# Skeletal System

*Anatomy First Stage*

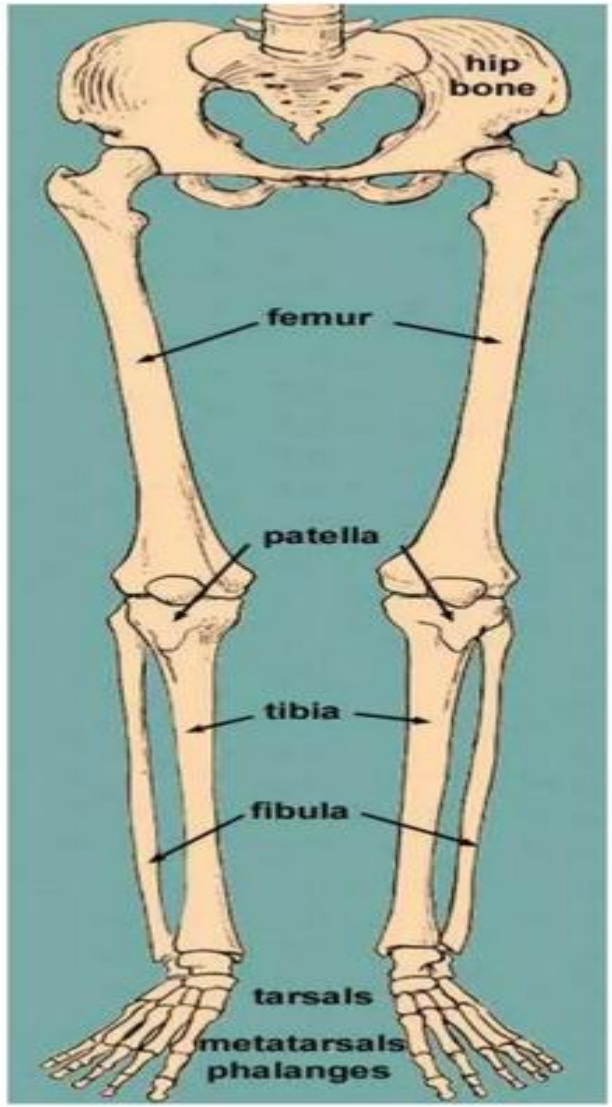
*Lec....6*

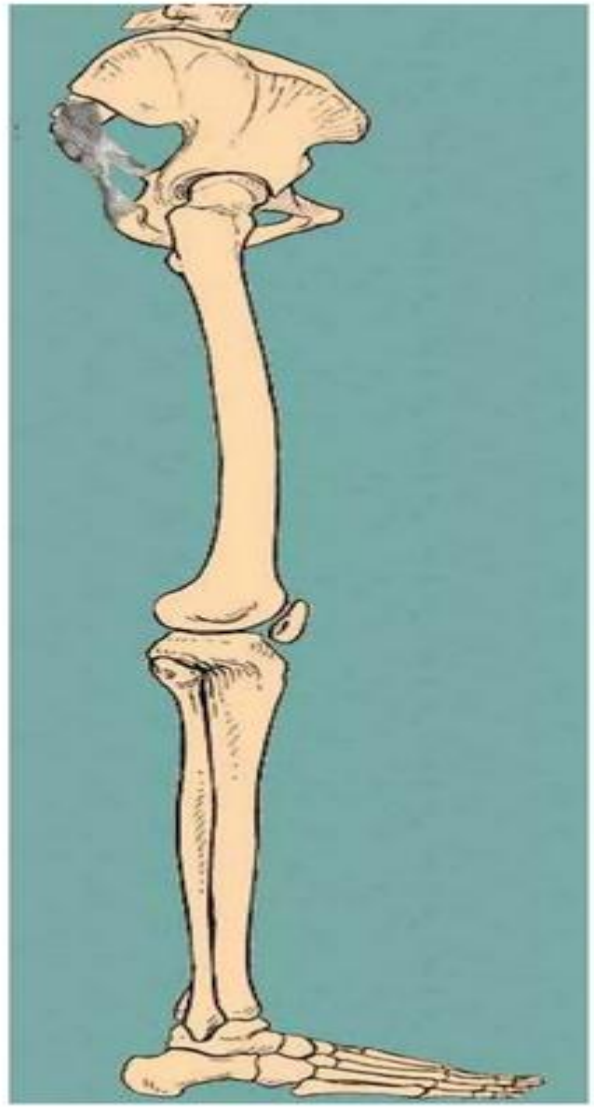
*Dr Hawraa kareem*

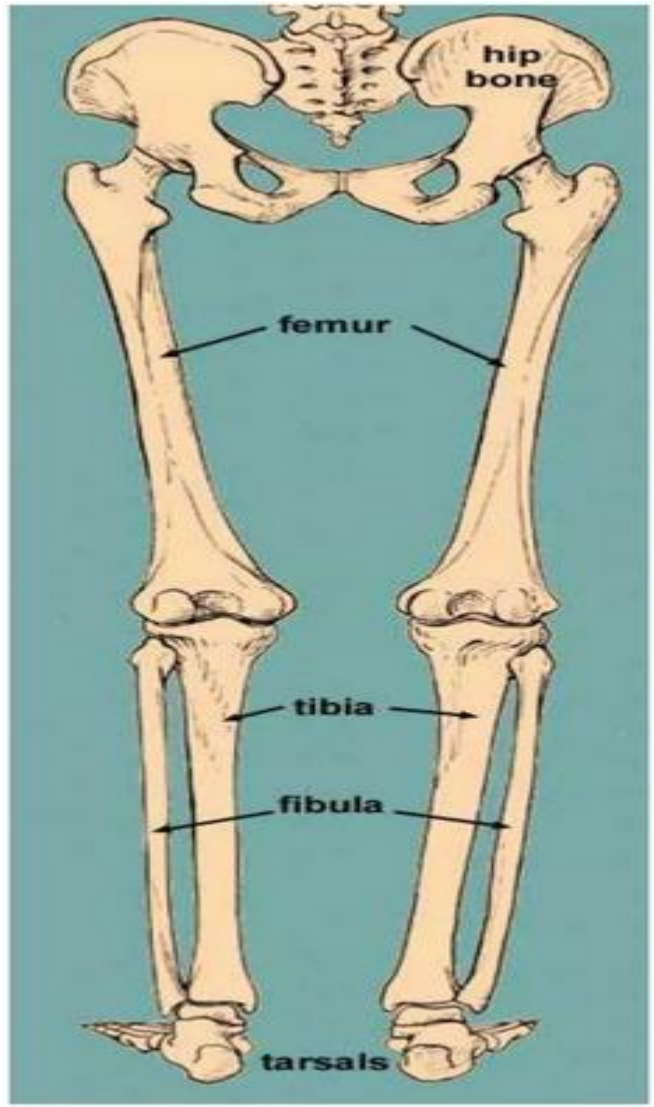
# **Appendicular skeleton** (Bones of lower limbs)

The bones of the lower limb must support the weight of the entire body, thus, these are the largest and heaviest of the bones.

- The lower limb consists of:
  - The Pelvic Girdle
  - The thigh
  - The leg
  - The foot
- Each lower limb is formed by 31 bones.

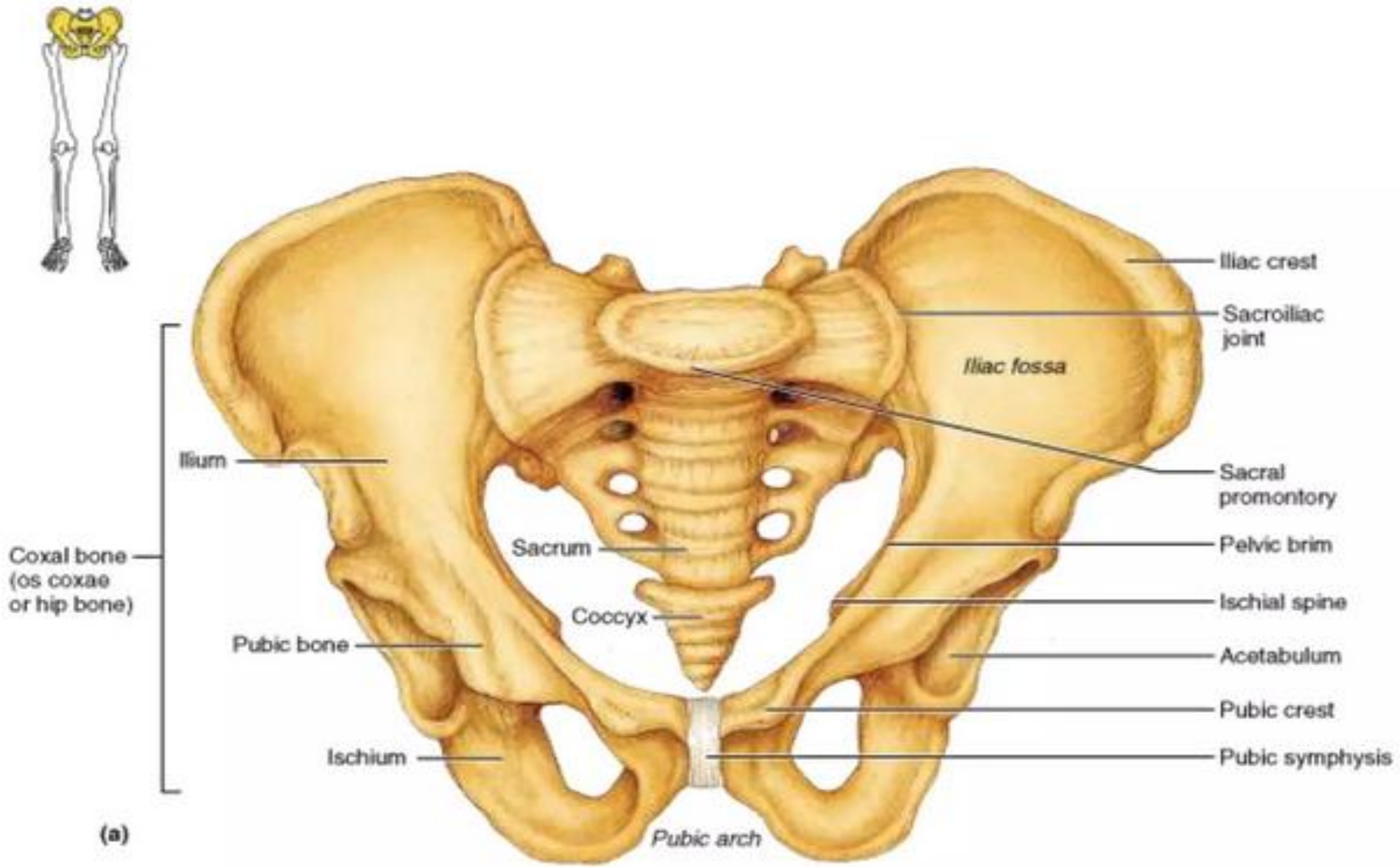

hip bone
femur
patella
tibia
fibula
tarsals
metatarsals
phalanges




hip bone
femur
tibia
fibula
tarsals

# THE PELVIC GIRDLE

- The pelvic girdle attaches the lower limbs to the axial skeleton.
- The attachment of the pelvis to the sacrum is an incredibly stable and strong attachment, unlike the pectoral girdle.
- The socket for the femur (acetabulum) is deep & holds the femur extremely well.
  - Less mobile ball & socket joint than the shoulder.
- Each wing of the pelvic girdle is formed from a bone called the coxal bone

