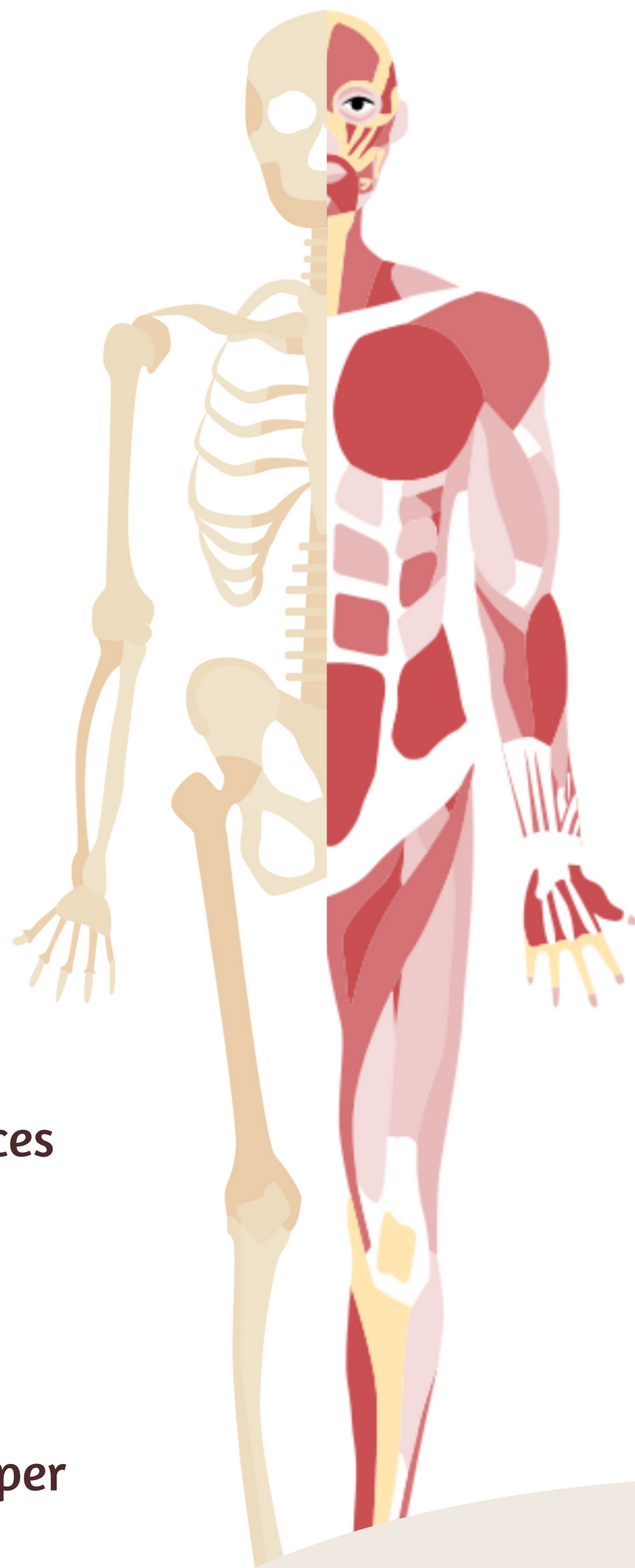


Lecture 20

INTRODUCTION TO SURFACE ANATOMY OF THE UPPER AND LOWER LIMBS

OBJECTIVES

- Define the surface anatomy and its clinical relevance.
- 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 Index:

- Main text
- Boys' Slides
- Girls' Slides
- Important
- Dr's Notes
- Extra



[Editing File](#)

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

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

we can learn by observing external features of the body also by feeling superficial aspect of the deeper structures (develop tactile skills).

Clinical application Surface Anatomy :

Physical examination is the clinical application of SA



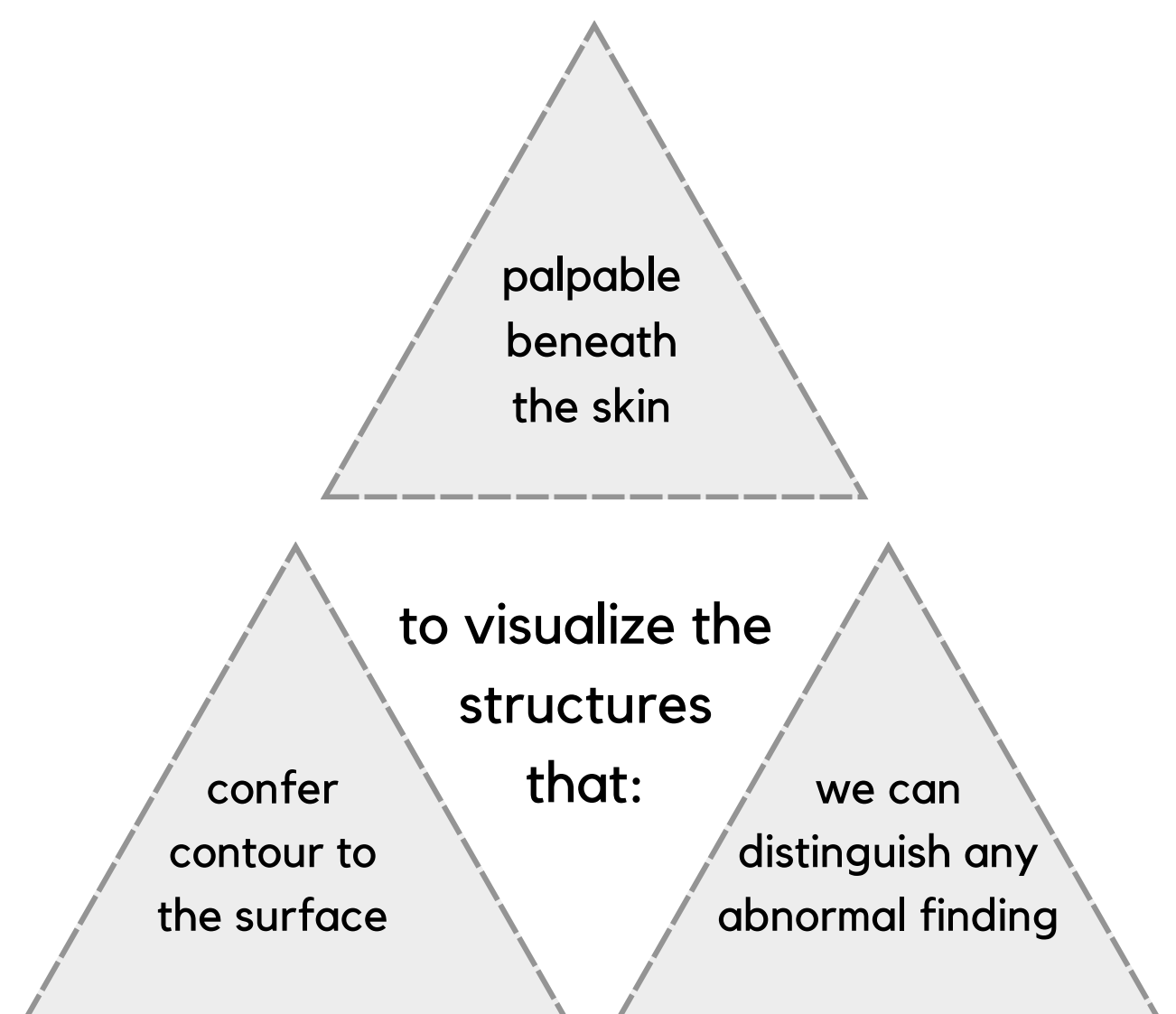
Palpation is clinical technique used with observation (inspection) and listening (auscultation) for examine the body

Palpation (taking) of arterial pules

Auscultation of heart sound and lungs

Its impossible to do any good surgical without good knowledge of anat of the revelant part of the body.

Aim of Surface Anatomy



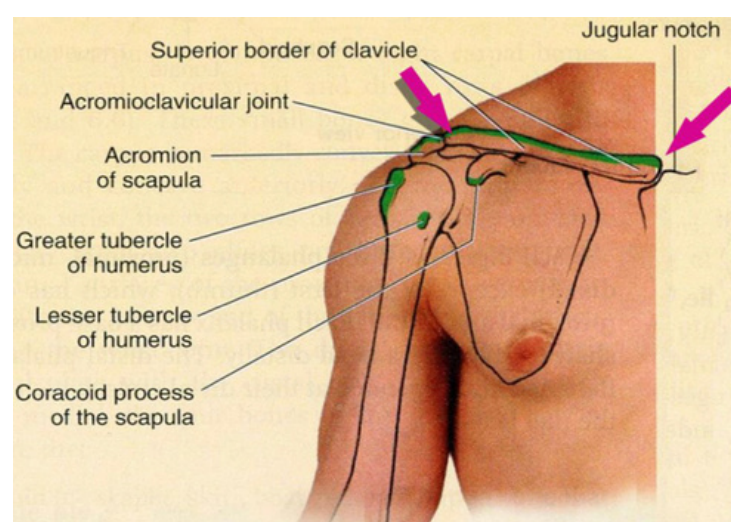
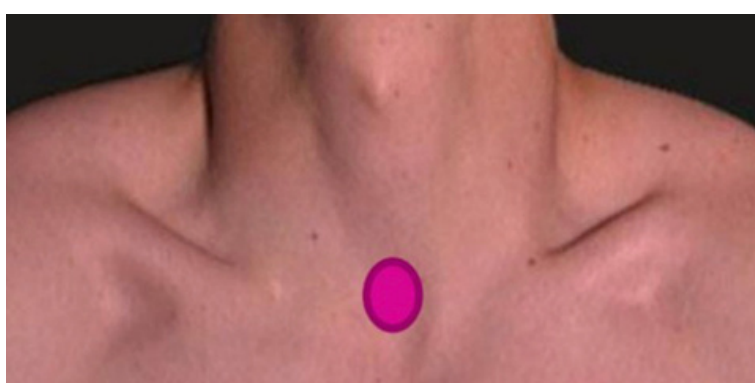
How, when and why

Surface landmarks that are used today were established by cadaveric dissection decades ago, many of them during the nineteenth century.

Surface anatomy was born out of the clinical need to visualize the internal landscape of the body from the outside by looking, listening, and palpating.

