



The Lower Limb IV



Anatomy

RHS 241

Lecture 4

Dr. Einas Al-Eisa

Skeleton of the foot

- 26 bones (not counting the sesamoid):
 - **7 tarsals** (the short bones of the hind foot)
 - **5 metatarsals** (the long bones of the anterior part of the foot)
 - **14 phalanges** (the miniature long bones of the toes)

PART II: BONES OF THE PELVIC GIRDLE AND LOWER LIMB

Foot
(Figure 8.11)

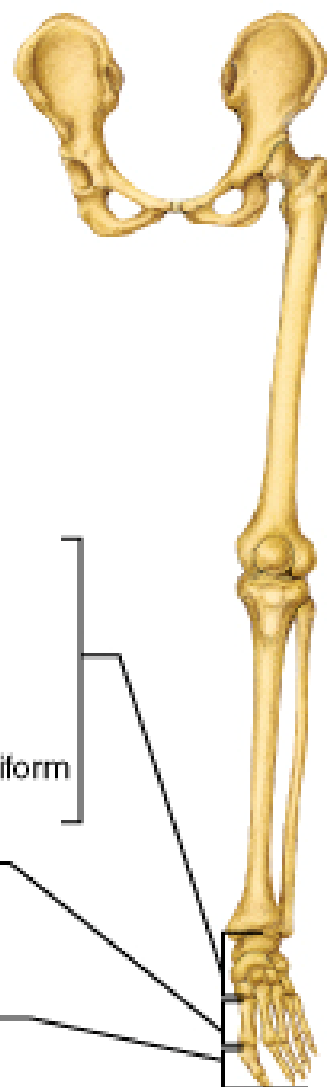
7 Tarsals (14)

- talus
- calcaneus
- navicular
- cuboid
- lateral cuneiform
- intermediate cuneiform
- medial cuneiform

5 Metatarsals (10)

14 Phalanges (28)

- distal
- middle
- proximal



Tarsals are seven bones forming the proximal part of the foot; the talus articulates with the leg bones at the ankle joint; the calcaneus, the largest tarsal, forms the heel

Metatarsals are five bones numbered 1–5

Phalanges form the toes; three in digits 2–5, two in digit 1 (the great toe)

Anterior view of pelvic girdle and left lower limb

*The number in parentheses () following the bone name denotes the total number of such bones in the body.

Skeleton of the foot

- **Talus:**

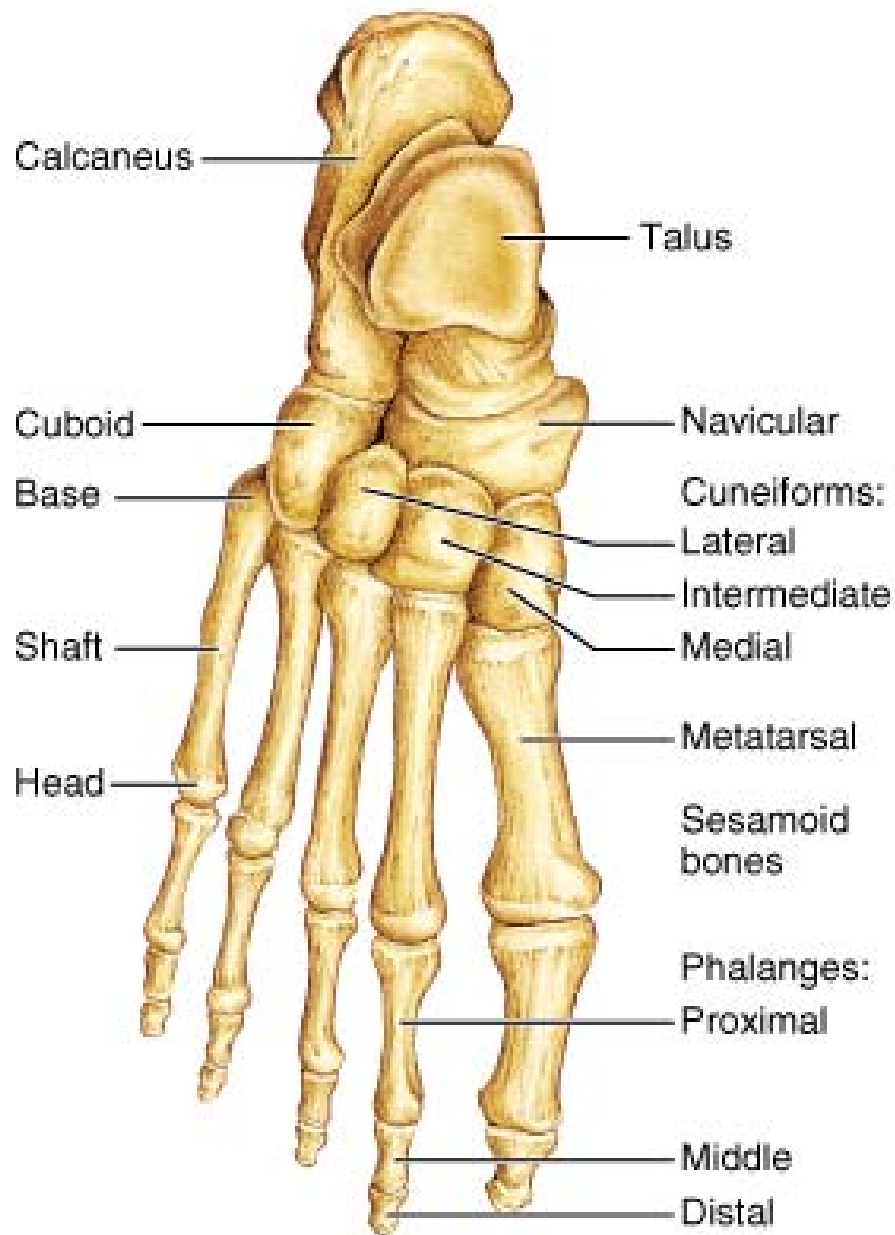
- Body, neck, head (articulate with navicular)
- The pulley-shaped articular surface of its body is called the *trochlea* which articulates with the distal end of the tibia and fibula to form the ankle joint