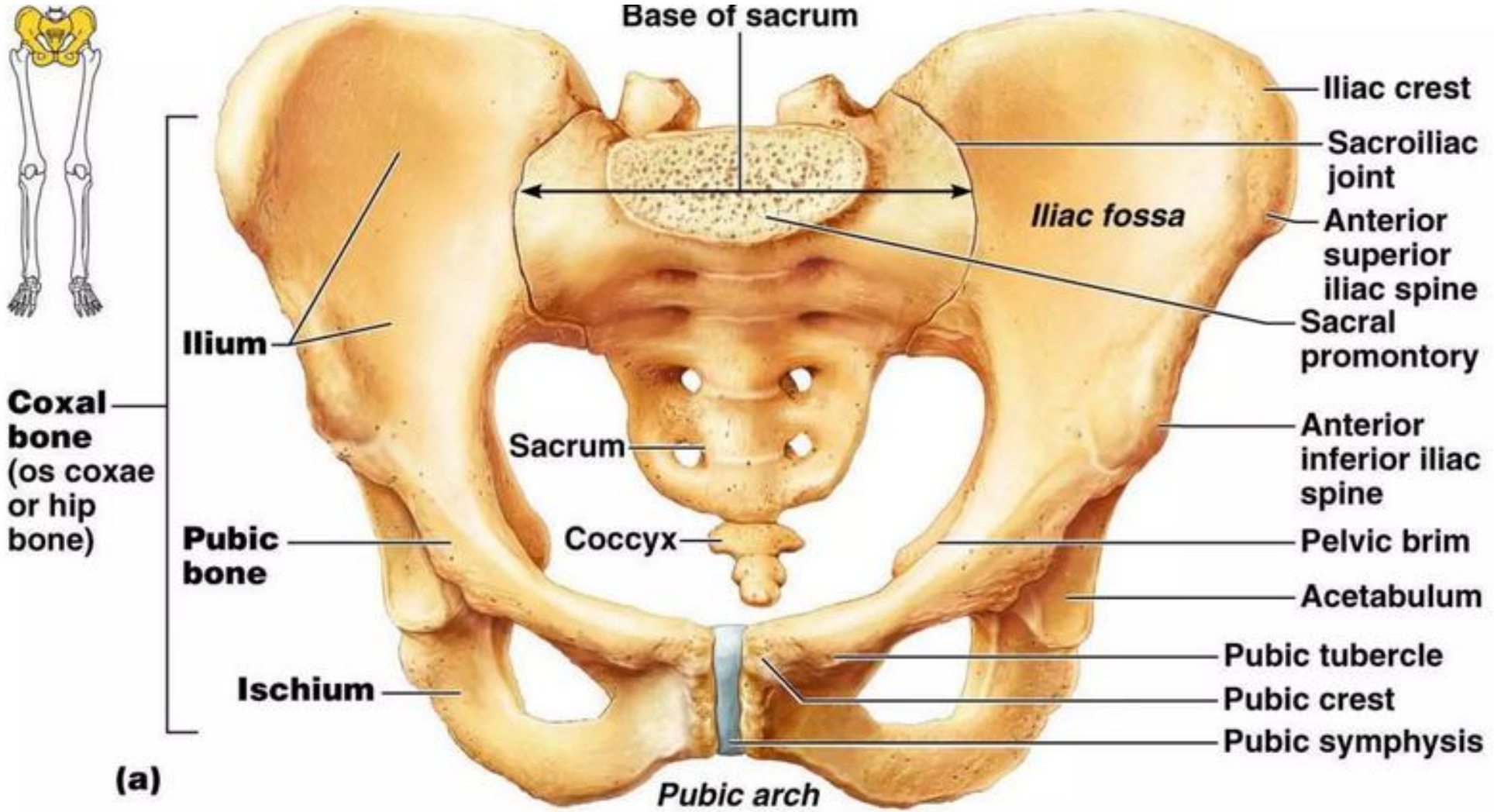

Iliac crest
Sacroiliac joint
Iliac fossa
Sacral promontory
Pelvic brim
Ischial spine
Acetabulum
Pubic crest
Pubic symphysis
Ilium
Sacrum
Coccyx
Pubic bone
Ischium
Pubic arch
Coxal bone (os coxae or hip bone)
(a)

# Pelvic Girdle

- Consists of paired hip bones (coxal bones)
- Hip bones unite anteriorly with each other
- Articulates posteriorly with the sacrum

## Bony Pelvis

- deep, basin-like structure
- Formed by – Coxal bones, sacrum, and coccyx


Base of sacrum
Iliac crest
Sacroiliac joint
Iliac fossa
Anterior superior iliac spine
Sacral promontory
Ilium
Coxal bone (os coxae or hip bone)
Sacrum
Anterior inferior iliac spine
Pubic bone
Coccyx
Pelvic brim
Acetabulum
Pubic tubercle
Ischium
Pubic crest
Pubic symphysis
(a)
Pubic arch

