General Anatomy

Lecture 5: Appendicular Skeleton (2): Bones of Lower Limb

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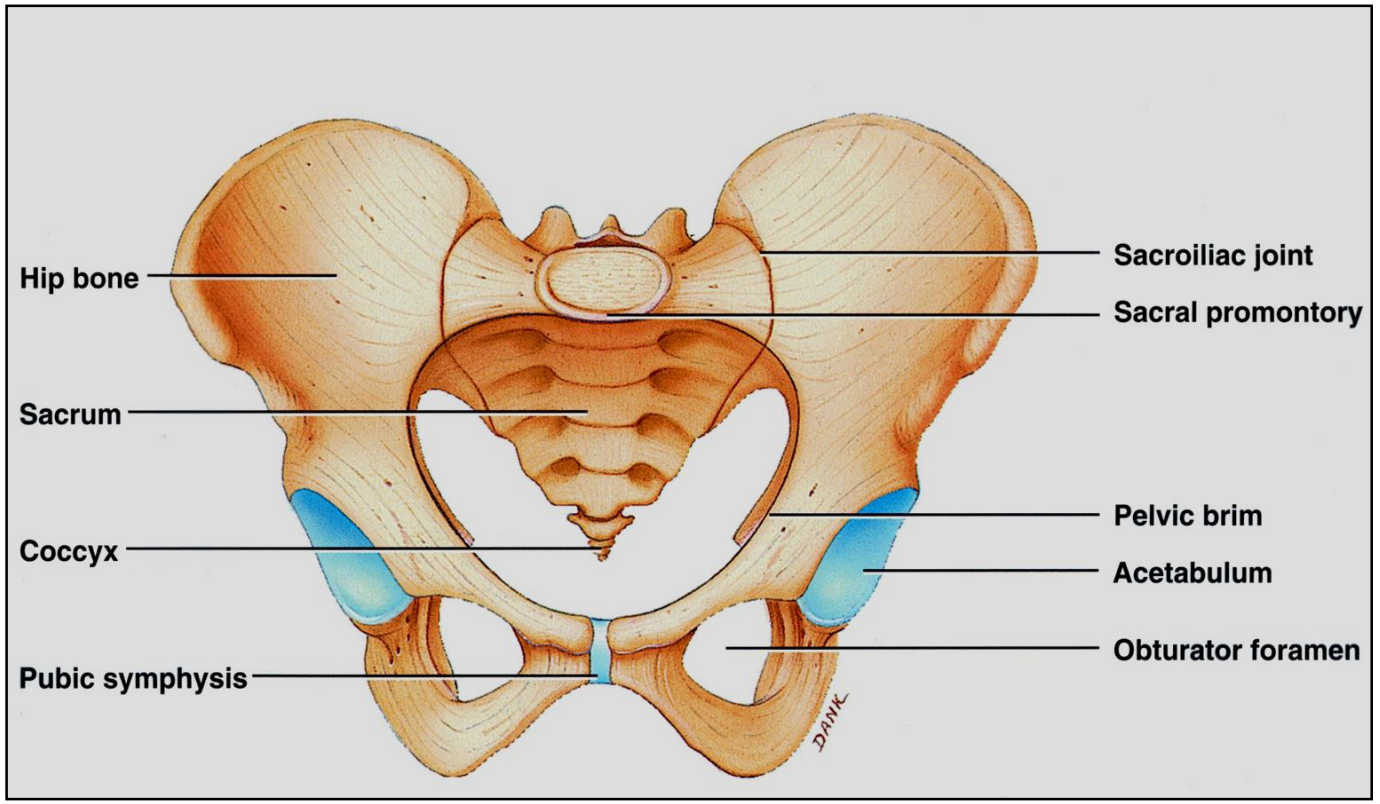
Bones of Lower Limb

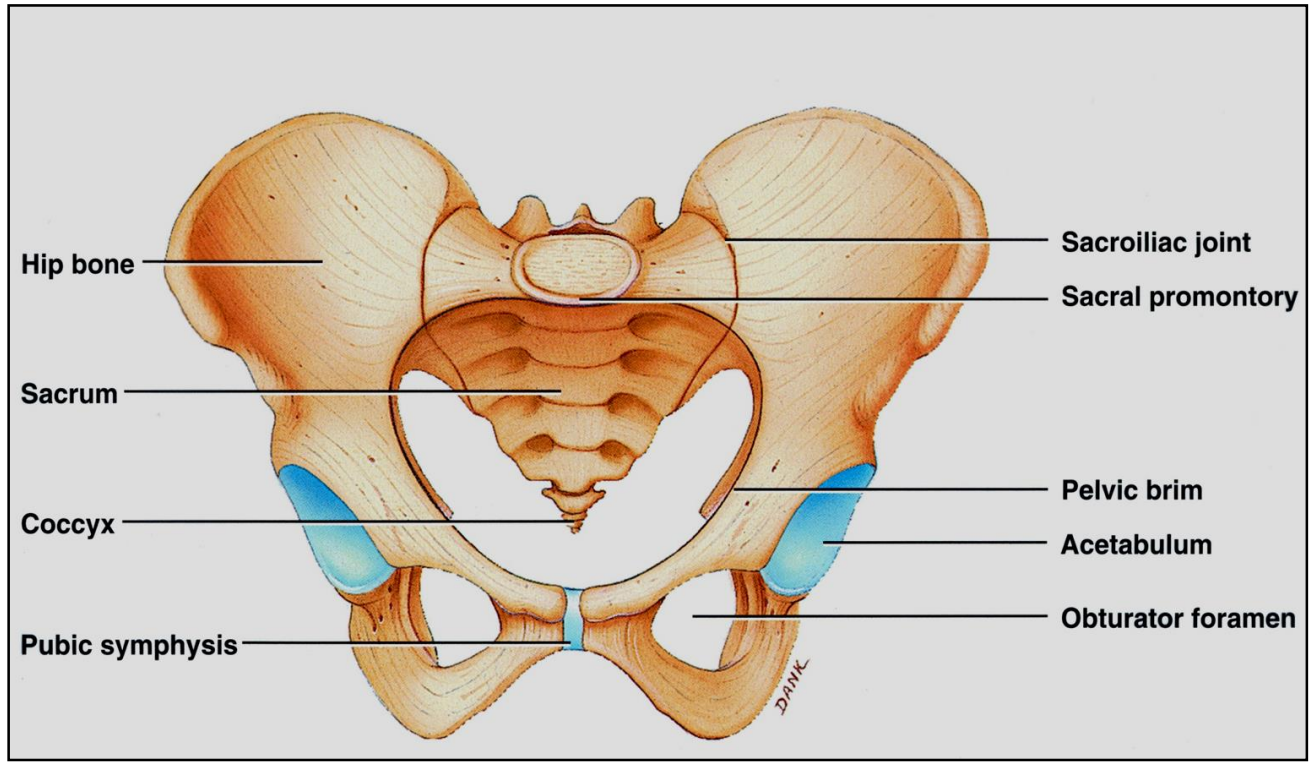
The Pelvic Girdle

* The pelvic girdle connects bones of lower limb to axial skeleton.
* The pelvic girdle consists of the two hip bones.
* The hip bones articulate posteriorly with the sacrum to form sacroiliac joints, and anteriorly with each other to form symphysis pubis.



