



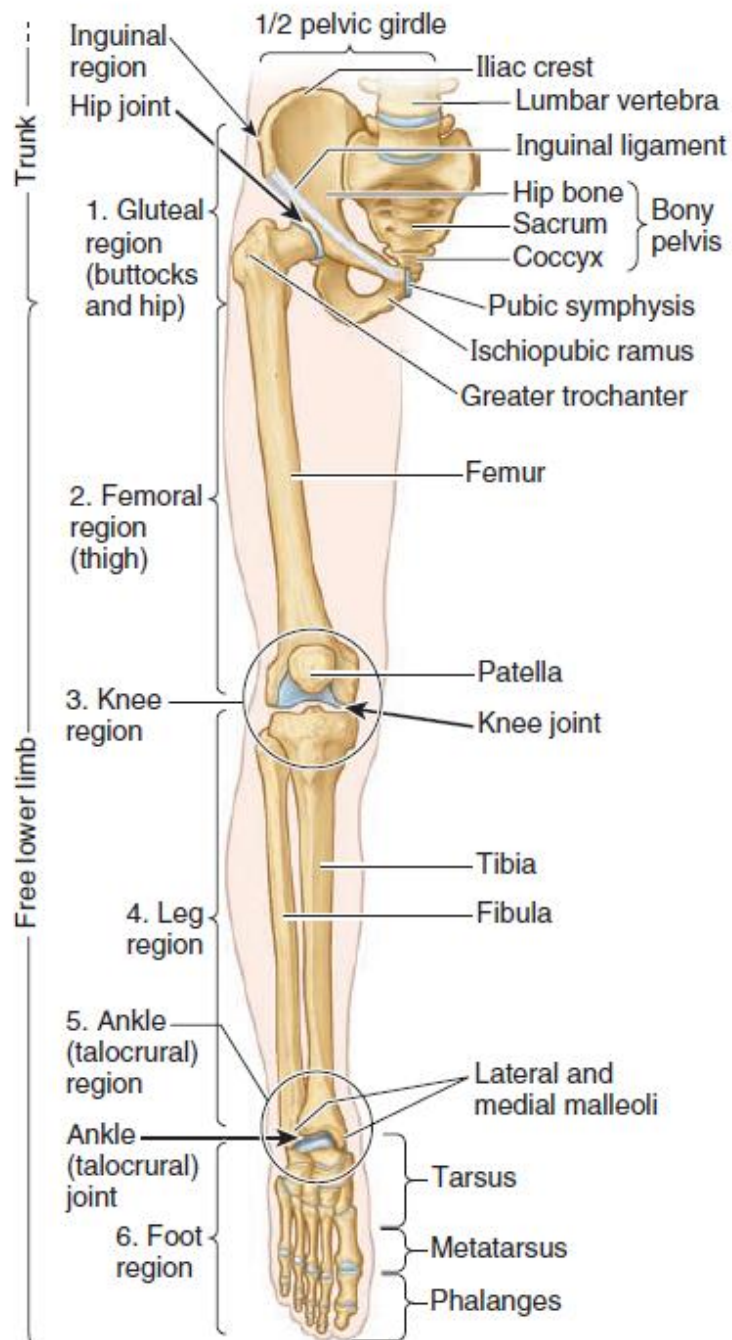
**ВОЛГОГРАДСКИЙ  
ГОСУДАРСТВЕННЫЙ  
МЕДИЦИНСКИЙ  
УНИВЕРСИТЕТ**

# The lower extremity

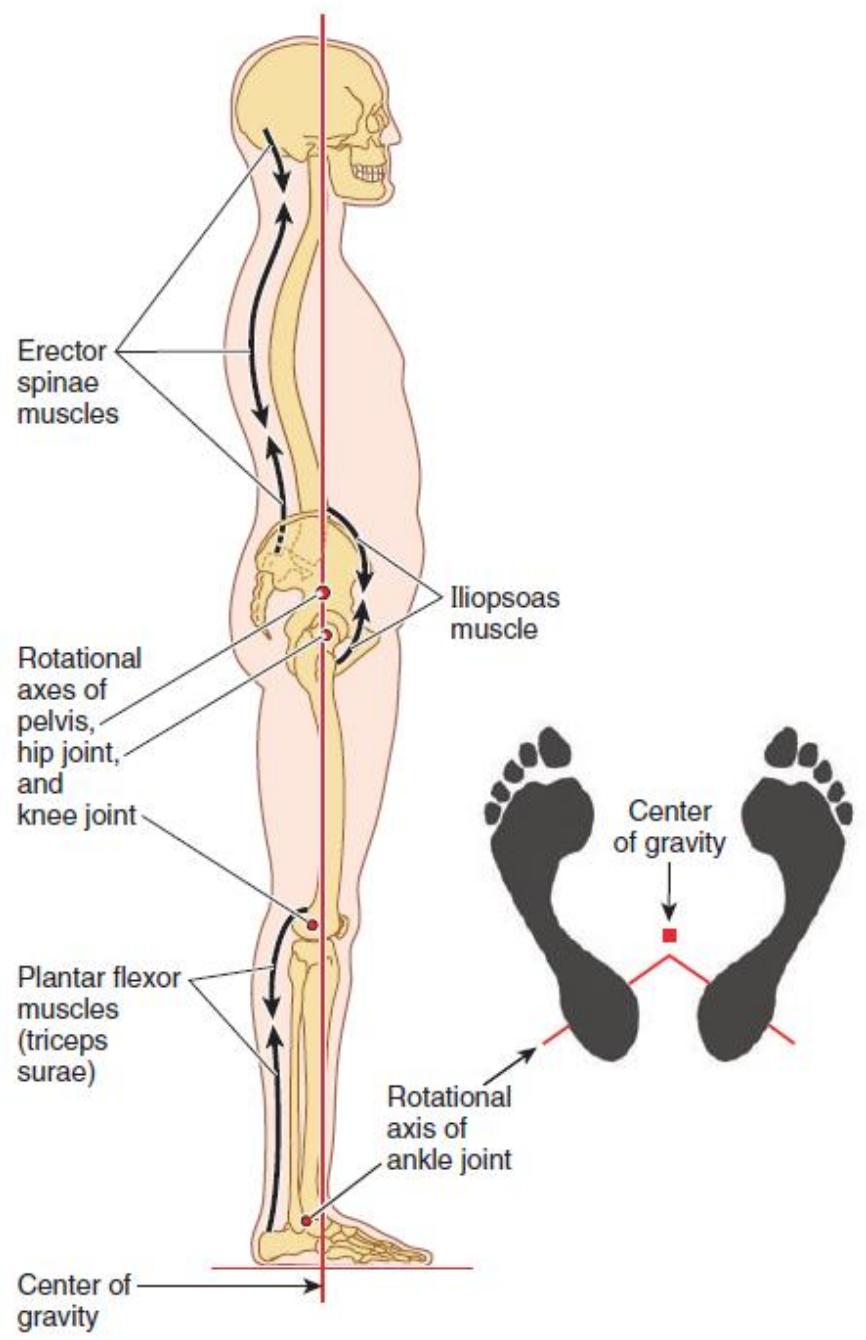
## Leg. Knee joint

Department for the operative surgery and  
topographic anatomy, VSMU

O.D. Chulkov, A.S. Mazunov, E.E. Pisareva, E.A. Barinova



(A) Anterior view



(B) Lateral view

(C) Inferior view

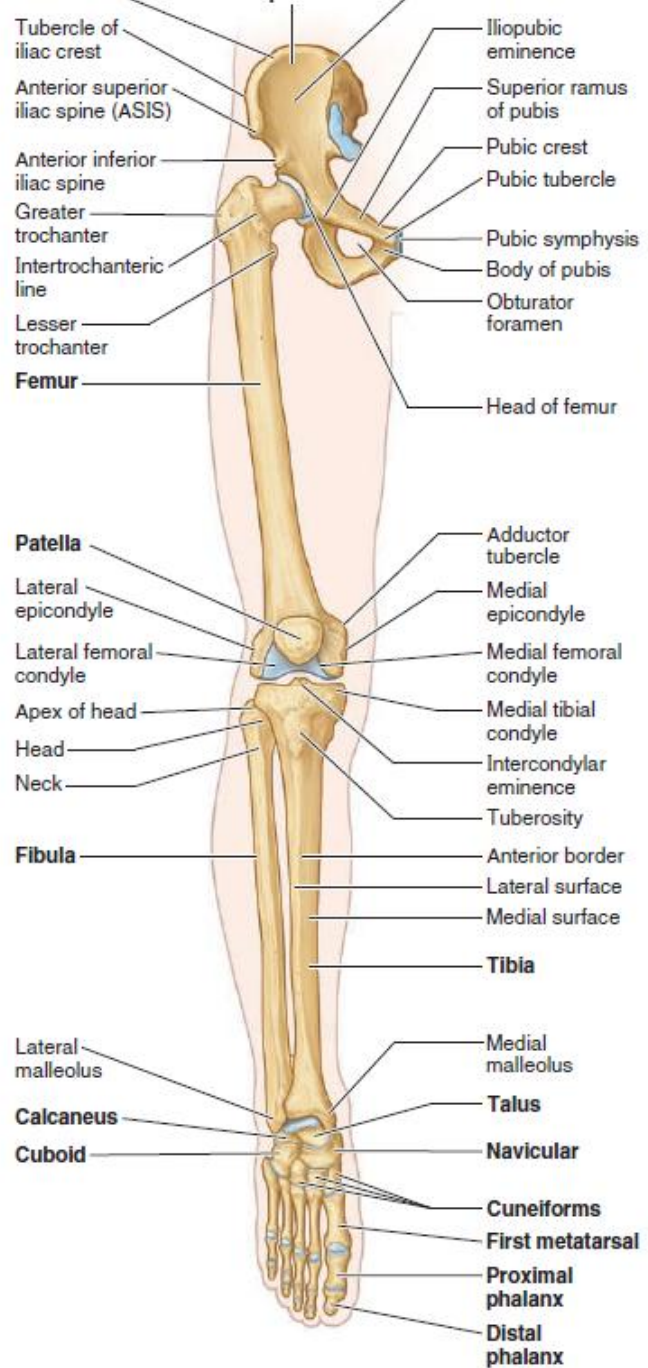


# Regions of the lower limb

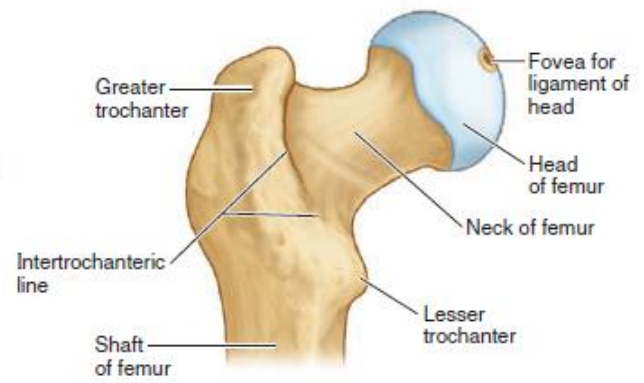
The lower limbs comprise the following six regions:

- Buttock or gluteal region
- Thigh or femoral region
- Knee or knee region
- Leg or leg region
- Ankle or talocrural region
- Foot or foot region

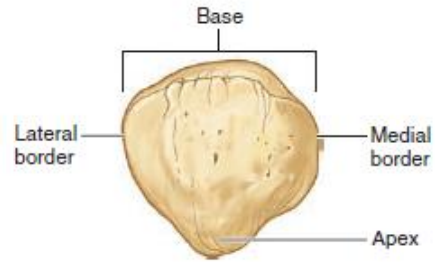
# An overview of bones of the lower extremity



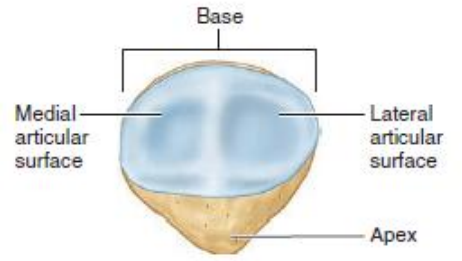
(A) Anterior view



(B) Anterior view of proximal femur

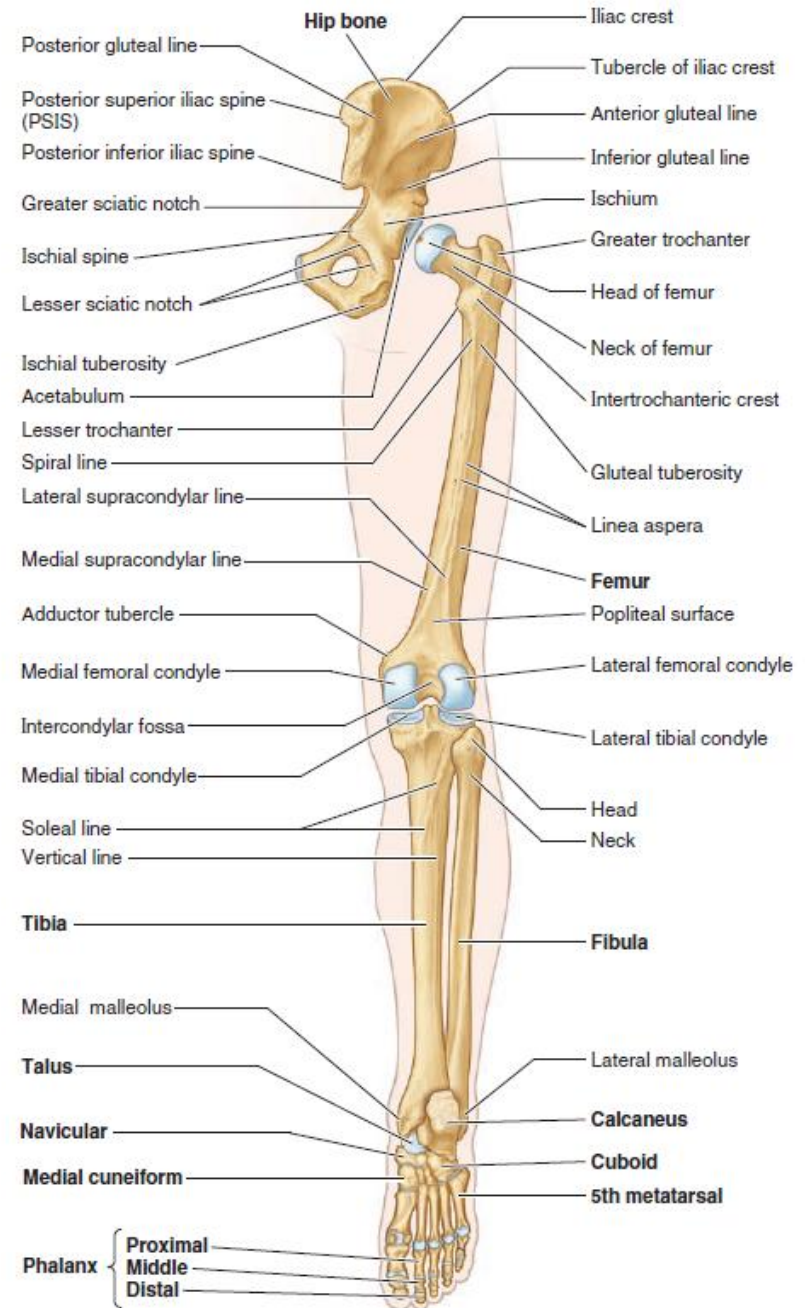


(C) Anterior view of patella



(D) Posterior view of patella

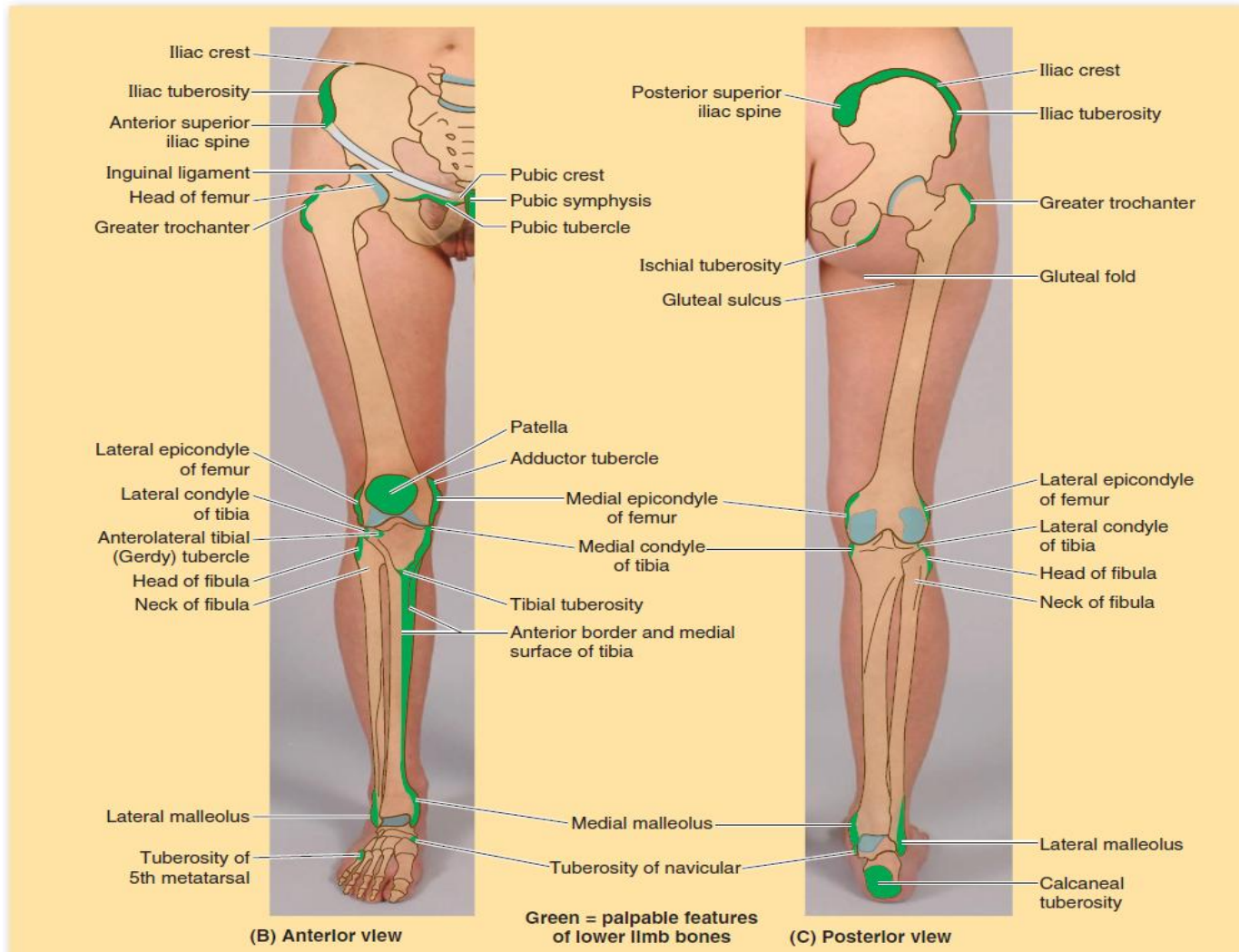
# An overview of bones of the lower extremity



(E) Posterior view



# The landmarks of the lower extremity



# Bones of lower limb



The patella (knee cap) is a large sesamoid bone that is formed intratendinously after birth. This triangular bone, located anterior to the femoral condyles, articulates with the patellar surface of the femur. The subcutaneous anterior surface of the patella is convex; the thick base (superior border) slopes infero-anteriorly; the lateral and medial borders converge inferiorly to form the pointed apex; and the articular surface (posterior surface) is smooth, covered with a thick layer of articular cartilage



# Bones of lower limb

The large, weight-bearing tibia (shin bone) articulates with the femoral condyles superiorly, the talus inferiorly, and the fibula laterally at its proximal and distal ends. The distal end of the tibia is smaller than the proximal end and has facets for articulation with the fibula and talus. The medial malleolus is an inferiorly directed projection from the medial side of the distal end of the tibia





# Bones of lower limb

The large nutrient foramen of the tibia is located on the posterior aspect of the proximal third of the bone. From it, the nutrient canal runs inferiorly in the tibia before it opens into the medullary (marrow) cavity. The primary ossification center for the superior end of the tibia appears shortly after birth and joins the shaft of the tibia during adolescence (usually 16–18 years of age).

# Bones of lower limb



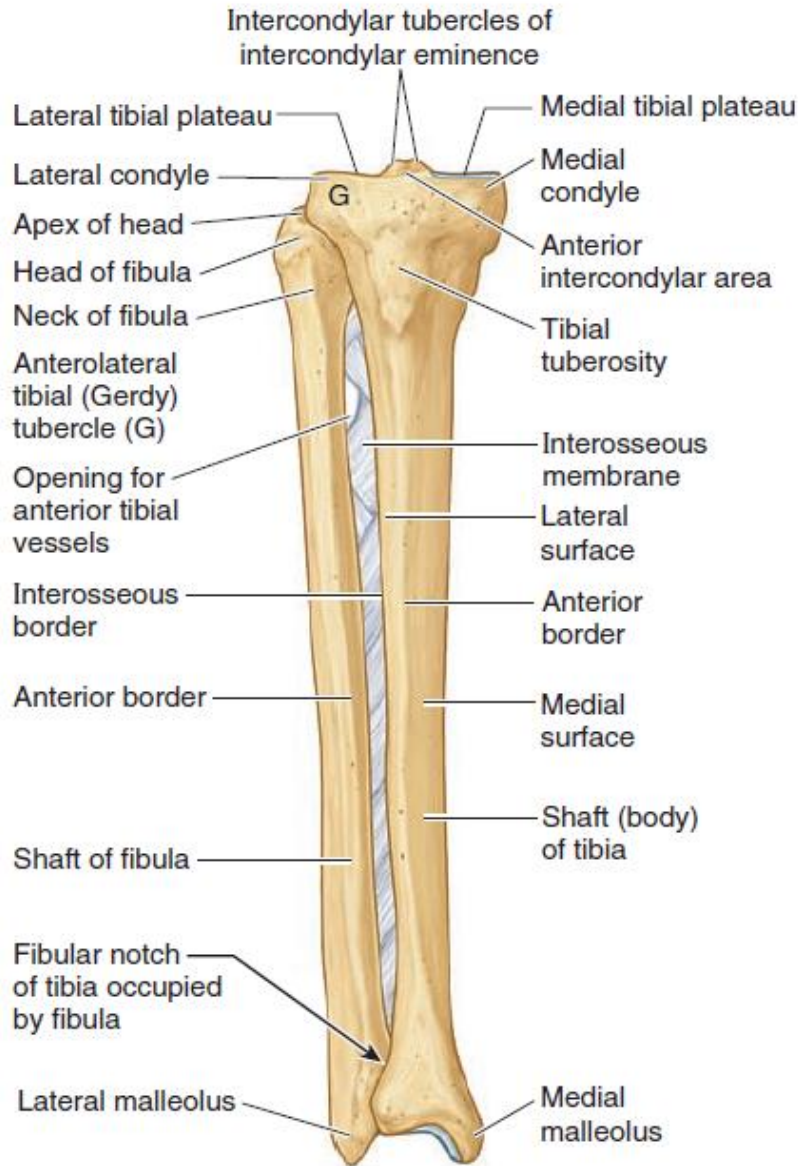
The slender fibula lies posterolateral to the tibia and serves mainly for muscle attachment. At its proximal end, the fibula consists of an enlarged head superior to a narrow neck. At its distal end, the fibula enlarges to form the lateral malleolus, which is more prominent and more posteriorly placed than the medial malleolus and extends approximately 1 cm farther distally.

# Bones of lower limb

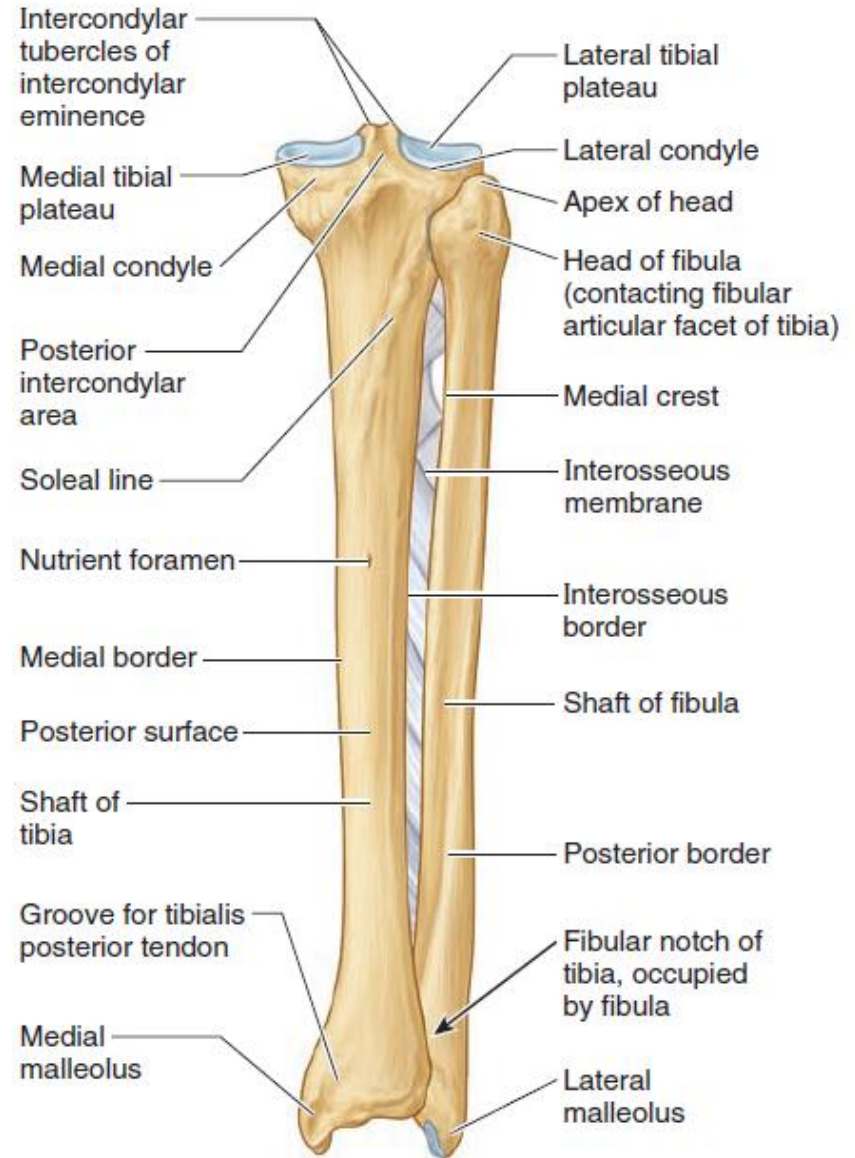


The fibula is not directly involved in weight bearing; however, its lateral malleolus forms the lateral part of the socket for the trochlea of the talus. The shafts of the tibia and fibula are connected by an interosseous membrane throughout most of their lengths.