# Coxal Bones

- Consist of three separate bones in childhood
  - Ilium, ischium, and pubis
- Bones fuse – retain separate names to regions of the coxal bones
- Acetabulum – A deep hemispherical socket on lateral pelvic surface

# Ilium

- Large, flaring bone
- Forms the superior region of the coxal bone
- Site of attachment for many muscles
- Articulation with the sacrum forms sacroiliac joint

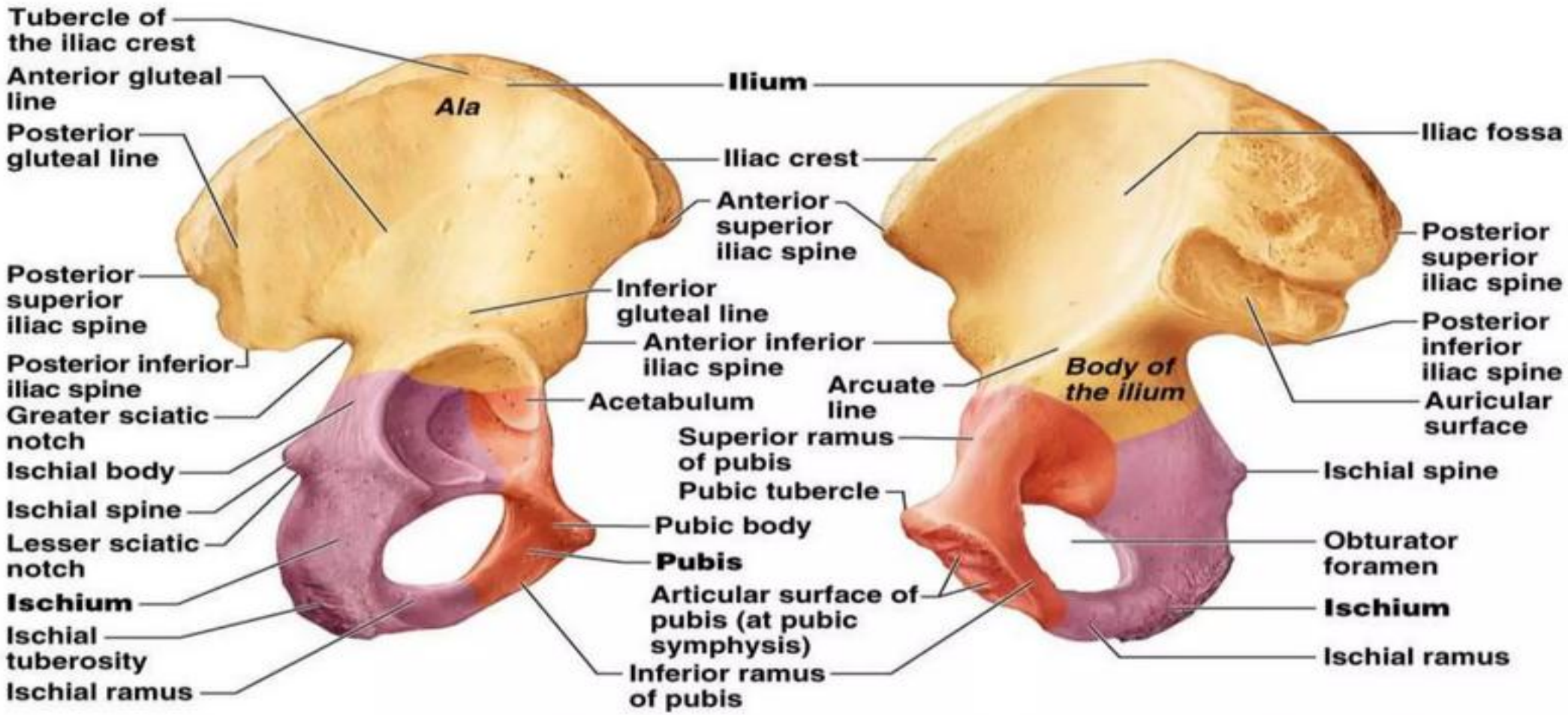
# Ischium

- Forms posteroinferior region of the coxal bone
- Anteriorly – joins the pubis
- Ischial tuberosities – Are the strongest part of the hip bone

# Pubis

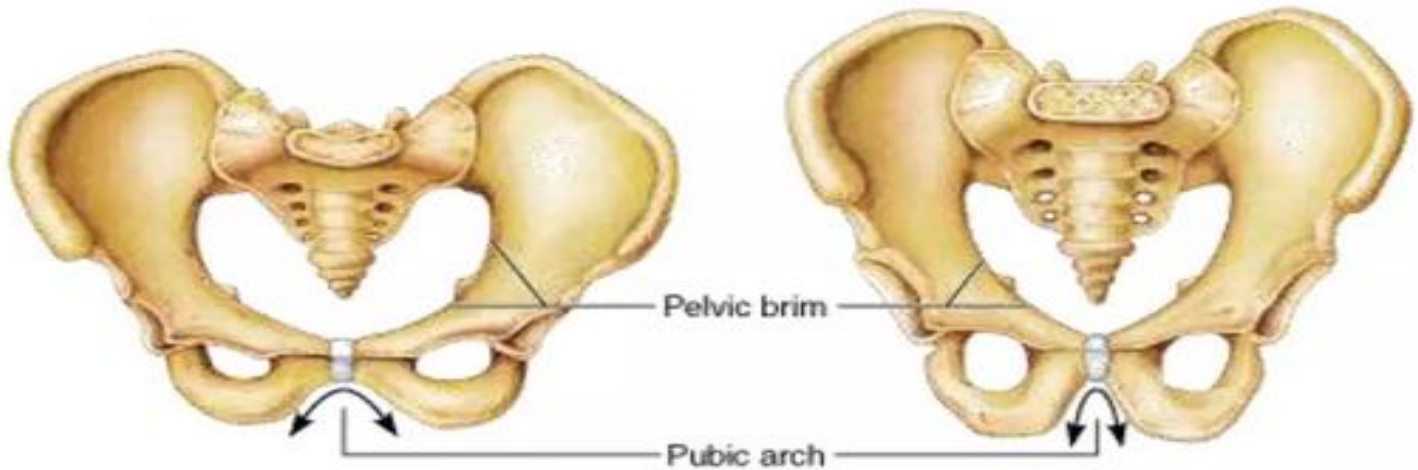
- Forms the anterior region of the coxal bone
- Lies horizontally in anatomical position
- Pubic symphysis
    - The two pubic bones are joined by fibrocartilage at the midline