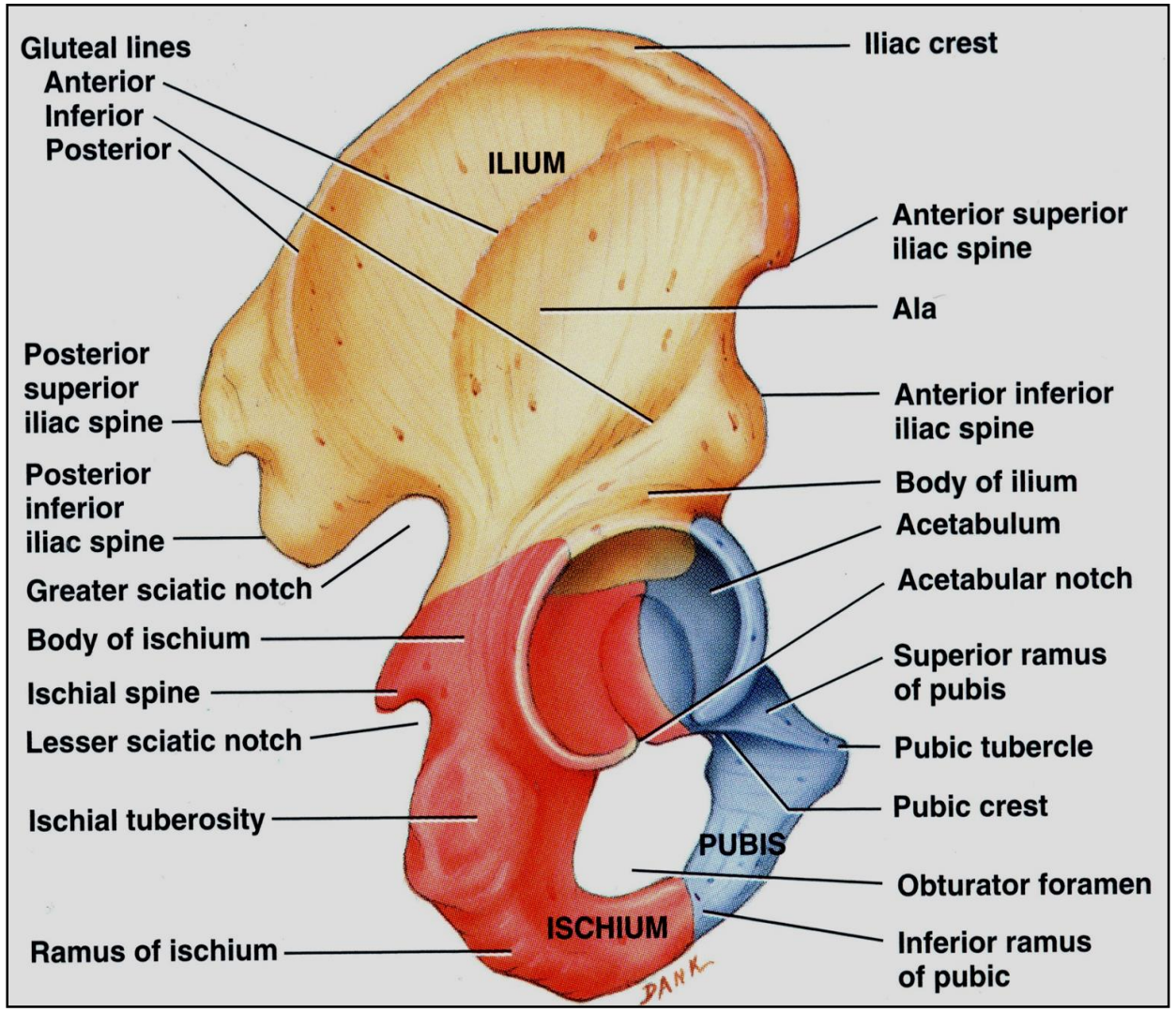
1. The Hip Bone

* Each hip bone is large & irregularly-shaped.
* Its lateral surface bears near it center a deep cup-shaped cavity termed the acetabulum, which articulates with head of femur to form hip joint.
* Below the acetabulum the bone presents a large oval or triangular gap, the obturator foramen.
* The hip bone has three parts: ilium, pubis, and ischium.



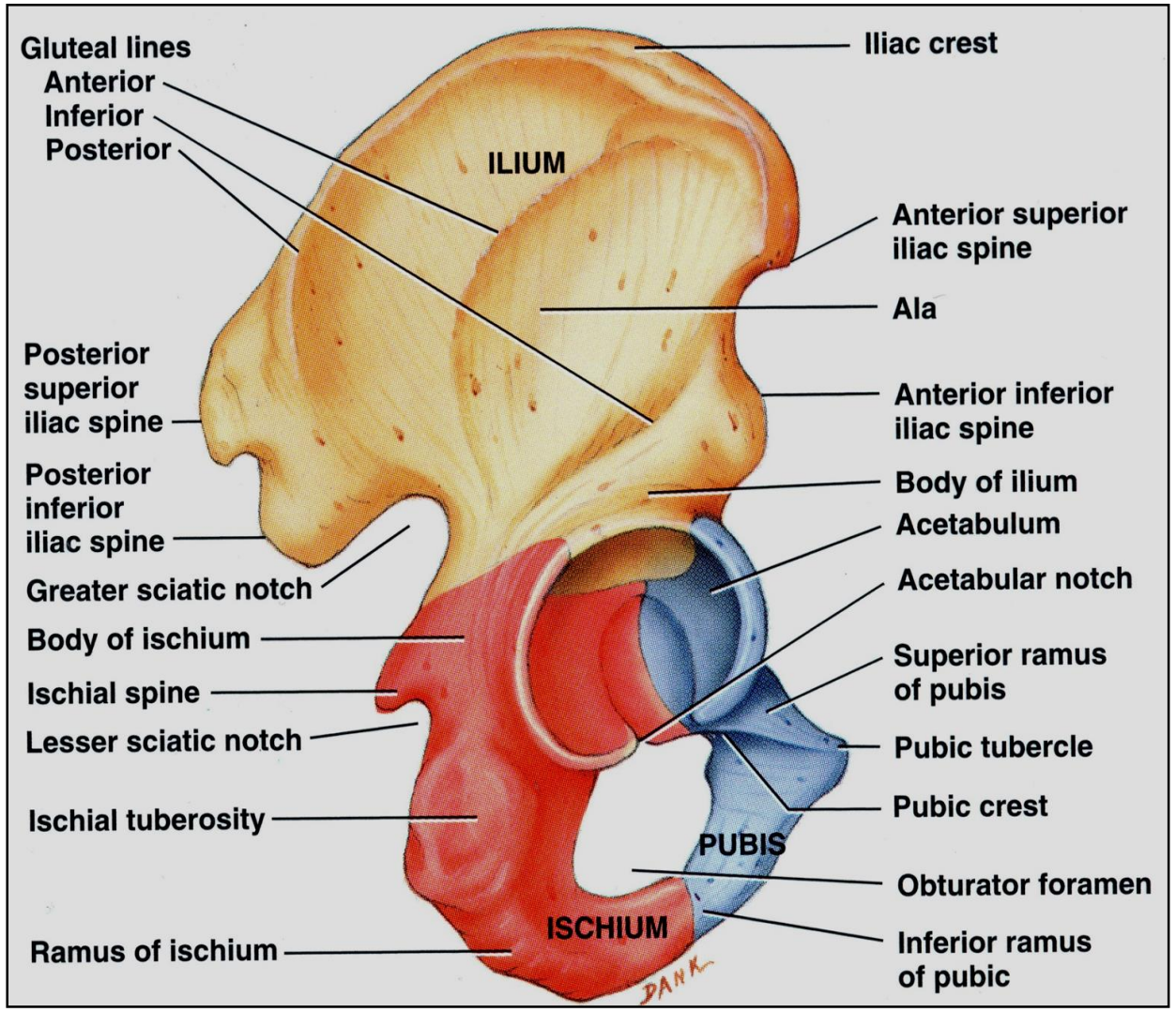
A. The Ilium

* Includes the upper part of acetabulum & the expanded, flattened area of bone above it.
* Its upper margin is curved and is termed **iliac crest.**
* Its anterior border presents anterior superior iliac spine (ASIS) & anterior inferior iliac spine (AIIS).
* Its posterior border presents posterior superior iliac spine (PSIS) & posterior inferior iliac spine (PIIS).
* The lateral surface of the ilium is called the **gluteal surface.**