1 clavicle

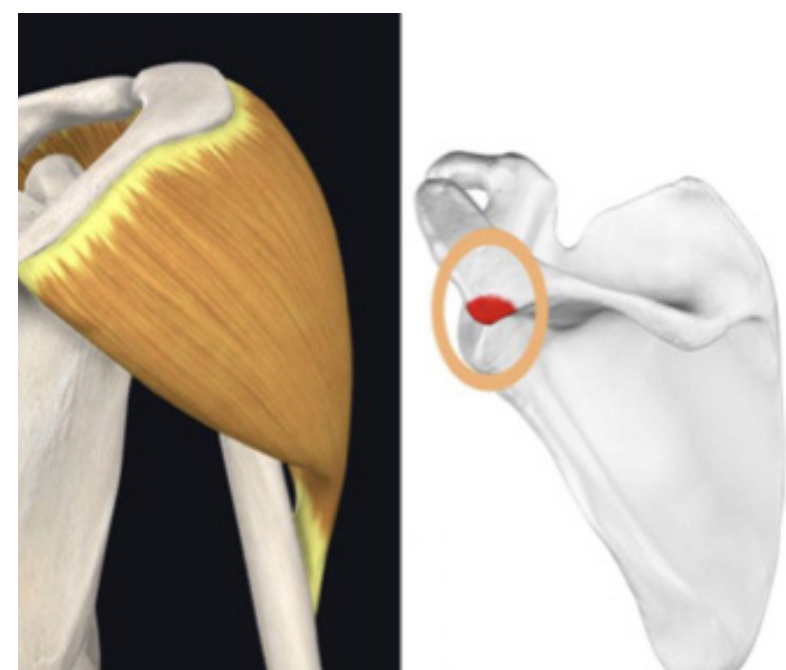
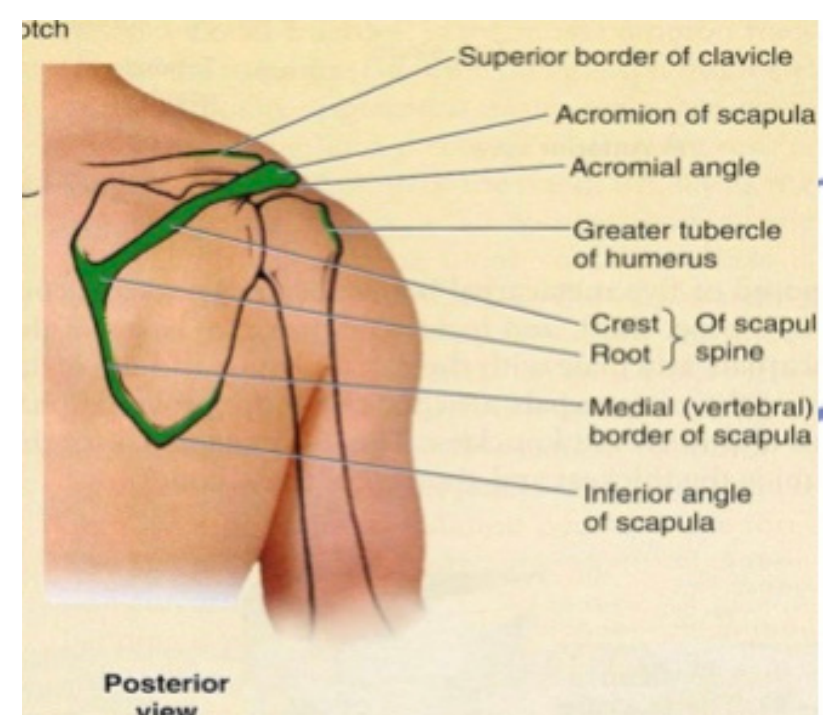
- Is subcutaneous and can be palpated throughout its length.
- Its sternal end projects little above the manubrium.
- Between the 2 sternal ends of the 2 clavicle lies the **jugular notch** (suprasternal notch).
- The acromial end of the clavicle: palpated medial to the lateral border of the acromion 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 middle (convexity) of the clavicle.



2 Scapula

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

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

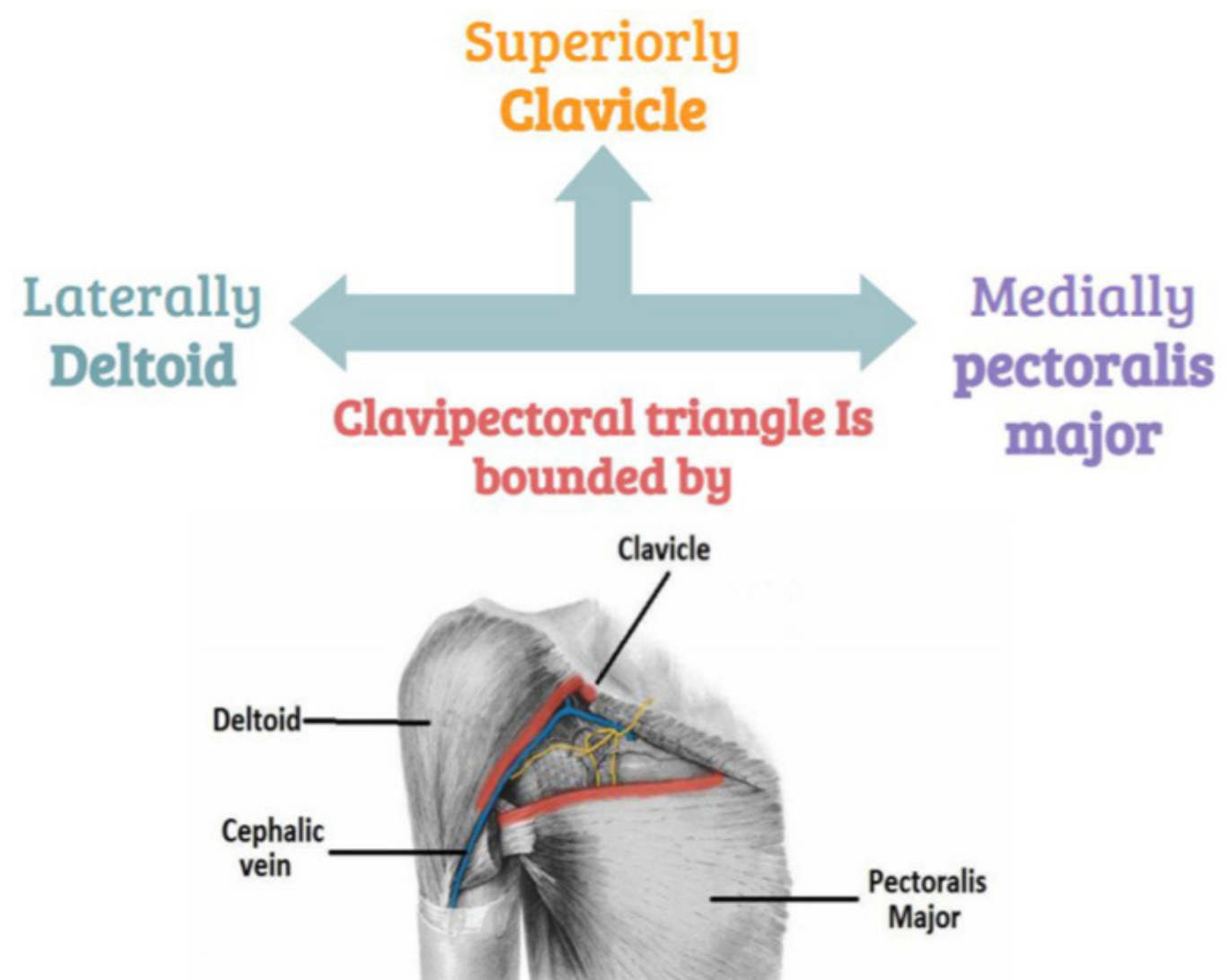


3 Deltopectoral groove

The coracoid process of scapula can be felt deeply below the lateral one third of the clavicle in the Deltopectoral GROOVE or claviopectoral triangle.

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

- The claviopectoral triangle is bounded by:
 - Clavicle **superiorly**
 - Deltoid **laterally**, and
 - Pectoralis major **medially**



4 Humerus

greater tubercle

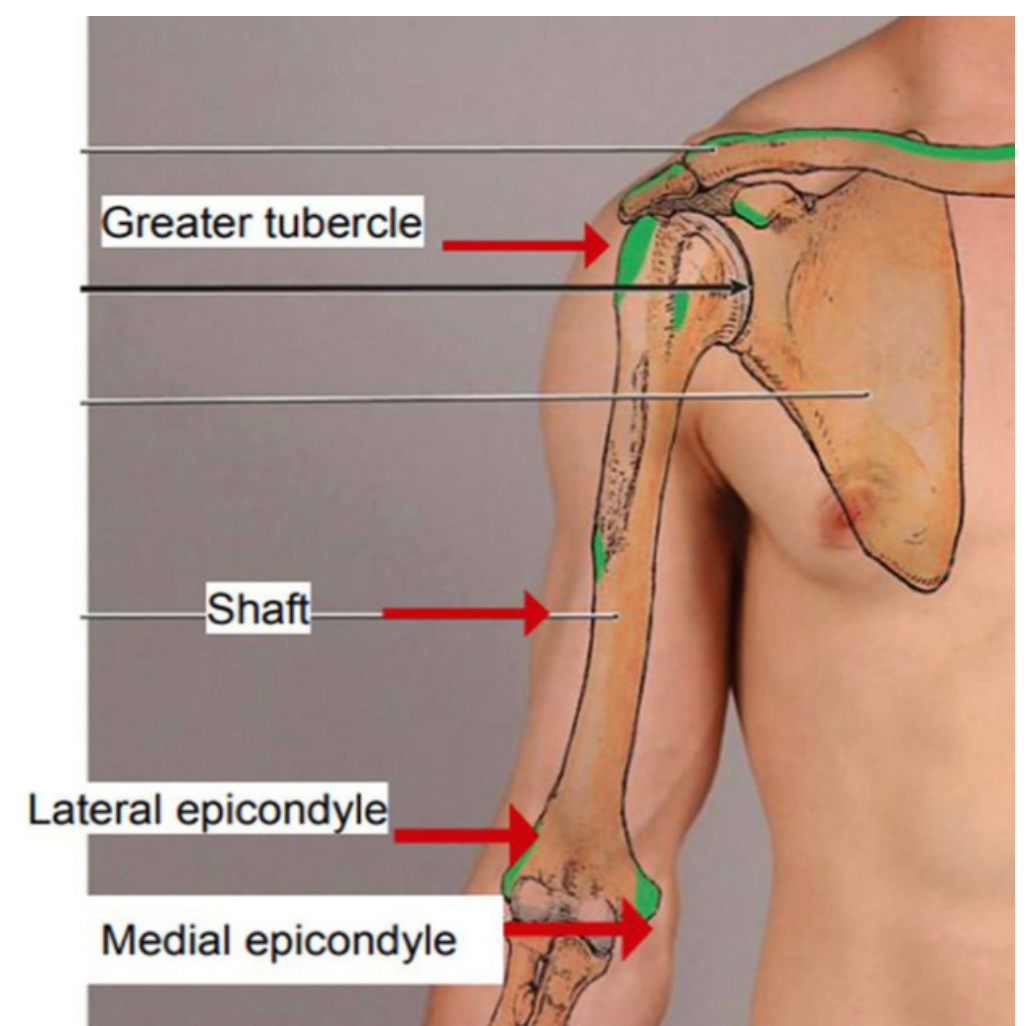
- can be felt by deep palpation through the deltoid muscle.
- inferior to the acromion when the arm is by the side.
- In this position, the greater tubercle is the most lateral bony point of the shoulder.

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.

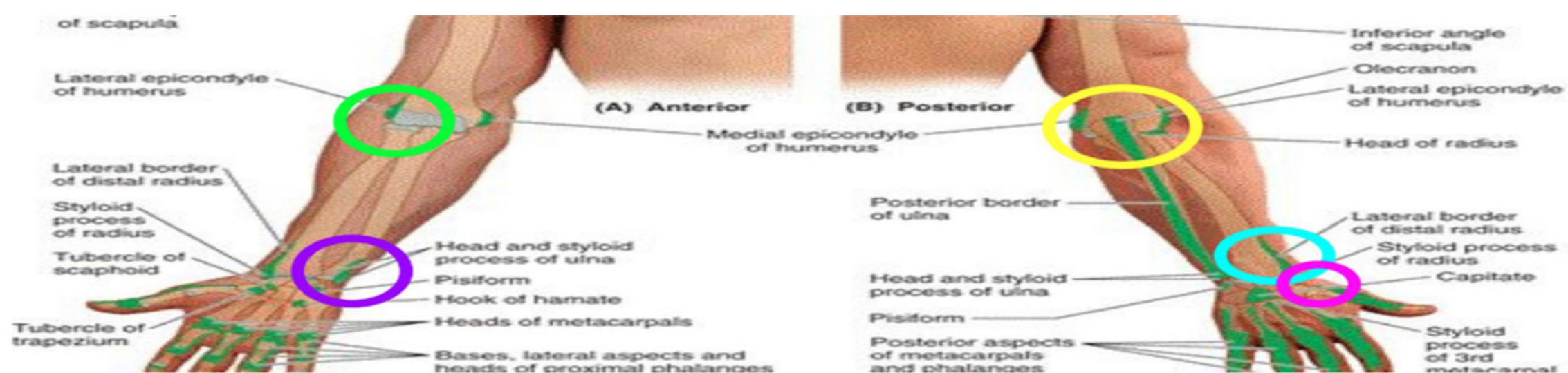


5

Ulna & radius

Ulna

1. The **head of the ulna** forms a rounded subcutaneous prominence that can be easily seen and palpated on the medial side of dorsal aspect of the wrist.
2. The pointed subcutaneous ulnar **styloid process** may be felt slightly distal to the head when the hand is supinated.
3. The **olecranon** and **posterior border of the ulna** lie subcutaneously and can be palpated easily



Radius

1. The **head of radius** 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.
2. The **radial styloid process** can be palpated on the lateral side of the wrist in the anatomical snuff box.