Skeleton of the foot

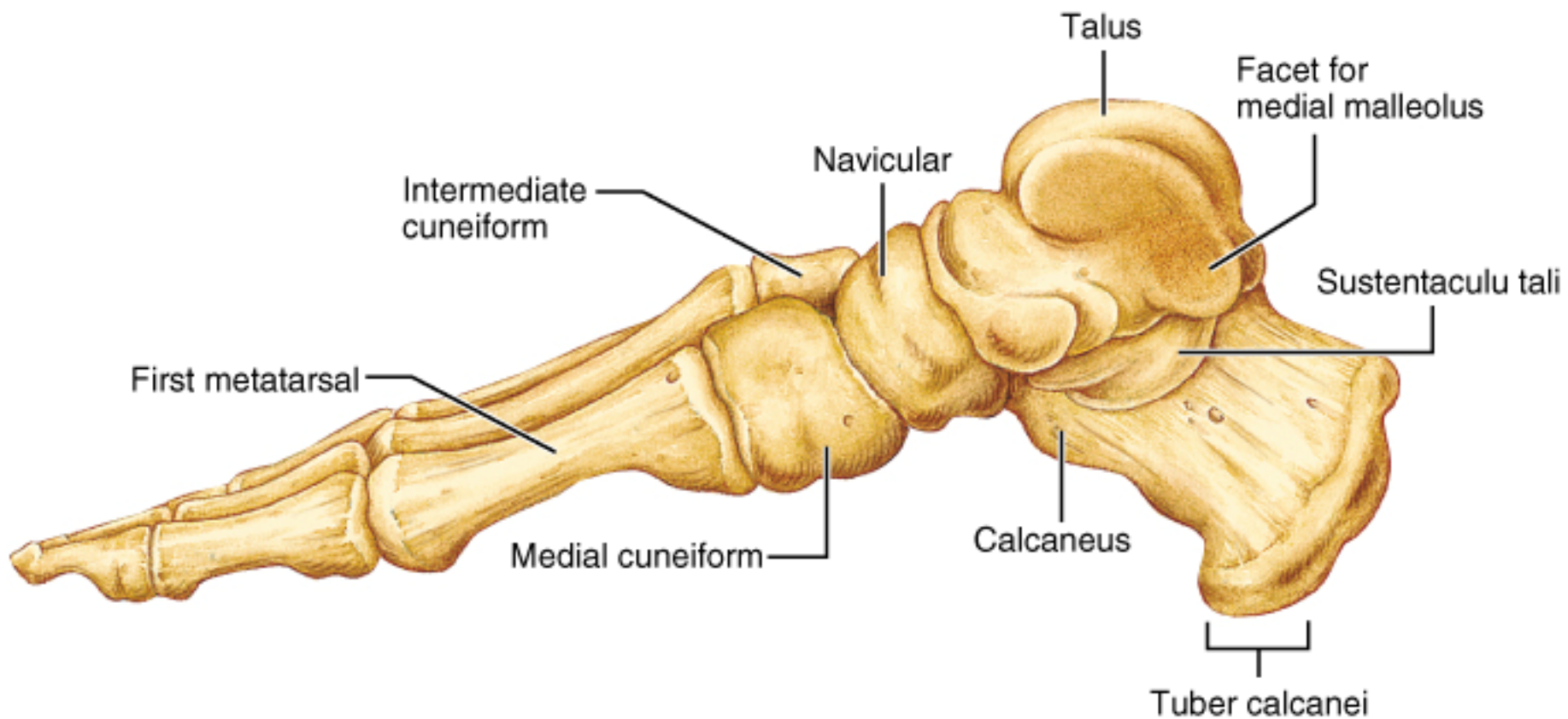
- **Calcaneus:** the prominent heel bone
- **Cuneiforms:** three bones identified as the 1st, 2nd, and 3rd (from medial to lateral)
- **Navicular:** articulates proximally with the head of the talus
- **Cuboid:** articulates proximally with the distal end of the calcaneus