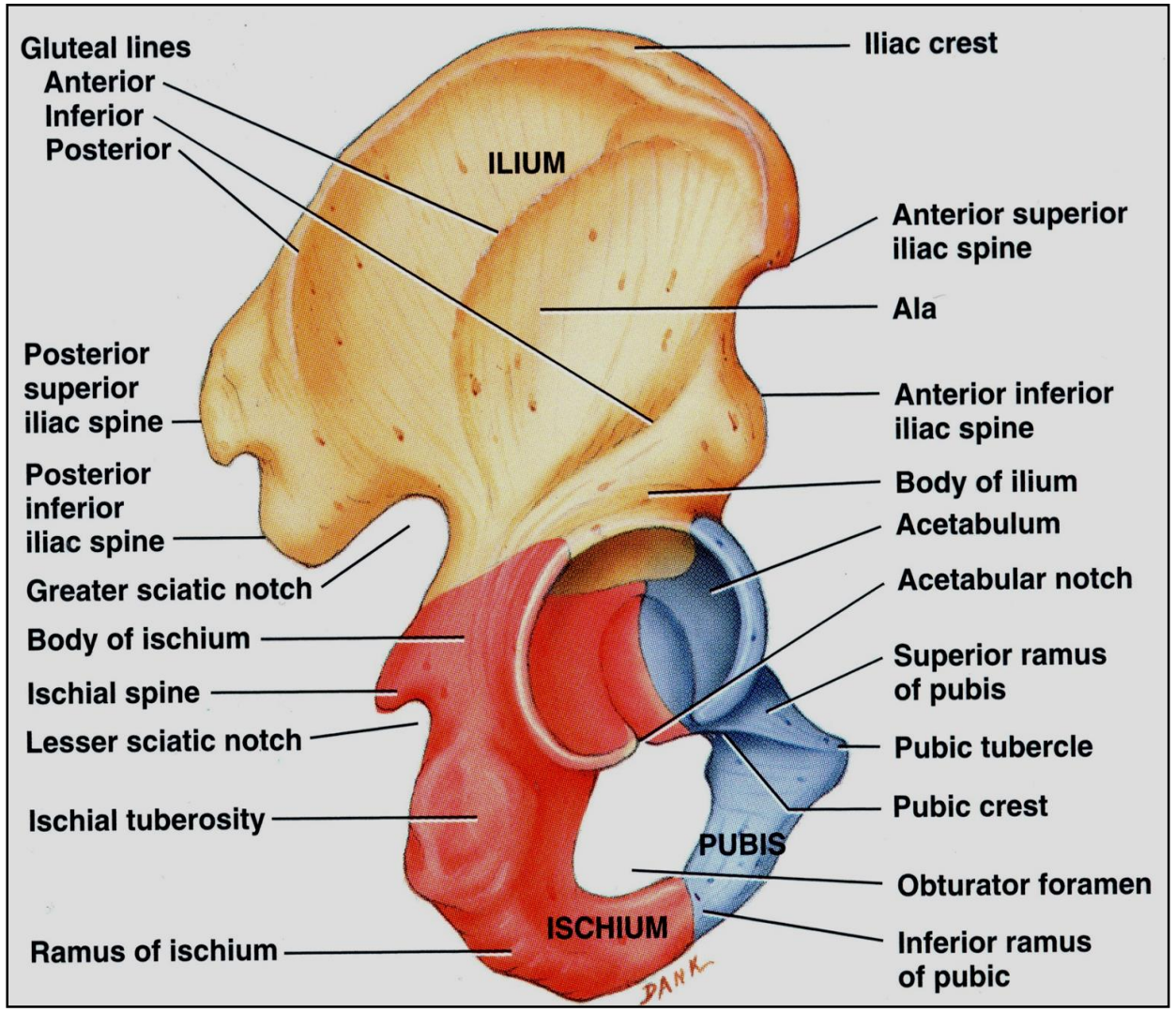
B. The Pubis

* Forms the anterior portion of the lower expanded part of the hip, and the lower anterior part of the acetabulum.
* It consists: a body, a superior ramus, and an inferior ramus.
* The body articulates with the body of the opposite pubis forming the symphysis pubis.



C. The Ischium

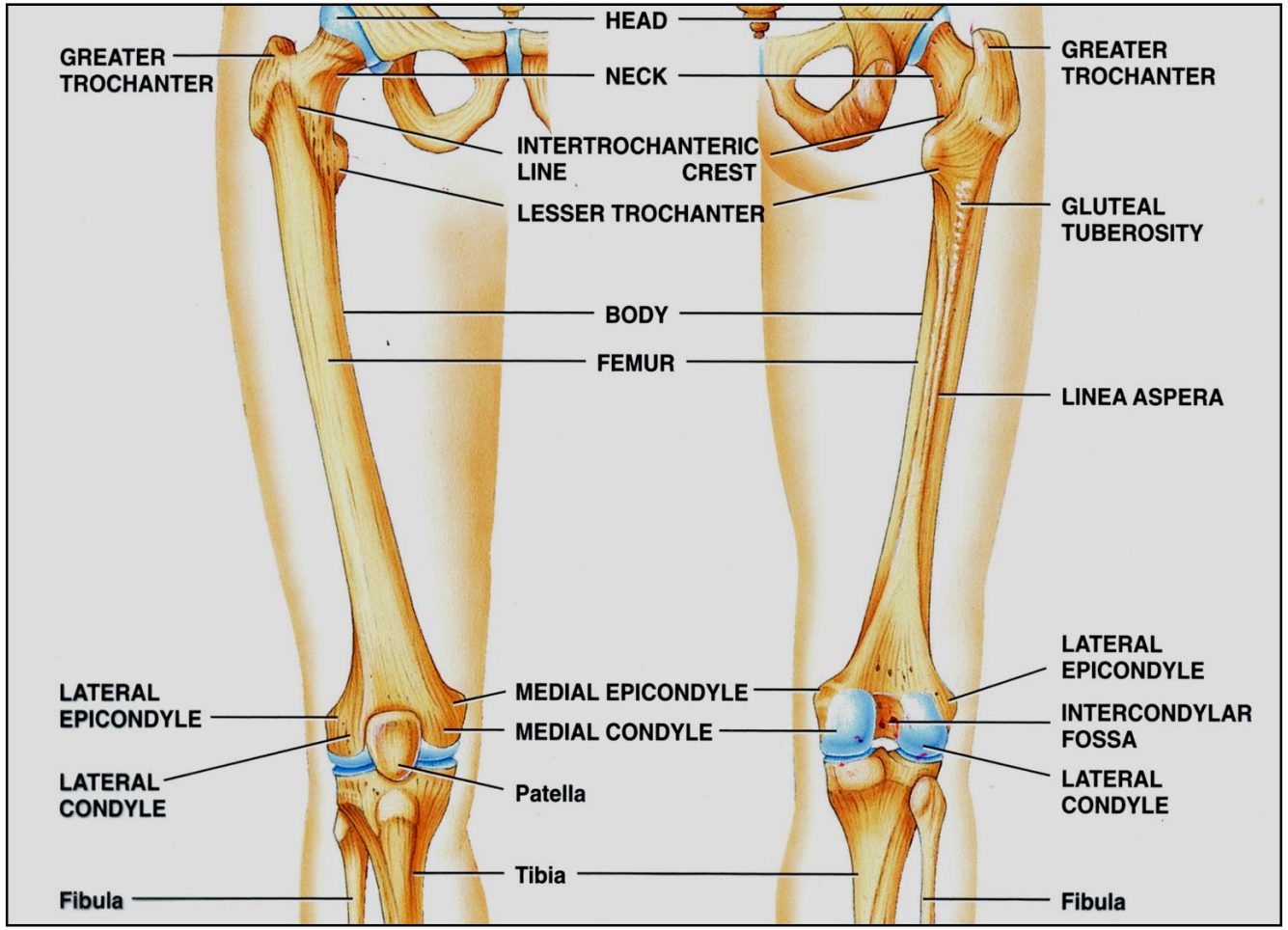
* Forms the posterior portion of the lower expanded part of hip and the lower posterior part of acetabulum.
* It consists of: a body and a ramus, which is continuous with the inferior ramus of the pubis.
* The ischial tuberosity is a large rough area situated on the lower part of the body.
* The posterior border of ischium is continuous with posterior border of ilium.
* It presents a sharp projection called ischial spine, which intervenes between the greater and lesser sciatic notches.



2. The Femur

A. Upper end:

* Shows a head, neck, and greater and lesser trochanters.
* The head, which is more than half of a sphere, articulates with acetabulum of the hip, to form the hip joint.
* The neck is about 5 cm long & connects the head to shaft.
* The intertrochanteric line is a rough ridge, which runs downwards and medially on anterior aspect of the bone from greater trochanter to lesser trochanter.