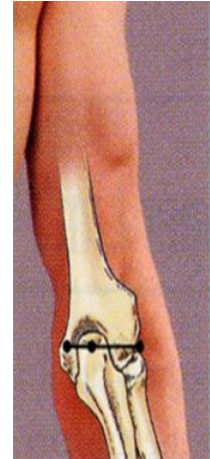
It is approximately 1 cm distal to that of the ulna.

6

Elbow

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.

7

hand

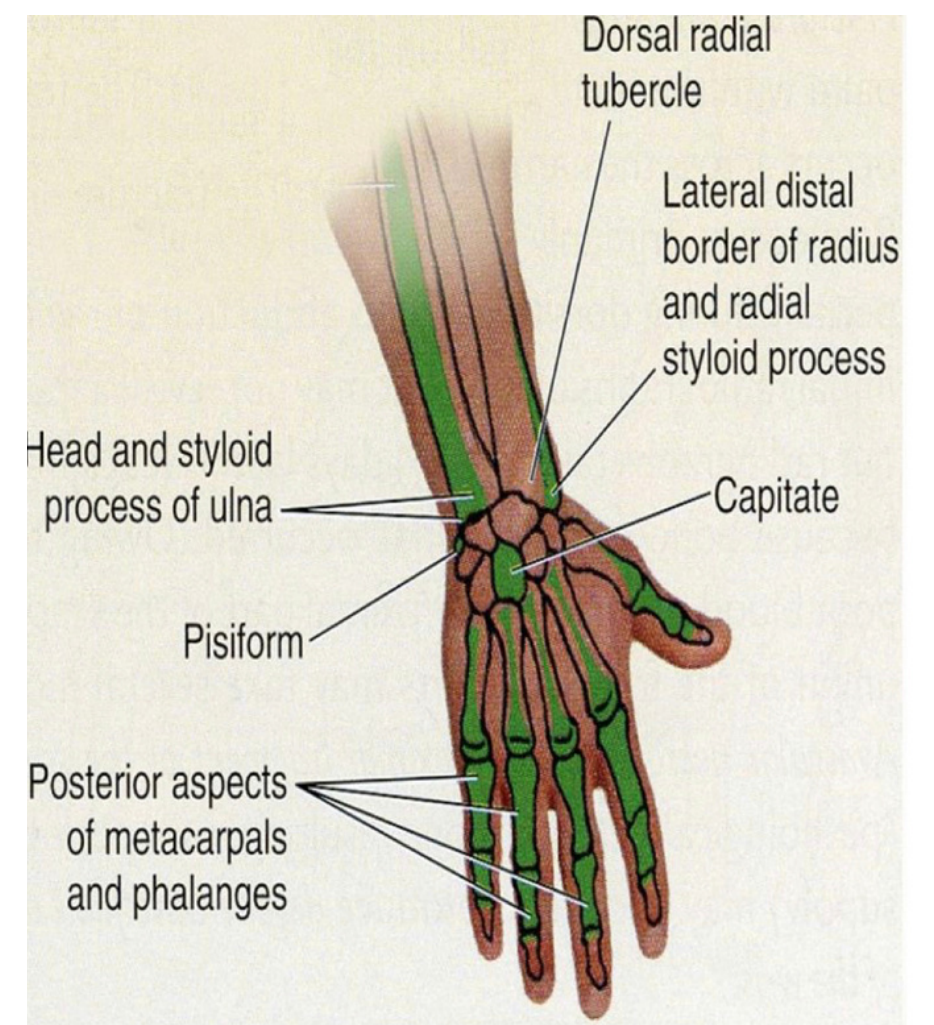
- The metacarpals, although they overlapped by the long extensor tendons of the fingers, they can be palpated on the dorsum of the hand.

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

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

- 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.

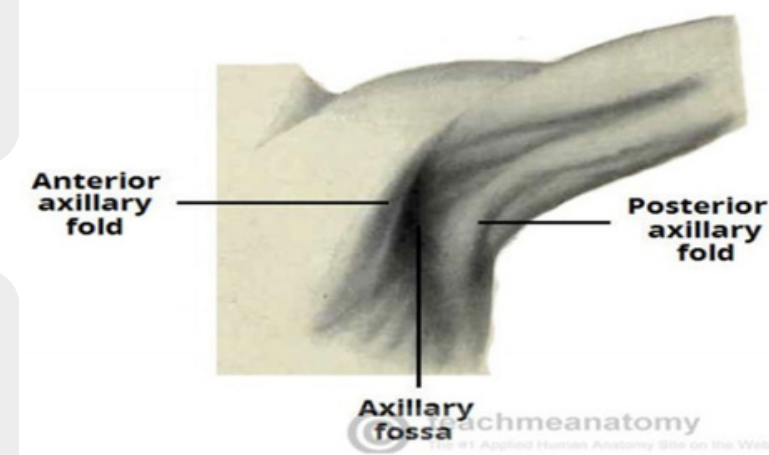


8

Axillary folds

Anterior

The anterior axillary fold 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.



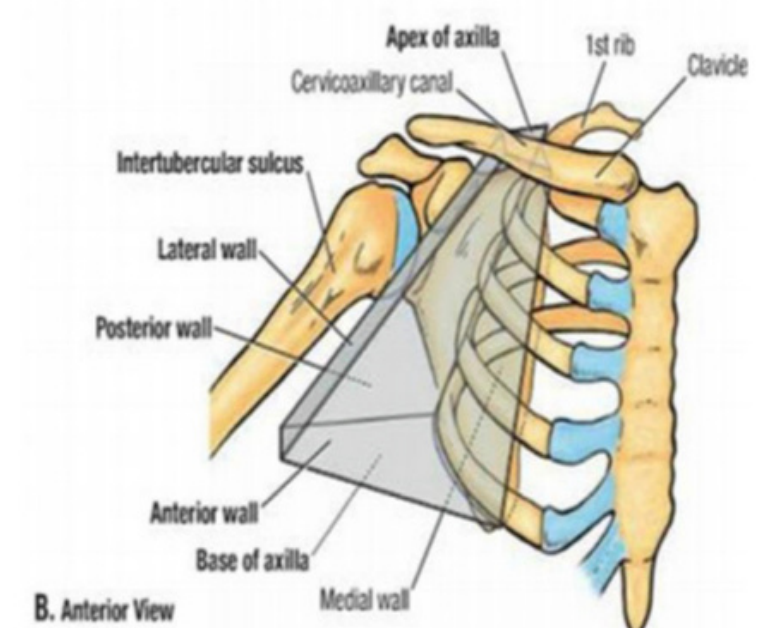
Posterior

The posterior axillary fold is formed by the tendon of latissimus dorsi & teres major.

9

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.



10 MUSCLES

1. Deltoid: (shoulder):

The borders are visible when the arm is abducted against resistance.

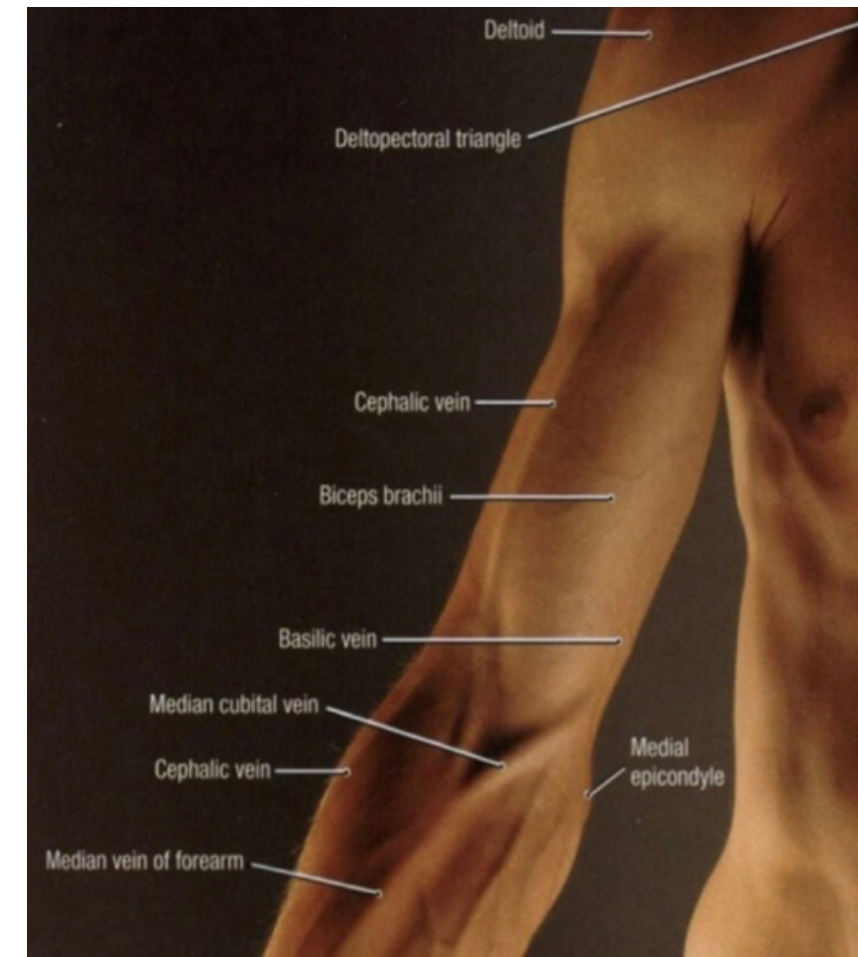
- The distal attachment of the deltoid can be palpated on the lateral surface of the humerus.

2. Muscles of the arm:

Biceps brachii & triceps brachii form bulge on the anterior and posterior surfaces of the arm:

1. The **triceps tendon** can be palpated where it is attached to the olecranon process. "Posteriorly"

2. The **biceps tendon** can be palpated in the cubital fossa, just lateral to the midline. "Anteriorly"



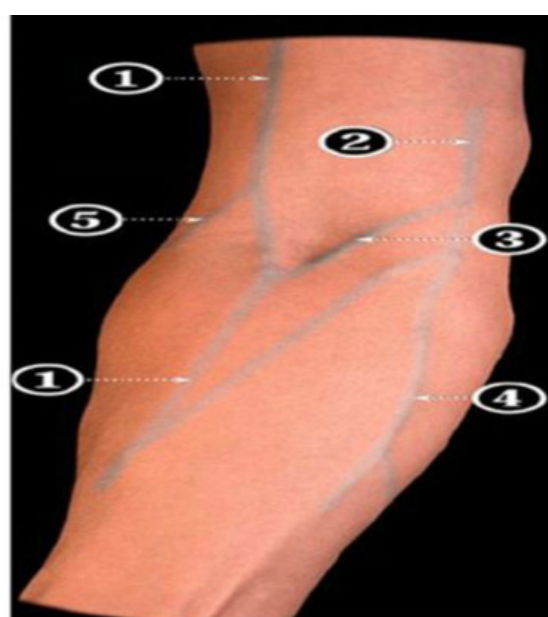
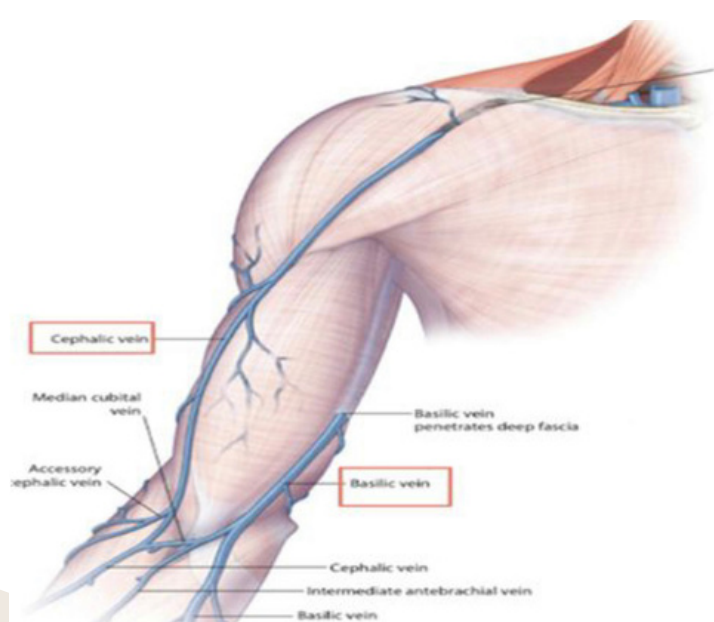
11 VEINS

There are 2 grooves that separate the bulges formed by the biceps and triceps:

(Medial and lateral grooves)

1- The cephalic vein ascends superiorly in the lateral groove.

