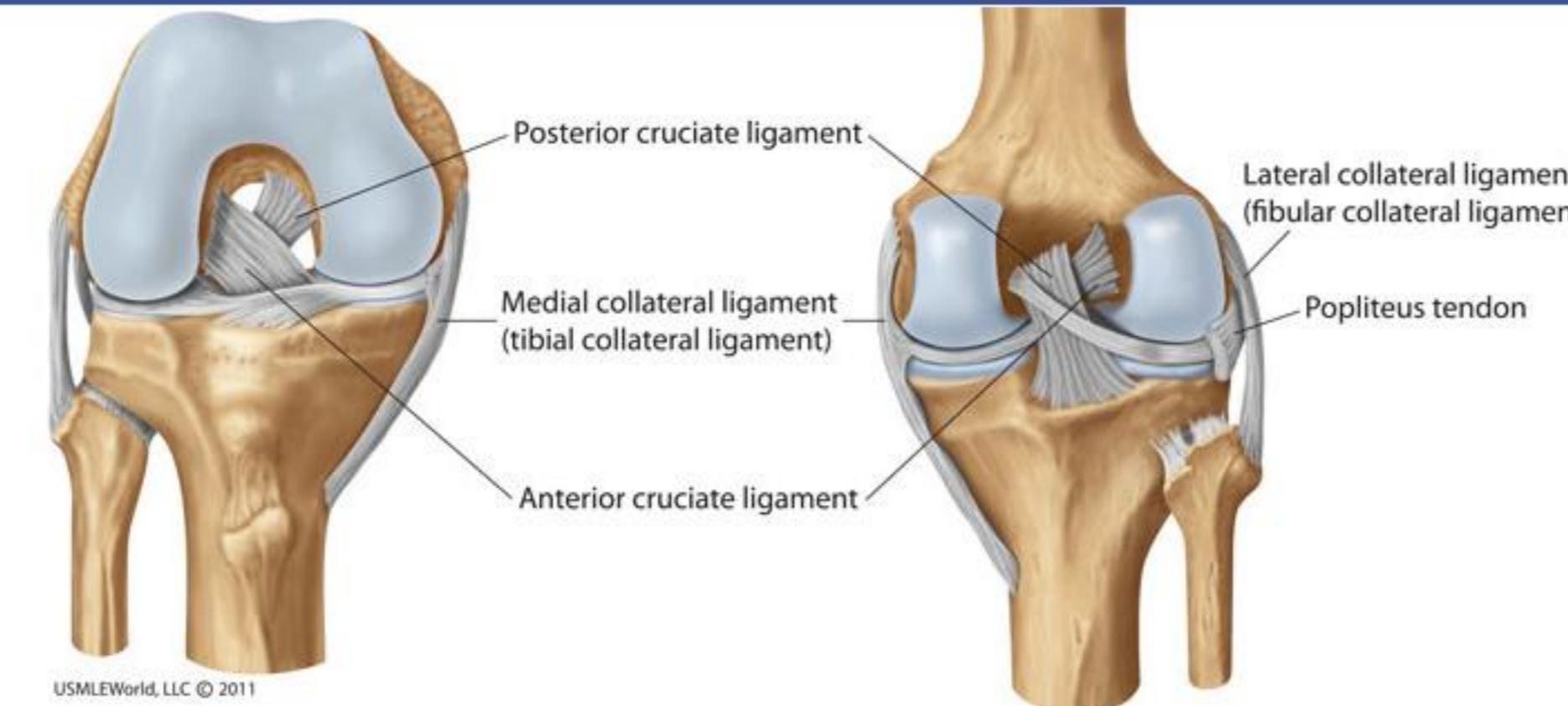
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In this **axial MRI of the right knee**, the patellar ligament is visible anteriorly at the top of the image and the gastrocnemius muscle is seen posteriorly at the bottom. The anterior and posterior cruciate ligaments are found within the articular capsule of the knee joint and cross one another as each spans from the femur to the tibia. The posterior cruciate ligament originates from the anterolateral surface of the medial femoral condyle and inserts into the posterior intercondylar area of the tibia. It prevents posterior displacement of the tibia relative to the femur. Its integrity can be tested in the clinical setting by using the posterior drawer test (the maneuver described in the question stem). The posterior cruciate ligament is most commonly injured during sporting activities or motor vehicle accidents following a direct blow to the anterior proximal tibia.

Anterior view**Posterior view**

(Choice A) The anterior cruciate ligament functions to resist anterior displacement of the tibia relative to the femur.

(Choices B and C) The lateral condyle of the femur articulates with the lateral superior articular surface of



(Choice A) The anterior cruciate ligament functions to resist anterior displacement of the tibia relative to the femur.

(Choices B and C) The lateral condyle of the femur articulates with the lateral superior articular surface of the tibia. The periphery of this articulation is normally covered by the lateral meniscus, which is rounder and covers a larger portion of the articular surface than the medial meniscus.

(Choice E) The medial condyle of the femur articulates with the medial superior articular surface of the tibia. The periphery of this articulation is normally covered by the medial meniscus. The medial articular surfaces of the knee are larger than the lateral articular surfaces, as this compartment bears more of the body's weight.

Educational objective:

The posterior cruciate ligament prevents posterior displacement of the tibia relative to the femur. It originates from the anterolateral surface of the medial femoral condyle and inserts into the posterior intercondylar area of the tibia. Its integrity can be tested in the clinical setting by using the posterior drawer test.



A 52-year-old male is being evaluated for vague back and abdominal pain. He has lost 4 lbs over the past three weeks. An axial CT scan of his abdomen is shown below.

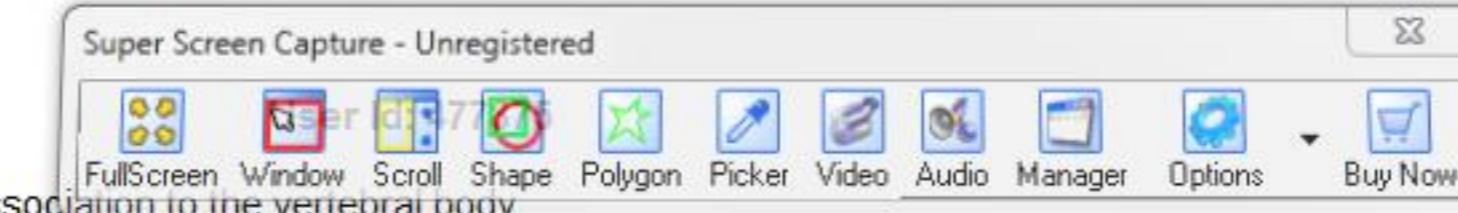


The arrow points to which structure?

- A. Quadratus lumborum muscle [13%]
- B. Erector spinae muscle [17%]
- C. Psoas major muscle [64%]
- D. Transversus abdominis muscle [3%]
- E. Ligamentum flavum [3%]

Explanation:

The above arrow points to a bilaterally symmetric structure that lies in close association to the vertebral body and vertebral transverse process. This is the psoas muscle. Inferiorly, the psoas muscle combines with the iliacus muscle to form the iliopsoas muscle, which functions in hip flexion.



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Explanation:

User Id: 477875

The above arrow points to a bilaterally symmetric structure that lies in close association to the vertebral body and vertebral transverse process. This is the psoas muscle. Inferiorly, the psoas muscle combines with the iliacus muscle to form the iliopsoas muscle, which functions in hip flexion.



(Choice A) The quadratus lumborum is a muscle of the posterior abdominal wall. It is not seen in the image above.

(Choice B) The erector spinae is a large muscle group of the back that courses longitudinally along the spinous processes. Bilateral contraction causes spine extension.

(Choice D) The transversus abdominis (transversalis) muscle is the most internal component of the anterior abdominal wall musculature. It lies immediately deep to the internal oblique. Since this muscle is not attached to the ribs, it is able to provide support to the abdominal contents during respiration without interfering with ribcage movement.

(Choice E) The ligamenta flava are paired elastic ligaments that connect the vertebral laminae. The ligamenta flava form the posterior wall of the spinal canal and help hold the body erect.

Educational Objective:

The psoas muscle originates from the anterior surface of the transverse processes and lateral surface of the corresponding vertebral bodies T12-L5. The psoas muscle acts primarily to flex the thigh at the hip. It

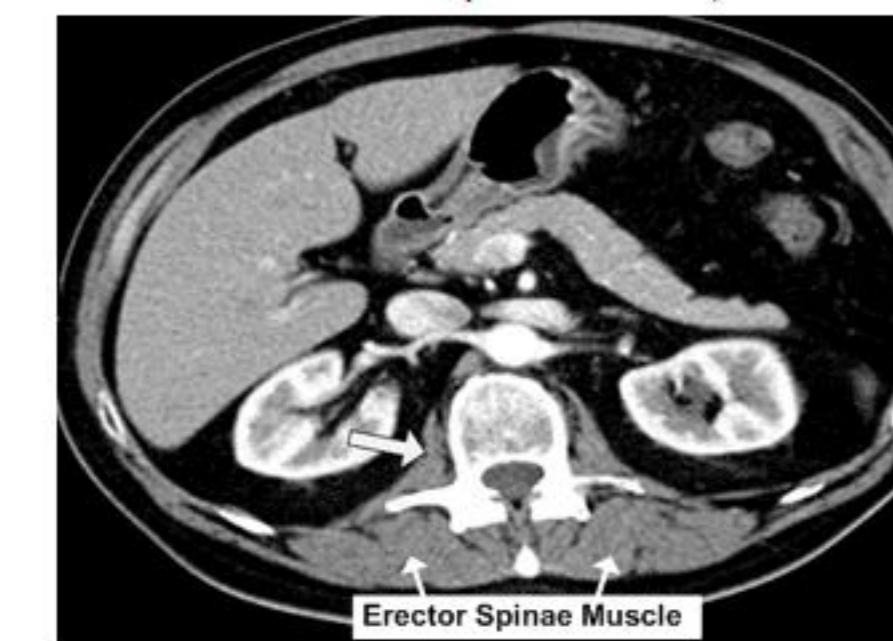




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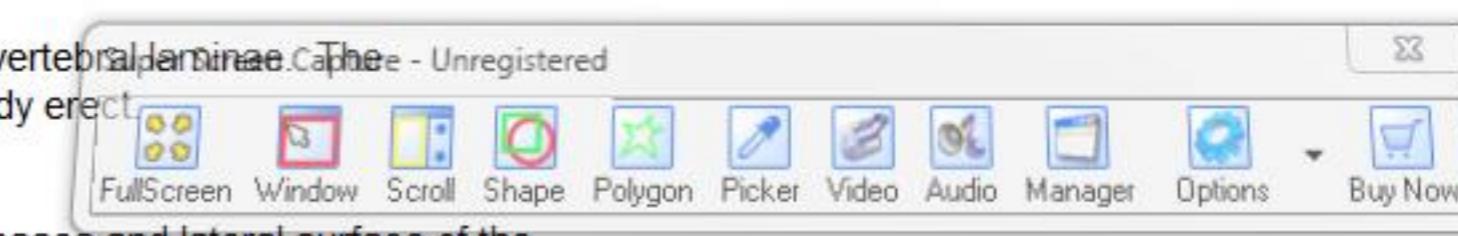
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(Choice E) The ligamenta flava are paired elastic ligaments that connect the vertebral laminae. The ligamenta flava form the posterior wall of the spinal canal and help hold the body erect.

Educational Objective:

The psoas muscle originates from the anterior surface of the transverse processes and lateral surface of the corresponding vertebral bodies T12-L5. The psoas muscle acts primarily to flex the thigh at the hip. It contributes somewhat to lateral rotation and abduction of the thigh as well.

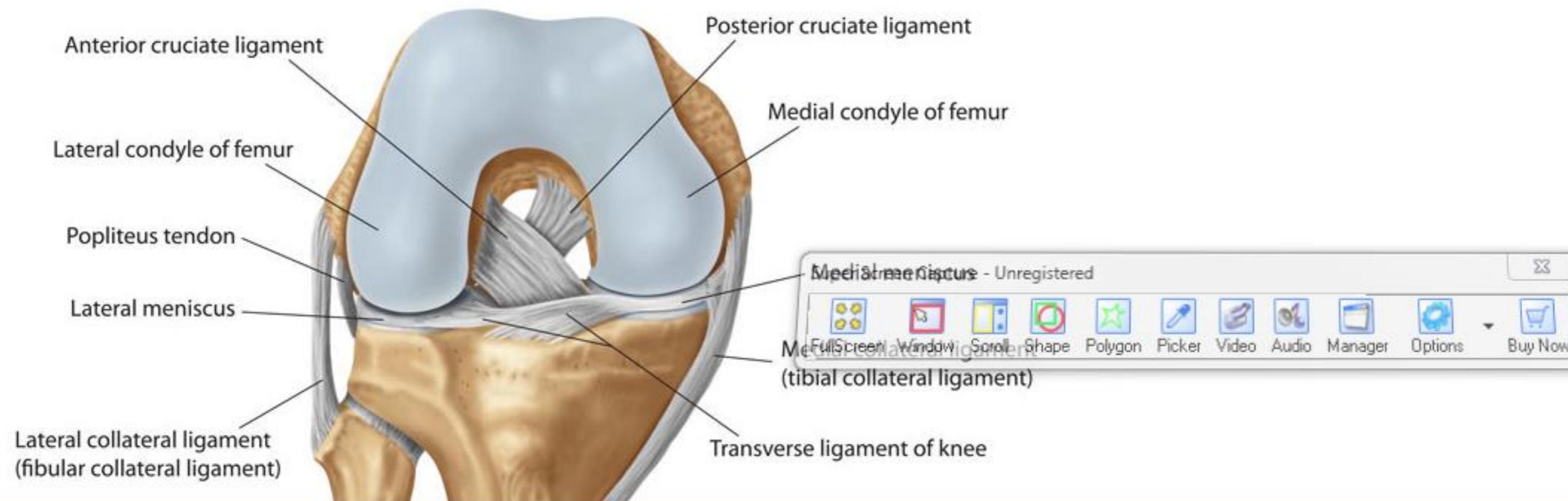


A 12-year-old soccer player presents to the emergency room with acute right knee pain after sustaining a kick injury to an extended leg. The trauma caused anterior displacement of her tibia with respect to her femur. Which of the following ligaments was most likely injured?