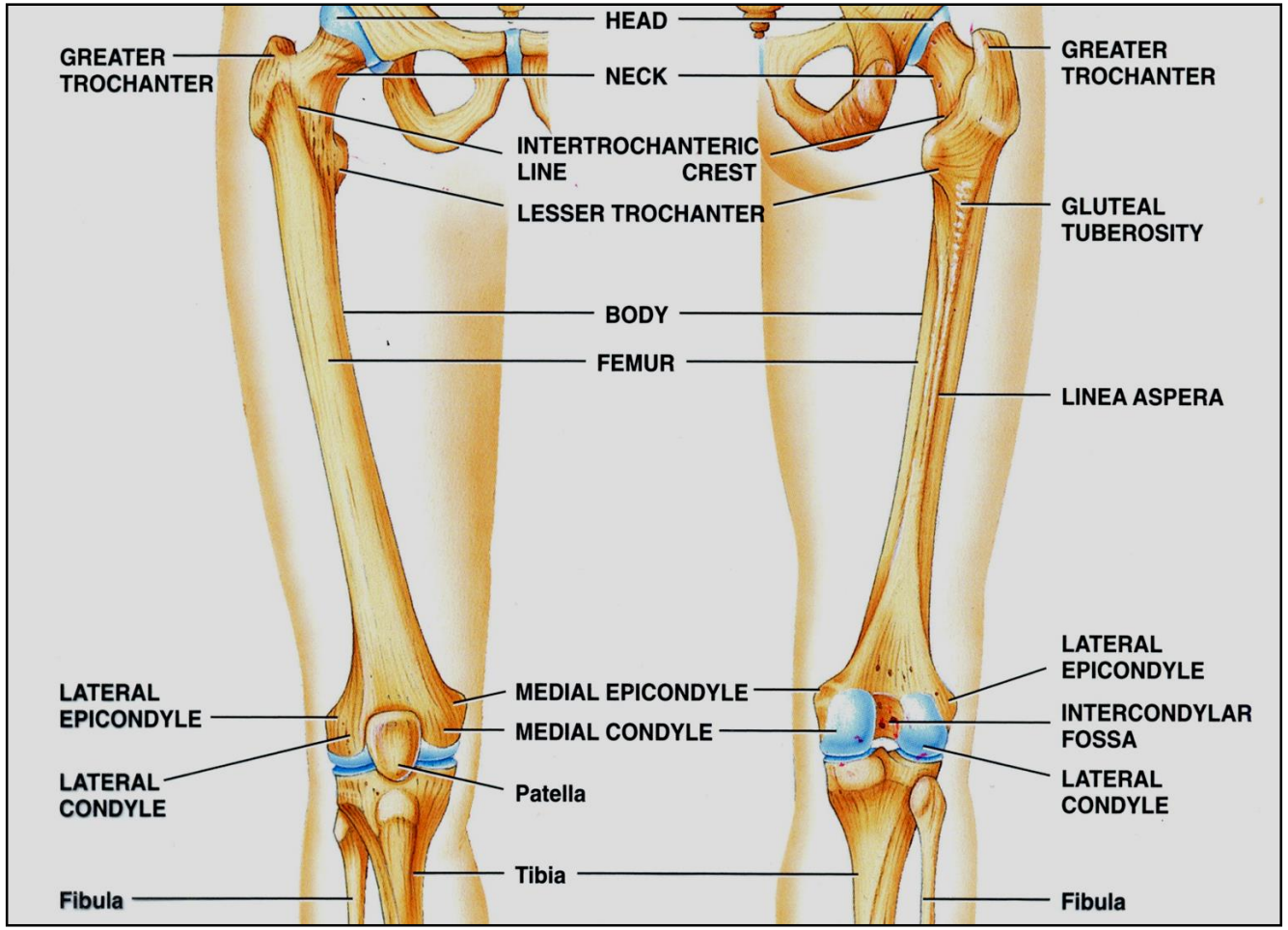


* The intertrochanteric crest is a smooth elevation on posterior aspect of the bone between greater and lesser trochanters.

B. Shaft:

* The middle third of the posterior aspect of femur presents a broad, rough vertical ridge termed **linea aspera.**

* Superiorly, the linea aspera is continuous with another vertical ridge, called **gluteal tuberosity.**

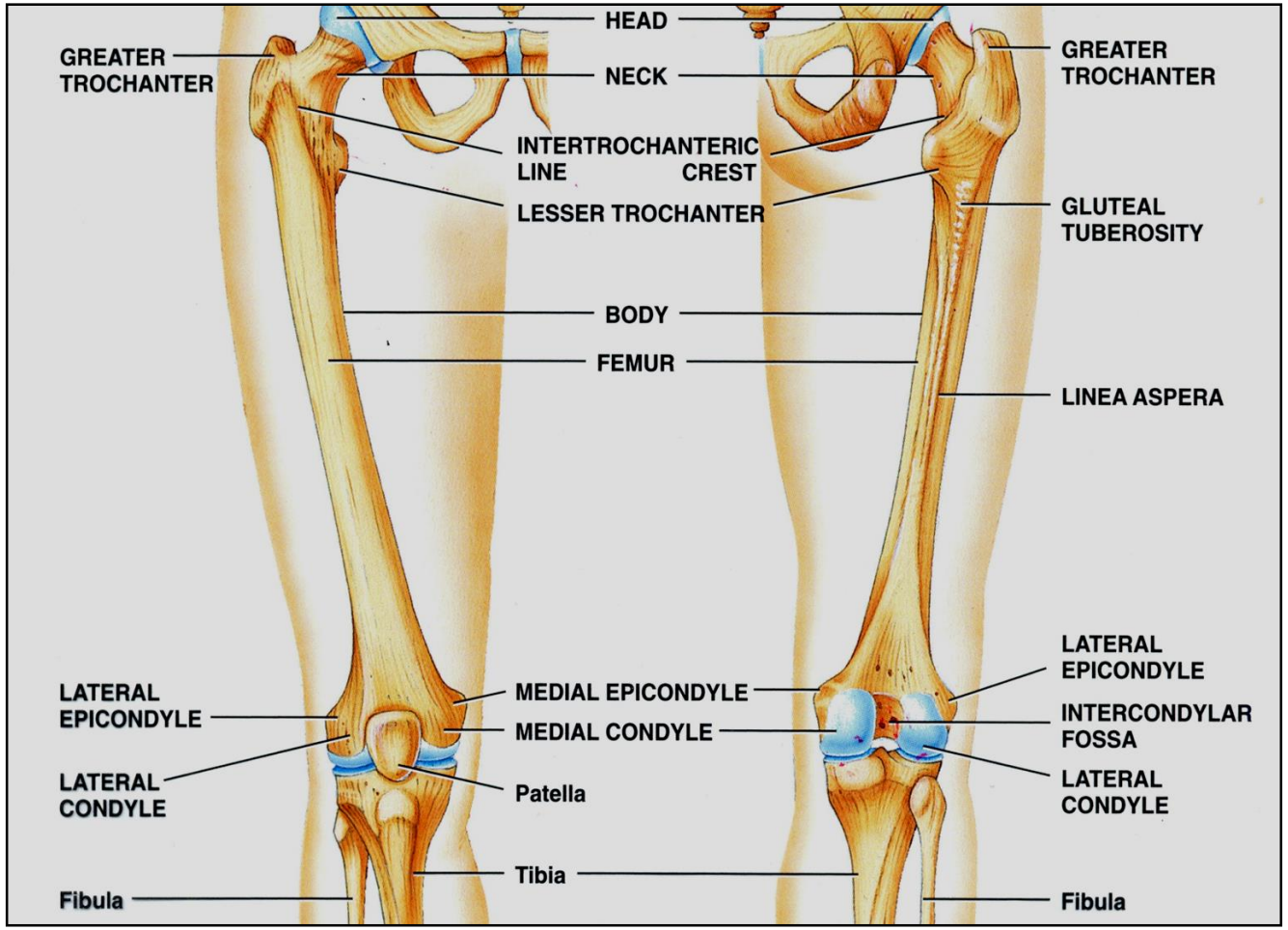


C. Lower end:

* The expanded lower end consists of two large masses, the medial and lateral condyles, which unite anteriorly, but separated posteriorly by the deep intercondylar fossa or notch.