2- The basilic vein ascends in the medial groove.



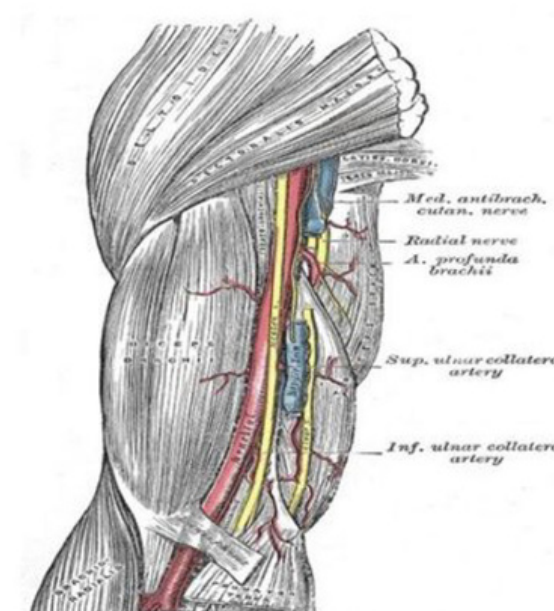
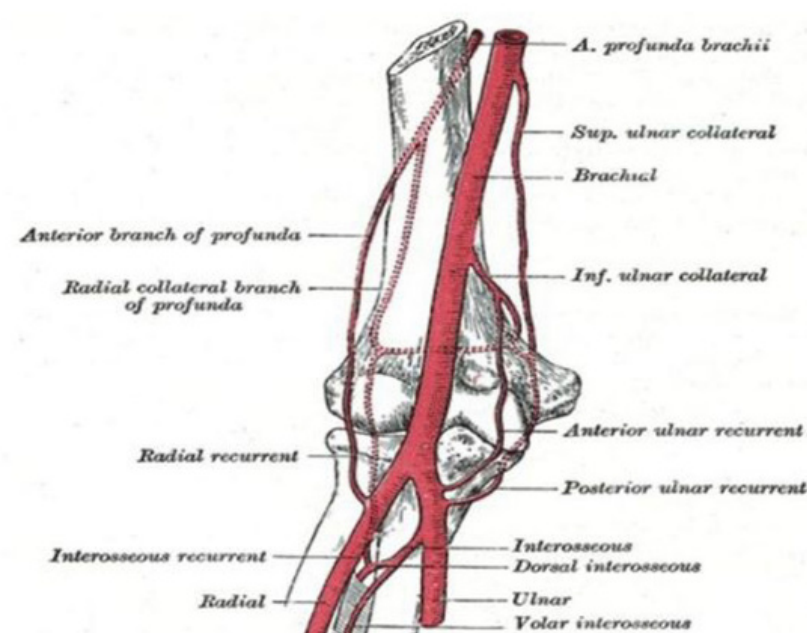
12 BRACHIAL ARTERY

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.



13 CUBITAL FOSSA

Consists of :

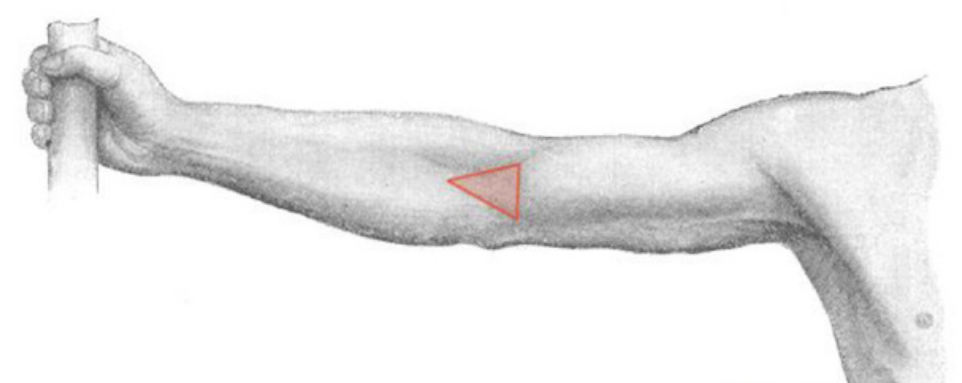
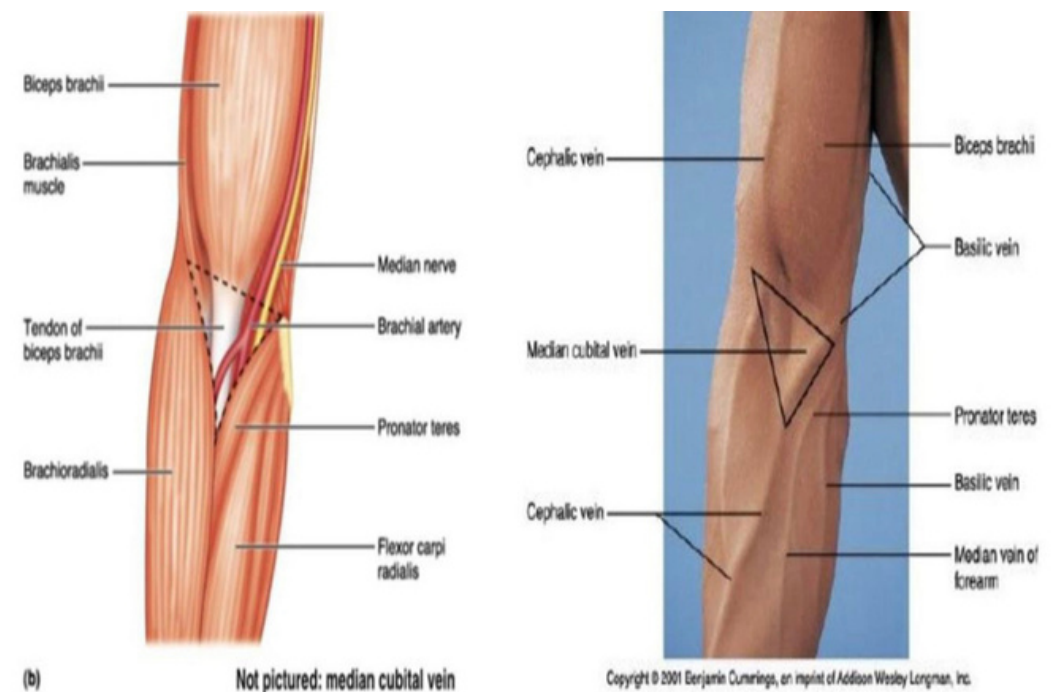
1. Cephalic vein
2. Basilic vein
3. Median cubital vein are clearly visible.

*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 it has a wide lumen and is clearly visible in the cubital fossa. It is also more stationary and not surrounded by nerves.



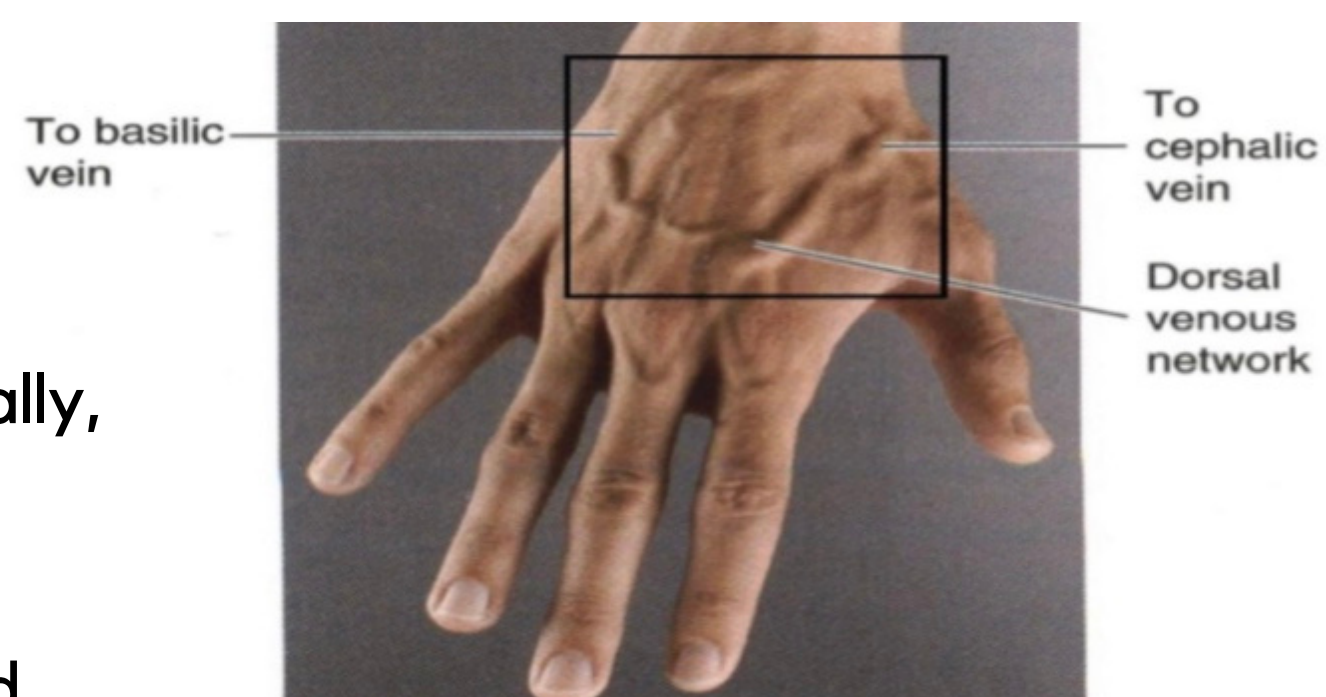
14 Dorsum of the Hand

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.



15 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.