# Lateral and Medial Views of the Hip Bone



# FEMALE VS. MALE PELVIS

**TABLE 7.4 Comparison of the Male and Female Pelves**

| *Characteristic* | *Female* | *Male* |
|---|---|---|
| General structure and functional modifications | Tilted forward; adapted for childbearing; true pelvis defines the birth canal; cavity of the true pelvis is broad, shallow, and has a greater capacity | Tilted less far forward; adapted for support of a male's heavier build and stronger muscles; cavity of the true pelvis is narrow and deep |
| Bone thickness | Less; bones lighter, thinner, and smoother | Greater; bones heavier and thicker, and markings are more prominent |
| Acetabula | Smaller; farther apart | Larger; closer |
| Pubic arch/angle | Broader (80–90°); more rounded | More acute (50–60°) |
| Anterior view |   | |
| Sacrum | Wider; shorter; sacral curvature is accentuated | Narrow; longer; sacral promontory more ventral |
| Coccyx | More movable; straighter | Less movable; curves ventrally |

# Female and Male Pelves

TABLE 8.2 Comparison of the Male and Female Pelves

| Characteristic | Female | Male |
|---|---|---|
| Pelvic inlet (brim) | Wider; oval from side to side | Narrow; basically heart-shaped |
| Pelvic outlet | Wider; ischial tuberosities shorter, farther apart, and everted | Narrower; ischial tuberosities longer, sharper, and point more medially |
| Posteroinferior view |  |  |

TABLE

## 8.2 Comparison of the Male and Female Pelves

| Characteristic | Female | Male |
|---|---|---|
| Sacrum | Wider; shorter; sacral curvature is accentuated | Narrow; longer; sacral promontory more ventral |
| Coccyx | More movable; straighter | Less movable; curves ventrally |
| Greater sciatic notch | Wide and shallow | Narrow and deep |
| Left lateral view |  |  |

# Thigh

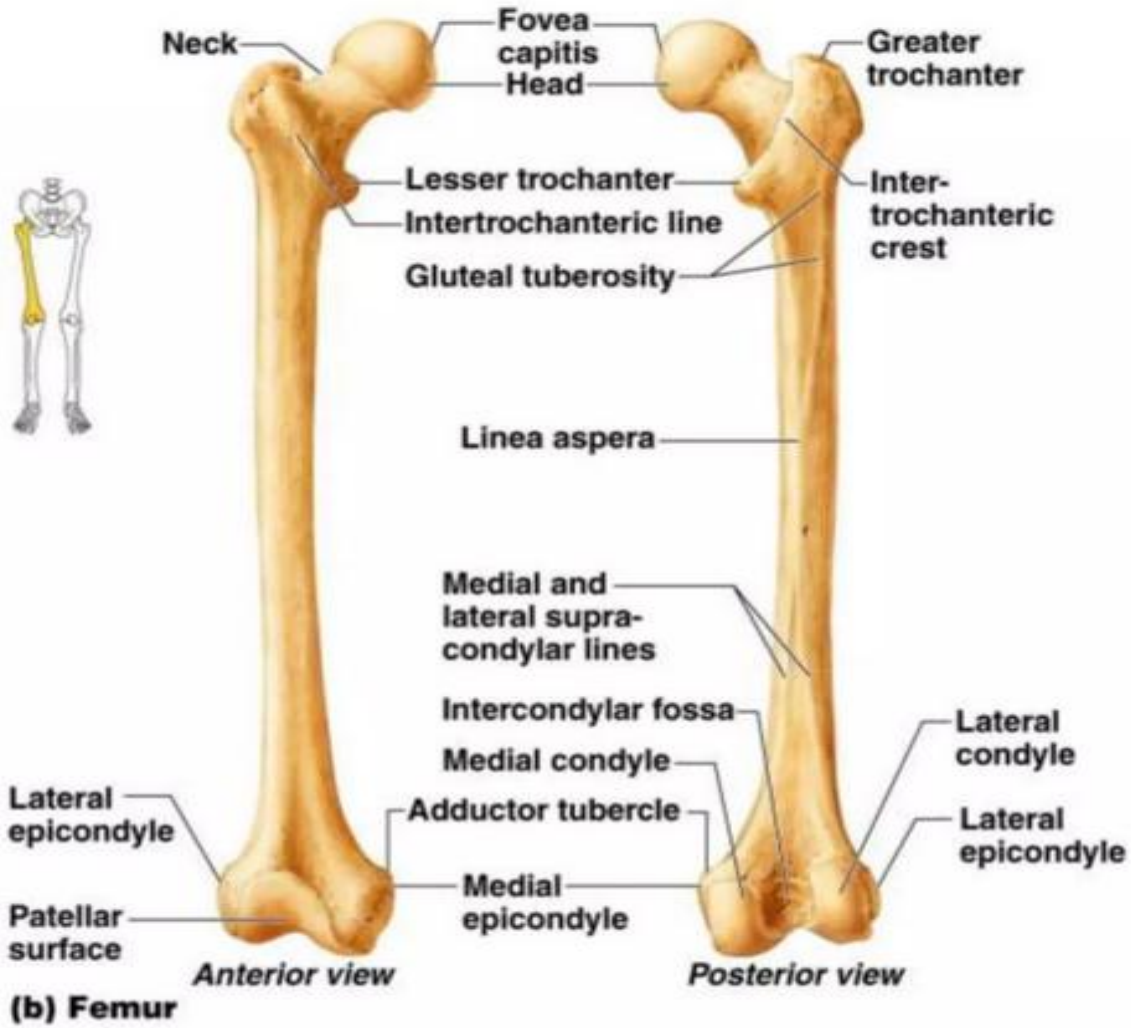
- The region of the lower limb between the hip and the knee
- Femur – the single bone of the thigh

