

Introduction to Surface anatomy

Musculoskeletal block- Anatomy-lecture 20

Editing file



Objectives

By the end of the lecture, you should be able to:

- ✓ Palpate and feel the important bony prominences in upper and lower limbs.
- ✓ Palpate and feel the different muscles and muscular groups and tendons.
- ✓ Perform some movements to see the action of individual muscle or muscular groups in the upper and lower limbs.
- ✓ Feel the pulsations of most of the arteries of the upper and lower limbs.
- ✓ Locate the site of most of the superficial veins in the upper and lower limbs

Color guide :

Only in boys slides in **Blue**

Only in girls slides in **Purple**

important in **Red**

Doctor note in **Green**

Extra information in **Grey**

What is Surface Anatomy?

It is a branch of **gross anatomy** that examines **shapes** and **markings** on the surface of the body as they are related to deeper structures.

It is essential in **locating** and **identifying** anatomic structures prior to studying the internal gross anatomy..

It helps to locate the affected organ / structure / region in disease process

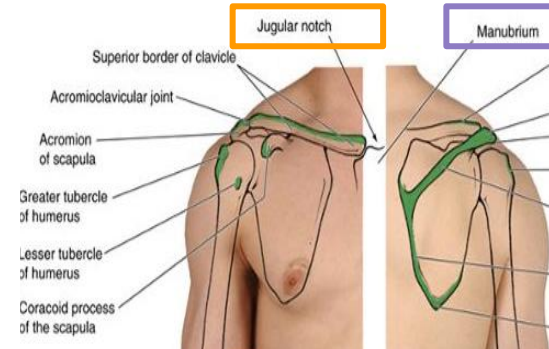
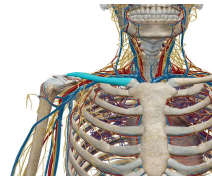
Surface anatomy of the upper limb: clavicle

It's **sternal end** projects little **above** the **manubrium**.

The **jugular notch** (**suprasternal notch**)
Between the 2 sternal ends of the 2 clavicles lies the jugular notch

The **acromial end** can be **palpated**: **medial** to the **lateral** border of the acromion, of the scapula, particularly when the shoulder is alternately **raised** and **depressed**.

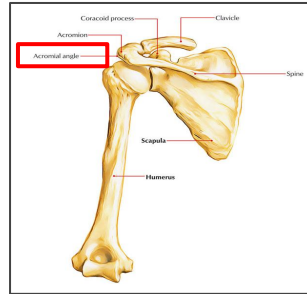
The large vessels and nerves to the upper limb pass **posterior** to the **convexity** of the clavicle.



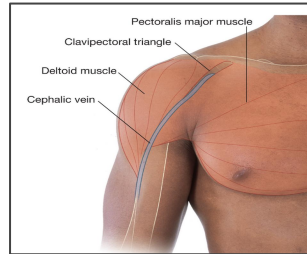
Surface anatomy of the upper limb: scapula

The **coracoid process** of scapula can be felt deeply **below** the lateral one third of the clavicle in the **Deltopectoral GROOVE** or (clavipectoral triangle)

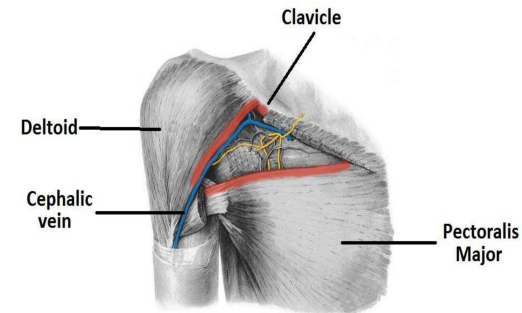
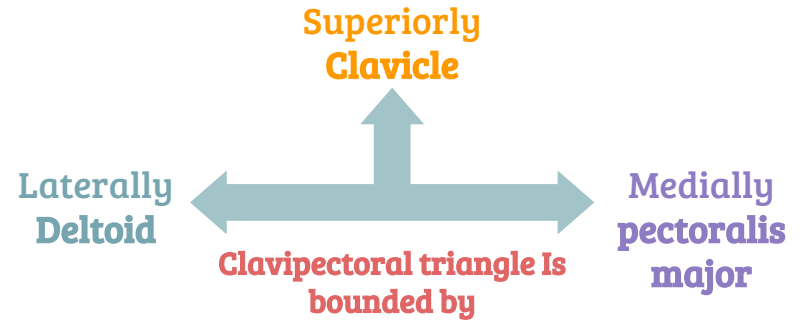
The **lateral** and **posterior** borders of the acromion meet to form the **acromial angle**