* Anteriorly, the condyles exhibit a broad n-shaped articular surface for articulation with the patella anteriorly and the tibia below.

* Superior to the medial and lateral condyles, are the medial, and lateral epicondyles, respectively.

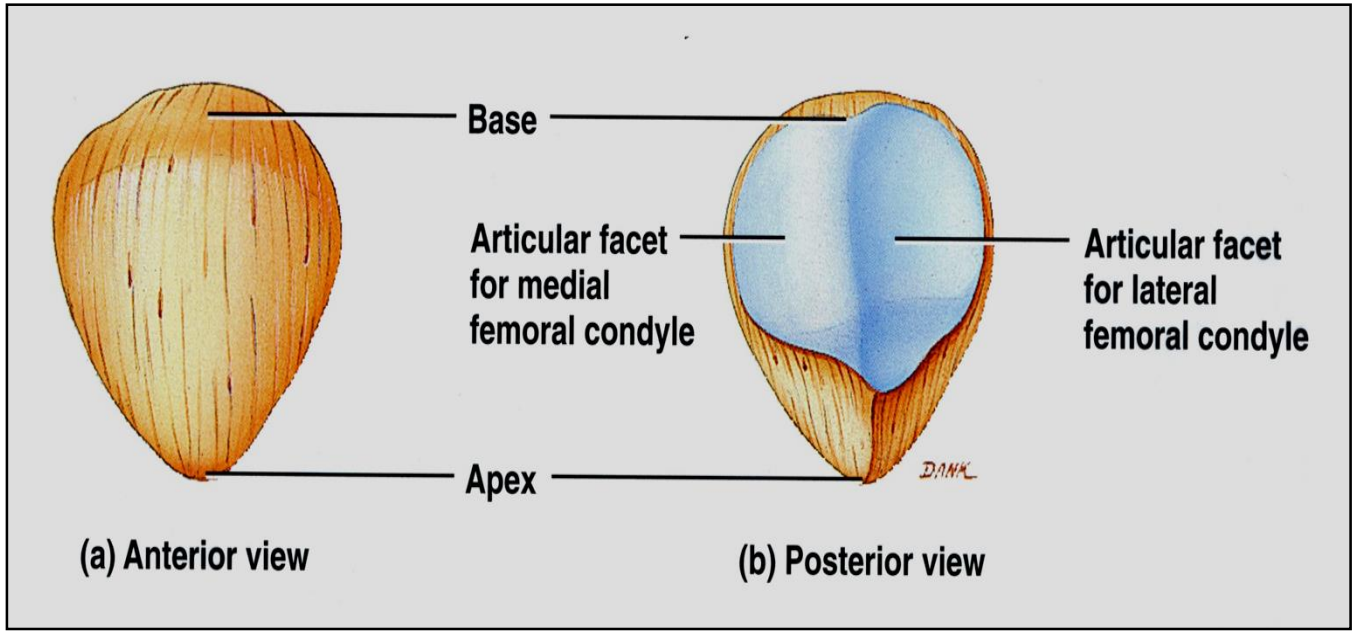


3. The Patella

* The patella is a triangular sesamoid bone (bone inside tendon), located in front of the knee joint.

* The base of the patella forms the upper border, whereas the apex is pointed inferiorly.

* The posterior surface contains two articular facets, for articulation with the medial and lateral condyles of the femur (in knee joint).



4. The Tibia

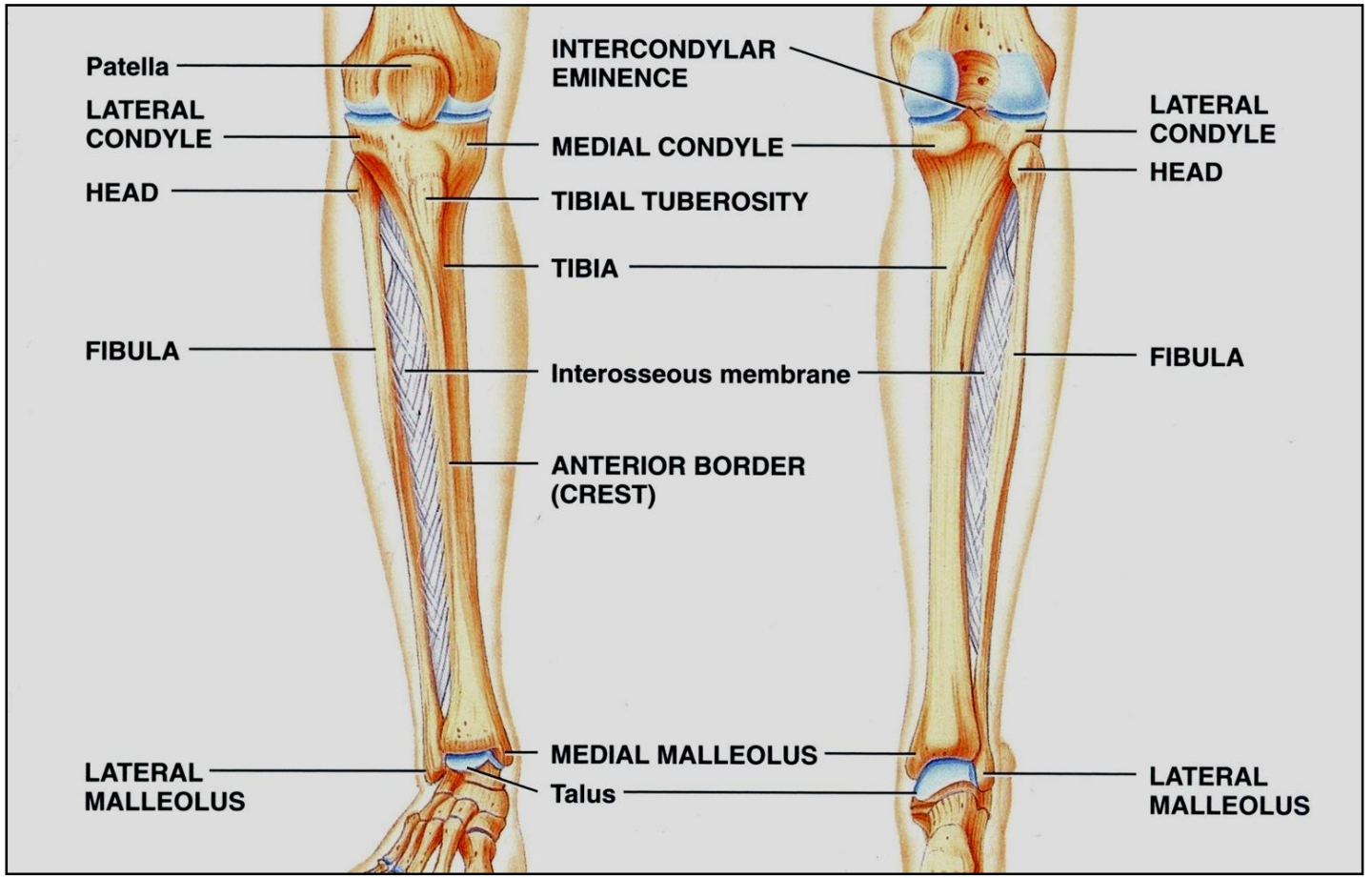
* The tibia is the medial, larger, and much stronger one of the two bones of the leg.

A. Upper end:

* Shows the medial and lateral condyles.

* The medial condyle is relatively larger than the lateral one.

* The upper surface of each condyle is smooth and articulates with the corresponding condyle of femur (in the knee joint).