Skeleton of the foot

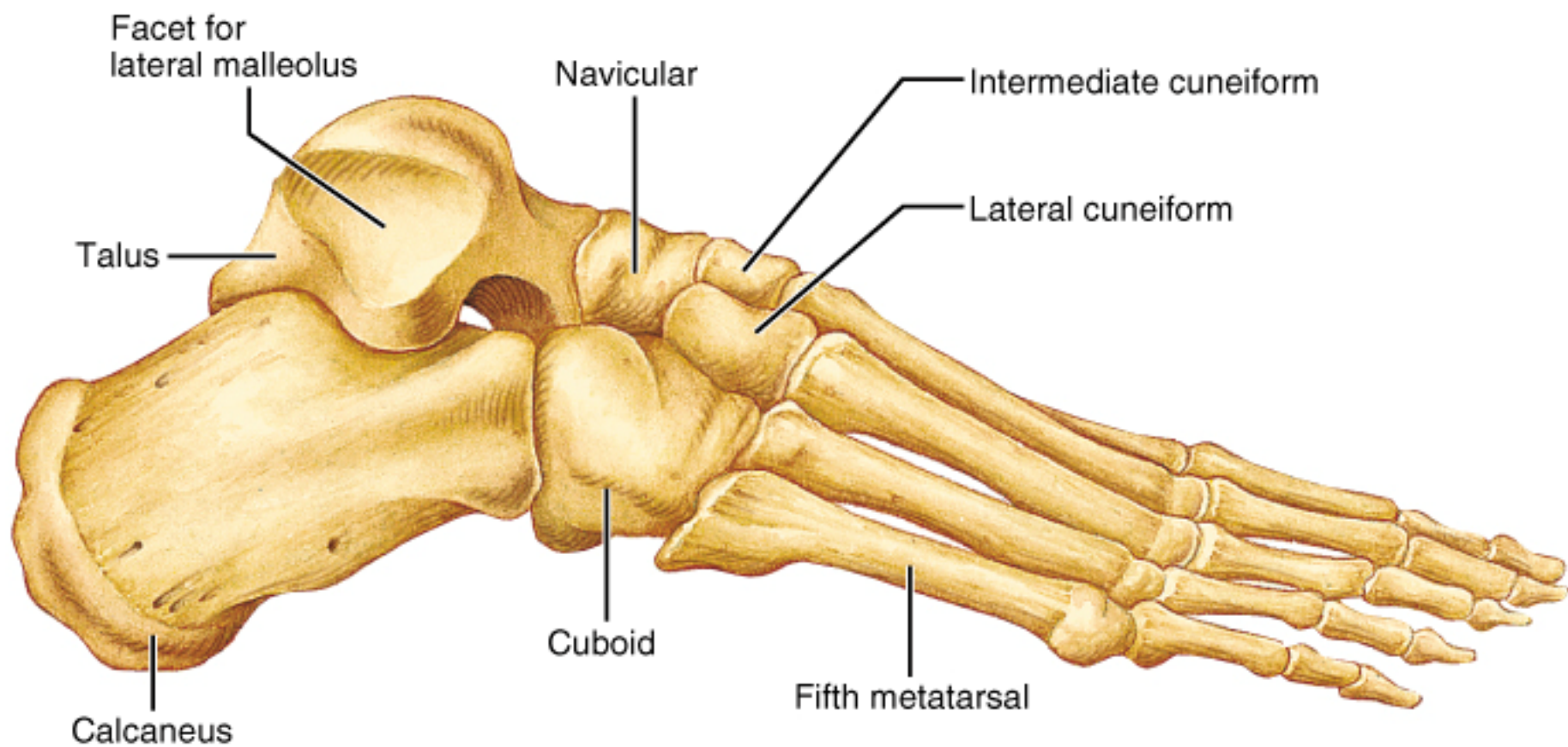
- **Metatarsals:** identified from medial to lateral as metatarsals 1 to 5
- **Phalanges:** two in the hallux (great toe) & three in each of the four smaller lateral toes
- Each phalanx has enlarged ends and a distinct shaft (typical long bone)