the **deltoid muscle** forms the rounded contour of the shoulder, Inferior to the acromion.

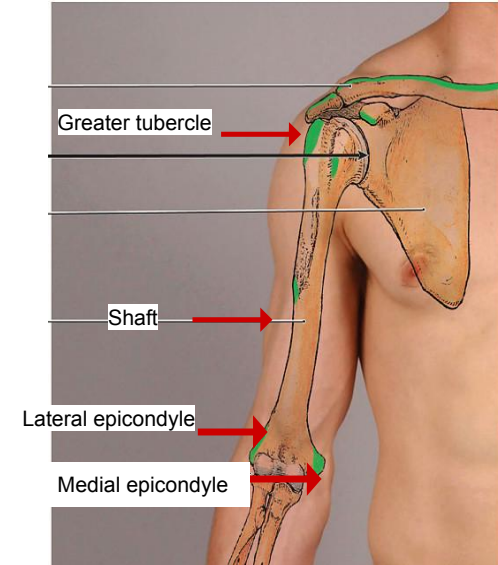


The **clavipectoral groove** or the (Deltopectoral triangle) is the slightly **depressed** area just **inferior** to the lateral third of clavicle.



Surface anatomy of the upper limb: arm

Humerus	
greater tubercle	Can be felt by deep palpation through the deltoid muscle , inferior to the acromion when the arm is by the side. In this position, the greater tubercle is the most lateral bony point of the shoulder.
shaft	May be felt in different areas deep to muscles surrounding it.
medial and lateral epicondyles	palpated on the medial & lateral sides of the elbow..



Surface anatomy of the upper limb: elbow & forearm

When the elbow joint

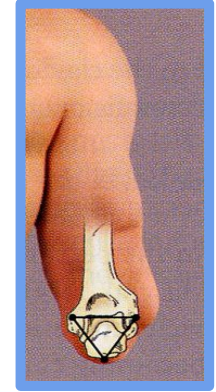
Extended

the tip of the olecranon process, the medial and the lateral epicondyles lie in a **straight line**.

Flexed

the olecranon forms the **apex** of an **equilateral triangle**, where the epicondyles form the **angles**.

Fractures of any of these structures will disturb this arrangement.



Ulna

Head

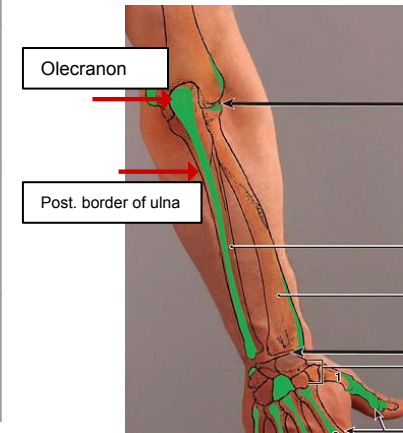
forms a **rounded subcutaneous** prominence that can be easily seen and palpated on the medial side of dorsal aspect of the wrist.

olecranon & posterior border

It's pointed **subcutaneous**, may be felt slightly distal to the head when the hand is supinated.

Styloid process

lie **subcutaneously** and can be palpated easily.



Radius

Head

can be palpated and felt to rotate in the **depression** on the posterolateral aspect of the **extended** elbow, just distal to the lateral epicondyle of the humerus with **supination and pronation**.

Styloid process

can be palpated on the lateral side of the wrist in the anatomical snuff box. It is approximately 1 cm distal to that of the ulna

Surface anatomy of the upper limb: hand

The **metacarpals**, although they overlapped by the long extensor tendons of the fingers, they can be palpated on the dorsum of the hand.

