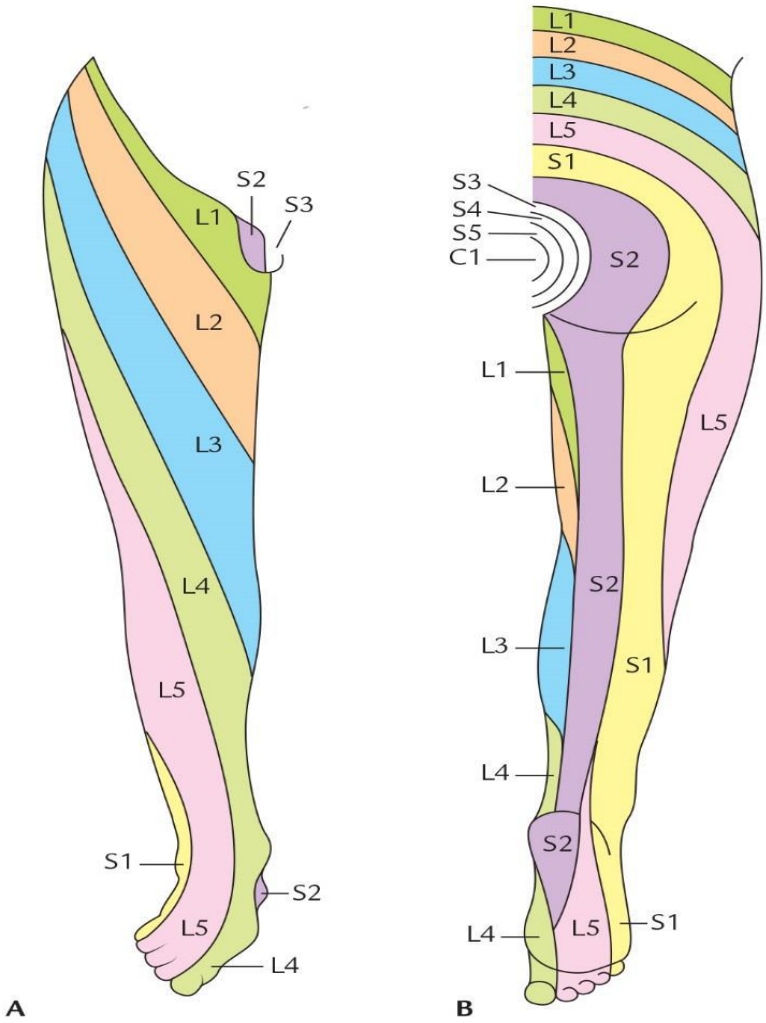
DERMATOMES OF THE LOWER LIMB

Dermatomes of the lower limb that can be tested for sensation and have minimal overlap are:

- L1 dermatome; over the inguinal ligament.
- L2 dermatome; along the lateral side of the thigh.
- L3 dermatome; along the lower medial side of the thigh.
- L4 dermatome; along the medial side of the big toe.
- L5 dermatome; along the medial side of the second toe.
- S1 dermatome; the skin of the little toe.
- S2 dermatome; along the back of the thigh.
- S3 dermatome; skin over the gluteal fold.
- S4 and S5 dermatomes; the skin of the perineum, around the anus.



MYOTOMES OF THE LOWER LIMB

On the basis of movements of joints, the myotomes of the LOWER limb may be expressed as follows;

- Flexors of the hip; L1, 2 myotome.
- Extensors of the knee; L3, 4 myotome.
- Flexors of the knee; L5 to S2 myotome.
- Plantar flexors of the foot; S1, 2 myotomes.
- Abductors of the toes; S2, 3 myotome.

NERVE INJURIES IN THE LOWER LIMB

Femoral nerve injury

The femoral nerve can be injured in stab or gunshot wounds, but a complete division of the nerve is rare. The following effects occur when the nerve is completely divided;

Motor

- The knee cannot be extended due to paralysis of the quadriceps femoris causing the patient to compensate for this during walking by the adductors to bring the leg forward and medially.

- Hip flexion is weakened due to paralysis of iliacus and pectineus.

- Psoas major is spared because it receives most of its nerve supply from the lumbar plexus.

Sensory

There is loss of skin sensation over the front and medial side of the thigh (intermediate and medial cutaneous nerves) and over the medial side of the leg and medial border of the foot (saphenous nerve).

Obturator nerve injury

This nerve is rarely injured by wounds or hip dislocations. It is more commonly compressed by the fetal head during parturition or by growing pelvic tumors. The following features occur;

Motor

All the adductors are paralyzed (except the hamstring part of adductor magnus) causing severe weakness in adduction.

Sensory

If the nerve is compressed, paresthesia is felt on the medial side of the thigh. Pain may be referred to the knee and / or hip joints.

Sciatic nerve injury

This nerve is most commonly injured by badly placed intramuscular injections in the gluteal region. It is sometimes injured by penetrating wounds, pelvic fractures or hip dislocations. Most lesions are incomplete and in 90% of cases, the common peroneal part (more superficial fibers) is affected. Sciatic nerve damage results in the following features;

Motor

- All the hamstring muscles are paralyzed.

