

*Vascular problems
of
the upper and lower limbs*

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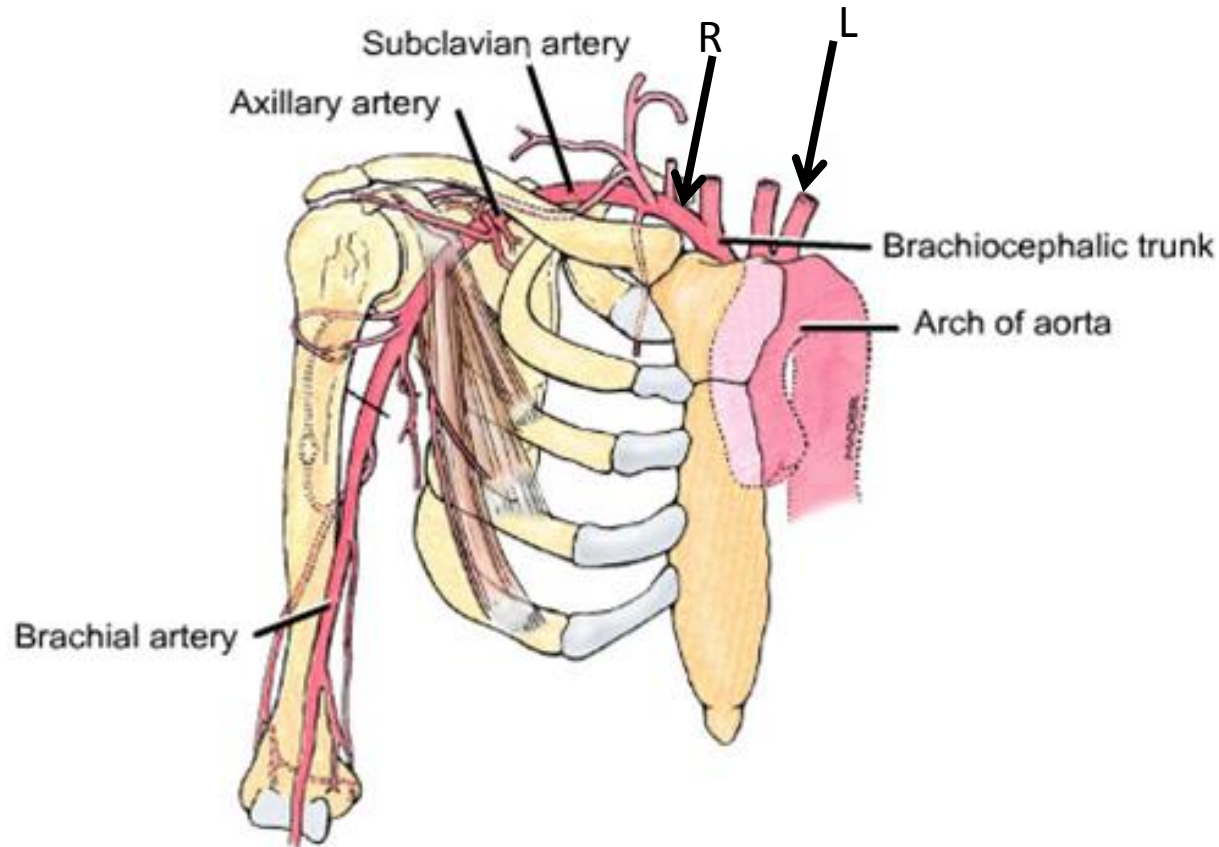
Objectives

- We try to remember some anatomic points regarding the vascular tree of the upper and lower limbs.
- Knowledge of some important problems and clinical applications related to the vascular tree of the upper and lower limbs.

Arterial supply of the upper limbs

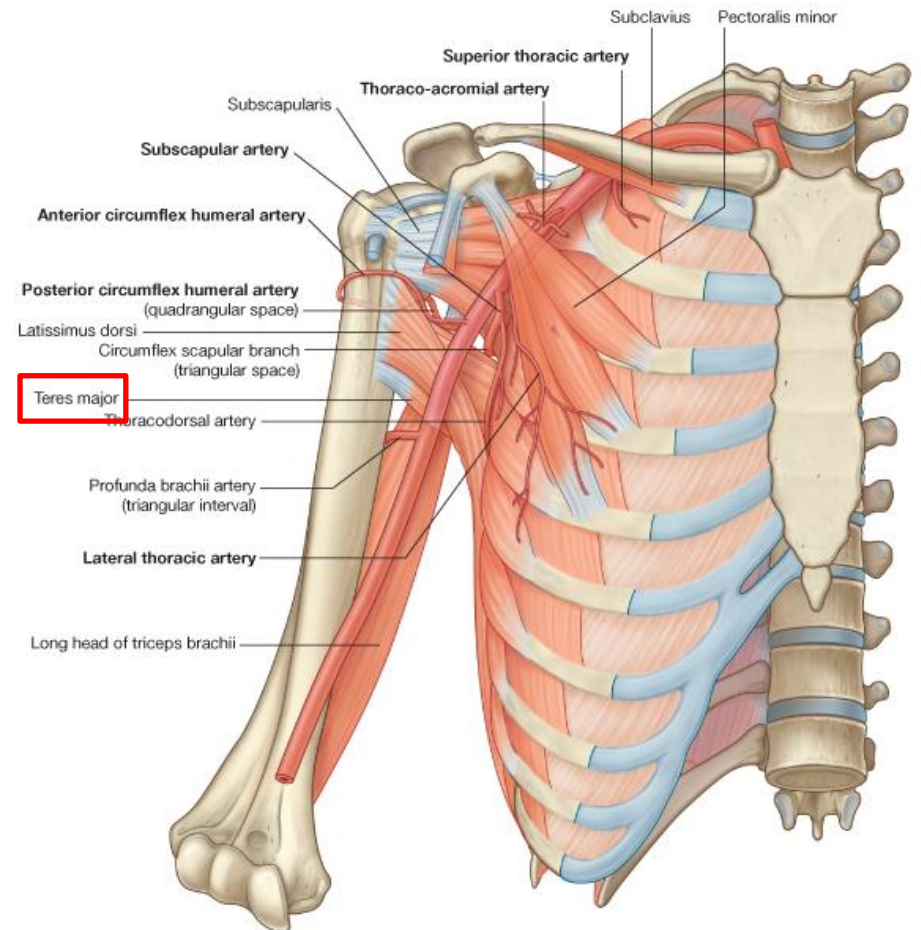
Subclavian artery

- ❑ Left side arises from **arch of aorta**,
- ❑ Right side is a branch of **brachiocephalic artery**.
- From origin to the outer margin of the **1st rib**,
- then it continues as axillary artery .



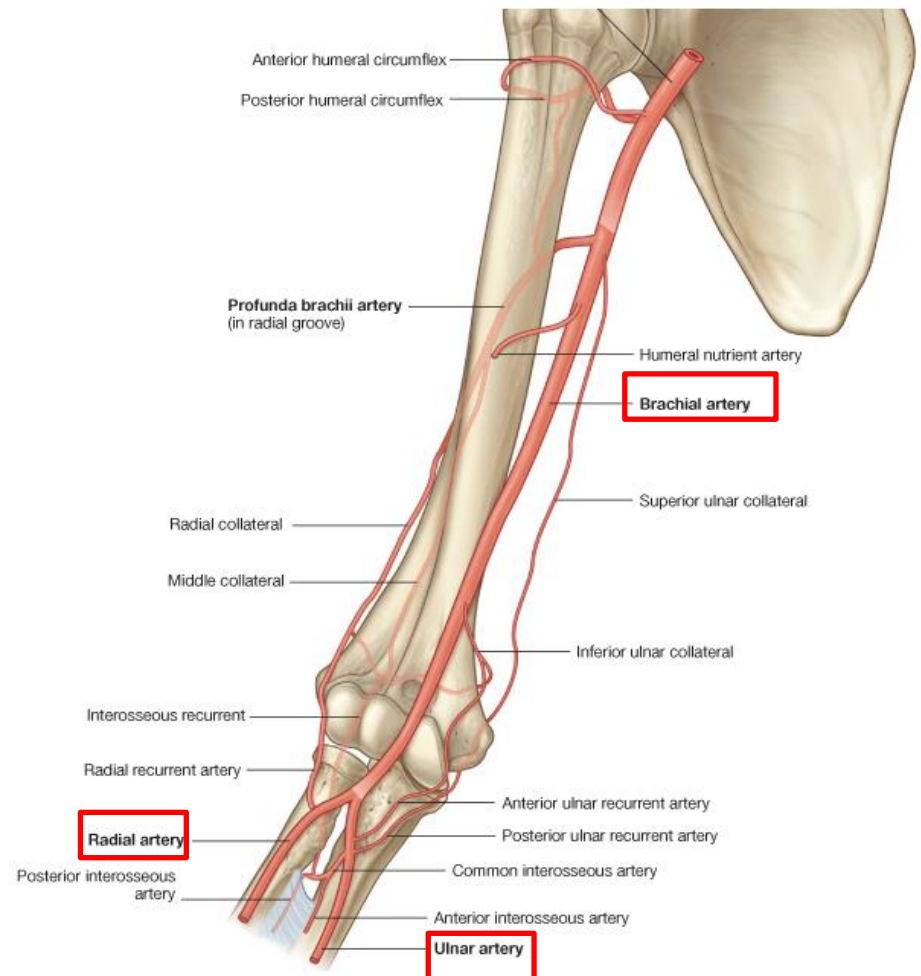
Axillary Artery

- ❑ Begins at lateral margin of **1st rib**.
- To the lower border of **Teres major**.
 - Major Branches
 - Superior Thoracic Artery.
 - Thoracoacromial Artery.
 - Lateral Thoracic Artery.
 - Subscapular Artery.
 - Anterior Circumflex Humeral and
 - Posterior Circumflex Humeral.



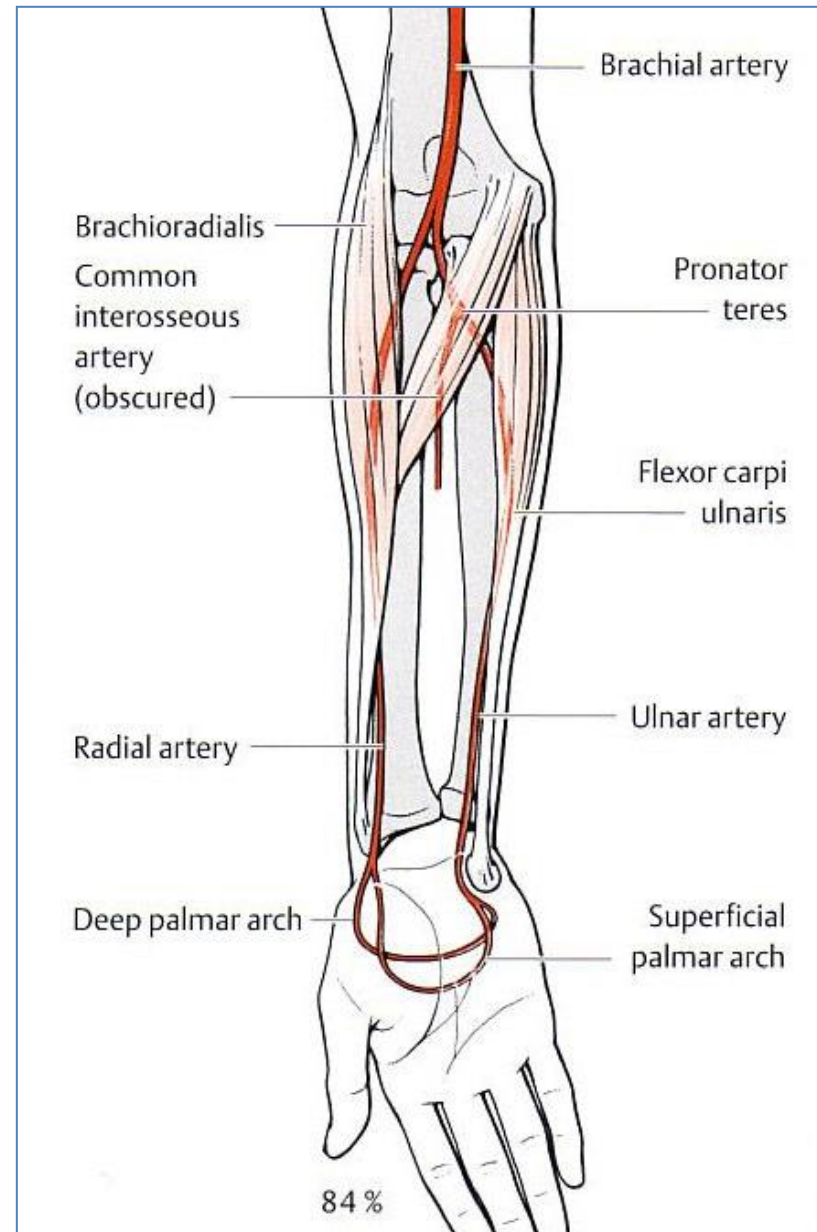
- ❑ Begins at the lower margin of **Teres major**, as a continuation of the axillary artery
- ❑ Major Branches
 - Profunda Brachial,
 - Superior and Inferior Ulnar collateral arteries.
 - Muscular.
 - Nutrient to the humerus.
 - Terminates opposite the **neck of radius** by dividing unto the **Radial and Ulnar Arteries**,

Brachial Artery



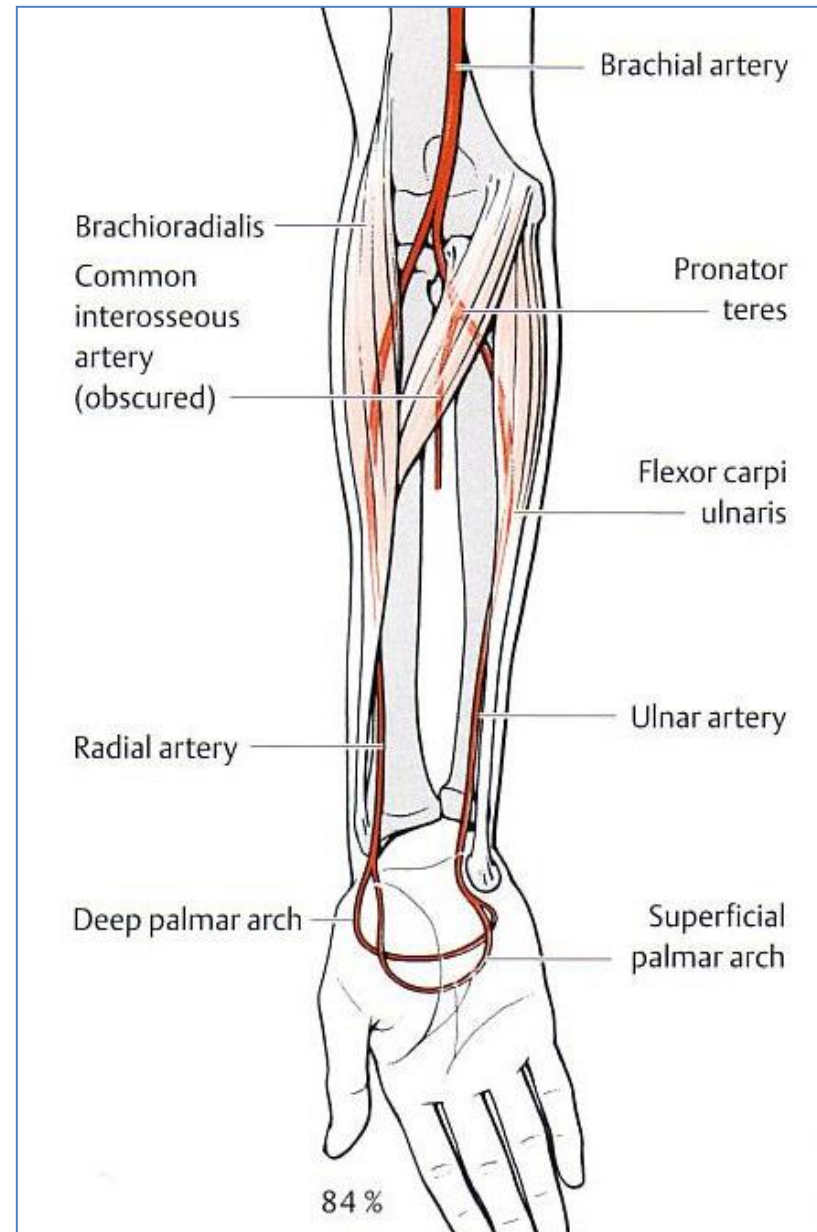
Radial artery

- ❑ Begins from the brachial artery at the level of the **neck of the radius** in the cubital fossa
- ❑ Descends downward and laterally, rests on deep muscles of front of the forearm.
- ❑ At the wrist it passes in the **anatomical snuff box**.
- ❑ Ends in the hand by anastomosis with the deep branch of the ulnar artery, to be continued as the **deep palmar arch**



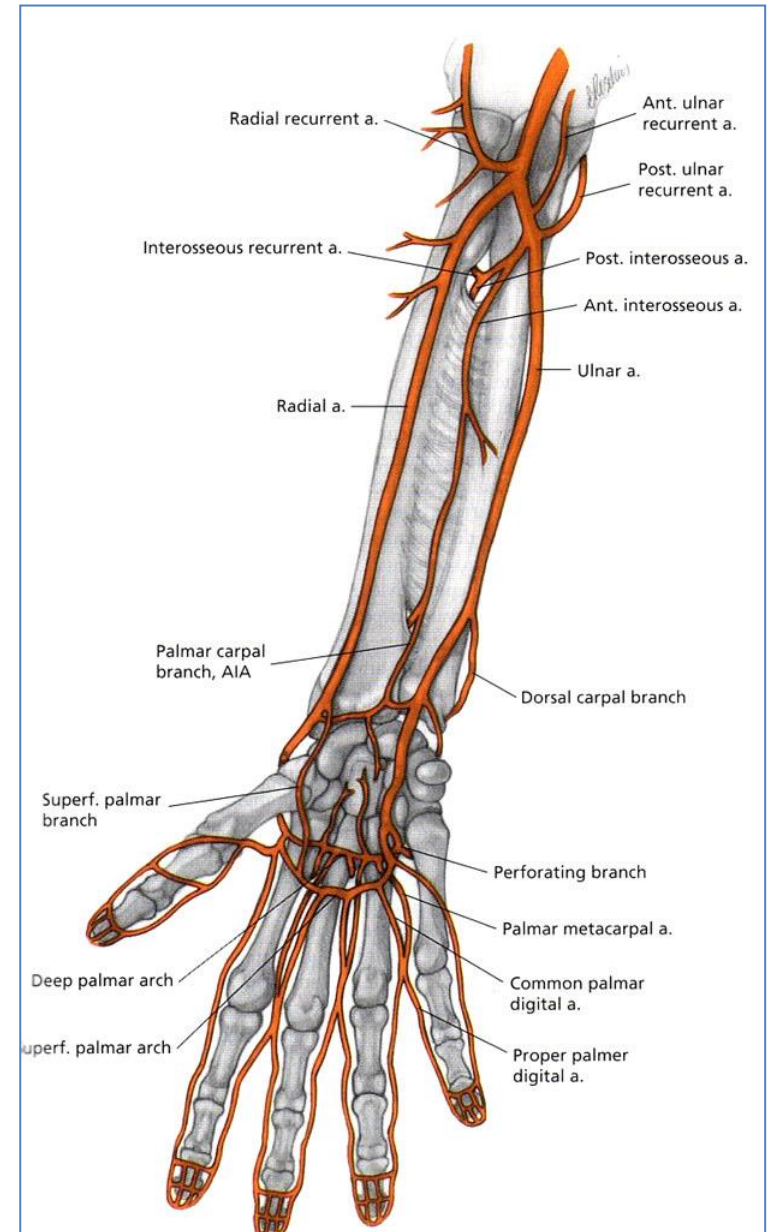
Radial artery

- Branches :
 - Radial recurrent artery (anastomoses with the radial collateral branch of the profunda brachii)
 - Muscular branches
 - Superficial palmar branch to complete the superficial palmar arch with ulnar artery
 - In the dorsum of the hand it gives radialis indicis and princeps pollicis.
 - Then continuous as **deep palmer arch**



Ulnar artery

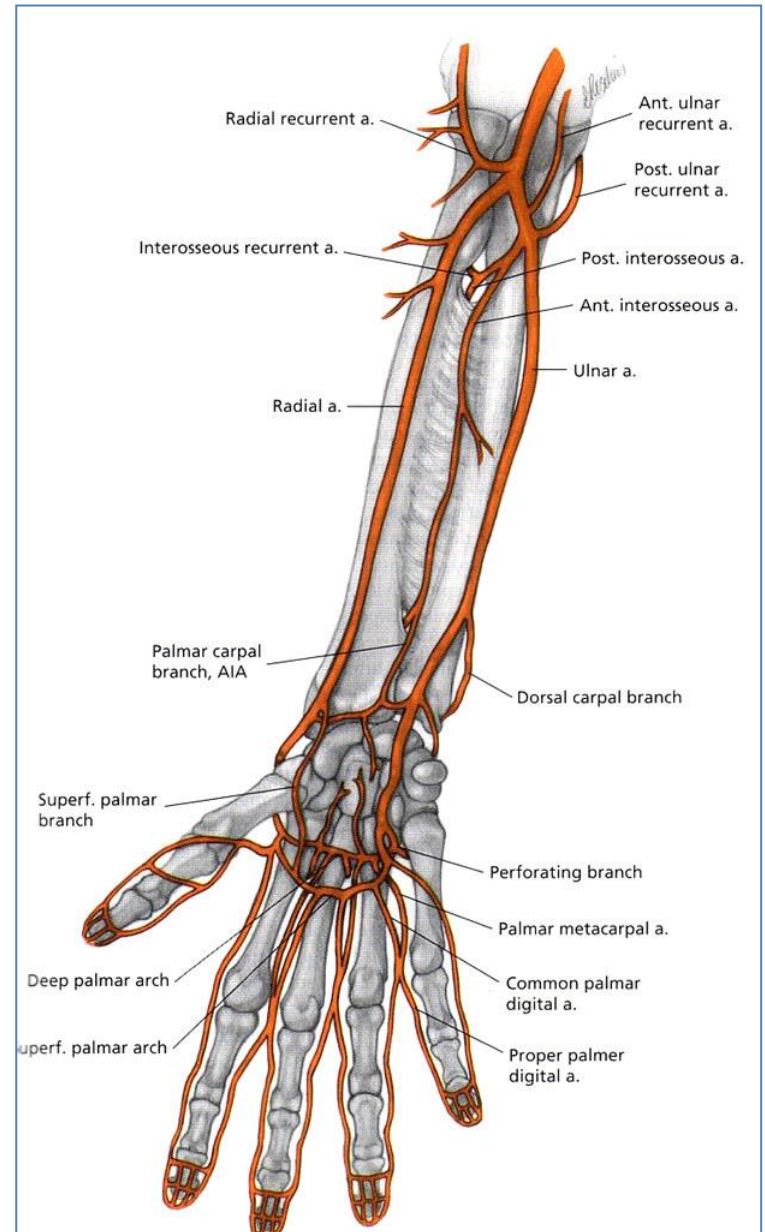
- ❑ Begins from termination of the brachial artery at the level of the **neck of the radius** in the cubital fossa.
- ❑ It descends through the anterior compartment of the forearm.
- ❑ Enters the palm superficial to the flexor retinaculum.
- ❑ Ends in the hand by forming the **superficial palmar arch** anastomosing with the superficial palmar branch of the radial artery.