(a) Superior view



(b) Medial view



(c) Lateral view

Surface anatomy

- Posterior surface of the **calcaneus**
(attachment site of the achilis tendon)
- Tuberosity of the **navicular**
- Head of **1st metatarsal**
- Tuberosity of **5th metatarsal**

- What is hallux valgus?
- What are sesamoid bones, where are they found in the foot, and what is their function?

General considerations

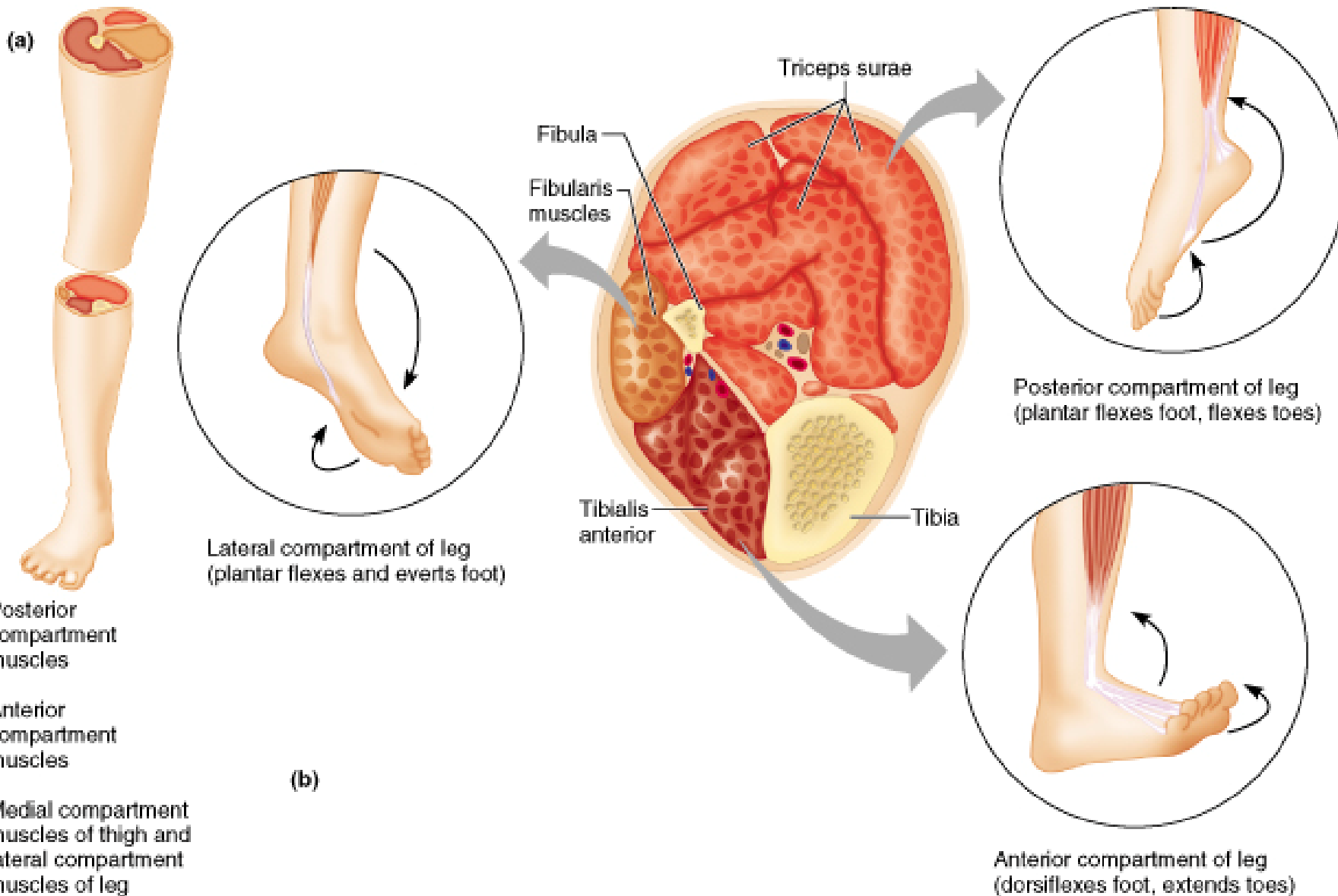
- **Plantar flexion of the foot** = rising upon the toes
- **Dorsiflexion of the foot** = standing upon the heels
- Through the “talocrural” joint