- The **heads** of the **metacarpals** form the **knuckles** of the hand.

The **dorsal aspects** of the **phalanges** can be easily palpated.

The **knuckles** of the fingers are formed by the **heads** of the **proximal and middle phalanges**.



- Notice that the **3rd metacarpal head** is the most projected.

Surface anatomy of the upper limb: axilla

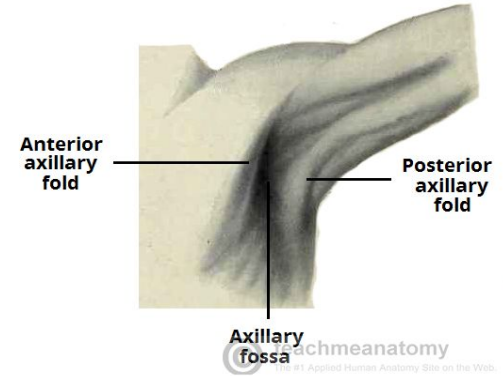
Axillary folds

Anterior

is formed by the lower margin of the **pectoralis major**, and can be palpated by the finger. This can be made by asking the patient to press the hand **against** the **ipsilateral hip**.

Posterior

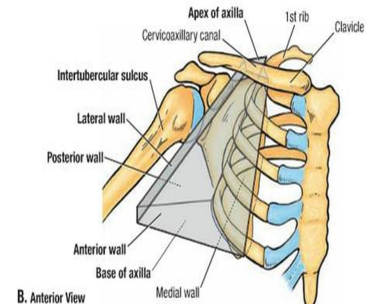
is formed by the tendon of **latissimus dorsi** and **teres major**



Axilla

When the arm by the side, the **inferior** part of the **head of the humerus** can be easily palpated through the floor of the axilla.

- Pulsations of the **axillary artery** can be felt high up in the axilla, and around the artery the cords of the brachial plexus.
- The **medial wall** of the axilla is formed by the **upper ribs** covered by **serratus anterior**.
- The **lateral wall** is formed by **biceps brachii**, **coracobrachialis** and the **bicipital groove**.



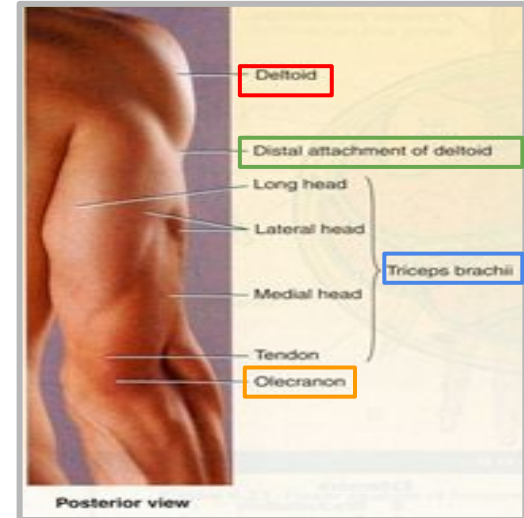
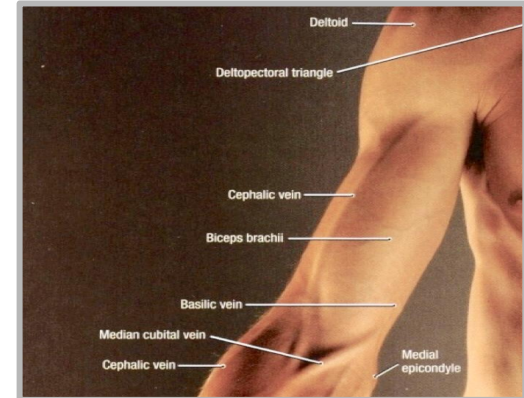
Surface anatomy of the upper limb

- The borders of the **delto**id are visible when the arm is **abducted** against resistance.
- The **distal attachment of the delto**id can be palpated on the lateral surface of the humerus.

