

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIAC TECHNOLOGY

COURSE NAME: ANATOMY RELATED TO CARDIAC TECHNOLOGY

UNIT : 1

TOPIC : OESTEOLGY- LOWER LIMB

FACULTY NAME: Ms. HARSHITHA S

Definition

INTRODUCTION (Define)

- Osteology is the study of bones.
- The bony and cartilaginous framework of the body constitutes the skeleton.
- The human skeleton is internal to muscles, so it is described as an endoskeleton.
- In lower animals such as insects, the muscles are attached to the inner aspects of rigid material which also offers protection-this type of skeleton is called an exoskeleton.

- It forms the structural framework of the body
 - Skeleton includes bones, cartilage and joints.
 - It is bilaterally symmetrical.
 - It can be studied in two parts
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- **Axial skeleton:** This includes bones of head (skull), vertebral column, ribs, and sternum.
 - Hyoid bone is also the part of axial skeleton.
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- **Appendicular skeleton:** It consists of bones of extremities, i.e. upper limb and lower limb along with shoulder girdle and pelvic girdle.

Lower Limb Bones

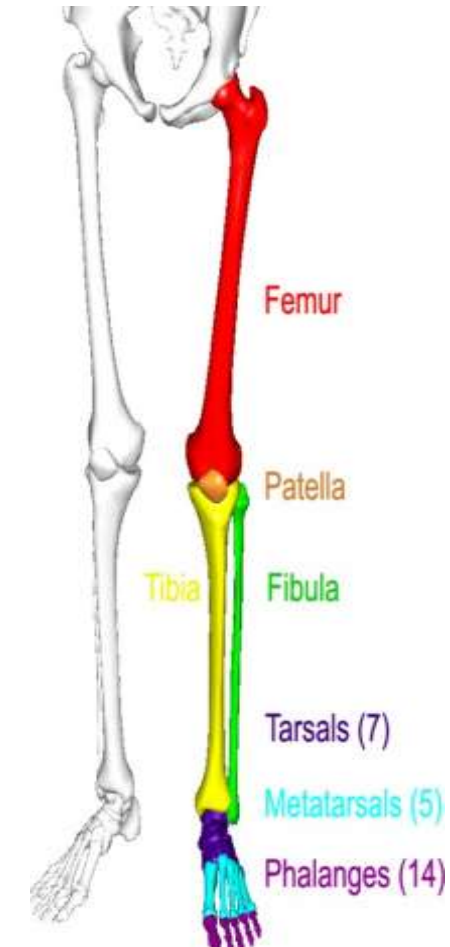
- Overview of the lower limb skeletal system

Functions:

- Support,
- Movement
- Protection

Key divisions

- Hip bone
- femur
- patella
- tibia
- fibula
- foot bones

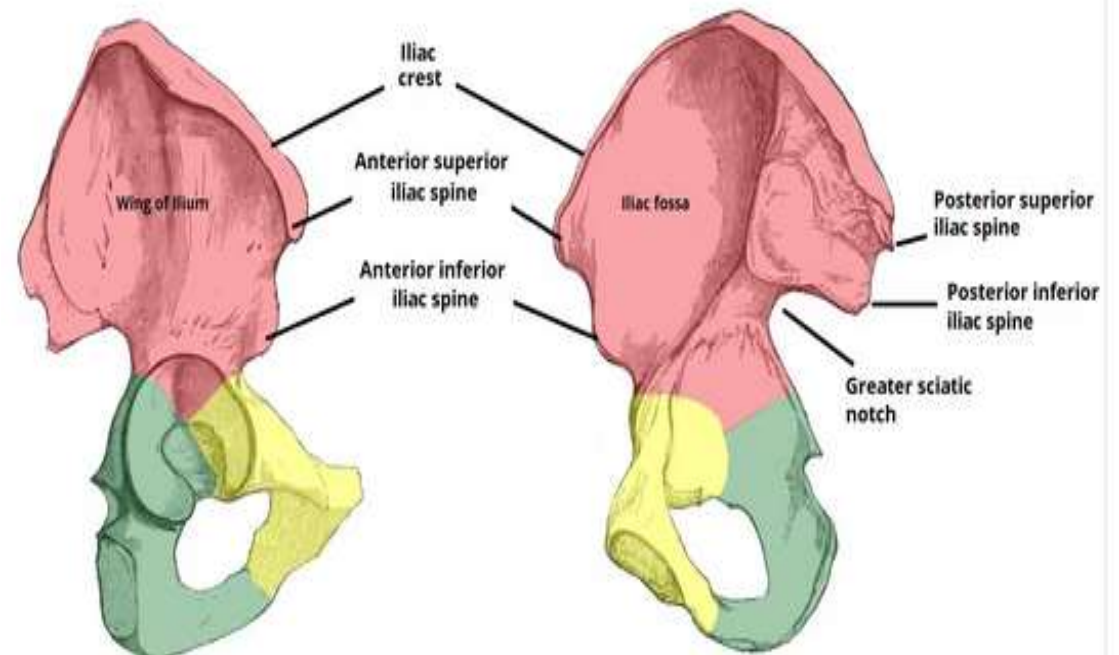


Hip Bone (Pelvis)

- Components:

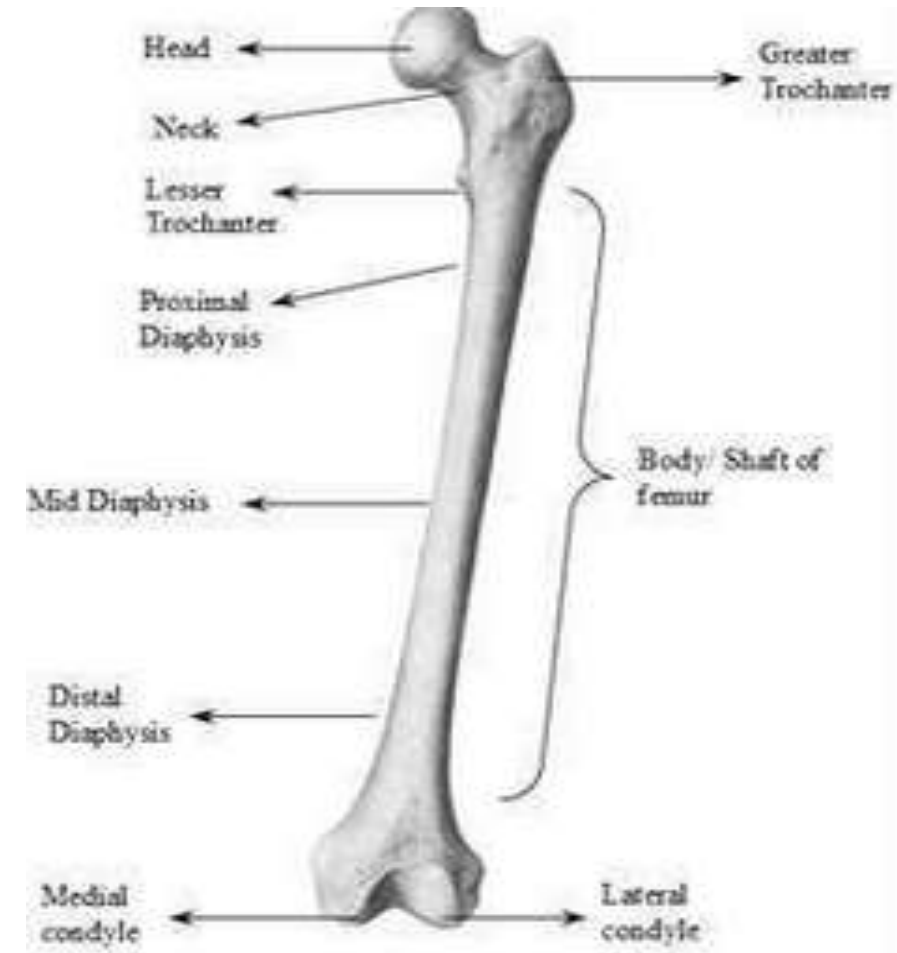
Ilium, Ischium, Pubis

- Ilium: Largest part, forms the superior portion
- Ischium: Supports body weight while sitting
- Pubis: Anterior portion, forms the pubic symphysis
- Acetabulum: Deep socket articulating with the femur
- Sacroiliac joint and pelvic girdle



Femur (Thigh Bone)