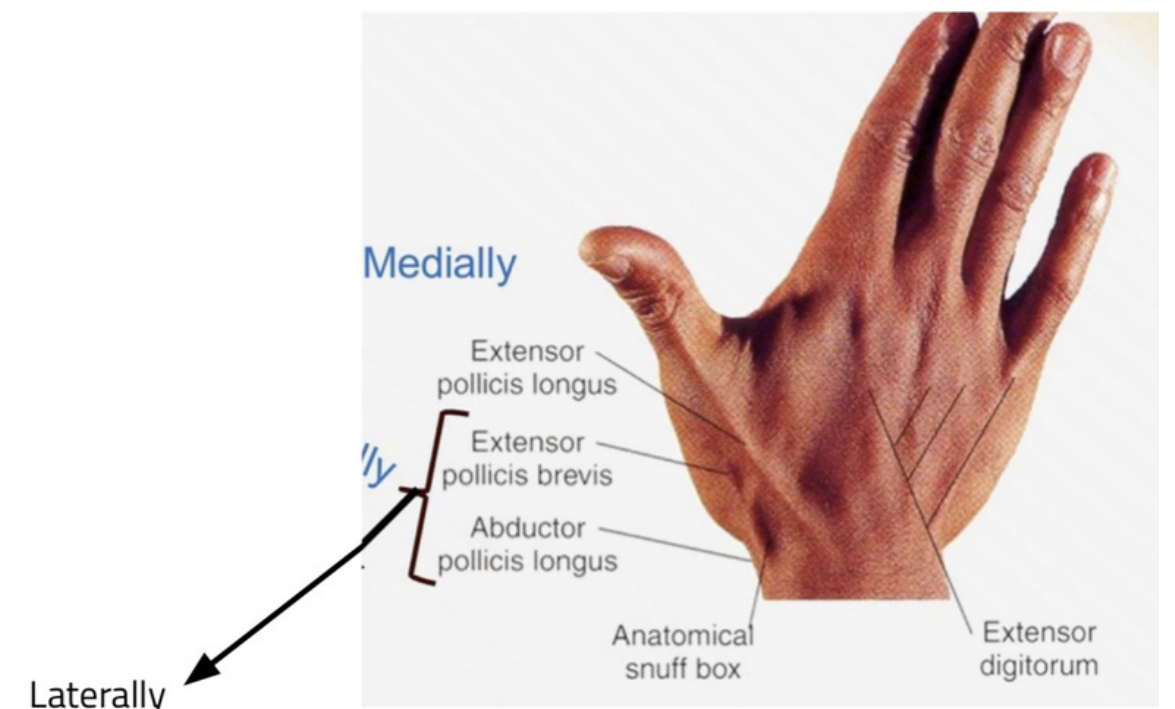
Medially:

- 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.



16 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.

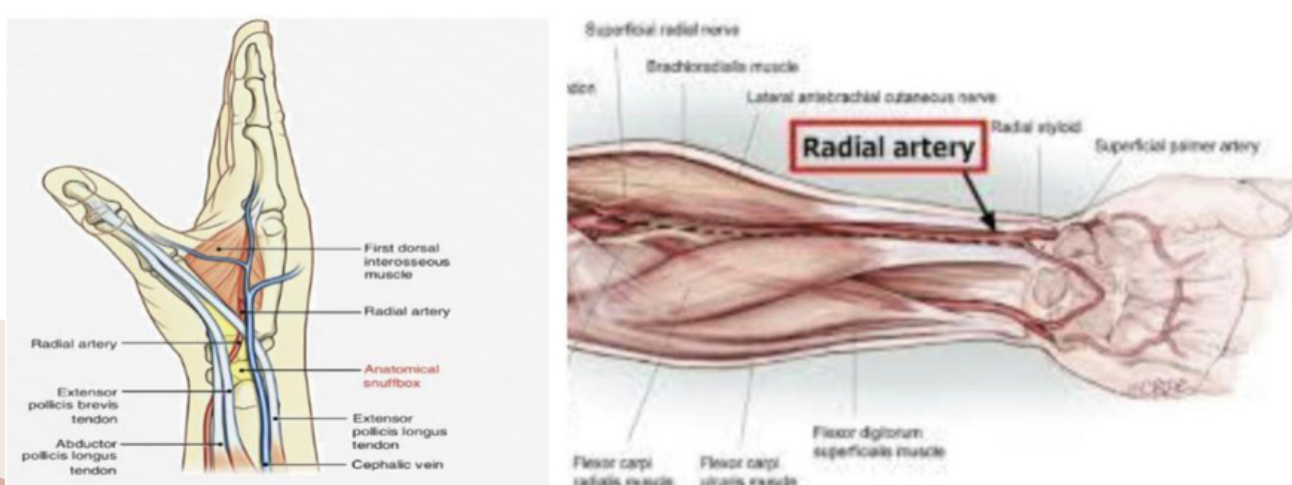
Here it lies just beneath the skin and fascia lateral to the tendon of flexor carpi radialis.

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.



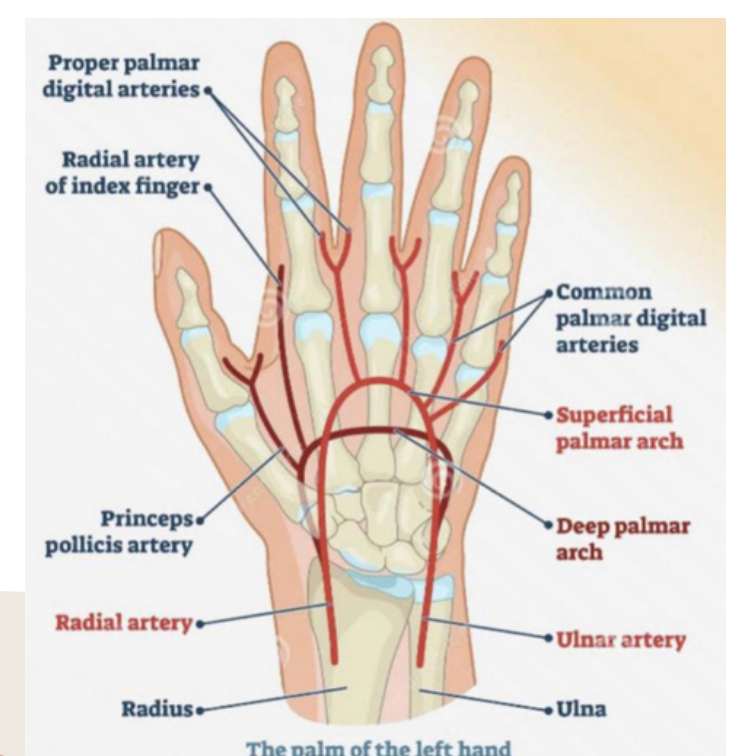
17 Superficial and deep Palmar Arterial arches

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.

Deep Palmar Arterial Arch:

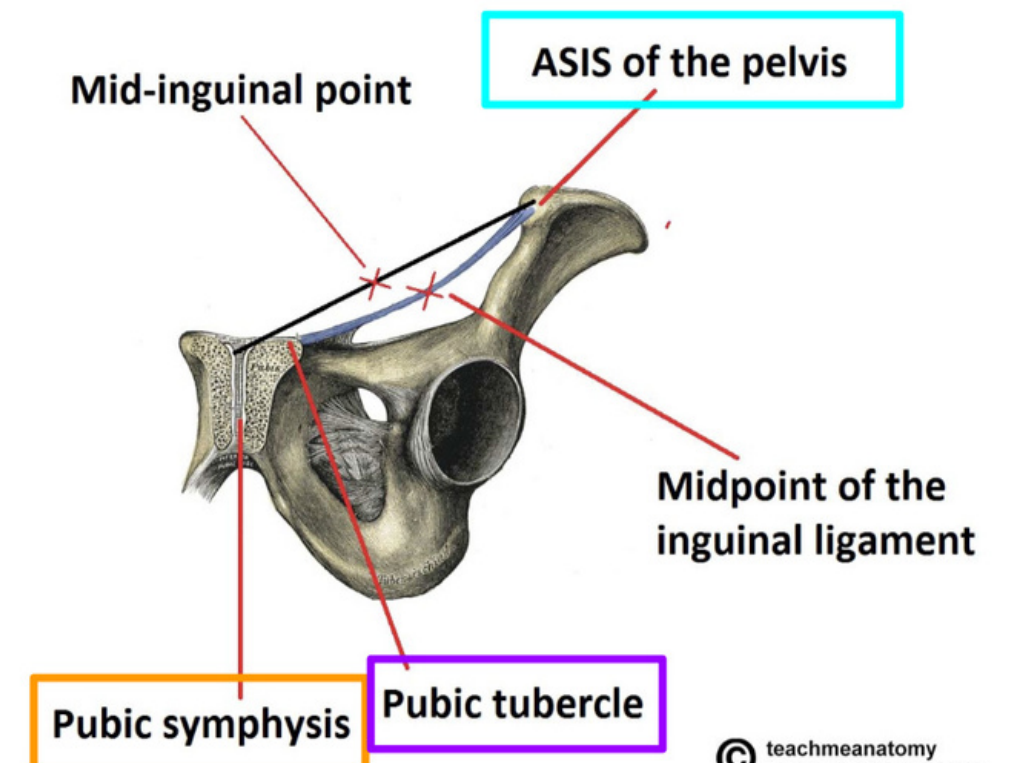
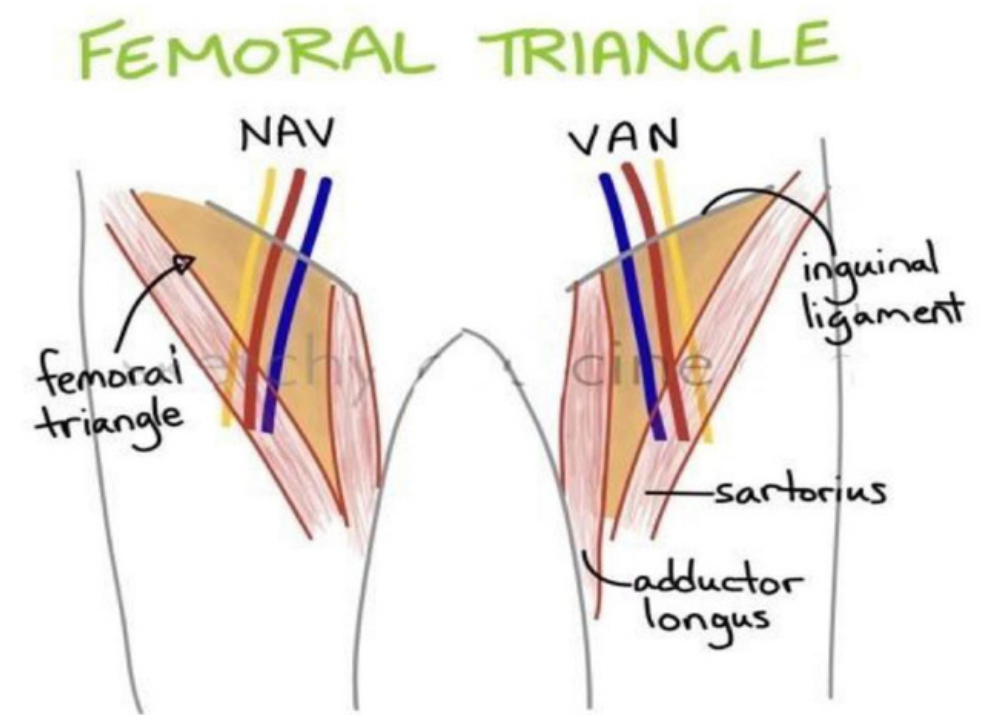
- The deep palmar arterial arch is also located in the central part of the palm (**proximal** to the superficial one), lies on a line drawn across the palm at the level of the **proximal border** of the fully extended thumb.