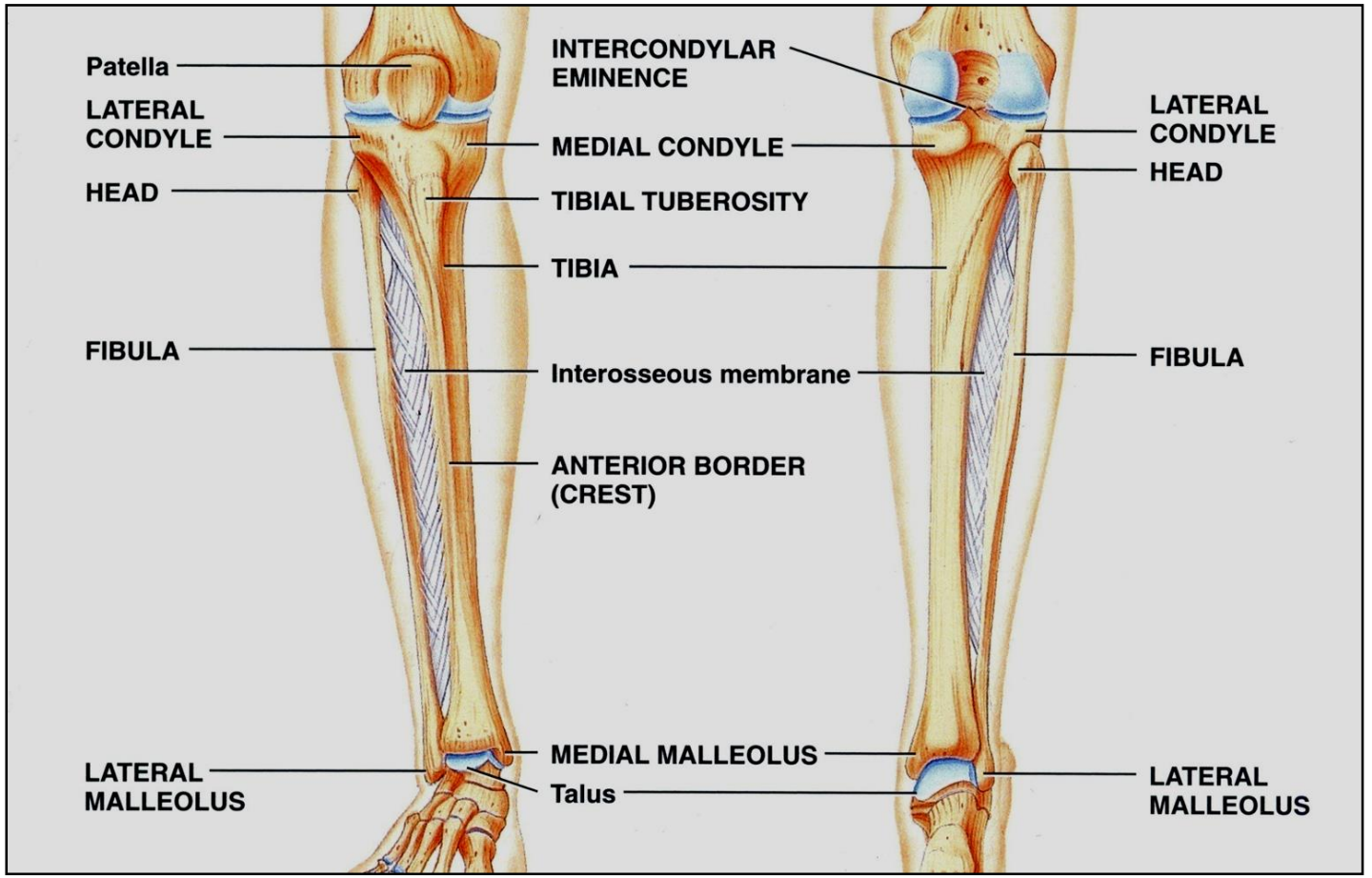


* On the posterior aspect of the lateral condyle there is a facet for articulation with the head of fibula forming the superior tibio-fibular joint.

B. Shaft:

* The tibial tuberosity lies at the upper end of anterior border of the shaft.

* The lateral border is sharp and is called the interosseous border to which the interosseous membrane is attached.

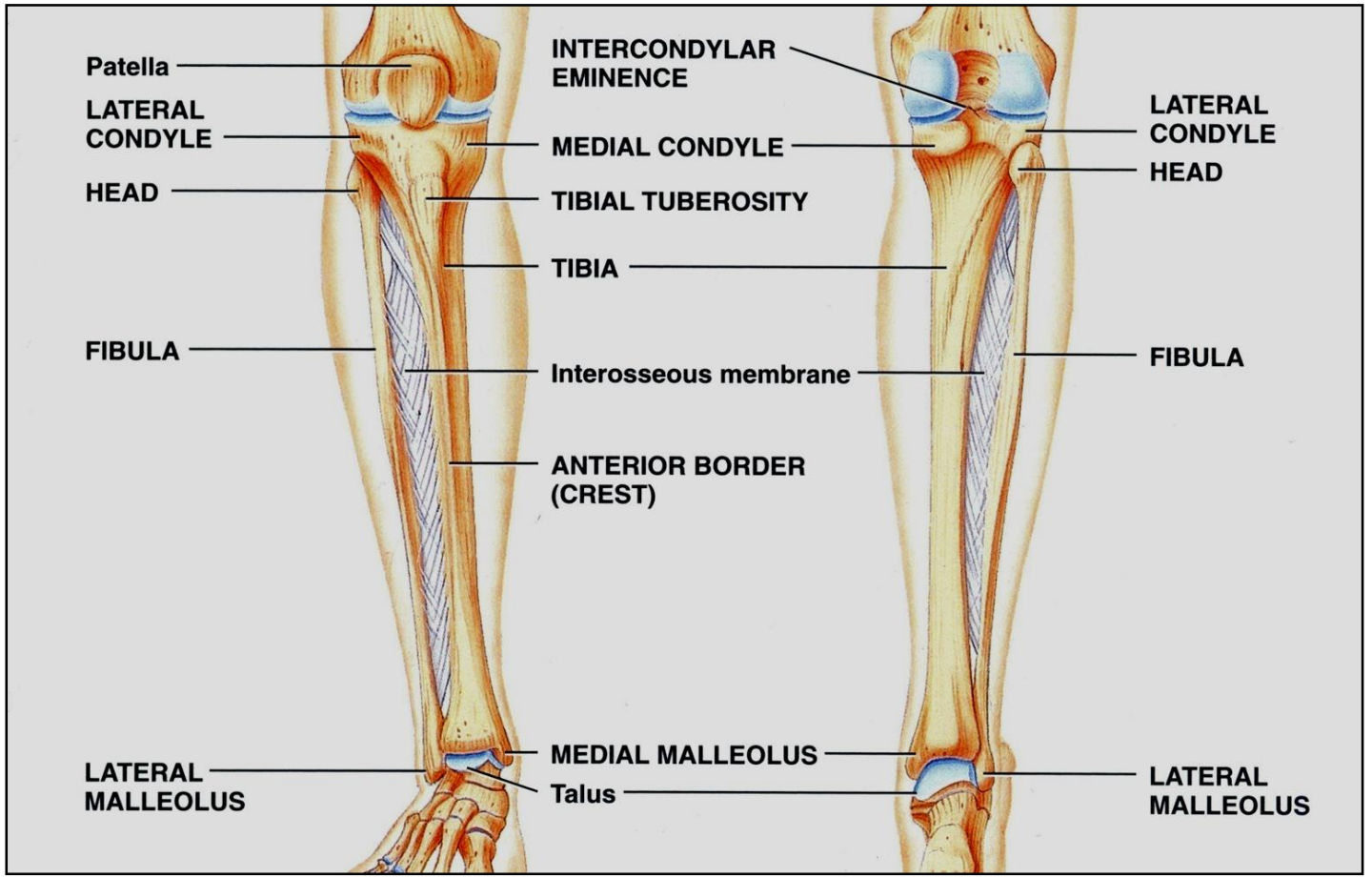


C. Lower end:

* The medial aspect of the lower end presents inferiorly the **medial malleolus.** This forms the prominence on medial aspect of ankle.