# Right tibia and fibula



(A) Anterior view (right side)



(B) Posterior view (right side)



# Tibial and Fibular Fractures

The tibial shaft is narrowest at the junction of its inferior and middle thirds, which is the most common site of fracture. Because its anterior surface is subcutaneous, the tibial shaft is the most frequent site of an *open fracture* (compound fracture)—one in which the skin is perforated and blood vessels are torn—or a diagonal fracture. Fracture of the tibia through the nutrient canal predisposes to nonunion of the bone fragments resulting from damage to the nutrient artery.

# Tibial and Fibular Fractures



Fibular fractures commonly occur just proximal to the lateral malleolus and often are associated with fracture dislocations of the ankle joint. When a person slips, forcing the foot into an excessively inverted position, the ankle ligaments tear, forcibly tilting the talus against the lateral malleolus and shearing it off.



# Tibial and Fibular Fractures

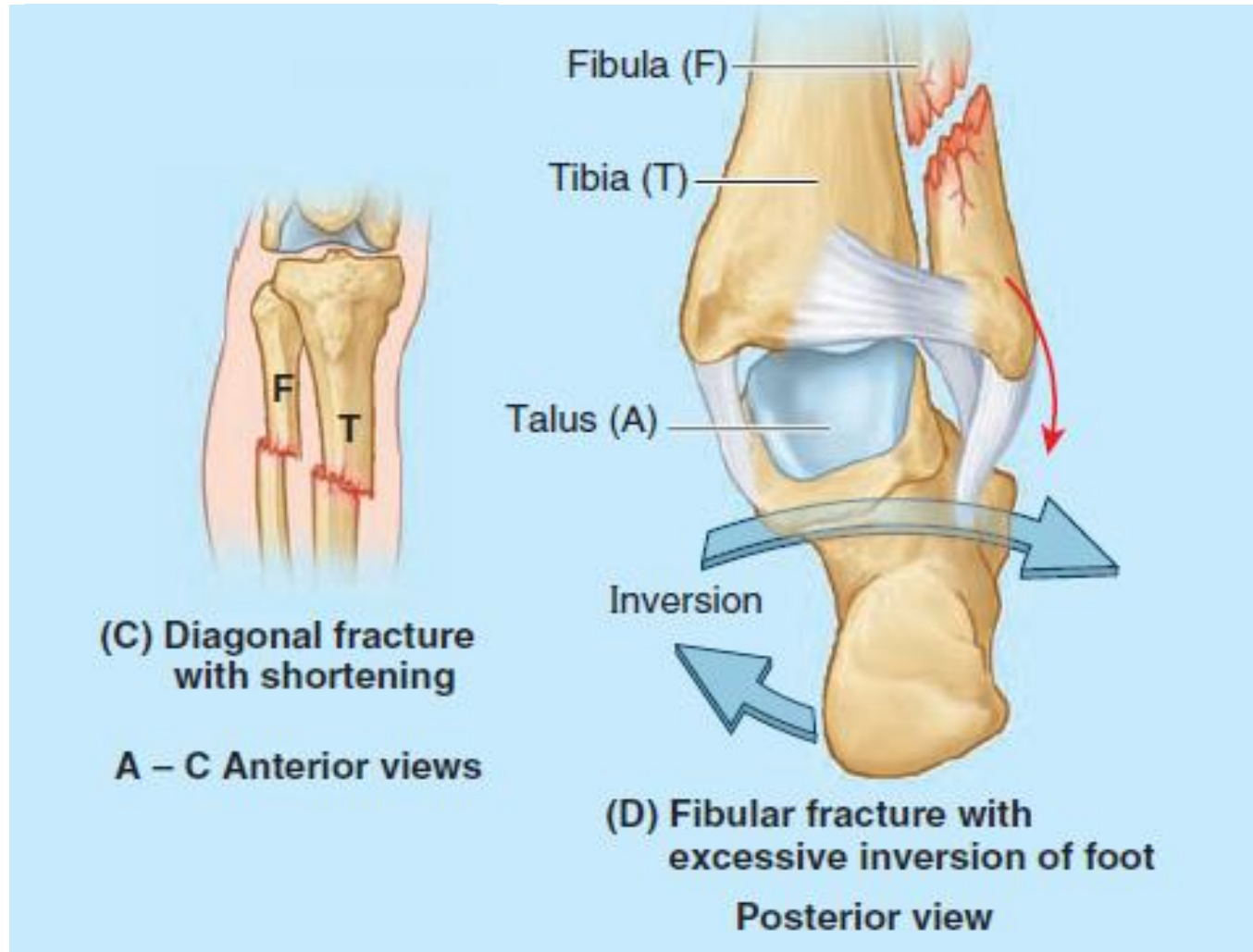


**(A) Compound (open) fracture with external bleeding**

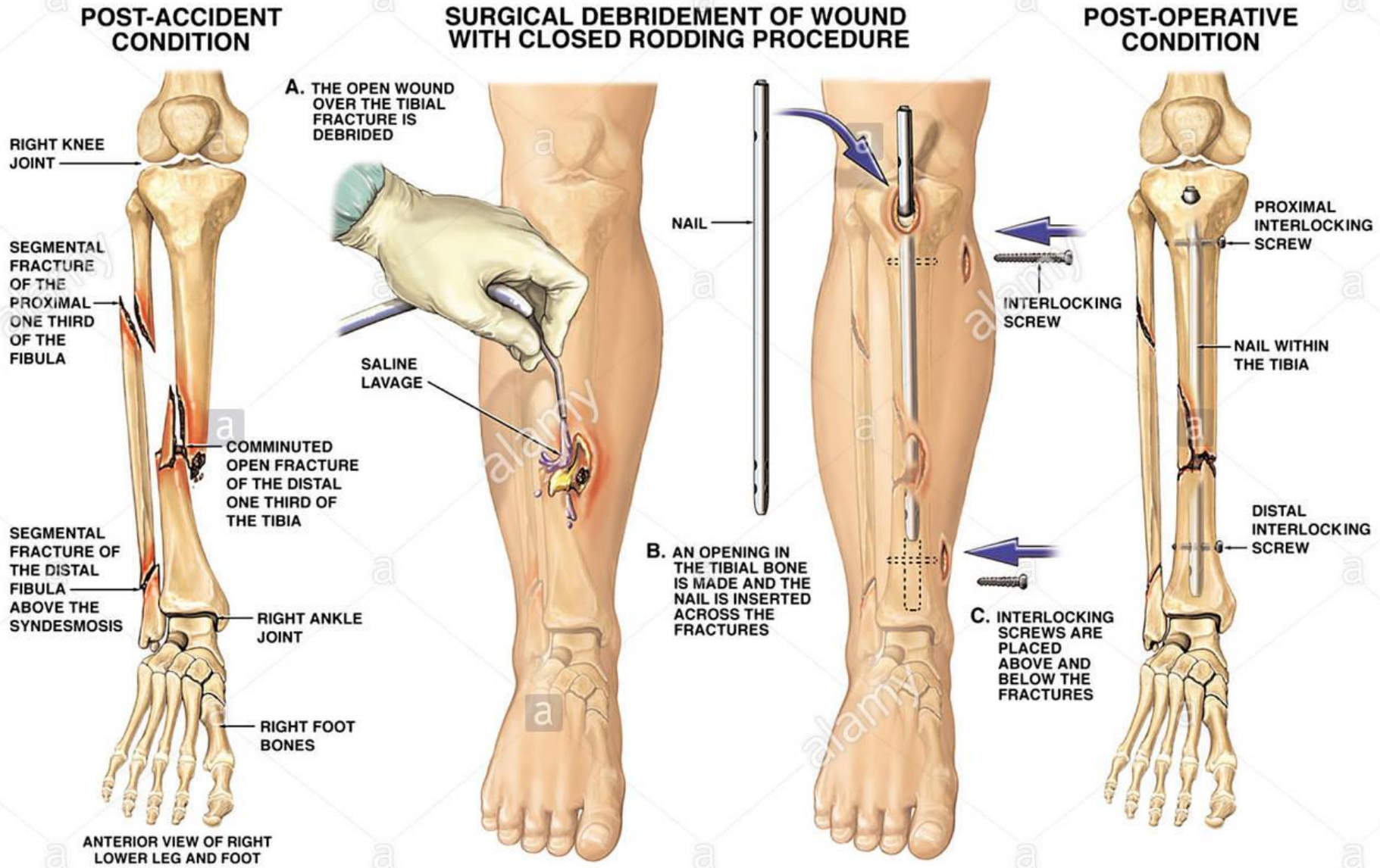


**(B) Transverse "boot top" fracture with shortening due to overriding of fracture fragments**

# Tibial and Fibular Fractures



# Tibial and Fibular Fractures: nailing



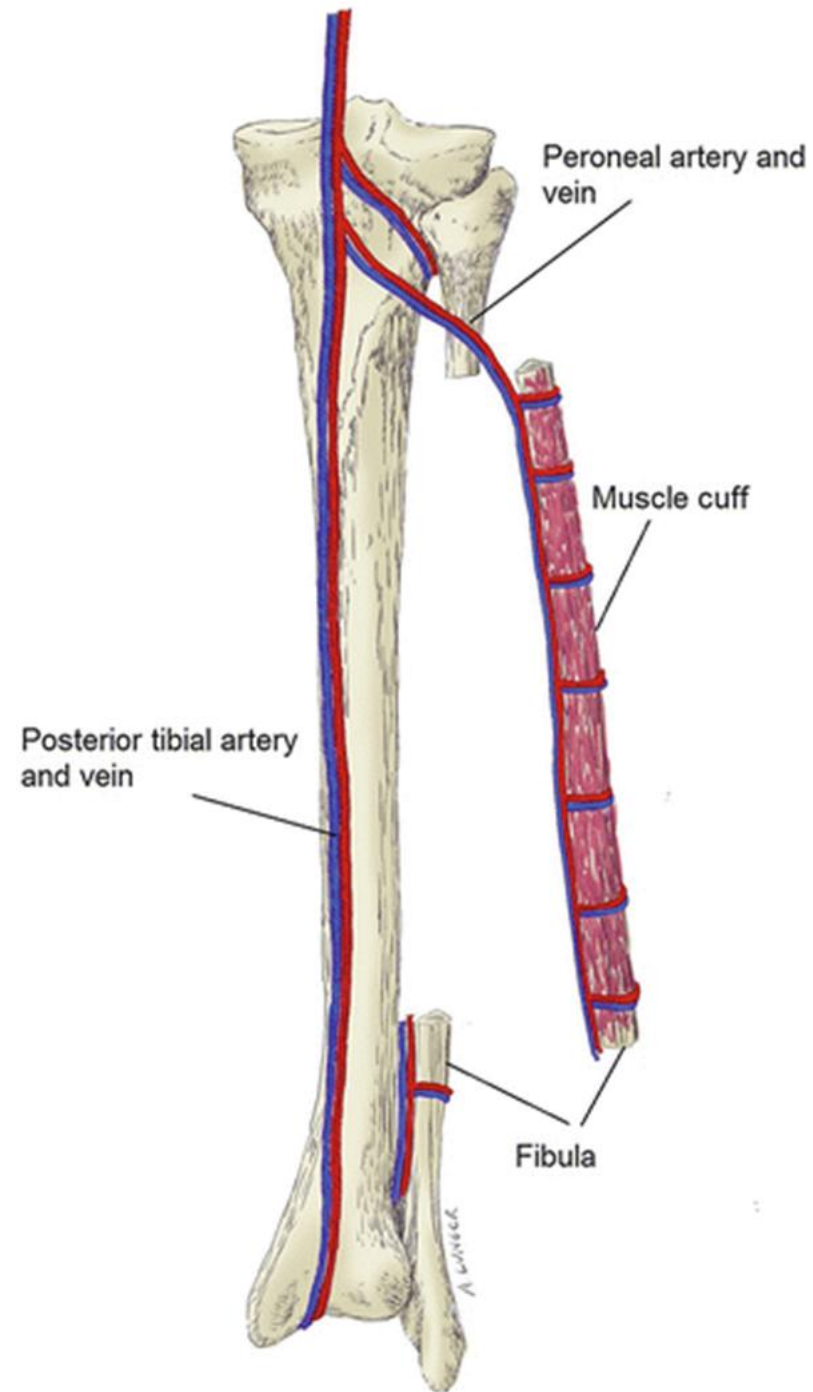


# Bone grafts

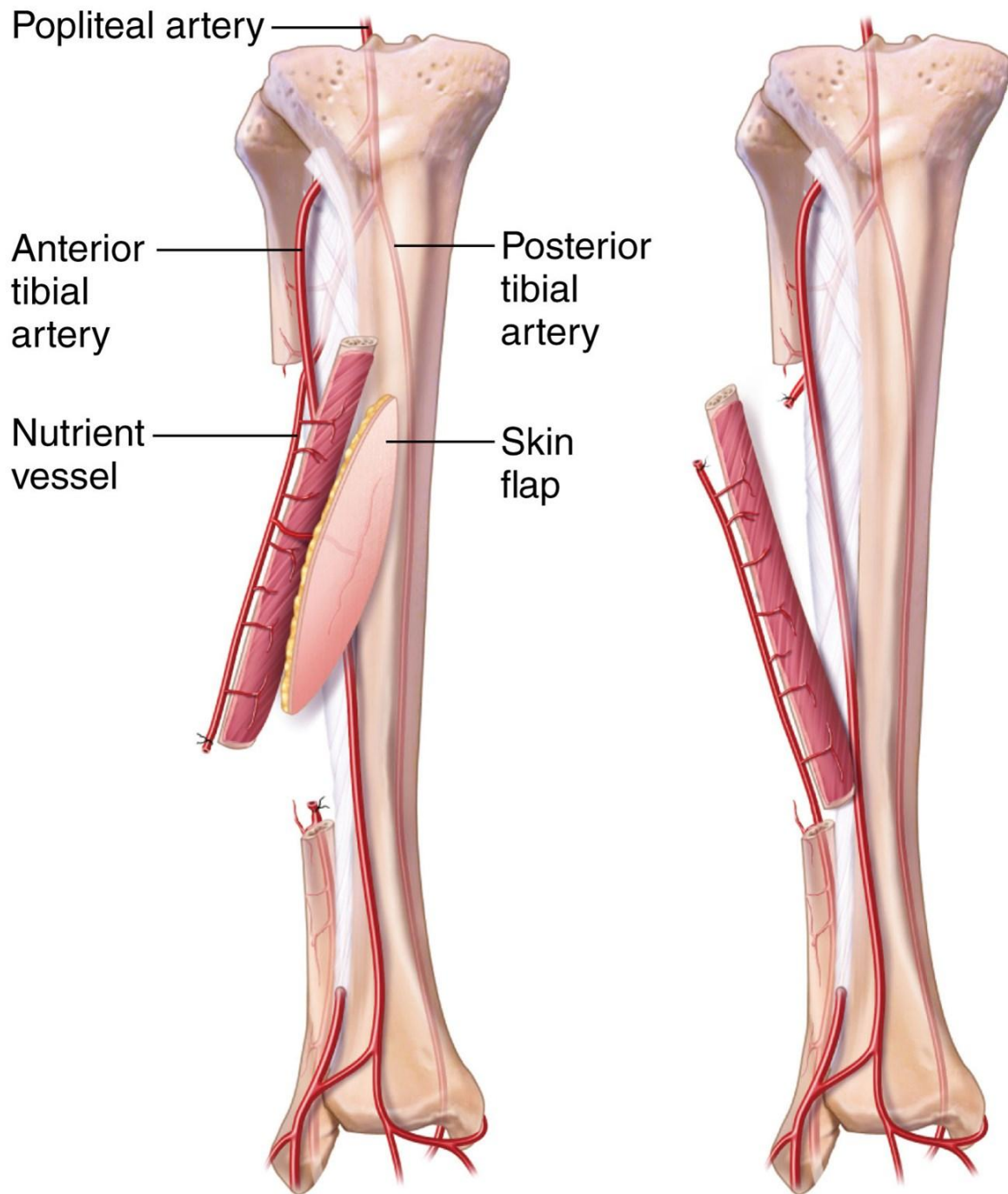
The fibula is a common source of bone for grafting. Even after a segment of the fibular shaft has been removed, walking, running, and jumping can be normal. Free vascularized fibulas have been used to restore skeletal integrity to limbs in which congenital bone defects exist and to replace segments of bone after trauma or excision of a malignant tumor.

# Bone grafts

The periosteum and nutrient artery are generally removed with the piece of bone so that the graft will remain alive and grow when transplanted to another site. The transplanted piece of fibula, secured in its new site, eventually restores the blood supply of the bone to which it has been attached.







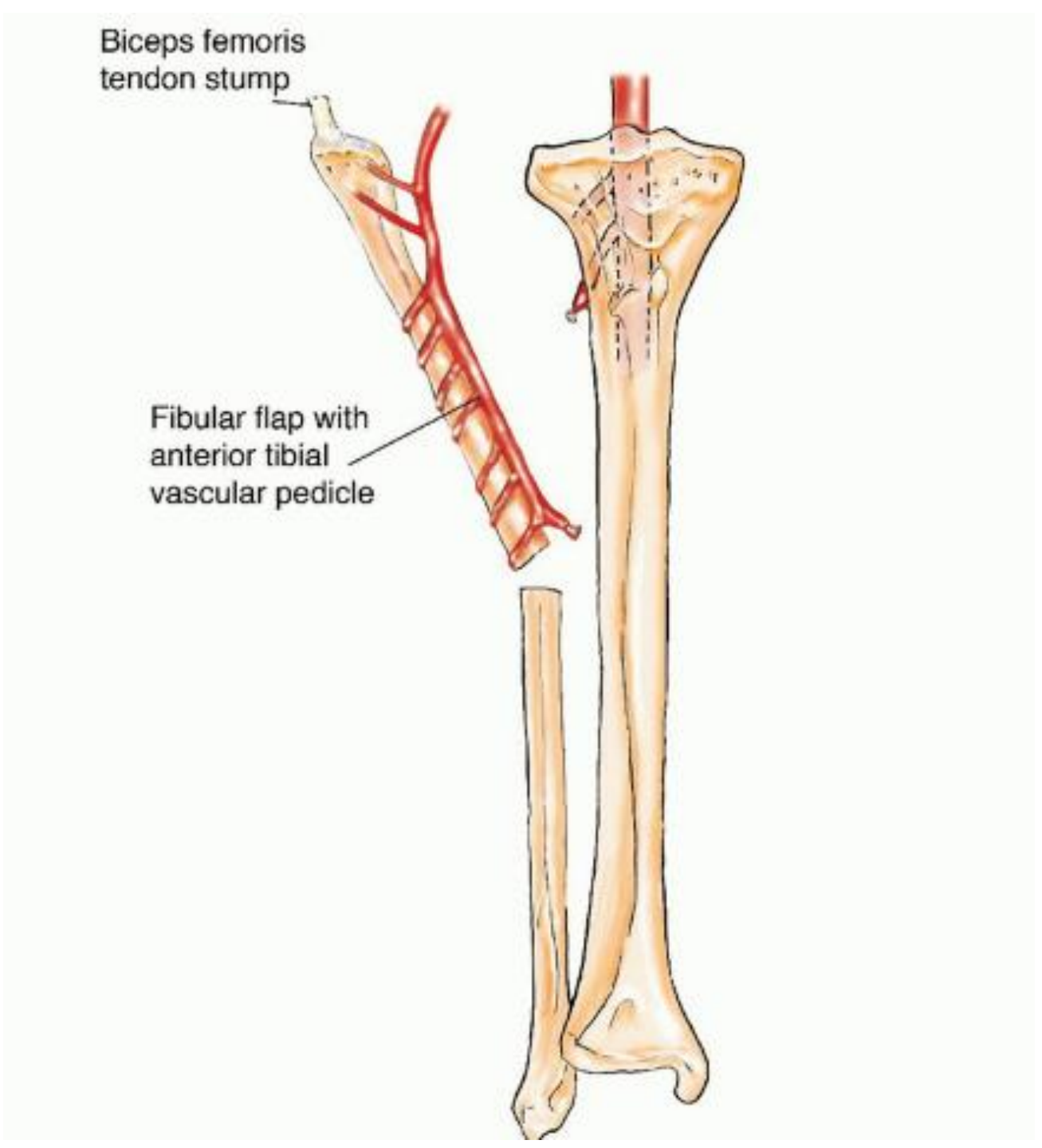
# Bone Grafts



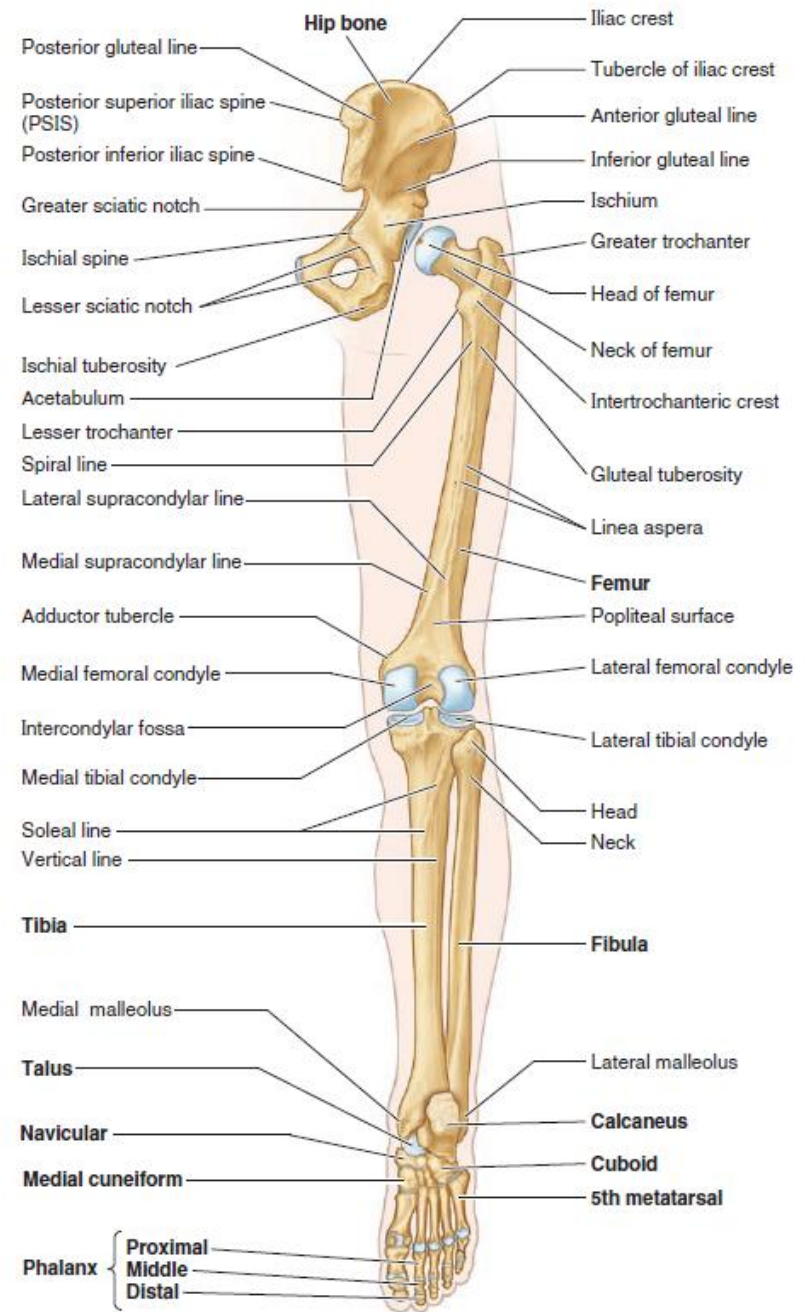
# Bone Grafts

Biceps femoris tendon stump

Fibular flap with anterior tibial vascular pedicle



# An overview of bones of the lower extremity



(E) Posterior view

# Knee region



This region includes:

- the prominences (or condyles) of the distal femur and proximal tibia
- the head of the fibula
- the patella (knee cap, which lies anterior to the distal end of the femur)
- joints between the above bony structures



# Knee joint

The knee is primarily a hinge type of synovial joint, allowing flexion and extension; however, the hinge movements are combined with gliding and rolling and with rotation about a vertical axis. The articular surfaces of the knee joint are characterized by their large size and incongruent shapes



# Knee joint

The knee joint consists of three articulations:

- Two femorotibial articulations (lateral and medial) between the lateral and the medial femoral and tibial condyles
- One intermediate femoropatellar articulation between the patella and the femur

The fibula is not involved in the knee joint.