□ Branches :

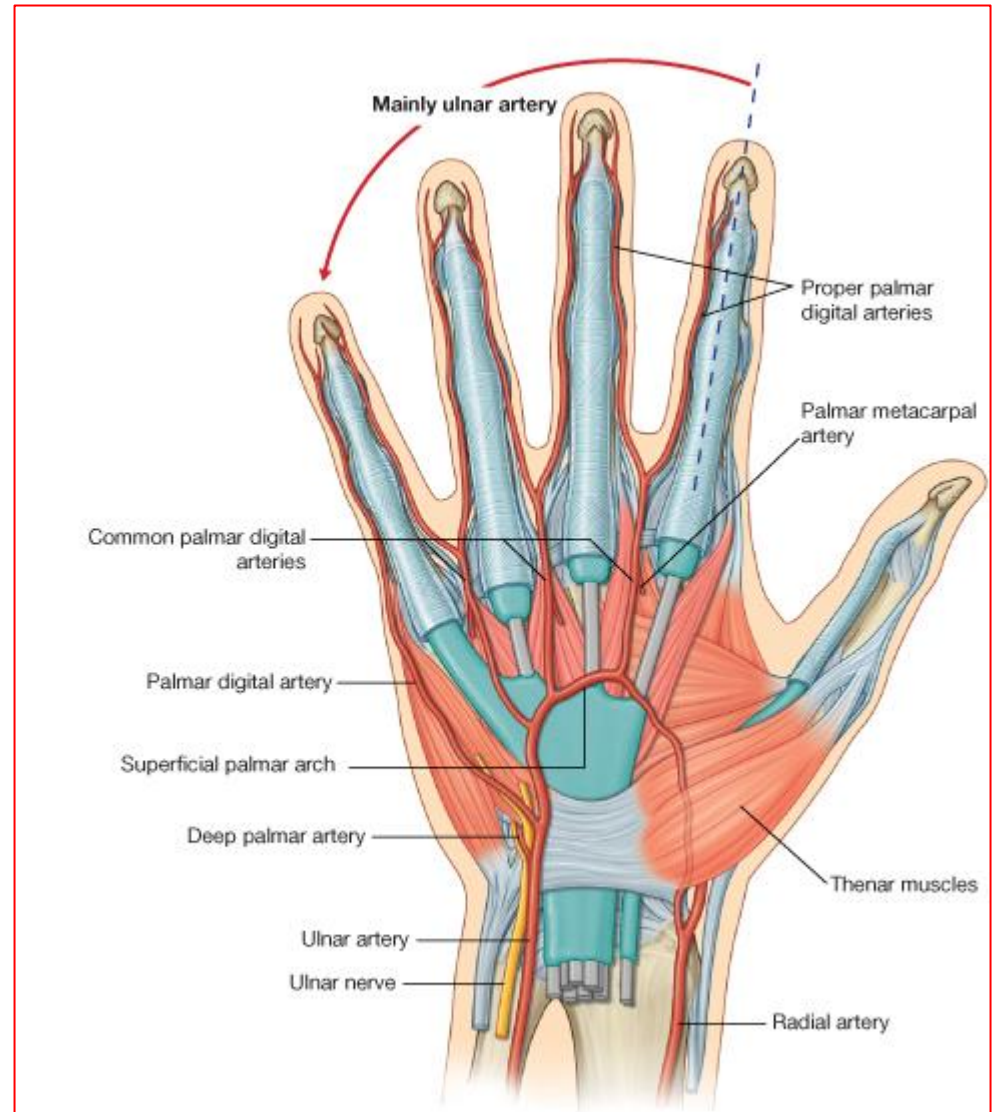
- Anterior ulnar recurrent artery
- Posterior ulnar recurrent artery
- Common interosseous artery, which divides into anterior interosseous artery and posterior interosseous artery (which gives rise to the posterior interosseous recurrent artery) .
- Muscular branches.
- Cutaneous branches
- Branches sharing in arterial anastomosis around the wrist joint.
- Ends by be continuous as **superficial palmar arch.**

Ulnar artery



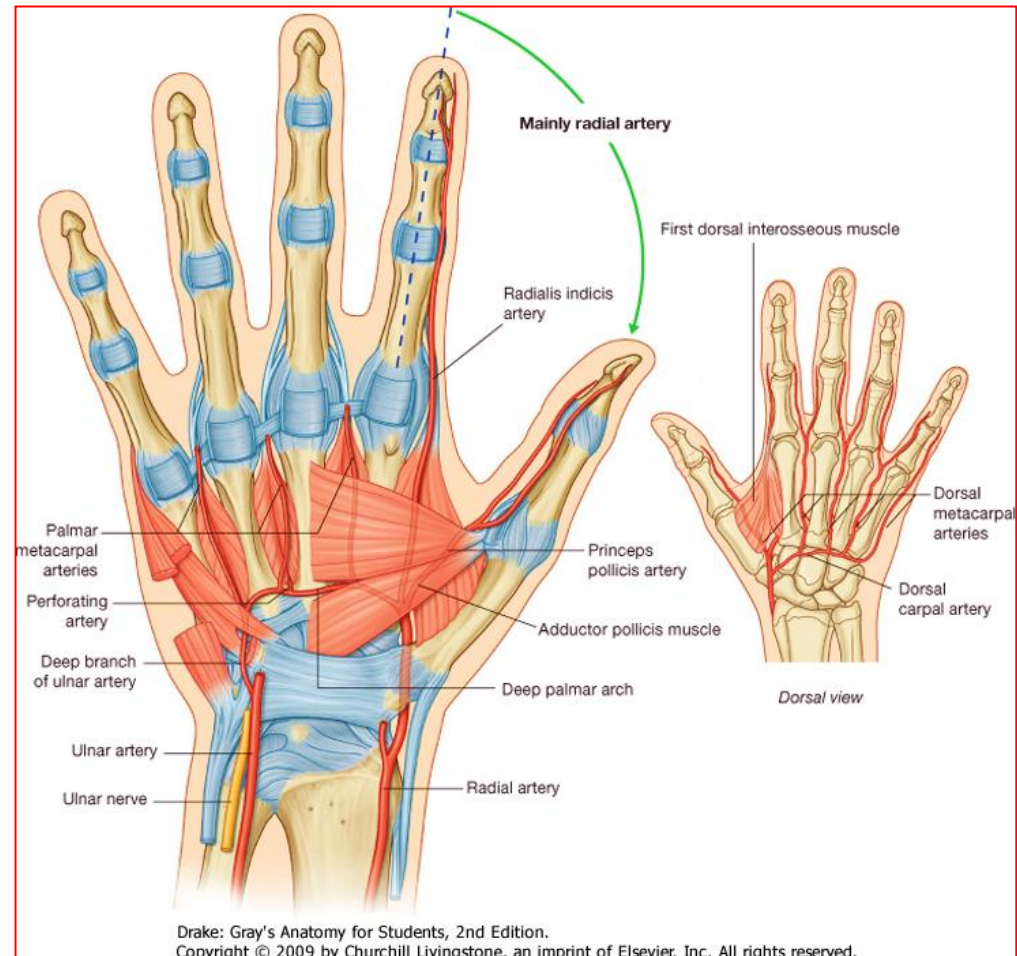
Superficial Palmar Arch

- Direct continuation of **Ulnar artery.**
- On the lateral side it is completed by **superficial palmar branch of the radial artery.**
- It is superficially placed in palm in front of the long flexor tendons.
- It gives four digital arteries



Deep Palmar Arch

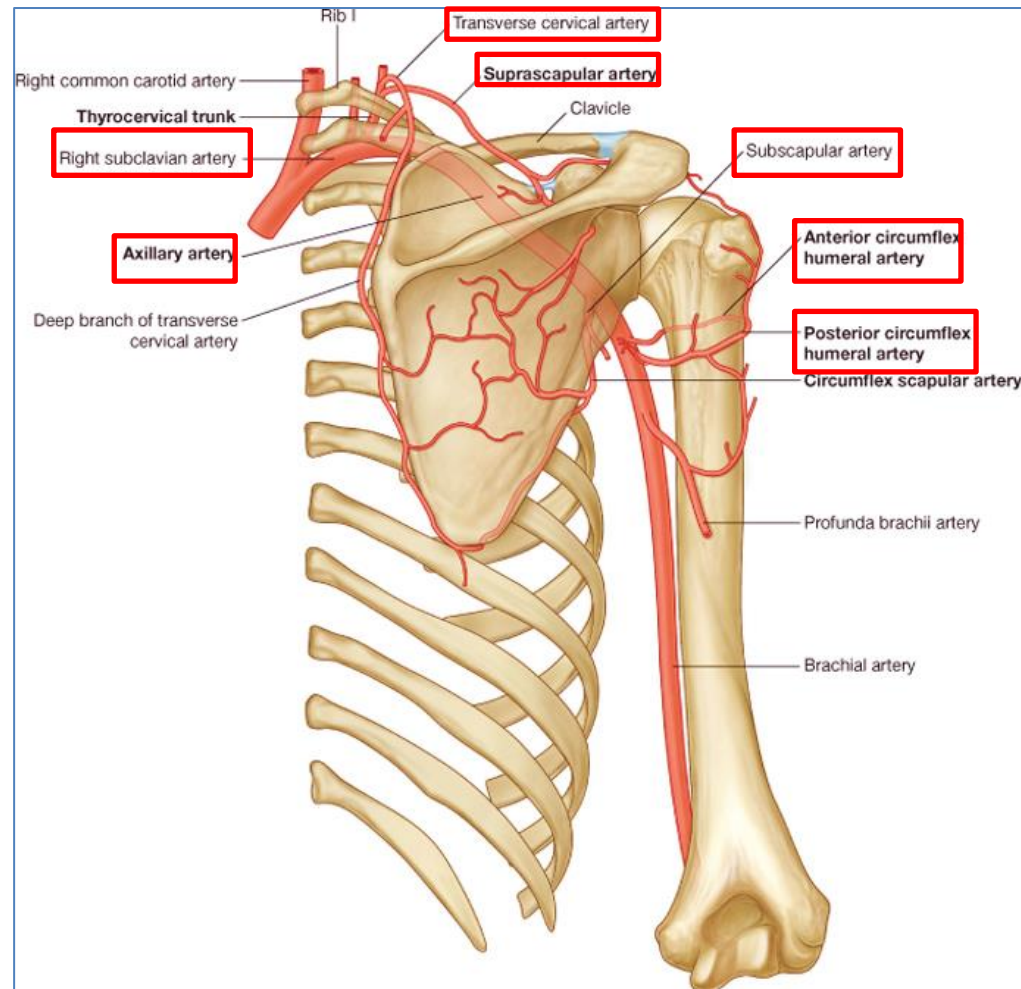
- Direct continuation of **Radial artery**.
- On the medial side it is completed by **deep branch of the ulnar artery**.
- It is deeply placed in palm in front of the metacarpal bones & Interosseous muscles.
- Branches: Palmar, Metacarpal, Perforating & Recurrent
- superiorly sharing in anastomosis around the wrist joint
- inferiorly joining digital branches of the superficial palmar arch



☐ Anastomosis occurs between branches of **Subclavian and Axillary arteries:**

- Branches from Subclavian Artery:
 - Suprascapular artery
 - Superficial cervical artery
- Branches from Axillary Artery:
 - Subscapular artery
 - Anterior circumflex humeral artery
 - Posterior circumflex humeral artery

Anastomosis around shoulder joint



Anastomosis around elbow joint

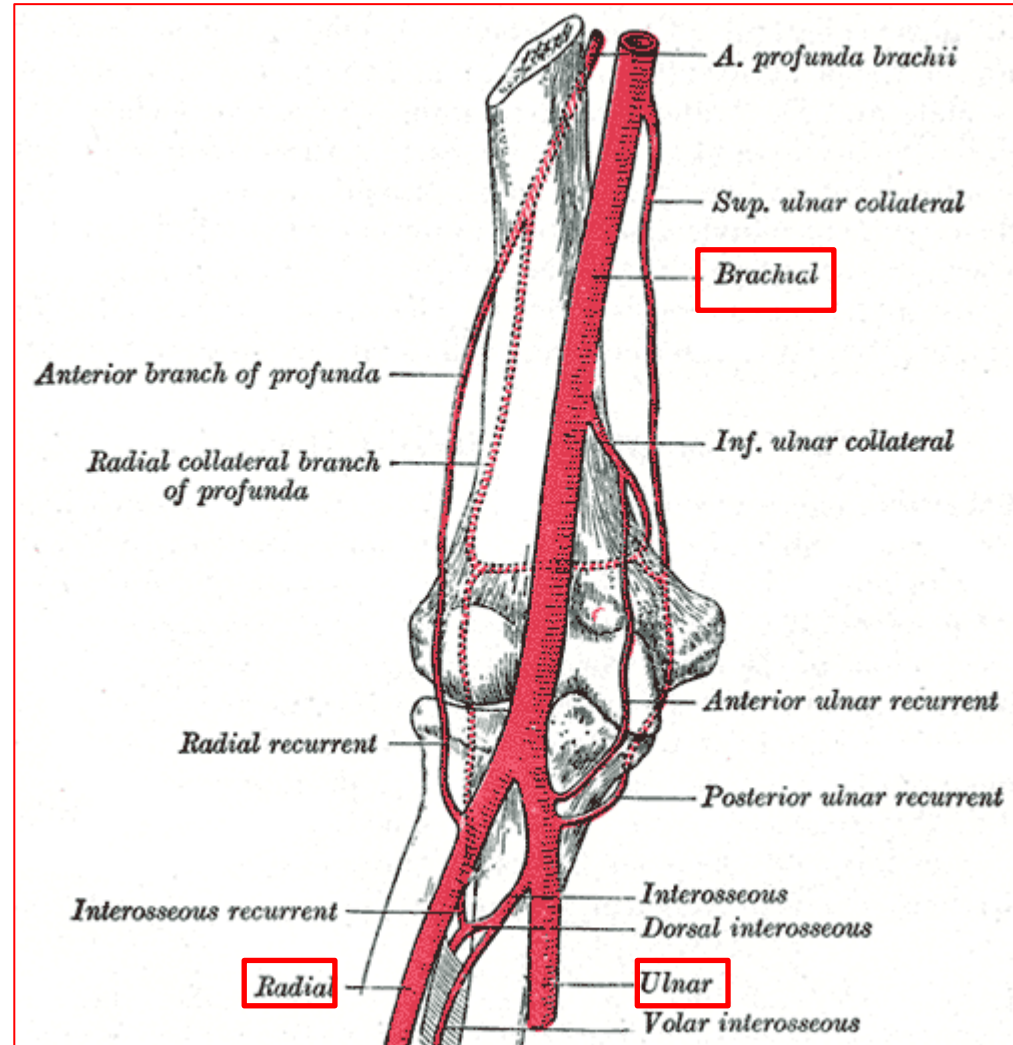
- ❑ Anastomosis occurs between
- ❑ **Brachial, Radial and Ulnar arteries:**

- Branches from Brachial Artery:

- Profunda Brachii artery
- Superior ulnar collateral artery
- Inferior ulnar collateral artery

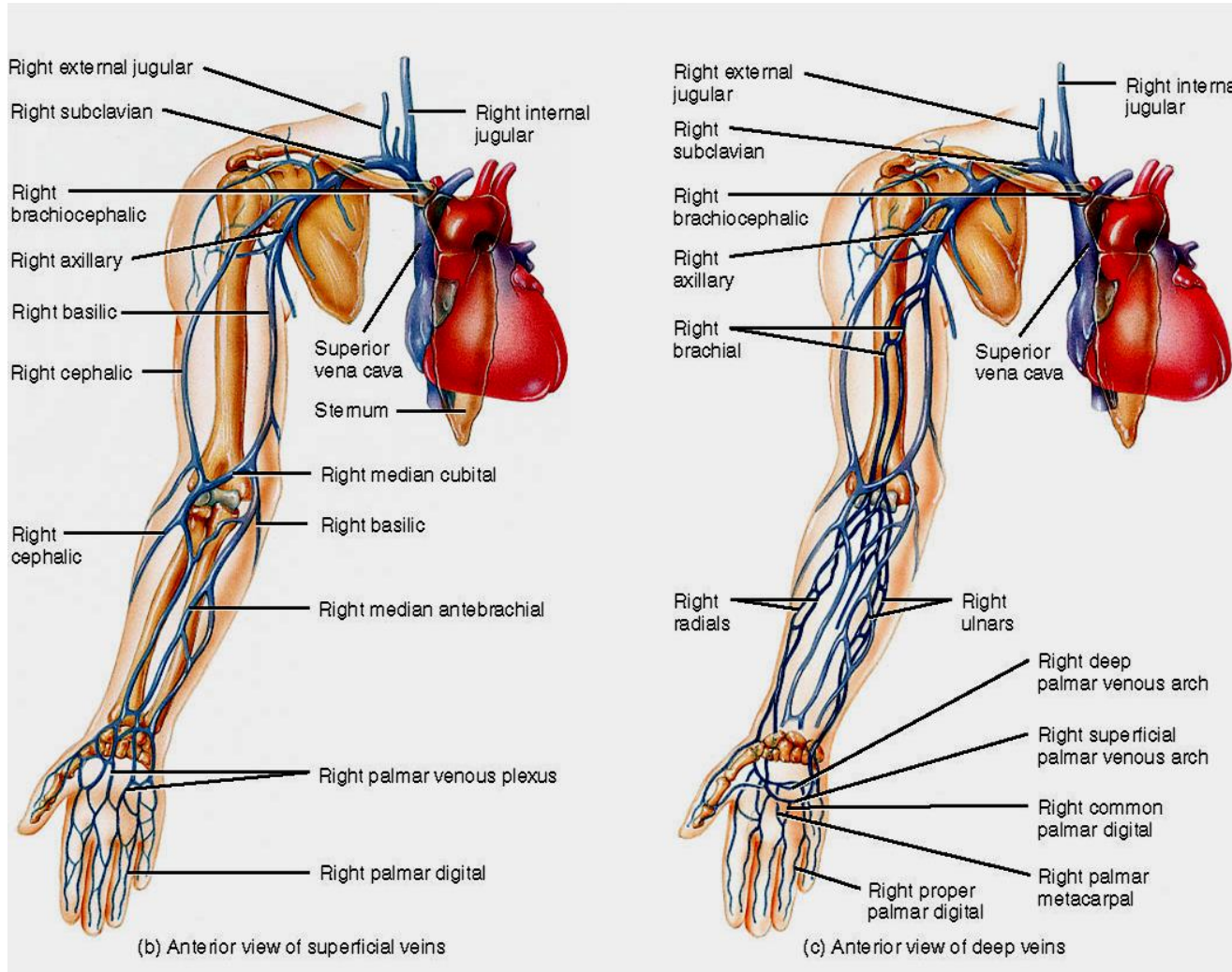
- Branches from Ulnar and Radial Arteries:

- Radial & ulnar recurrent arteries
- Interosseous recurrent artery



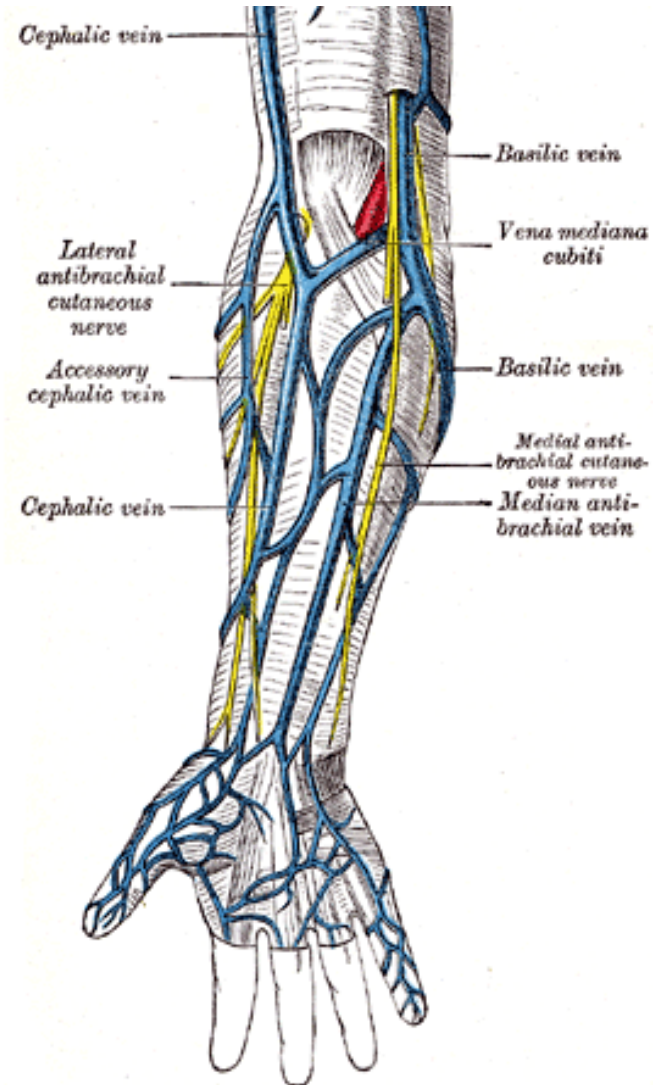
Veins of the Upper Limb

- **Superficial veins**
- **Deep veins**



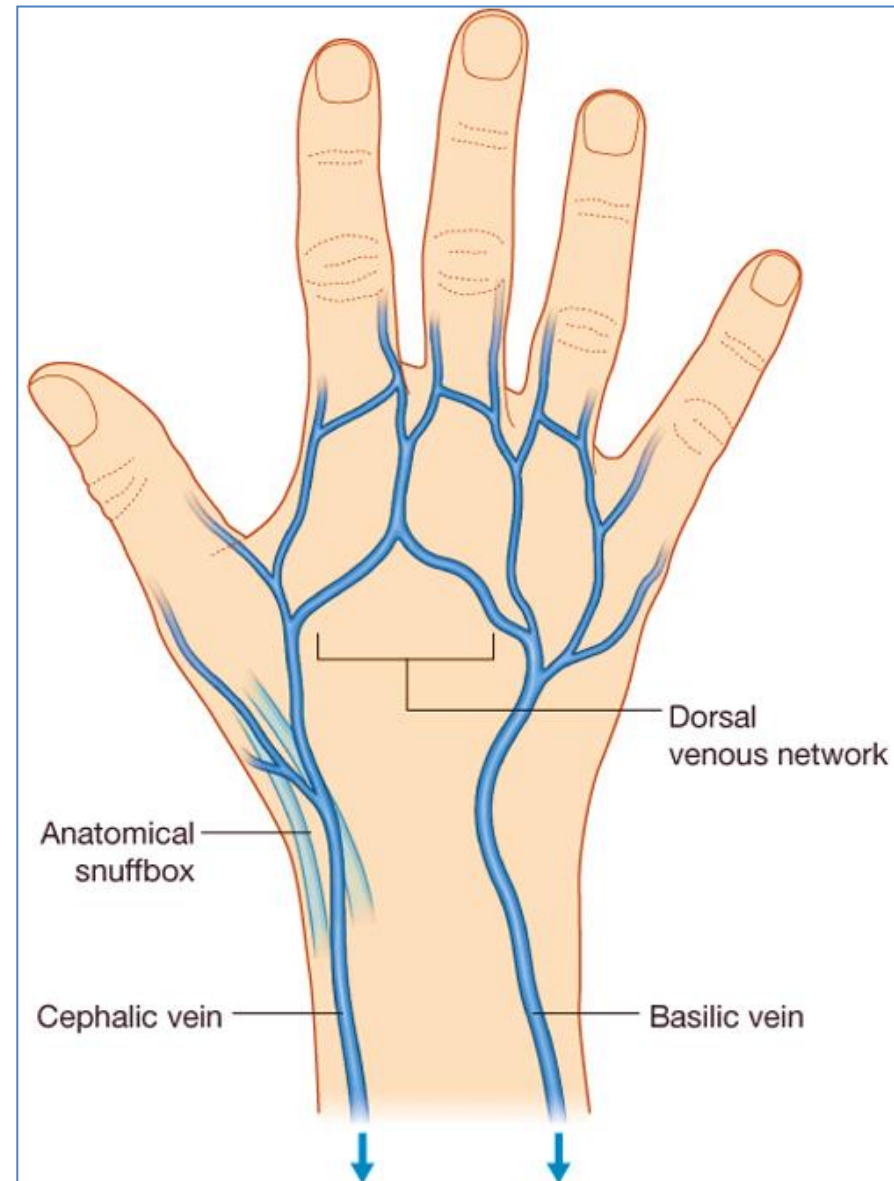
Superficial Veins of the Upper Limb

- Dorsal venous arch
- Veins of the Palm
- Cephalic vein
- Basilic vein
- Median vein of the forearm



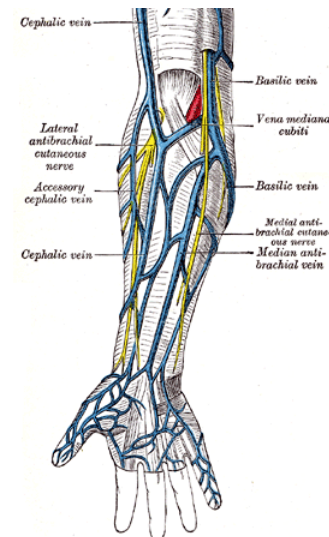
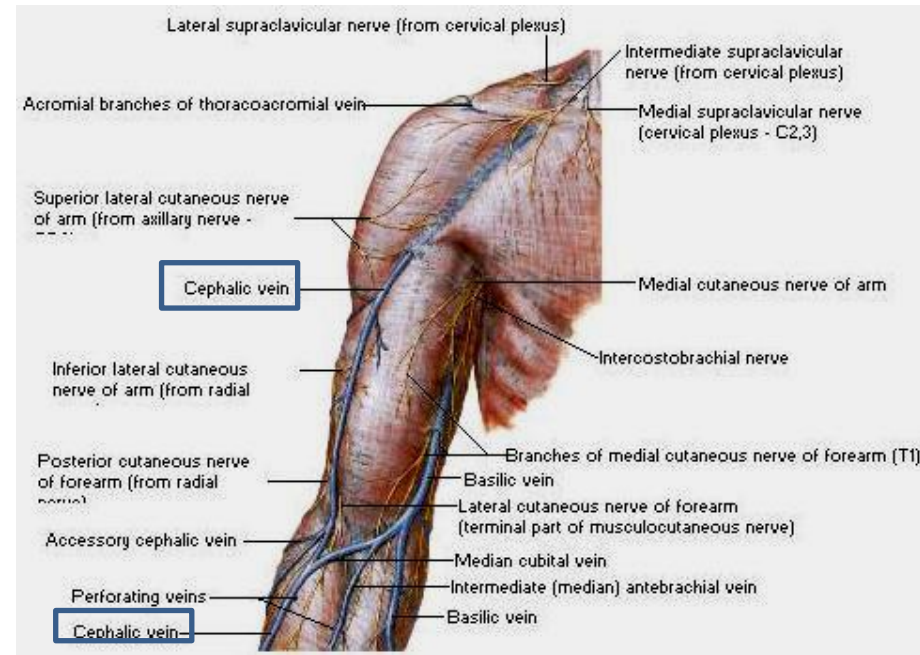
Dorsal venous arch

- Lies in the subcutaneous tissue proximal to Metacarpophalangeal joints.
- Drains on the lateral side into the **Cephalic** vein, and on the medial side into the **Basilic** vein.
- Communicates with the deep veins of the palm freely.



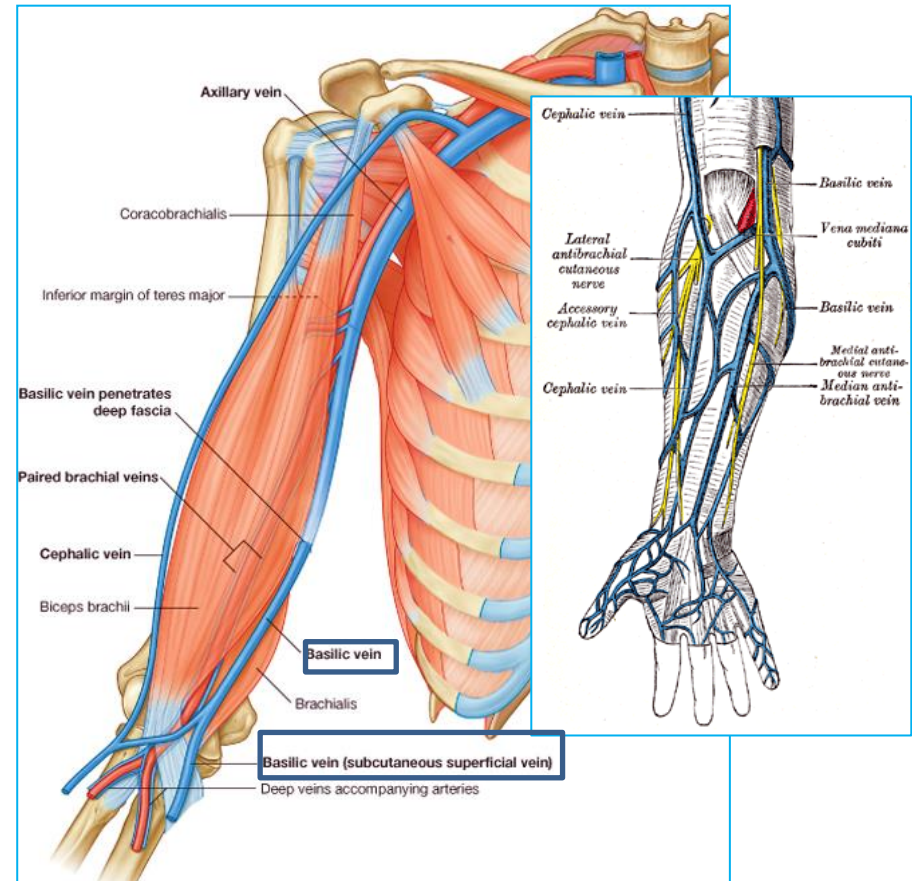
Cephalic Vein

- Arises from the lateral side of the dorsal venous arch on the back of hand.
- Winds round the lateral border of forearm
- Ascends in the superficial fascia into the cubital fossa and up the front of the arm on the lateral side of Biceps.
- On reaching the interval between deltoid & Pectoralis major muscles, it pierces deep fascia & joins the Axillary vein.
- Drains the lateral and posterior surfaces of the limb.
- Median Cubital Vein, a branch of cephalic vein, joins the Basilic vein in the cubital fossa.



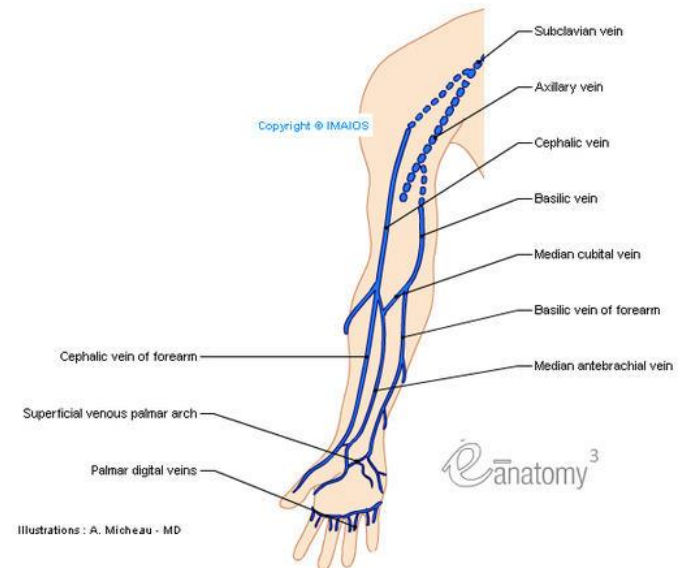
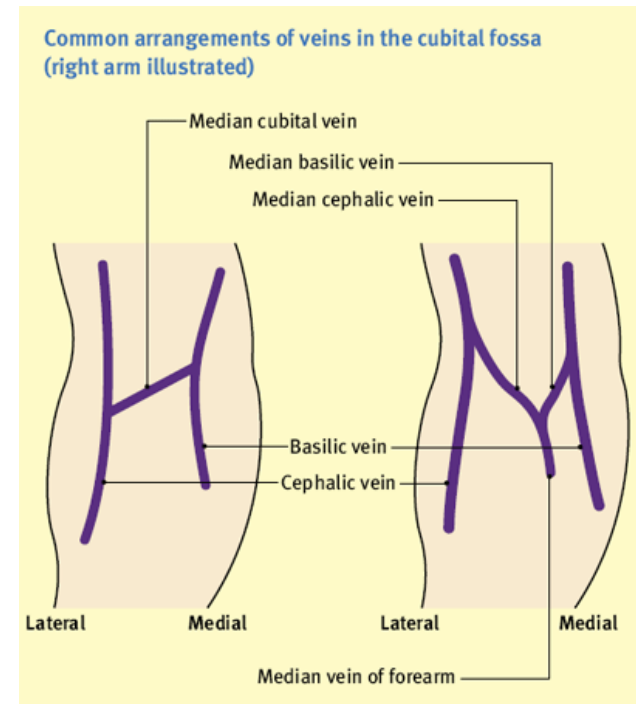
Basilic Vein

- Arises from the medial side of the dorsal venous arch on the back of hand.
- Winds round the medial border of forearm.
- Ascends in the superficial fascia on the posterior surface of the forearm.
- Below elbow it inclines to reach the cubital fossa.
- Ascends on the medial side of Biceps
- It pierces deep fascia at the middle of the arm
- It joins the vena comitantes of the brachial artery to form the Axillary vein.
- Drains the medial and posterior surfaces of the limb.
- Receives Median Cubital Vein at cubital fossa.



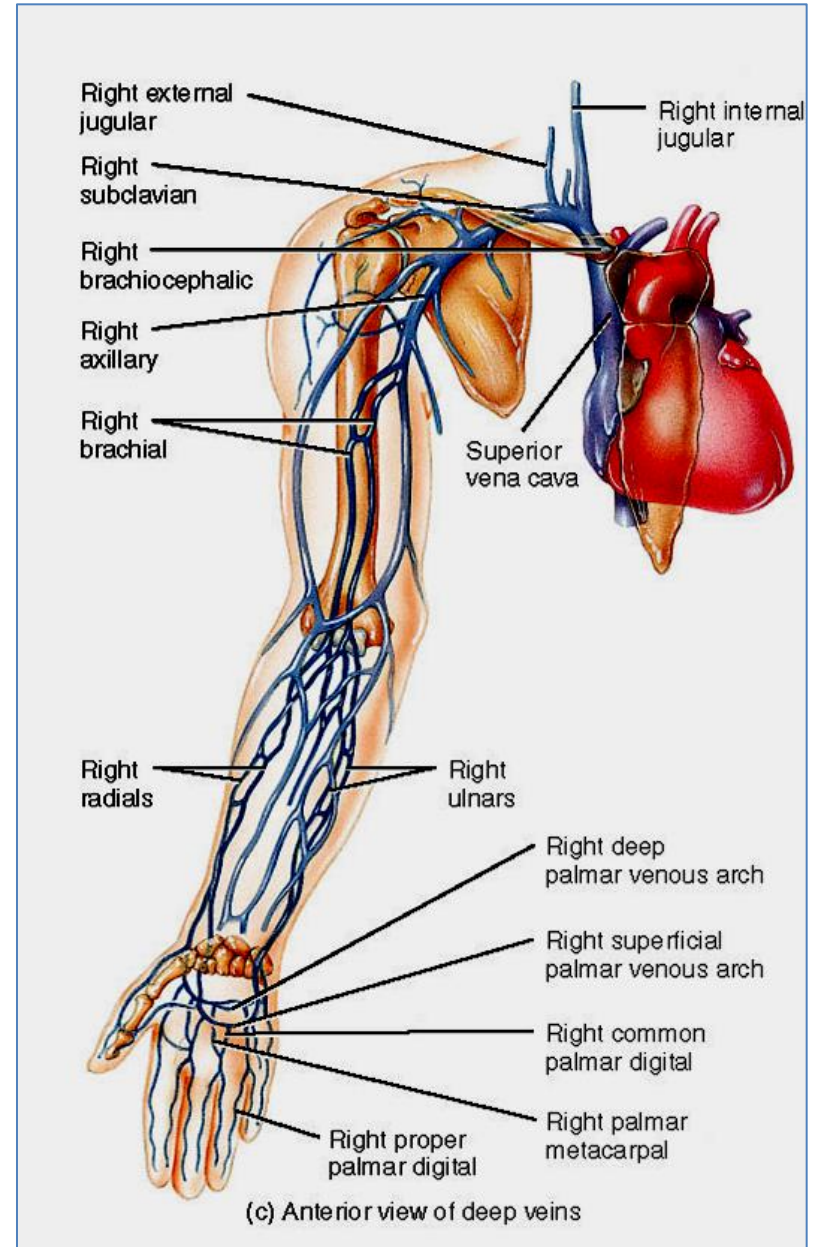
Median Vein of the Forearm

- Arises in the palm
- Ascends on the front of forearm
- Drains into Basilic vein or Median cubital vein or divides into two branches:
 - Median Basilic vein:
(drains into basilic vein)
 - Median cephalic vein:
(drains into cephalic vein)