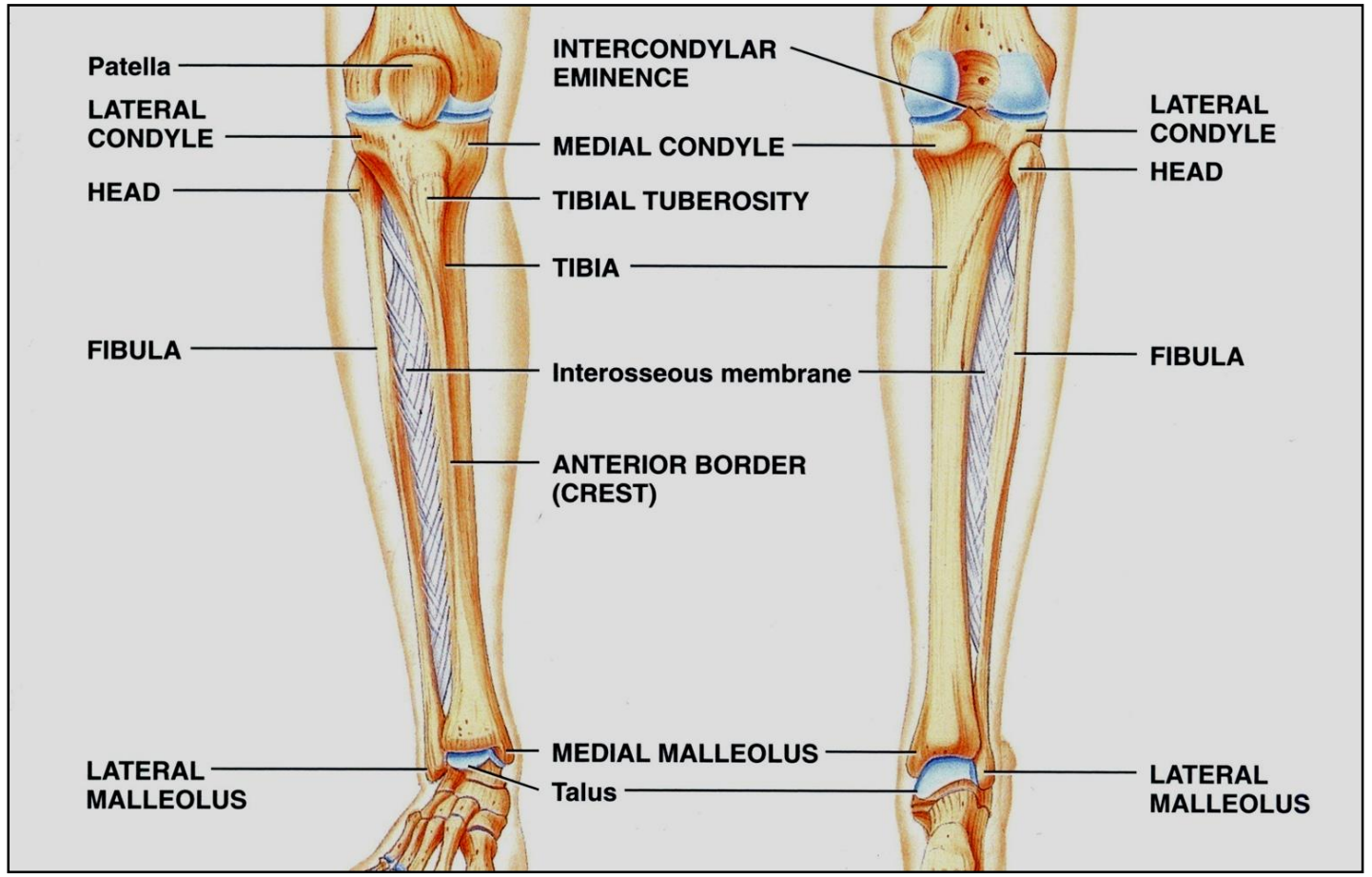
* The inferior surface of this end articulates with talus bone (in ankle joint).

* On the lateral aspect of lower end, there is a rough depression, the **fibular notch,** to which the lower end of fibula articulates forming the **inferior tibio-fibular joint.**



5. The Fibula

* The fibula is the lateral bone of the leg.
* It has an upper end (head), shaft, and lower end.
* The medial border of the shaft is called **interosseous border,** to which the interosseous membrane is attached.
* The lower end has a projection, **the lateral malleolus.** This forms the prominence on the lateral aspect of the ankle.



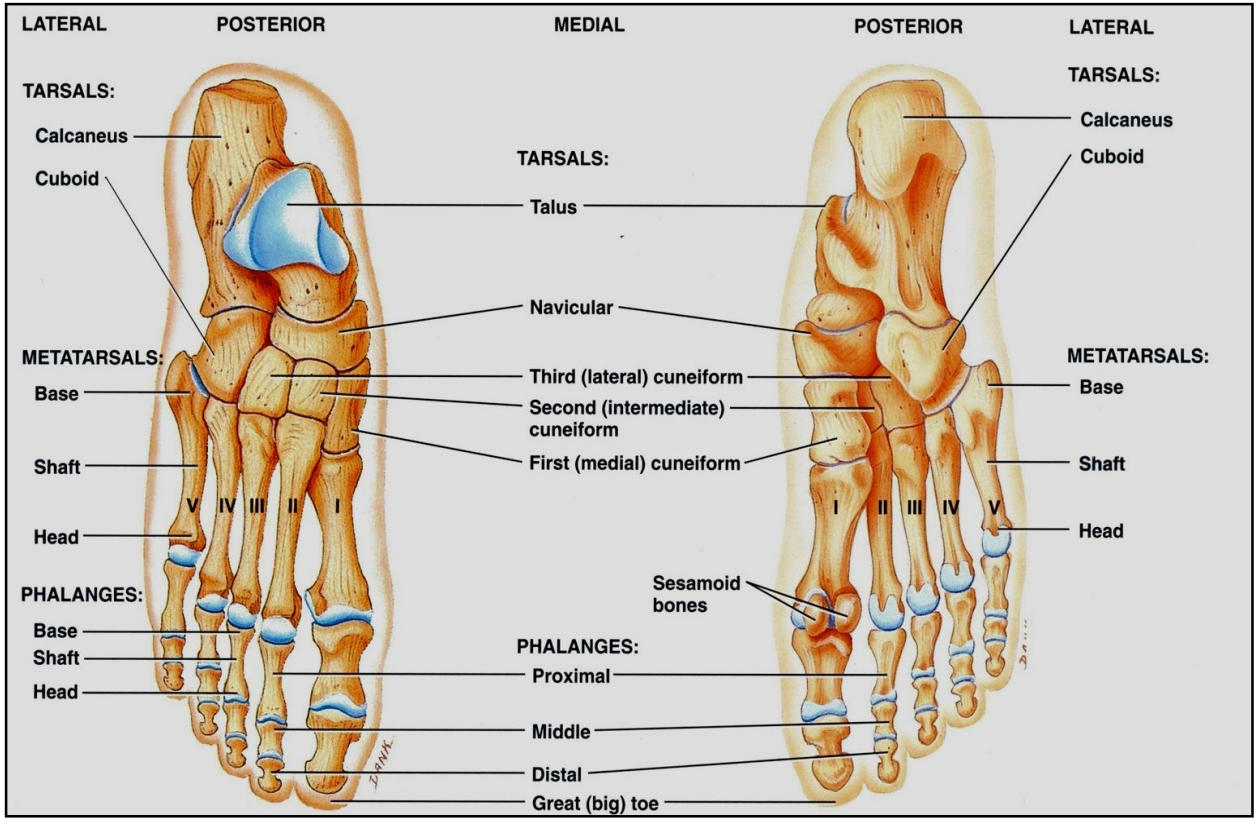
6. Bones of Foot

A. The Tarsal Bones (Tarsus):

* Form the proximal region of foot.

* It consist of two large bones: talus & calcaneus + five smaller bones: cuboid & navicular bones and the medial, intermediate & lateral cuneiform bones.