# Patella

- Triangular sesamoid  bone
- Imbedded in the tendon that secures the quadriceps muscles
- Protects the knee anteriorly
- Improves leverage of the thigh muscles across the knee

# The Femur

- Longest and strongest bone of the body
- Ball-shaped head articulates with the acetabulum



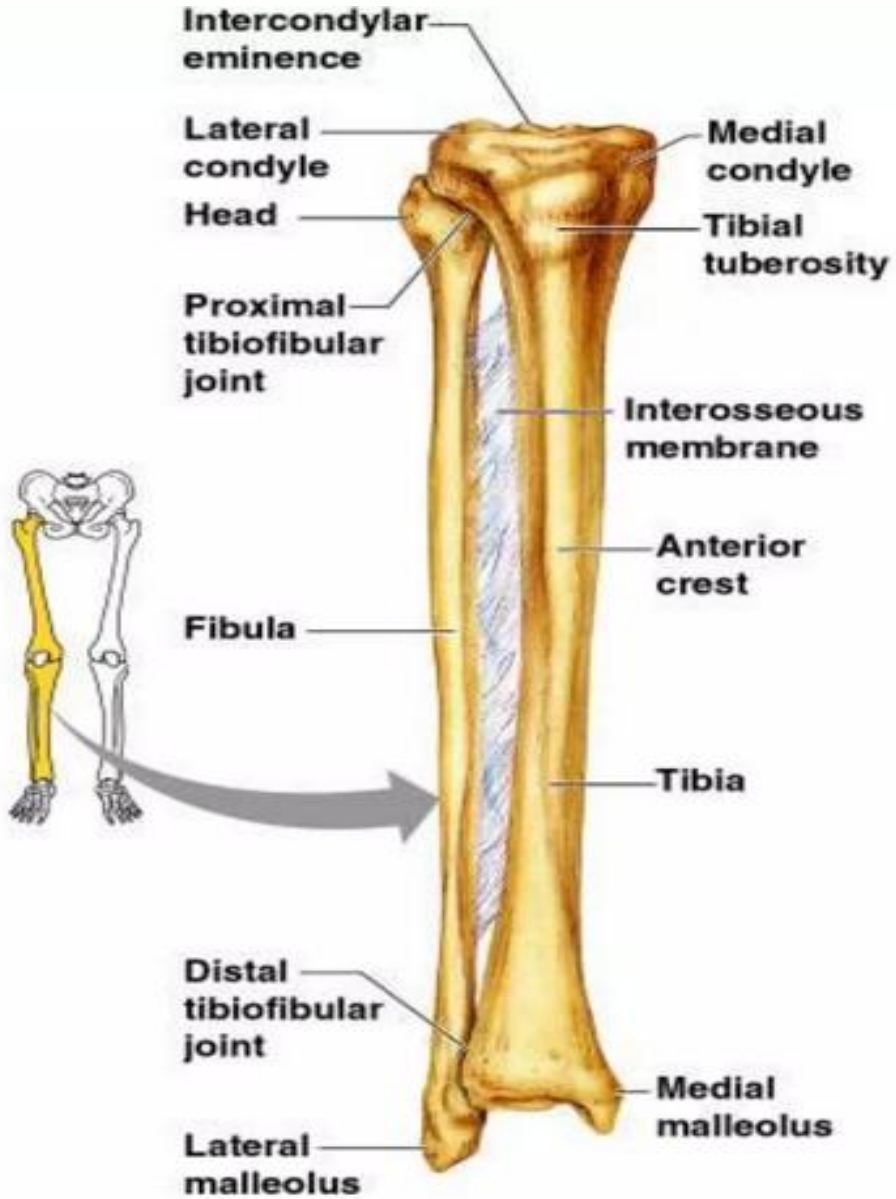
# Leg

- Refers to the region of the lower limb between the knee and the ankle
- Composed of the tibia and fibula
  - Tibia – more massive medial bone of the leg
- Receives weight of the body from the femur
  - Fibula – stick-like lateral bone of the leg
- Interosseous membrane
  - Connects the tibia and fibula PLAY Knee