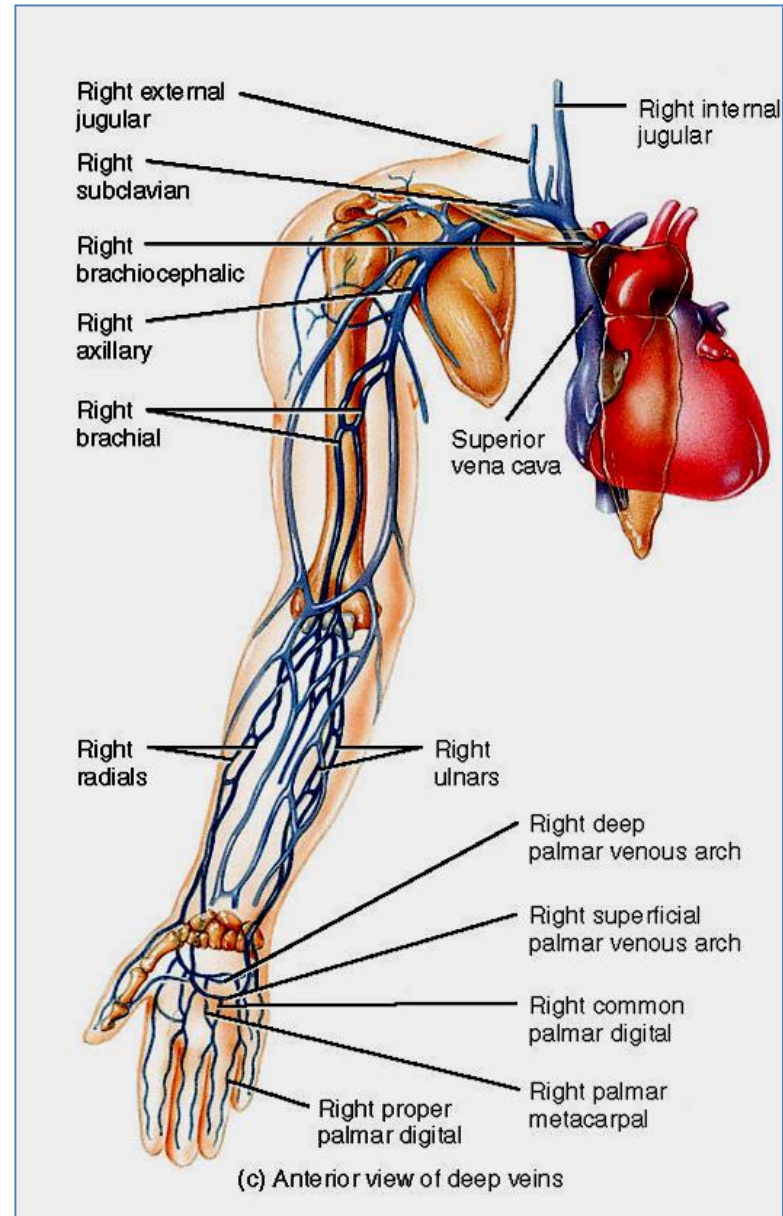
Deep Veins of the Upper Limb

- Venae Comitantes
- Axillary vein



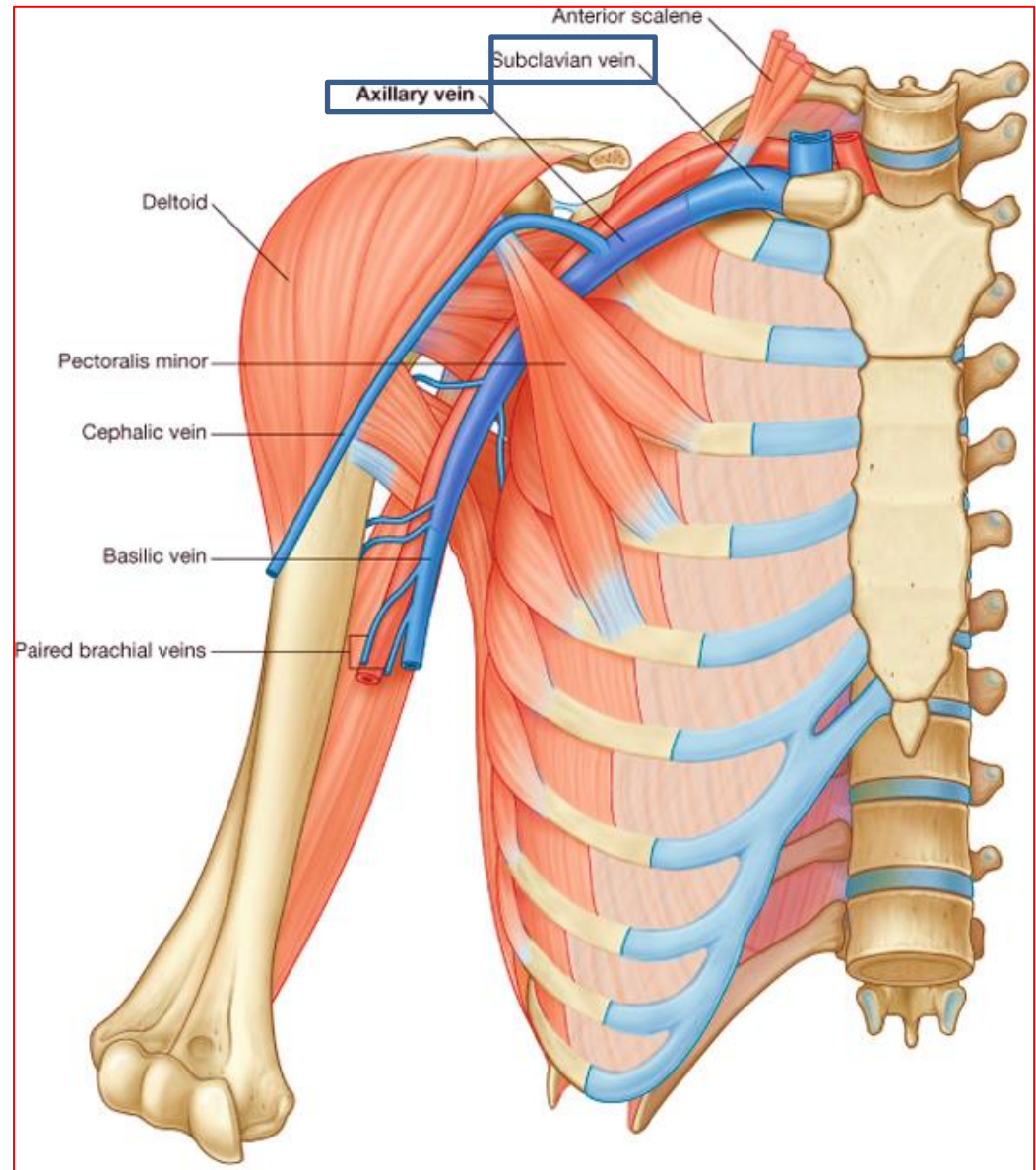
Vena Comitantes

- Deep veins accompany the respective arteries radial and ulnar.
- Two vena comitantes of brachial artery join the basilic vein
- at the lower border of teres major to form Axillary vein



Axillary Vein

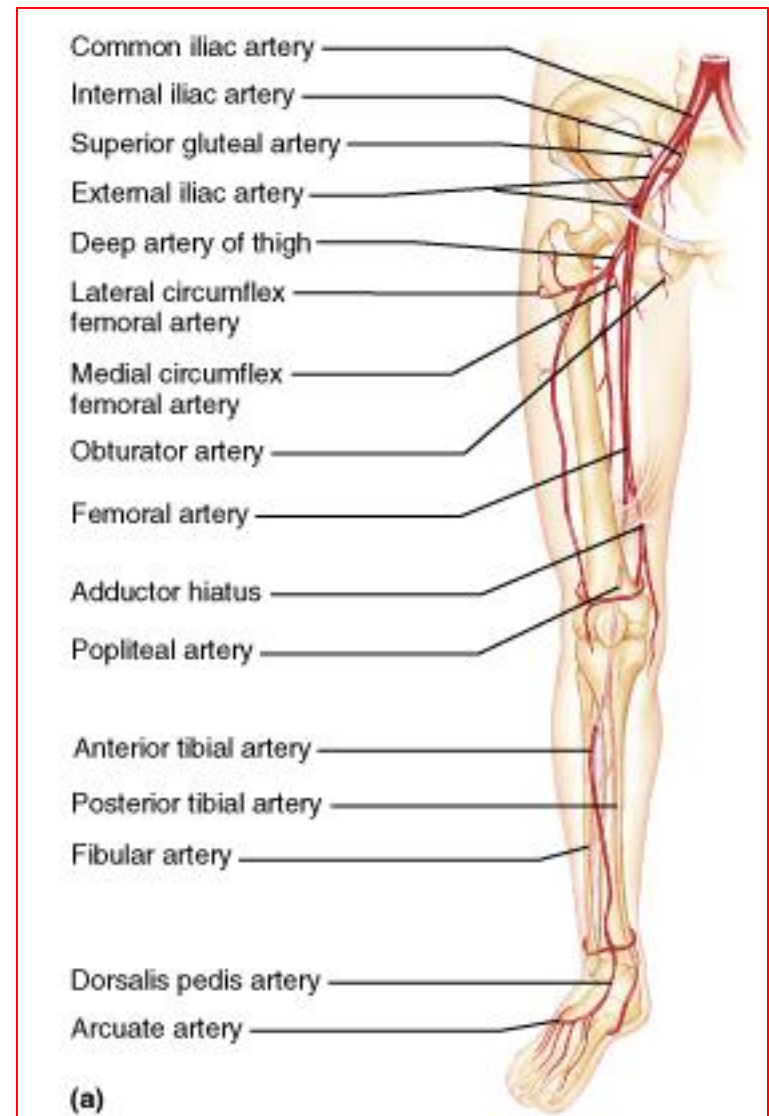
- Formed by the union of the vena comitantes of brachial artery with basilic vein
- It becomes Subclavian Vein at the outer border of 1st rib
- Tributaries correspond to the branches of the axillary artery and also receive Cephalic Vein



Arterial supply of the lower limbs

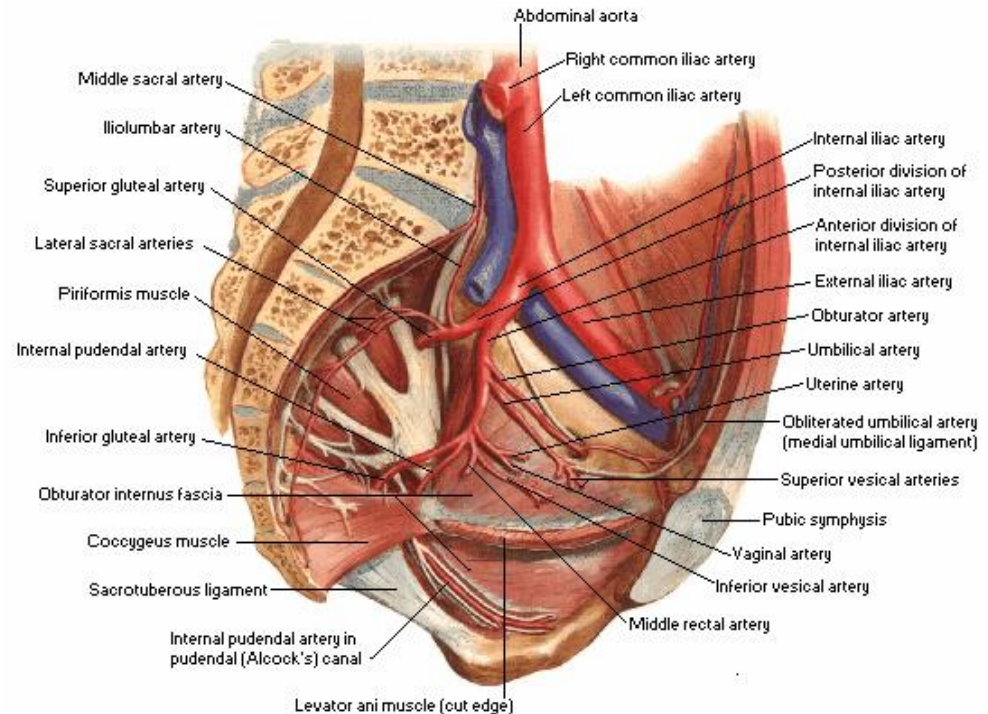
Arterial supply of the lower limbs

- Right and left **Common iliac arteries** arise as terminal branches of the abdominal aorta at the level of L4
- Each artery ends anterior to the Sacroiliac joint by dividing into
 - **Internal Iliac artery.**
 - **External Iliac artery.**



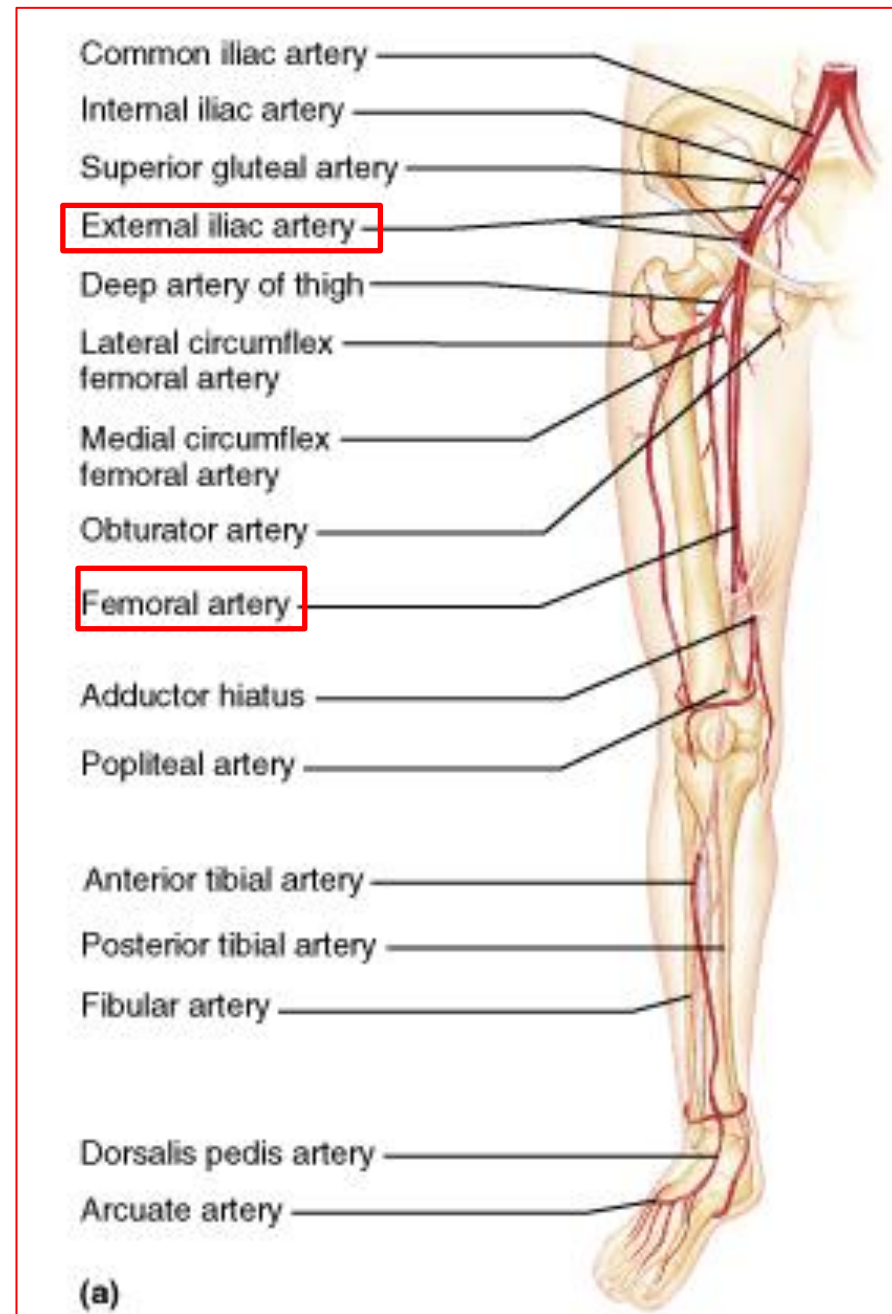
Internal Iliac Artery

- The following branches are our concern
- **Obturator artery** “leaves the pelvis through the obturator canal”
- **Inferior Gluteal artery**” leaves through the greater sciatic foramen inferior to pyriformis”
- **Superior Gluteal artery**” leaves through the greater sciatic foramen superior to pyriformis”



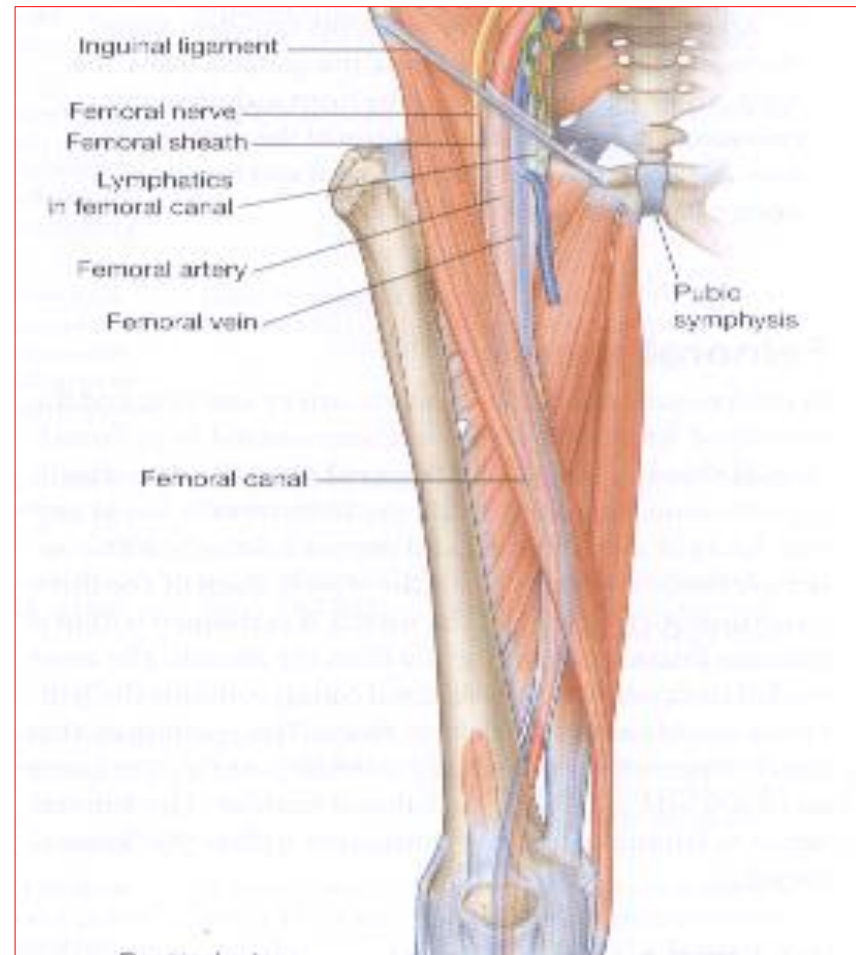
External Iliac artery

- **Femoral artery;** continuation of the external iliac artery, at mid point of the inguinal ligament , It gives;
- **Profunda femoris;** adductors, hamstrings, and quadriceps
- **Popliteal artery** (continuation of femoral)
- **Anterior Tibial artery;** anterior compartment of the leg, further branches to feet.
- **Posterior Tibial artery;** posterior compartment of the leg flexor muscles, plantar arch, branches to toes



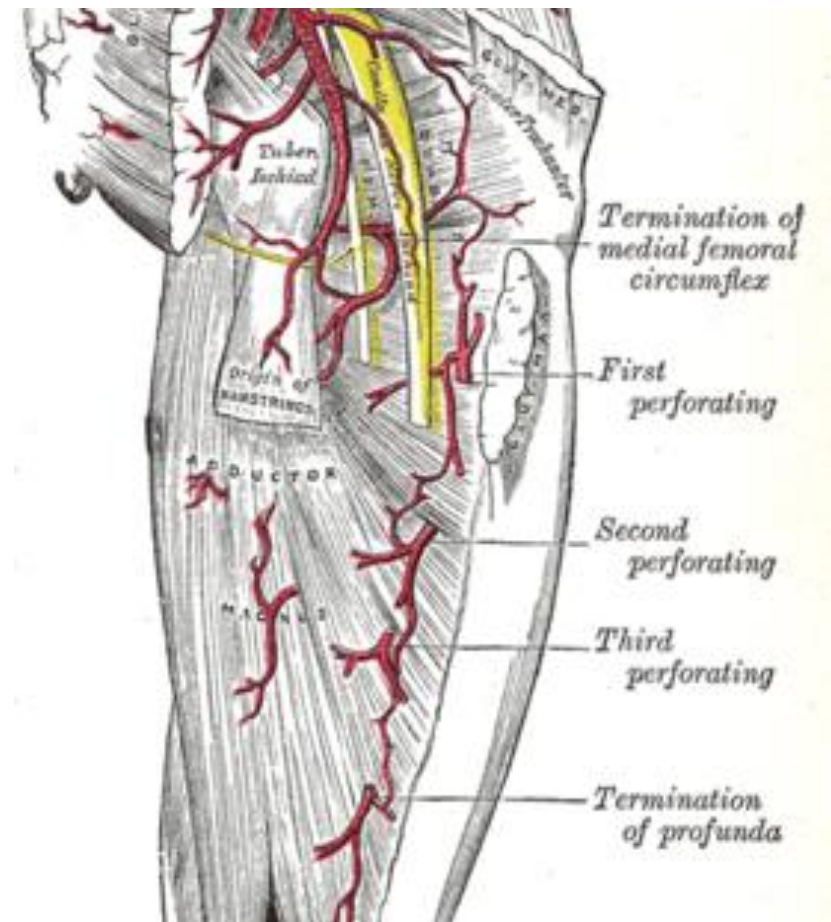
Femoral Artery

- Is the continuation of the **external iliac** artery at mid point of the inguinal ligament.
- Begins deep to the inguinal ligament.
- Enclosed within the femoral sheath.
- Becomes the **popliteal artery** at the adductor hiatus.
- **Proximal branches;**
 - Superficial epigastric artery.
 - Superficial circumflex iliac artery.
 - Superficial external pudendal artery.



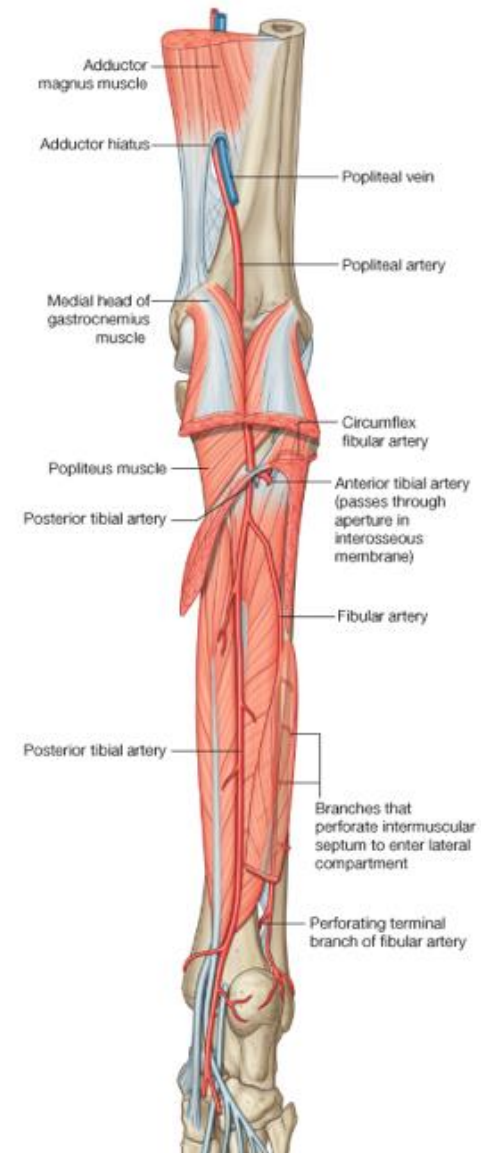
- Deep external pudendal.
- Descending genicular.” runs with saphenous nerve
- Profunda femoris (deep femoral): Arises from deep of femoral artery within femoral triangle, Largest branch of femoral artery, Passes posterior to adductor longus muscle.
- Branches:” of profunda femoris”
- Medial femoral circumflex.
- Lateral femoral circumflex.
- Perforating arteries (3).
- Descending genicular.

Femoral Artery “deep branches”



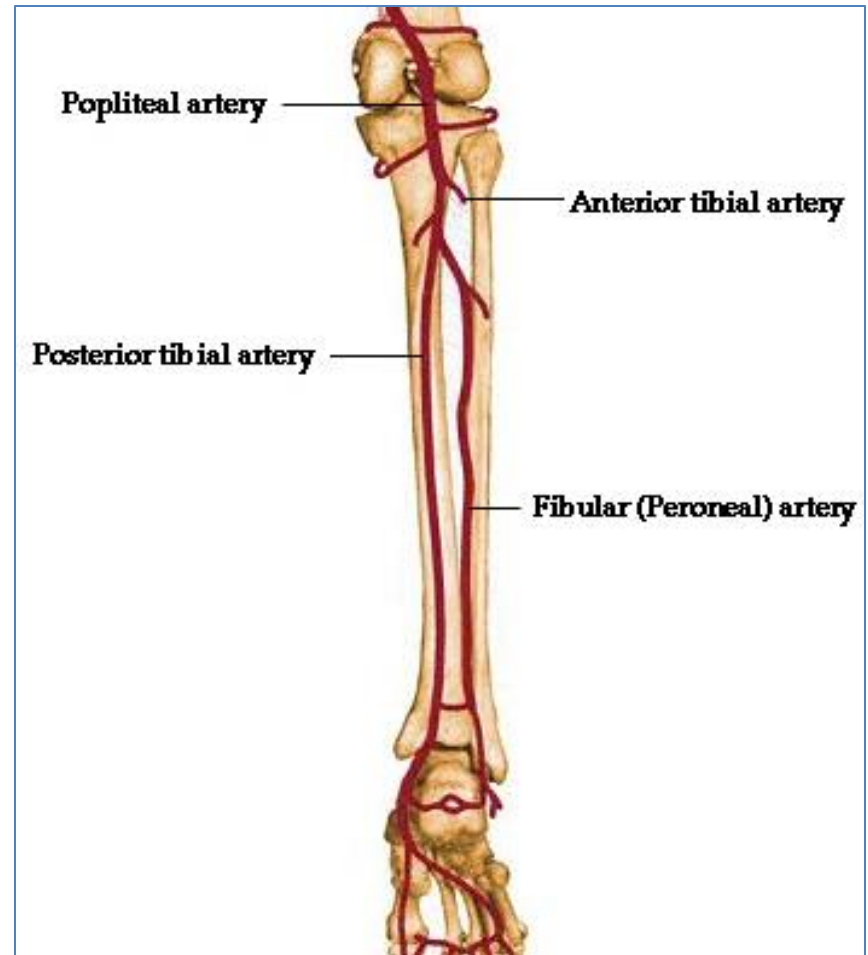
Femoral artery Cont.

- The femoral artery enters the subsartorial canal “ adductor canal” then through the adductor hiatus to pass to the posterior compartment of the knee “popliteal fossa” and changes it’s name to popliteal artery
- It is accompanied by popliteal vein which runs in the lateral side of the artery



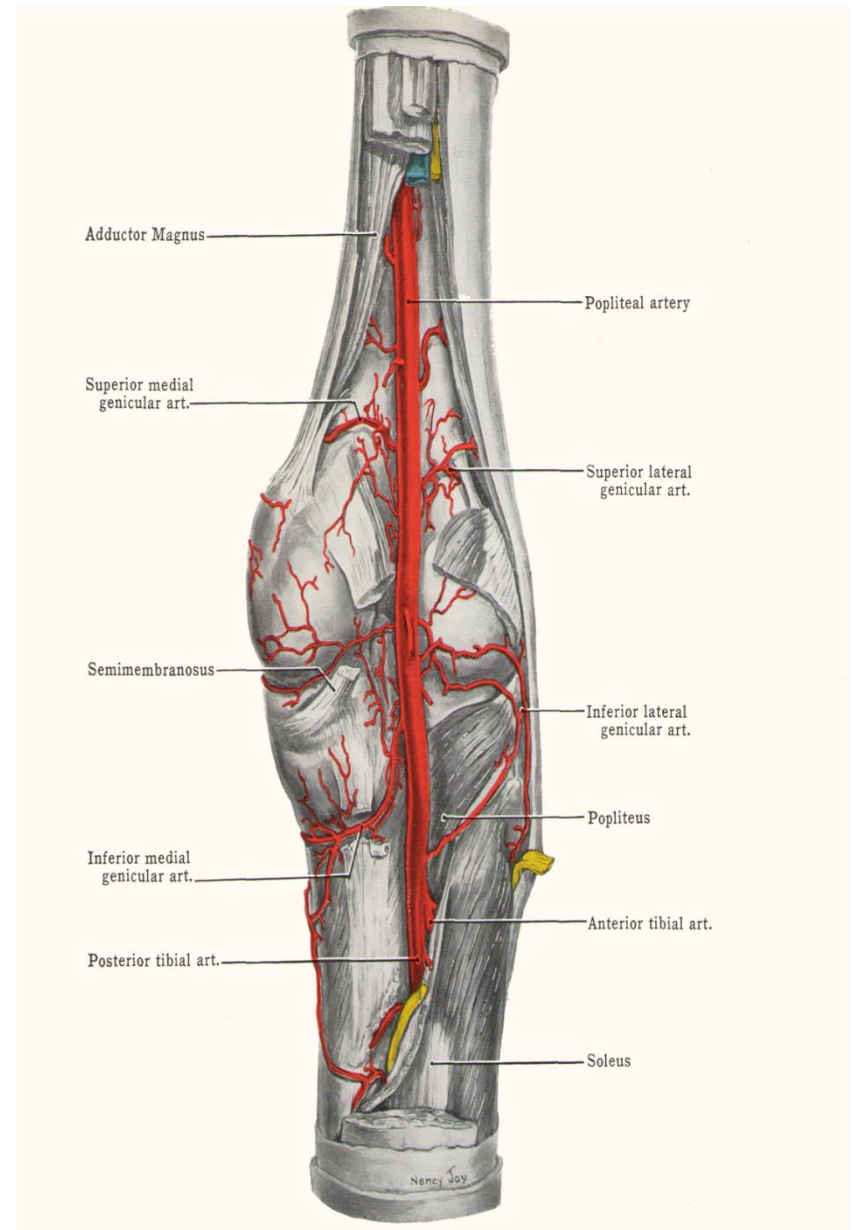
Popliteal artery

- Continuation of femoral artery as it passes through opening in adductor magnus muscle.
- From its origin it runs downwards & slightly laterally in popliteal fossa.
- Reaches lower border of popliteus
- Terminates by dividing into anterior & posterior tibial arteries



Popliteal artery

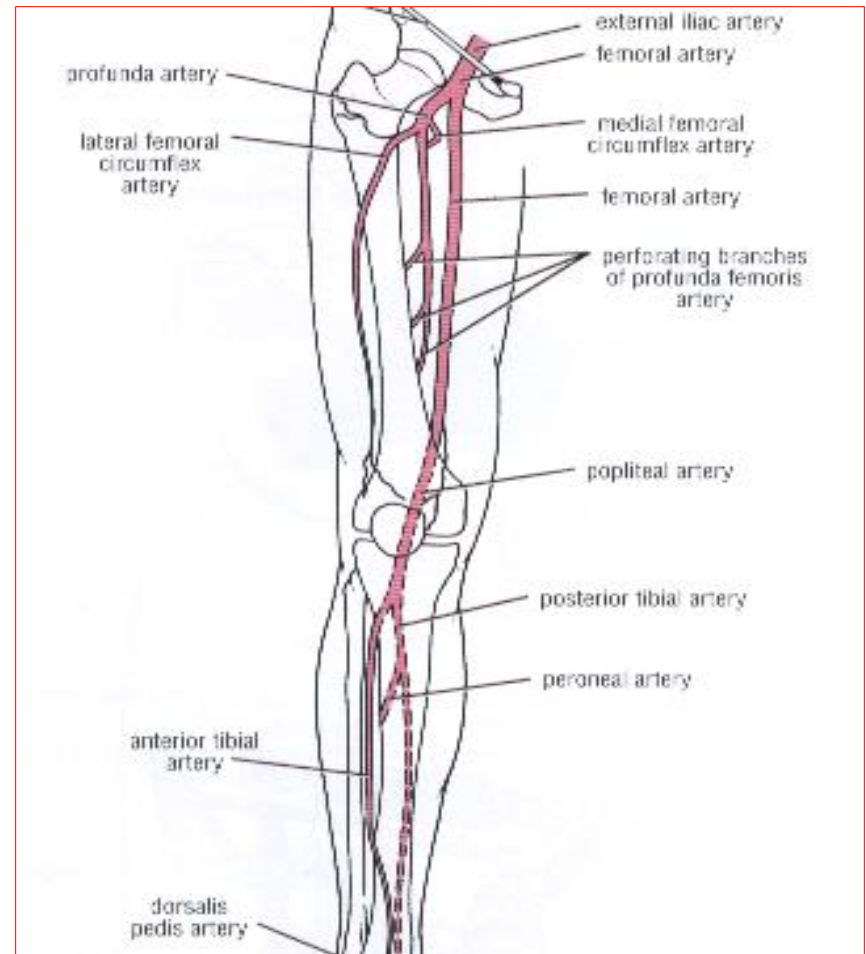
- **Branches**
- Muscular: supplies surrounding muscles
- Articular (genicular) :
 - lateral & medial superior genicular
 - middle genicular
 - lateral & medial inferior genicular



Blood Supply of the anterior Compartment of the Leg

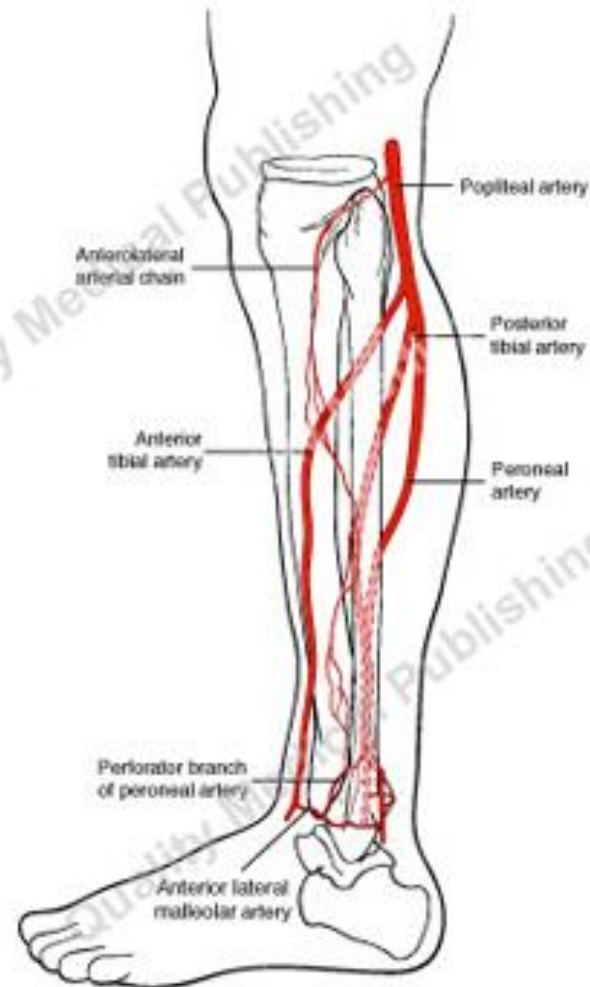
□ Anterior Tibial Artery

- Is the smaller of the terminal branches of the popliteal artery.
- It arises at the level of the lower border of the popliteus muscle and
- Passes forward into the anterior compartment of the leg through an opening in the upper part of the interosseous membrane.
- Descends on the anterior surface of the interosseous membrane, accompanied by the deep peroneal nerve.
- In front of the ankle joint, the artery becomes the dorsalis pedis artery.



Anterior Tibial Artery

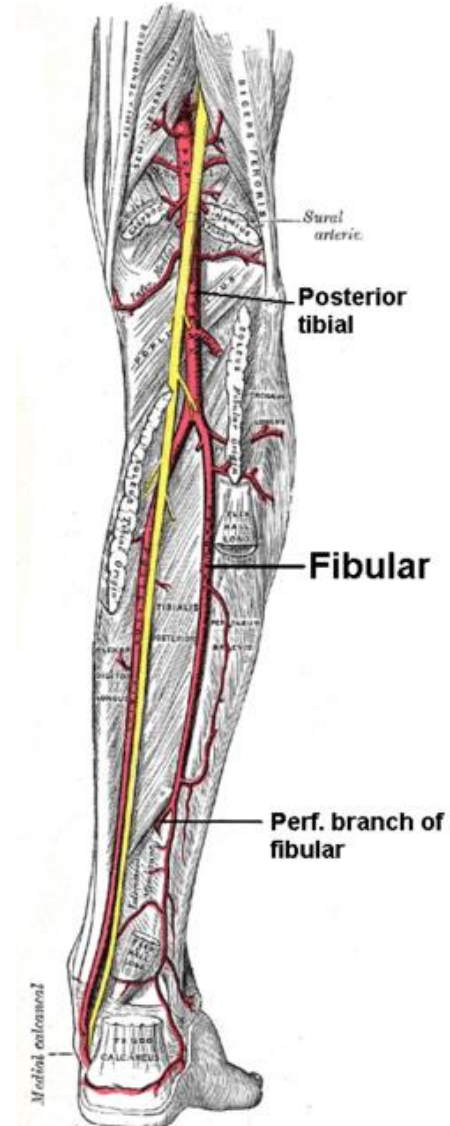
- Branches
- Muscular branches to neighboring muscles.
- Anastomotic branches around the knee and ankle joints.



Artery of the Posterior Fascial Compartment of the Leg

❑ Posterior Tibial Artery

- Is one of the terminal branches of the popliteal artery.
- Begins at the level of the lower border of the popliteus muscle.
- It lies on the posterior surface of the tibia below.
- The artery passes behind the medial malleolus deep to the flexor retinaculum and terminates by dividing into
 - **medial and lateral plantar arteries.**

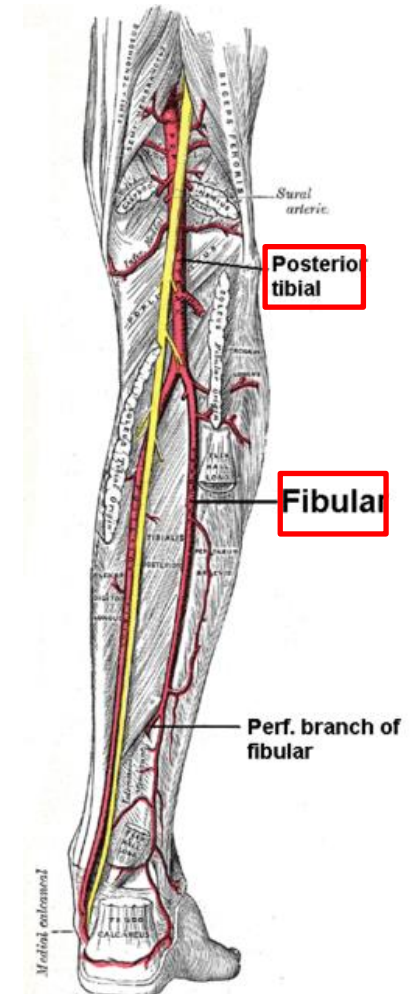


❑ Branches

- **Peroneal artery:** gives off muscular branches and a nutrient artery to the fibula and ends by taking part in the anastomosis around the ankle joint.
- **Lateral Plantar Artery;** the larger of the terminal branches of the posterior tibial artery.
- On reaching the base of the fifth metatarsal bone, the artery curves medially to form the plantar arch and at the proximal end of the first intermetatarsal space joins the dorsalis pedis artery.
- During its course, it gives off muscular, cutaneous, and articular branches. The plantar arch gives off plantar digital arteries to the toes.



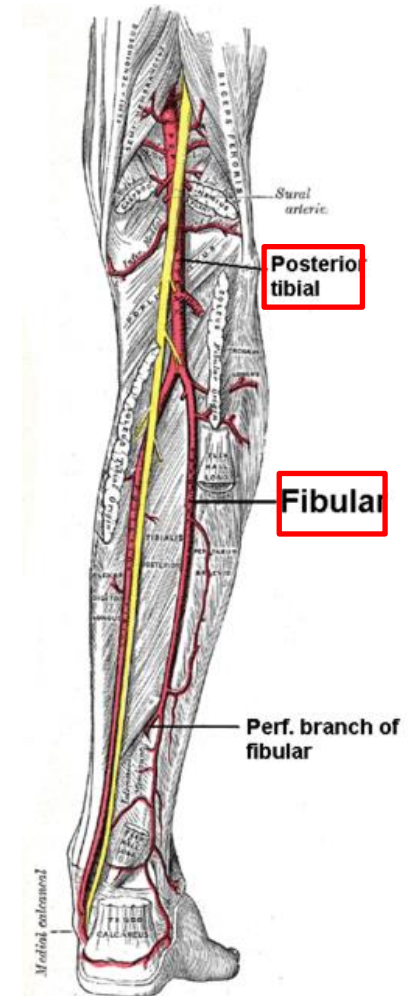
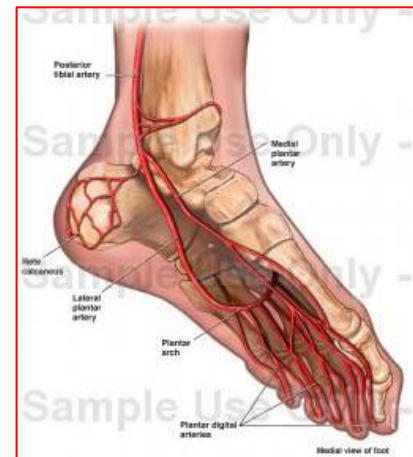
Artery of the Posterior Fascial Compartment of the Leg



Artery of the Posterior Fascial Compartment of the Leg

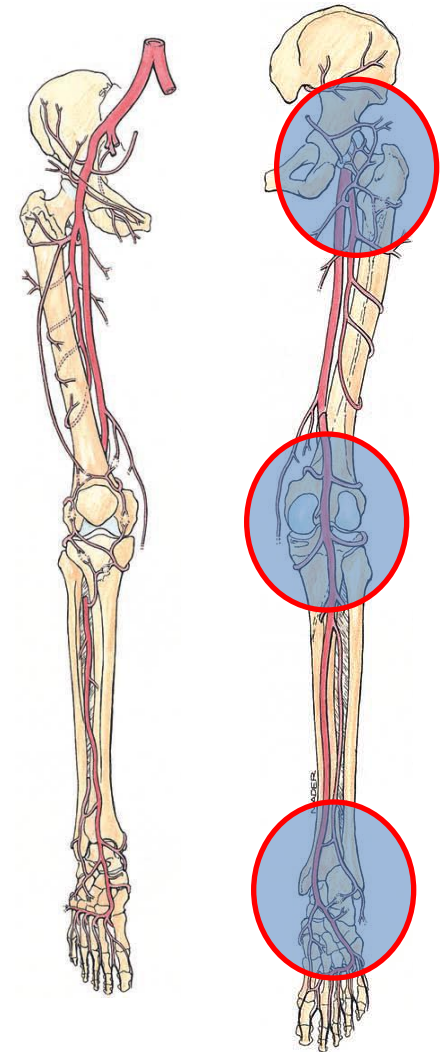
□ Branches

- **Medial Plantar** Artery; the smaller of the terminal branches of the posterior tibial artery.
- Reaching the base of the first metatarsal bone,



Anastomosis in the Lower Limb

- Anastomosis between different arterial branches
- To ensure blood circulation in the case of occlusion in any artery
- Cruciate anastomosis
- Geniculate anastomosis
- Plantar anastomosis



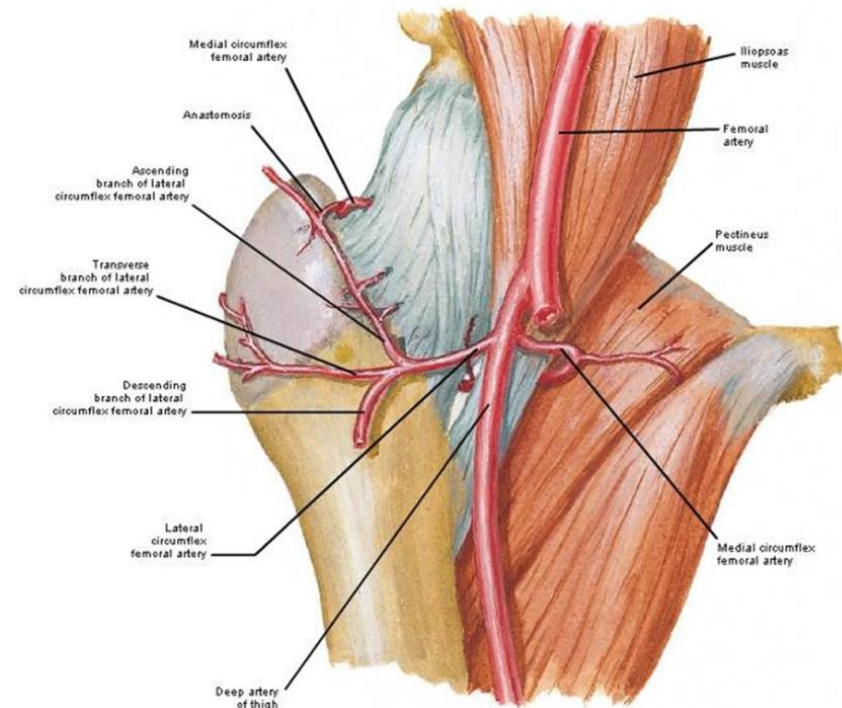
Anastomosis in the Lower Limb

■ Cruciate anastomosis

- Branches of inferior gluteal artery.
- Medial femoral circumflex arteries
- Lateral femoral circumflex arteries.
- The first perforating artery.

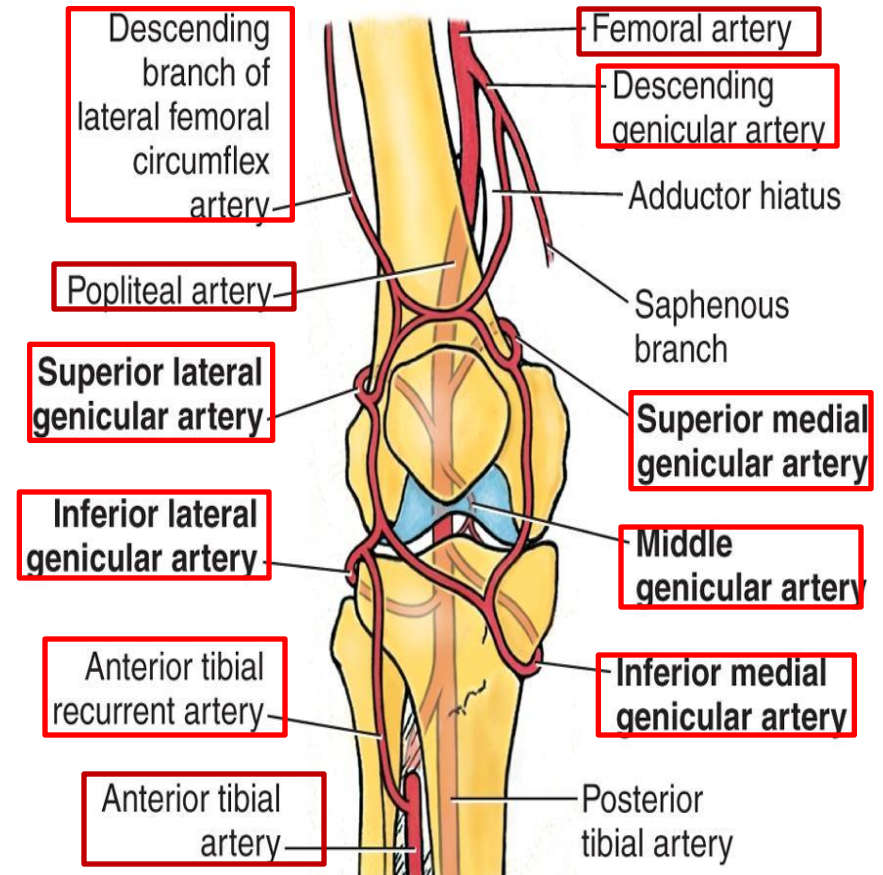
■ Trochanterica anastomosis

- Superior Gluteal arteries
- Inferior Gluteal arteries.
- Medial femoral circumflex arteries.
- Lateral femoral circumflex arteries.



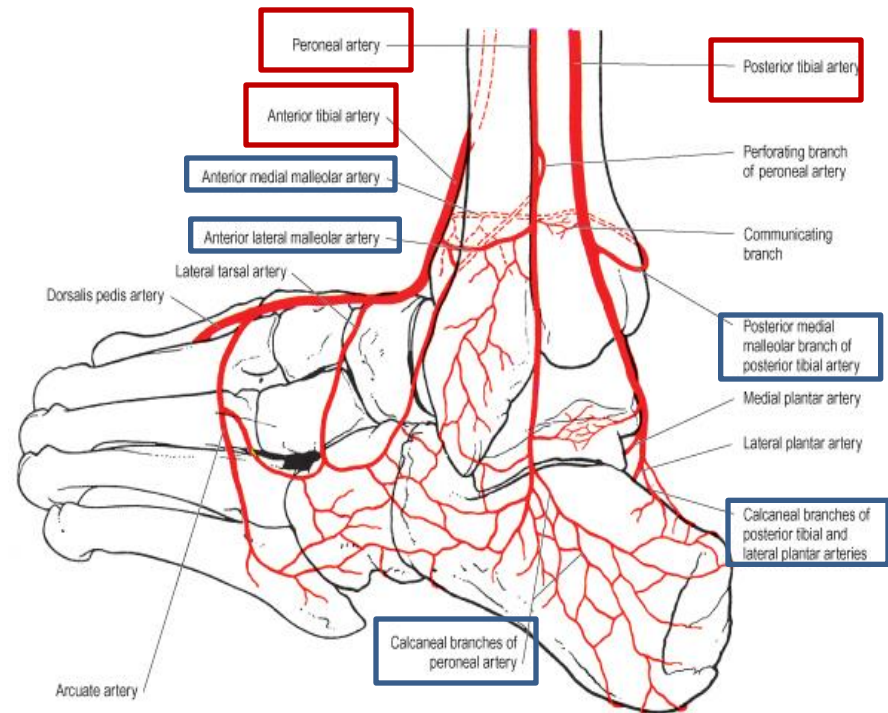
Anastomosis around the Knee Joint

- Is made by the following branches:
 - Descending branch of lateral circumflex femoral.
 - Descending genicular of femoral
 - Anterior tibial recurrent.
 - Five branches of popliteal artery.



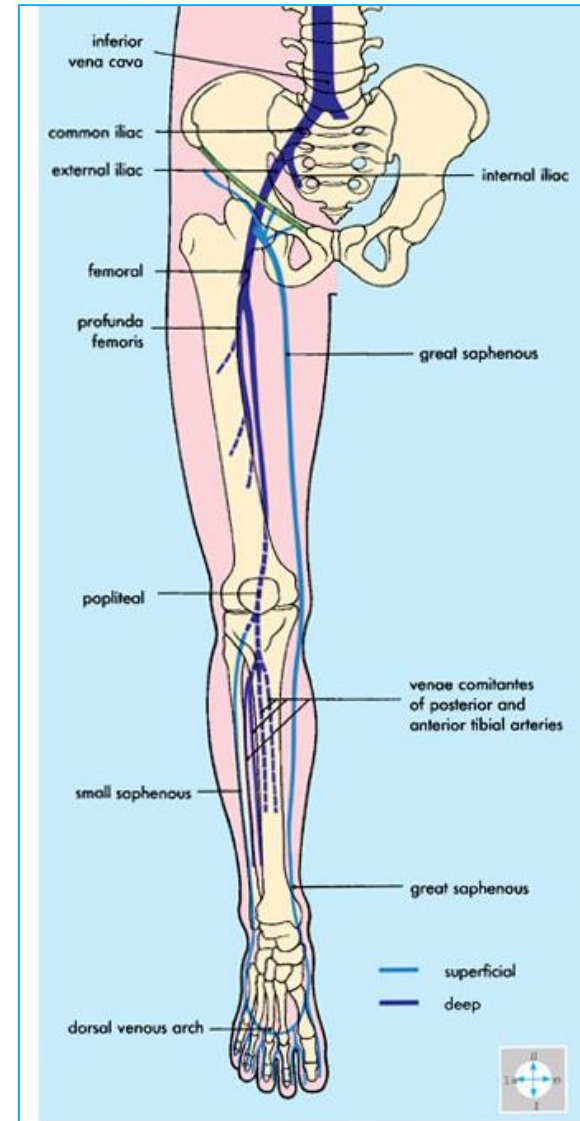
Anastomosis around the Ankle Joint

- Is formed by the following branches:
 - Calcanean branches of posterior tibial and peroneal arteries.
 - Malleolar branches of posterior tibial and peroneal arteries.
 - Medial and lateral malleolar branches of anterior tibial artery.



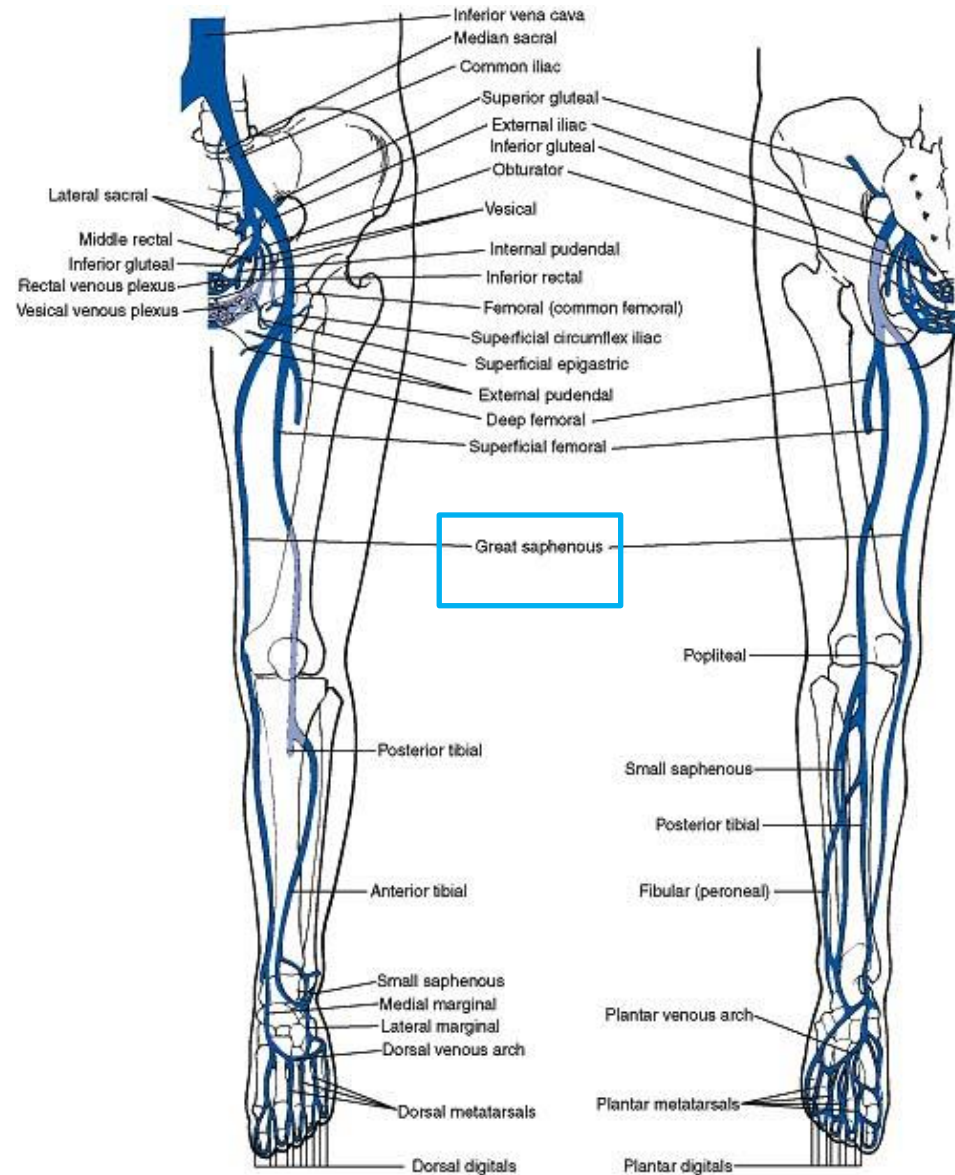
Venous drainage of the lower limb

- They are subdivided into superficial and deep veins.
- The superficial veins are between the two layers of superficial fascia while
- The deep veins accompany the arteries.
- Both sets of veins are provided with valves more numerous in the deep than in the superficial set.



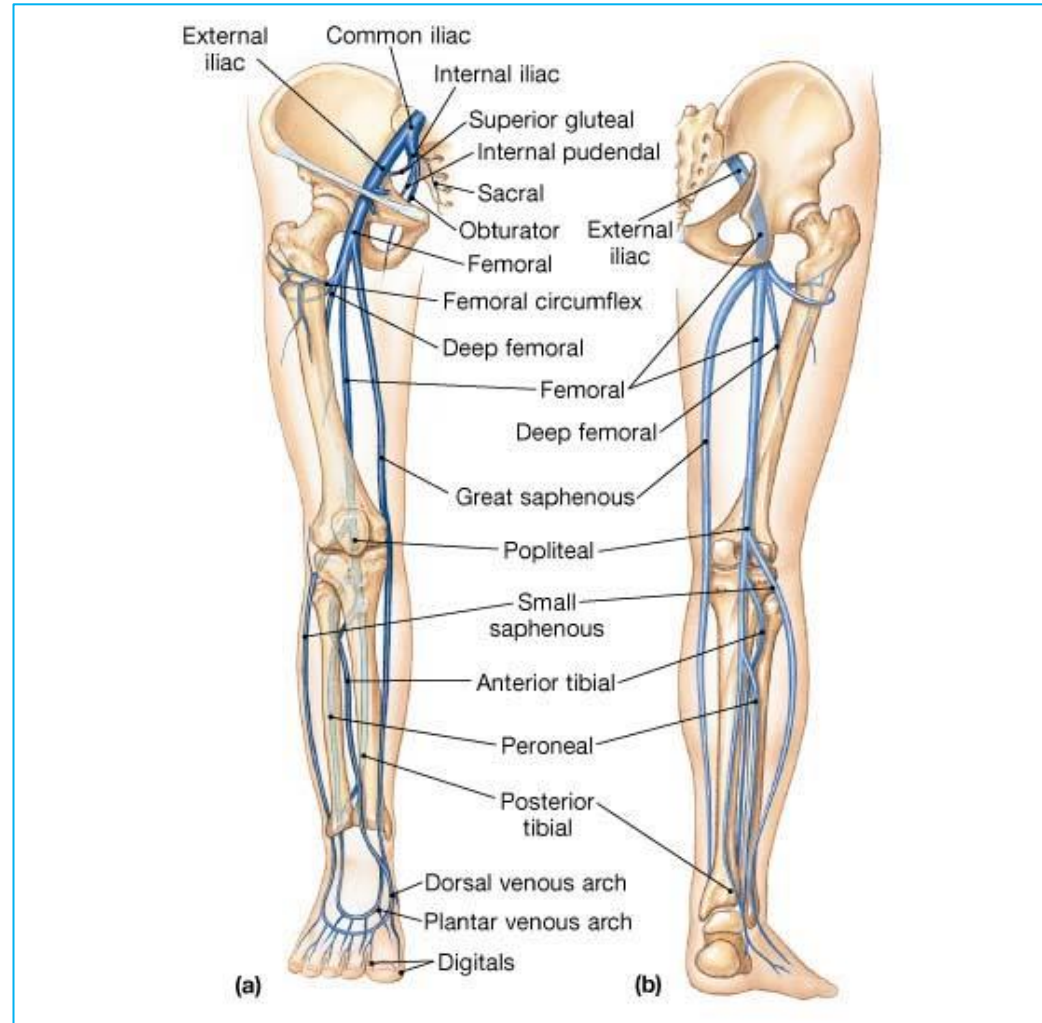
The great saphenous vein (long saphenous vein)

- Is the longest vein in the body.
- Begins in the medial marginal vein of the dorsum of the foot.
- It passes in front of the medial malleolus and along the medial side of the leg.
- along the medial side of the thigh to end in the femoral vein about 3 cm below the inguinal ligament.
- Main Tributaries:
 - superficial circumflex iliac
 - superficial external pudendal



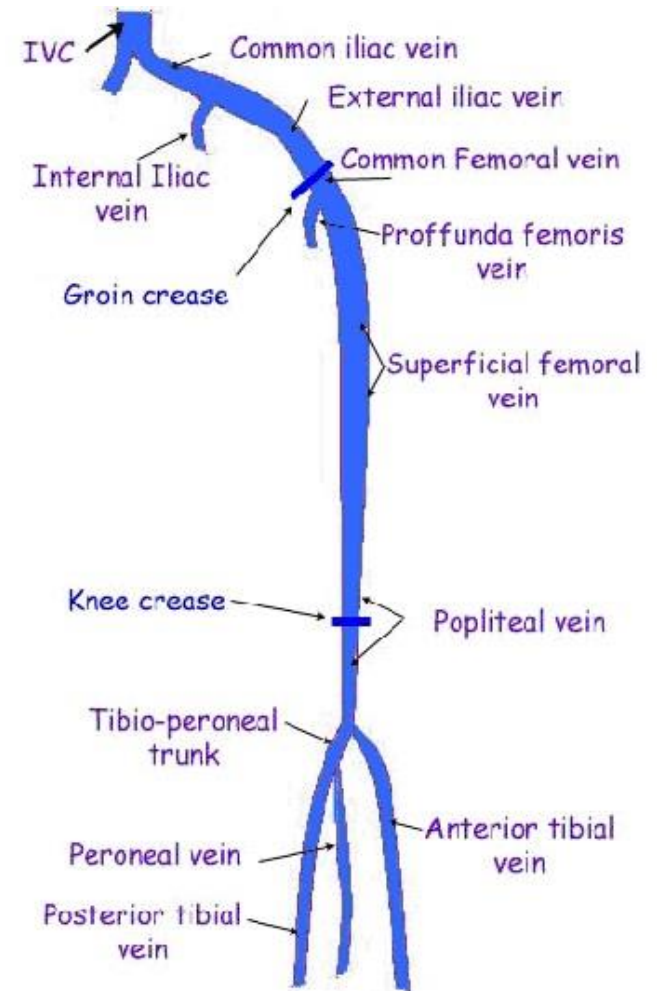
Small saphenous vein (short saphenous vein)

- Begins behind the lateral malleolus as a continuation of the lateral marginal vein,
- Ascends to reach the middle of the back of the leg.
- It perforates the deep fascia at the popliteal fossa and ends in the popliteal vein
- Tributaries
 - Branch from great saphenous vein
 - Lateral marginal vein
 - Numerous tributaries from the back of the leg.