Surface anatomy of lower limb :

1 Inguinal Region

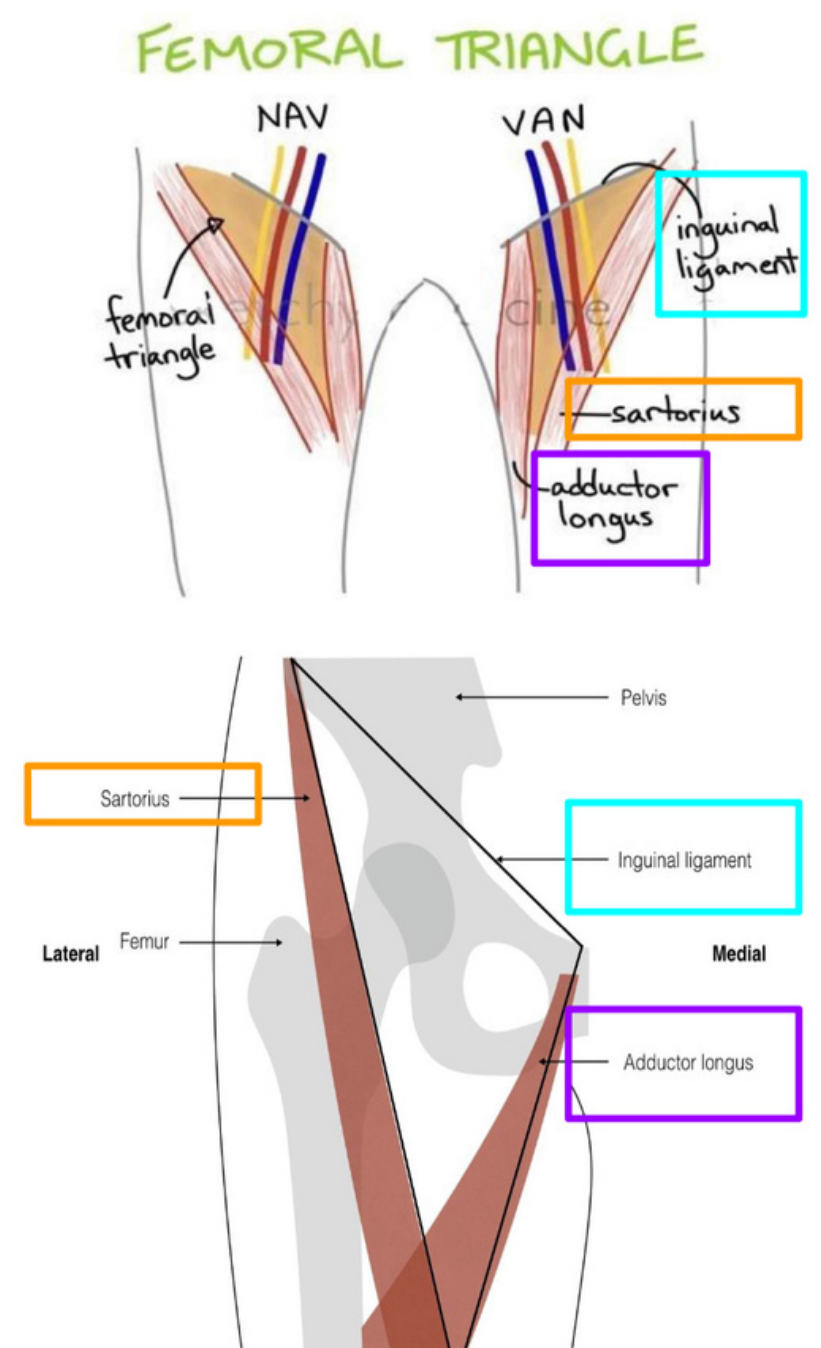
- All of the following structures are palpable in the inguinal region:
 1. Symphysis pubis.
 2. Body of pubis.
 3. Pubic tubercle.
 4. ASIS. (Anterior Superior Iliac Spine)
- The inguinal ligament extends between: The pubic tubercle and The ASIS.
- In the mid-inguinal point you can feel the pulsations of the femoral artery.
- 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 femoral vein lies on the medial side of the artery. While the femoral nerve lies lateral to the artery.



© teachmeanatomy

2 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
 - the medial border by the adductor longus.
 - The iliac crest is subcutaneous and can be palpated throughout its length, from the ASIS to the PSIS.
 - The greater trochanter of the femur is also subcutaneous and can be palpated on the lateral aspect of the hip joint behind and below to the ASIS.



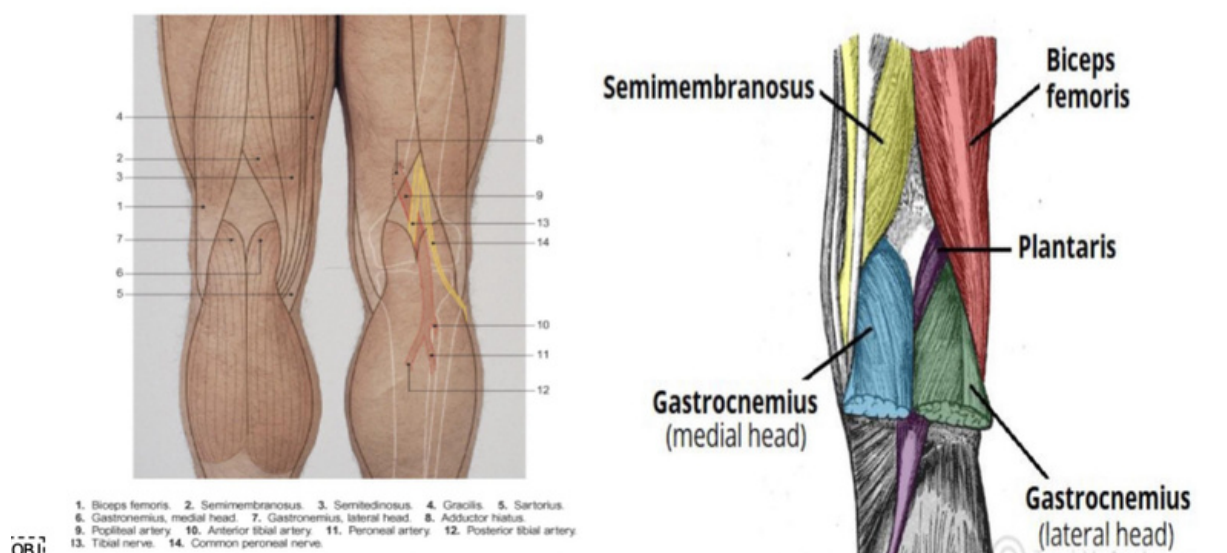
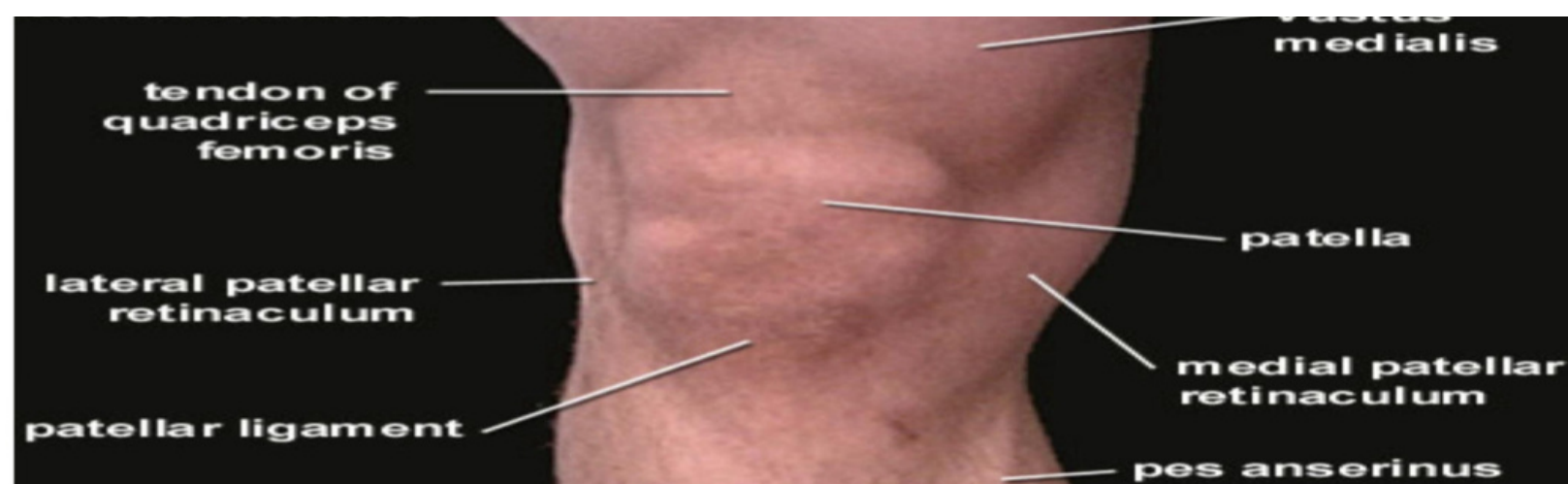
3 Knee region

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

1. The ligamentum patellae can be traced downward as it is attached to the tibial tuberosity.
2. 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.

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

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

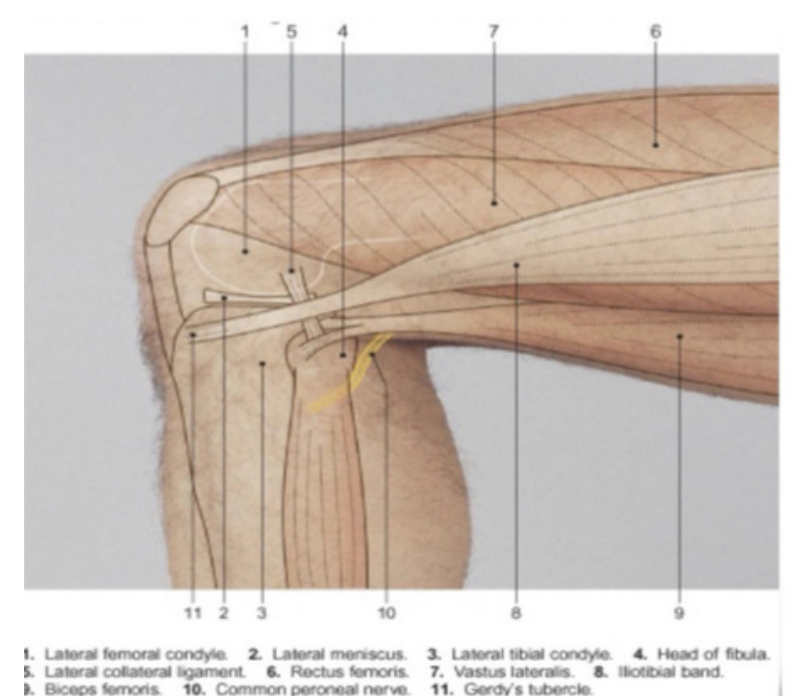
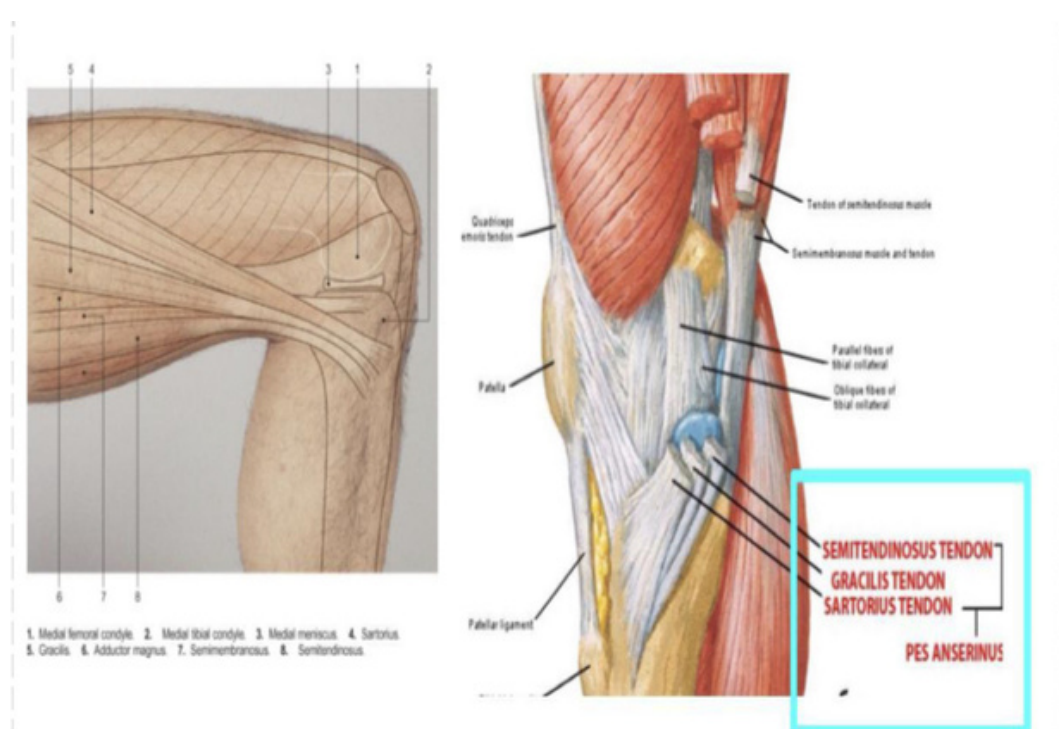


On the **medial aspect of the knee Joint** try to palpate:

1. Medial femoral condyle.
2. Medial tibial condyle.
3. The 3 tendons of:
 - Sartorius (سموها عضلة الخياطة لأن الخياطين يستخدمونها)
 - Gracilis.
 - Semitendinosus.