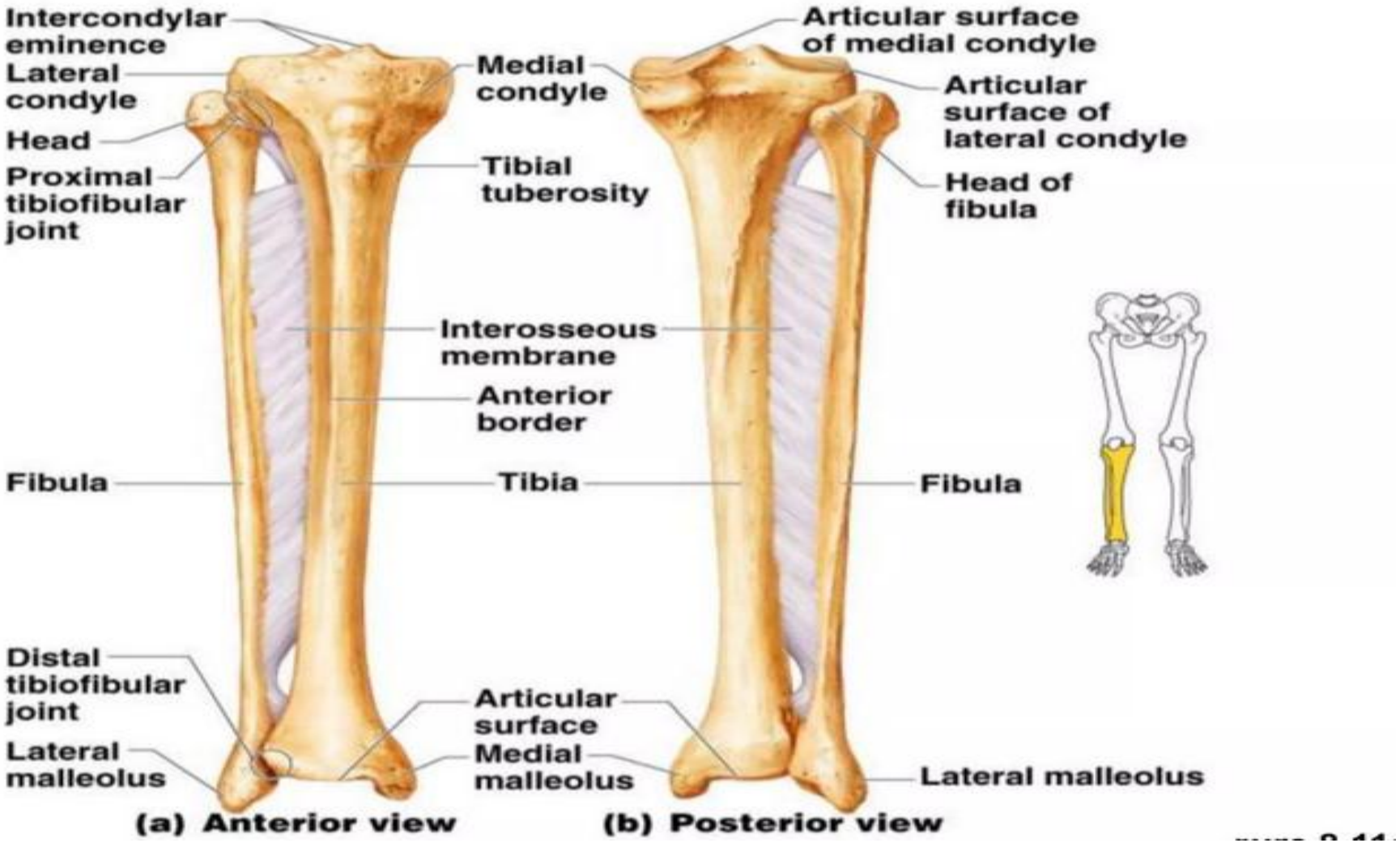
- Tibia articulates with femur at superior end
  - Forms the knee joint
- Tibia articulates with talus at the inferior end
  - Forms the ankle joint
- Fibula does not contribute to the knee joint
  - Stabilizes the ankle joint

# Bones of the Leg

- The leg has two bones
  - Tibia
  - Fibula



# Structures of the Tibia and Fibula



# The Foot

- Foot is composed of
  - Tarsus, metatarsus, and the phalanges
- Important functions
  - Supports body weight
  - Acts as a lever to propel body forward when walking
  - Segmentation makes foot pliable and adapted to uneven ground

# Tarsus

- Makes up the posterior half of the foot
- Contains seven bones called tarsals
- Body weight is primarily borne by the talus and calcaneus

# Metatarsus

- Consists of five small long bones called metatarsals
- Numbered 1–5 beginning with the hallux (great toe)
- First metatarsal supports body weight

# Phalanges of the Toes

- 14 phalanges of the toes
  - Smaller and less nimble than those of the fingers
  - Structure and arrangement are similar to phalanges of fingers
  - Except for the great toe, each toe has three phalanges
- Proximal, middle, and distal