- A. Fibular (lateral) collateral [1%]
- B. Tibial (medial) collateral [4%]
- C. Patellar [2%]
- D. Anterior cruciate [78%]
- E. Posterior cruciate [15%]
- F. Oblique popliteal [0%]

Explanation:

User Id: 477875





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The anterior cruciate ligament (ACL) connects the lateral femoral condyle to the anteromedial tibial head. The ACL prevents anterior motion of the tibia with respect to the femur. Damage to the ACL can be assessed on physical examination with the anterior drawer test, a maneuver that involves flexing the lower extremity to approximately 90° and pulling the tibia anteriorly with the femur held fixed. Laxity indicates ACL injury. This patient appears to have sustained force on the anterior tibia greater than the ACL could bear, causing ligament rupture.

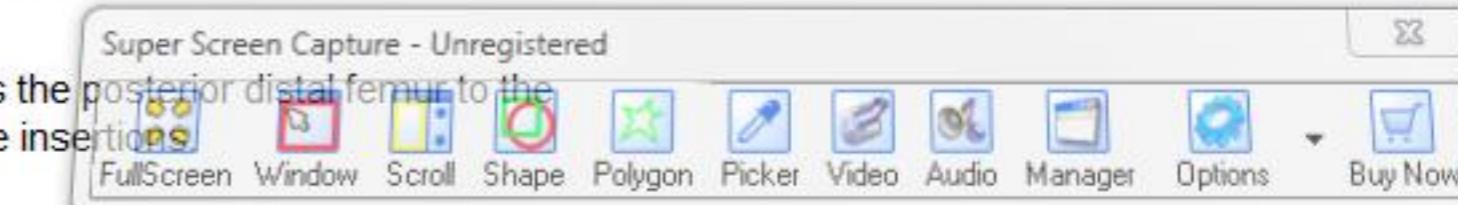
Athletes who play contact sports are at risk for complex knee injuries, which include simultaneous damage to the tibial (medial) collateral ligament, menisci, and ACL. These injuries generally result from a forceful blow to the lateral knee while the lower extremity is fully extended and the foot is rigidly planted. Extreme force to the lateral knee causes tearing of the tibial (medial) collateral ligament. A meniscal tear also occurs. The ACL can be injured by this mechanism due to anterior and medial movement of the tibia with respect to the femur.

(Choice A) The fibular (lateral) collateral ligament is extremely strong and is rarely injured. Injury to this ligament would require a forceful blow to the medial knee while the leg is extended.

(Choice C) The patellar ligament is the inferior projection of the quadriceps femoris tendon. Injury causes difficulty with leg extension.

(Choice E) The posterior cruciate ligament extends from the medial condyle of the femur to the posterior head of the tibia. It functions to prevent posterior movement of the tibia with respect to the femur. Damage is assessed using the posterior drawer test.

(Choice F) The oblique popliteal ligament is a wide fibrous band that connects the posterior distal femur to the posterior proximal tibia. It has small openings for nerves, vessels, and muscle insertion.



Educational Objective:

The anterior cruciate ligament (ACL) can be damaged by forceful anterior motion of the tibia with respect to the femur.

Time Spent: 2 seconds

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Last updated: [1/10/2013]

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A 19-year-old female presents to your office complaining of "right hand clumsiness." Physical examination reveals decreased sensation over the fifth finger and a flattened hypothenar eminence. The affected nerve is commonly injured at which of the following locations?

- A. Carpal tunnel [10%]
- B. Hook of the hamate [73%]
- C. Surgical neck of the humerus [5%]
- D. Head of the radius [8%]
- E. Coracobrachialis muscle [3%]

Explanation:

User Id: 477875

The ulnar nerve is a branch of the medial cord of the brachial plexus derived from the C8-T1 ventral rami. The ulnar nerve provides sensory innervation to the fifth digit and the medial half of the fourth digit as well as to the palmar and dorsal surfaces of the hand. The ulnar nerve also provides motor innervation to the flexor carpi ulnaris and to the medial section of the flexor digitorum profundis in the forearm. In the hand, the ulnar nerve innervates all of the palmar and dorsal interosseous muscles, the muscles of the hypothenar eminence, the palmaris brevis muscle, the third and fourth lumbrical muscles, and the adductor pollicis muscle.

The ulnar nerve enters the forearm after passing behind the medial epicondyle of the humerus where it is covered by a small amount of overlying soft tissue. This region, sometimes referred to as the "funny bone," is a common site of ulnar nerve injury. Ulnar nerve injury at this site classically causes a "claw hand" deformity. In the wrist, the ulnar nerve passes between the hook of the hamate and the pisiform bone in a fibroosseous tunnel known as Guyon's canal. Ulnar nerve injury at Guyon's canal causes dyesthesia of the ulnar side of



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Explanation:

User Id: 477875

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The ulnar nerve enters the forearm after passing behind the medial epicondyle of the humerus where it is covered by a small amount of overlying soft tissue. This region, sometimes referred to as the "funny bone," is a common site of ulnar nerve injury. Ulnar nerve injury at this site classically causes a "claw hand" deformity. In the wrist, the ulnar nerve passes between the hook of the hamate and the pisiform bone in a fibroosseous tunnel known as Guyon's canal. Ulnar nerve injury at Guyon's canal causes dysesthesia of the ulnar side of the hand and weakness of the intrinsic muscles of the hand.

(Choice A) In carpal tunnel syndrome, some factor reduces the size of the carpal tunnel causing median nerve compression. Patients typically experience difficulty with fine motor control of the thumb.

(Choice C) Fracture of the surgical neck of the humerus may cause axillary nerve injury leading to paralysis of the deltoid and teres minor muscles as well as loss of sensation of the lateral upper arm.

(Choice D) The deep branch of the radial nerve can be affected by radial head subluxation leading to weakness or paralysis of many of the muscles of the extensor compartment of the forearm.

(Choice E) The coracobrachialis muscle is an arm flexor that lies deep to the biceps brachii and overlies the median nerve and brachial artery. It is innervated by the musculocutaneous nerve.

Educational Objective:

Ulnar nerve injury classically causes a "claw hand" deformity. The ulnar nerve can be injured either near the medial epicondyle of the humerus or in Guyon's canal near the hook of the hamate and pisiform bone in the wrist.



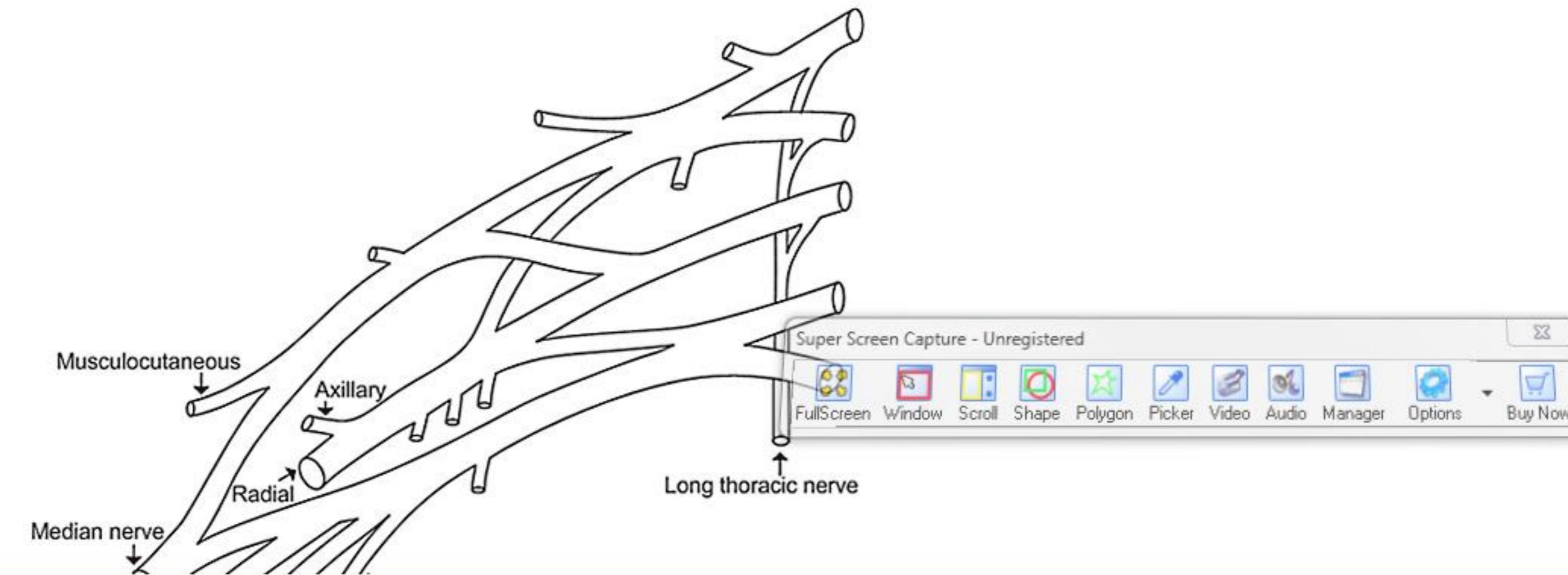
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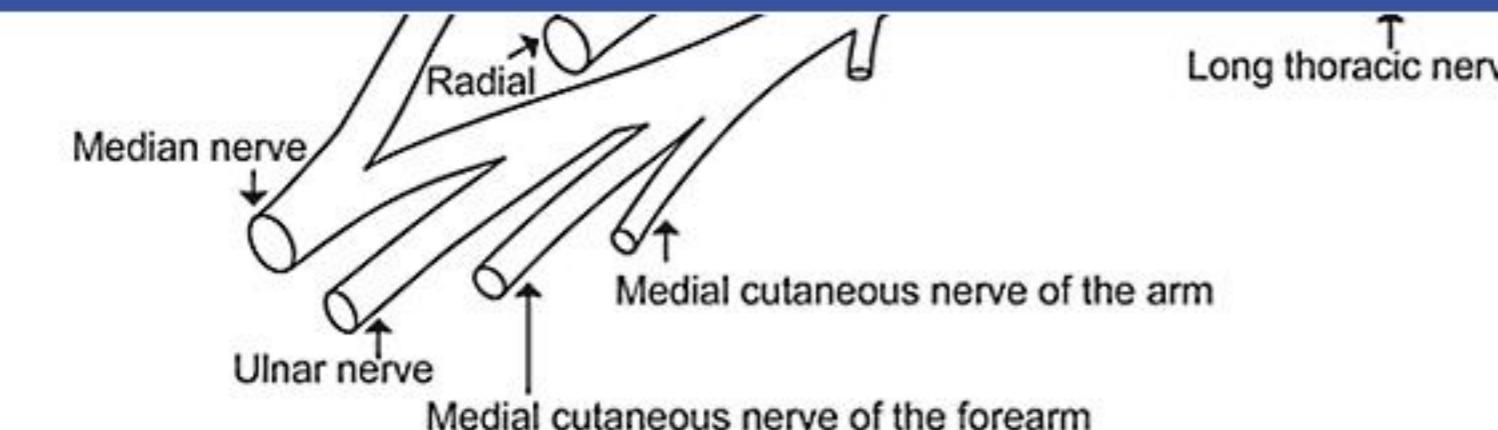
A 12-year-old boy falls from a tree he is climbing, but catches himself on a branch with his right hand. He swings by his right arm and jumps to the ground. Several hours later he presents to the emergency room with right hand clumsiness. Which of the following structures has he most likely injured?

- A. Axillary nerve [10%]
- B. Radial nerve [18%]
- C. Musculocutaneous nerve [5%]
- D. Long thoracic nerve [3%]
- E. Brachial plexus, lower trunk [64%]

Explanation:

User Id: 477875





Of the choices listed, only injury to the lower trunk of the brachial plexus would cause hand weakness.

Sudden upward jerking of the arm at the shoulder, as occurred in this patient, can cause injury to the lower trunk of the brachial plexus. The lower trunk of the brachial plexus carries nerve fibers from the C8 and T1 spinal levels that ultimately contribute to the median and ulnar nerves. Together, these nerves innervate all of the intrinsic muscles of the hand. Thus injury to the lower trunk of the brachial plexus can cause hand clumsiness or paralysis.

(Choice A) Shoulder dislocations or fractures of the proximal humerus can cause axillary nerve injury.

Weakness of the deltoid and teres minor muscles may result.

(Choice B) Fractures at the midshaft of the humerus commonly cause radial nerve injury. Patients may experience posterior arm numbness and paralysis of the arm and forearm extensors.

(Choice C) The musculocutaneous nerve may be damaged in injuries involving the upper trunk of the brachial plexus. The upper trunk of the brachial plexus is classically injured when the head and shoulder are violently stretched apart. The musculocutaneous nerve innervates the biceps brachii and brachialis muscles, so injury to this nerve would cause weakness of forearm flexion at the elbow.

(Choice D) Long thoracic nerve injury classically occurs during axillary lymph node dissection and results in paralysis of the serratus anterior muscle leading to scapular "winging" on physical examination.

Educational Objective:

Sudden upward stretching on the arm at the shoulder can damage the lower trunk of the brachial plexus. This trunk carries nerves from the C8 and T1 spinal levels that ultimately form the median and ulnar nerves. These nerves innervate all of the intrinsic muscles of the hand.



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A 34-year-old Caucasian female has difficulty abducting her right arm past the horizontal position. An abnormal prominence of the right inferior scapular angle is also observed. Which of the following is the most likely cause of this patient's condition?

- A. Thyroidectomy [3%]
- B. Anterior dislocation of the shoulder joint [21%]
- C. Violent stretch between the head and the shoulder [16%]
- D. Clavicular fracture [8%]
- E. Mastectomy [52%]

Explanation:

User Id: 477875

The patient described in the question stem is exhibiting symptoms consistent with paralysis of the serratus anterior muscle due to long thoracic nerve injury. Paralysis of the serratus anterior causes two classic signs. First, when a patient is asked to press anteriorly against a wall scapular "winging" can be observed. A winged scapula results from an inability of the serratus anterior to hold the medial border and inferior angle of the scapula against the posterior chest wall. Second, patients with serratus anterior paralysis are unable to abduct the arm higher than the horizontal position. The deltoid and supraspinatus muscles abduct the arm up to the horizontal position, but at that point the action of the serratus anterior is required to rotate the glenoid cavity superiorly, thereby allowing complete abduction of the arm over the head. The long thoracic nerve injury can occur during penetrating trauma or iatrogenically during axillary lymph node dissections as may occur during a radical mastectomy.