# Knee joint

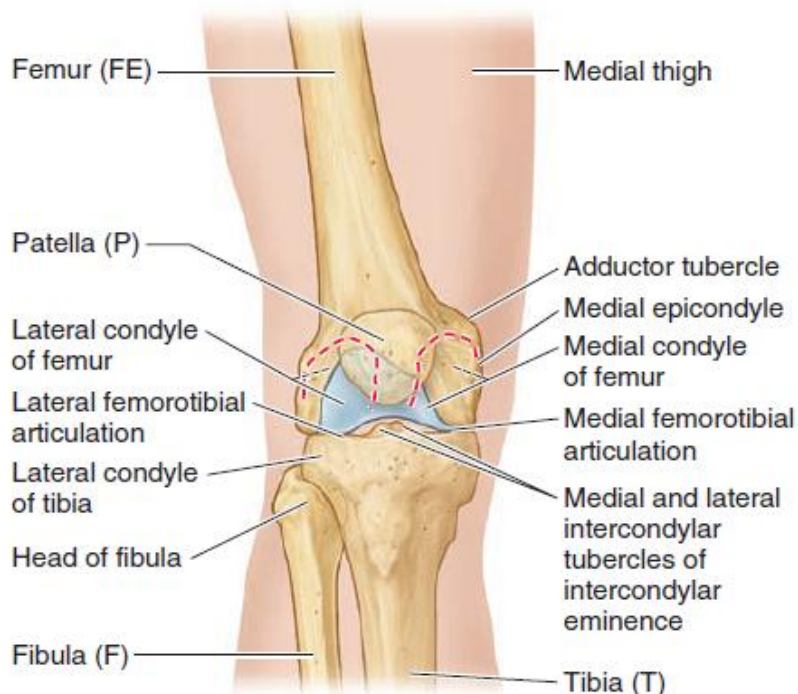
The stability of the knee joint depends on the

- Strength and actions of surrounding muscles and their tendons
- Ligaments connecting the femur and tibia

Of these supports, the muscles are most important; therefore, many sport injuries are preventable through appropriate conditioning and training. The most important muscle instabilizing the knee joint is the large quadriceps femoris



# Knee joint

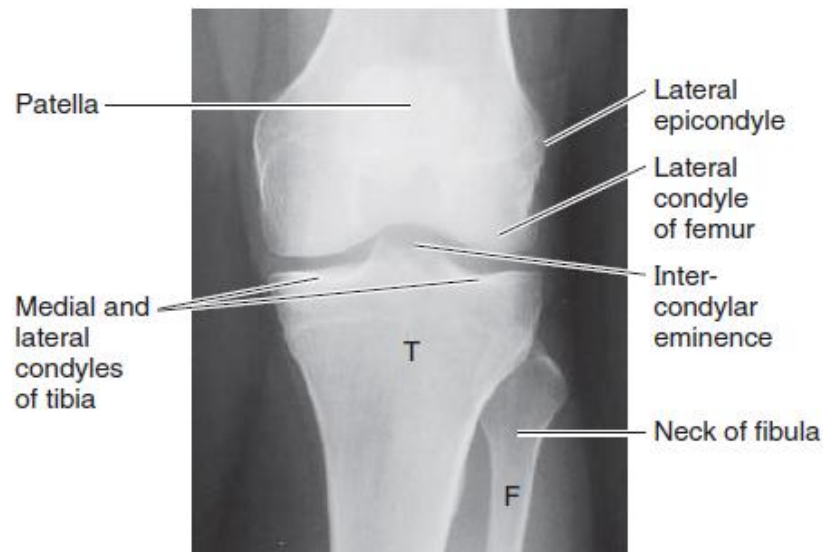


(A) Anterior view

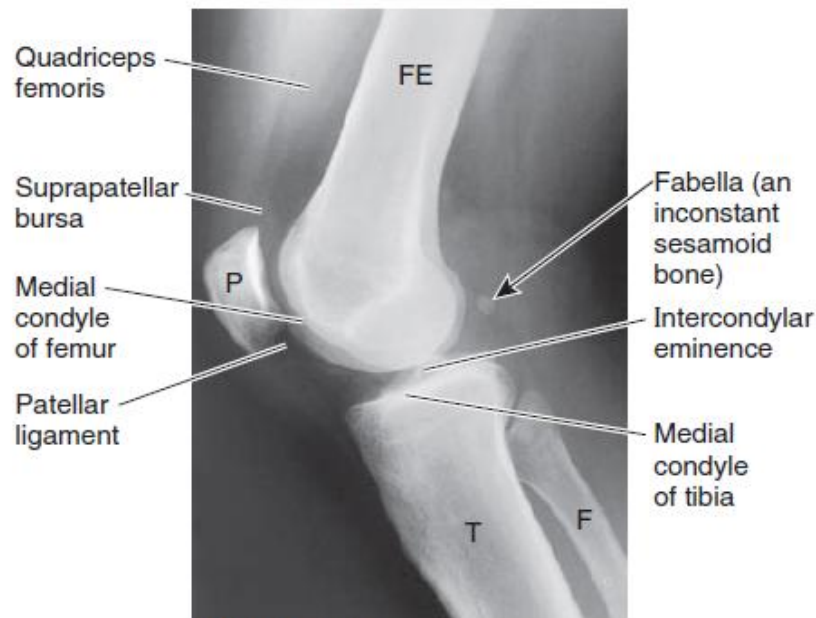
--- Posterior aspect of condyles



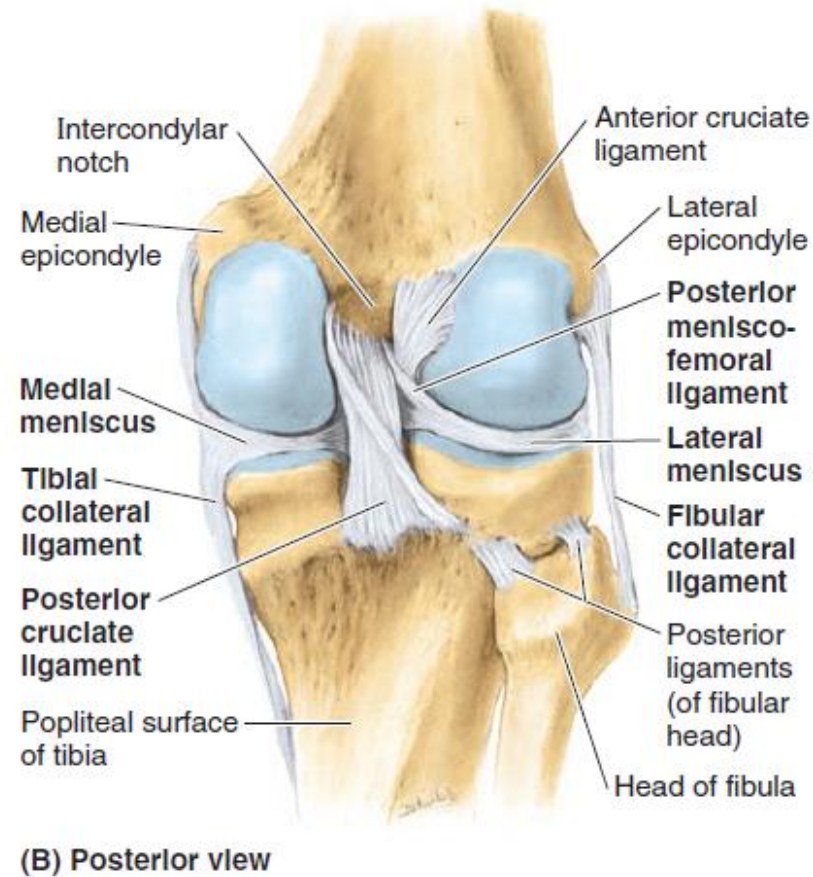
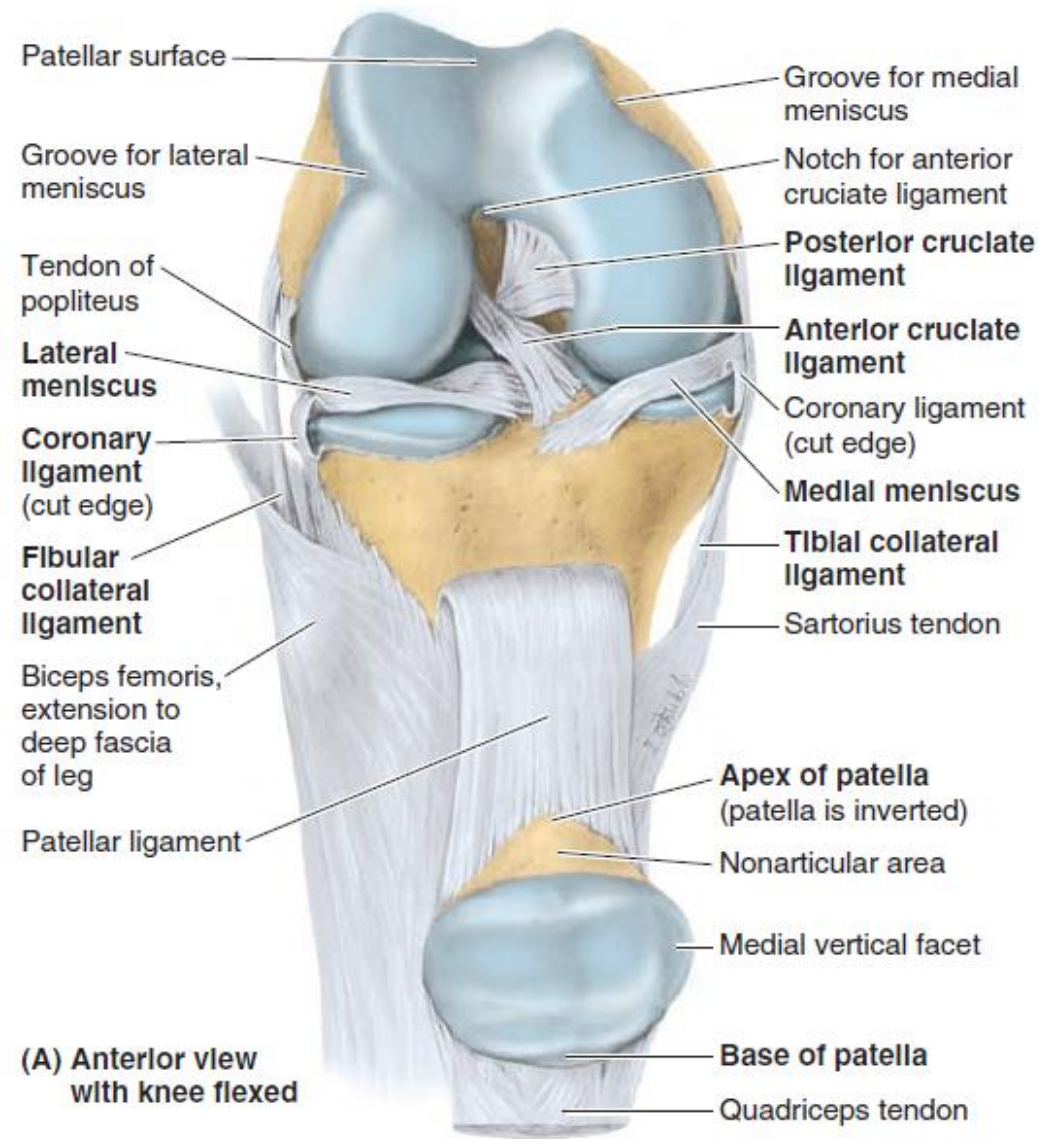
(C) Posterior view



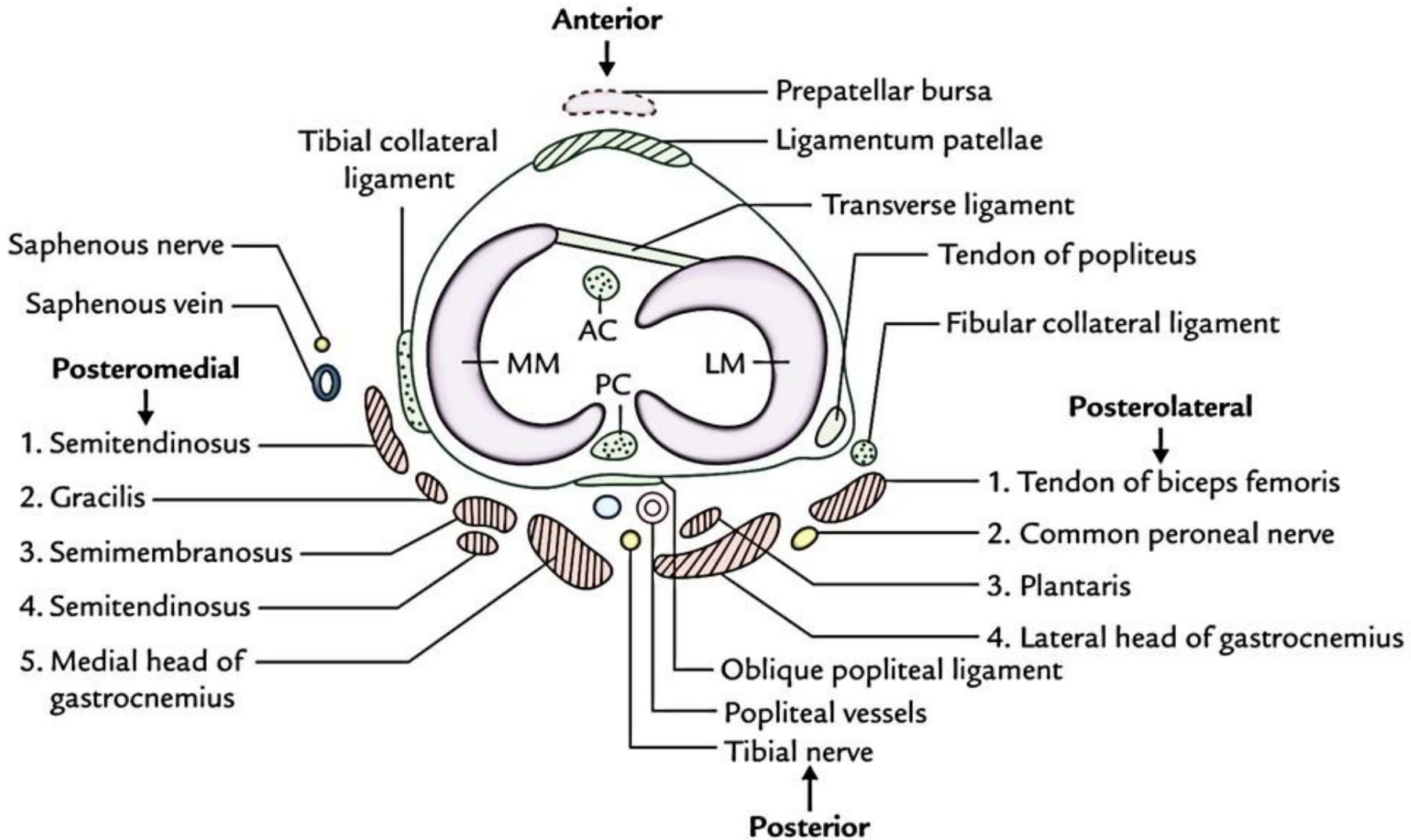
(B) Anteroposterior view



(D) Lateral view

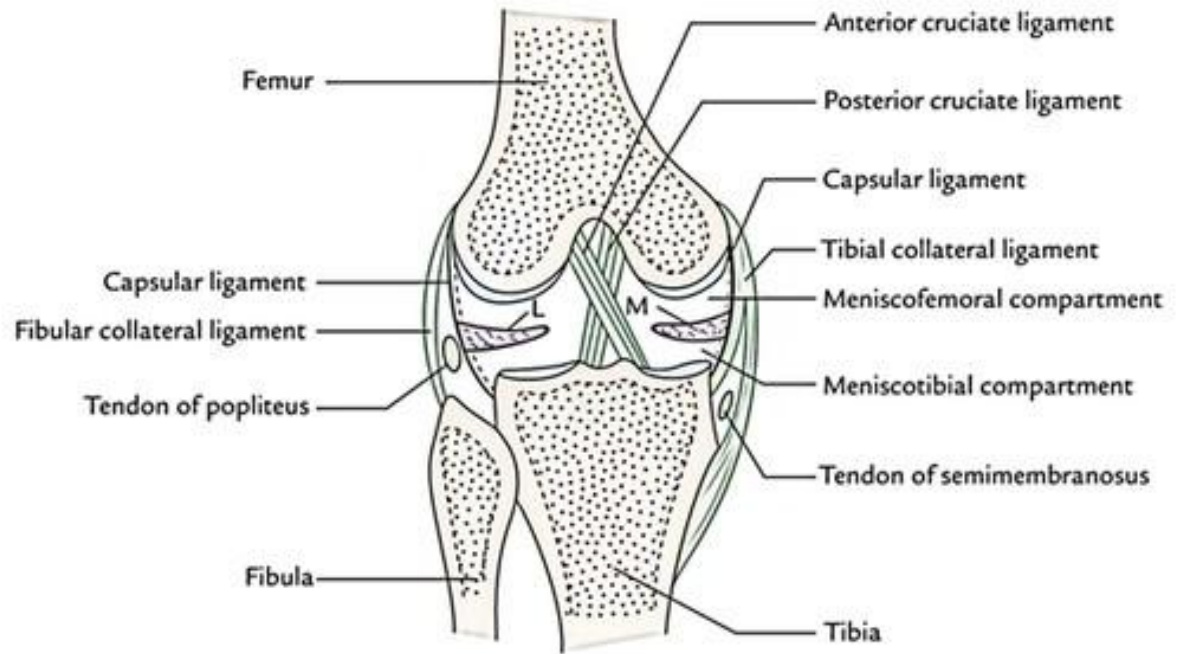


## Relations and ligaments of knee joint

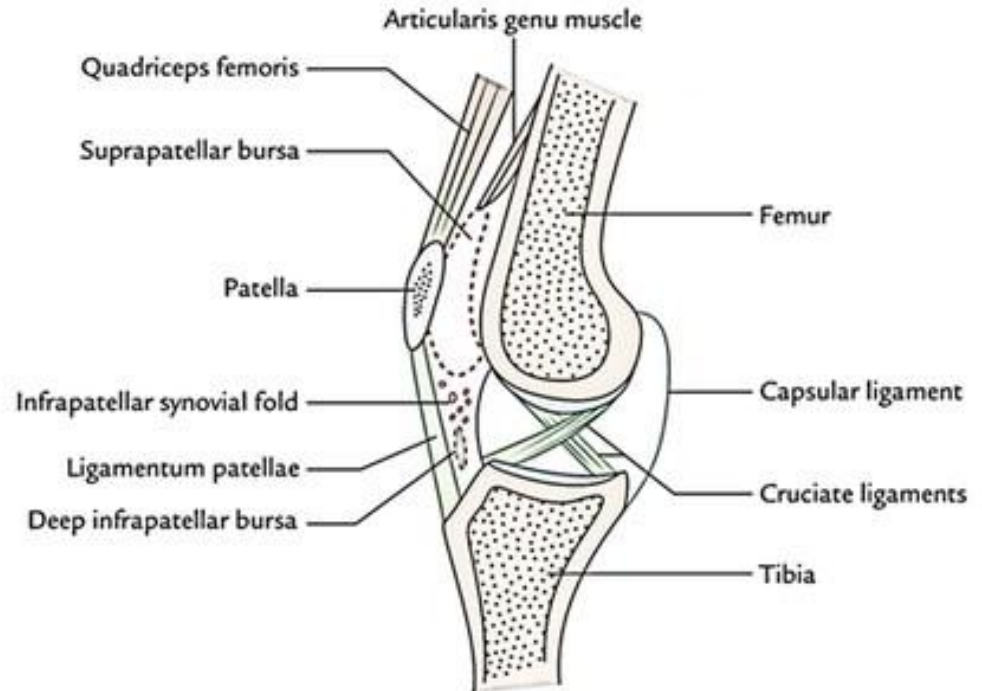


Relations and ligaments of knee joint





# Relations and ligaments of knee joint



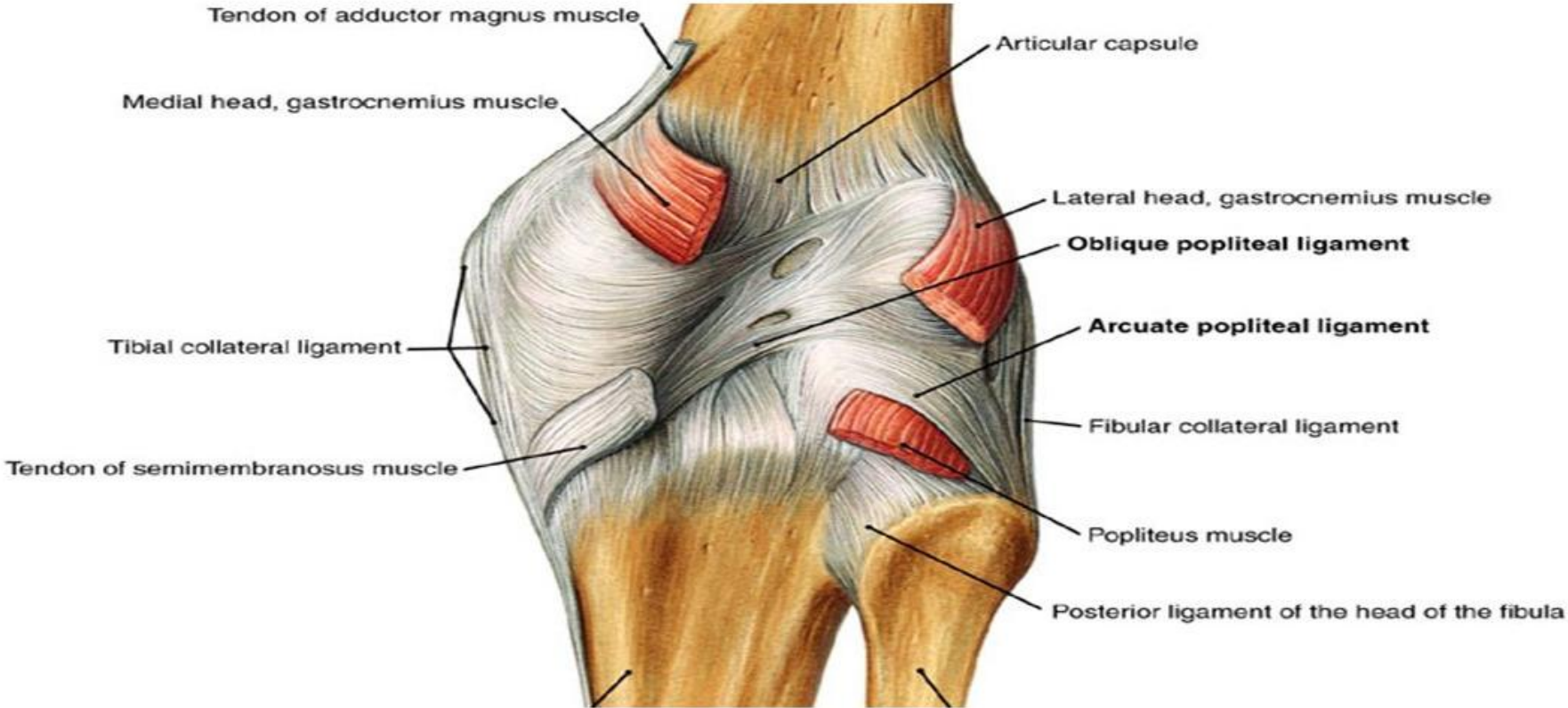
# Knee joint



The joint capsule is strengthened by four capsular (intrinsic) ligaments, the patellar, tibial collateral, oblique popliteal, and arcuate popliteal ligaments and one extracapsular ligament, the fibular collateral ligament. The cruciate ligaments (L. crux, cross) join the femur and tibia, crisscrossing within the joint capsule but outside the articular cavity

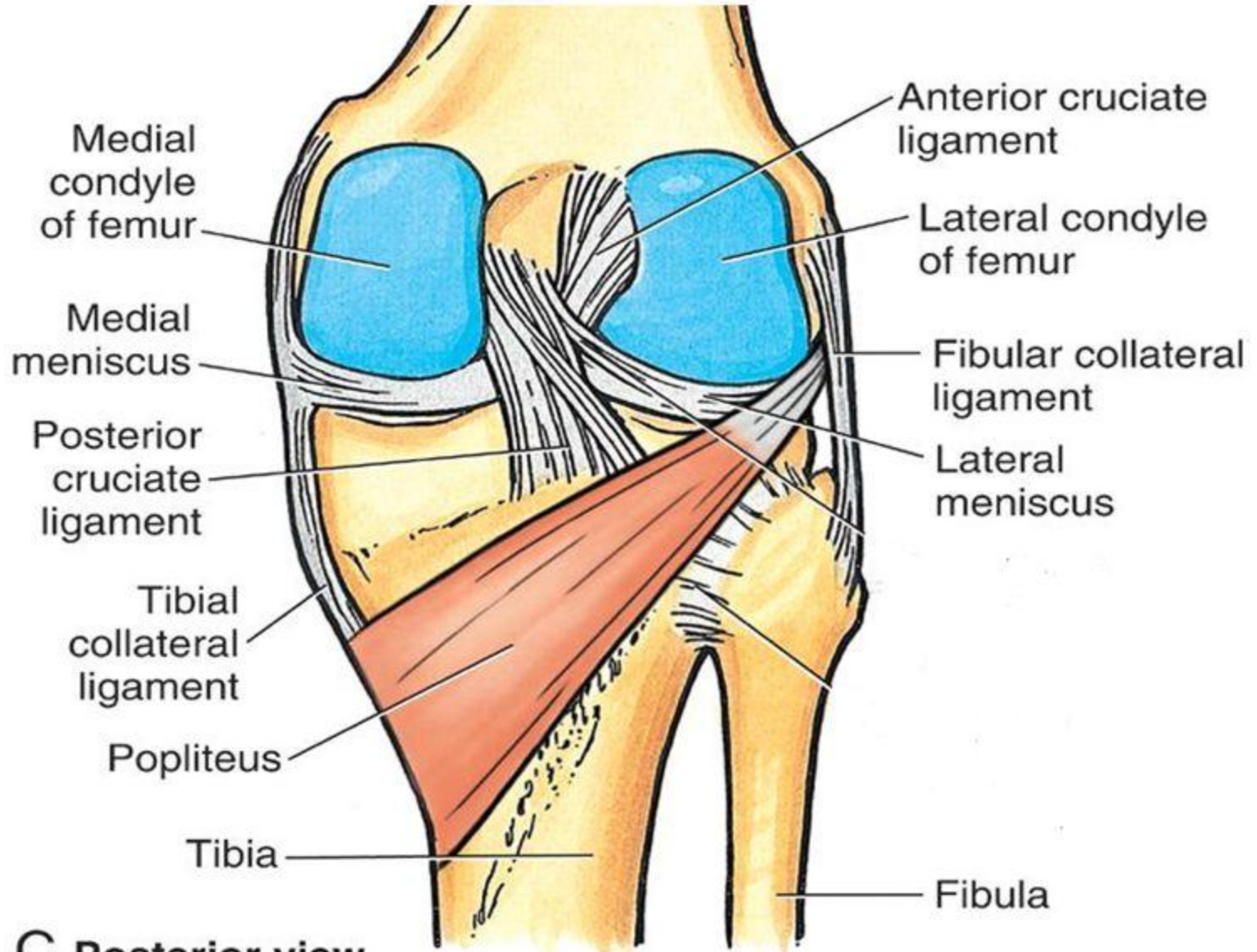


# Oblique Popliteal Arcuate Popliteal Fibular Collateral



## Knee ligaments

# Knee Ligaments



**C** Posterior view

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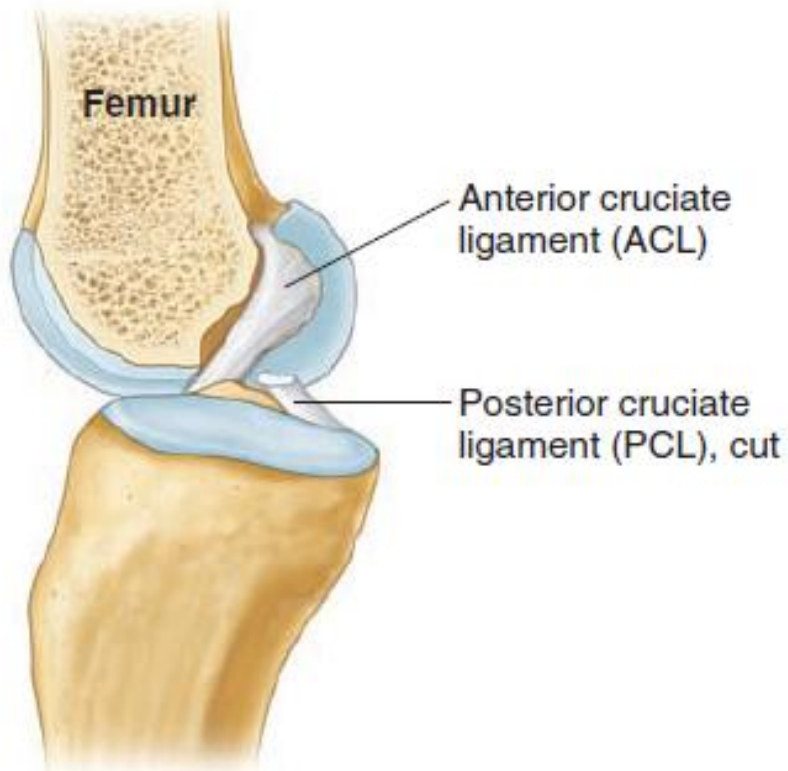




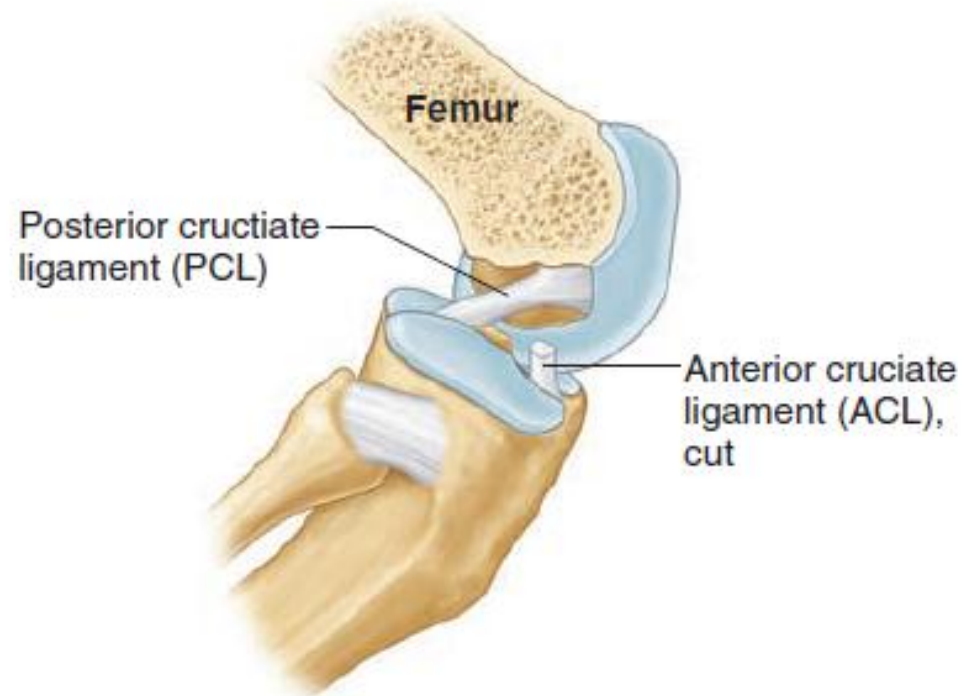
# Knee joint

The anterior cruciate ligament (ACL), the weaker of the two cruciate ligaments, arises from the anterior intercondylar area of the tibia, just posterior to the attachment of the medial meniscus. The posterior cruciate ligament (PCL), the stronger of the two cruciate ligaments, arises from the posterior intercondylar area of the tibia

# Knee joint



(A) Medial view



(B) Lateral view



# Knee joint

The joint capsule consists of an external fibrous layer (fibrous capsule) and an internal synovial membrane that lines all internal surfaces of the articular cavity not covered with articular cartilage.

