



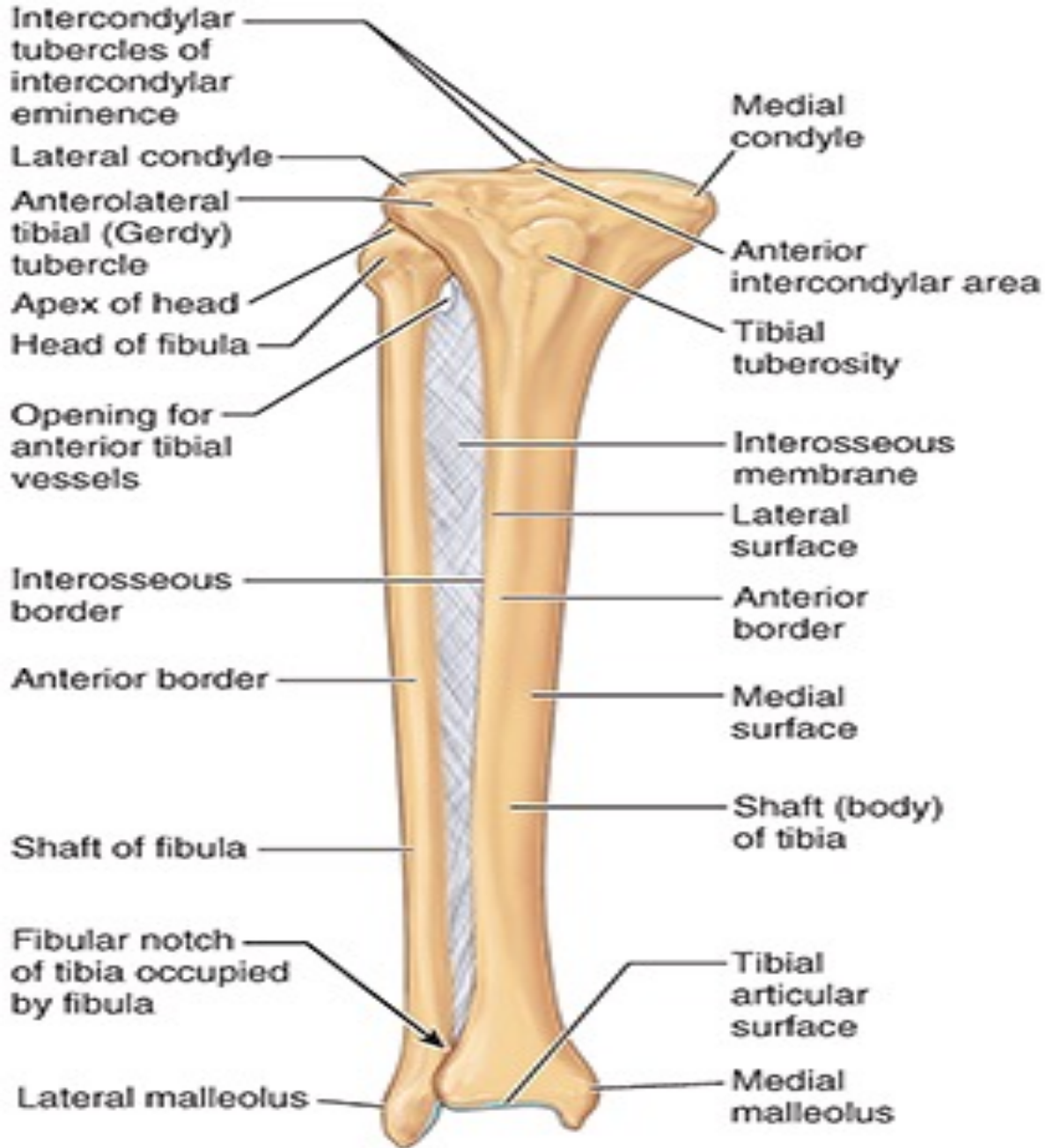
# Leg Anatomy

Dr. Gary Mumaugh

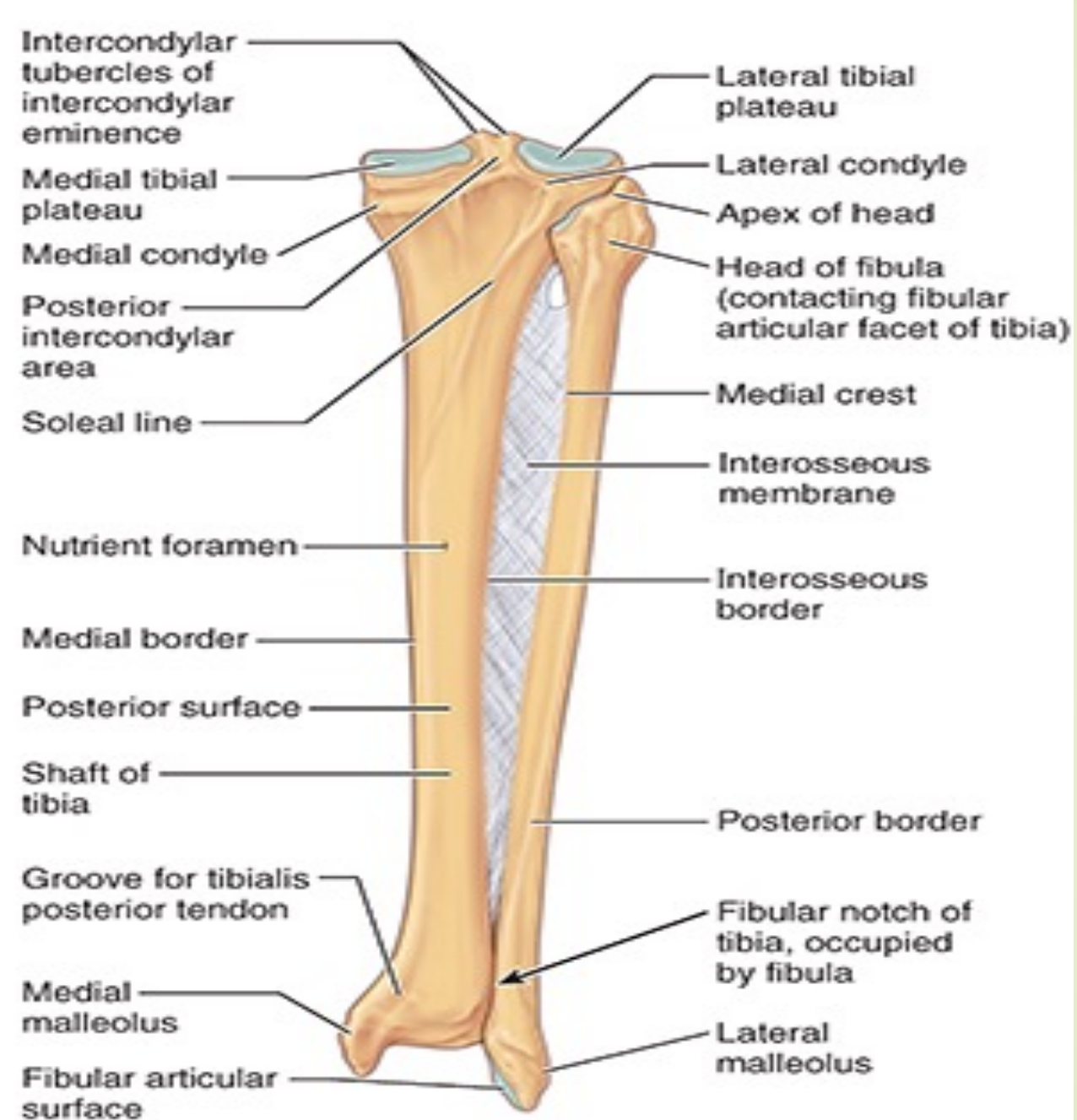


# Tibia and Fibula

- The tibia and fibula are the bones of the leg
- The tibia articulates with the condyles of the femur superiorly and the talus inferiorly and in so doing transmits the body's weight.
- The fibula mainly functions as an attachment for muscles, but it is also important for the stability of the ankle joint.
- The shafts of the tibia and fibula are connected by a dense interosseous membrane composed of strong oblique fibers descending from the tibia to the fibula.




**(A) Anterior view**





**(B) Posterior view**


# TIBIA

- The tibia (shin bone) is located on the anteromedial side of the leg, nearly parallel to the fibula.
- It is the second largest bone in the body. It flares outward at both ends to provide an increased area for articulation and weight transfer.
- The superior (proximal) end widens to form medial and lateral condyles that overhang the shaft medially, laterally, and posteriorly, forming a relatively flat superior articular surface, or tibial plateau.
- This plateau consists of two smooth articular surfaces (the medial one slightly concave and the lateral one slightly convex) that articulate with the large condyles of the femur.


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- The anterior border of the tibia is the most prominent border.
  - It and the adjacent medial surface are subcutaneous throughout their lengths and are commonly known as the “shin.”
  - Their periosteal covering and overlying skin are vulnerable to bruising.