(Choice A) Thyroidectomy carries many risks due to the complicated anatomy of the midline neck. Nerve injuries that can occur with this procedure include damage to the recurrent laryngeal nerve during ligature of the inferior thyroid artery and damage to the external branch of the superior laryngeal nerve during ligature of the superior thyroid artery.

(Choice B) Anterior dislocation of the shoulder joint or a fracture of the neck of the humerus can injure the axillary nerve, resulting in paralysis of the deltoid and teres minor and some sensory loss to the upper lateral arm.

(Choice C) Violent stretch between the head and the shoulder can occur during delivery or by trauma in the





End Block

Explanation:

User Id: 477875

The patient described in the question stem is exhibiting symptoms consistent with paralysis of the serratus anterior muscle due to long thoracic nerve injury. Paralysis of the serratus anterior causes two classic signs. First, when a patient is asked to press anteriorly against a wall scapular "winging" can be observed. A winged scapula results from an inability of the serratus anterior to hold the medial border and inferior angle of the scapula against the posterior chest wall. Second, patients with serratus anterior paralysis are unable to abduct the arm higher than the horizontal position. The deltoid and supraspinatus muscles abduct the arm up to the horizontal position, but at that point the action of the serratus anterior is required to rotate the glenoid cavity superiorly, thereby allowing complete abduction of the arm over the head. The long thoracic nerve injury can occur during penetrating trauma or iatrogenically during axillary lymph node dissections as may occur during a radical mastectomy.

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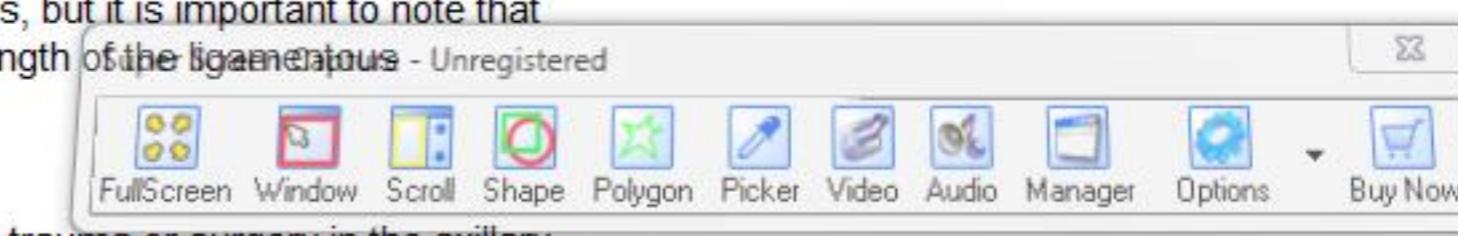
(Choice B) Anterior dislocation of the shoulder joint or a fracture of the neck of the humerus can injure the axillary nerve, resulting in paralysis of the deltoid and teres minor and some sensory loss to the upper lateral arm.

(Choice C) Violent stretch between the head and the shoulder can occur during delivery or by trauma in the adult. This results in damage to the upper trunk of the brachial plexus and the classic Erb-Duchenne palsy. This palsy results from damage to the musculocutaneous and suprascapular nerves and causes a waiter's tip posturing of the arm (shoulder adducted, arm pronated, and elbow extended).

(Choice D) Clavicular fracture does not cause any characteristic nerve palsies, but it is important to note that these fractures typically occur in the middle third of the clavicle due to the strength of the ligamentous structures at either end of this bone.

Educational Objective:

Mastectomy is a commonly tested cause of long thoracic nerve injury, but any trauma or surgery in the axillary region is at risk of damaging this nerve. Injury to this nerve causes winging of the scapula and inability to abduct the shoulder past 90 degrees.



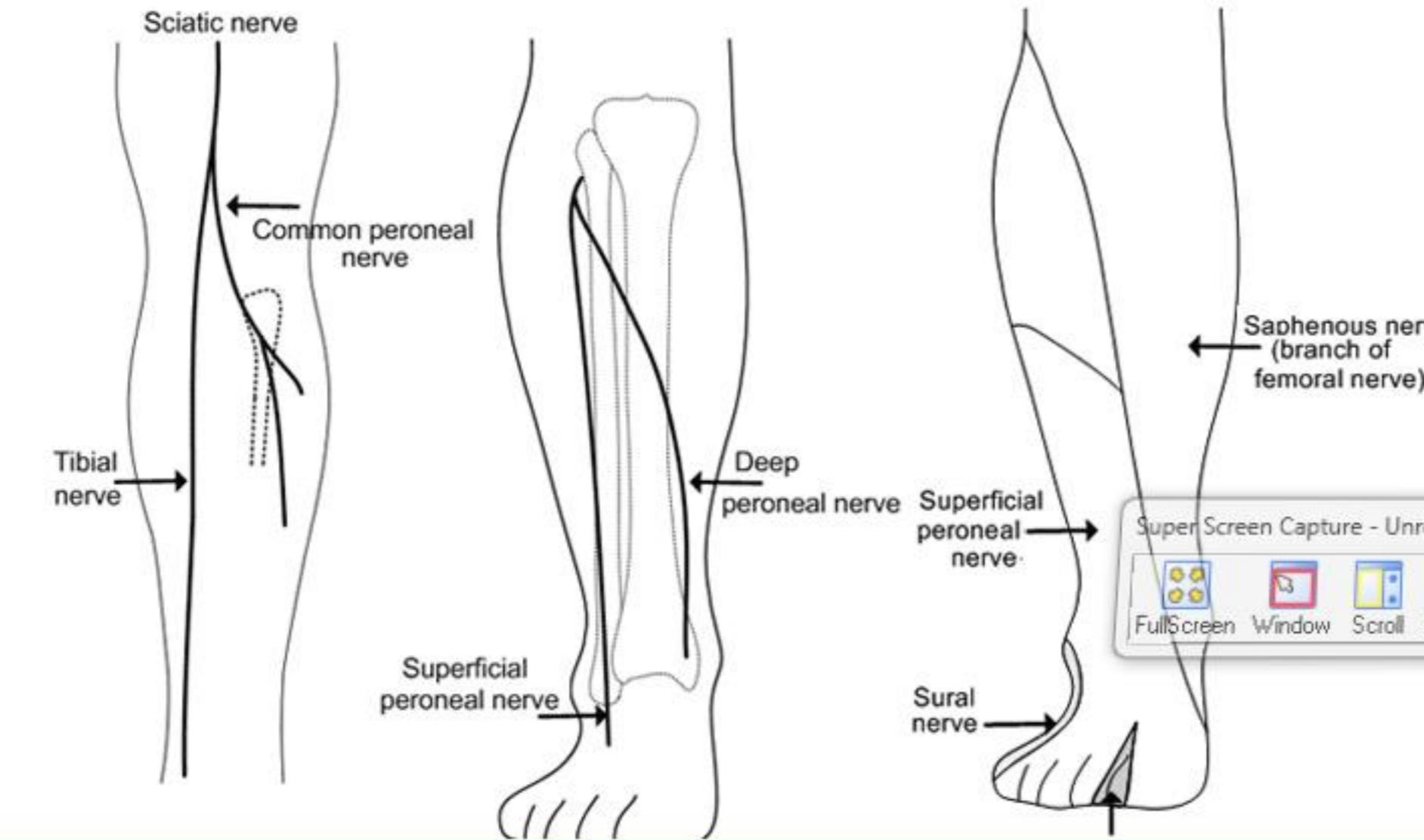
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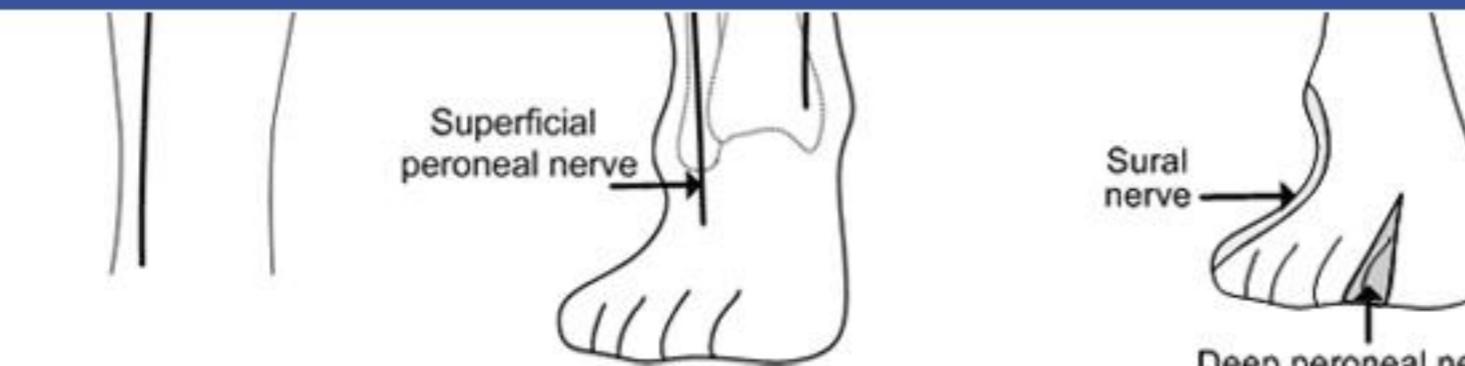
A 17-year-old football player comes to the ER hopping on his right foot. An X-ray of the left leg shows a fracture of the neck of the fibula. Which of the following findings do you most expect on physical examination?

- A. Loss of plantar flexion of the left foot [13%]
- B. Weakened inversion of the left foot [12%]
- C. Loss of sensation on the sole of the left foot [8%]
- D. Loss of sensation on the medial aspect of the left leg [6%]
- E. Loss of sensation on the dorsum of the left foot [61%]

Explanation:

User Id: 477875





The common peroneal nerve is the most commonly injured nerve in the leg due to its superficial location where it courses laterally around the neck of the fibula. This location makes the common peroneal nerve susceptible to injury when a traumatic insult results in fracture of the neck of the fibula. The sciatic nerve branches into the common peroneal (fibular) nerve and the tibial nerve posteriorly on the thigh just proximal to the popliteal fossa. After coursing around the neck of the fibula, the common peroneal nerve divides into superficial and deep branches. The superficial branch innervates the muscles of the lateral compartment of the leg, which function primarily to evert the foot. The deep peroneal nerve innervates the anterior compartment of the leg, whose muscles mainly act as dorsiflexors of the foot and toes, though they also participate in some inversion. The superficial peroneal nerve gives off branches that provide sensory innervation to the majority of the dorsum of the foot while the deep peroneal nerve provides sensory innervation only to the region between the first and second digits of the foot. Injury to the common peroneal nerve from a proximal fibula fracture would cause loss of sensation in both of these regions as well as motor deficits resulting in a clinical presentation with "foot drop".

(Choices A, B and C) Loss of plantar flexion of the left foot could result from injury of the tibial nerve as it courses through the middle of the popliteal fossa. Such an injury would also cause weakness of inversion of the foot as well as sensory loss on the sole.

(Choice D) Loss of sensation on the medial aspect of the left leg would result from a lesion of the saphenous nerve. The saphenous nerve is the largest purely sensory branch of the femoral nerve.

Educational Objective:

The common peroneal nerve is vulnerable to injury where it courses around the neck of the fibula. Fibula neck fractures can lesion this nerve, causing weakness of dorsiflexion (deep peroneal nerve) and eversion (superficial peroneal nerve) of the foot as well as loss of sensation over the dorsum of the foot. Inversion and plantarflexion would remain intact due to the action of the tibial nerve.



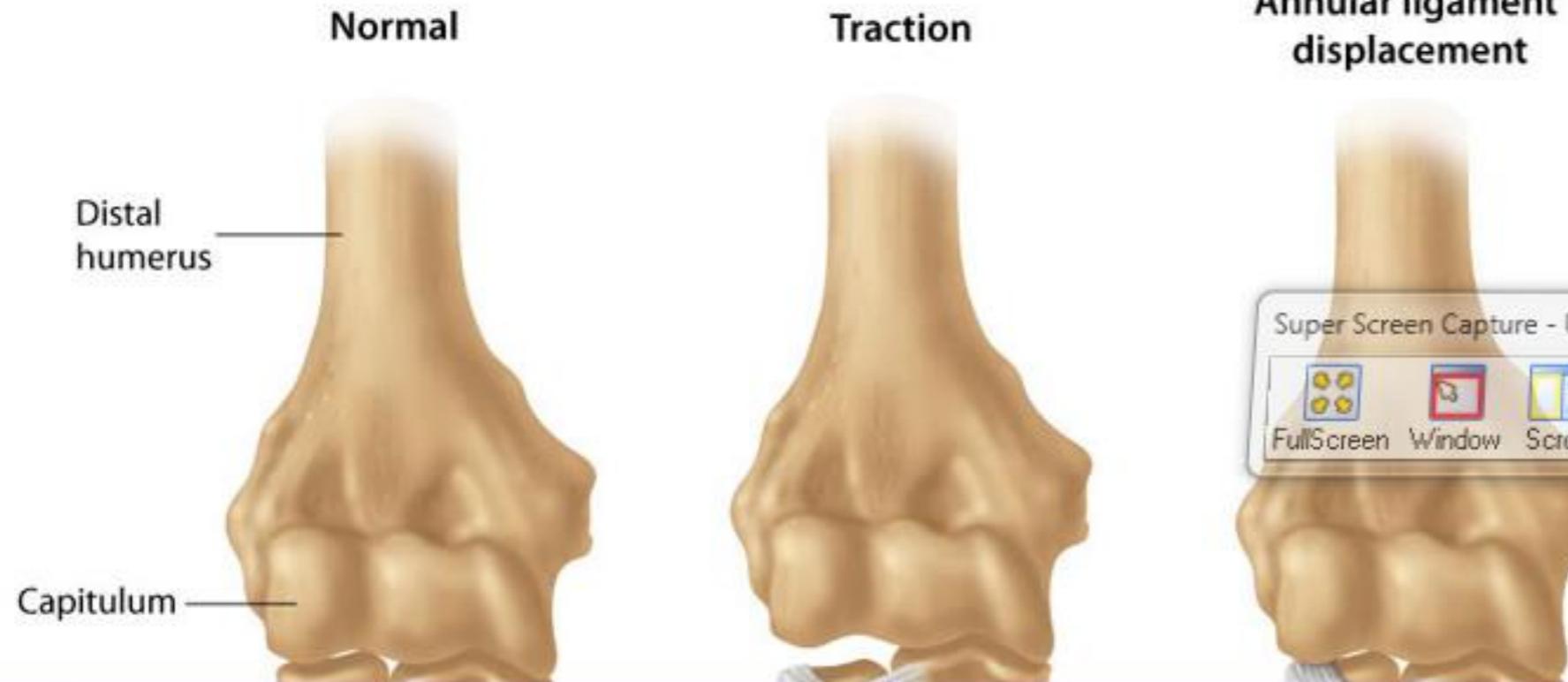
A 3-year-old boy is brought to the emergency department for refusal to move his right upper extremity. His mother states that the child was fine this morning. She recalls that he fell while holding hands and walking with his older sister 2 hours earlier. On physical examination, he holds his right upper extremity at his side with his elbow extended and forearm pronated. Any motion of the right elbow produces pain. There are no visible bruises or edema. Which of the following structures is most likely injured in this patient?