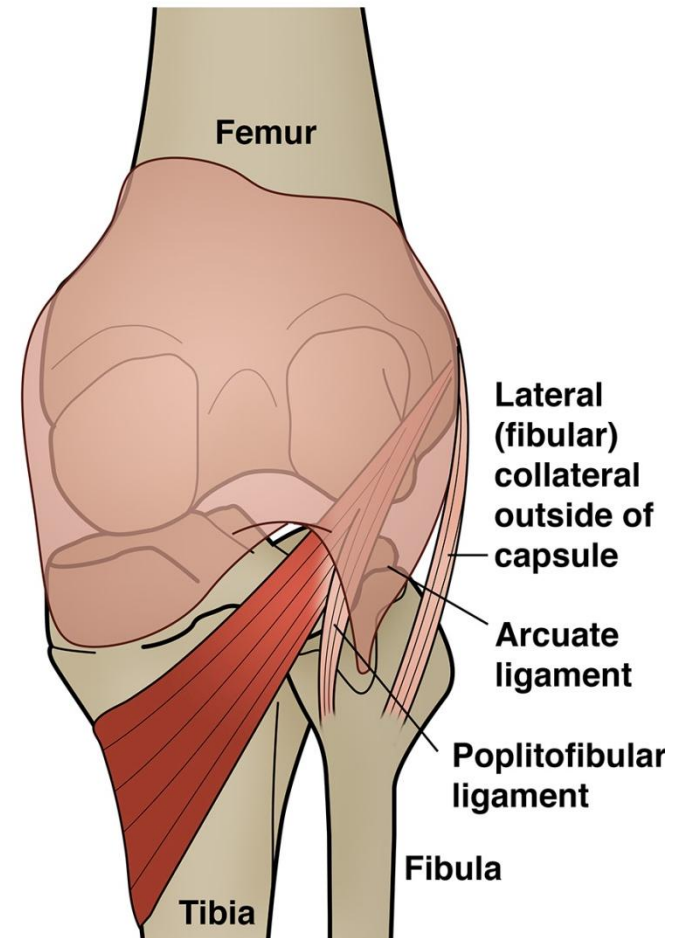
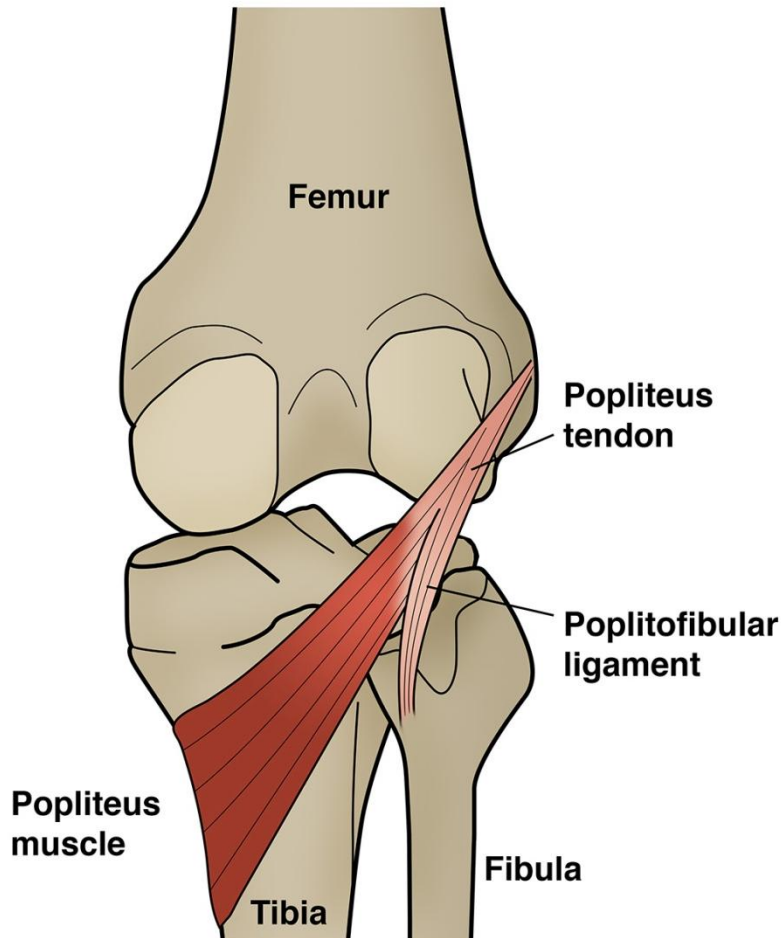
The fibrous layer has a few thickened parts that make up intrinsic ligaments but, for the most part, it is thin posteriorly and laterally.



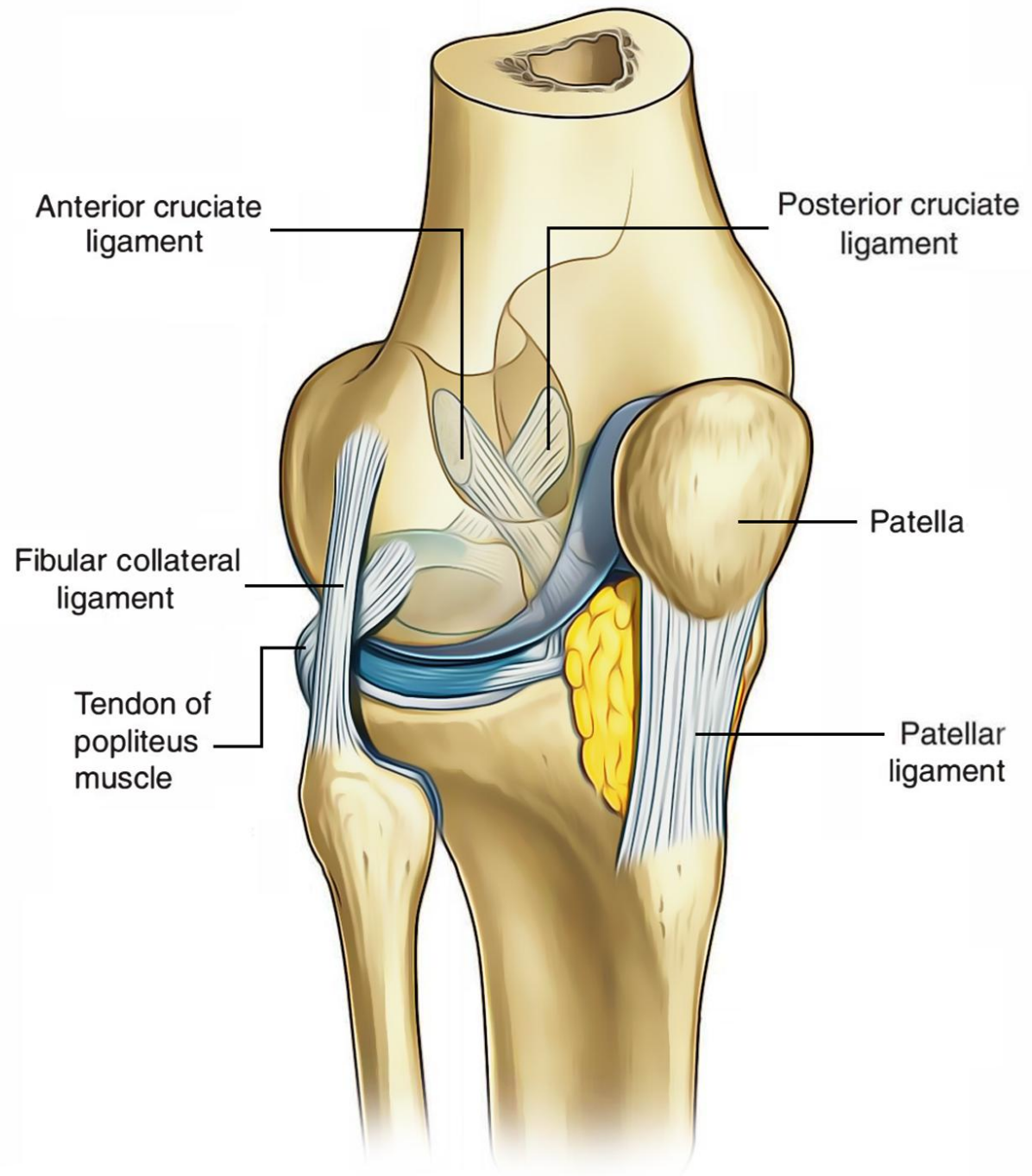
# Knee joint

The fibrous layer attaches to the femur superiorly, just proximal to the articular margins of the condyles. Posteriorly, it encloses the condyles and the intercondylar fossa. The fibrous layer has an opening posterior to the lateral tibial condyle to allow the popliteus tendon to pass out of the joint capsule to attach to the tibia.

# Knee Joint: posterior view



Relations and  
ligaments of knee  
joint



# Knee joint



Inferiorly, the fibrous layer attaches to the margin of the articular surface of the tibia (tibial plateau), except where the popliteus tendon crosses the bone. The quadriceps tendon, patella, and patellar ligament serve as a capsule anteriorly— that is, the fibrous layer is continuous with the lateral and medial margins of these structures.



# Knee joint

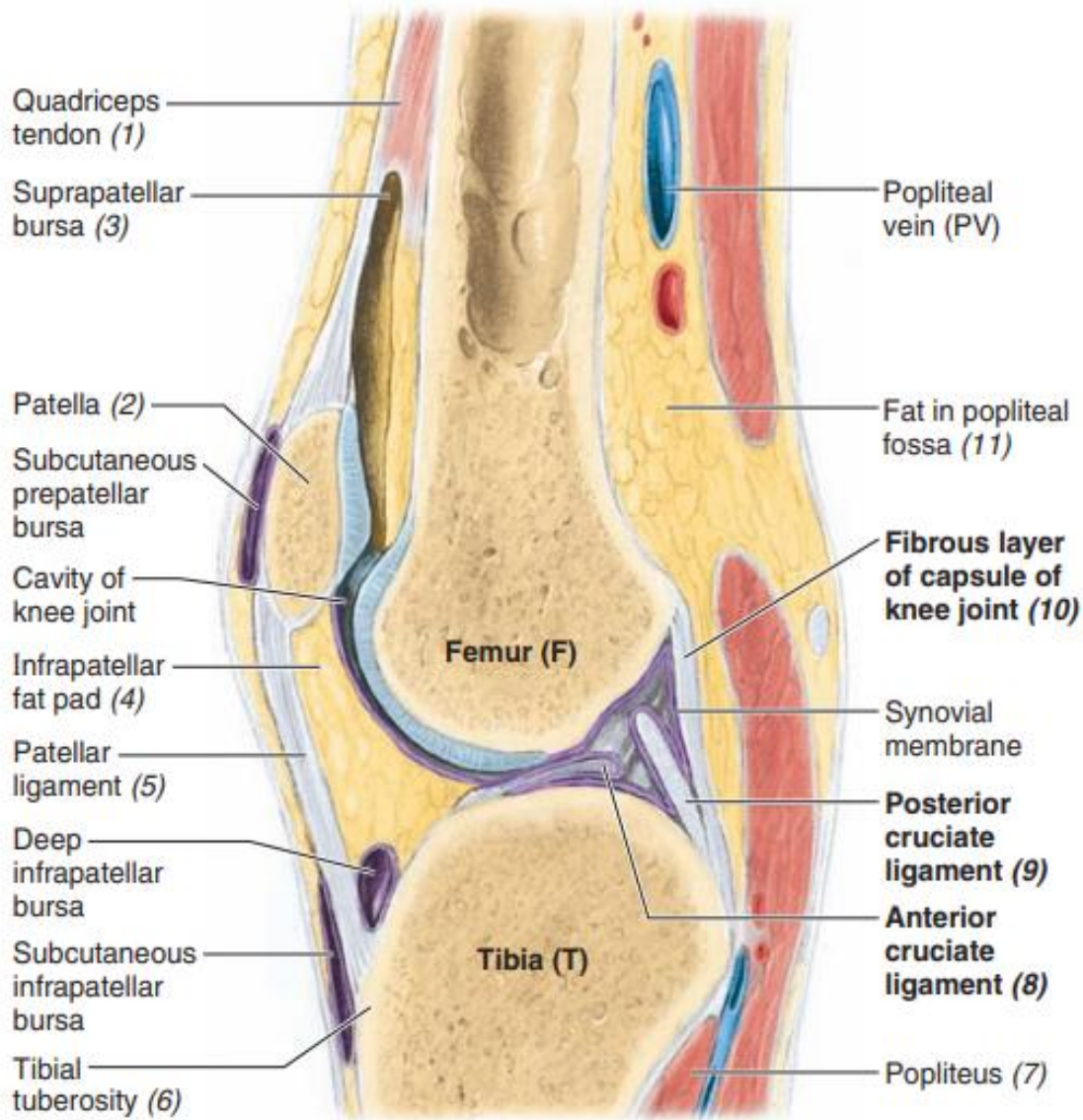


The extensive synovial membrane lines the internal aspect of the fibrous capsule and attaches to the periphery of the patella and the edges of the menisci. It lines the fibrous layer laterally and medially, but centrally, it becomes separated from the fibrous layer.

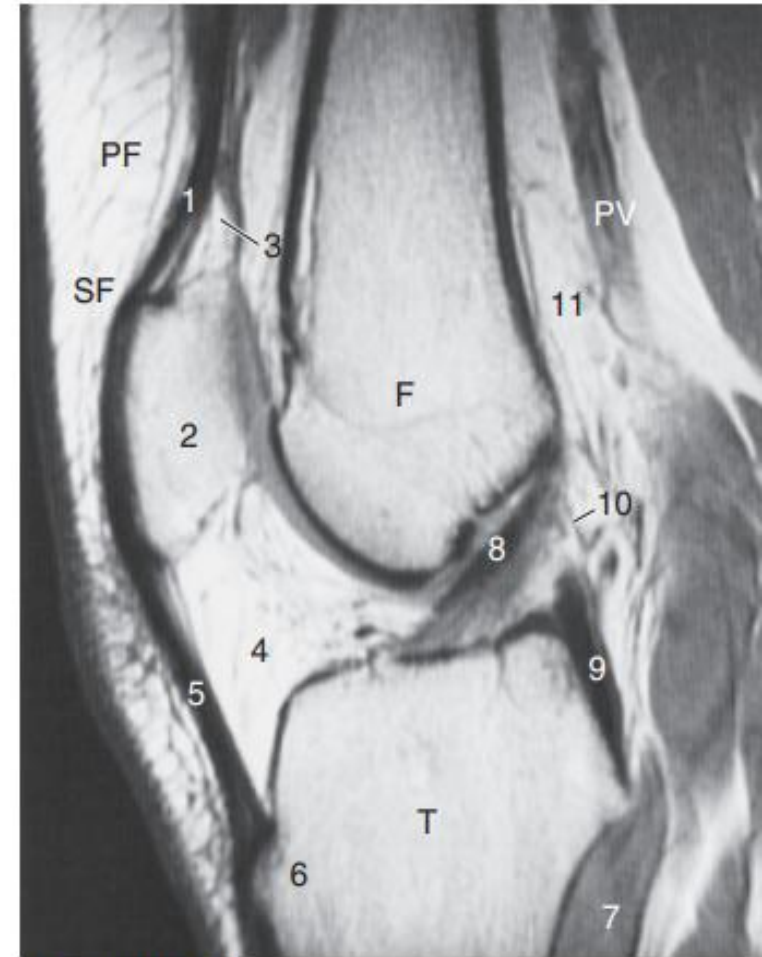
# Knee joint



The synovial membrane reflects from the posterior aspect of the joint anteriorly into the intercondylar region, covering the cruciate ligaments and the infrapatellar fat pad, so they are excluded from the articular cavity. This creates a median infrapatellar synovial fold, a vertical fold of synovial membrane that approaches the posterior aspect of the patella.



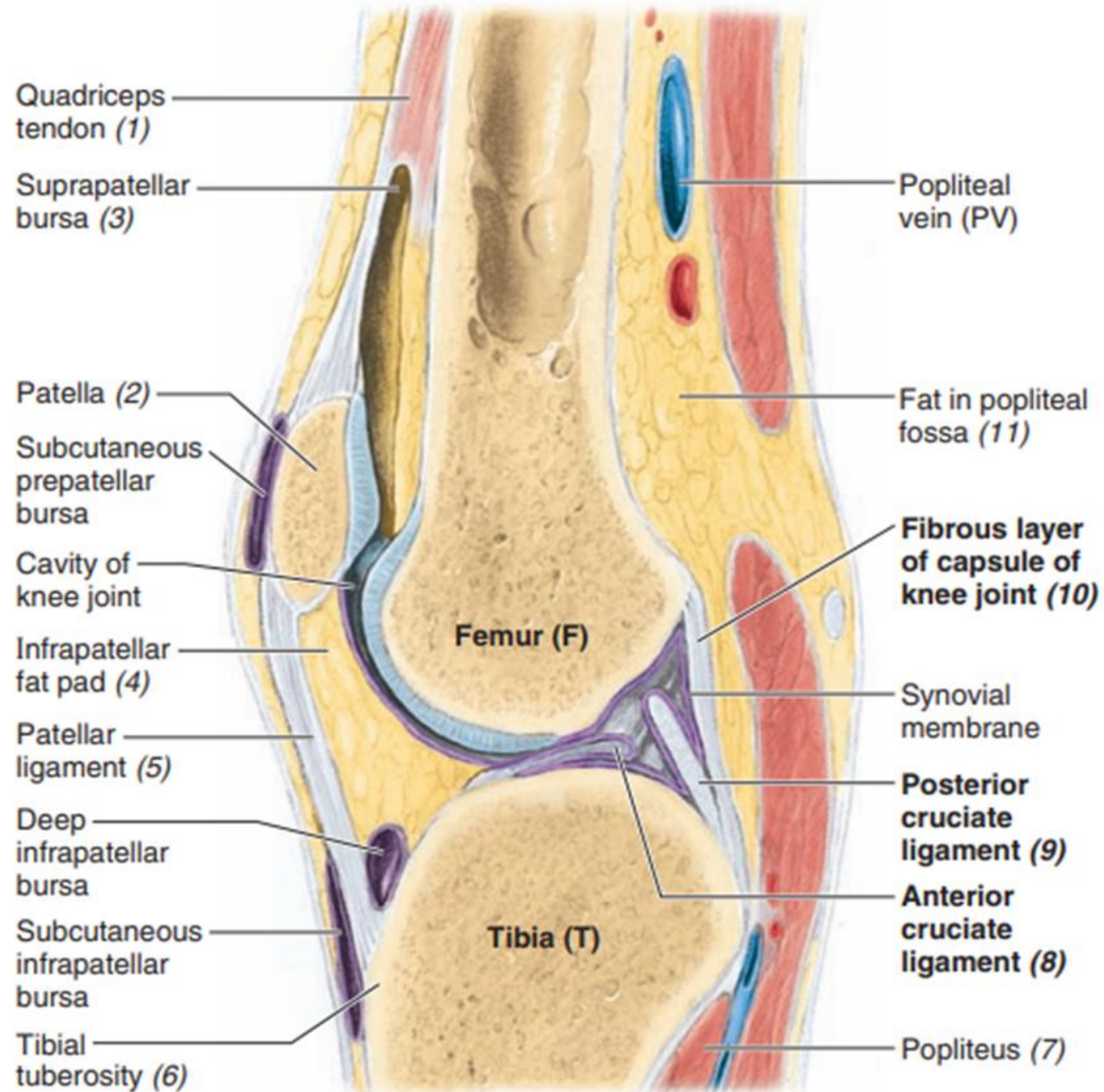
(A) Sagittal section



(B) Sagittal MRI

# Knee Joint

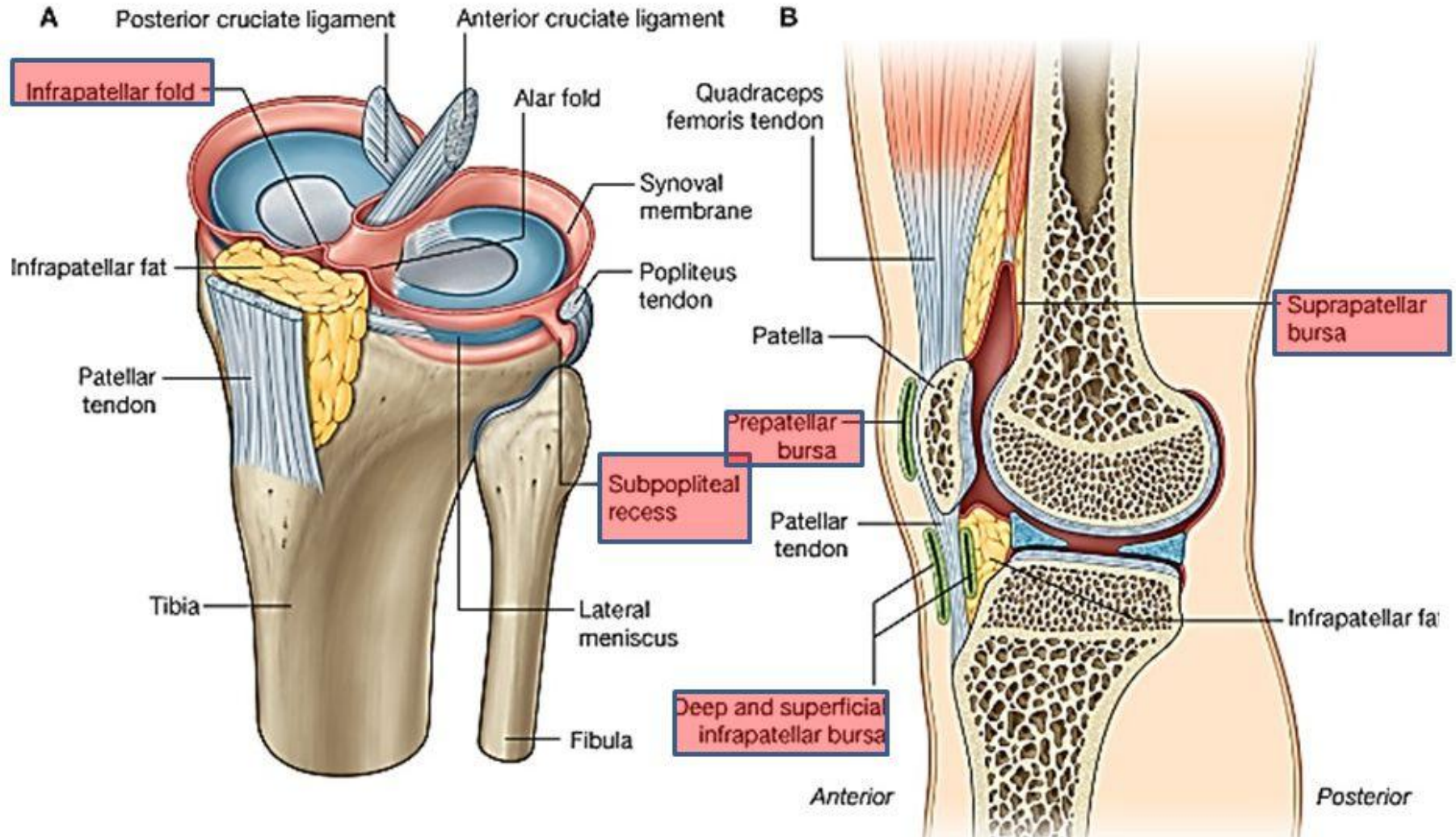
Thus, this synovial fold almost subdivides the articular cavity into right and left femorotibial articular cavities. Fat-filled lateral and medial alar folds of synovial membrane extend into the joint from the infrapatellar fold.