  - At the superior end of the anterior border, a broad, oblong tibial tuberosity provides distal attachment for the patellar ligament, which stretches between the inferior margin of the patella and the tibial tuberosity.

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- The tibial shaft is thinnest at the junction of its middle and distal thirds.
  - The distal end of the tibia is smaller than the proximal end, flaring only medially.
  - The medial expansion extends inferior to the rest of the shaft as the medial malleolus.
  - The inferior surface of the shaft and the lateral surface of the medial malleolus articulate with the talus and are covered with articular cartilage.


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- The interosseous border of the tibia is sharp where it gives attachment to the interosseous membrane that unites the two leg bones.
  - Inferiorly, the sharp border is replaced by a groove, the fibular notch, that accommodates and provides fibrous attachment to the distal end of the fibula.
  - On the posterior surface of the proximal part of the tibial shaft is a rough diagonal ridge, called the soleal line, which runs inferomedially to the medial border.




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- This line is formed in relationship to the aponeurotic origin of the soleus muscle approximately one third of the way down the shaft.
  - Immediately distal to the soleal line is an obliquely directed vascular groove, which leads to a large nutrient foramen for passage of the main artery supplying the proximal end of the bone and its marrow.
  - From it, the nutrient canal runs inferiorly in the tibia before it opens into the medullary (marrow) cavity.