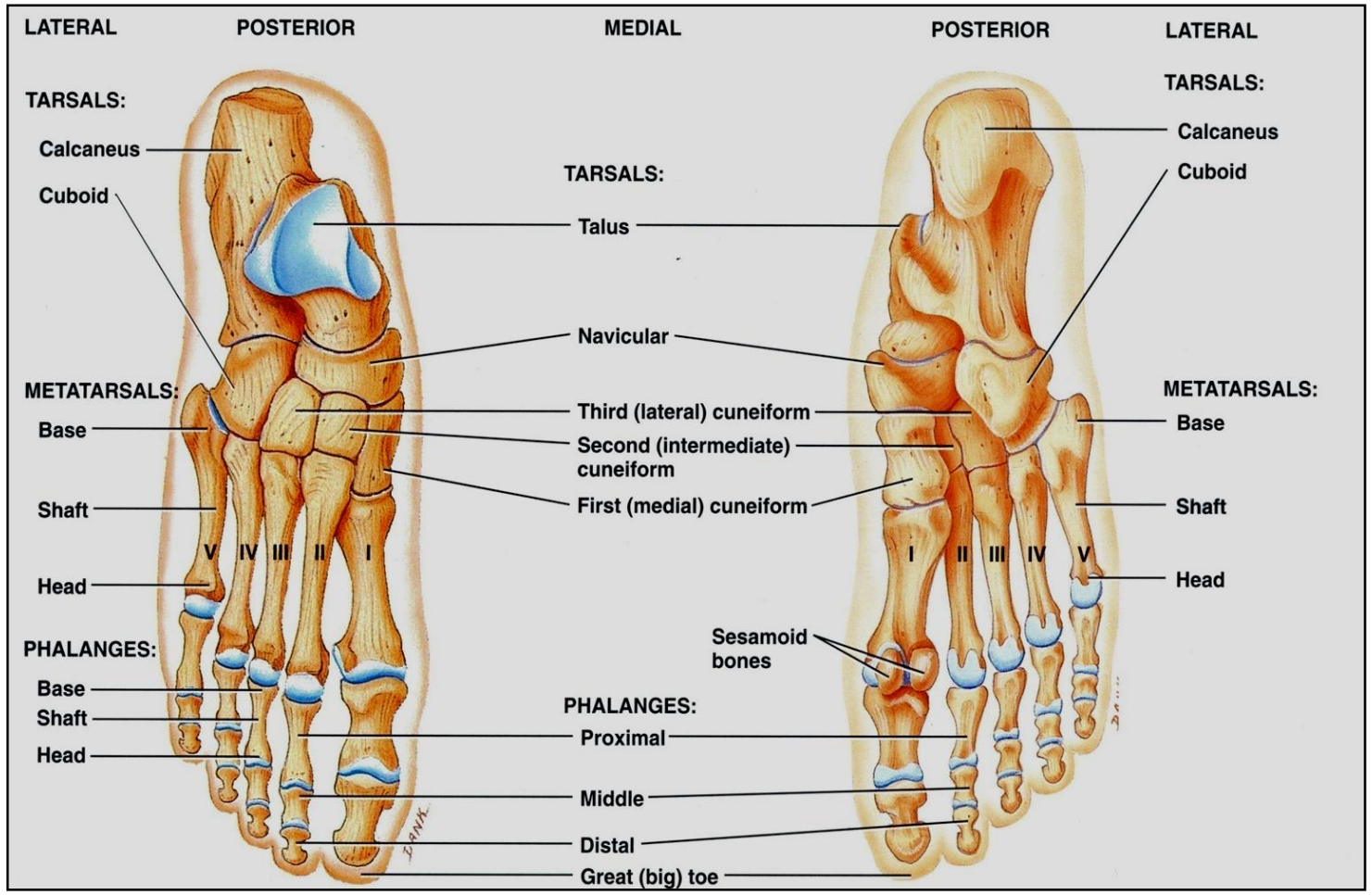
* The talus bone articulates superiorly with lower end of the tibia to form ankle joint, inferiorly with calcaneus, and anteriorly with navicular bone.



* The three cuneiform bones articulate posteriorly with the navicular bone and anteriorly with the 1st, 2nd & 3rd metatarsal bones.

* The cuboid bone articulates posteriorly with calcaneus, medially with lateral cuneiform, and anteriorly with the fourth and fifth metatarsal bones.

* Joints between tarsal bones are called the intertarsal joints.



B. The Metatarsal Bones:

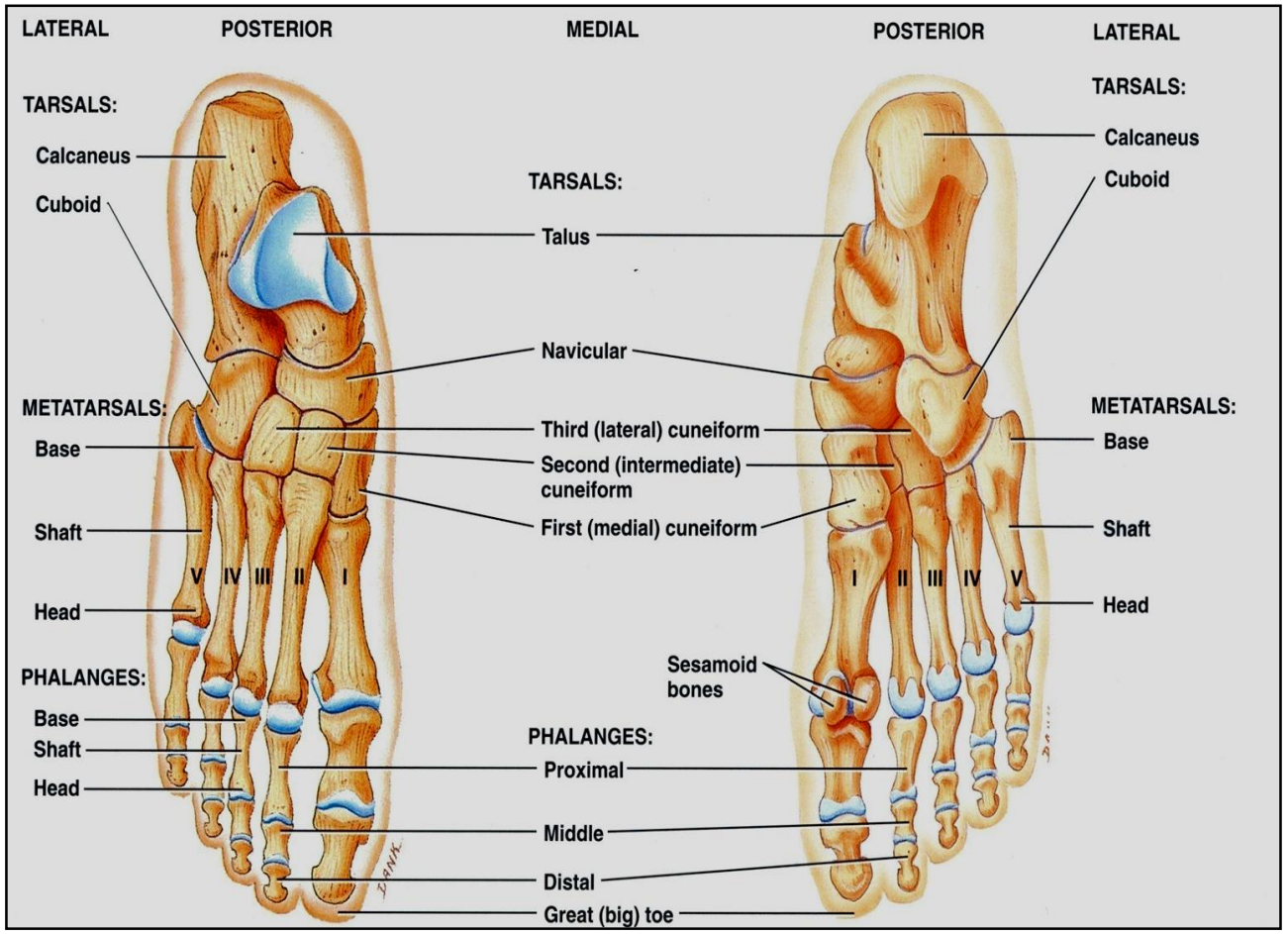
* In each foot there are five metatarsal bones. The 1st one is that of the big toe.

* Each one has a proximal base, a body & a distal head.

C. The Phalanges:

* There are two phalanges in the big toe and three in each one of the lateral four digits.

* Each phalanx has a proximal base, a body & a distal head.



Arches of the Foot

* The tarsal and metatarsal bones are arranged in such a way that they form arches in longitudinal and transverse axes of the foot.

* The function of these arches is to distribute body weight over the soft and hard tissues of the foot.

* Flat foot:

* Bones are held in position by ligaments and muscles tendons.

* Weakness of these ligaments and tendons results in a decrease in the height of the arches.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