# Synovial membrane

- infrapatellar fat pad
- Alar fold
- Subpopliteal recess
- suprapatellar bursa
- infrapatellar bursae

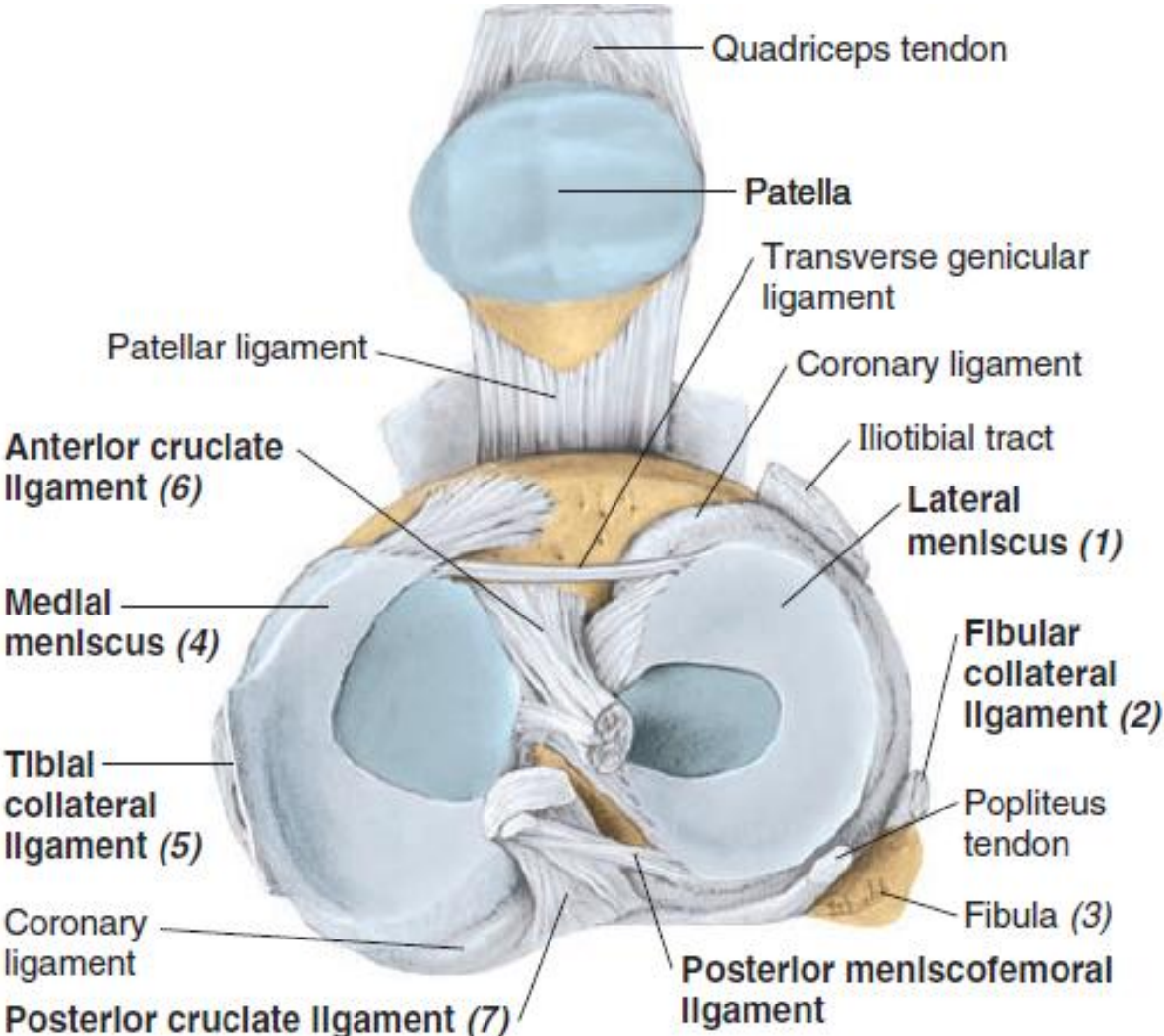


# Knee joint



The menisci of the knee joint are crescentic plates of fibrocartilage on the articular surface of the tibia that deepen the surface and play a role in shock absorption. The menisci are thicker at their external margins and taper to thin, unattached edges in the interior of the joint. Wedgeshaped in transverse section, the menisci are firmly attached at their ends to the intercondylar area of the tibia. Their external margins attach to the fibrous layer of the capsule of the knee joint.

# Knee joint





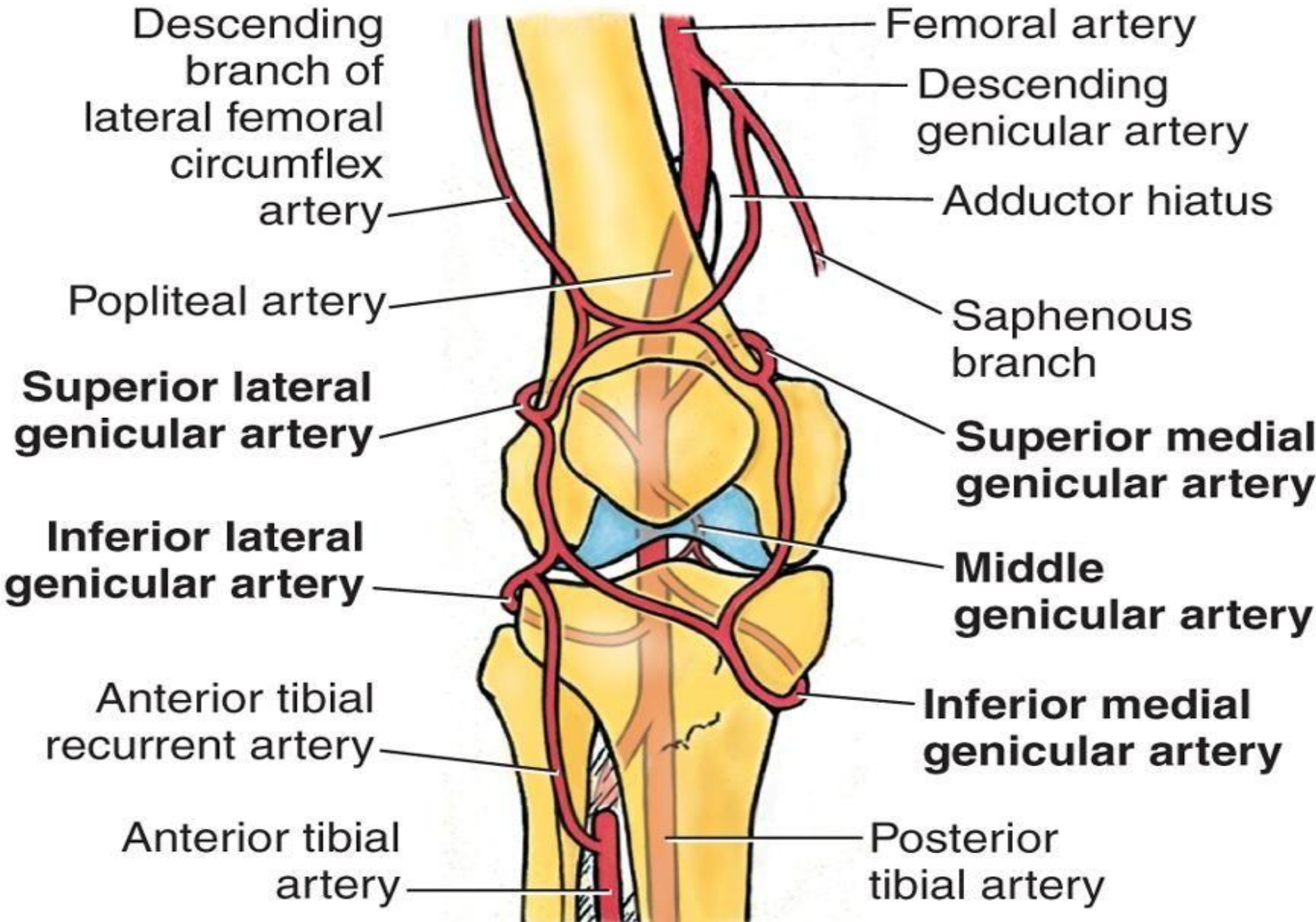


## Knee joint: blood supply

The knee joint is lavishly furnished by the blood via the arterial anastomosis around the knee, that is created by:

- (a) 5 genicular branches of popliteal artery,
- (b) descending genicular branch of femoral artery,
- (c) descending branch of the lateral circumflex femoral artery,
- (d) 2 recurrent branches of the anterior tibial artery, and
- (e) circumflex fibular branch of the posterior tibial artery.

# Knee region: arteries (anterior view)





## Knee joint: nerve supply

The knee joint has abundant Nerve Supply by:

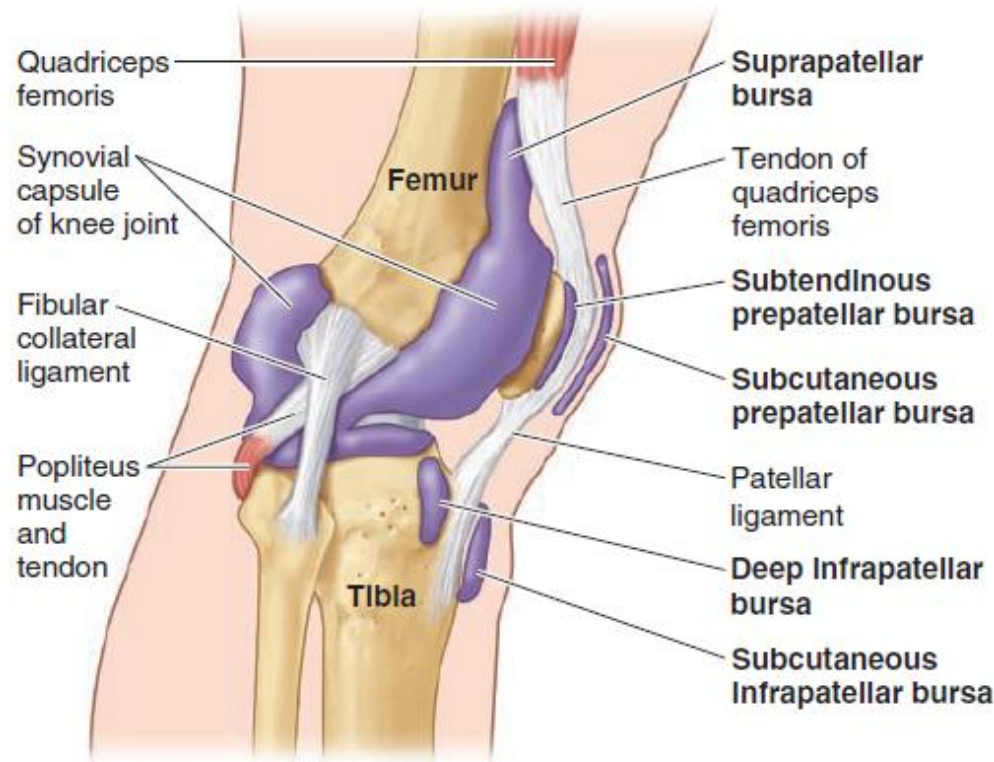
1. Femoral nerve via its branches to vasti, notably to vastus medialis.
2. Tibial and common peroneal nerves via their genicular branches.
3. Obturator nerve via its posterior section.

# Bursae around knee

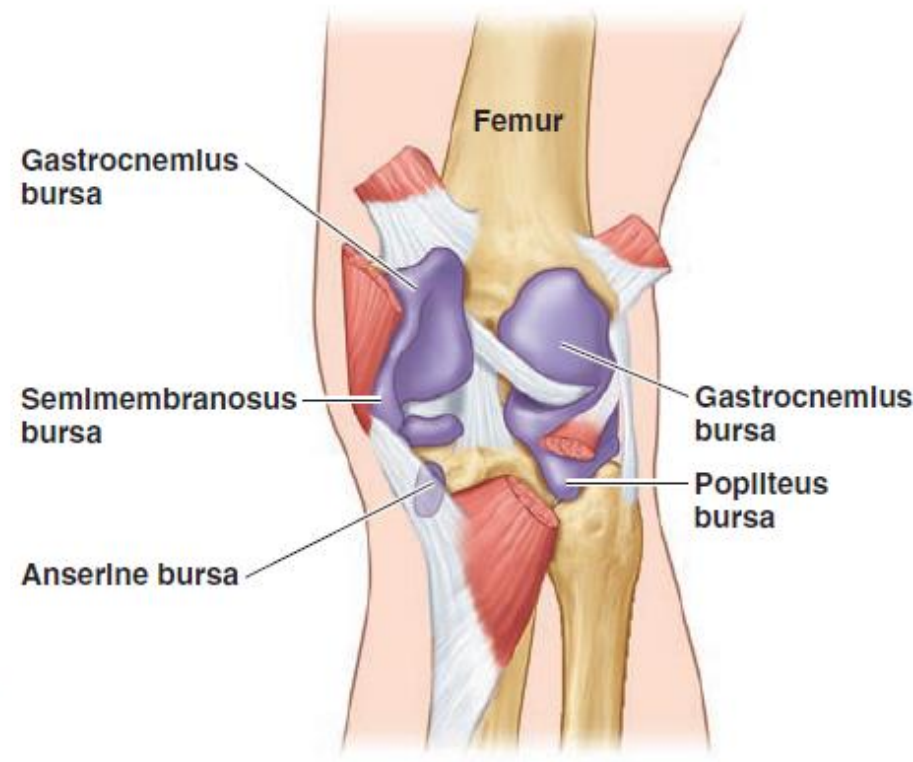


There are at least 12 bursae around the knee joint because most tendons run parallel to the bones and pull lengthwise across the joint during knee movements. The subcutaneous prepatellar and infrapatellar bursae are located at the convex surface of the joint, allowing the skin to be able to move freely during knee movements. Four bursae communicate with the articular cavity of the knee joint: suprapatellar bursa (deep to the distal quadriceps), popliteus bursa, anserine bursa, and gastrocnemius bursa.

# Bursae around knee



(A) Lateral view



(B) Posterior view

# Knee joint injuries



Knee joint injuries are common because the knee is a low-placed, mobile, weight-bearing joint and its stability depends almost entirely on its associated ligaments and muscles. The most common knee injuries in contact sports are ligament sprains, which occur when the foot is fixed on the ground. If a force is applied against the knee when the foot cannot move, ligament injuries are likely to occur.



# Knee joint injuries



The MCL and LCL are tightly stretched when the leg is extended, preventing disruption of the sides of the joint. The firm attachment of the MCL to the medial meniscus is of clinical significance because tearing of this ligament frequently results in concomitant tearing of the medial meniscus. The injury is frequently caused by a blow to the lateral side of the extended knee or excessive lateral twisting of the flexed knee.



# Knee Joint Injuries

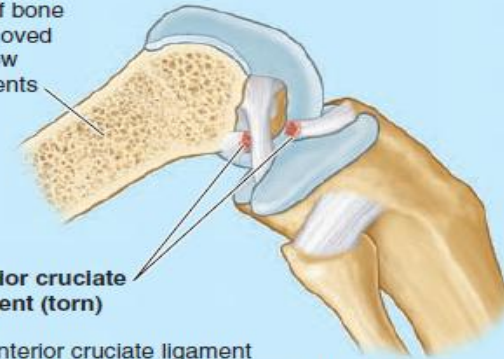
The ACL, which serves as a pivot for rotatory movements of the knee, is taut during flexion and may also tear subsequent to the rupture of the MCL. ACL rupture, one of the most common knee injuries in skiing accidents, for example, causes the free tibia to slide anteriorly under the femur, a sign known as the anterior drawer sign

# Knee joint injuries



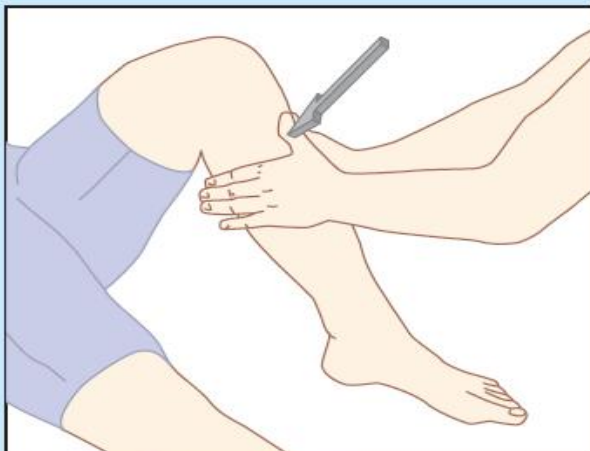
**(B) Anterior drawer sign (ACL)**

Half of bone is removed to show ligaments



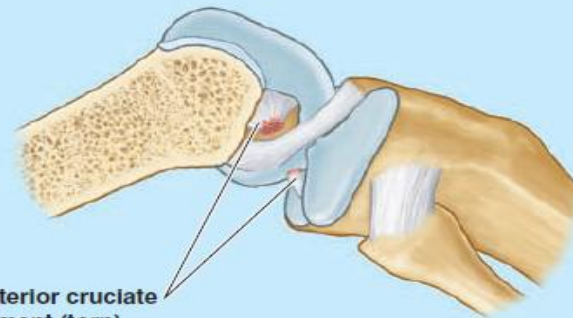
**Anterior cruciate ligament (torn)**

The anterior cruciate ligament prevents the femur from sliding posteriorly on the tibia and hyperextension of the knee and limits medial rotation of the femur when the foot is on the ground, and the leg is flexed.



**(C) Posterior drawer sign (PCL)**

**Posterior cruciate ligament (torn)**



The posterior cruciate ligament prevents the femur from sliding anteriorly on the tibia, particularly when the knee is flexed.



# Knee joint injuries

Although strong, PCL rupture may occur when a person lands on the tibial tuberosity when the knee is flexed. PCL ruptures usually occur in conjunction with tibial or fibular ligament tears. The posterior drawer sign, in which the free tibia slides posteriorly under the fixed femur, occurs as a result of PCL rupture.

# Knee region



The posterior part of the region is marked by a fossa. This fossa is a well defined, fat-filled space called the popliteal fossa. The word popliteal is derived from the Latin word “poples”, and this fossa mainly transmit neurovascular structures.





# Knee region

The popliteal fossa is a diamond-shaped depression located posterior to the knee joint. Important nerves and vessels pass from the thigh to the leg by traversing through this fossa. These include the two terminal branches of the sciatic nerve, the popliteal vessels and short saphenous vein. Several muscles of the thigh and leg form the boundaries of the popliteal fossa. They include the semimembranosus, semitendinosus, biceps femoris, gastrocnemius and popliteus muscles.

# Knee region



## Key facts about the popliteal fossa

### Borders

*Superomedial:* semimembranosus and semitendinosus muscles

*Lateral:* biceps femoris muscle

*Inferior:* gastrocnemius muscle

*Floor:* knee joint capsule, distal femur, proximal tibia, popliteus muscle

*Roof:* popliteal fascia

### Contents

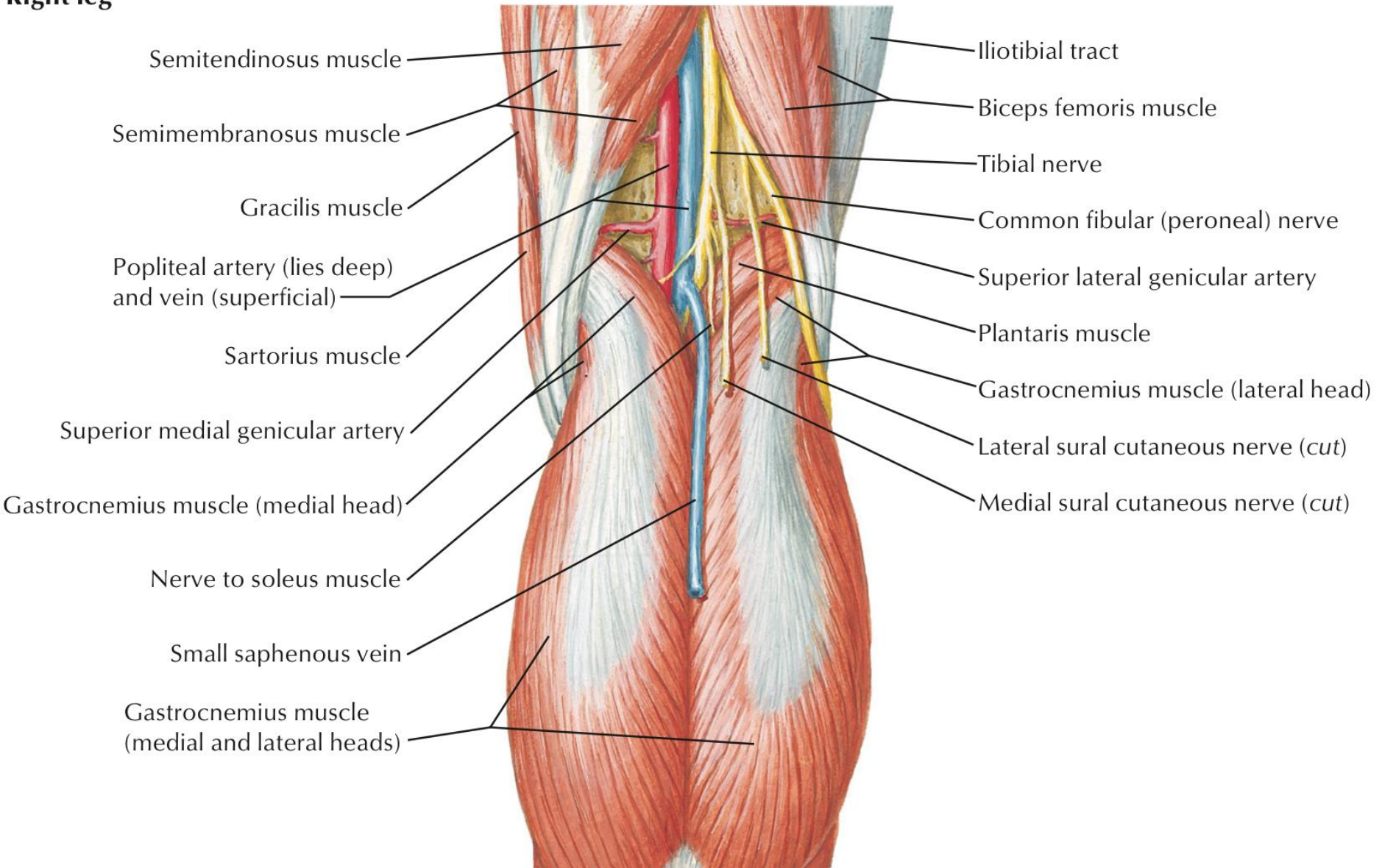
*Nerves:* tibial, common fibular, sural, posterior femoral cutaneous

*Vessels:* popliteal artery and vein, short saphenous vein

*Lymph nodes:* superficial and deep popliteal lymph nodes

# The popliteal fossa

Right leg



# Knee region



The popliteal artery passes through the popliteal fossa and ends at the inferior border of the popliteus by dividing into the anterior and posterior tibial arteries. The deepest structure in the popliteal fossa, the popliteal artery, runs close to the joint capsule of the knee joint. Five genicular branches of the popliteal artery supply the joint capsule and ligaments of the knee joint.

# Knee region



The genicular arteries are the superior lateral, superior medial, middle, inferior lateral, and inferior medial genicular arteries. They participate in the formation of the genicular anastomosis (L. genu, knee), a peri-articular arterial anastomosis around the knee that provides collateral circulation capable of maintaining blood supply to the leg during full knee flexion.

# Knee region



- Popliteal pulse

Palpation of the popliteal pulse is usually performed with the knee flexed in order to relax the hamstrings and popliteal fascia. The pulse is best felt in the inferior part of the fossa but may be difficult to find because of the deep location of the popliteal artery. A loss of the popliteal pulse can indicate femoral artery obstruction.