- Biceps brachii & **triceps brachii** form bulge on the anterior and posterior surfaces of the arm.
- The **biceps tendon** can be palpated in the cubital fossa, just lateral to the midline.

The **triceps tendon** can be palpated where it is attached to the olecranon process

- **There are 2 grooves:** **Medial and lateral grooves** separate the bulges formed by the biceps and triceps.
- The **cephalic vein** ascends superiorly in the lateral groove.
- The **basilic vein** ascends in the medial groove.



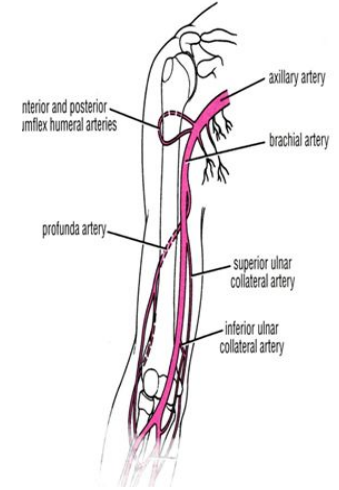
brachial artery

The **brachial artery** can be felt pulsating deep to the medial border of the biceps.

To stop bleeding by pressure on the artery in the:

- **upper half of the arm** it is pushed laterally against the humerus.
- **In the lower half** it is pushed posteriorly.

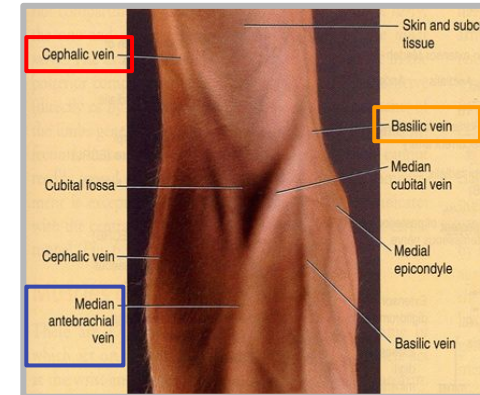
In the cubital fossa, it lies beneath the bicipital aponeurosis.



Cubital Fossa

In the cubital fossa, try to locate:

- **Cephalic vein**, **Basilic vein** & **Median cubital vein** are clearly visible.
- The median cubital vein connects the cephalic and the basilic veins.
- **It crosses over the bicipital aponeurosis.**
- It is the vein of choice for IV line, **WHY?** Because this vein is located in the roof of cubital fossa



Dorsum Of The Hand:

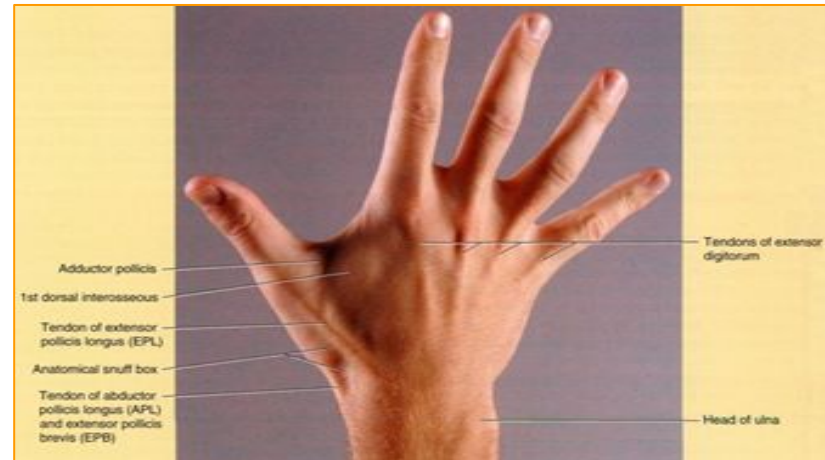
The dorsal venous network

The network of superficial veins can be seen on the dorsum of the hand.

The network drains upward into the cephalic vein laterally, and the basilic vein medially.



The tendons of **extensor digitorum**, **extensor indicis**, and **extensor digiti minimi** can be seen and felt as you extends your fingers.



Anatomical Snuff Box:

- It is a depression on the lateral aspect of the wrist joint which is accentuated when you extends your thumb.