# FIBULA

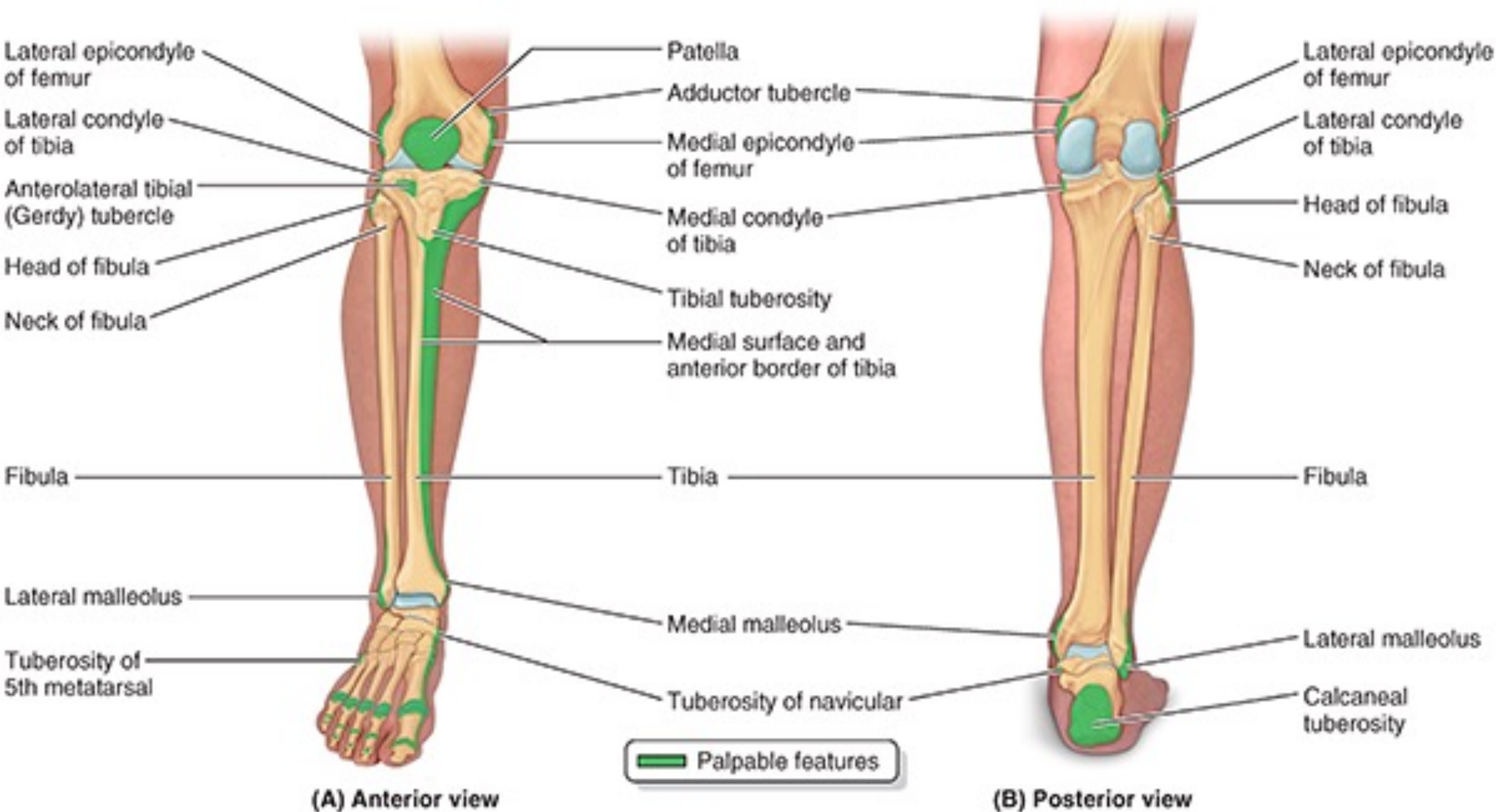
- The slender fibula lies posterolateral to the tibia and is firmly attached to it by the tibiofibular syndesmosis, which includes the interosseous membrane.
- The fibula has no function in weight bearing.
- It serves mainly for muscle attachment, providing distal attachment (insertion) for one muscle and proximal attachment (origin) for eight muscles.
- The fibers of the tibiofibular syndesmosis are arranged to resist the resulting net downward pull on the fibula.


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- The distal end enlarges and is prolonged laterally and inferiorly as the lateral malleolus.
  - The malleoli form the outer walls of a rectangular socket, which is the superior component of the ankle joint, and provide attachment for the ligaments that stabilize the joint.
  - The lateral malleolus is more prominent and posterior than the medial malleolus and extends approximately 1 cm more distally.

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- The proximal end of the fibula consists of an enlarged head superior to a small neck.
  - The head has a pointed apex and articulates with the fibular facet on the posterolateral, inferior aspect of the lateral tibial condyle.
  - The shaft of the fibula is twisted and marked by the sites of muscular attachments.
  - Like the shaft of the tibia, it is triangular in cross section, having three borders (anterior, interosseous, and posterior) and three surfaces (medial, posterior, and lateral).