Leg region

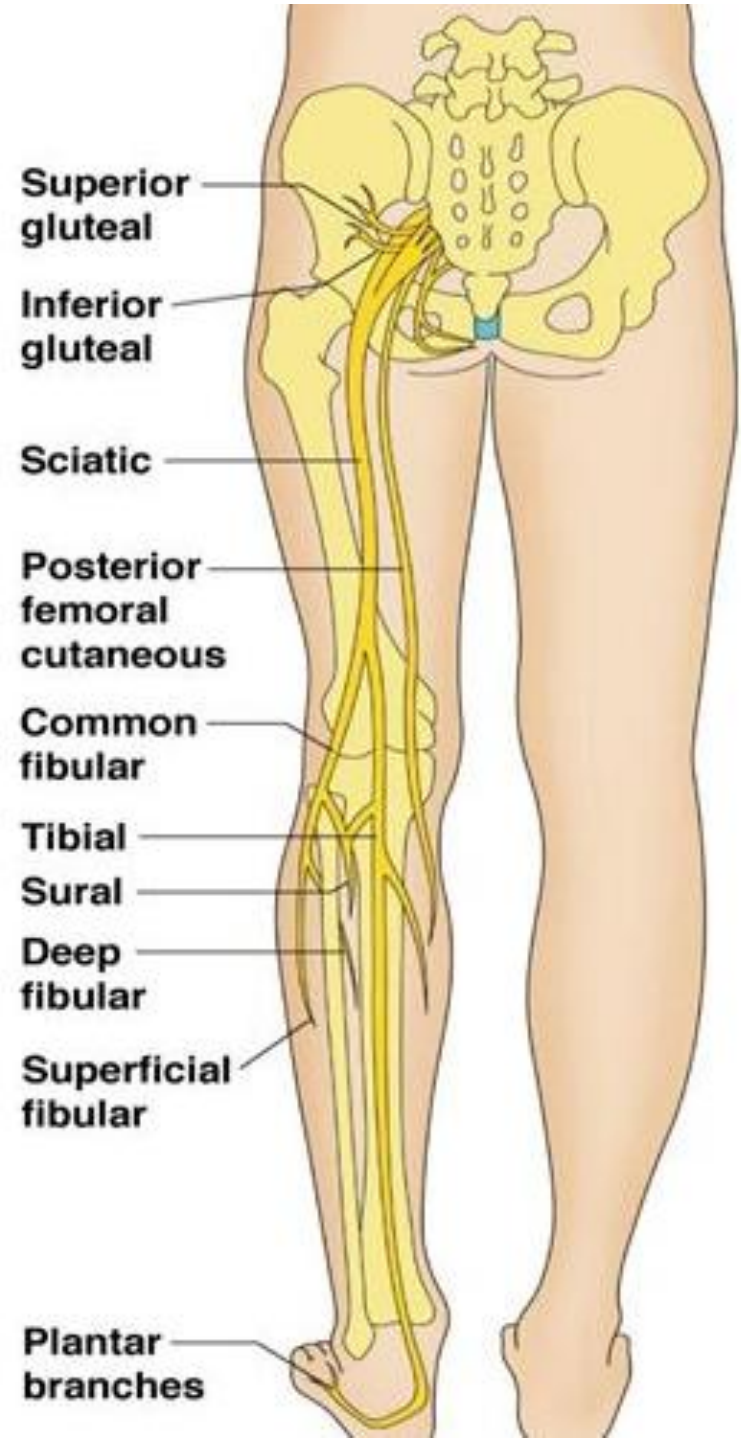


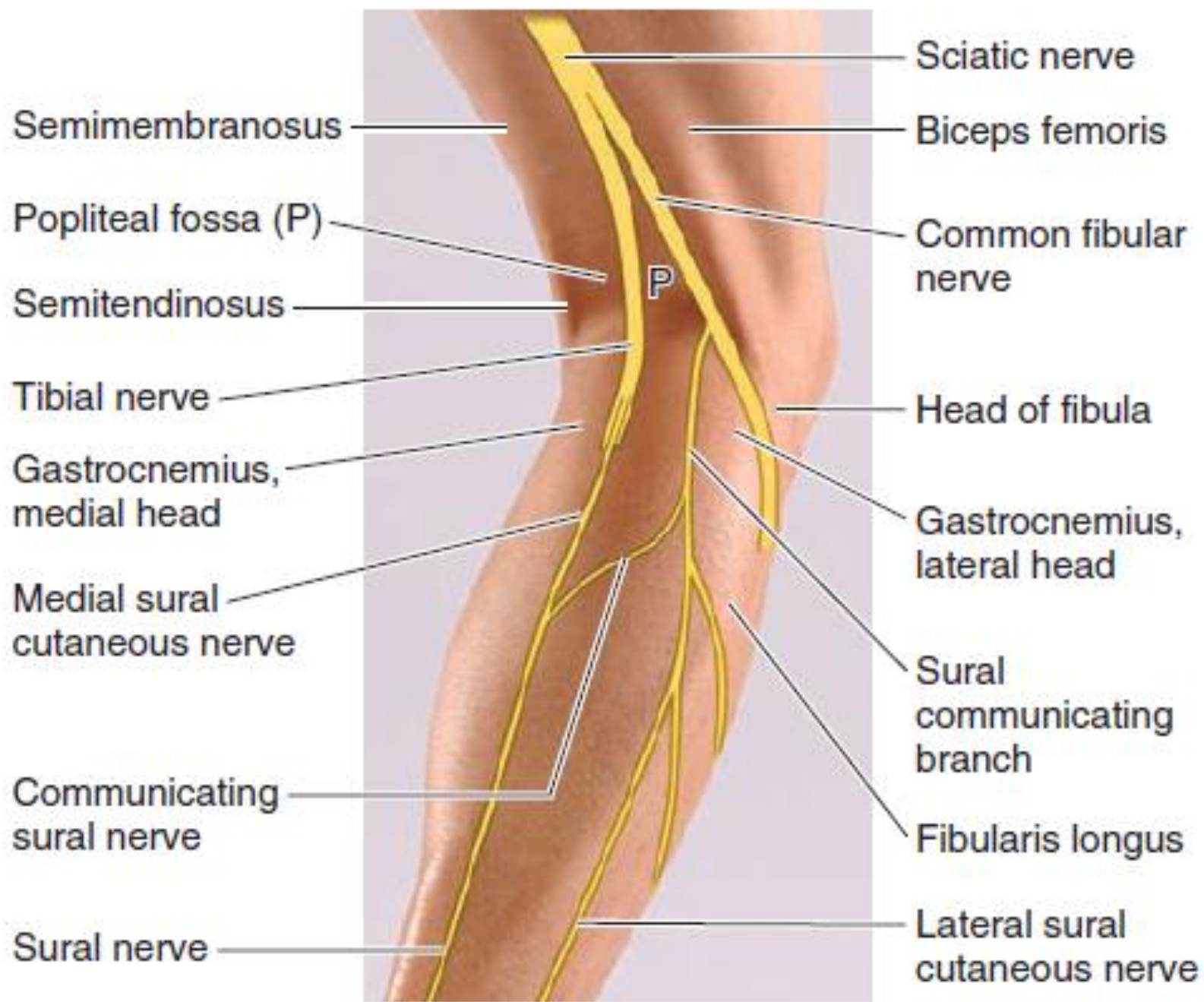
# Leg region



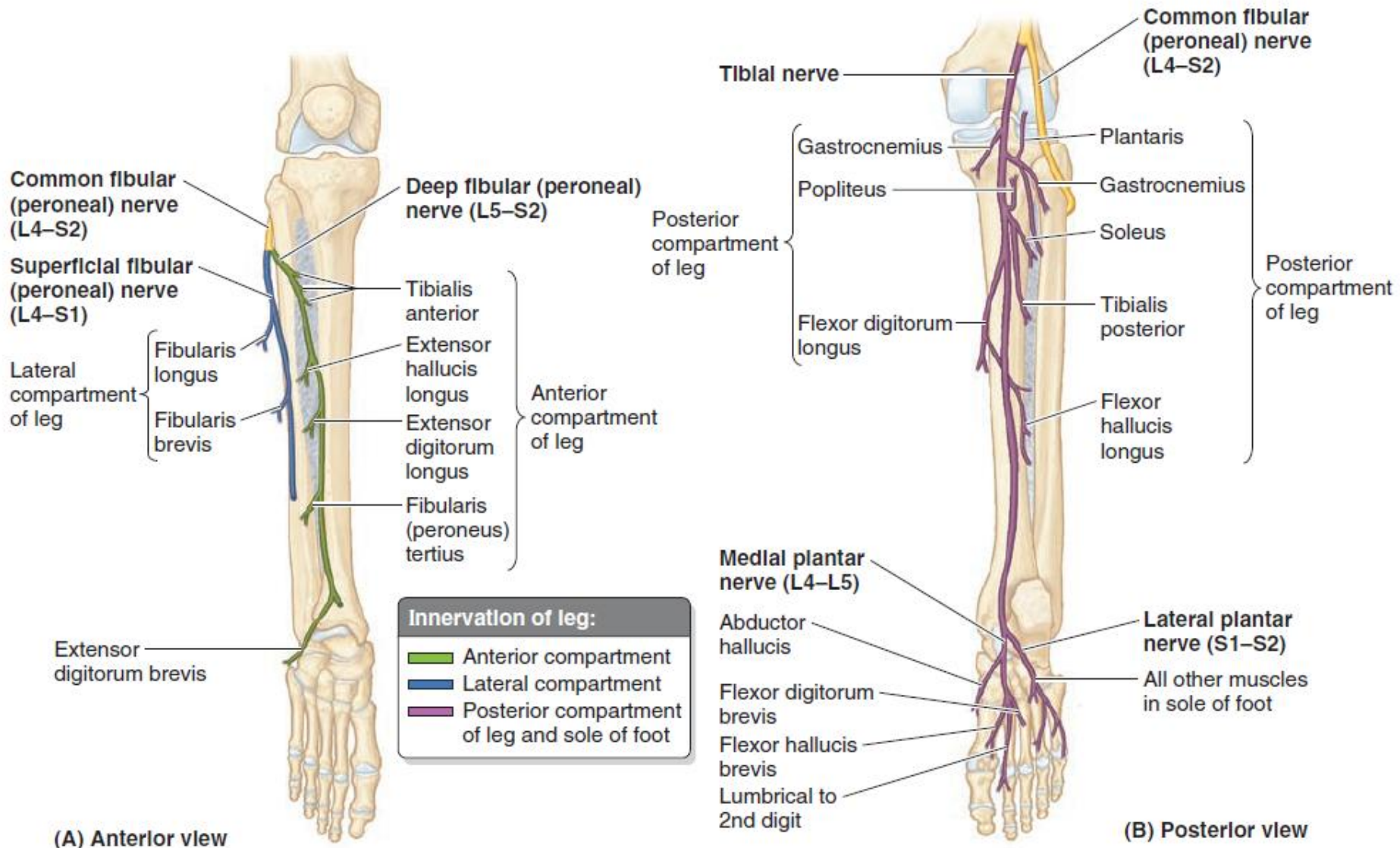
This is the part of the lower limb that lies between the knee and the rounded medial and lateral prominences (medial and lateral malleoli) that flank the ankle joint. It contains the tibia (shin bone) and fibula (Latin word meaning “buckle”) and connects the knee and foot. The calf of the leg is the posterior prominence caused by the triceps surae muscle, from which the calcaneal (Achilles) tendon extends to reach the heel.

The sciatic nerve usually ends at the superior angle of the popliteal fossa by dividing into the tibial and common fibular nerves



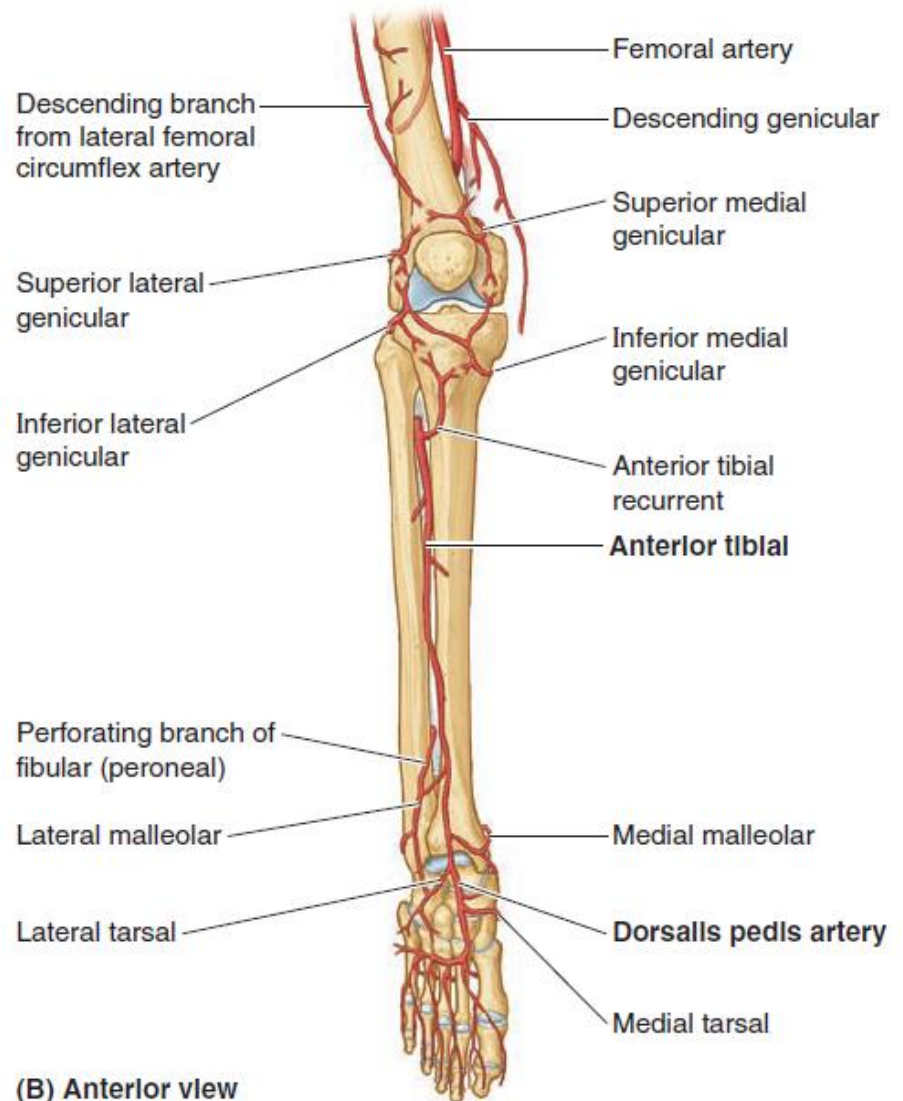
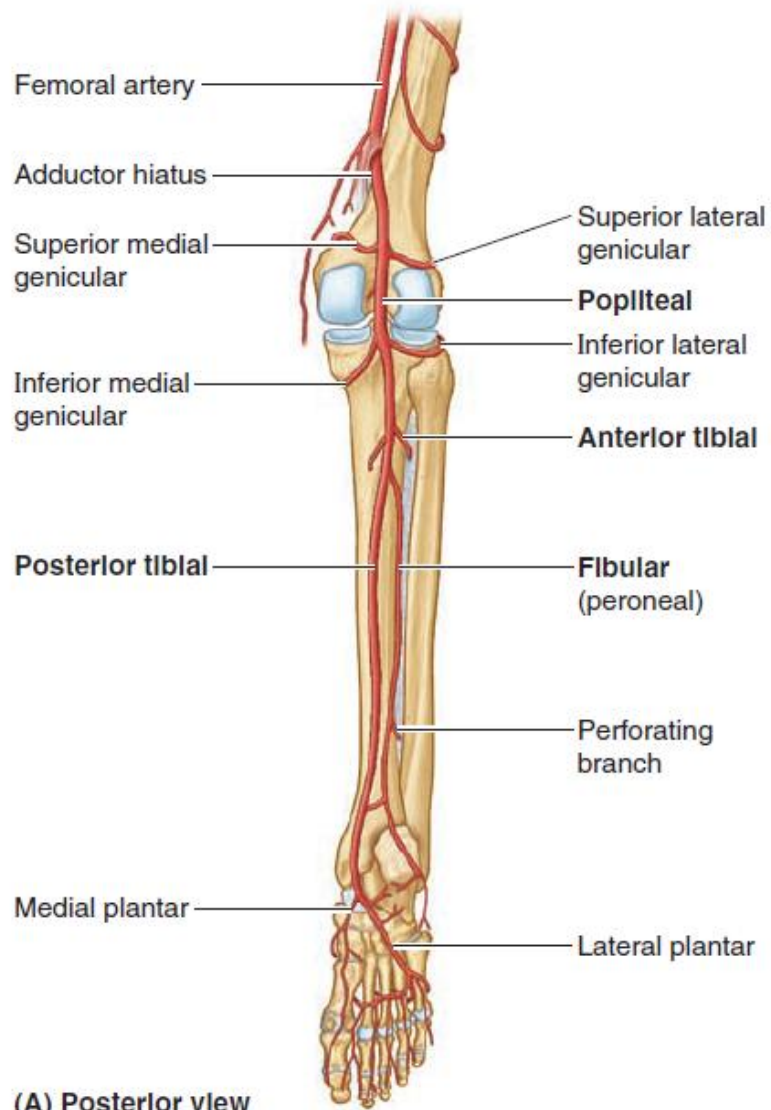


# Leg region. Nerves of the leg





# Leg region. Arteries of the leg





# Leg region



The deep fascia of the leg or crural fascia (L. crus, leg) is continuous with the fascia lata and attaches to the anterior and medial borders of the tibia, where it is continuous with its periosteum. The crural fascia is thick in the proximal part of the anterior aspect of the leg, where it forms part of the proximal attachments of the underlying muscles.



# Leg region

Although thin in the distal part of the leg, the crural fascia is thickened where it forms the extensor retinacula. Anterior and posterior intermuscular septa pass from the deep surface of the crural fascia and attach to the corresponding margins of the fibula.

# Leg region



The leg is divided into three compartments—anterior, lateral, and posterior—which are formed by the anterior and posterior intermuscular septa, the interosseous membrane, and the two leg bones. The transverse intermuscular septum divides the plantarflexor muscles in the posterior compartment into superficial and deep parts.



# Leg region

The anterior compartment, or dorsiflexor (extensor) compartment, is located anterior to the interosseous membrane, between the lateral surface of the tibial shaft and the medial surface of the fibular shaft. The anterior compartment is bounded anteriorly by the deep fascia of the leg and skin.



# Leg region

The four muscles in the anterior compartment are

- Tibialis anterior
- Extensor digitorum longus
- Extensor hallucis longus
- Fibularis tertius

These muscles are mainly dorsiflexors of the ankle joint and extensors of the toes

Leg region:  
anterior compartment

Tibialis anterior

Fibularis longus

Extensor digitorum  
longus

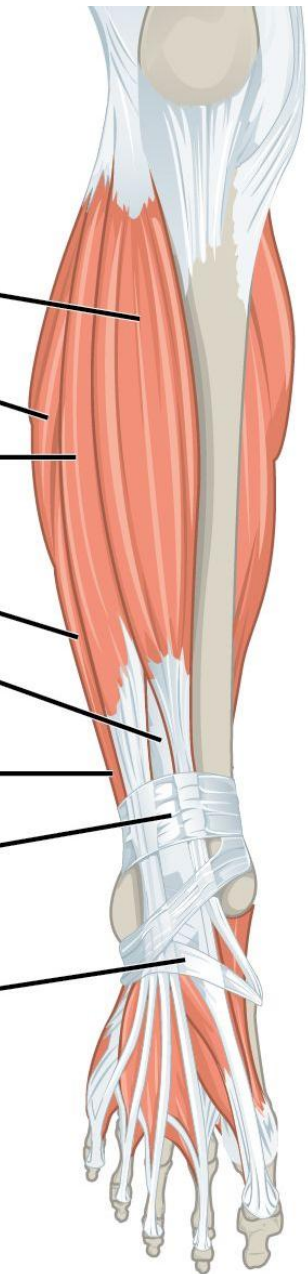
Fibularis brevis

Extensor hallucis  
longus

Fibularis tertius

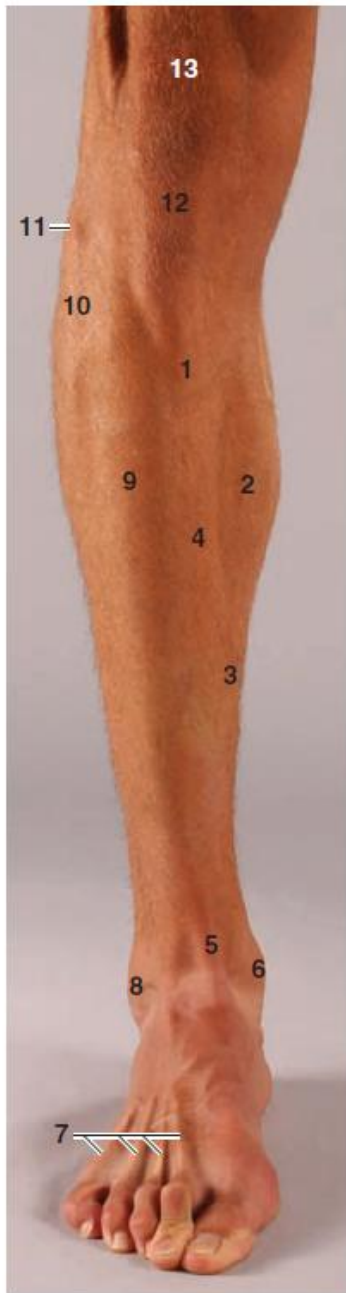
Superior extensor  
retinaculum

Inferior extensor  
retinaculum

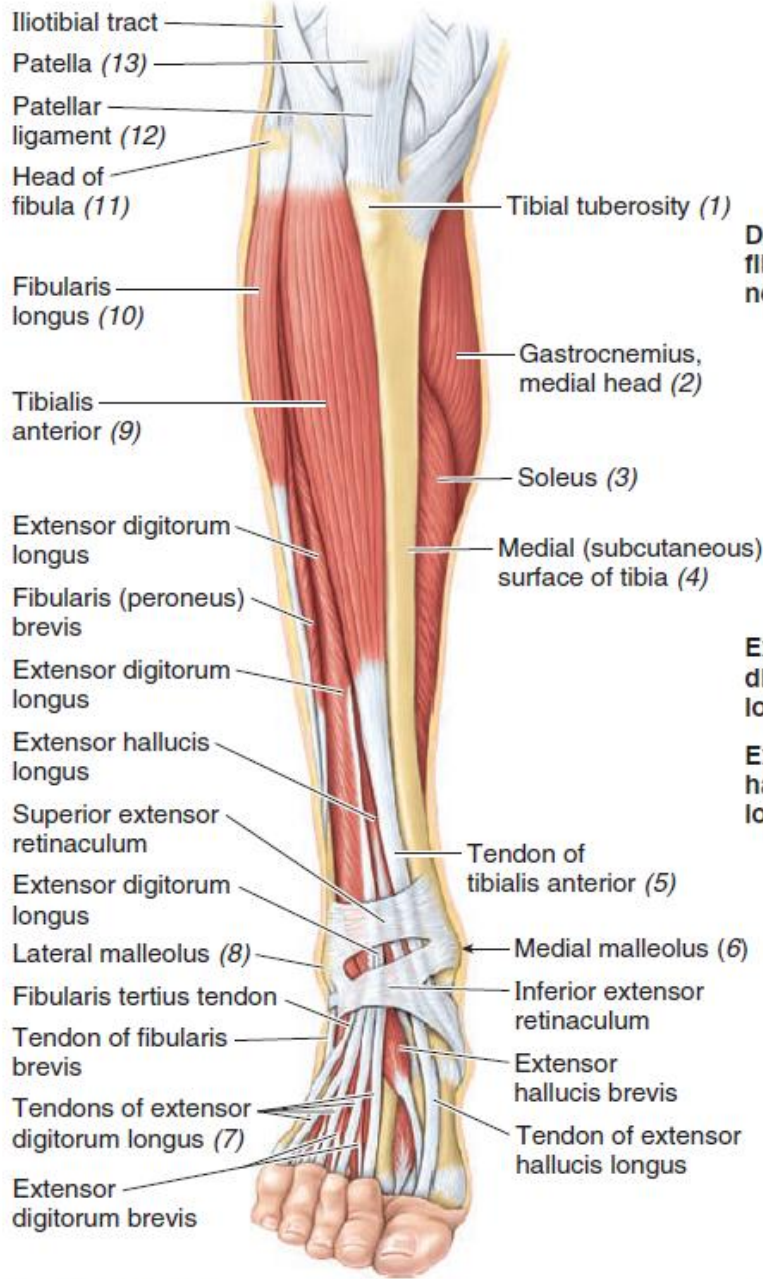


Superficial muscles of the right  
lower leg (anterior view)

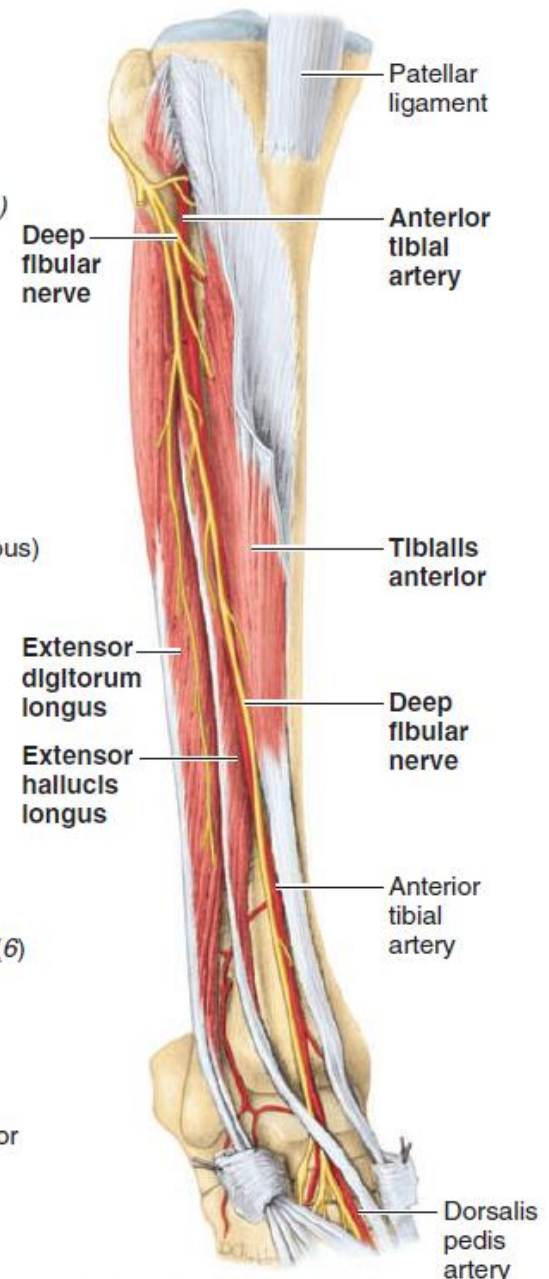




(A) Anterior view



(B) Anterior view



(C) Anterior oblique view

# Leg region



The anterior tibial artery supplies structures in the anterior compartment. The smaller terminal branch of the popliteal artery, the anterior tibial artery, begins at the inferior border of the popliteus muscle. It passes anteriorly through a gap in the superior part of the interosseous membrane and descends on the anterior surface of this membrane between the tibialis anterior and the extensor digitorum longus.

# Leg region: anterior compartment



The anterior tibial artery is the key artery of the anterior compartment of the leg. It corresponds to the posterior interosseous artery of the forearm. The blood supply to the anterior compartment of the leg is bolstered by the perforating branch of peroneal artery. Hence, the size of peroneal artery is inversely proportional to that of the anterior tibial artery.

# Leg region: anterior compartment



The anterior tibial artery is escorted by 2 venae comitantes.

The anterior tibial artery descends through the anterior compartment on the interosseous membrane. In the distal leg, it lies between the tendons of the tibialis anterior and extensor hallucis longus muscles. It leaves the leg by passing anterior to the distal end of the tibia and ankle joint and continues onto the dorsal aspect of the foot as the dorsalis pedis artery.

# Leg region: anterior compartment



In the proximal leg, the anterior tibial artery has a recurrent branch, which connects with the anastomotic network of vessels around the knee joint. It commences in the rear of the leg at the lower border of popliteus. It enters the anterior compartment of the leg by passing forward between both heads of the tibialis posterior, via an opening in the upper part of the interosseous membrane.

# Leg region: anterior compartment



In the anterior compartment, it runs vertically downward to a point midway between the medial and lateral malleoli, where it enters the foot and changes its name to dorsalis pedis artery, which finishes near the internet between the big and 2nd toes.