Boundaries:

Laterally by 2 tendons:

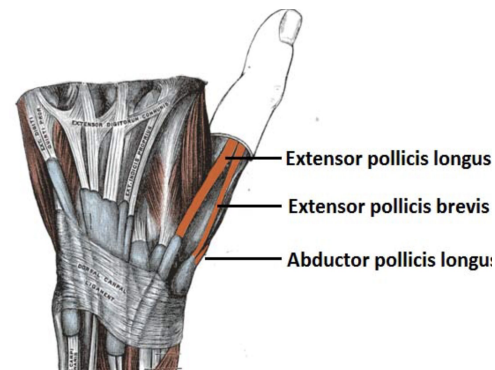
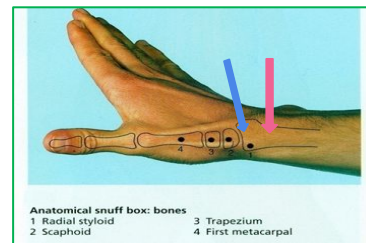
- Abductor pollicis longus.
- Extensor pollicis brevis.

Medially :

- Extensor pollicis longus.

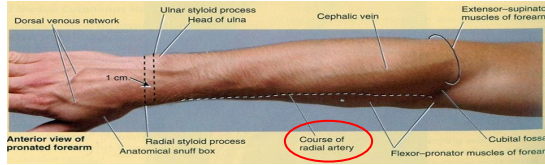
The Floor:

In its proximal part the **radial styloid process** is palpable. The **scaphoid bone** is also palpable in the distal part of the anatomical snuff box.



Radial Artery

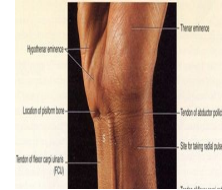
The **Radial artery** can be drawn by a line extends from the midpoint of the cubital fossa to the base of the styloid process of radius.



Radial Artery pulsation:

Universally, its pulsations can easily be felt anterior to the distal third of radius.

Here it lies just beneath the skin and fascia lateral to the tendon of **flexor carpi radialis.**



radial artery pulsation can be felt against the floor of the snuff box.

- More superficially, the anatomical snuff box is crossed by
- The **cephalic vein.**
- The **radial nerve.**

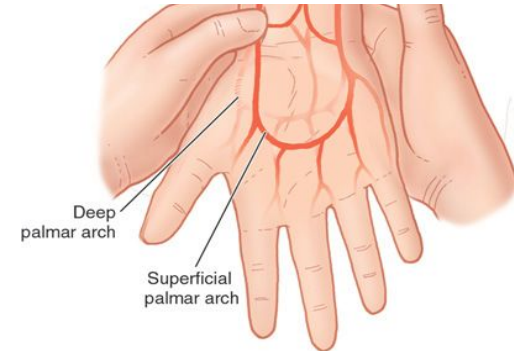


Superficial Palmar Arterial Arch.

The superficial palmar arterial arch is located in the central part of the palm and lies on a line drawn across the palm at the level of the **distal border** of the **fully extended thumb**. It is the continuation of ulnar artery.

Deep Palmar Arterial Arch.

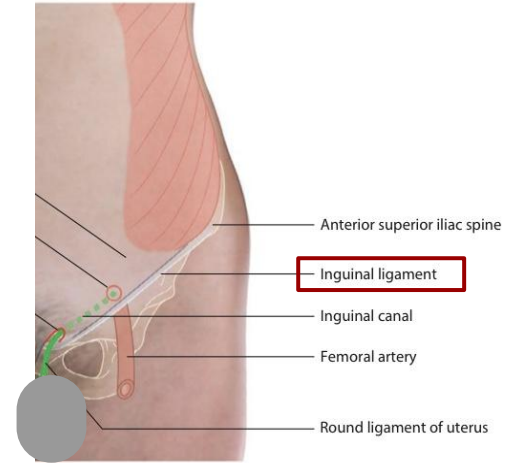
The deep palmar arterial arch is also located in the central part of the palm (**proximal** to the superficial one), lies on a line drawn across the palm at the level of the **proximal border** of the **fully extended thumb**. It is the continuation of radial artery.