# SURFACE ANATOMY OF TIBIA AND FIBULA

- The tibial tuberosity, an oval elevation on the anterior surface of the tibia, is easily palpated approximately 5 cm distal to the apex of the patella.
- The subcutaneous, flat anteromedial surface of the tibia is also easy to palpate.
- The skin covering this surface is freely movable.
- The tibial condyles can be palpated anteriorly at the sides of the patellar ligament, especially when the knee is flexed.



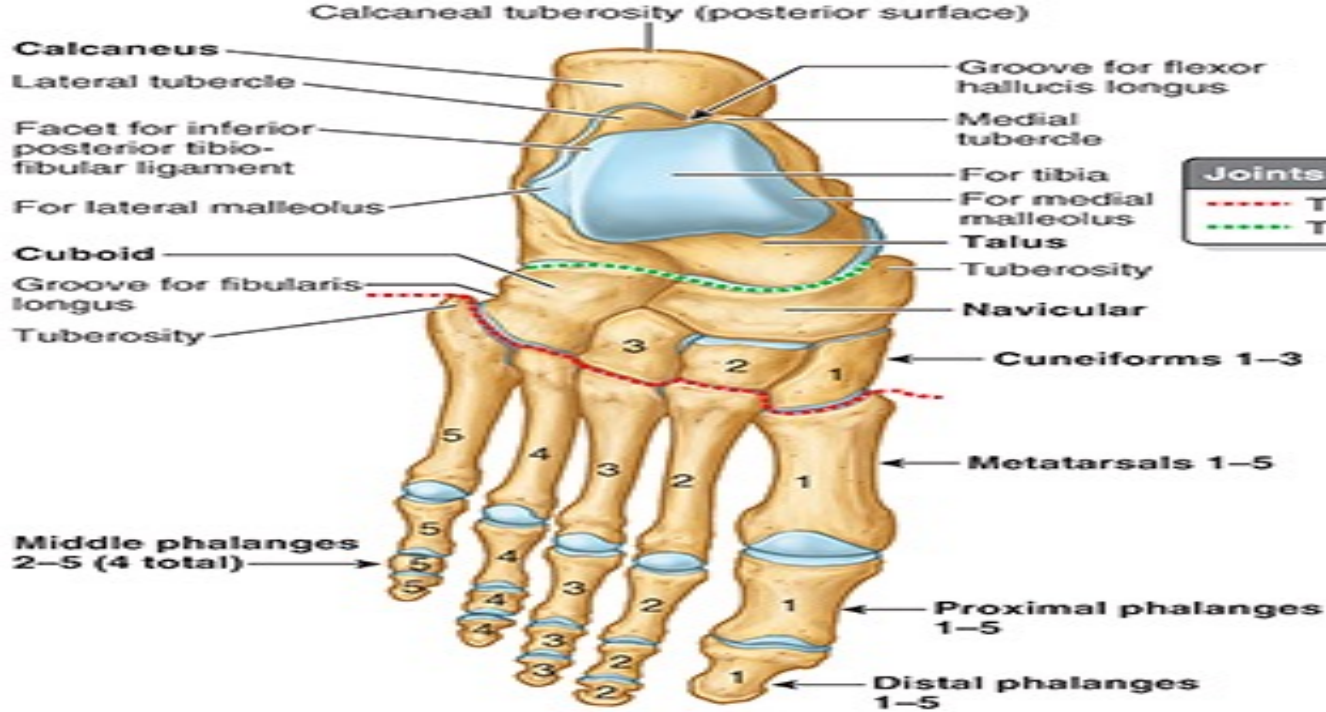
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- The head of the fibula is prominent at the level of the superior part of the tibial tuberosity because the knob-like head is subcutaneous at the posterolateral aspect of the knee.
  - The neck of the fibula can be palpated just distal to the lateral side of the fibular head.
  - The medial malleolus, the prominence on the medial side of the ankle, is also subcutaneous and prominent.