# Leg region: anterior compartment

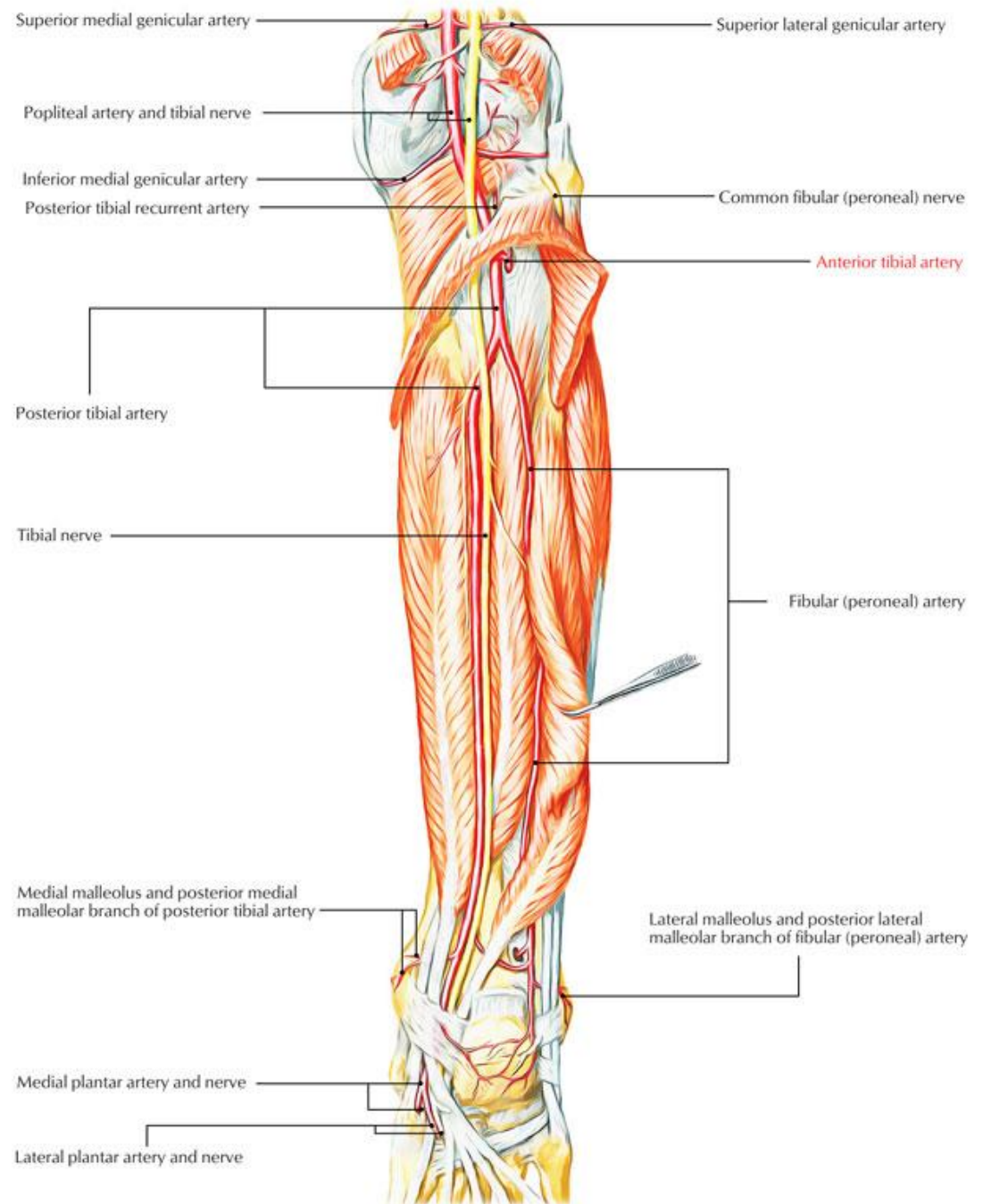


In the upper 1/3rd of the leg it is located between the tibialis anterior and extensor digitorum longus.

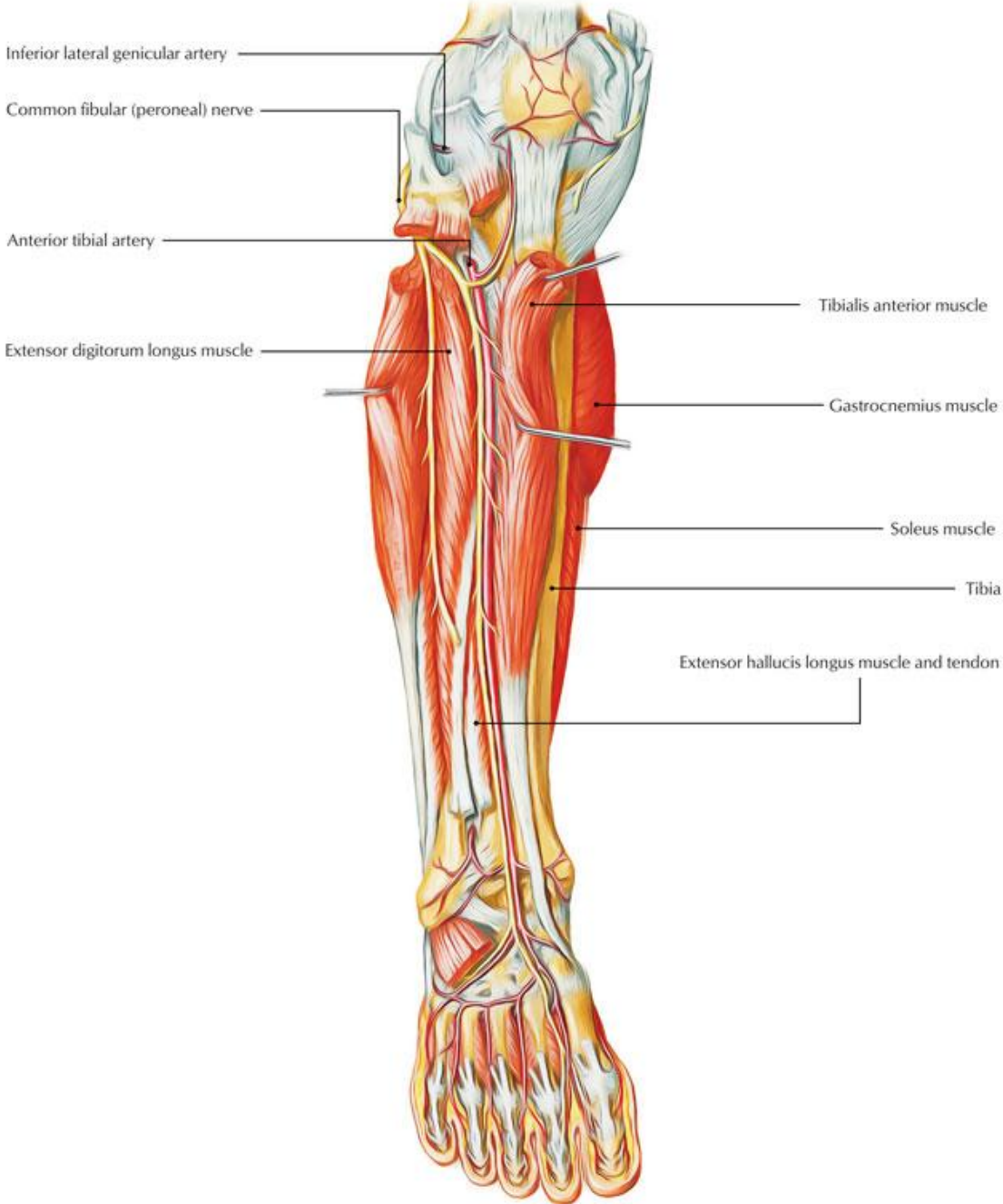
In the middle 1/3rd of the leg it is located between the tibialis anterior and extensor hallucis longus.

In the lower 1/3rd of the leg it is located between extensor hallucis longus and extensor digitorum longus.

Leg region:  
anterior  
compartment  
The anterior tibial  
artery: origin



Leg region:  
anterior  
compartment  
The anterior tibial  
artery



# Leg region: anterior compartment



The nerve associated with the anterior compartment of the leg is the deep fibular nerve. This nerve originates in the lateral compartment of the leg as one of the two divisions of the common fibular nerve.

# Leg region



The deep fibular (peroneal) nerve, one of the two terminal branches of the common fibular nerve, is the nerve of the anterior compartment. The deep fibular nerve arises between the fibularis longus muscle and the neck of the fibula. After entering the compartment, the nerve accompanies the anterior tibial artery.

# Leg region: anterior compartment



The deep fibular nerve passes anteromedially through the intermuscular septum that separates the lateral from the anterior compartments of the leg and then passes deep to the extensor digitorum longus. It reaches the anterior interosseous membrane where it meets and descends with the anterior tibial artery.



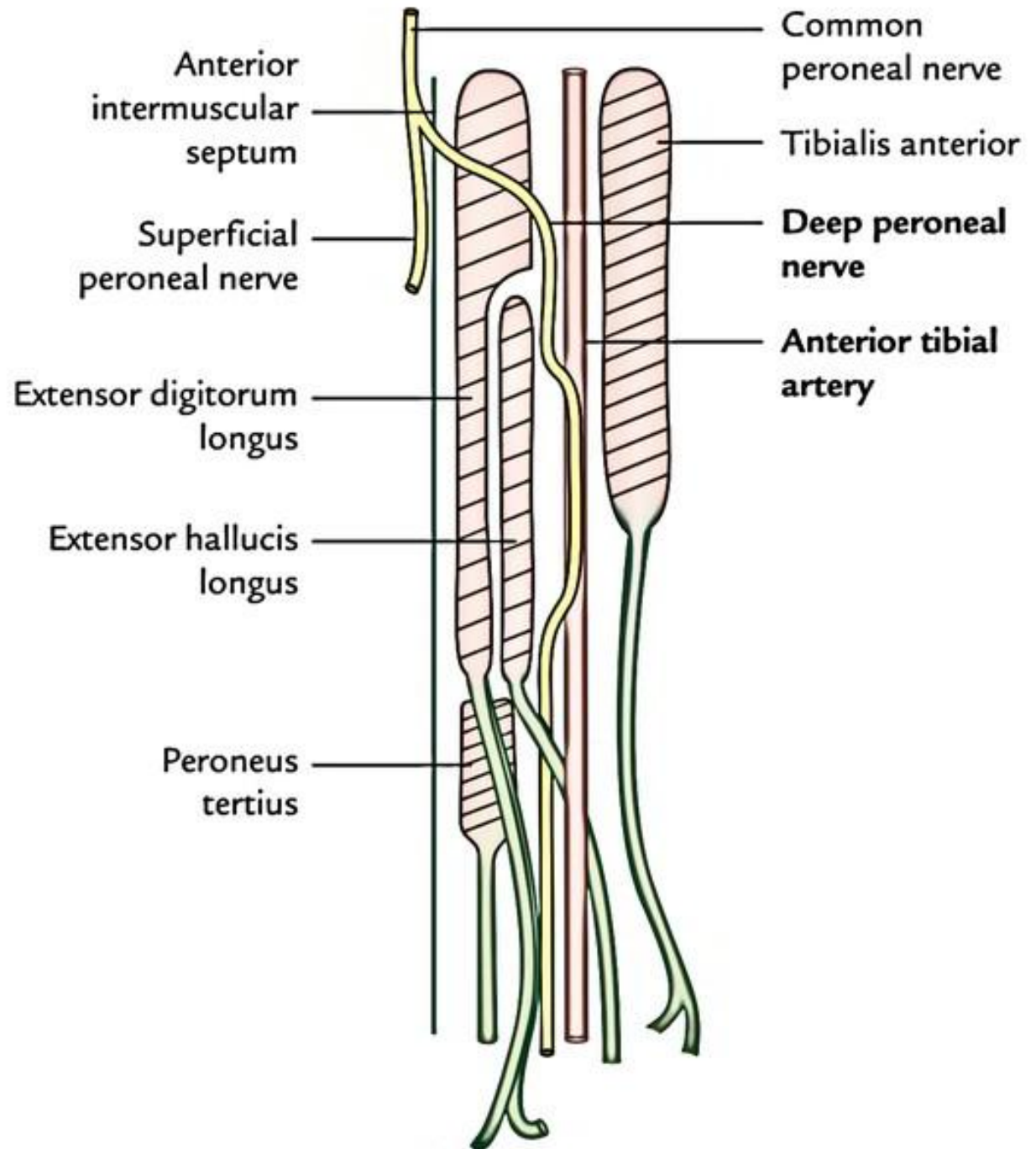
# Leg region



The nerve is located lateral to artery in its upper 1/3rd and lower 1/3rd and anterior to artery in the middle 1/3rd. It's stated that in the middle 1/3rd the nerve hesitates to cross the artery from lateral to medial side, therefore it goes back to the lateral side of the artery. For this reason, deep peroneal nerve is also called nervus hesitans.

# Leg region

## The deep peroneal nerve

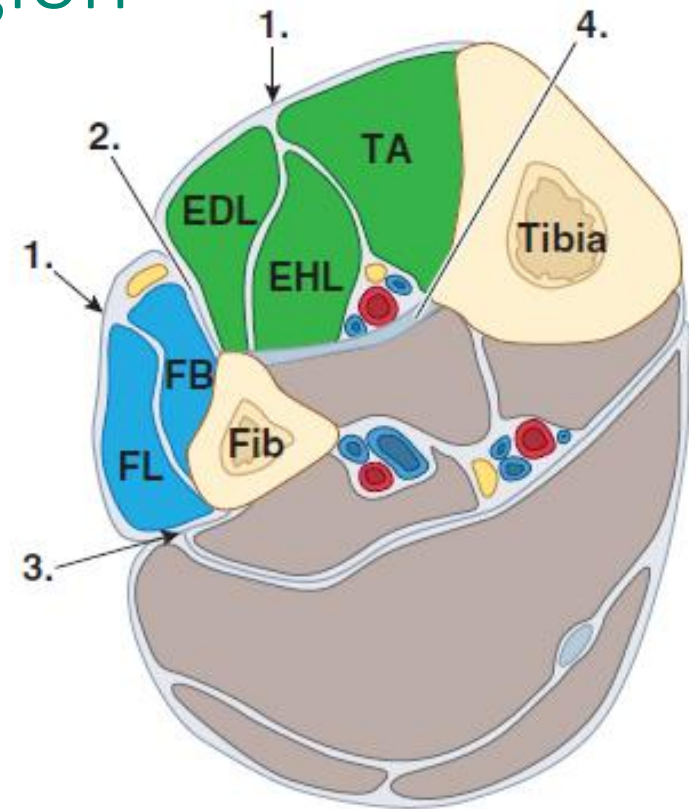


# Leg region

Anterior and lateral compartments of leg.

Contents, transverse section.

- Tibialis anterior
- Extensor digitorum longus
- Extensor hallucis longus
- Fibularis (peroneus) longus and brevis



Inferior view of transverse section

## Key

- Anterior compartment
- Lateral compartment
- 1. Deep (crural) fascia
- 2. Anterior intermuscular septum
- 3. Posterior intermuscular septum
- 4. Interosseous membrane

# Leg region



## Lateral Compartment of Leg

The **lateral compartment**, or *evertor compartment*, is bounded by the lateral surface of the fibula, the anterior and posterior intermuscular septa, and the deep fascia of the leg. The lateral compartment contains two muscles—the fibularis longus and brevis—that pass posterior to the lateral malleolus. The superficial fibular nerve, the nerve in the lateral compartment, is a terminal branch of the common fibular nerve

# Leg region



## Lateral Compartment of Leg

The lateral compartment of the leg does not have an artery coursing through it. The muscles are supplied proximally by perforating branches of the anterior tibial artery and distally by perforating branches of the fibular artery. These perforating arteries have accompanying veins (L. venae comitantes).

# Leg region



## **Injury to Common Fibular Nerve**

Because of its superficial and lateral position, the common fibular nerve is the nerve most often injured in the lower limb. It winds subcutaneously around the fibular neck, leaving it vulnerable to direct trauma. This nerve may also be severed during fracture of the fibular neck or severely stretched when the knee joint is injured or dislocated.



# Leg region



## Injury to Common Fibular Nerve

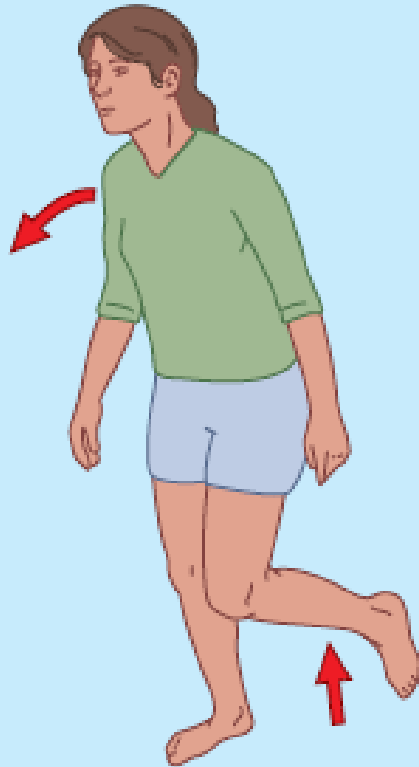
Severance of the common fibular nerve results in flaccid paralysis of all muscles in the anterior and lateral compartments of the leg (dorsiflexors of ankle and evertors of foot). The loss of dorsiflexion of the ankle causes footdrop, which is exacerbated by unopposed inversion of the foot. This has the effect of making the limb “too long”

## Footdrop

## Compensating for footdrop



**(A)** Toes do not clear ground during swing phase



**(B)** Waddling gait



**(C)** Swing-out gait



**(D)** Steppage gait

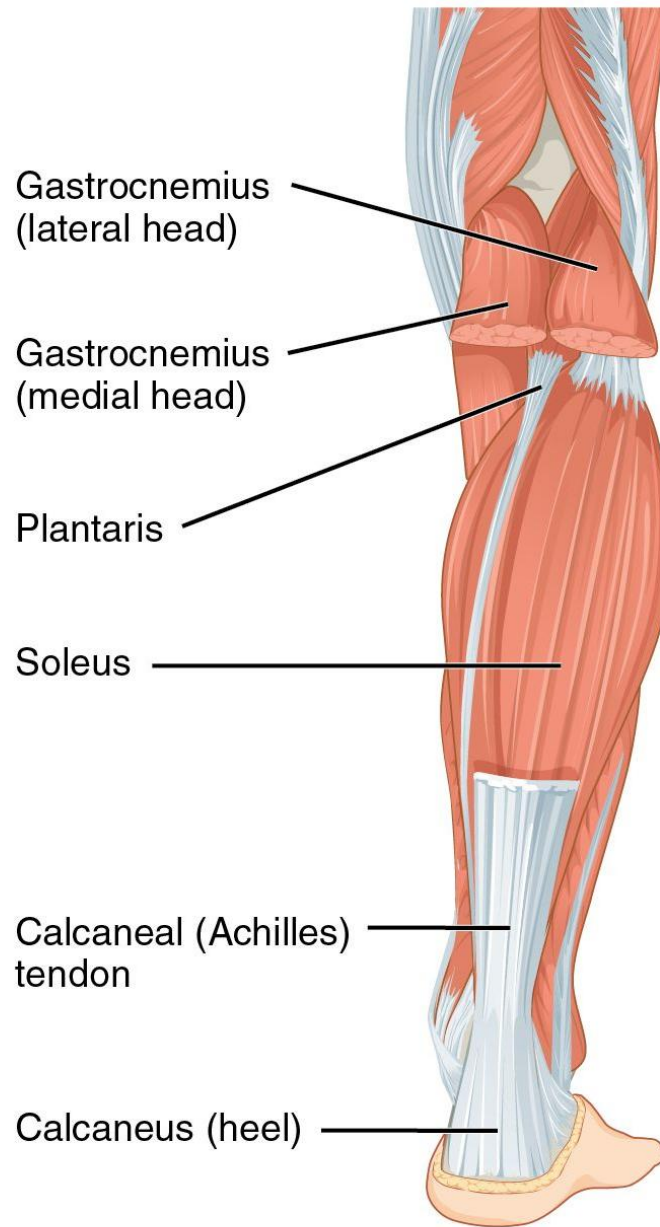
Injury to common fibular nerve

# Leg region

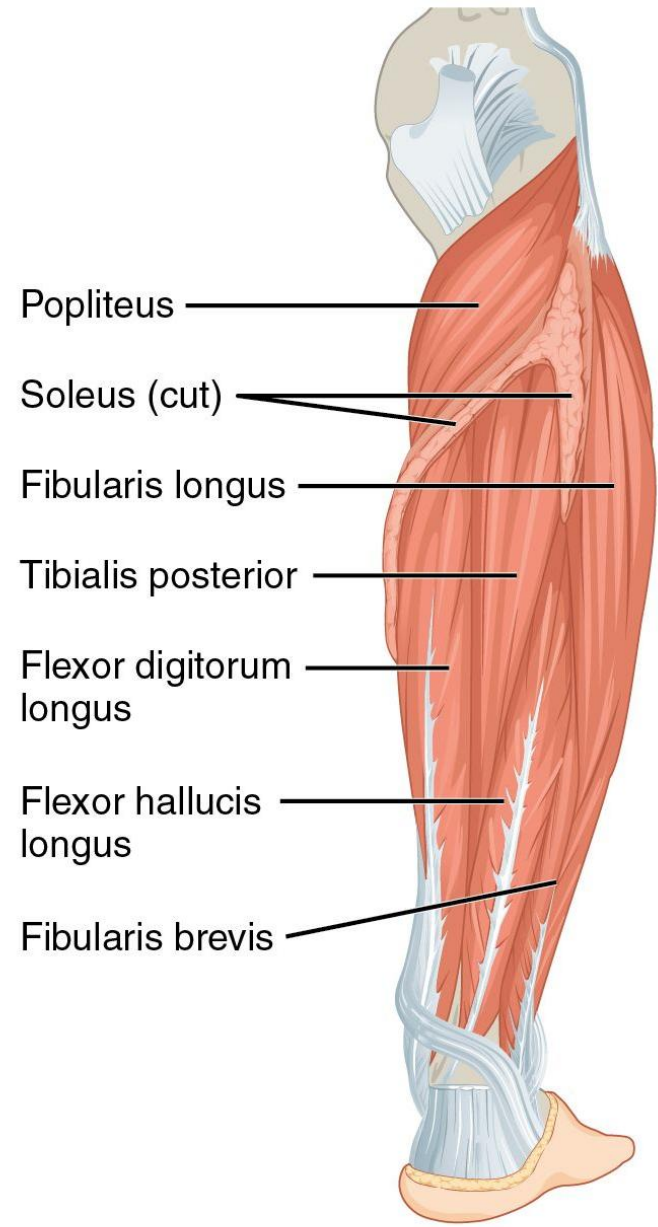


The posterior compartment, or plantarflexor compartment, is the largest of the three leg compartments. The posterior compartment and the calf muscles within it are divided into superficial and deep subcompartments/muscle groups by the transverse intermuscular septum

# Leg region



Superficial muscles of the right lower leg (posterior view)



Deep muscles of the right lower leg (posterior view)

# Leg region



The tibial nerve and posterior tibial and fibular vessels supply both parts of the posterior compartment but run in the deep part, just deep (anterior) to the transverse intermuscular septum (in the space known as cruropopliteal canal). The superficial group of plantarflexors, including the gastrocnemius, soleus, and plantaris, forms a powerful muscular mass in the calf

# Leg region



The two-headed gastrocnemius and the soleus share a common tendon, the calcaneal tendon (L. tendo calcaneus, Achilles tendon), which attaches to the calcaneus. Collectively, these two muscles form the three-headed triceps surae.





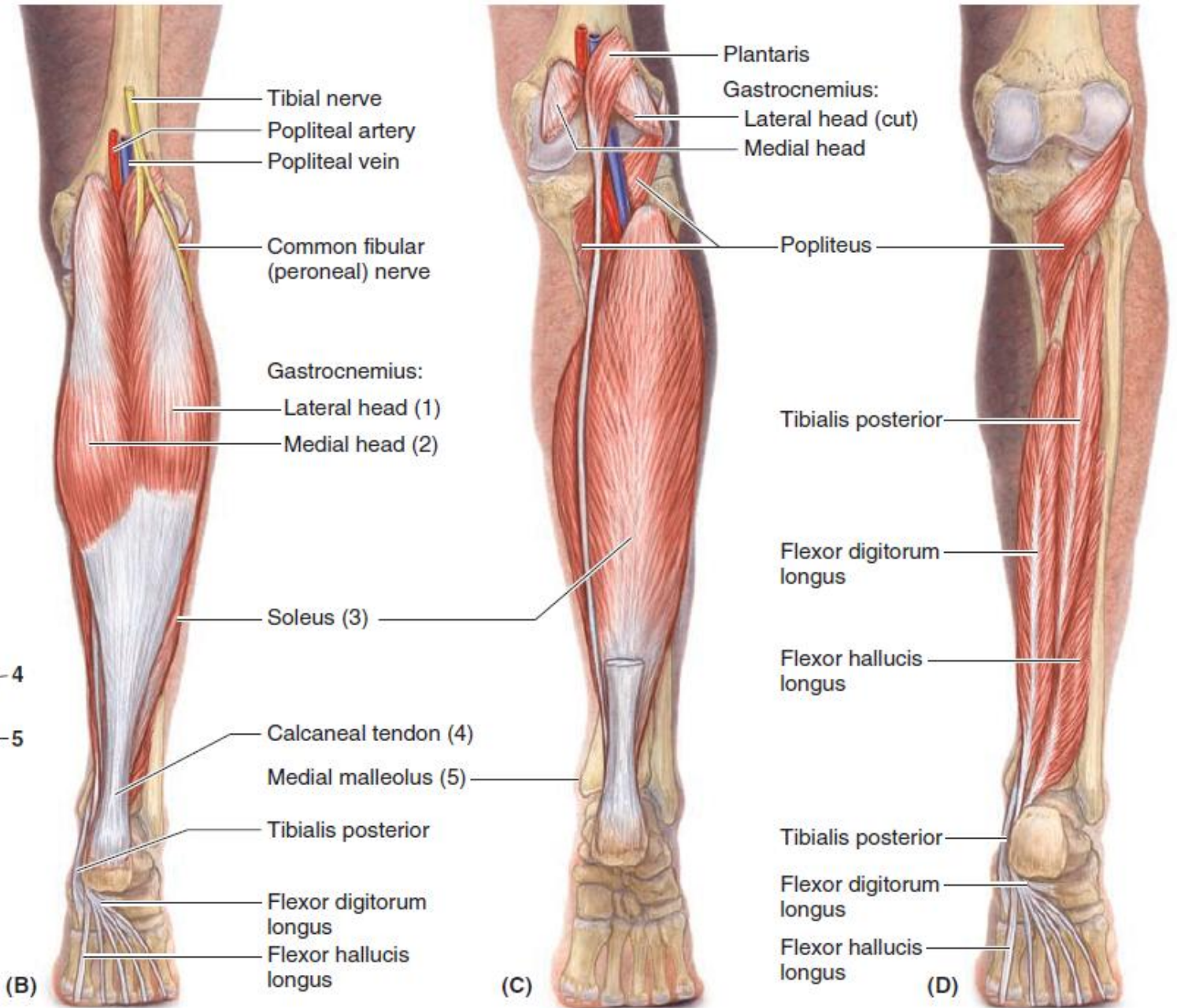
# Leg region

Four muscles make up the deep group in the posterior compartment

- Popliteus
- Flexor digitorum longus
- Flexor hallucis longus
- Tibialis posterior

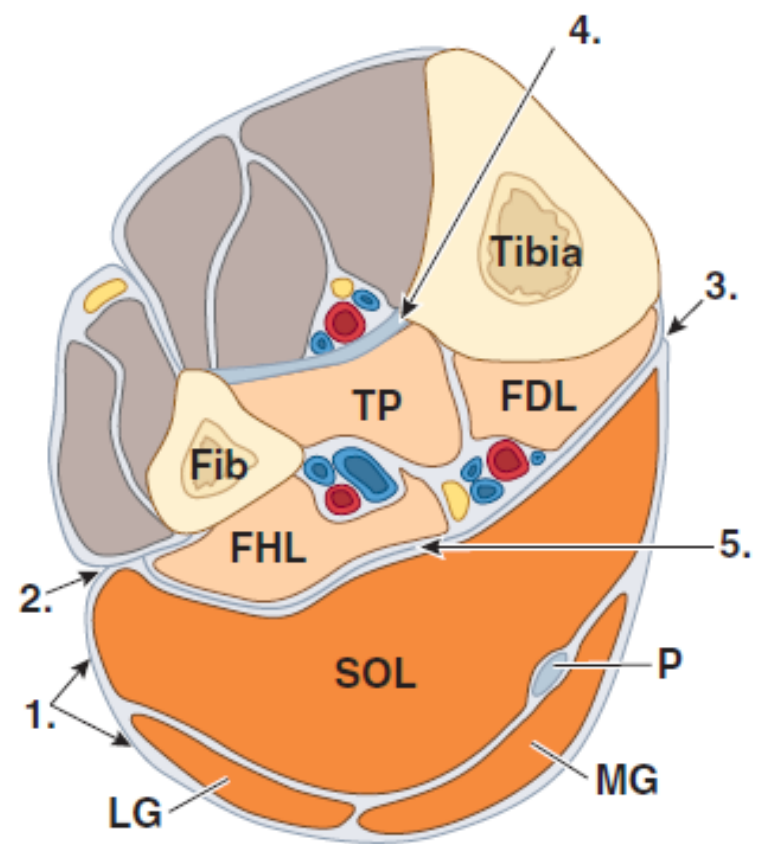


(A) Posterior view





# Leg region

Posterior  
compartment of leg.  
Contents, transverse  
section.