inguinal region

All of the following structures are palpable in the inguinal region:

1. **Symphysis pubis.** secondary cartilaginous joint
2. **Body of pubis.**
3. **Pubic tubercle.**
4. **ASIS.**



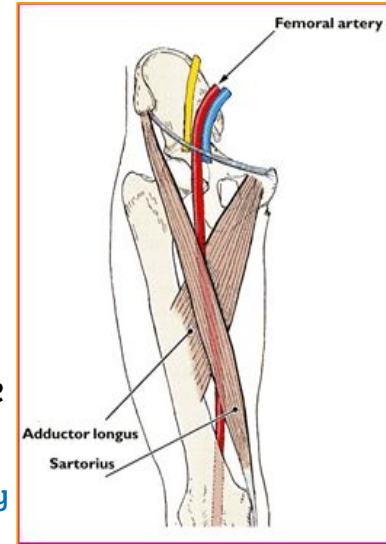
The inguinal ligament extends between:

The **pubic tubercle** and The **ASIS**. {Anterior Superior Iliac Spine}

- In the **mid-inguinal point** you can feel the pulsations of the **femoral artery**.
- The **femoral vein** lies on the **medial** side of the **artery**.
- The **femoral nerve** lies **lateral** to the **artery**

Mid-inguinal point: It is a point on the inguinal ligament midway between the symphysis pubis and the ASIS. **The femoral artery** is an important site for vascular access as a large number of arteriographic procedures are undertaken through its percutaneous puncture (e.g. coronary angiography)

The external iliac artery becomes femoral artery



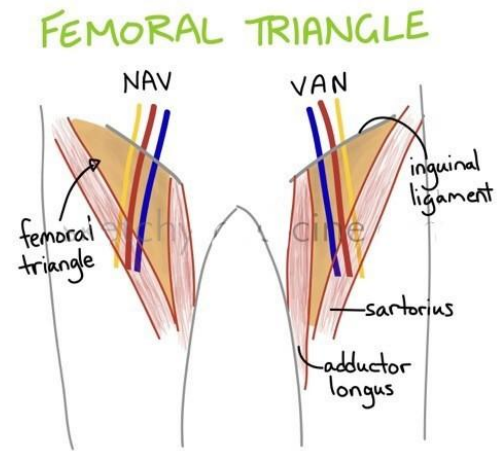
Femoral triangle

Femoral Triangle:

The **femoral triangle** can be seen as a depression below the fold of the groin in the upper part of the thigh.

In a thin, muscular subject, the boundaries of the triangle can be identified when the thigh is flexed, abducted, and laterally rotated.

The **base** of the triangle is formed by the **inguinal ligament**, the **lateral border** by the **sartorius** and the **medial border** by the **adductor longus**.



Contents of femoral triangle:

Femoral vein

Femoral artery

Both vein & artery are enclosed in a fascial envelope (Femoral sheath)

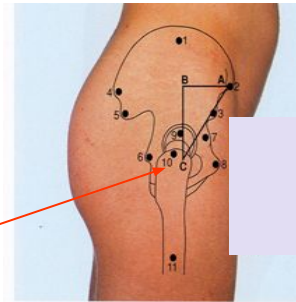
Femoral nerve (outside femoral sheath)

Deep inguinal lymph nodes

The **iliac crest is subcutaneous** and can be palpated throughout its length, from the **ASIS** to the **PSIS**.

{Posterior Superior Iliac Spine}

The **greater trochanter** of the femur is also subcutaneous and can be palpated on the lateral aspect of the hip joint behind and distal to the **ASIS**.



8.17

Lateral aspect of the hip joint: bones

- | | |
|----------------------------------|-----------------------|
| 1 Ilium | 6 Ischial spine |
| 2 Anterior superior iliac spine | 7 Iliopubic eminence |
| 3 Anterior inferior iliac spine | 8 Body of pubis |
| 4 Posterior superior iliac spine | 9 Head of femur |
| 5 Posterior inferior iliac spine | 10 Greater trochanter |
| | 11 Shaft of femur |
- ABC, Bryant's triangle

Lower limb: knee region

In front of the knee joint the **patella** and the **ligamentum patellae** can be easily palpated.