- A. Annular ligament [31%]
- B. Biceps tendon [27%]
- C. Interosseous membrane [6%]
- D. Radial collateral ligament [23%]
- E. Ulnar collateral ligament [12%]

Explanation:

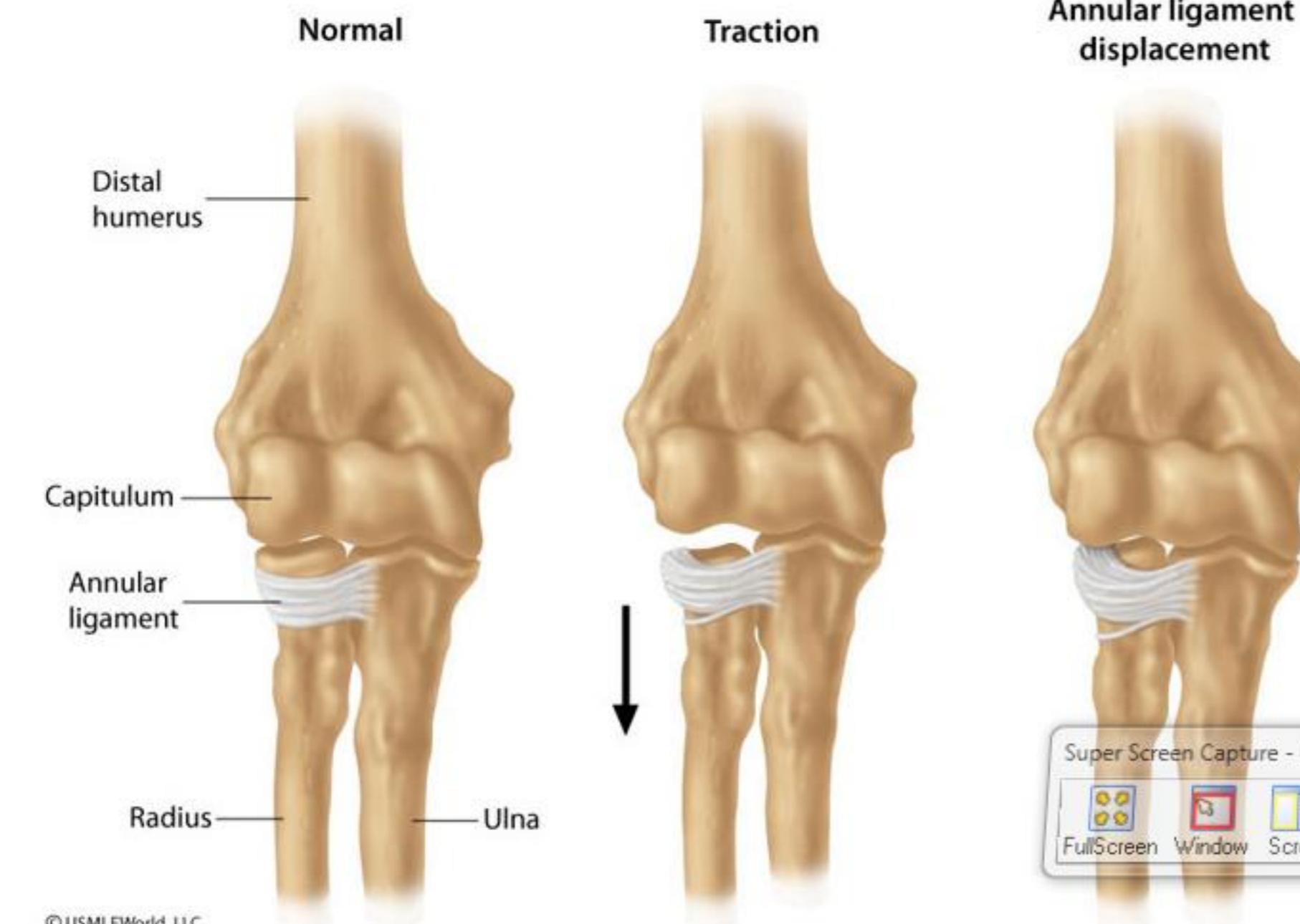
User Id: 477875

Radial head subluxation (nursemaid's elbow)



Explanation:

User Id: 477875

Radial head subluxation (nursemaid's elbow)

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This patient is experiencing radial head subluxation (nursemaid's elbow), the most common elbow injury in children. It occurs most frequently between the ages of 1 to 4 years. This injury often results from a sharp

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This patient is experiencing radial head subluxation (nursemaid's elbow), the most common elbow injury in children. It occurs most frequently between the ages of 1 to 4 years. This injury often results from a sharp pull on the hand while the forearm is pronated and the elbow is extended. The sudden increase in axial traction on the proximal radius causes the annular ligament to tear from its periosteal attachment at the radial neck. It then slips over the head of the radius and slides into the radiohumeral joint, where it becomes trapped. By age 5, the annular ligament becomes thick and strong, decreasing the likelihood that it can be torn or displaced.

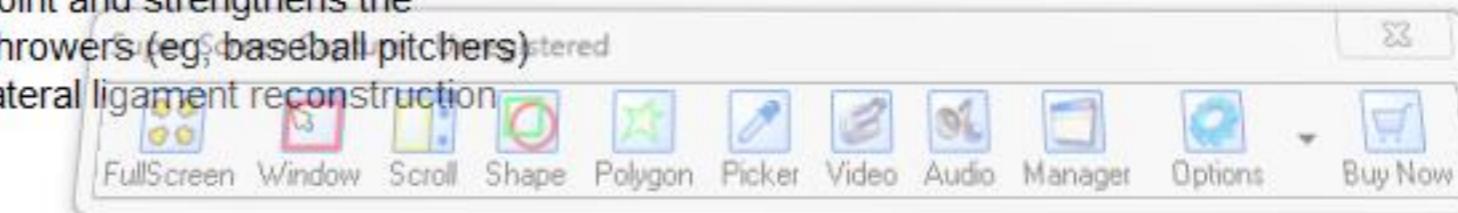
Affected children present with the injured arm held close to the body with the elbow extended (or slightly flexed) and the forearm pronated. The child is typically in little distress until attempts are made to move the elbow. Mild tenderness can be elicited on palpation of the subluxed radial head. Reduction can be accomplished by fully supinating the child's forearm followed by fully flexing the elbow.

(Choice B) The long head tendon of the biceps brachii courses intra-articularly to insert into the supraglenoid tubercle, while the short head tendon attaches to the tip of the coracoid process. The common distal tendon inserts into the radial tuberosity and the fascia of the forearm. Biceps tendon ruptures can occur both proximally and distally, and present with a visible or palpable mass in the mid-upper arm ("Popeye" deformity).

(Choice C) The interosseous membrane is a broad sheet of connective tissue that spans the space between the radius and ulna, connecting these 2 bones at their midsections and serving as a site of attachment for muscles of the forearm.

(Choice D) The radial collateral ligament lies on the lateral side of the elbow joint and strengthens the radiohumeral joint.

(Choice E) The ulnar collateral ligament lies on the medial side of the elbow joint and strengthens the ulnohumeral joint. Ulnar collateral ligament injuries occur most commonly in throwers (eg, baseball pitchers) due to intense valgus stress at the elbow. Treatment often involves ulnar collateral ligament reconstruction ("Tommy John" surgery).



Educational objective:

Radial head subluxation (nursemaid's elbow) results from sudden traction on the outstretched and pronated arm of a child. Affected children are usually in little distress unless attempts are made to move the elbow. The annular ligament is torn and displaced in this injury.

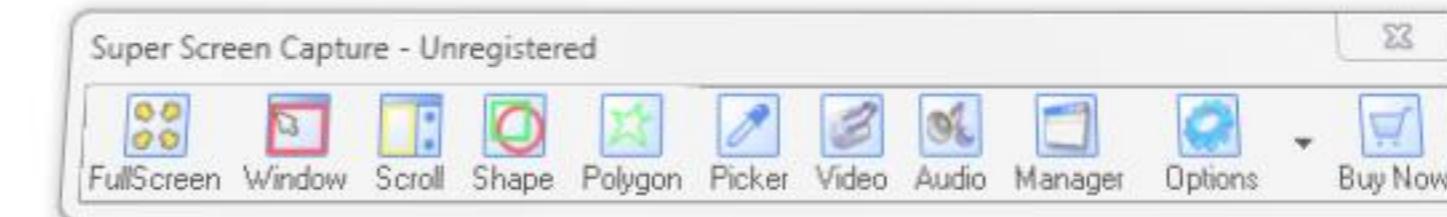
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A 65-year-old Caucasian female is brought to the emergency department with severe left-sided hip pain after falling in the bathroom. She is agitated and demands quick pain relief. A pelvic x-ray is shown below.



Which of the following arteries is most likely to be damaged in this patient?

- A. Femoral [13%]
- B. Medial circumflex [49%]
- C. Lateral circumflex [19%]
- D. Obturator [12%]
- E. Inferior gluteal [6%]



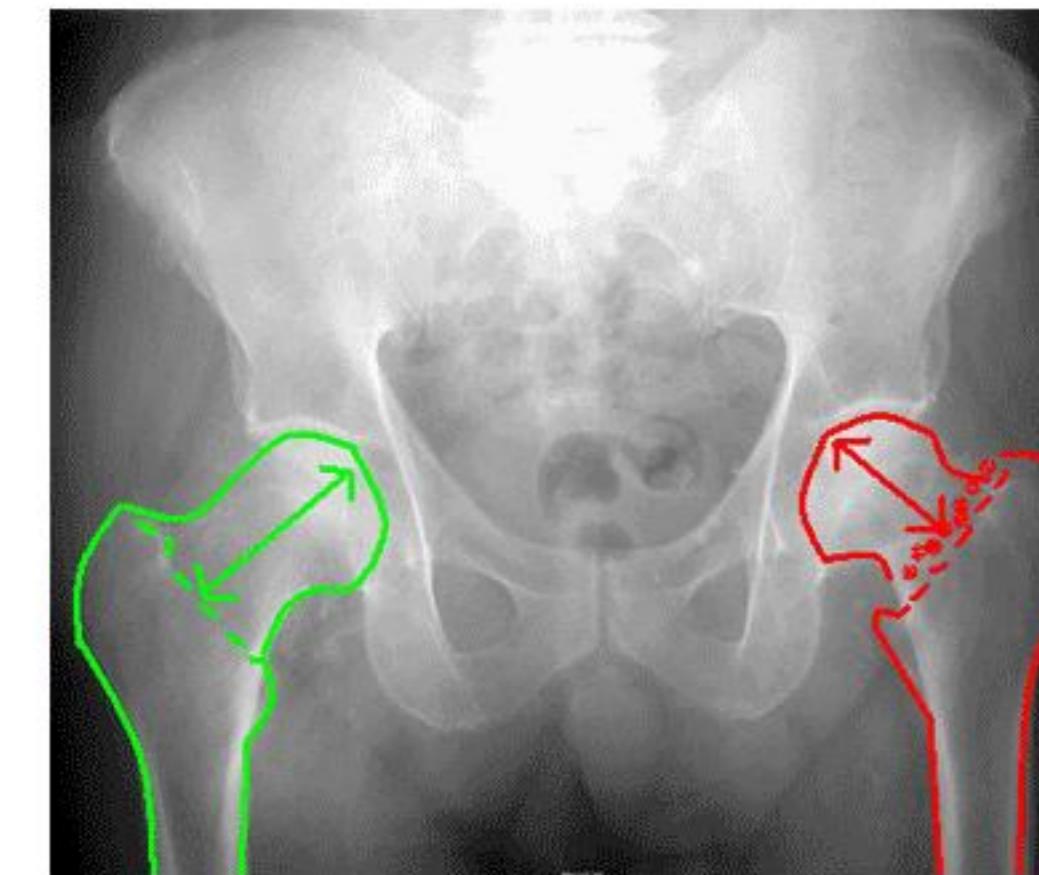
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Explanation:

User Id: 477875

This patient's x-ray shows a nondisplaced left subcapital femoral neck fracture. Note below how the femoral neck is markedly shortened compared to the right side. The dashed lines demarcate the intertrochanteric line, and the red dots label the fracture plane.



Femoral neck fractures are common in elderly patients with osteoporosis who have sustained a fall. The femoral head and neck derive their blood supply from the superior and inferior gluteal arteries and the medial and lateral femoral circumflex arteries, vessels that together form the trochanteric anastomosis. The medial femoral circumflex artery makes the largest contribution to the blood supply of this region and is vulnerable to damage from femoral neck fractures due to its close association with the posterior neck. Injury or thrombosis of this vessel predisposes to avascular necrosis of the femoral head.



(Choice A) The femoral artery gives rise to the medial and lateral femoral circumflex arteries. Injury to the femoral artery is unlikely here given its anatomical relationship to the fractured femoral head and because lower extremity claudication and other signs/symptoms of seriously compromised limb perfusion (including limb necrosis) would be expected with such an injury.



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(Choice A) The femoral artery gives rise to the medial and lateral femoral circumflex arteries. Injury to the femoral artery is unlikely here given its anatomical relationship to the fractured femoral head and because lower extremity claudication and other signs/symptoms of seriously compromised limb perfusion (including limb necrosis) would be expected with such an injury.

(Choice C) The lateral femoral circumflex artery courses anterior to the femoral neck and contributes to the blood supply of the femoral head and neck.

(Choice D) The obturator artery gives rise to an artery that supplies the femoral head. This vessel is especially important in children because it supplies blood to the region of the femoral head proximal to the epiphyseal growth plate. This artery is of minimal clinical significance in adults.

(Choice E) The superior and inferior gluteal arteries contribute to the trochanteric anastomosis that supplies the head and neck of the femur.

Educational Objective:

A femoral neck fracture can damage the blood supply to the femoral head and neck. This is most common with displaced fractures. The medial femoral circumflex artery provides the majority of the blood supply to the femoral head and neck; injury to this vessel can cause avascular necrosis of the femoral head.

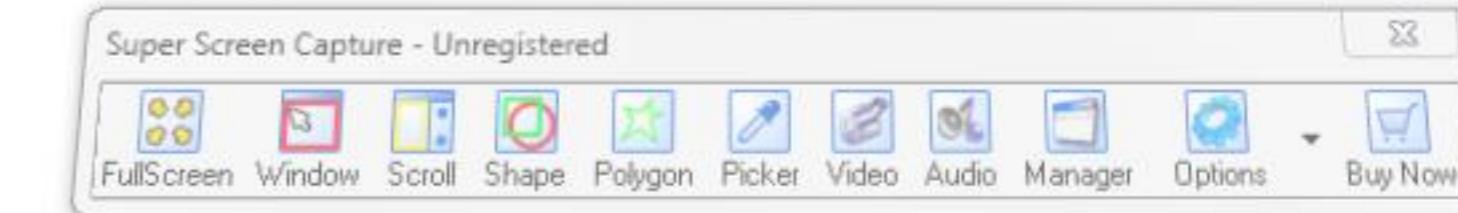


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A 34-year-old female presents to the emergency room after falling in the bathroom. She complains of wrist pain and numbness in her right palm. Based on her symptoms, you suspect that she has dislocated the lunate bone in the wrist. Identify the lunate bone on the X-ray below.



- A. A [7%]
- B. B [13%]
- C. C [31%]
- D. D [41%]
- E. E [8%]





- A. A [7%]
- B. B [13%]
- C. C [31%]
- D. D [41%]
- E. E [8%]

Explanation:

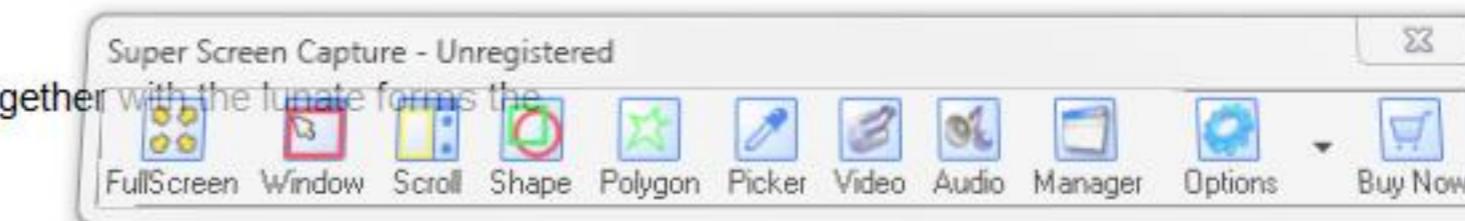
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A fall on an outstretched, dorsiflexed hand is the classic injury that causes lunate dislocation. The lunate (**Choice D**) is one of the proximal carpal bones. It can be identified on an X-ray of the hand as the more medial of the two bones that articulate with the radius. The scaphoid is the other (more lateral) bone that articulates with the radius (**Choice C**). Injuries that cause lunate dislocation also often cause fracture of the scaphoid. A potential late sequela of such an injury is avascular necrosis of the proximal scaphoid fracture fragment.

(Choice A) The trapezium is the most lateral of the distal carpal bones. Recall that the "thumb swings on the trapezium."

(Choice B) The capitate bone lies in the center of the wrist.

(Choice E) The triquetrum bone is located in the proximal medial wrist and together with the lunate forms the small articular surface between the distal ulna and the carpal bones.

**Educational Objective:**

The lunate bone can be identified on a hand X-ray as the more medial of the two carpal bones that articulate with the radius. It lies immediately medial to the scaphoid bone.

Time Spent: 11 seconds

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Last updated: [7/7/2010]

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A 54-year-old alcoholic who has been sober for 6 months "falls off the wagon" and imbibes a large amount of isopropyl alcohol. After an unknown period of time she is found by her neighbor and brought to the emergency room. The patient eventually arouses but is troubled by a persistent right foot drop. Prolonged compression of what nerve most likely accounts for her symptoms?

- A. Common peroneal [82%]
- B. Femoral [2%]
- C. Tibial [12%]
- D. Radial [1%]
- E. Pudendal [2%]
- F. Lateral sural cutaneous [1%]

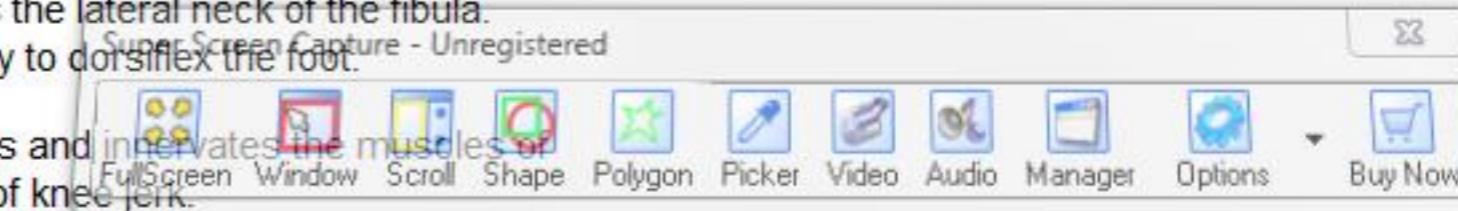
Explanation:

User Id: 477875

The common peroneal nerve is the lateral branch of the sciatic nerve and originates at the superior aspect of the popliteal fossa. It then traces the lateral aspect of the fossa, crosses the head of the fibula, and comes into direct contact with the lateral neck of the fibula as it enters the leg. At this point it divides into the deep peroneal nerve and superficial peroneal nerve. The deep peroneal innervates the extensor and the great dorsiflexors. The superficial peroneal branch supplies the peroneal muscles and the skin of most of the toes. The common peroneal nerve is particularly susceptible to damage as it traces the lateral neck of the fibula. Damage typically occurs via compression or leg fracture. The result is inability to dorsiflex the foot.

(Choice B) The femoral nerve (L2-L4) is the largest nerve in the lumbar plexus and innervates the muscles of the anterior and medial thigh. Damage to the femoral nerve will result in loss of knee jerk.

(Choice C) The tibial nerve is the larger of the two terminal branches of the sciatic nerve and it provides motor innervation for the popliteus and the flexors of the foot. Damage of this nerve would yield difficulty with plantar flexion.



- C. Tibial [12%]
- D. Radial [1%]
- E. Pudendal [2%]
- F. Lateral sural cutaneous [1%]

Explanation:

User Id: 477875

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(Choice D) The radial nerve innervates the upper extremity and damage results in wrist drop.

(Choice E) The pudendal nerve provides the majority of the motor and sensory input to the pelvic floor.

(Choice F) The lateral sural cutaneous is a cutaneous branch of the tibial nerve and supplies sensation to the calf.

Educational Objective:

Common peroneal nerve injury as it traces the lateral aspect of the fibular neck is common. Bony fracture and compression are the most common causes. Clinically this manifests as foot drop.



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A 34-year-old male presents to the emergency room complaining of severe right shoulder pain after falling from a tree. X-ray reveals a fracture in the middle third of the right clavicle. The medial end of the fractured clavicle is displaced upward due to traction by the:

- A. Rhomboid muscles [2%]
- B. Sternocleidomastoid muscle [73%]
- C. Pectoralis minor muscle [4%]
- D. Serratus anterior muscle [5%]
- E. Subclavius muscle [9%]
- F. Sternoclavicular ligaments [7%]

Explanation:

User Id: 477875

Several muscles insert on the clavicle, including the pectoralis major muscle on the inferior medial aspect, the deltoid muscle on the inferior lateral aspect, the subclavius muscle on the inferior lateral aspect, the trapezius muscle on the superior lateral aspect, and the sternocleidomastoid muscle on the superior medial aspect.

The sternocleidomastoid muscle is responsible for the upward traction on the medial section of the fractured clavicle described above. Recall that the sternocleidomastoid muscle has three points of insertion (described in its name): "sterno" - the muscle inserts superiorly on the manubrium of the sternum, "cleido" - the muscle inserts on the medial part of the clavicle, "mastoid" - the muscle inserts on the mastoid process of the skull.

(Choice A) Both the major and the minor rhomboid muscles originate on the vertebral bodies/spines and insert on the medial border of the scapula.

(Choice C) The pectoralis minor muscle originates on 3rd, 4th and 5th ribs and inserts on the coracoid process of the scapula.

(Choice D) The serratus anterior muscle originates laterally on the 1st through 8th ribs and inserts onto the medial border of the scapula. This muscle is innervated by the long thoracic nerve, injury to which causes winging of the scapula.

(Choice E) The subclavius muscle originates on the 1st rib and inserts on the inferior lateral aspect of the clavicle.



- C. Pectoralis minor muscle [4%]
- D. Serratus anterior muscle [5%]
- E. Subclavius muscle [9%]
- F. Sternoclavicular ligaments [7%]

Explanation:

User Id: 477875

Several muscles insert on the clavicle, including the pectoralis major muscle on the inferior medial aspect, the deltoid muscle on the **inferior lateral aspect**, the subclavius muscle on the **inferior lateral aspect**, the trapezius muscle on the **superior lateral aspect**, and the sternocleidomastoid muscle on the **superior medial aspect**.

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(Choice E) The subclavius muscle originates on the 1st rib and inserts on the **inferior lateral aspect** of the clavicle.

(Choice F) The sternoclavicular ligaments join the clavicle to the manubrium. These ligaments would tend to hold the medial fragment of the clavicle in place.

**Educational Objective:**

The sternocleidomastoid muscle originates on the medial clavicle and manubrium and inserts on the mastoid process of the skull. It is innervated by CN XI and functions to turn the head in the opposite direction.

Time Spent: 1 seconds

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Last updated: [1/10/2013]

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A 24-year-old male complains of 'clumsiness' of his right arm. The patient is asked to face a wall and push against it with both hands. Abnormal prominence of the right inferior scapular angle is observed during the maneuver. Which of the following muscles is most likely denervated in this patient?

- A. Serratus anterior [79%]
 B. Latissimus dorsi [9%]
 C. Deltoid [4%]
 D. Rhomboid major [3%]
 E. Teres major [4%]

Explanation:

User Id: 477875

Injury to the long thoracic nerve results in paralysis of the serratus anterior. This presents as a winged scapula, which means that the medial border and inferior angle sticks out posteriorly like a bird's wing when the patient presses anteriorly against a wall.

(Choice B) The latissimus dorsi muscle is innervated by the thoracodorsal nerve and serves to adduct and extend the humerus.

(Choice C) The deltoid is innervated by the axillary nerve and has three segments that act to flex, extend, and abduct the arm.

(Choice D) The rhomboid major is innervated by the dorsal scapular nerve and acts to draw the scapula medially at its medial border.

(Choice E) The teres major is innervated by the subscapular nerve and acts to adduct and medially rotate the arm. This muscle is not a part of the rotator cuff.



Educational Objective:

The serratus anterior muscle serves to fix the scapula against the posterior chest wall and rotate the scapula to allow abduction of the arm over the head. Paralysis of this muscle occurs with injury to the long thoracic nerve and results in winging of the scapula.

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User Id: 477875

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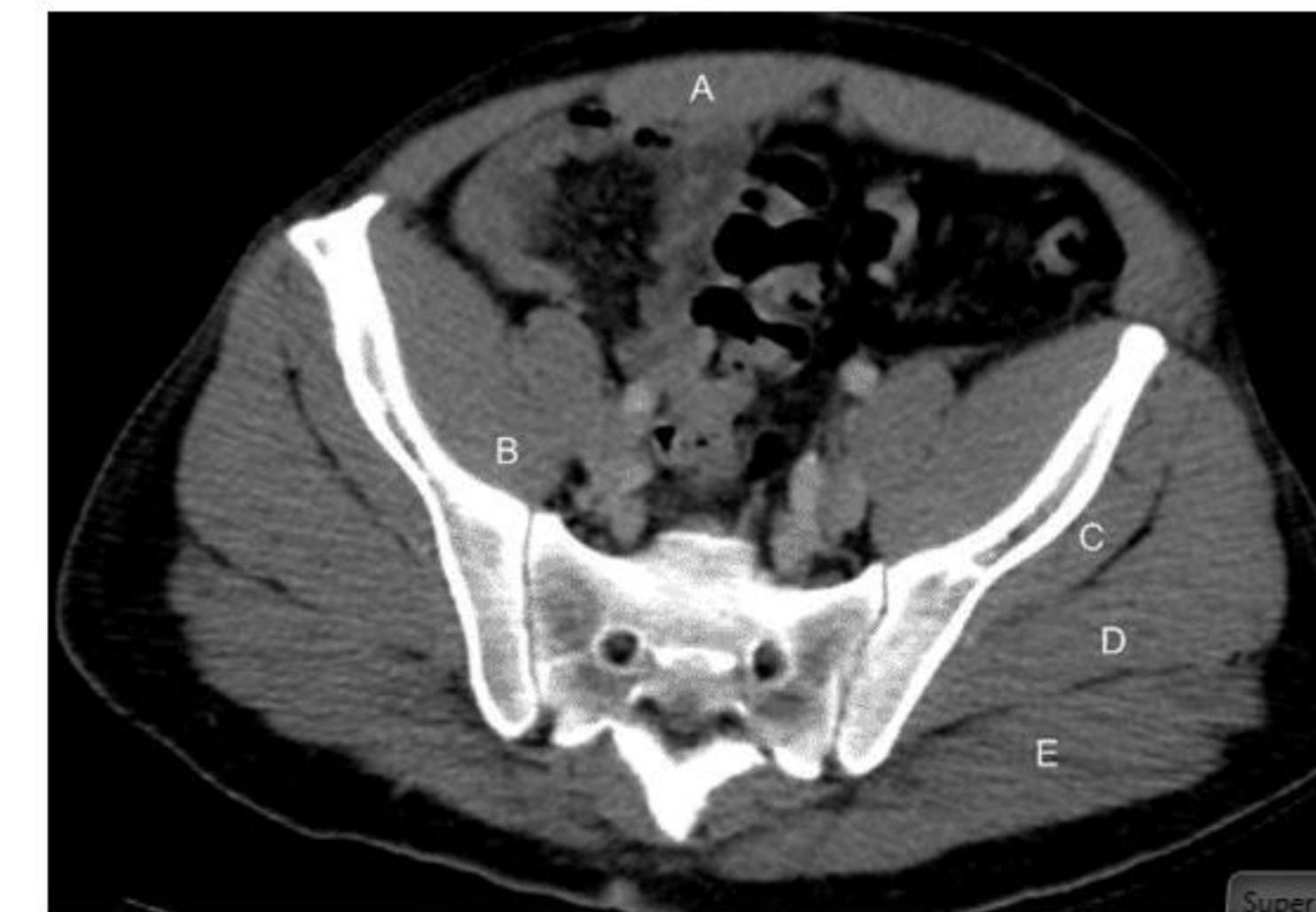
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A 32-year-old male presents to the ER with sudden-onset heart palpitations. His blood pressure is 100/70 mmHg, and his heart rate is 160/min with regular rhythm. The physician instructs the patient to do the "Valsalva maneuver" to relieve these symptoms. Which of the following structures indicated on the pelvic CT image below is most important in performing the Valsalva maneuver?



- A. A [74%]
- B. B [15%]
- C. C [3%]
- D. D [3%]
- E. E [3%]

Super Screen Capture - Unregistered



- B. B [15%]
- C. C [3%]
- D. D [3%]
- E. E [3%]

Explanation:

User Id: 477875

The patient described in the question stem is experiencing paroxysmal supraventricular tachycardia.

Treatment can be with vagal stimulation, such as carotid sinus massage or the Valsalva maneuver.

Maneuvers that increase vagal tone increase the refractory period in the AV node and help prevent a reentrant circuit from conducting. If Valsalva measures fail, intravenous administration of adenosine is recommended.

The Valsalva maneuver is executed by forcibly exhaling against a closed glottis. This is done by taking a full inhalation, closing the glottis (i.e. holding one's breath), and subsequently bearing down-without exhaling-as one would during a bowel movement. The rectus muscles are recruited in this process, and they (**Choice A**) play the largest role in the development of the resultant elevated intraabdominal and intrathoracic pressure during this maneuver.

(Choice B) This structure is the iliocostalis muscle, a flexor of the hip that lies over the iliac fossa.

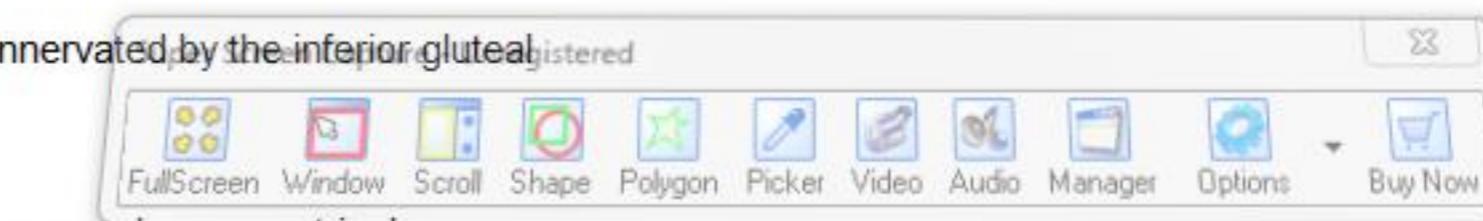
(Choice C) This structure is the gluteus minimus muscle. This muscle is innervated by the superior gluteal nerve and has the subtle, but important function of preventing the contralateral (non-weight-bearing) side of the pelvis from dipping when that leg is elevated off of the ground, as when one walks.

(Choice D) This structure is the gluteus medius muscle. This muscle has the same innervation and function as the gluteus minimus.

(Choice E) This structure is the gluteus maximus muscle. This muscle is innervated by the inferior gluteal nerve and is the major extensor of the thigh at the hip.

Educational Objective:

The Valsalva maneuver increases vagal tone and can be used to abolish paroxysmal supraventricular tachycardia. The rectus abdominis is the most important muscle in achieving the increased intraabdominal and intrathoracic pressure of the Valsalva maneuver.



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A 56-year-old male with advanced bladder carcinoma suffers from compression of a nerve that passes through the obturator foramen. Which of the following functions would be most affected in this patient?

- A. Abduction of the thigh [14%]
- B. Adduction of the thigh [64%]
- C. Flexion of the thigh [10%]
- D. Extension of the thigh [8%]
- E. Extension of the leg [3%]

Explanation:**User Id: 477875**

The obturator nerve is the only nerve that exits the pelvis via the obturator foramen. This nerve innervates the adductor compartment of the thigh after dividing into anterior and posterior branches subsequent to leaving the pelvis. The anterior branch innervates the gracilis, pectineus, and the adductors longus and brevis. The posterior branch innervates the obturator externus and the adductor magnus. Obturator nerve injury would cause weakness and spasm of the adductor compartment muscles.

(Choice A) Abduction of the thigh is accomplished by the tensor fascia lata and the sartorius muscles. These muscles are supplied by the superior gluteal and femoral nerves, respectively, and lie in the anterior compartment of the thigh.

(Choice C) Flexion of the thigh is accomplished by the psoas, iliacus, tensor fascia lata and the sartorius muscles. The psoas is directly innervated by the lumbar plexus, and the iliacus is innervated by the femoral nerve.

(Choice D) Extension of the thigh is accomplished primarily by the gluteus maximus muscle, which is supplied by the inferior gluteal nerve. This nerve exits the pelvis through the greater sciatic foramen below the piriformis.



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- C. Flexion of the thigh [10%]
- D. Extension of the thigh [8%]
- E. Extension of the leg [3%]

Explanation:

User Id: 477875

The obturator nerve is the only nerve that exits the pelvis via the obturator foramen. This nerve innervates the adductor compartment of the thigh after dividing into anterior and posterior branches subsequent to leaving the pelvis. The anterior branch innervates the gracilis, pectineus, and the adductors longus and brevis. The posterior branch innervates the obturator externus and the adductor magnus. Obturator nerve injury would cause weakness and spasm of the adductor compartment muscles.

(Choice A) Abduction of the thigh is accomplished by the tensor fascia lata and the sartorius muscles. These muscles are supplied by the superior gluteal and femoral nerves, respectively, and lie in the anterior compartment of the thigh.

(Choice C) Flexion of the thigh is accomplished by the psoas, iliacus, tensor fascia lata, and the sartorius muscles. The psoas is directly innervated by the lumbar plexus, and the iliacus is innervated by the femoral nerve.

(Choice D) Extension of the thigh is accomplished primarily by the gluteus maximus muscle, which is supplied by the inferior gluteal nerve. This nerve exits the pelvis through the greater sciatic foramen below the piriformis.

(Choice E) Extension of the leg is primarily accomplished by the quadriceps femoris muscle group. These muscles are innervated by the femoral nerve, which gains access to the thigh deep to the center of the unregistered inguinal ligament.

Educational Objective:

The obturator nerve is the only major nerve that exits the pelvis through the obturator foramen. This nerve supplies the muscles of the medial (adductor) compartment of the thigh and can be damaged during pelvic surgery, especially in procedures such as lymph node dissection.



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A 23-year-old athlete presents to your office with right knee pain after playing basketball. A coronal MRI image of his knee is shown below.



The asterisk marks the attachment site of which of the following ligaments?

- A. Anterior cruciate [44%]
- B. Tibial collateral [3%]
- C. Transverse genicular [5%]
- D. Posterior cruciate [45%]
- E. Patellar [2%]

**Explanation:****User Id: 477875**

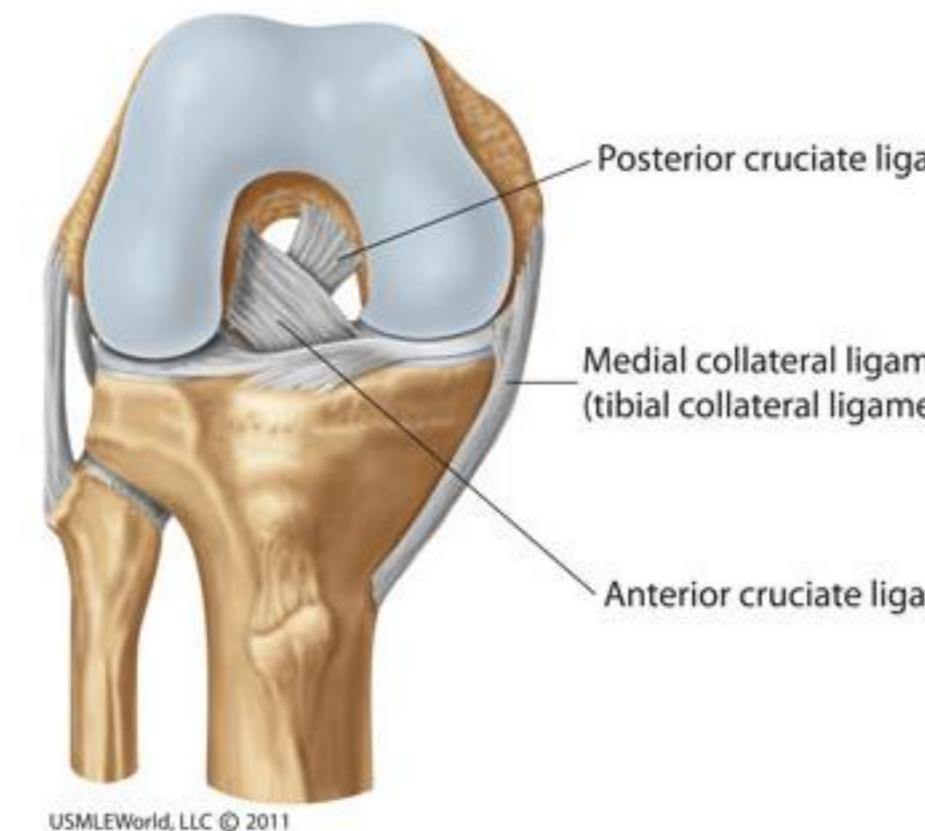
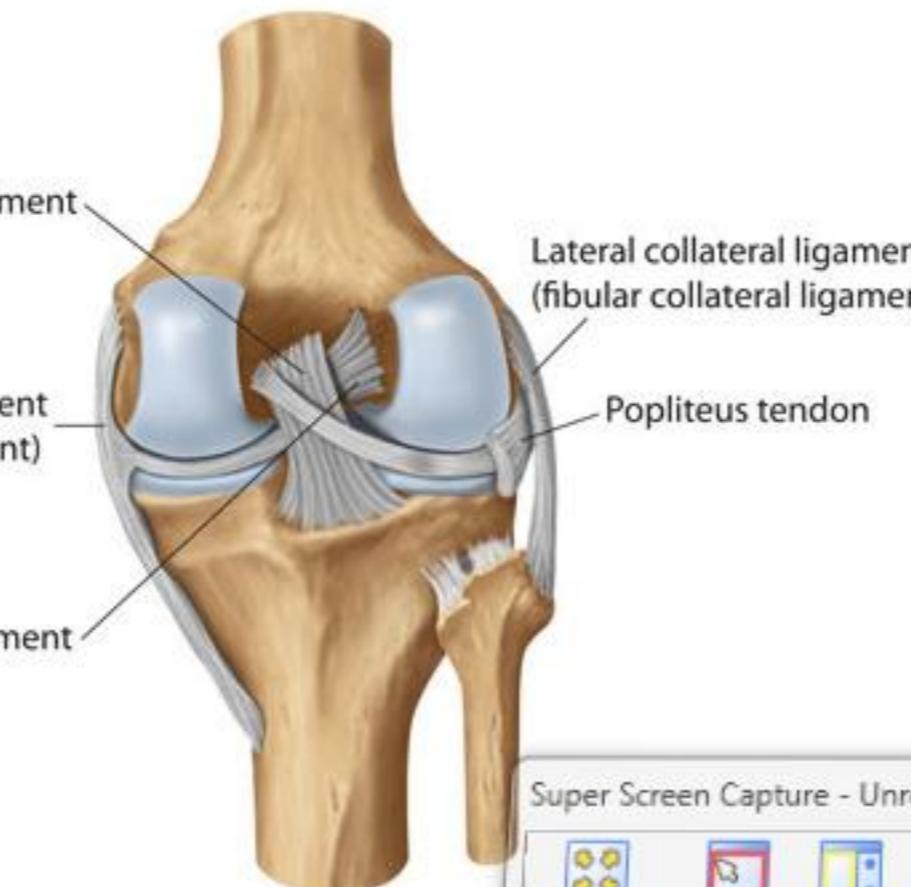
In this coronal MRI image of the right knee, the opaque (white) regions, from top to bottom, correspond to: the lateral and medial condyles of the femur (the medial condyle is adjacent to the asterisk), the lateral and medial

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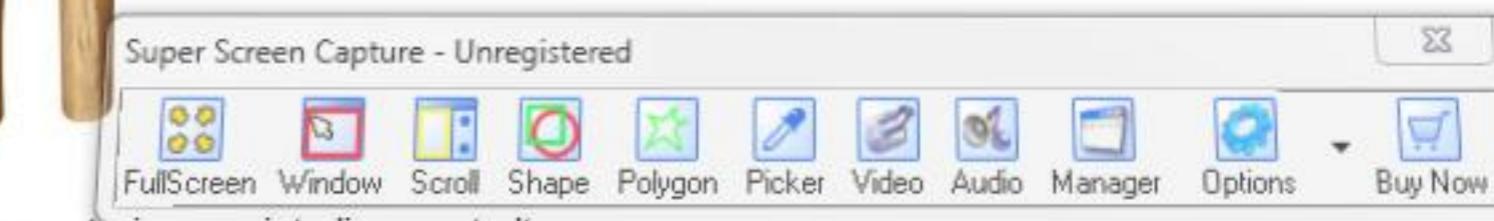
Explanation:

User Id: 477875

In this coronal MRI image of the right knee, the opaque (white) regions, from top to bottom, correspond to: the lateral and medial condyles of the femur (the medial condyle is adjacent to the asterisk), the lateral and medial condyles of the tibia, and the head of the fibula. The anterior and posterior cruciate ligaments are ligaments within the articular capsule of the knee joint that cross one another as each spans from the tibia to the femur. The posterior cruciate ligament attaches to the posterior part of the intercondylar area of the tibia and the anterior lateral surface of the medial epicondyle of the femur (asterisk).

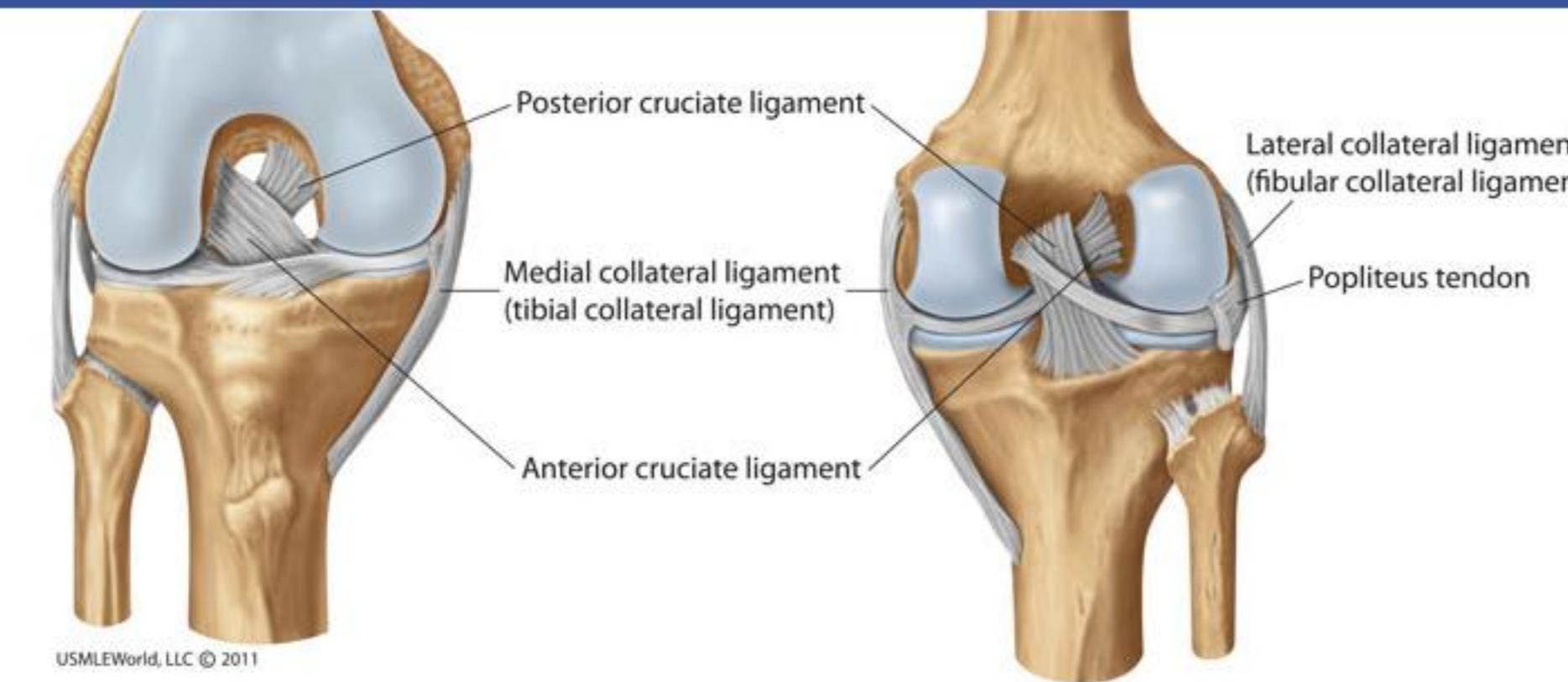
Anterior view**Posterior view**

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(Choice A) The anterior cruciate ligament is more commonly injured than the posterior cruciate ligament. It spans from the anterior portion of the intercondylar tibia to the posterior medial side of the lateral femoral condyle. It prevents posterior displacement of the femur relative to the tibia when the knee is fully extended.

(Choice B) The tibial collateral ligament is a very strong band of tissue that spans from the medial femoral epicondyle to the medial condyle of the tibia. It also attaches to the medial meniscus.



(Choice A) The anterior cruciate ligament is more commonly injured than the posterior cruciate ligament. It spans from the anterior portion of the intercondylar tibia to the posterior medial side of the lateral femoral condyle. It prevents posterior displacement of the femur relative to the tibia when the knee is fully extended.

(Choice B) The tibial collateral ligament is a very strong band of tissue that spans from the medial femoral epicondyle to the medial condyle of the tibia. It also attaches to the medial meniscus.

(Choice C) The transverse genicular ligament attaches the medial and lateral menisci anteriorly on the proximal articular surface of the tibia.

(Choice E) The patellar ligament spans from the patella to the tibial tuberosity. It is the continuation of the registered quadriceps femoris tendon.

Educational Objective:

The posterior cruciate ligament prevents anterior displacement of the femur relative to the tibia when the knee is flexed. It attaches to the posterior part of the intercondylar area of the tibia and the anterior part of the lateral surface of the medial epicondyle of the femur.



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A 56-year-old man comes to the emergency department because of persistent left wrist pain. While walking his dog 5 hours ago, he fell forward to the ground and landed on his outstretched left hand. Examination shows mild swelling over the dorsum of the left hand with preserved range of motion. There is point tenderness present over the anatomic snuffbox. An x-ray of his left wrist is shown below.



This patient is at greatest risk for developing which of the following complications?

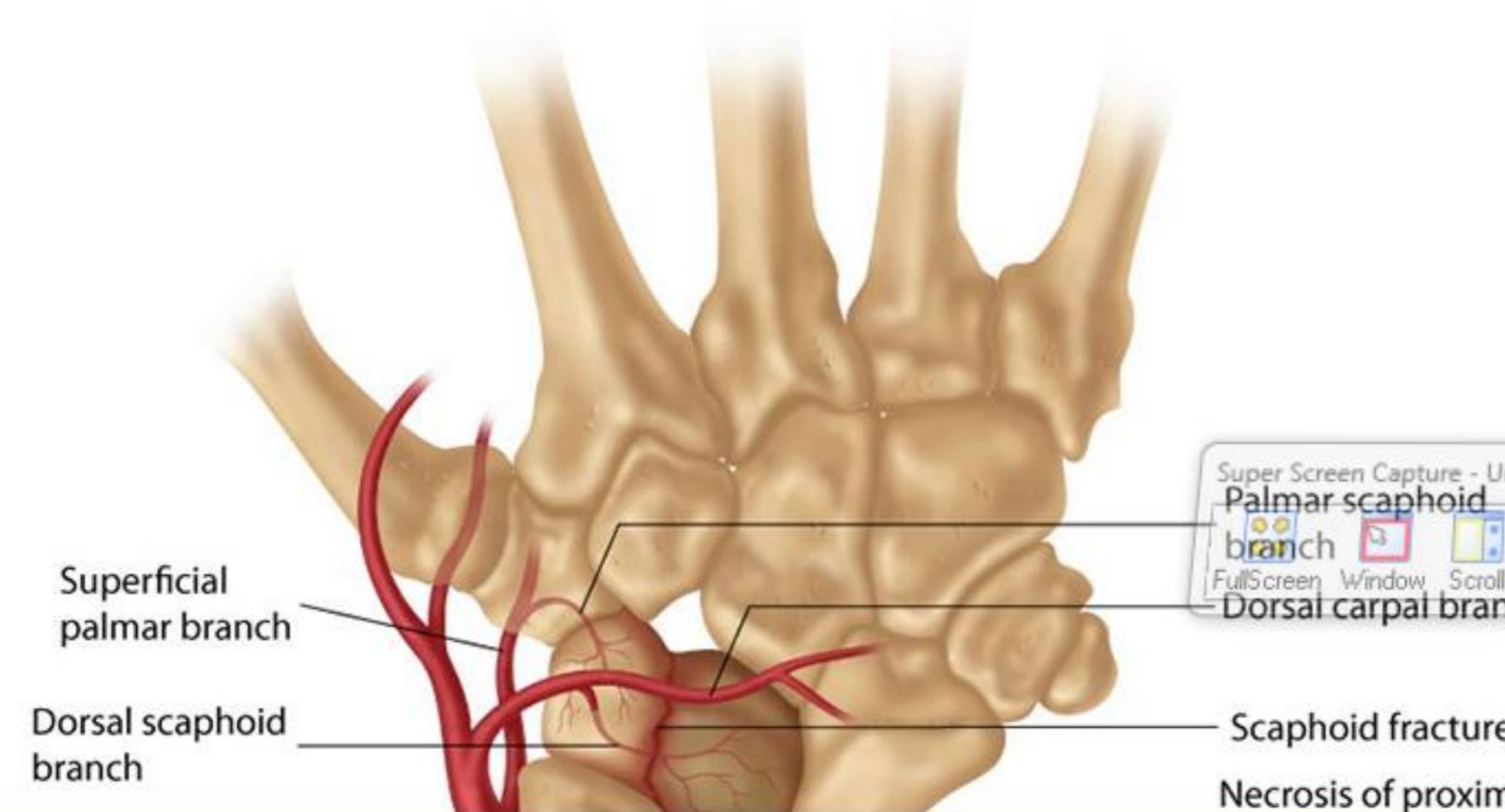
This patient is at greatest risk for developing which of the following complications?

- A. Avascular necrosis [77%]
- B. Carpal tunnel syndrome [8%]
- C. Compartment syndrome [8%]
- D. Dupuytren's contracture [6%]
- E. Osteomyelitis [1%]

Explanation:

User Id: 477875

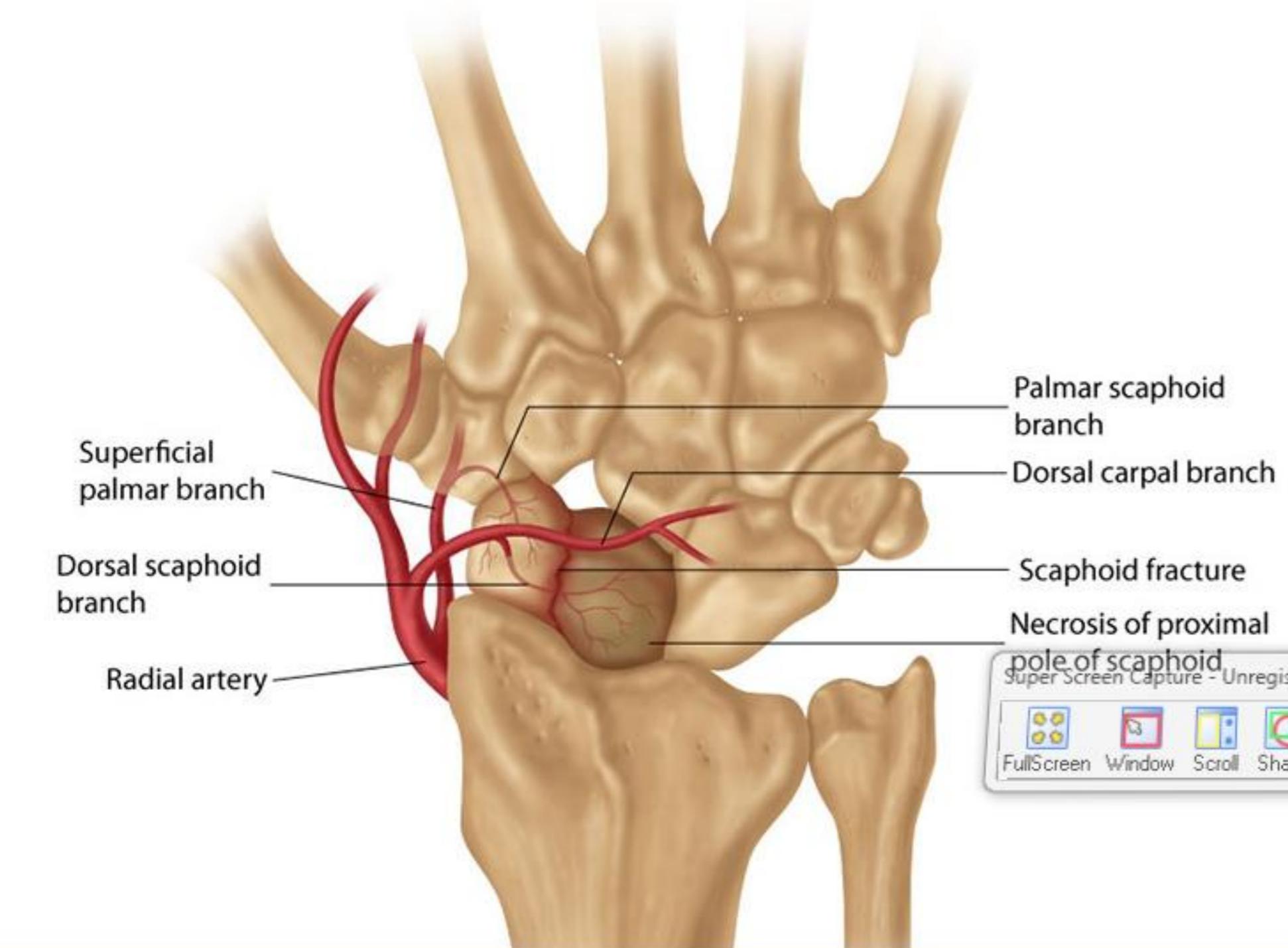
Scaphoid avascular necrosis



Explanation:

User Id: 477875

Scaphoid avascular necrosis



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Scaphoid fractures are the most common of the carpal bone fractures. They frequently result from falls onto an outstretched arm that cause direct axial compression or wrist hyperextension. A scaphoid fracture should be suspected in any patient with persistent wrist pain and tenderness in the **anatomical snuff box** following a fall. The snuffbox is a triangular deepening on the dorsoradial aspect of the hand at the level of the carpal bones. The scaphoid and trapezium bones form the floor of the snuffbox.