Inferior view of transverse section

## Key

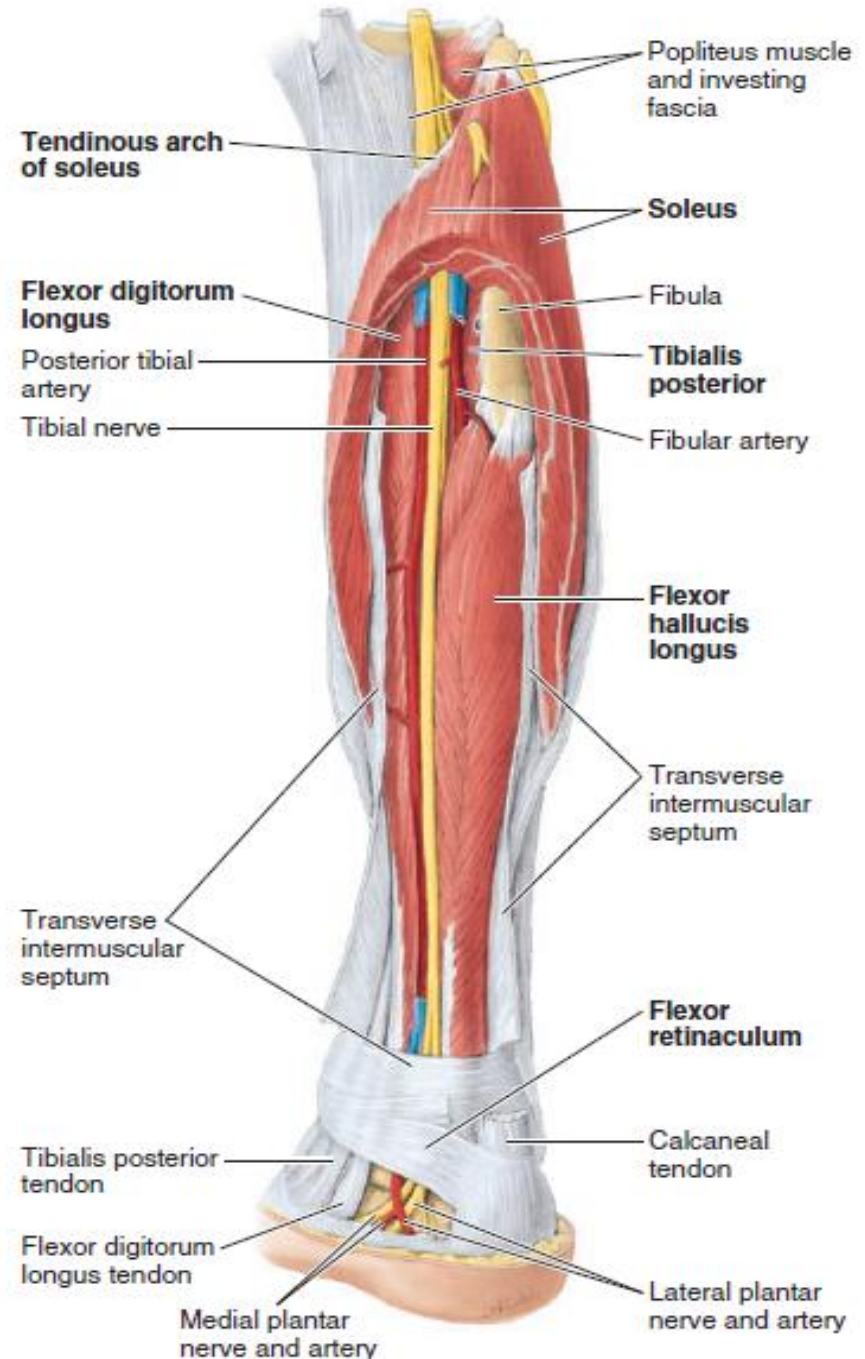
-  Superficial posterior compartment
-  Deep posterior compartment
- 1. Deep (crural) fascia
- 2. Posterior intermuscular septum
- 3. Anterior intermuscular septum
- 4. Interosseous membrane
- 5. Transverse intermuscular septum

# Leg region

## Posterior

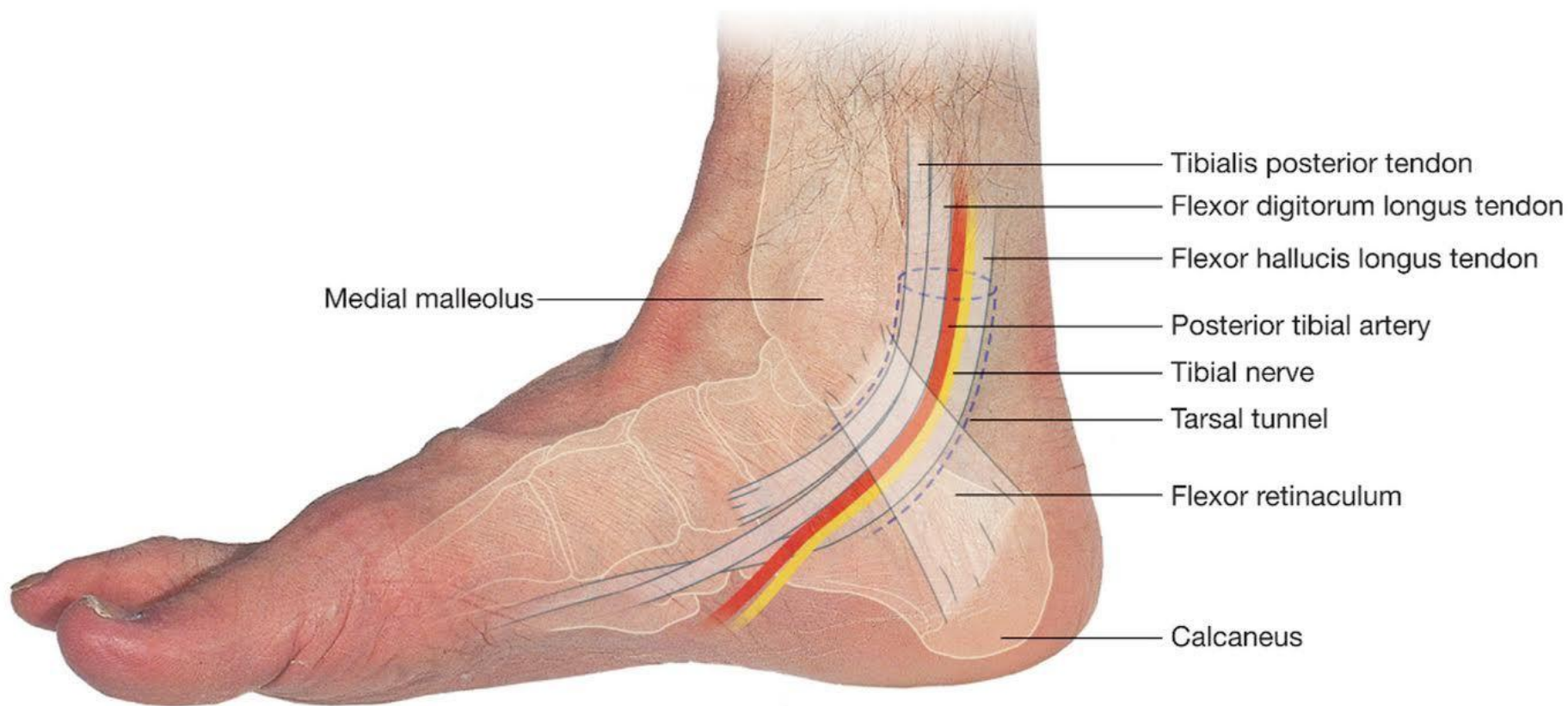
compartment of leg.

Vessels and nerves are exposed by removal of most of soleus muscle

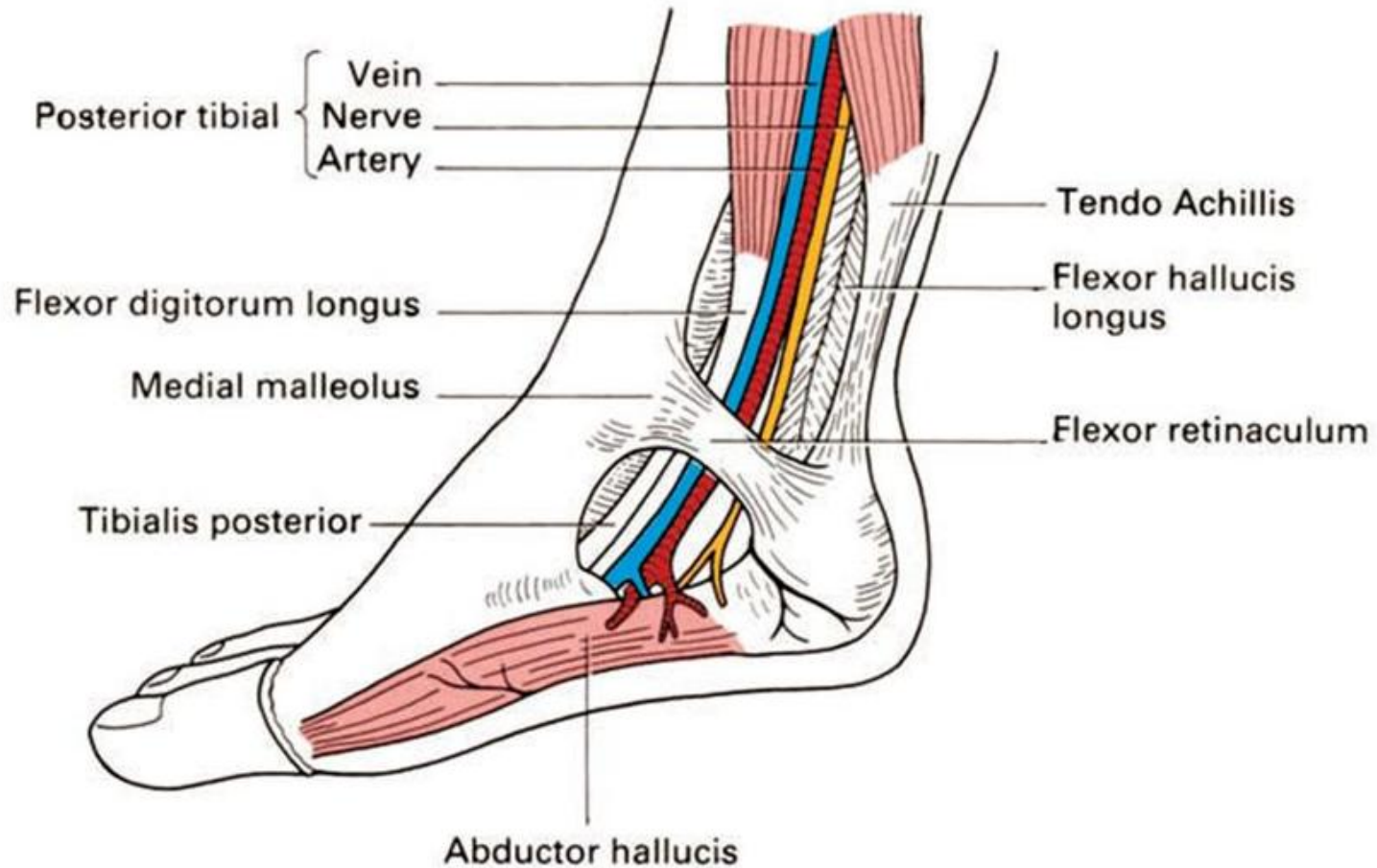




# Medial malleolar (calcaneal) canal of Richet



# Medial malleolar (calcaneal) canal of Richet





# Leg region



Posterior compartment of the leg.

Posterior Tibial Artery is the bigger branch of both terminal branches of the popliteal artery because its branches not only supply the posterior compartment but also the lateral compartment of the leg and the sole of the foot.

# Leg region



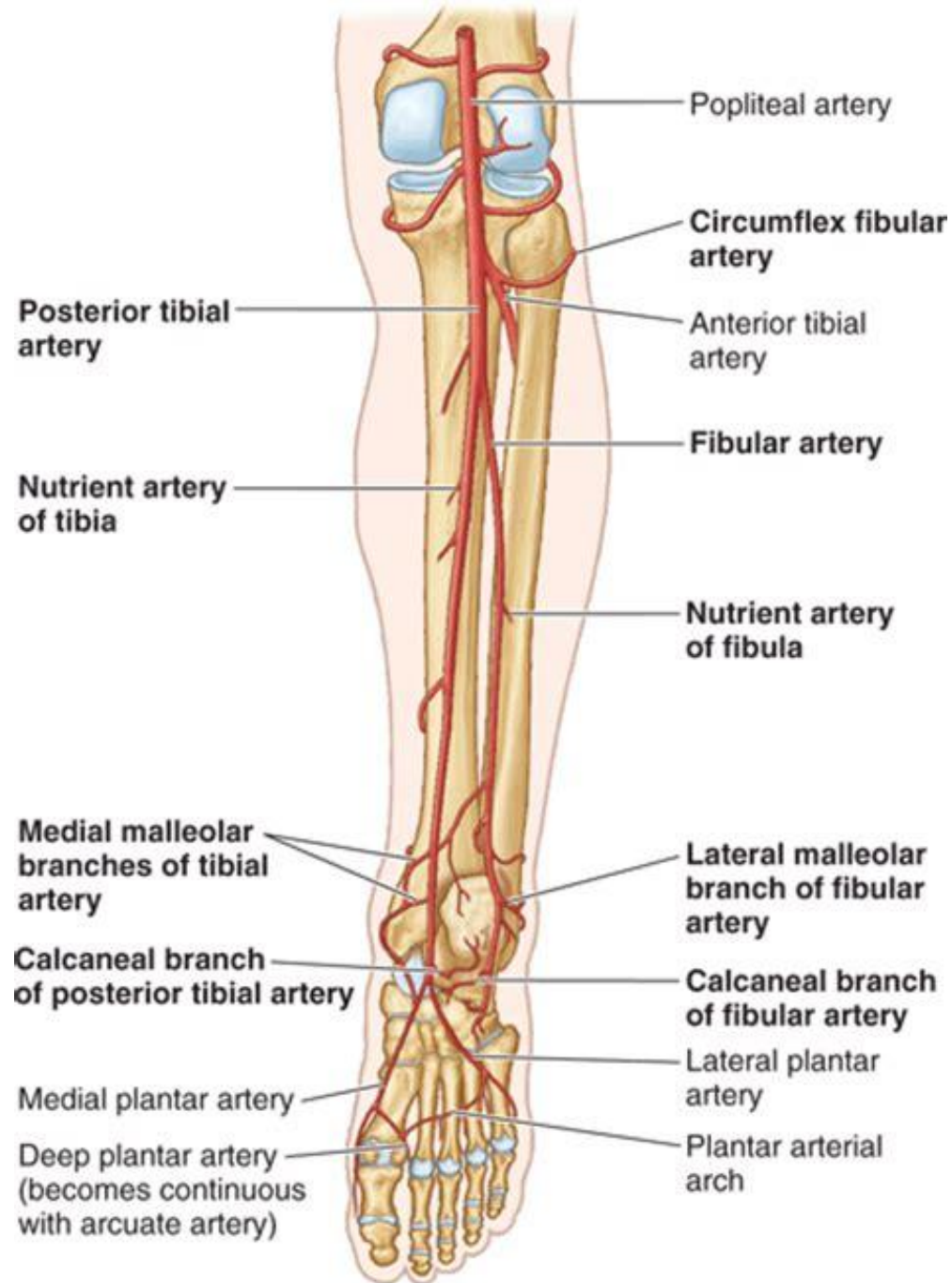
## Posterior tibial artery

It starts at the lower border of popliteus, between the tibia and fibula, deep to gastrocnemius and enters the rear of the leg by passing deep to the tendinous arch of soleus.

In the leg, it goes downward and somewhat medially to reach the posteromedial side of the ankle, midway between the medial malleolus and the medial tubercle of calcaneum.

# Leg region

## Posterior tibial artery



Posterior view with foot plantar flexed

# Leg region

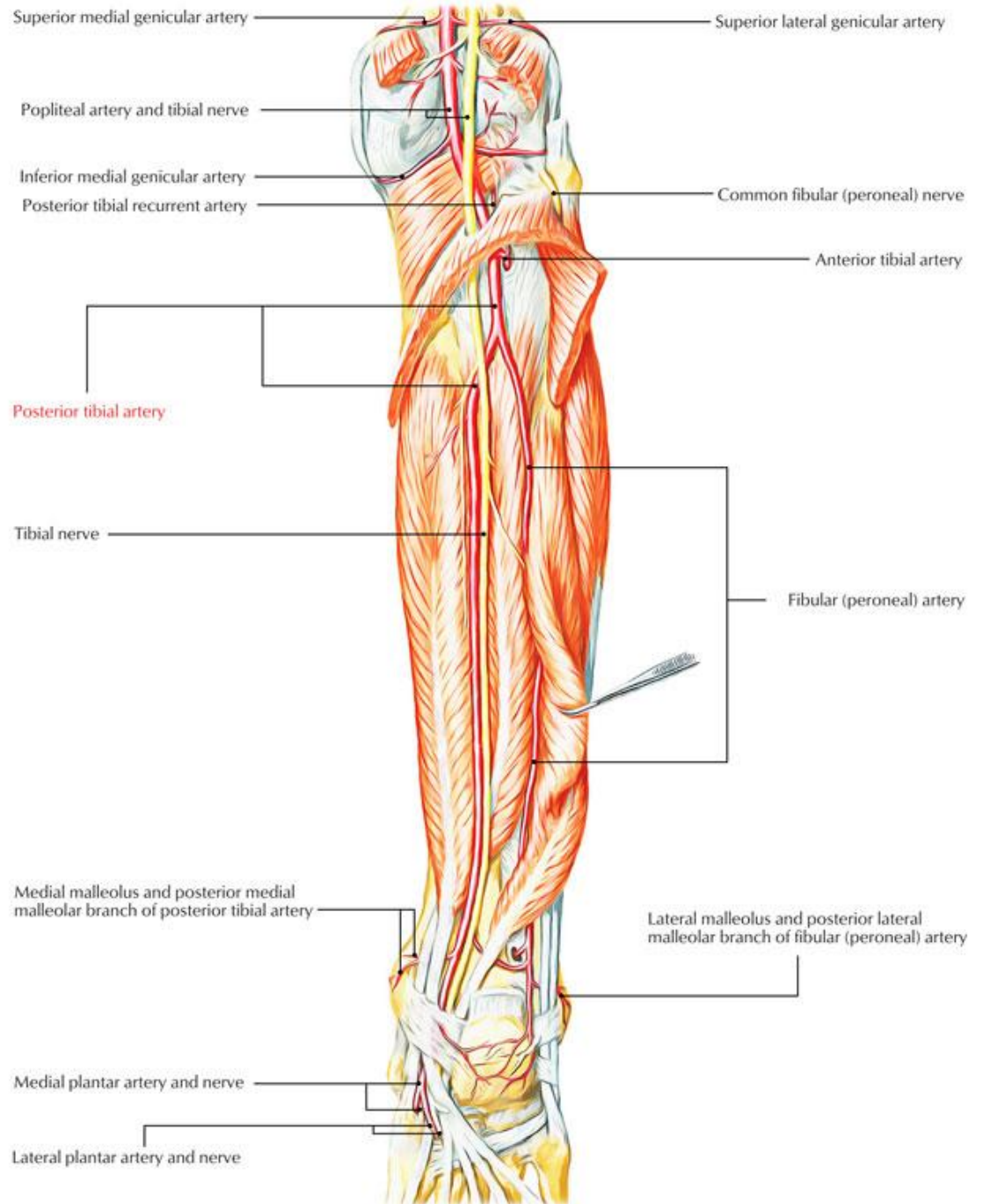


## Posterior tibial artery

It ends deep to the flexor retinaculum by splitting into a large lateral plantar artery and a small medial.

Throughout its course, it's escorted by the tibial nerve, which crosses the artery from the medial to lateral side.

# Posterior tibial artery



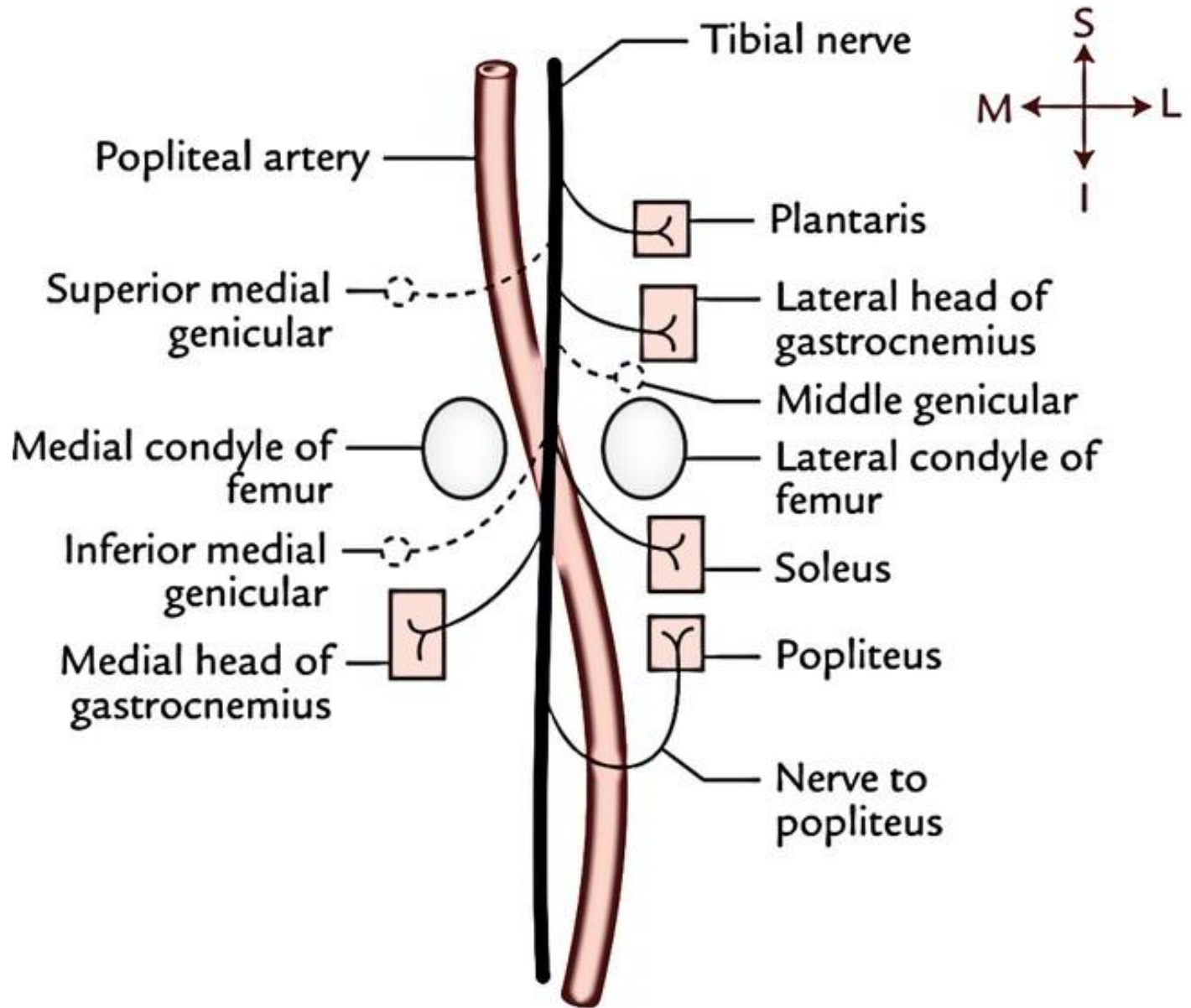
# Leg region



## Posterior compartment of the leg.

Tibial Nerve is a large branch of the Sciatic nerve. The point of origin is above the popliteal fossa and goes downward respectively through middle of popliteal fossa and posterior compartment of leg and afterwards goes into sole of foot by passing deep to the flexor retinaculum where it divides into medial and lateral plantar nerves.

All the muscles of the posterior compartment of the leg are directly supplied by motor branches of the tibial nerve





# Leg region



Injury to the tibial nerve is uncommon because of its protected position in the popliteal fossa; however, the nerve may be injured by deep lacerations in the fossa. Posterior dislocation of the knee joint may also damage the tibial nerve. Severance of the tibial nerve produces paralysis of the flexor muscles in the leg and the intrinsic muscles in the sole of the foot. People with a tibial nerve injury are unable to plantarflex their ankle or flex their toes.

# Effects of injury of the tibial nerve



## Motor reduction:

- Foot is held dorsiflexed and everted (pes calcaneus), because of paralysis of the muscles of posterior compartment of the leg.
- Loss of bulge of calf, because of paralysis of the triceps surae muscle (gastrocnemius and soleus).
- Loss of plantar flexion of foot, as a result of paralysis of the flexors of ankle.
- Inability to stand on the toes, as a result of loss of plantarflexion of foot.

# Effects of injury of the tibial nerve

## Pes calcaneus





# Effects of injury of the tibial nerve

## **Sensory loss:**

- The loss of sense in the sole and plantar aspects of the toes consisting of the dorsal aspects of their distal phalanges, as a result of engagement of the cutaneous branches.

# Deformities of the foot

Pes varus

Pes valgus

Pes cavus

Pes equinus

Pes calcaneus

Pes equinovarus