In the back of the knee and leg try to palpate:

On the medial aspect of the knee joint try to palpate:

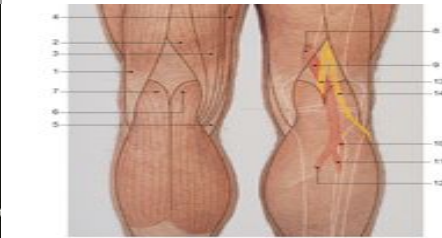
On the lateral aspect of the knee joint try to palpate:

- The **ligamentum patellae** can be traced downward as it is attached to the tibial tuberosity.
- The condyles of the femur and tibia can be recognized on the sides of the knee and the joint line can be identified between them.

- 1- The boundaries of the popliteal fossa.
- 2- The pulsation of the popliteal artery which is deeply situated in the fossa.

1. Medial femoral condyle
2. Medial tibial condyle
3. The 3 tendons of:
 - a.Sartorius
 - b.Gracilis
 - c.Semitendinosus

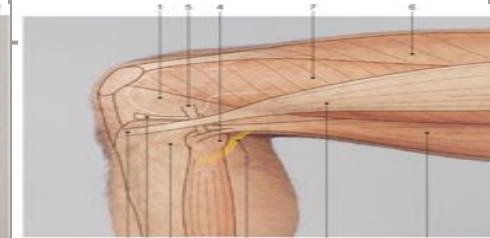
1. Lateral femoral condyle
2. Lateral tibial condyle
3. Head of the fibula
4. Neck of the fibula
5. Tendon of biceps femoris



1. Biceps femoris, 2. Semimembranosus, 3. Semitendinosus, 4. Gracilis, 5. Sartorius, 6. Gastrocnemius, medial head, 7. Gastrocnemius, lateral head, 8. Adductor pollicis, 9. Popliteal artery, 10. Anterior tibial artery, 11. Peroneal artery, 12. Posterior tibial artery, 13. Tibial nerve, 14. Common peroneal nerve.



1. Medial femoral condyle, 2. Medial tibial condyle, 3. Medial meniscus, 4. Sartorius, 5. Gracilis, 6. Adductor magnus, 7. Semimembranosus, 8. Semitendinosus,



1. Lateral femoral condyle, 2. Lateral meniscus, 3. Lateral tibial condyle, 4. Head of fibula, 5. Neck of fibula, 6. Tendon of biceps femoris, 7. Vastus lateralis, 8. Iliotibial band, 9. Biceps femoris, 10. Common peroneal nerve, 11. Gerdy's tubercle.

Lower limb: leg and foot

On the anterior aspect of the leg and knee Joint and try to palpate:

1. The patella.
2. The tibial tuberosity.
3. The anterior border of the tibia (shin).
4. The medial tibial condyle.
5. The medial surface of the tibia.
6. The medial malleolus.
7. The lateral malleolus.

On the dorsum of the foot try to palpate:

1. The tuberosity of the 5th metatarsal
2. The tubercle of navicular.
3. The metatarsals.



1. Tibia.
2. Fibula.
3. Medial malleolus.
4. Lateral malleolus.
5. Talus.
6. First metatarsal.
7. Fifth metatarsal.

On the dorsum of the foot try to palpate:

The long extensor tendons:

1. Tibialis anterior
2. Extensor hallucis longus.
3. Extensor digitorum longus.
4. Peroneus tertius.

tom has a very nice dog pig

Also, try to feel the pulsation of **the dorsalis pedis artery.**

Between the tendons of extensor hallucis longus & extensor digitorum longus.