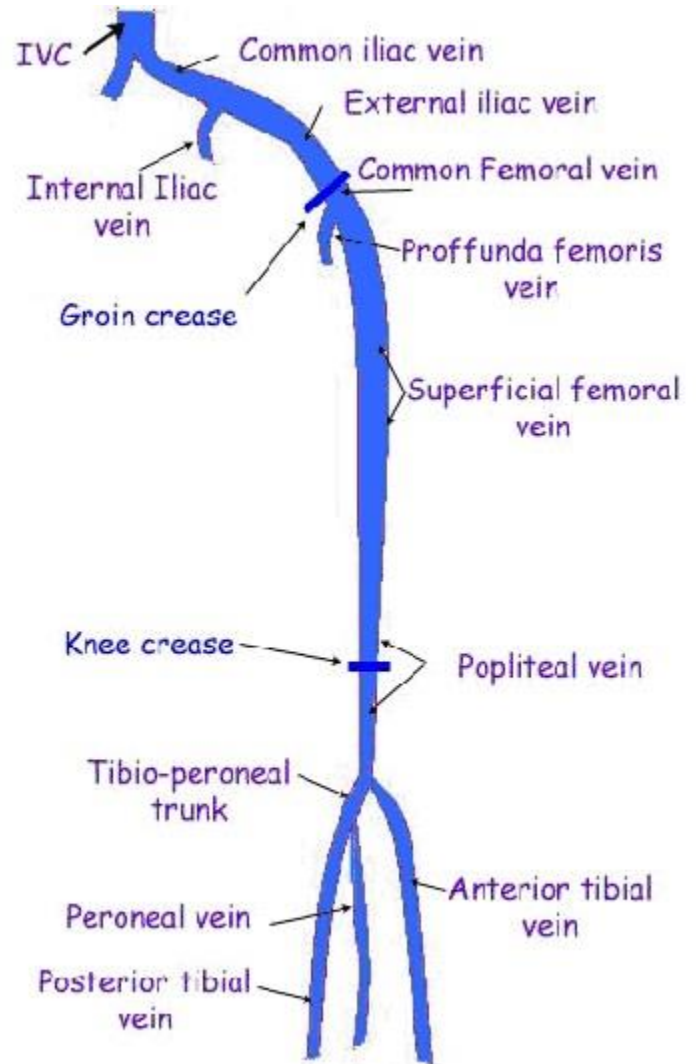


- They accompany the arteries and their branches.
- They possess numerous valves.
- The deep plantar venous arch lies alongside the plantar arterial arch drains into the **medial and lateral plantar veins**.
- The **posterior tibial vein** accompanies the posterior tibial artery and joined by the **peroneal vein** to form the **popliteal vein**.
- The **anterior tibial vein** is the upward continuation of the **venæ comitantes of the dorsalis pedis artery**.
- They leave the front of the leg by passing between the tibia and fibula, over the interosseous membrane, and unite with the posterior tibial vein

Deep veins



- The **Popliteal Vein** ascends through the popliteal fossa to the opening in the Adductor magnus, where it becomes the femoral vein.
- It receives tributaries corresponding to the branches of the popliteal artery, and the small saphenous vein.
- The **femoral vein** accompanies the femoral artery through the upper two-thirds of the thigh.
- It receives many muscular tributaries, and about 4 cm below the inguinal ligament is joined by the deep femoral vein and is joined by the great saphenous vein before it terminates.
- The deep femoral vein receives tributaries corresponding to the perforating branches of the profunda artery, and through these establishes communications with the popliteal vein below and the inferior gluteal vein above.



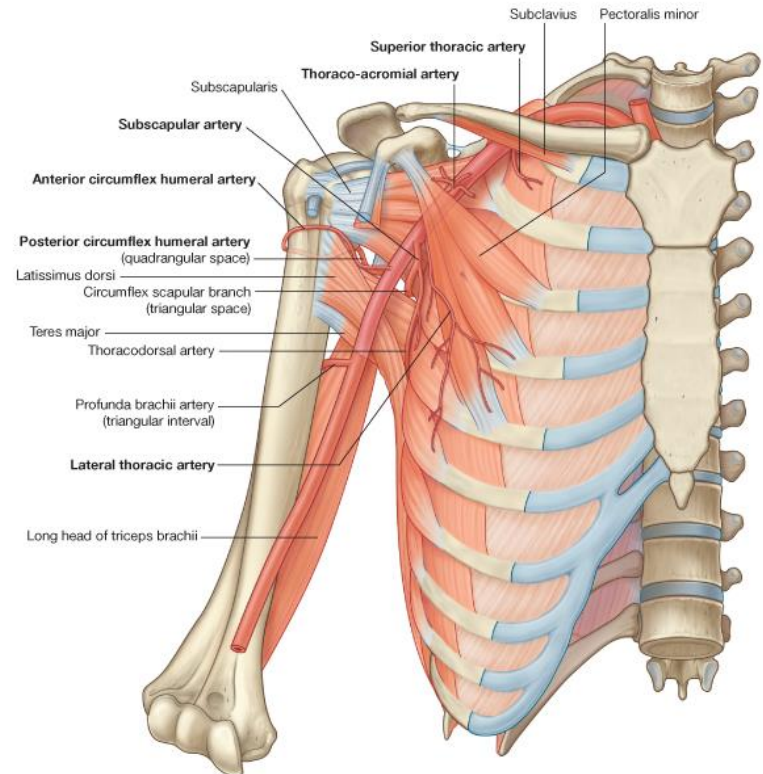
CLINICAL APPLICATION

AND

PROBLEMS

Thoracic outlet syndrome

- The brachial plexus of nerves and the subclavian artery and vein are closely related to the upper surface of the first rib and the inferior surface of the clavicle.
- It is caused by pressure on the lower trunk of the plexus and circulatory impairment of the upper limb.

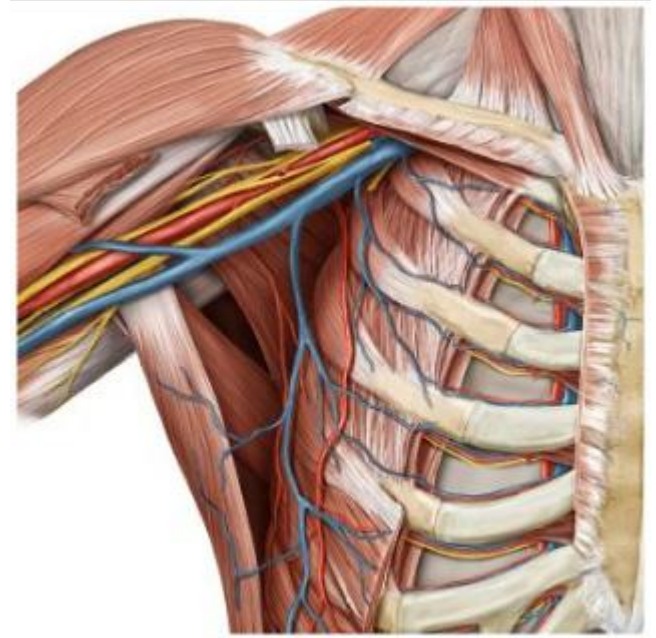


The axillary sheath and brachial plexus nerve block

As the axillary sheath encloses the axillary vessels and the brachial plexus, through the cervicoaxillary canal

The **brachial plexus nerve block** is obtained by injection of the anesthetic solution into the sheath.

Position of the sheath is verified; and confirmed by feeling the pulsation of the 3rd part of the axillary artery.



Venipuncture and blood transfusion

- The superficial veins are important for venipuncture, transfusion, and cardiac catheterization.
- When a patient is in a state of shock the superficial veins are not always visible.
- In extreme hypovolemic shock excessive venous tone may inhibit venous blood flow and so delay introduction of intravenous blood into the vascular system

Venipuncture and blood transfusion

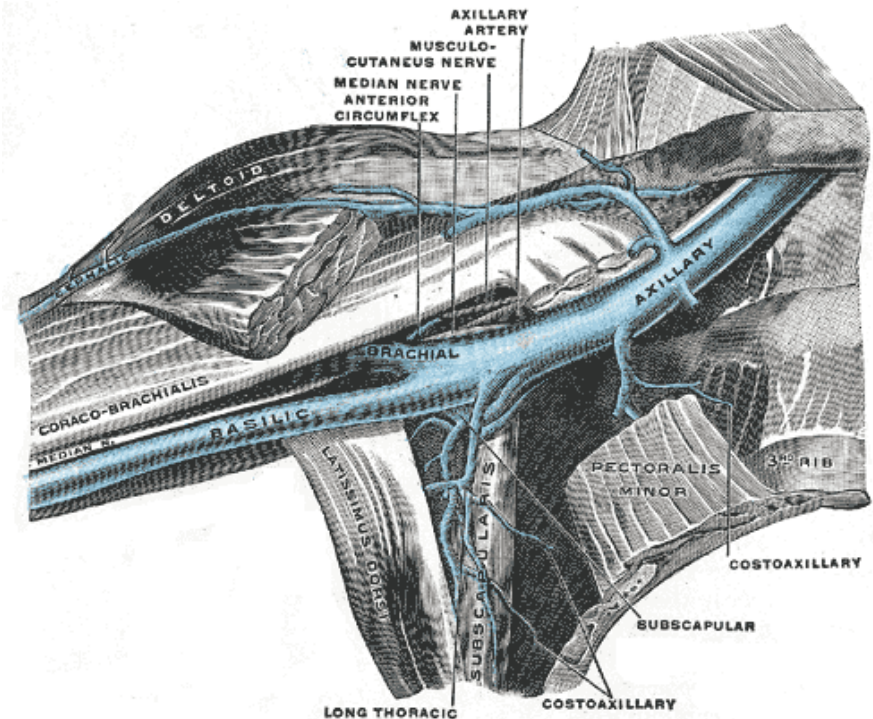
- The **cephalic vein** lies fairly constantly immediately posterior to the styloid process of the radius.
- In the cubital fossa the **median cubital vein** is separated from the brachial artery by the bicipital aponeurosis, which protects the artery from mistaken introduction of irritating drugs.

Anatomy of Basilic and Cephalic vein catheterization

The basilic vein is the vein of choice for central venous catheterization

From the cubital fossa until reaching the axillary vein it increases in diameter and lies in direct line with the axillary vein

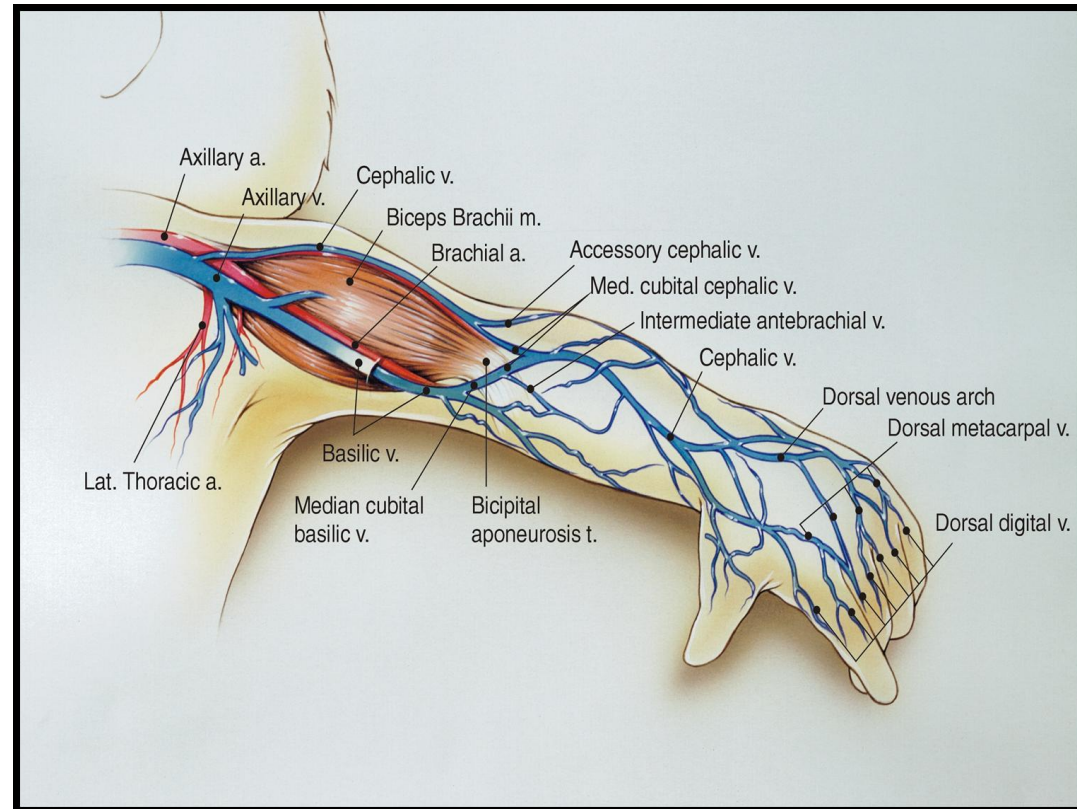
Abduction of the arm will overcome the troublesome caused by the valves in the axillary vein, and permits the catheter to move past the obstruction.



Anatomy of Basilic and Cephalic vein catheterization

The **cephalic vein** does not increase in size as it ascends in the arm, and frequently divides into small branches

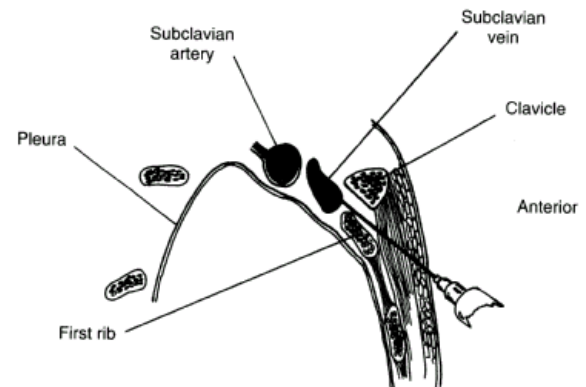
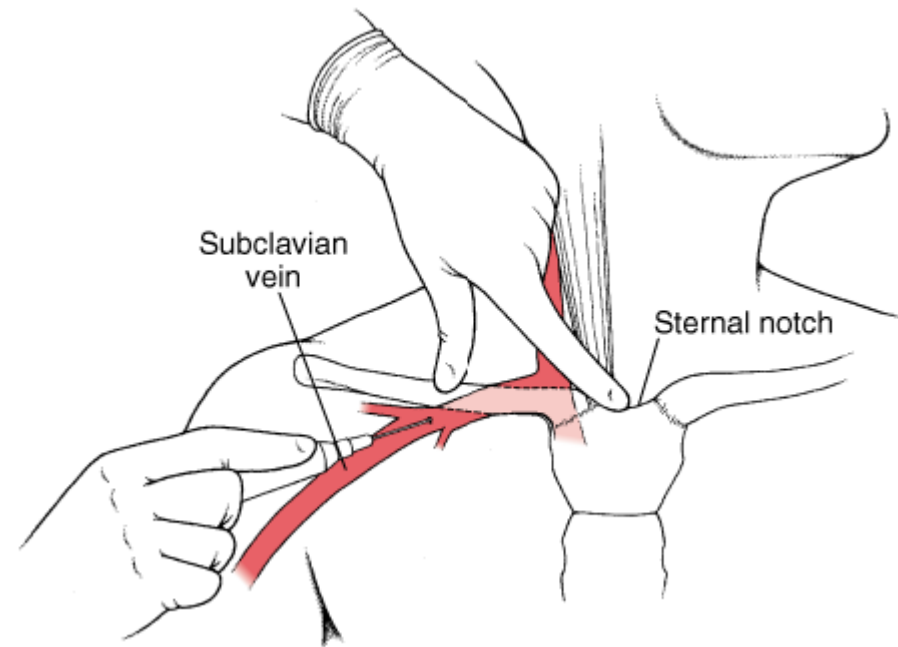
At its termination it joins the axillary vein at right angle, so it is difficult to maneuver the catheter around this angle.



□ Subclavian vein

- It lies immediately posterior to the medial third of the clavicle.
- It is more medially placed on the left than the right side
- The needle is inserted just below the lower border of the clavicle
- at junction of medial third and outer two thirds.
- It is pointed upward and posteriorly towards the middle of the suprasternal notch.

Catheterization



Femoral Vein Catheterization

Position; Supine

Femoral vein determination ;

- Femoral arterial pulse just below inguinal ligament

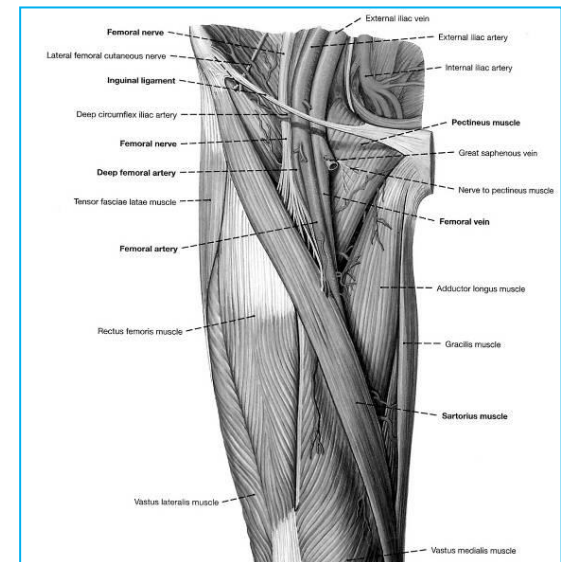
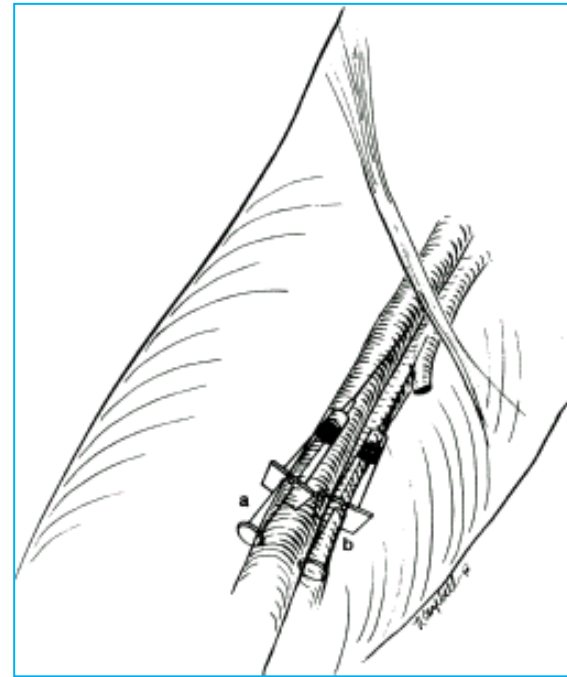
Needle placement

Medial to femoral artery

Needle held at 45 degree angle

2 cm below inguinal ligament

toward umbilicus.

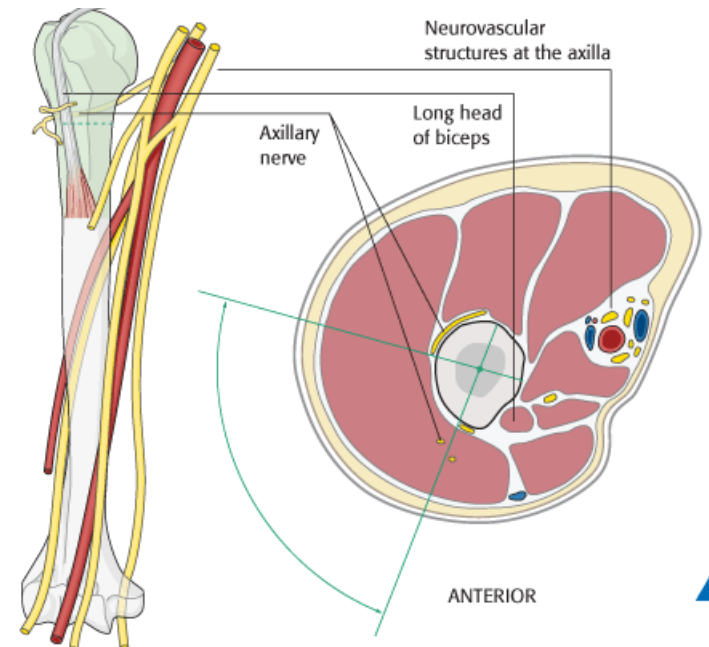


Compartment syndrome of the forearm

The forearm is enclosed in a sheath of deep fascia that is attached to the periosteum of the posterior border of ulna

This sheath with the intermuscular septum and interosseous membrane divide the forearm into several compartments each has its own muscle , nerve and blood supply

there is very little room within each compartment, any edema can cause secondary vascular compression of the blood vessels; the veins first affected and later the arteries



Compartment syndrome of the forearm

Early signs include

Absence of capillary refill in the nail bed

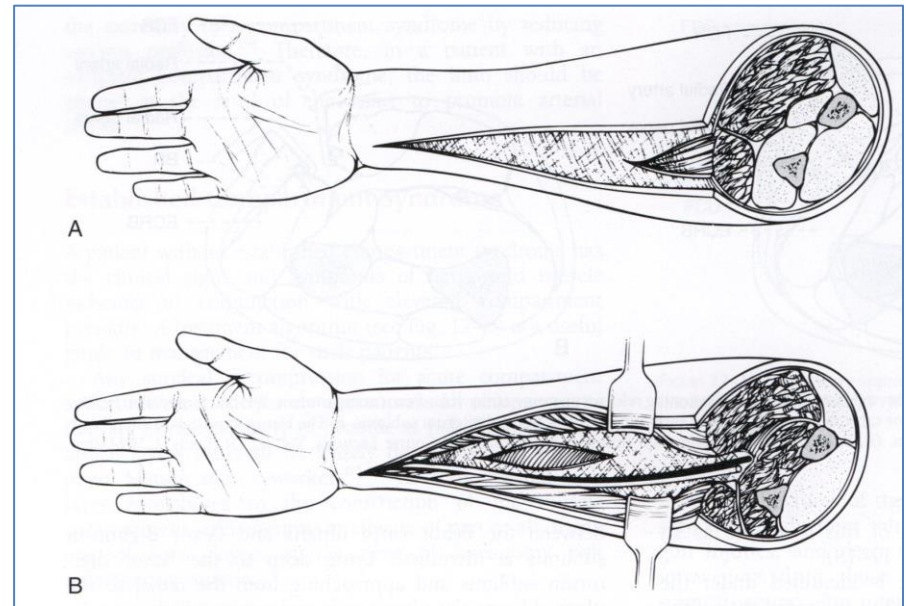
Altered skin sensation.

Pain disproportionate to the injury ,
pain on passive stretch of muscles
(muscle ischemia)

Tenderness (late sign) is caused by
edema.

Deep fascia must be incised surgically to
decompress the affected
compartment.

A delay up to 4 h can cause
irreversible damage to the muscles



Volkman's ischemic contracture

A contracture of muscles of the forearm follows fracture distal end humerus or both bones ; radius and ulna.

A localized segment of the brachial artery goes into spasm.

Reduction of the blood flow to flexor and extensor muscles that undergo ischemic necrosis.

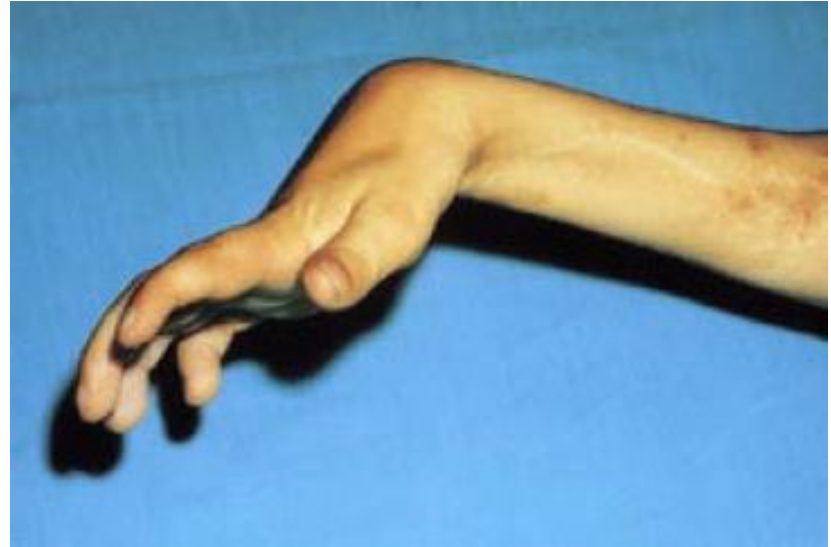
The muscles are replaced by fibrous tissue, which contracts producing the deformity



Volkmann's ischemic contracture

Both extensor and flexor, are affected

the **wrist joint is flexed** and **metacarpophalangeal joints are extended** and the **interphalangeal joints are flexed**



Arterial injury

- Arteries of the upper limbs damaged by penetrating wounds may require ligation.
- Adequate collateral circulation around shoulder, elbow and wrist prevent subsequent tissue necrosis or gangrene providing that the patient's general circulation is satisfactory.
- It may take days or weeks to open sufficiently to provide the distal part of the limb with the same volume of blood.

Palpation and compression of arteries

- Arteries of the upper limb can be palpated or compressed in an emergency.
- **Subclavian artery** ;can be traced in the root of posterior triangle of the neck as it crosses the 1st rib to become the axillary artery .
- **Axillary artery (3rd part)**; can be felt in the axilla as it lies anterior to teres major muscle .

Palpation and compression of arteries

- **Brachial artery;** can be palpated in the arm as it lies on brachialis and is overlapped from the lateral side by the biceps brachii.
- **Radial artery;** it lies superficial anterior to distal end of radius between tendons of brachioradialis and flexor carpi radialis (radial pulse) or as it crosses the anatomical snuffbox.
- **Ulnar artery;** can be palpated as it crosses anterior to the flexor retinaculum lateral to pisiform bone.

Allen test

- It is used to **determine the patency of radial and ulnar arteries**
- The hands are resting on a lap
- To examine the ulner artery
- Ask the patient to tightly clench the fists
- Compress the radial arteries
- Ask the patient to open the hands;
- the skin of the palm is at first white then the palms are promptly turn pink.
- This establishes that the ulner arteries are patent.
- Do the same with ulner arteries

ARTERIAL INNERVATION AND RAYNAUD'S DISEASE

- Sympathetic innervation of the upper limb arteries is carried on by; preganglionic fibers from cell bodies from **2nd to 8th thoracic** segments.
- They ascend in the sympathetic trunk to synapse in middle and inferior cervical and 1st thoracic.
- Postganglionic fibers are distributed along branches of the **brachial plexus**.

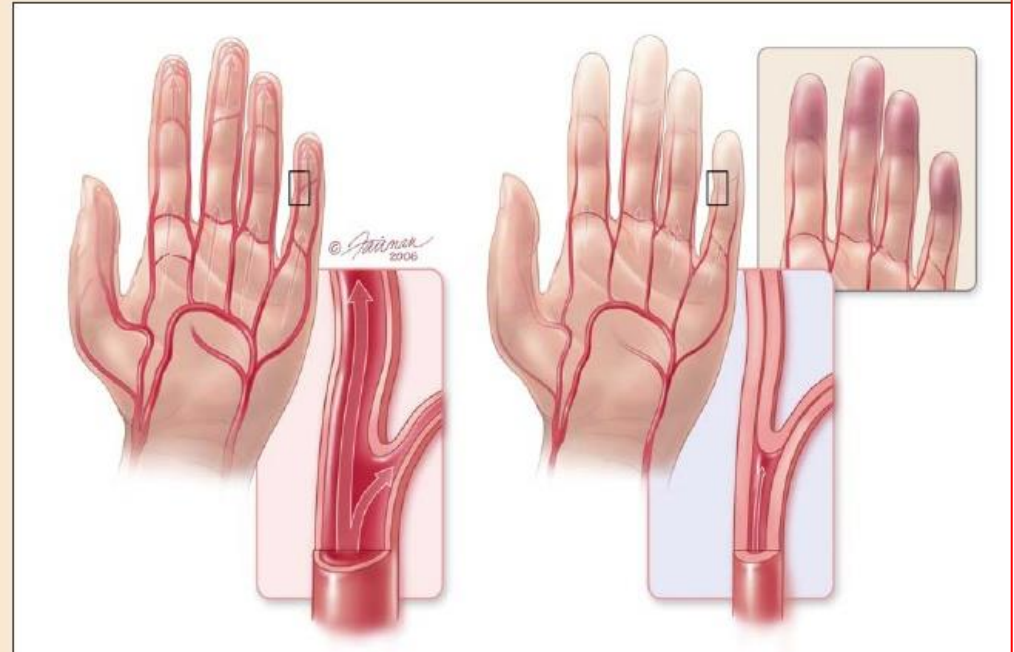
ARTERIAL INNERVATION AND RAYNAUD'S DISEASE

Raynaud's disease is a vasospastic disease involves digital arteries.

It may require cervicodorsal sympathectomy to prevent necrosis of the fingers

FIGURE 1

Vascular changes that occur during acute Raynaud's disease



Blood supply of the femoral head and avascular necrosis

Anastomosis between a small branch from **obturator artery** (run through the ligament of the head) and **medial femoral circumflex artery** (pierce the capsule and ascend the neck deep to the synovial membrane)



Blood supply of the femoral head and avascular necrosis

A vascular necrosis of the femoral head can occur after fracture of the neck of the femur in adult fracture neck of the femur results in interfering with and interrupting the blood supply from the root of the femoral neck to the head

Blood supply along the ligament of the head may be insufficient to sustain viability of the head and necrosis gradually takes place.



Venous pump of the Lower Limb

- The **venae comitantes** are subjected to intermittent pressure at rest and during exercise, and pulsation of the adjacent arteries;
- helps the movement of blood up the limbs.
- The **superficial vein** do not subjected to this presser
- Valves in the perforating veins prevent escape of blood from the high presser deep system to the low presser superficial system.
- **With relaxation** of the muscles within the compartment **the venous blood is sucked from the superficial to the deep veins.**

Has a large diameter than normal , elongated and tortuous.

It is responsible for discomfort and pain.

Many causes include hereditary weakness of the veins wall and incompetent valves, elevated intra abdominal pressure, multiple pregnancies, and tumors

Varicose veins



Varicose veins

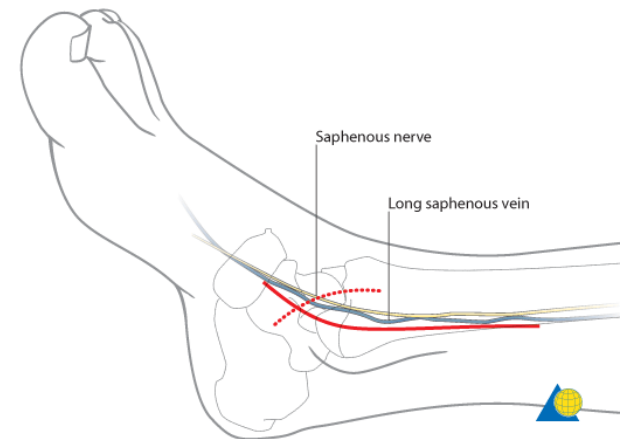
- Thrombophlebitis of the deep veins so the superficial veins become the main venous pathway for the lower limbs
- High pressure venous blood escape from deep veins into the superficial veins due to incompetent perforators producing the varicosity.

Great saphenous vein cut down

Exposure of the great saphenous vein for cut down at the ankle;
Skin in front of the medial malleolus is blocked by local anesthesia

Transverse incision across the long axis of the vein **just anterior and superior to the medial malleolus.**

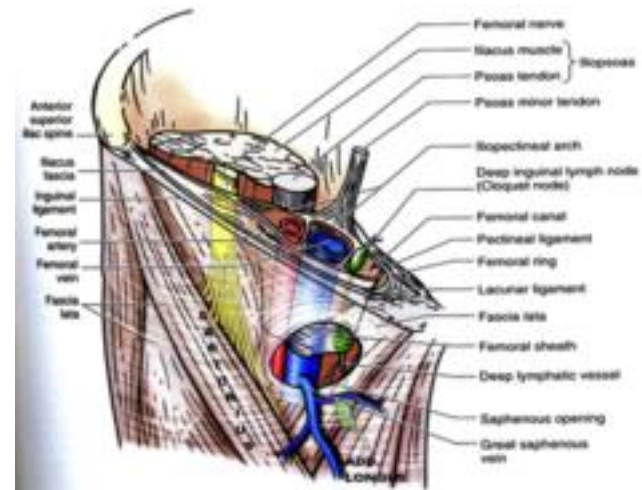
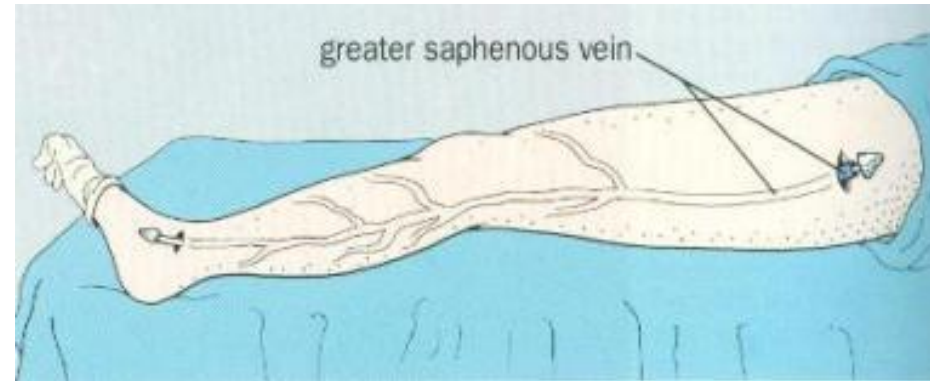
Although it may be not visible it is constant



Great saphenous vein cut down

At the groin; The area of thigh skin below and lateral to scrotum or labia majus is blocked by local anesthetic.

Transverse incision **1.5 in 4 cm below (2 finger breadth) and lateral to the pubic tubercle**
just medial to the femoral pulse if it is felt



Great saphenous vein

- The coronary disease(grafting)
- Bypass is done by inserting a graft of a portion of the Great saphenous vein

Anterior compartment syndrome

Produced by
intracompartmental tissue
injury follow bone fracture

Early diagnosis is critical

**Leg pain is exaggerated by
dorsiflexion** of the foot

Stretching of the muscles
by passive planter flexion

**Dorsalis peddis arterial
pulse disappears**

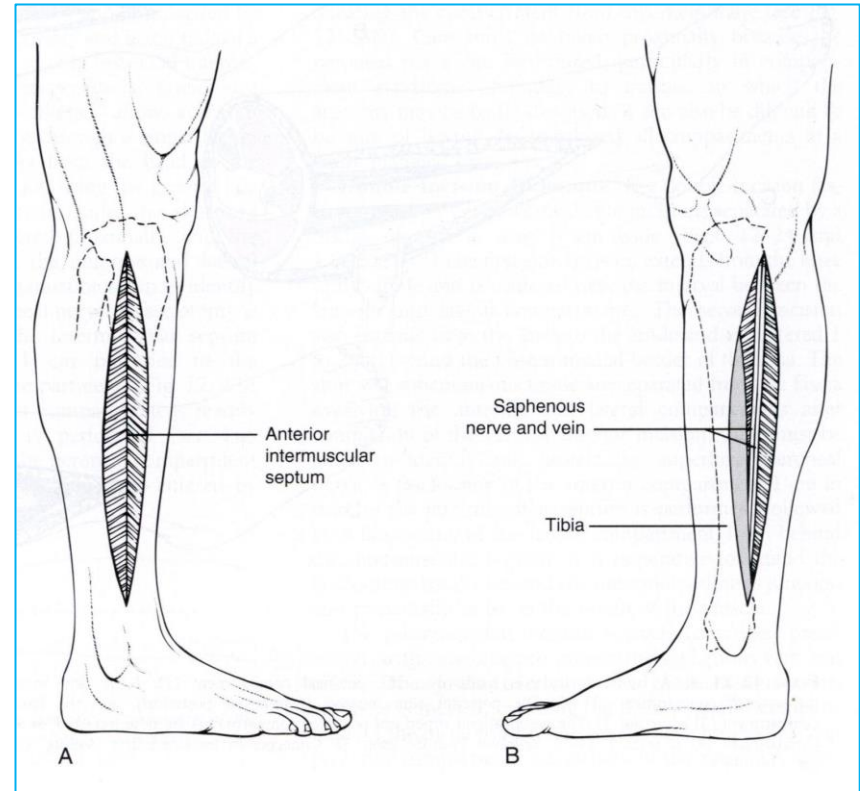


Anterior compartment syndrome

Anterior compartment muscles are paralyzed
Loss of sensation of the area supplied by the deep peroneal nerve.

Treatment;

Fasciotomy through longitudinal incision to decompress the area and prevent necrosis of muscles



Long distance air travel

- Sit immobile for hours on long distance travel are prone to **deep venous thrombosis**.
- May be asymptomatic or manifested by mild pain or tightness or tenderness in the calf muscles.
- It is prevented by **stretching of the legs every hour to improve the venous circulation**

Arterial palpation of the lower limbs

- Should know the precise position of the main arteries of the lower limbs.
- To arrest a severe hemorrhage.
- Palpate different parts of the arterial tree in arterial occlusive disease.

Arterial palpation of the lower limbs

- **Femoral artery;** enters the thigh behind the inguinal ligament at a point mid way between the anterior superior iliac spine and the symphysis pubis, it is easily palpated or compressed against the pectineus muscle and the superior pubic ramus.
- **Popliteal artery;** can be felt in depth of the popliteal fossa with relaxed deep fascia during passive flexion of the knee.

Arterial palpation of the lower limbs

- **Dorsalis pedis artery;** midway between medial and lateral malleoli in front of the ankle joint first interosseous space between tendons of extensor hallucis longus and extensor digitorum longus.
- **Posterior tibial artery;** behind medial malleolus, beneath flexor retinaculum between tendons of flexor digitorum longus flexor hallucis longus, midway between medial malleolus and the heel

Collateral circulation

- Prevent necrosis or gangrene that may follow the arterial obstruction (Sudden occlusion).
- Gradual occlusion as in atherosclerosis is less likely to be followed by necrosis
- For the femoral artery cruciate and trochantric anastomosis
- In the adductor canal the perforating branches of profunda femoris , articular and muscular branches of femoral and popliteal arteries

Arterial occlusive disease of the leg

More common in men;
manifested by:

Ischemia of muscles produces
cramp like pain with exercise,
the supply to the calf muscles is
inadequate , the patient is forced
to stop walking after a limited
distance

With rest the oxygen depletion is
corrected and pain disappears
this condition is known as
intermittent claudication



Sympathetic innervation of the arteries

- It develops from **the lower thoracic and upper two or three lumbar segments** of the spinal cord
- The preganglionic fibers pass to the lower thoracic and upper lumbar ganglia via the white rami communicants.
- Fibers synapse in the lumbar and sacral ganglia
- **Postganglionic fibers reach blood vessel via lumbar and sacral plexus.**
- Femoral artery receives its sympathetic supply from femoral and obturator nerves
- The more distal arteries receive its sympathetic supply from common peroneal and tibial nerves

Lumber sympathectomy and occlusive arterial disease

- It is a form of treatment for occlusive arterial diseases of the lower limbs to improve the blood flow through the collateral circulation
- Preganglionic sympathectomy is performed by removing the **upper three lumbar ganglia and the intervening parts of the sympathetic trunk**

THANK YOU