The scaphoid is the largest bone of the proximal carpal row and is located on the radial aspect of the hand just distal to the radius itself. The dorsal scaphoid branch of the radial artery supplies the majority of the scaphoid after entering near the bone's distal pole. Blood supply to the proximal pole proceeds in a retrograde manner and can be easily interrupted by a fracture. Thus, scaphoid fractures are at risk for **avascular necrosis** and **nonunion**.

(Choice B) Carpal tunnel syndrome is caused by median nerve compression as it travels through the carpal tunnel. It is associated with repetitive wrist movements, hypothyroidism, diabetes mellitus, and rheumatoid arthritis.

(Choice C) Acute compartment syndrome occurs when increased pressure within a fascial compartment compromises blood circulation and tissue function within that space. It develops after significant trauma, particularly long-bone fractures of the leg or forearm.

(Choice D) **Dupuytren's contracture** is a benign, slowly progressive fibroproliferative disease of the palmar fascia. As the scarring progresses, nodules form on the palmar fascia and the fingers gradually lose their flexibility, eventually resulting in contractures that draw the fingers into flexion.

(Choice E) Osteomyelitis commonly results from either hematogenous seeding of bone with bacteria or by contiguous spread of organisms from a nearby wound. However, unexposed bone is unlikely to develop osteomyelitis. *Staphylococcus aureus* is the most common cause of hematogenous osteomyelitis.

Super Screen Capture - Unregistered



Educational objective:

Fall on an outstretched hand may cause fracture of the scaphoid bone. Examination shows tenderness in the anatomical snuff box. The scaphoid bone is vulnerable to avascular necrosis and nonunion due to its tenuous blood supply.

References:

1. Fractures in brief: scaphoid fractures.

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A 46-year-old gardener presents to your office with knee pain. He reports that he spends hours on his knees several times per week while gardening. Which of the following bursae do you most expect to be affected in this patient?

- A. Suprapatellar bursa [25%]
- B. Prepatellar bursa [56%]
- C. Anserine bursa [6%]
- D. Semimembranous (popliteal) bursa [11%]
- E. Gastrocnemius bursa [2%]

Explanation:

User Id: 477875

The prepatellar bursa is located between the patella and the overlying skin and prepatellar tendon. It is lined by synovium and contains very little fluid. Its function is to diminish friction and ensure maximal range of motion at the knee. Chronic trauma from repeated kneeling is one cause of prepatellar bursitis, also called "housemaid's knee." It is common in roofers, plumbers and carpet layers.

Symptoms of prepatellar bursitis include knee pain, swelling, redness and inability to flex the knee on the affected side. The symptoms are usually relieved by rest. Physical examination reveals tenderness to palpation, erythema, crepitance, and fluctuant edema over the lower pole of the patella.

(Choices A, D and E) Prolonged kneeling is not associated with inflammation of the suprapatellar, popliteal or gastrocnemius bursae. Popliteal and gastrocnemius bursitis can be associated with the formation of Baker's cysts.

(Choice C) Anserine bursitis (pes anserinus bursitis) presents with pain along the medial aspect of the knee. It results from overuse in athletes or from chronic trauma in patients with heel pain. It is typically tenderness to palpation approximately 4 cm distal to the anteromedial joint margin of the knee.



Educational Objective:

Repeated and prolonged kneeling can cause prepatellar bursitis. Dubbed "housemaid's knee," today it is most commonly seen in roofers, carpenters and plumbers. Signs and symptoms of prepatellar bursitis include knee pain, erythema, swelling and inability to kneel on the affected side.

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A 40-year-old gardener presents to your office with knee pain. He reports that he spends hours on his knees several times per week while gardening. Which of the following bursae do you most expect to be affected in this patient?

- A. Suprapatellar bursa [25%]
- B. Prepatellar bursa [56%]
- C. Anserine bursa [6%]
- D. Semimembranous (popliteal) bursa [11%]
- E. Gastrocnemius bursa [2%]

Explanation:

User Id: 477875

The prepatellar bursa is located between the patella and the overlying skin and prepatellar tendon. It is lined by synovium and contains very little fluid. Its function is to diminish friction and ensure maximal range of motion at the knee. Chronic trauma from repeated kneeling is one cause of prepatellar bursitis, also called "housemaid's knee." It is common in roofers, plumbers and carpet layers.

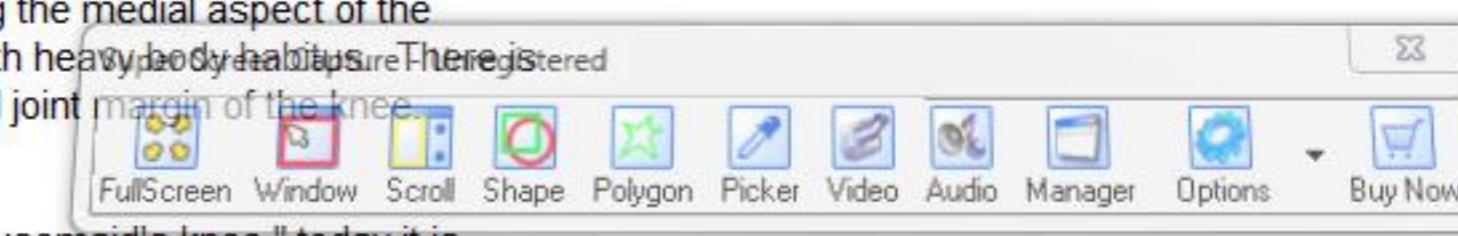
Symptoms of prepatellar bursitis include knee pain, swelling, redness and inability to flex the knee on the affected side. The symptoms are usually relieved by rest. Physical examination reveals tenderness to palpation, erythema, crepitance, and fluctuant edema over the lower pole of the patella.

(Choices A, D and E) Prolonged kneeling is not associated with inflammation of the suprapatellar, popliteal or gastrocnemius bursae. Popliteal and gastrocnemius bursitis can be associated with the formation of Baker's cysts.

(Choice C) Anserine bursitis (pes anserinus bursitis) presents with pain along the medial aspect of the knee. It results from overuse in athletes or from chronic trauma in patients with heavy body habits. There is typically tenderness to palpation approximately 4 cm distal to the anteromedial joint margin of the knee.

Educational Objective:

Repeated and prolonged kneeling can cause prepatellar bursitis. Dubbed "housemaid's knee," today it is most commonly seen in roofers, carpenters and plumbers. Signs and symptoms of prepatellar bursitis include knee pain, erythema, swelling and inability to kneel on the affected side.

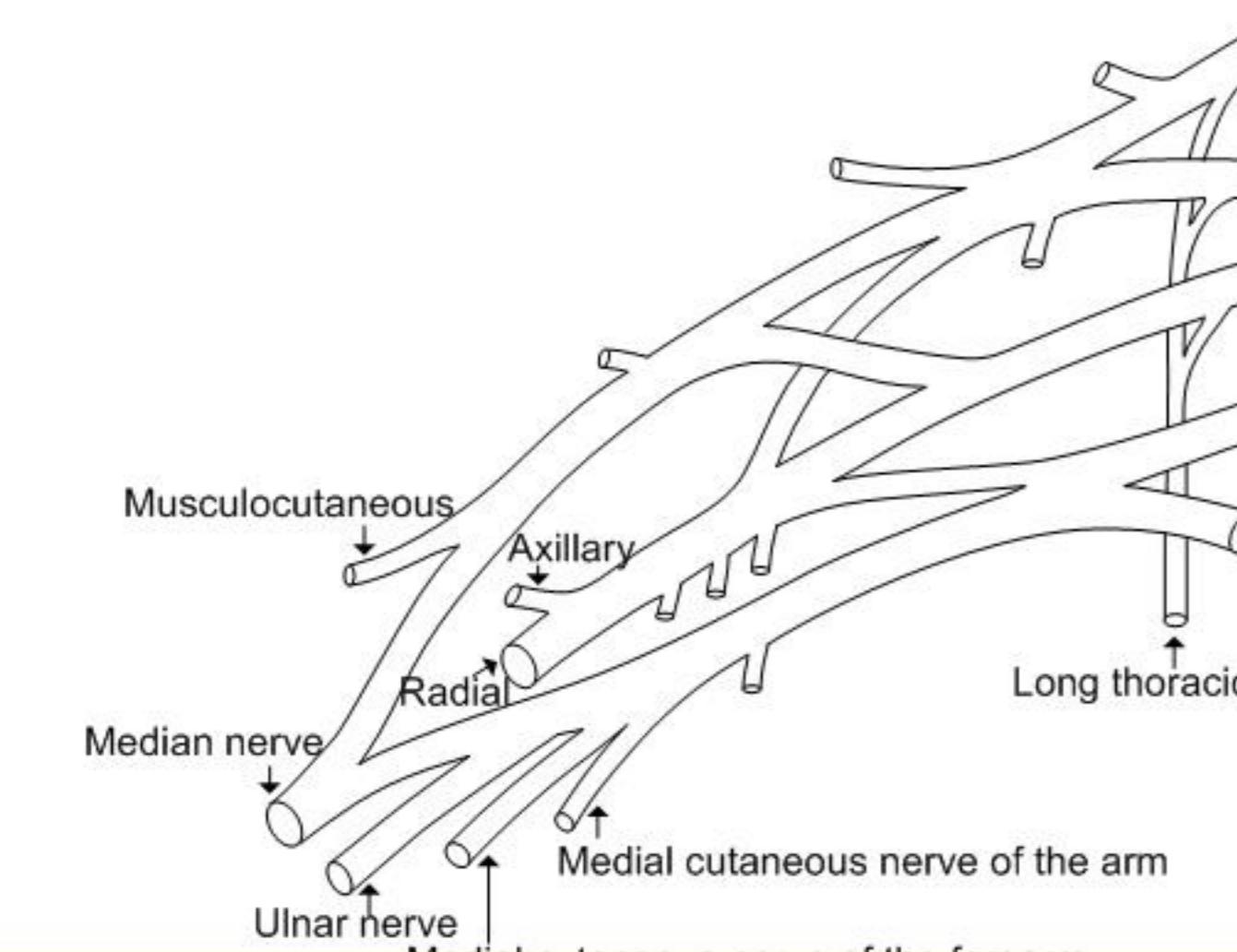


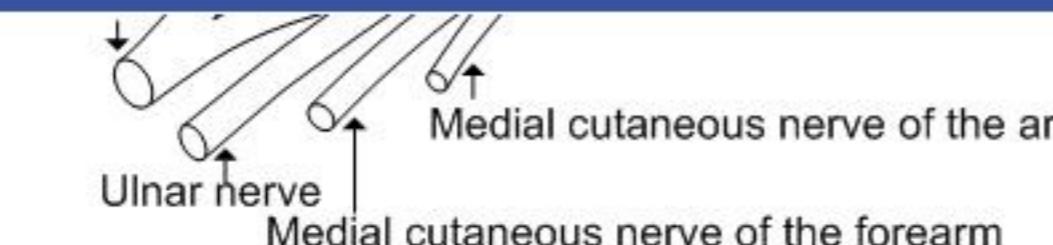
A 25-year-old male fractures his right tibia in a motor vehicle accident. His right leg is fixed in a cast, and he requires crutches to ambulate. Two weeks later, he presents with difficulty extending his wrist. Injury to which of the following nerves is most likely responsible?

- A. Suprascapular nerve [1%]
- B. Long thoracic nerve [2%]
- C. Axillary nerve [13%]
- D. Accessory nerve [1%]
- E. Radial nerve [82%]

Explanation:

User Id: 477875





This patient is suffering from a pressure-induced radial nerve injury, most likely caused by improperly fitted crutches. The radial nerve is derived from the C5-T1 spinal nerves, and is one of the two final branches of the posterior cord of the brachial plexus. The radial nerve initially courses medial to the surgical neck of the humerus inferior to the teres major muscle within the axilla before entering the posterior arm to course between the long head of the triceps brachii and the posterior humerus.

The radial nerve can be injured at its superficial location within the axilla by repetitive pressure and trauma caused by an ill-fitting crutch ("crutch palsy"). The radial nerve and deep brachial artery can also be injured by midshaft humerus fractures. Injury to the radial nerve at either location causes weakness or paralysis of the extensor muscles of the forearm and wrist as well as to the extrinsic extensors of the digits, a motor deficit described clinically as "wrist drop."

(Choice A) The suprascapular nerve innervates the supraspinatus and infraspinatus muscles. These muscles function to abduct and laterally rotate the arm, respectively.

(Choice B) Damage to the long thoracic nerve causes paralysis of the serratus anterior muscle and winging of the scapula. This nerve is often injured during lymph node dissection in patients undergoing radical mastectomy.

(Choice C) Fracture of the surgical neck of the humerus and anterior dislocation of the glenohumeral joint can cause injury to the axillary nerve. The resultant paralysis of the deltoid and teres minor muscles causes weakness of abduction, extension, flexion and lateral rotation of the arm at the shoulder.

(Choice D) The spinal accessory nerve (CN XI) exits the jugular foramen and courses over the levator scapulae muscle to innervate the sternocleidomastoid and trapezius muscles bilaterally.



Educational Objective:

Improperly fitted crutches can cause radial nerve injury, resulting in weakness of all forearm, wrist and finger extensors ("wristdrop").