dorsalis pedis arterial pulse is weak in patients with diabetes

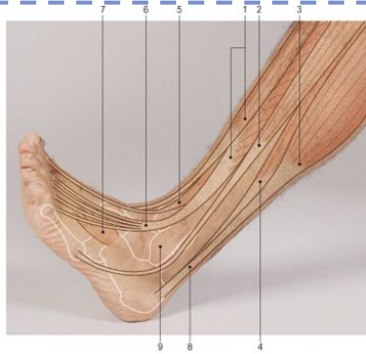


1. Tibialis anterior
2. Extensor hallucis longus.
3. Extensor digitorum longus.
4. Peroneus tertius.
5. Superior extensor retinaculum.
6. Dorsalis pedis artery
7. First dorsal metatarsal artery

Lower limb: leg and foot

On the **lateral aspect** of the leg try to palpate:

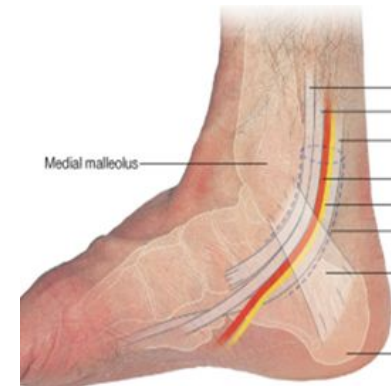
1. The tendons of **peroneus longus and brevis**.
2. The Achilles tendon.
3. The lateral malleolus.



1. Tibialis anterior. 2. Peroneus longus. 3. Gastrocnemius. 4. Soleus.
5. Tendon of extensor hallucis longus. 6. Tendons of extensor digitorum longus.
7. Extensor digitorum brevis. 8. Calcaneus tendon (Achilles tendon). 9. Lateral malleolus.

On the **medial aspect** of the ankle try to palpate and feel:

- 1-The medial malleolus.
- 2-The tendons of tibialis posterior
First tendon behind medial malleolus
- 3-The tendon of flexor digitorum longus.
First tendon in front of medial malleolus
- 4-The posterior tibial artery
- 5-The calcaneus.



Congrats you have reached the last lecture of anatomy on MSK

without dying

Thank you team 437 and 436 & the best leaders in the world.
A huge thank you to our wonderful , amazing **TEAM** .



MCQs

Question 1: The clavipectoral triangle is medially bound by:

- A. Clavicle
- B. Deltoid
- C. Pectoralis Major
- D. Pectoralis Minor

Question 2: An x-ray was taken of patient's arm posteriorly while it was flexed. The normal equilateral triangle was disturbed. Which of the following structures is most likely affected?

- A. Olecranon process
- B. Head of femur
- C. Head of fibula
- D. Radial styloid process

Question 3: Which of the following structures make up the knuckle of the hand?

- A. Head of proximal phalanges
- B. Head of distal phalanges
- C. Head of metacarpals
- D. Base of metacarpals

Question 4: Which of the following descends in the lateral bicipital groove?

- A. Cephalic vein
- B. Saphenous vein
- C. Basilic vein
- D. Median cubital vein

Question 5: Which one of the following muscles makes the anterior axillary fold?

- A. Teres major
- B. Pectoralis major
- C. Teres minor
- D. Pectoralis minor

Question 6: A patient arrived in the ER suffering from dehydration. The doctor requested that he have a saline drip. Which of the following veins should we use to start the IV line?

- A. Cephalic vein
- B. Saphenous vein
- C. Basilic vein
- D. Median cubital vein

Question 7: The pulsation of which of the following arteries can be felt in the snuff box?

- A. Brachial artery
- B. Ulnar artery
- C. Radial artery
- D. Femoral artery

Question 8: A patient suffering from a myocardial infarction underwent a coronary angiography. Which of the following arteries was used to gain vascular access?

- A. Axillary artery
- B. Femoral artery
- C. Radial artery
- D. Brachial artery

Team members

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Team leaders

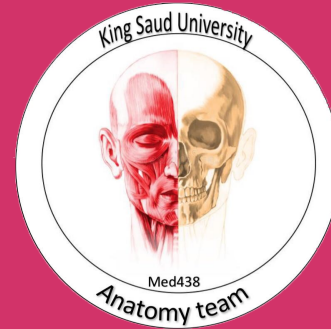
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Special thank for
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Good luck

Give us your feedback:

