ARTERIES, VEINS OF LOWER LIMB
At the end of the lecture, students should be able to:

List the main arteries of the lower limb.
Describe their origin, course distribution & branches.
List the main arterial anastomosis.
List the sites where you feel the arterial pulse.
Differentiate the veins of LL into superficial & deep
Describe their origin, course & termination and tributaries
It is derived

Mostly from:
FEMORAL artery
(from External iliac artery)

Partially from:
Superior gluteal artery
&
Inferior gluteal artery
(from Internal iliac artery)
FEMORAL ARTERY

It is the main arterial supply to the lower limb.

It is the continuation of the External Iliac artery.

It begins at the inguinal ligament, midway between the anterior superior iliac spine and the symphysis pubis.

It enters the femoral triangle deep to the midpoint of inguinal ligament.
RELATIONS

**Anterior:**
Skin, fascia lata.

**Posterior:**
Hip joint, it is separated from it by Psoas muscle

It lies on the muscles forming floor of the femoral triangle.

**Medial:**
Femoral vein.

**Lateral:**
Femoral nerve and its branches.
How it Terminates?

It enters the adductor canal deep to sartorius muscle.

It exits the canal by passing through the adductor hiatus and becomes the **Popliteal artery**.
BRANCHES

It supplies the lower abdominal wall & External Genitalia through:
1. Superficial epigastric.
2. Superficial circumflex iliac.
5. Profunda femoris artery (Deep artery of thigh):

It arises from the lateral side of the femoral artery.

Passes medially behind the femoral vessels to supply the medial side of the thigh.
Medial & lateral circumflex femoral arteries.

Three Perforating arteries.

It ends by becoming the 4th perforating artery.
**CRUCIATE ANASTOMOSIS**

It supplies blood to the lower limb in case of ligation of the femoral artery.

It is formed by the union of Medial & Lateral circumflex femoral arteries + the Inferior gluteal artery superiorly + the First perforating artery inferiorly.
CANNULATION OF FEMORAL ARTERY

It is used for left cardiac angiography. A long catheter is inserted percutaneously into the artery and passed up the external iliac artery, common iliac artery and aorta to the left ventricle.
The superficial position of the femoral artery in the femoral triangle makes it vulnerable to lacerations and gunshot wounds. Commonly, both the femoral artery and vein are lacerated in anterior thigh wounds because they lie so close together. As a result of communication between the injured vessels, an arteriovenous shunt occurs.
It can be palpated just inferior to the midinguinal point.

**How to Stop blood in the femoral artery?**

At this site, the femoral artery is by pressed directly posteriorly against the superior pubic ramus and the femoral head, this will stop the blood flow through the femoral artery and its branches.
POPLITEAL ARTERY

It is the continuation of femoral artery.
It is the deepest structure in the Popliteal Fossa (posterior to the Popliteal vein & Tibial nerve), it runs close to the capsule of the knee joint.
Ends at the lower border of popliteus muscle by dividing into Anterior and Posterior Tibial Arteries.

Branches:
Muscular & Five Genicular branches to the articular capsule and ligaments of the knee joint.
ANASTOMOSIS AROUND KNEE

The Genicular arteries participate in the formation of the important **Genicular Anastomosis** around the knee, (it compensates for the narrowing of the Popliteal artery during flexion of the knee).
Because of the deep position of the artery, its pulsations are best felt in the inferior part of the popliteal fossa where the artery is related to the tibia. Weakening or loss of the popliteal pulse is a sign of femoral artery obstruction.
ANTERIOR TIBIAL ARTERY

It is the smaller terminal branch of the popliteal artery.

It enters the anterior compartment of the leg by passing through an opening in the upper part of the interosseous membrane, in company with the Deep Peroneal nerve.

It supplies structures in the Anterior Compartment of the leg.

It ends at the ankle joint midway between the malleoli where it becomes the Dorsalis Pedis artery (dorsal artery of the foot.)
It is the larger terminal branch of the popliteal artery and provides the main blood supply to the Foot.

Descends Deep to muscles of the posterior compartment of the leg.

Its lower part is covered by skin & fascia only.

It Passes behind Medial Malleolus & Deep to Flexor Retinaculum.
POSTERIOR TIBIAL ARTERY

It terminates by dividing into:

Medial & Lateral plantar arteries.

Branches:

1. Peroneal (fibular) artery:
   The largest and most important branch.
   It supplies a nutrient artery to the Fibula & Muscular branches to the muscles of the Lateral and Posterior Compartments of the Leg.

2. Nutrient artery to the Tibia (it is the largest nutrient artery of the body).

3. Calcaneal arteries: supply the Heel.
It is taken Posterior inferior to the medial malleolus (in the groove between the malleolus and the heel).

The flexor retinaculum must be relaxed by inverting the foot.

Palpation of PT pulse is essential for examining patients with occlusive peripheral arterial diseases.
ARTERIES OF THE FOOT

DORSALIS PEDIS ARTERY

It is the main source of blood supply to the Toes.

Begins in front of ankle joint as the direct continuation of the Anterior Tibial artery.

It is superficial in position.

Crossed by the inferior extensor retinaculum

It passes to the 1st interosseous space where it divides into a deep plantar artery to the sole and the first dorsal metatarsal artery.
It is easy to be felt being subcutaneous, over the tarsal bones between the tendons of extensor hallucis longus and extensor digitorum longus.

Some people have congenitally non palpable DP pulse, the anomaly is usually bilateral.

A diminished or absent dorsalis pedis pulse usually suggests vascular insufficiency resulting from arterial disease.
PLANTAR ARTERIES

**Medial PA**
The smaller of the two terminal branches of the posterior tibial artery.

It supplies mainly the muscles of the great toe & the skin of the medial side of the sole.

**Lateral PA**
It is the larger terminal branch.

At the base of the 5th metatarsal bone, it curves medially to form the Plantar Arch (completed by the deep plantar artery b from Dorsalis Pedis artery).

The arch supplies the skin, fascia and muscles in the sole and plantar digital arteries to the adjacent digits.
VEINS OF THE LOWER LIMB

- The veins of the lower limb are two sets:
- **Superficial**: in the subcutaneous tissue.
- **Deep**: deep to the deep fascia and accompany all major arteries.

- The superficial & deep veins have valves which are numerous in the deep veins.
GREAT SAPHENOUS VEIN

- **The Longest Superficial vein of the body.**
- **Begins from the medial end of the dorsal venous arch (as the medial marginal vein).**
- **Ascends:**
  - In front of the Medial Malleolus accompanied by the (Saphenous nerve).
  - Posterior the Medial Condyle of the femur.
- **Passes through the Saphenous Opening (2.5-3.25) cm below and lateral to the pubic tubercle.**
- **Terminates in:** Femoral Vein.
**SMALL SAPHENOUS VEIN**

- **Originates** from the lateral end of the dorsal venous arch.
- **Ascends:**
- Behind the lateral Malleolus in company with the Sural nerve.
- Along the middle of the back leg.
- **Termination:**
- 1. It may join the Great Saphenous vein.
- 2. Or Bifurcates:
- One branch joins the Great saphenous and the other joins the Popliteal vein.
Even when it is not visible in infants and obese persons or in patients in shock, the great saphenous vein can always be located **Anterior to the Medial Malleolus**.

This procedure (saphenous cutdown) is used to insert a cannula for prolonged administration of blood, plasma or drugs.
DEEP VEINS (VENAE COMITANTES)

Accompany all the major arteries and their branches. Usually they are paired. They are contained within the vascular sheath of the artery, whose pulsations help to compress and move during exercise, blood received from the veins.
PERFORATING VEINS

- They originate from the superficial veins & penetrate the deep fascia close to their origin.
- They contain valves which normally allow the blood to flow from the superficial to the deep veins.
- The perforating veins pass through the deep fascia at an oblique angle so during muscular contraction, they are compressed. This also prevents blood flowing from the deep superficial to superficial the veins.
It is Dilatation and Degeneration of the superficial veins that may be complicated by ulcers.

It is more common in the postero medial part of the lower limb.

It results because of incompetence of the valves in the perforating veins,

Or valves within the great saphenous itself.

This allows the passage of high pressure blood from the deep to the superficial veins.
THANK YOU