# Bones of the Foot

- The foot
  - Tarsus – ankle
  - Metatarsals – sole
  - Phalanges – toes

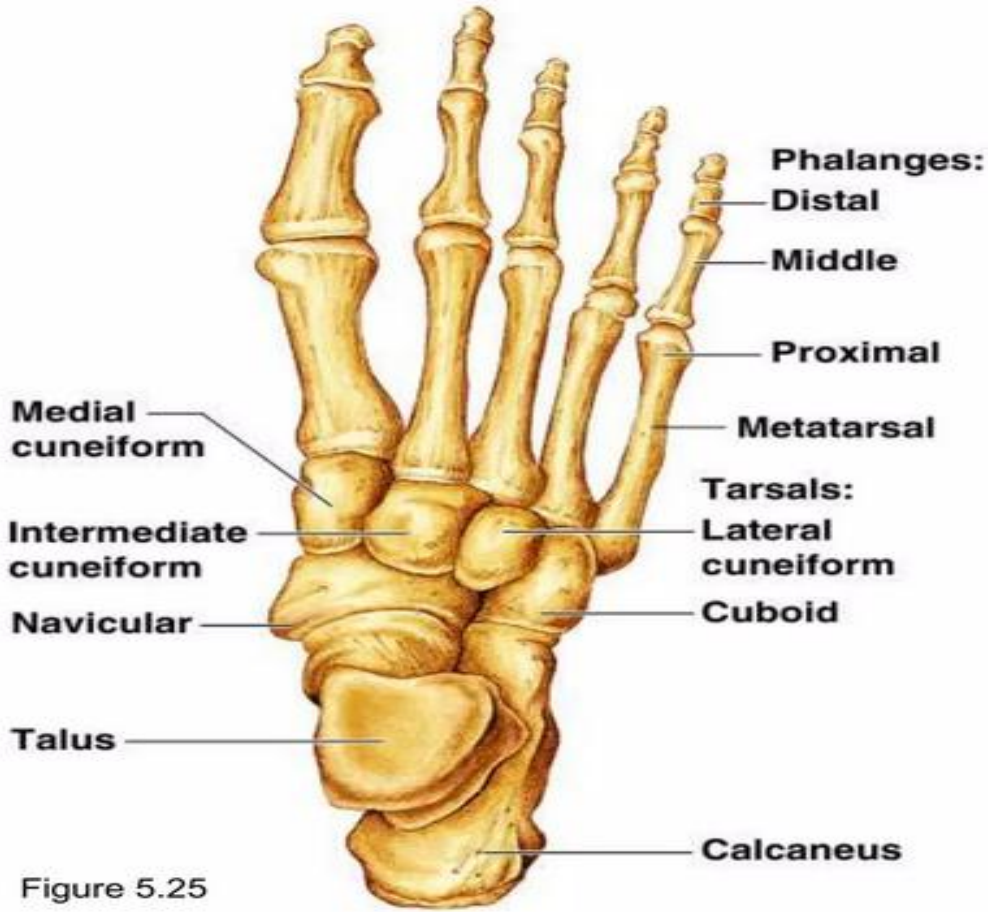
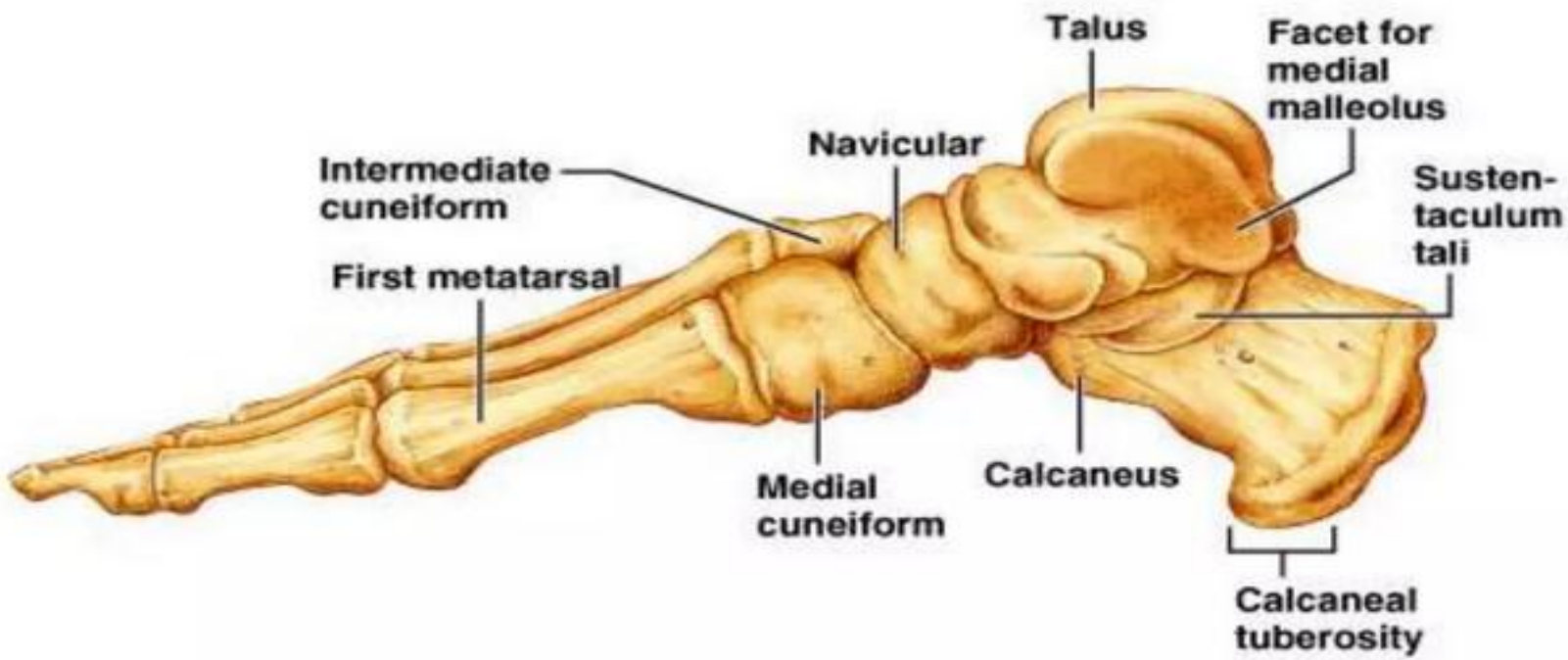



Figure 5.25

# Bones of the Foot




(b) Medial view