On the **lateral aspect of the knee Joint** try to palpate:

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



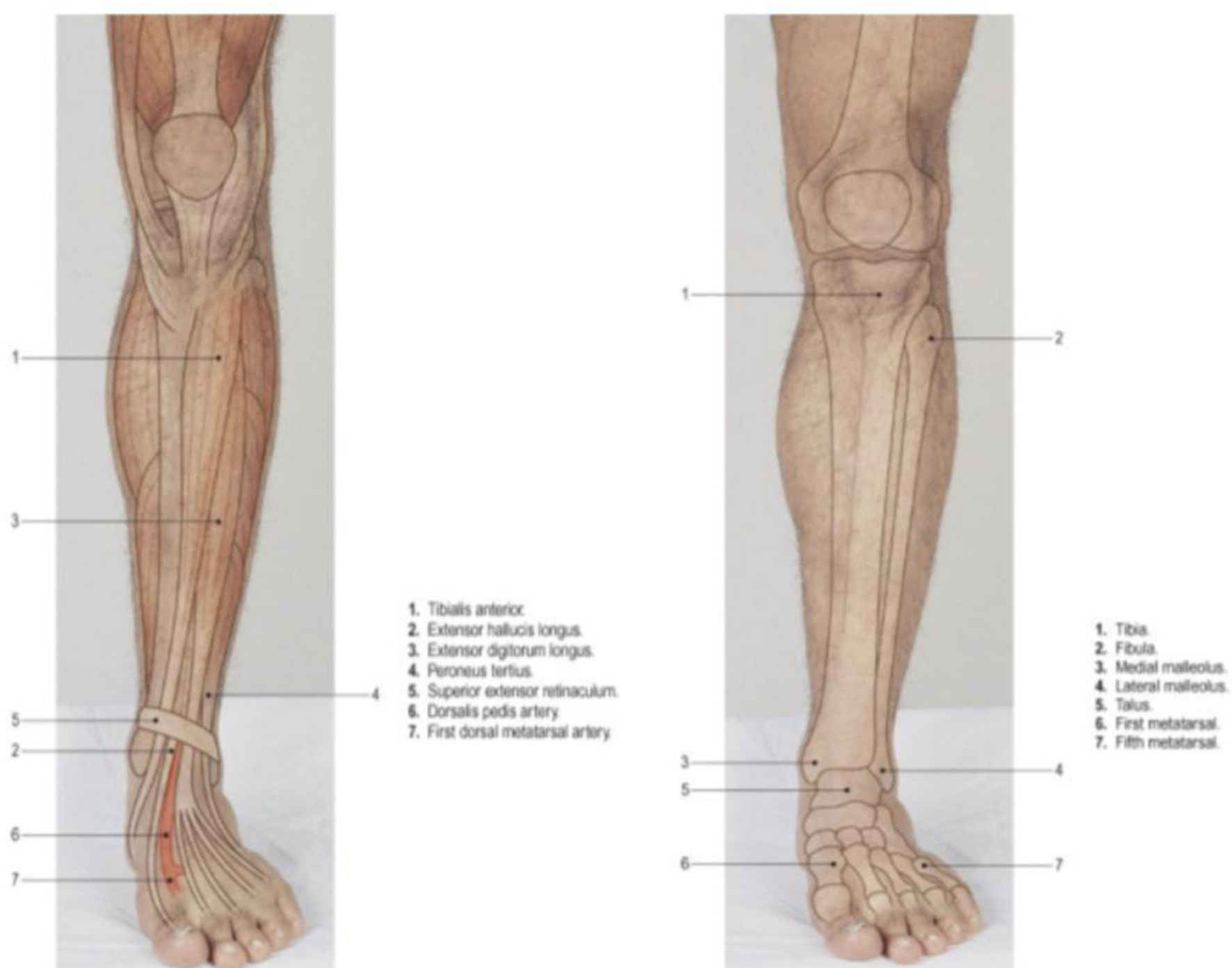
4 Leg and foot

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, (shine).
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:

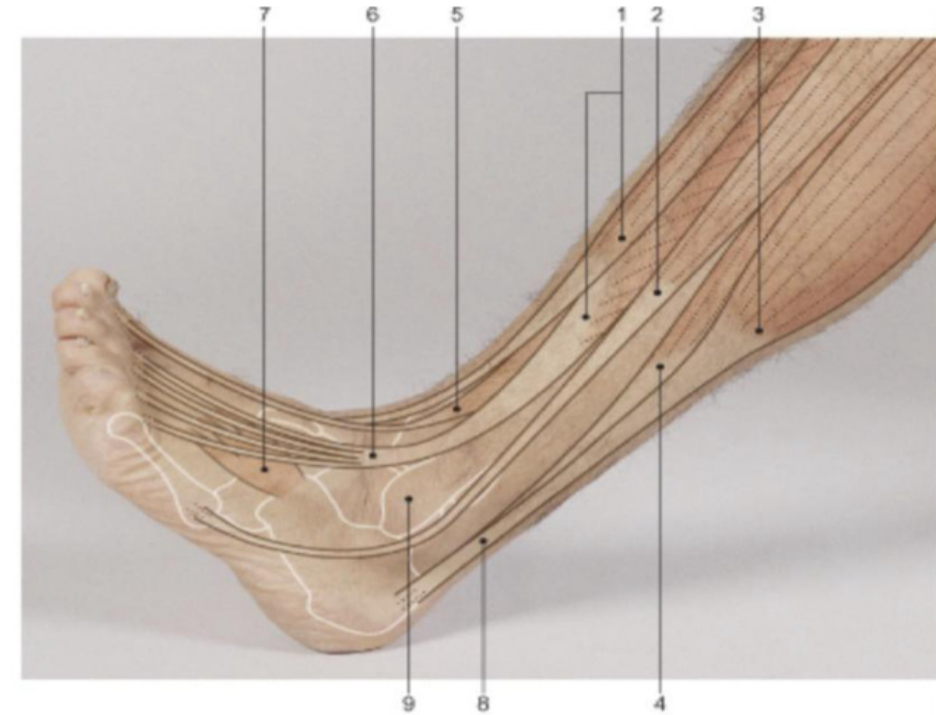
1. The tuberosity of the 5th metatarsal.
2. The tubercle of navicular.
3. The metatarsals.



5 Leg and knee

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

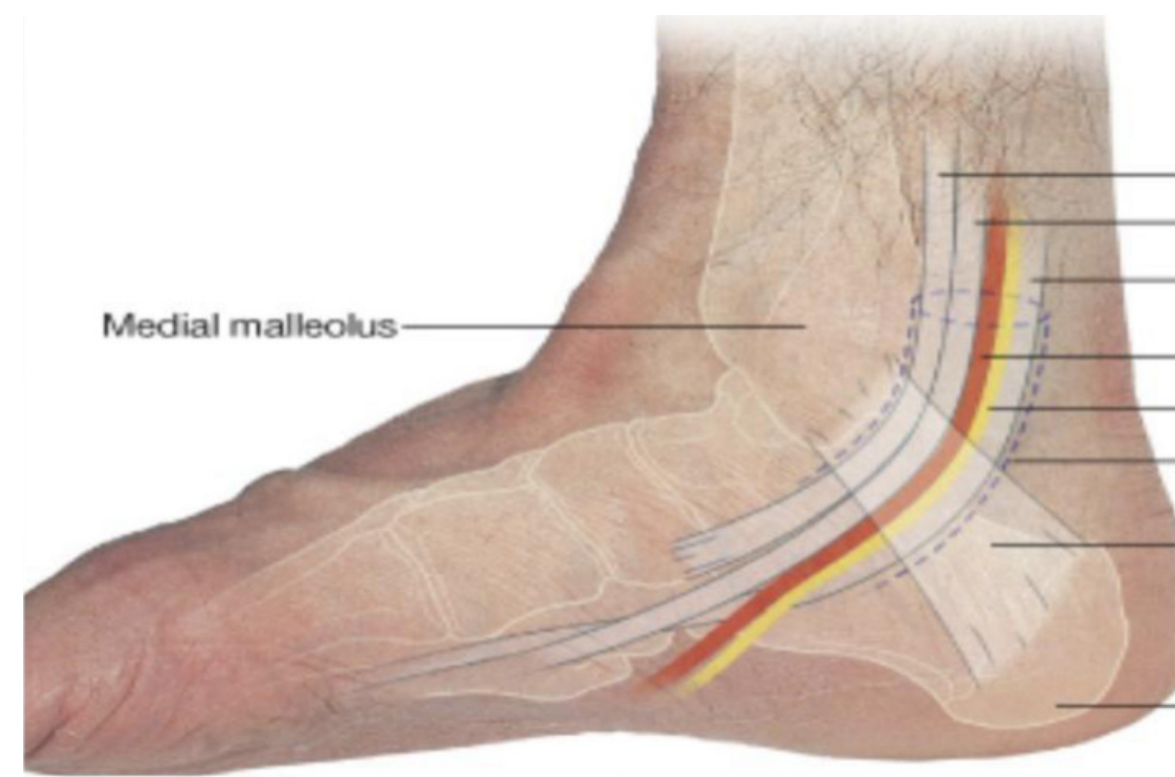
1. The tendons of peroneus longus and brevis.
2. The tendon Achilles. (کثیر یشتکون ان فيه ألم)
3. The lateral malleolus.



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
3. The tendon of flexor digitorum longus.
4. The posterior tibial artery.
5. The calcaneus.



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.

6 iliac crest

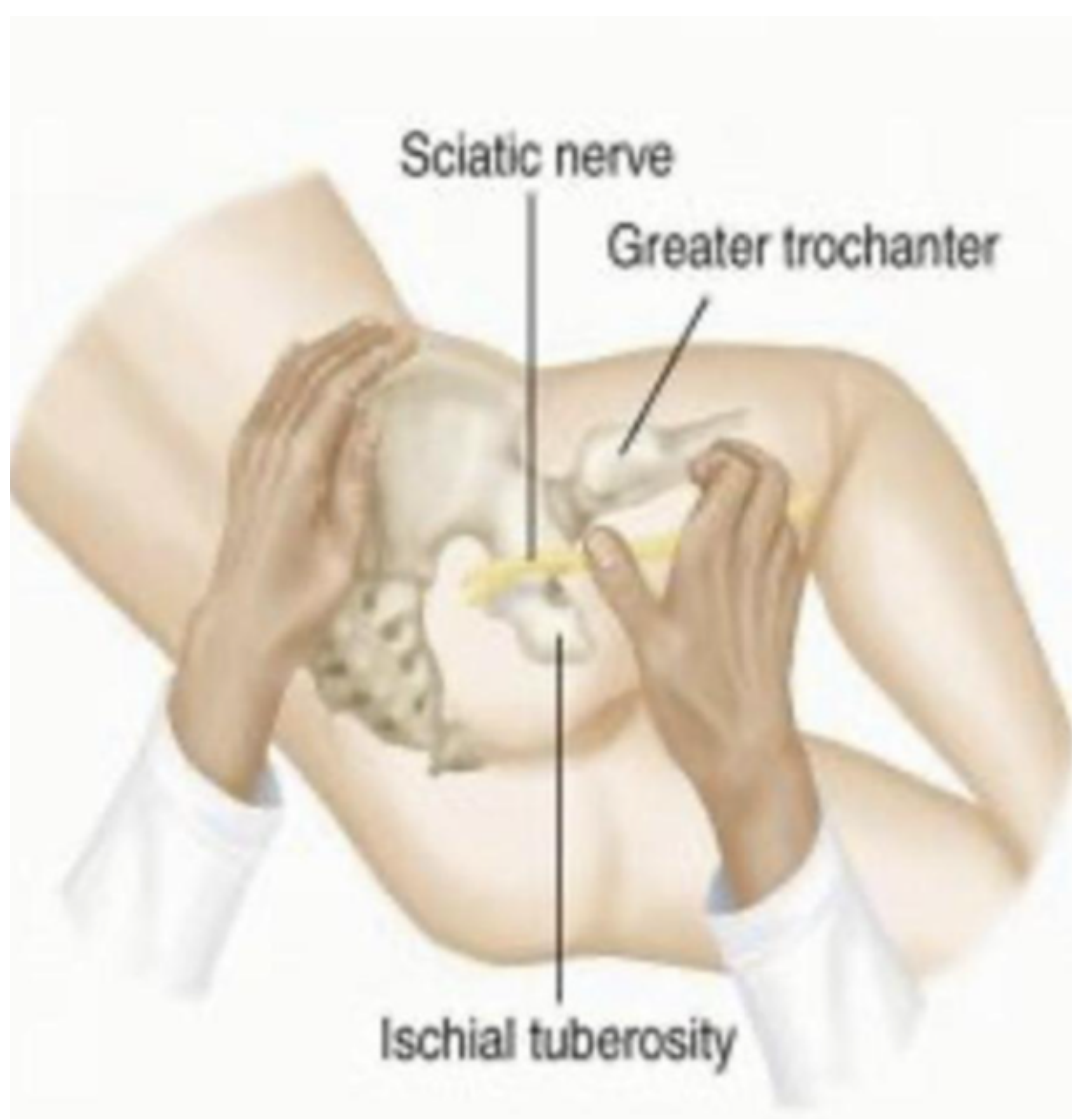
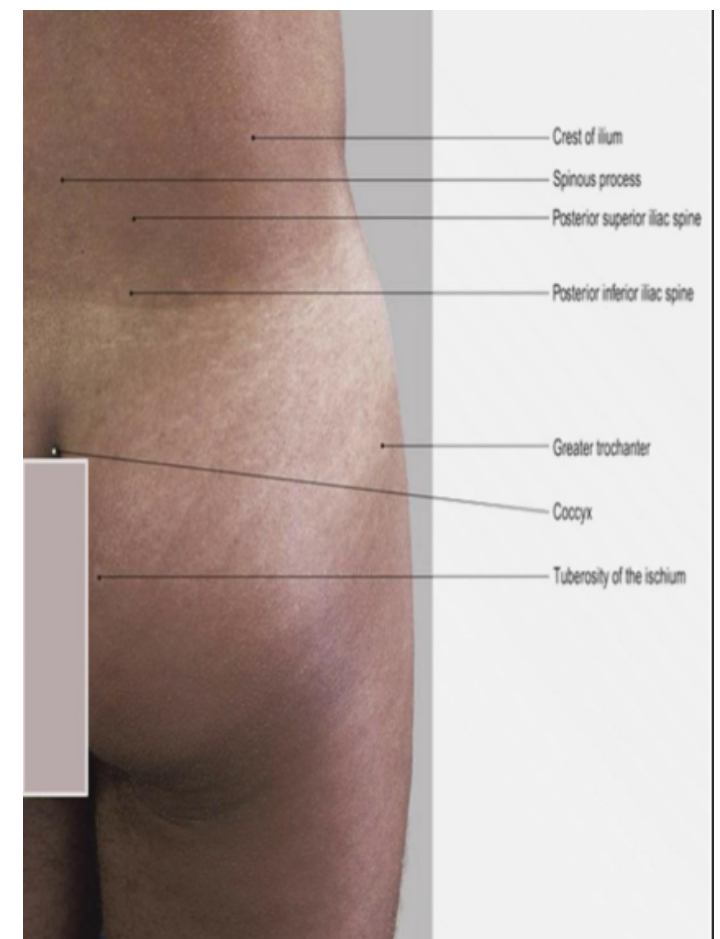
The **iliac crest** is subcutaneous and can be palpated throughout its length, from the ASIS to the PSIS.

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

The greater trochanter of the femur lies a hand's breadth below the iliac crest; it is best palpated with the hip abducted so that the overlying hip abductors (tensor fasciae latae and gluteus medius and minimus) are relaxed.

in the very thin, wasted patient the greater trochanter may be seen as a prominent bulge and its overlying skin is a common site for a pressure sore to form in such a case.

The ischial tuberosity is covered by gluteus maximus when one stands, in sitting position, however, the muscle slips away laterally so that weight is taken directly on the bone, to palpate this bony point, therefore, feel for it uncovered by gluteus maximus in the flexed position of the hip.



On the Medial Aspect of the ankle try to palpate and feel:

-The Great (Or Long) Saphenous Vein

- arises from the medial side of the dorsal network of veins
- passes upwards in front of the medial malleolus
- enter the femoral vein in the groin, one inch below the inguinal ligament and immediately medial to the femoral pulse

From the practical point of view, The position of the long saphenous vein immediately in front of the medial malleolus is perhaps the most important single anatomical relationship; no matter how collapsed or obese , or how young and tiny the patient , the vein can be relied upon to be available at this site when urgently required for transfusion purposes

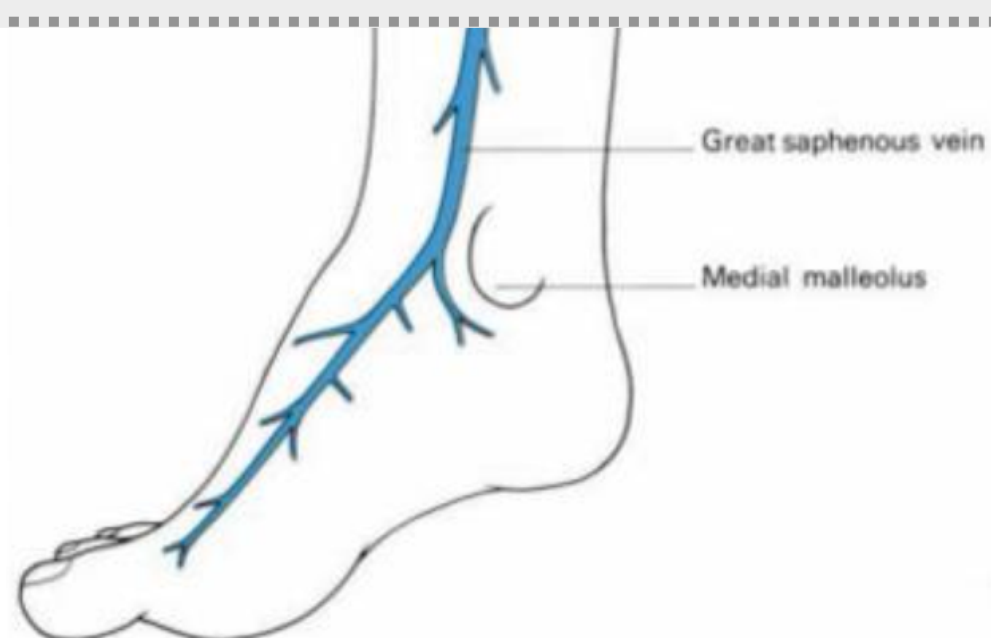


Fig. 154 The relationship of the great (long) saphenous vein to the medial malleolus.

MCQs

1

the lateral and posterior borders of the acromion meet to form which of the following

| | | | |
|------------------------|-----------------------------|------------------|-------------------------------|
| A- Acromion of scapula | B-inferior angle of scapula | C-acromial angle | D-superior border of clavicle |
|------------------------|-----------------------------|------------------|-------------------------------|

2

which vein passes through the anatomical snuffbox?

| | | | |
|----------------|------------------|-----------------|-----------------------|
| A-Basilic vein | B- Cephalic vein | C-Axillary vein | D-Median cubital vein |
|----------------|------------------|-----------------|-----------------------|

3

The inguinal ligament extends between?

| | | | |
|----------------------------|---------------------------|---------------------------------|-----------------------|
| A-Symphysis pubis and ASIS | B-Pubic tubercle and ASIS | C-Body pubis and Pubic tubercle | D-Body pubis and ASIS |
|----------------------------|---------------------------|---------------------------------|-----------------------|

4

Which of the following is slightly depressed area just inferior to the lateral third of clavicle?

| | | | |
|--------------------------|--------------------|----------------------|------------|
| A-Deltopectoral triangle | B-Femoral triangle | C-Suprasternal notch | D-Clavicle |
|--------------------------|--------------------|----------------------|------------|

5

Which one you can palpate on the Medial aspect of knee joint?

| | | | |
|----------------------------|----------------------|------------------------|----------------------------|
| A-Tendon of biceps femoris | B-Neck of the fibula | C-Lateral femoral cond | D-Tendon of Semitendinosus |
|----------------------------|----------------------|------------------------|----------------------------|



1-C 2-B 3-B 4-A 5-D

MCQs

6

The biceps brachii tendon can be palpated in the?

| | | | |
|-----------------|------------------|-------------------|----------------|
| A-Cubital fossa | B-Coronoid fossa | C-Olecranon fossa | D-Radial fossa |
|-----------------|------------------|-------------------|----------------|

7

it is Subcutaneous and Can be palpated from the ASIS to the PSIS?

| | | | |
|----------------------|---------------------|---------------|----------------------|
| A-Greater trochanter | B-inguinal ligament | C-iliac crest | D-Mid-Inguinal point |
|----------------------|---------------------|---------------|----------------------|

8

Which of the following forms the distal part floor of the anatomical snuffbox?

| | | | |
|--------------------------|----------------------------|------------|------------------|
| A-Radial styloid process | B-Adductor pollicis brevis | C-Scaphoid | D-Hook of hamate |
|--------------------------|----------------------------|------------|------------------|

9

Which one you can palpate on the lateral aspect of the leg?

| | | | |
|-------------------|-------------|--------------------|------------|
| A-Tendon Achilles | B-Calcaneus | C-Medial malleolus | D-Gracilis |
|-------------------|-------------|--------------------|------------|

10

in the Mid-inguinal point you can feel the pulsations of the?

| | | | |
|-------------------|-----------------|-------------------|------------------|
| A-Brachial Artery | B-Radial Artery | C-Axillary Artery | D-femoral Artery |
|-------------------|-----------------|-------------------|------------------|



6-A 7-C 8-C 9-A 10-D

SAQs

List 3 major structures passing through the femoral triangle ?

1

- 🔑 A/ Femoral artery.
- B/ Femoral nerve.
- C/ Femoral vein.

cubital fossa consist of ?

2

- 🔑 A/ Cephalic vein.
- B/ Basilic vein.
- C/ Median cubital vein are clearly visible.

While palpating the medial aspect of the knee what 3 tendons can we feel?

3

- 🔑 A/ Sartorius.
- B/ Gracilis.
- C/ Semitendinosus.



Congrats 🎉🎉

You've just finished anatomy of MSK Block!



LECTURE DONE BY

Shouq alshehri

Basil ibrahim

TEAM LEADERS

Nisreen Alotaibi

Abdulaziz Alanazi

Ritaj Alsubaie

Saad Aldosari

Shaden Alotaibi



anatomy.444ksu@gmail.com