- Flexion of the knee is not completely lost as sartorius and gracilis can still flex the knee.

- Hip extension is weakened but not completely lost because gluteus maximus; a powerful extensor; is spared since it is supplied by the inferior gluteal nerve.

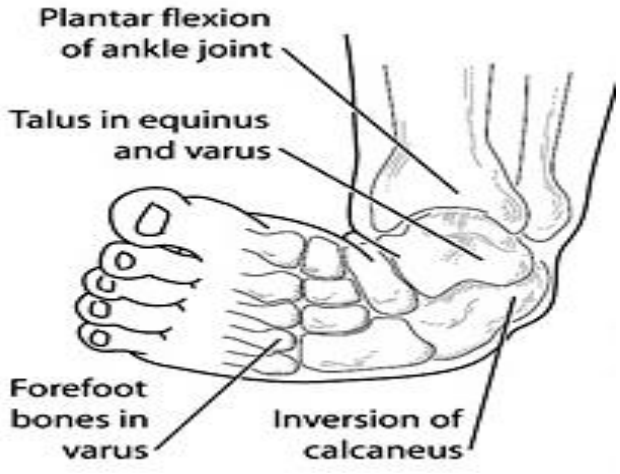
- All the muscles of the leg and foot (supplied by the tibial and common peroneal components) are paralyzed and the weight of the foot causes it to fall down in the plantar-flexed position, a condition known as **foot drop**. During walking, the falling foot makes a characteristic slam as it drops on the ground.

Sensory

Sensation is lost below the knee except for the saphenous area i.e. medial side of the leg and medial border of the foot.

Common peroneal nerve injury

This nerve is commonly injured in fractures of the neck of the fibula and by pressure from ill-fitted casts or splints resulting in the following features;



Motor

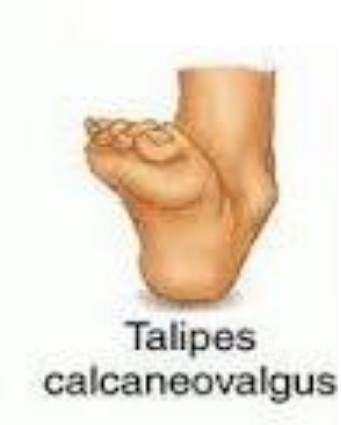
All the muscles of the anterior and lateral compartments of the leg (dorsiflexors and everters) are paralyzed and the opposing muscles (plantar-flexors and inverters) keep the foot plantar-flexed and inverted, a position called **equinovarus**.

Sensory

There is sensory loss over the anterior and lateral sides of the leg and dorsum of the foot including the medial side of the big toe (superficial peroneal branch and cutaneous branch of the deep peroneal nerve). Sensation is preserved on the lateral side of the foot and little toe (sural branch of tibial nerve) and on the medial border of the foot as far as the ball of the big toe (saphenous branch of femoral nerve). However, since the injury usually occurs at the neck of the fibula (distal to the origin of the lateral cutaneous nerve of the calf) the loss of sensation is confined to the foot and distal leg.

Tibial nerve injury

The tibial nerve is rarely injured because of its deep and protected position. Complete division (rare) results in the following features;



Motor

All the muscles of the calf and sole of the foot become paralyzed and the opposing muscles (dorsiflexors and peronei) keep the foot dorsiflexed and everted, a position known as **calcaneovalgus**.

Sensory

Sensation is lost on the sole leading to development of trophic ulcers.

SURFACE LANDMARKS FOR PALPATION OF LOWER LIMB ARTERIES

- The **femoral artery** is palpated behind the inguinal ligament midway between the anterior superior iliac spine and the pubic tubercle as it is pressed against pectineus and the superior pubic ramus.

- The **popliteal artery** is palpated while the knee is passively flexed by deep palpation of the popliteal fossa (using the 8 fingers of both hands while stabilizing the knee with the thumbs).

 The **anterior tibial artery** is palpated midway between the 2 malleoli.

 The **dorsalis pedis artery** is palpated on the dorsum of the foot (in front of the ankle) just proximal to the first intermetatarsal space.

 The **posterior tibial artery** is palpated a fingerbreadth behind the medial malleolus.

GOLDEN FACT TO REMEMBER

■ Most stable position of the knee joint	Erect extended position
■ Most important muscle to stabilize the knee joint	Quadriceps femoris
■ Most frequently injured joint in the lower limb	Ankle joint
■ Key muscle of the knee joint	Popliteus
■ Unhappy triad of knee joint Injury of	(a) tibial collateral ligament, (b) medial meniscus, and (c) anterior cruciate ligament
■ Most commonly injured meniscus of the knee joint	Medial meniscus
■ Strongest tibiofibular joint	Inferior tibiofibular joint
■ Most important ligament for maintaining the arches of the foot	Spring ligament