General considerations

- **Inversion** = the sole of the foot is turned inward
- **Eversion** = the sole of the foot is turned outward
- Distal to the talocrural joint (through joints among the tarsals)

Muscles of the leg

- **Posterior** compartment (superficial & deep):
 - primary plantar flexors of the foot
 - flexors of the toes
- **Anterior** compartment:
 - dorsiflexors & supinators (inv.) of the foot
 - extensors of the toes
- **Lateral** compartment:
 - muscles that assist plantarflexion and pronation (eve.) of the foot



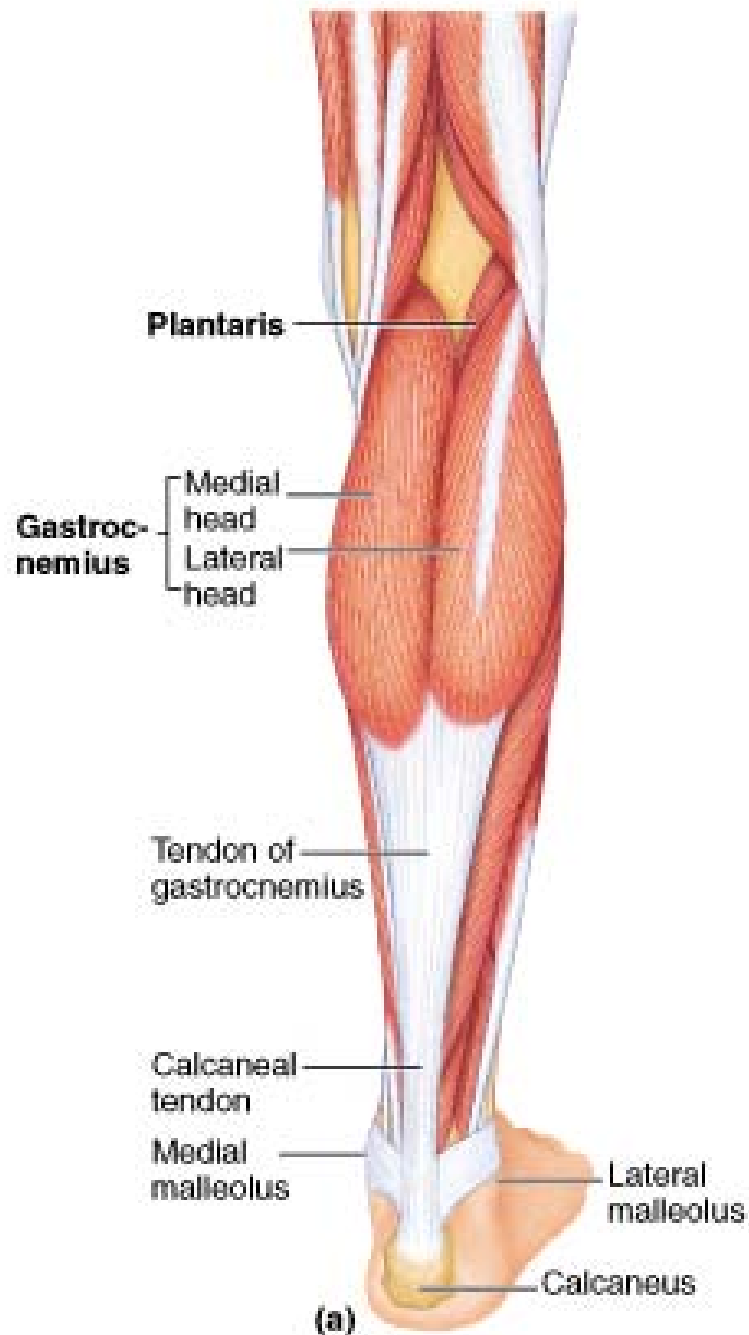
Posterior compartment

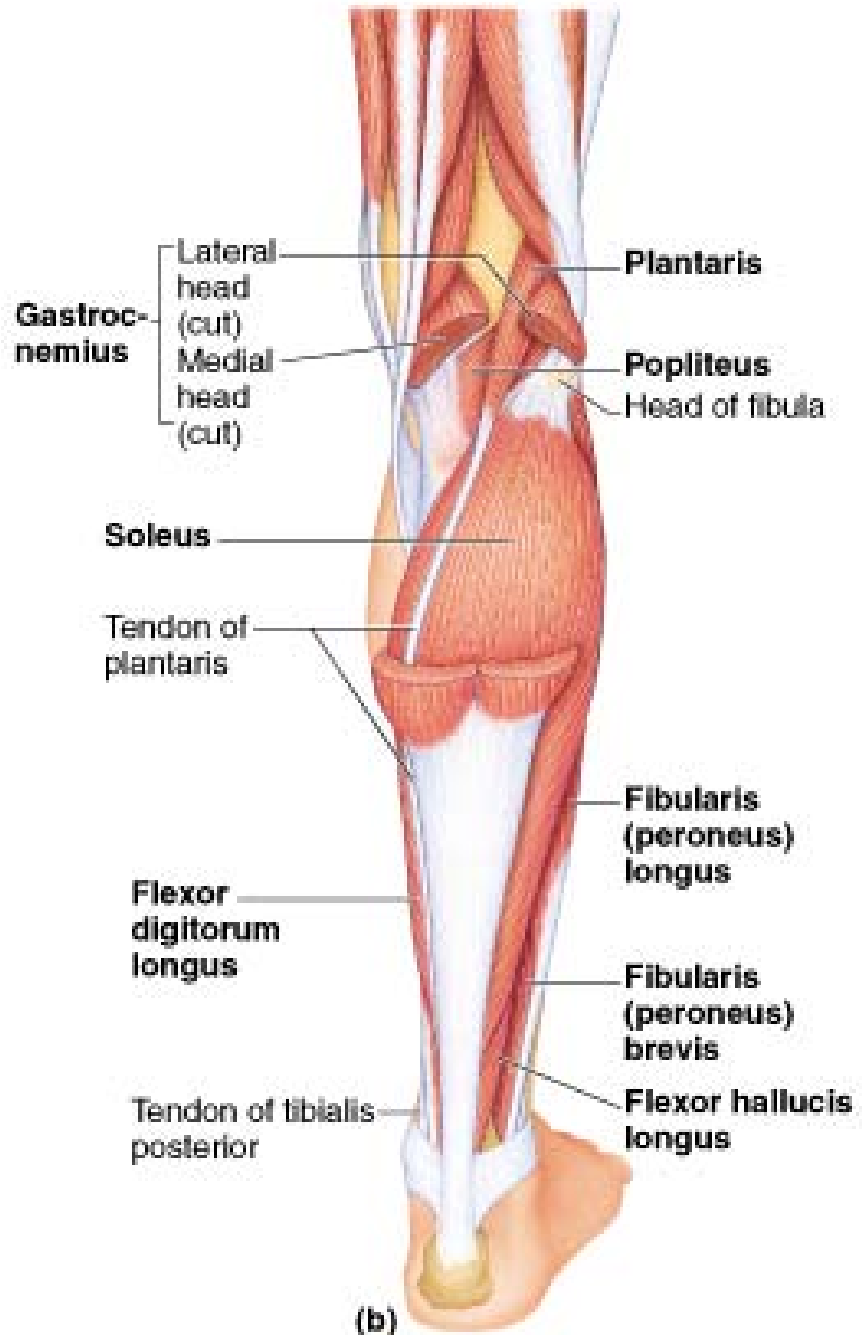
Superficial group

- **Gastrocnemius:** two heads or bellies that cross the knee joint (femur to calcaneus)
- **Soleus:** deep to the gastrocnemius (from tibia & fibula to calcaneus)

Posterior compartment Superficial group

- **Plantaris:** weakly assist gastrocnemius in plantarflexion and knee flexion
- The common tendon of these muscles is the **achilis tendon**





(b)

Posterior compartment

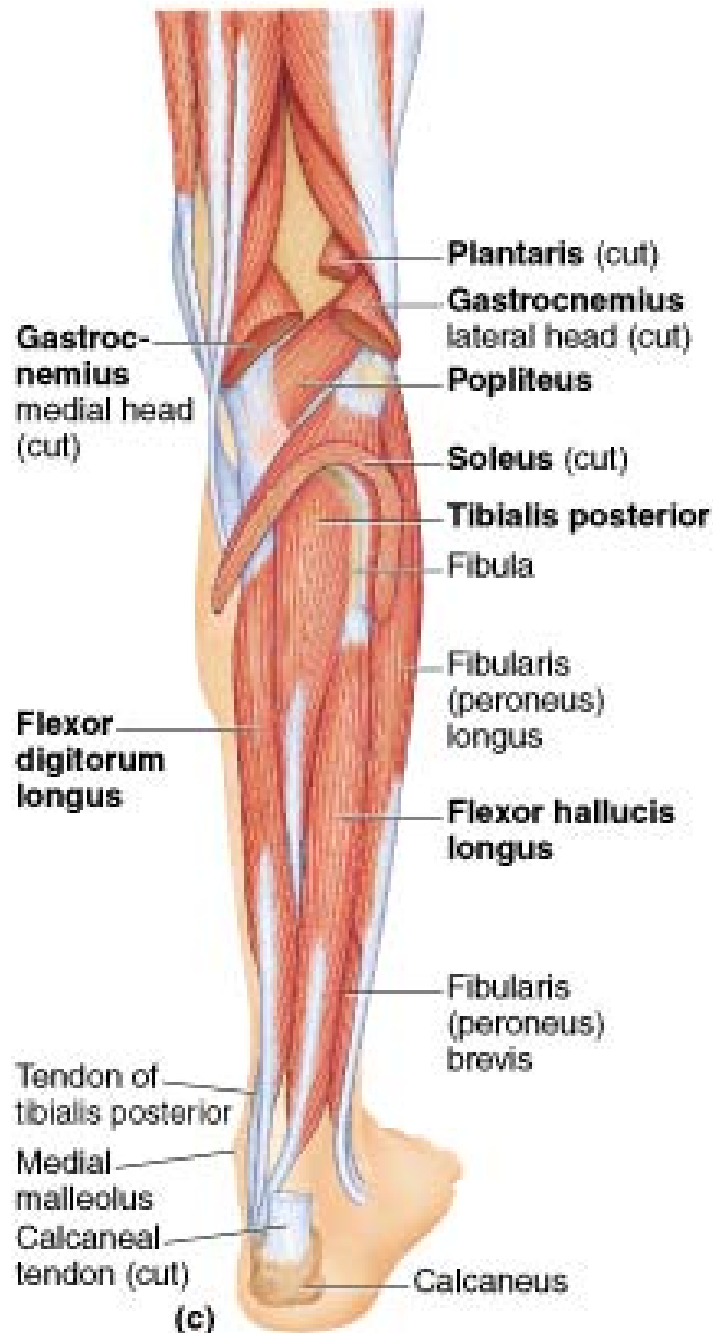
Deep group

- **Flexor hallucis longus:** from fibula & interosseous membrane to distal phalanx of hallux
- **Flexor digitorum longus:** from med. Tibia to distal phalanges of the lateral 4 digits

Posterior compartment

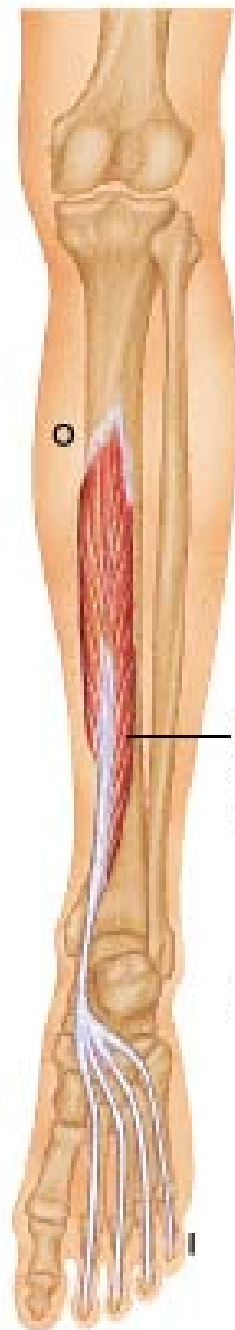
Deep group

- **Tibialis posterior:** plantarflexion and inversion (from interosseous membrane, tibia, & fibula to navicular, cuneiform, cuboid, base of 2nd, 3rd, 4th, metatarsal)





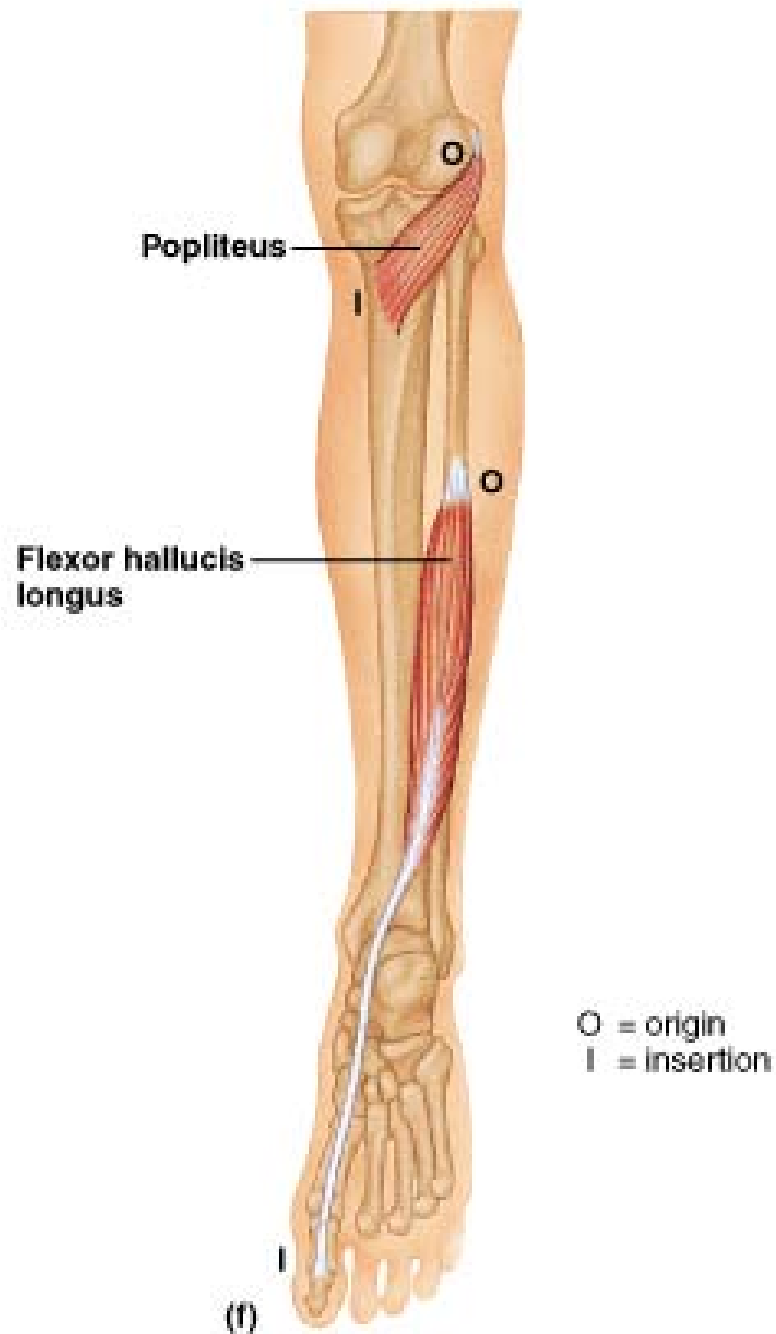
(d)



Flexor digitorum longus

O = origin
I = insertion

(e)



Posterior compartment

- Innervation: Tibial Nerve

Tibial nerve

- Arises as a terminal branch of the sciatic nerve
- Descends near the posterior midline of the popliteal fossa
- Enters the calf by passing deep to the soleus muscle
- Descends within the deep compartment of the leg
- Terminates by giving rise to the medial and lateral plantar nerves (near the medial malleolus)

Tibial nerve

Sensory distribution:


- **Cutaneous:** branches to the lateral side of the dorsum (the S1 dermatome of the foot)
- **Articular:** branches to the ankle and joints of the foot

Tibial nerve

- **Medial & lateral plantar nerves:**
 - supply the intrinsic muscles within the plantar foot
 - sensory to the plantar skin

Tibial nerve

Entrapment & clinical conditions:

- Injuries to this nerve are most the result of trauma to the popliteal fossa (stab wounds)
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- Weakened plantarflexion of the foot & flexion of the toes
 - Most noticeable when walking producing a weak heel-lift & weak toe-off