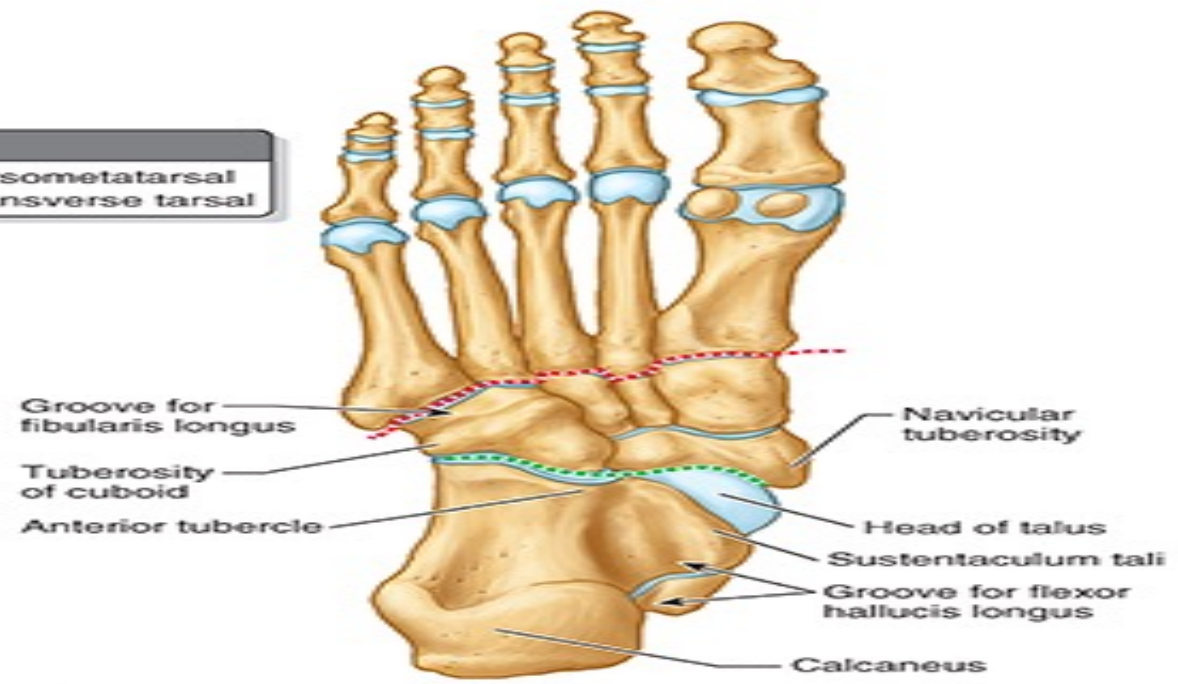
# Bones of Foot

- The bones of the foot include the tarsus, metatarsus, and phalanges.
- There are 7 tarsal bones, 5 metatarsal bones, and 14 phalanges.





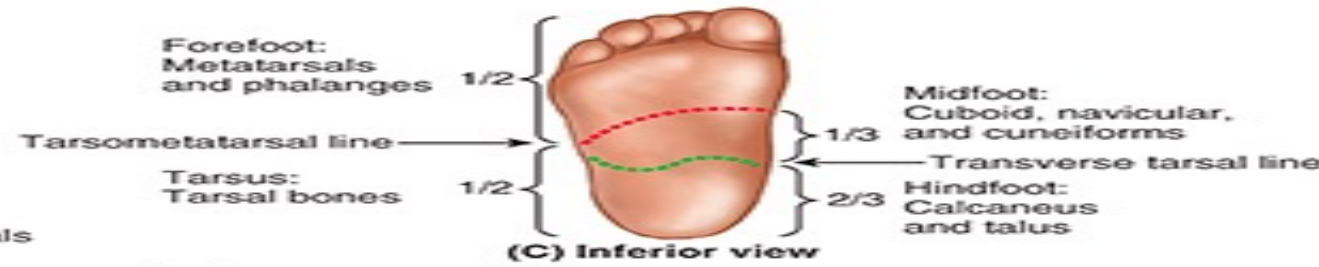
(A) Superior view



(B) Inferior view



(D) Lateral view



(E) Medial view


# TARSALS

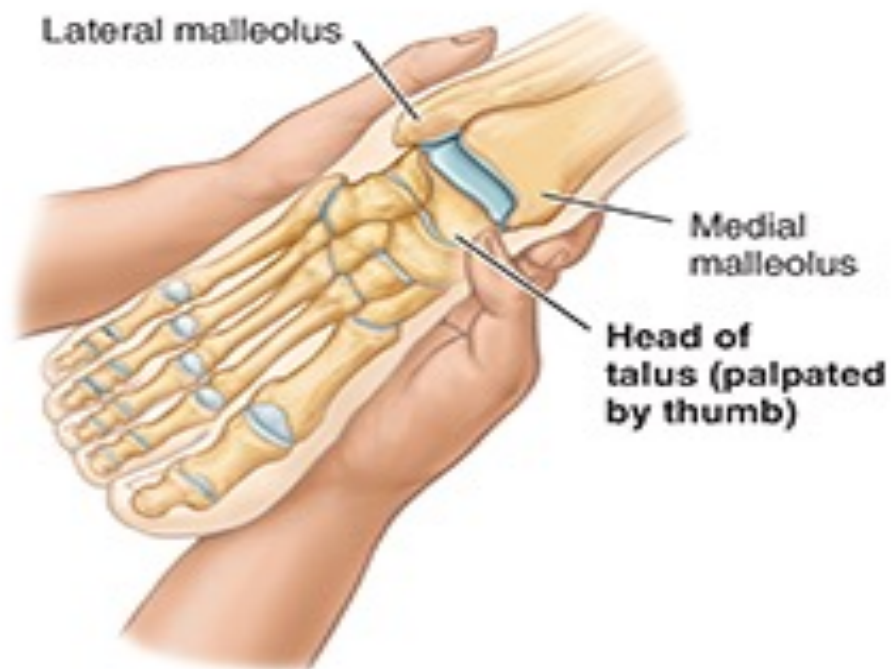
- The tarsals consists of seven bones (Fig. 7.12A, B): talus, calcaneus, cuboid, navicular, and three cuneiforms.
- Only one bone, the talus, articulates with the leg bones.
- A good mnemonic for remembering the names of the tarsal bones is: **Tiger Cubs Need MILC**. Here are the names of the tarsal bones: Talus, Calcaneous, Navicular, Medial Cuneiform, Intermediate Cuneiform, Lateral Cuneiform and the Cuboid bones.



# TALUS

- The talus (L., ankle bone) has a body, neck, and head.
- The superior surface, or trochlea of the talus, is gripped by the two malleoli and receives the weight of the body from the tibia.
- The talus transmits that weight in turn, dividing it between the calcaneus, on which the body of talus rests, and the forefoot.

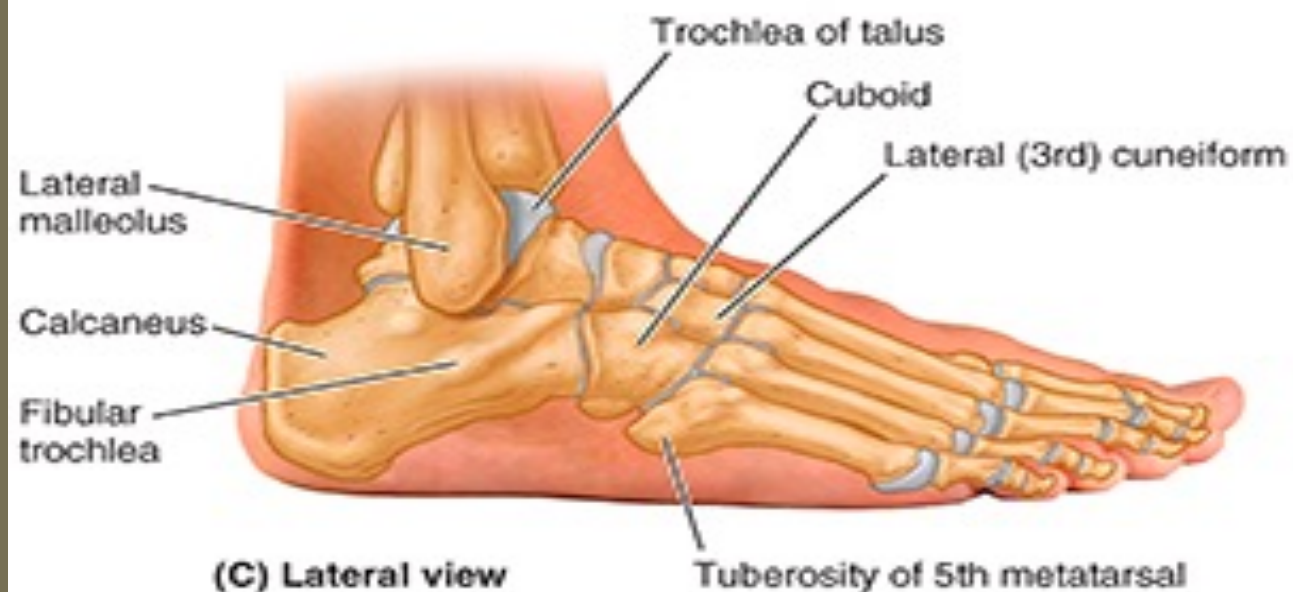
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- The talus is the only tarsal bone that has no muscular or tendinous attachments.
  - Most of its surface is covered with articular cartilage.
  - The talar body bears the trochlea superiorly and narrows into a posterior process that features a groove for the tendon of the flexor hallucis longus, flanked by a prominent lateral tubercle and a less prominent medial tubercle.



(A) Schematic



(B) Schematic



(C) Lateral view



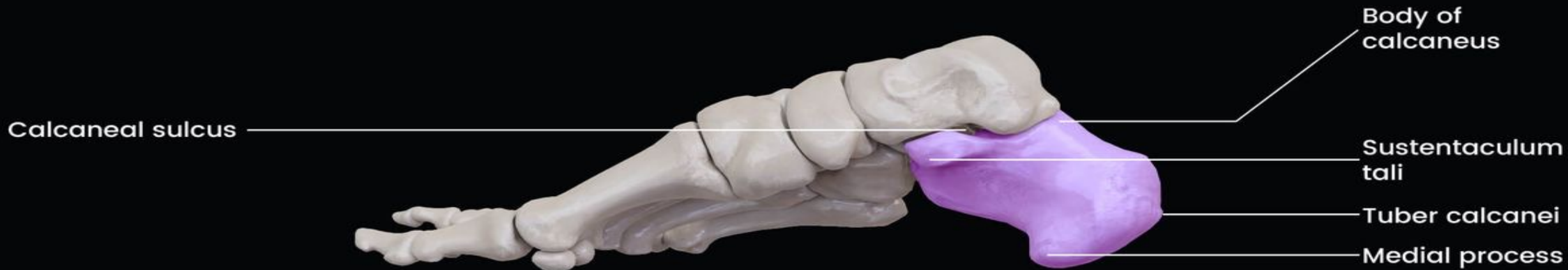
(D) Medial view



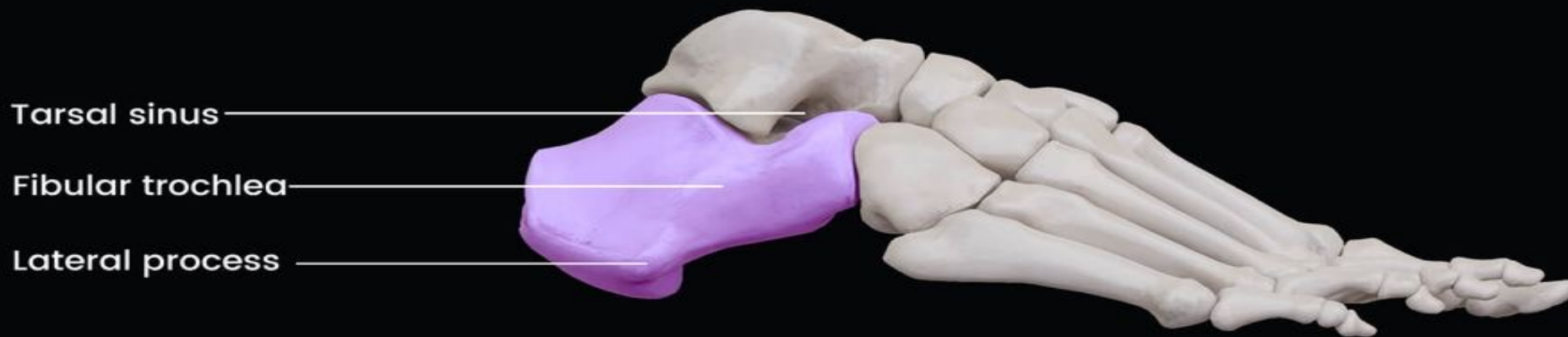
# Calcaneus

- The calcaneus (L., heel bone) is the largest and strongest bone in the foot.
- When standing, the calcaneus transmits the majority of the body's weight from the talus to the ground.
- The anterior two thirds of the calcaneus' superior surface articulates with the talus and its anterior surface articulates with the cuboid.

# Calcaneus




Medial view



Lateral view


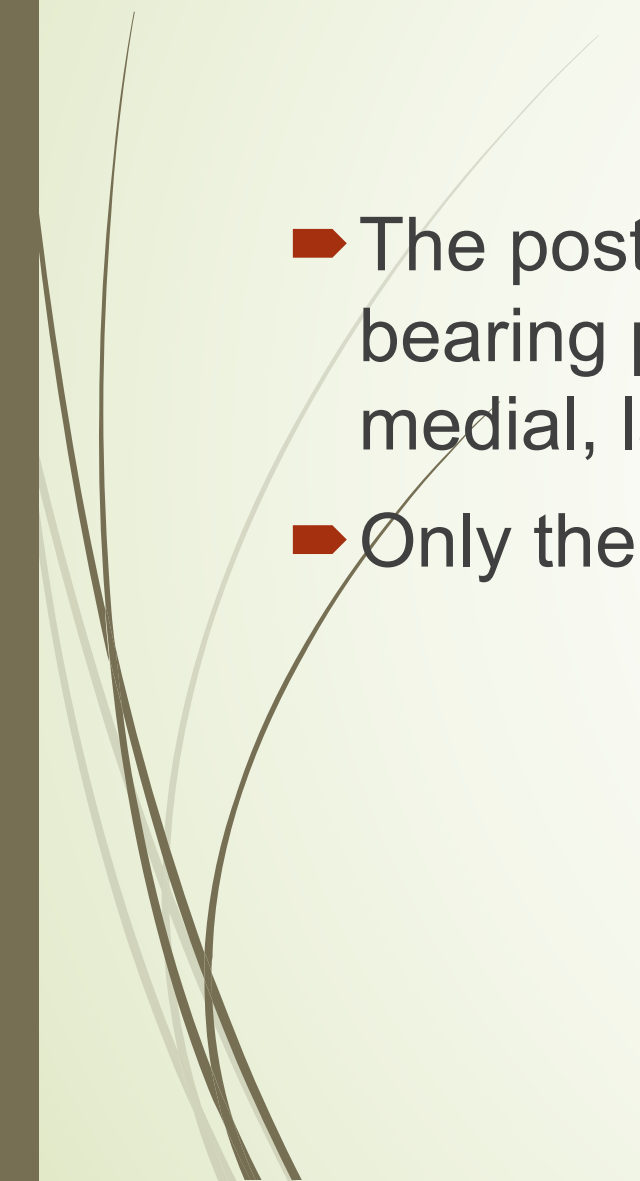






The lateral surface of the calcaneus has an oblique ridge, that lies between the tendons of the fibularis longus and brevis.

- This trochlea anchors a tendon pulley for the evertors of the foot (muscles that move the sole of the foot away from the median plane).
- The sustentaculum tali (L., talar shelf), the shelf-like support of the head of the talus, projects from the superior border of the medial surface of the calcaneus.

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- The posterior part of the calcaneus has a massive, weight-bearing prominence, the calcaneal tuberosity, which has medial, lateral, and anterior tubercles.
  - Only the medial tubercle contacts the ground during standing.

# Navicular

- The navicular (L., little ship) is a flattened, boat-shaped bone located between the head of the talus posteriorly and the three cuneiforms anteriorly.
- The medial surface of the navicular projects inferiorly to form the navicular tuberosity, an important site for tendon attachment because the medial border of the foot does not rest on the ground, as does the lateral border.
- Instead, it forms a longitudinal arch of the foot, which must be supported centrally.
- If this tuberosity is too prominent, it may press against the medial part of the shoe and cause foot pain.



Medial view



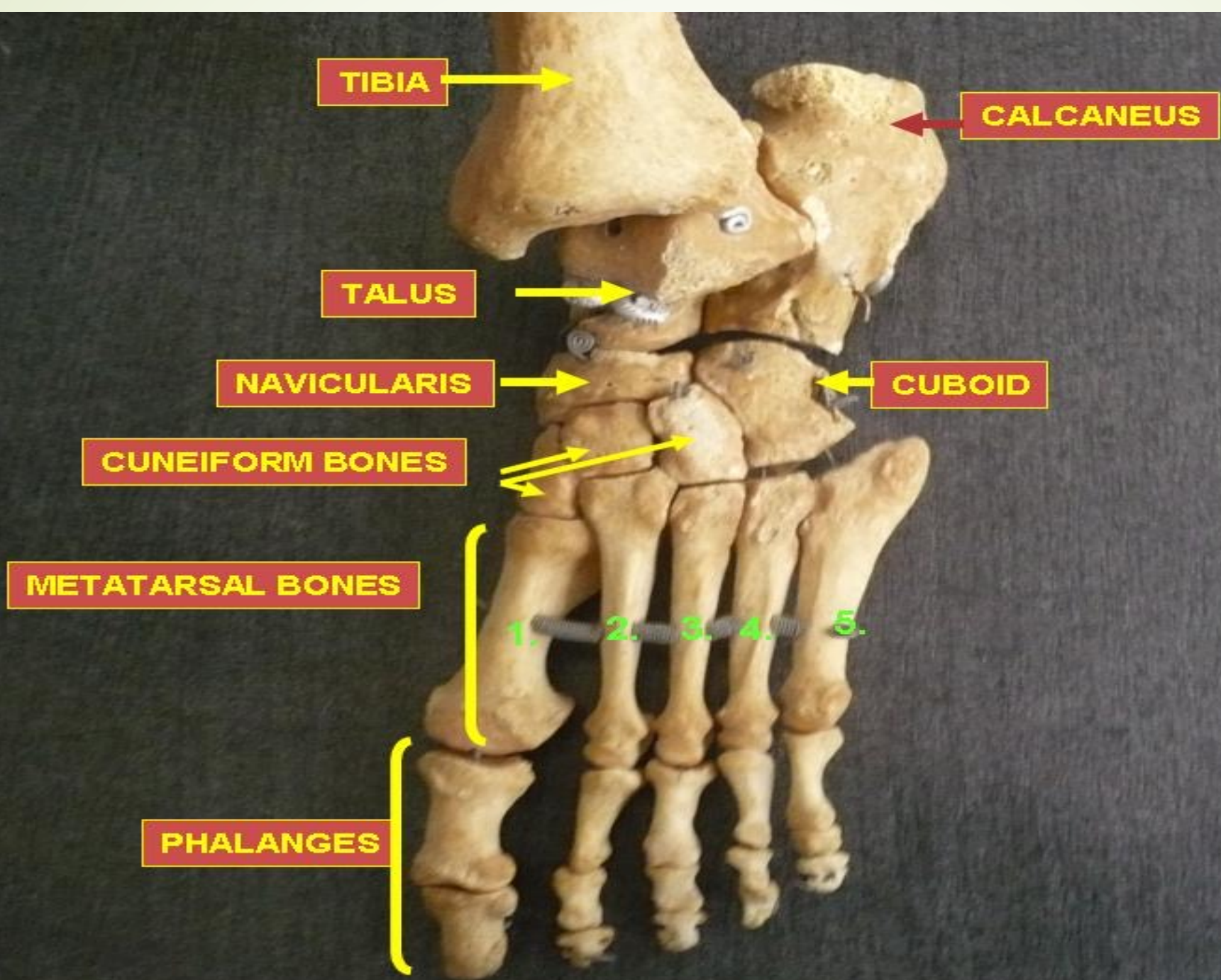
Lateral view



Dorsal view



Plantar view



# Cuboid

- The cuboid, approximately cubical in shape, is the most lateral bone in the distal row of the tarsus.
- Anterior to the tuberosity of the cuboid on the lateral and inferior surfaces of the bone is a groove for the tendon of the fibularis (peroneus) longus muscle.





# Cuneiforms

- The three cuneiform bones are the medial (1st), intermediate (2nd), and lateral (3rd).
- The medial cuneiform is the largest bone, and the intermediate cuneiform is the smallest.
- Each cuneiform (L. cuneus, wedge shaped) articulates with the navicular posteriorly and the base of its appropriate metatarsal anteriorly.
- The lateral cuneiform also articulates with the cuboid.

- Medial cuneiform bone
- Intermediate cuneiform bone
- Lateral cuneiform bone



Medial view



Lateral view



Dorsal view



Plantar view



# METATARSALS

- The metatarsus consists of five metatarsals that are numbered from the medial side of the foot.
- The tarsometatarsal joints form an oblique tarsometatarsal line joining the midpoints of the medial and shorter lateral borders of the foot.
- Thus, the metatarsals and phalanges are located in the anterior half (forefoot) and the tarsals are in the posterior half (hindfoot).

## Metatarsal bones



Medial view



Lateral view



Dorsal view



Plantar view