- Longest and strongest bone
- Head: Spherical, articulates with acetabulum
- Neck: Narrow, prone to fractures
- Greater & Lesser Trochanters: Muscle attachment
- Shaft: Long, cylindrical
- Condyles: Distal end, knee joint articulation



Patella (Kneecap)

- Sesamoid bone embedded in quadriceps tendon
- Function: Protects knee joint, improves leverage
- Articulation with femur (patellofemoral joint)



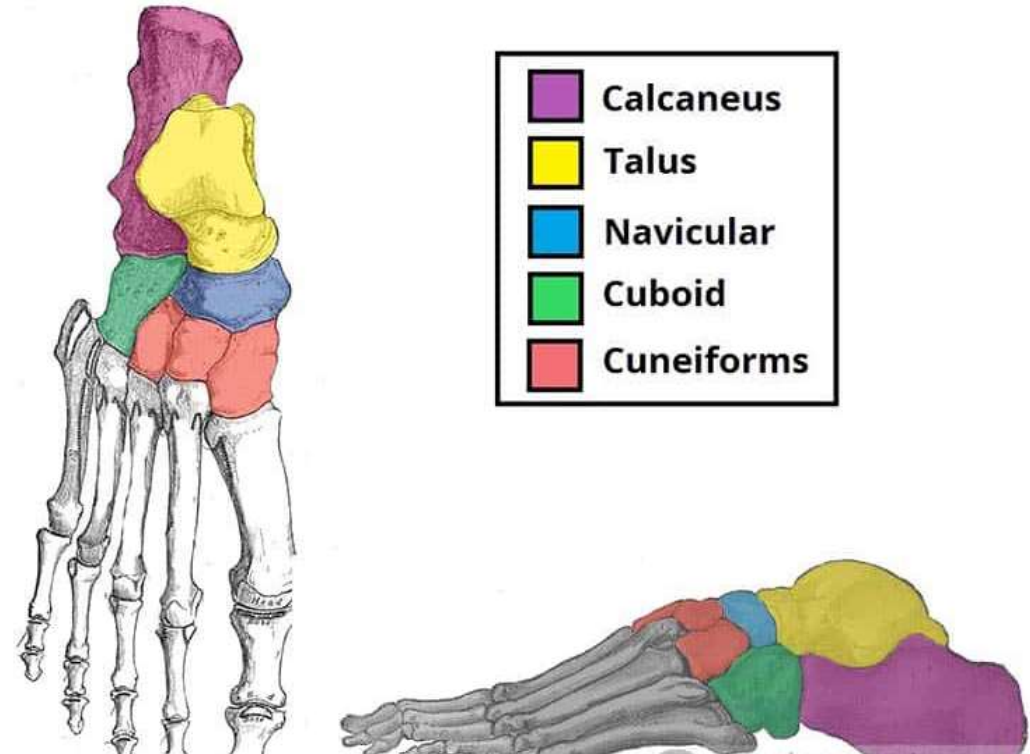
Tibia and Fibula (Leg Bones)

- Tibia: Weight-bearing, medial malleolus at ankle
- Fibula: Non-weight-bearing, lateral malleolus
- Proximal ends articulate with knee joint



Foot Bones

- Tarsals: 7 bones - Calcaneus, Talus, Navicular, Cuboid, 3 Cuneiforms
- Metatarsals: 5 long bones, numbered 1-5
- Phalanges: 14 bones, forming toes (proximal, middle, distal)



Clinical Relevance and Common Injuries (Empathy)



- Hip fractures, ACL tears, ankle sprains
- Osteoporosis and bone density loss
- Arthritis and joint inflammation

SUMMARY TABLE

Bone	Location	Key Features / Landmarks	Articulations	Functions	Clinical Importance
Femur	Thigh (between hip and knee)	Head, neck, greater & lesser trochanters, linea aspera, medial & lateral condyles, intercondylar fossa	- Proximally with acetabulum of hip bone- Distally with tibia & patella	Supports body weight; allows walking & running; major muscle attachment site	Common site of fractures (especially neck of femur in elderly); avascular necrosis risk
Patella	Knee (in front of femur)	Base, apex, anterior & posterior surfaces	- Articulates with femur (patellofemoral joint)	Protects knee joint; increases leverage of quadriceps muscle	Patellar dislocation; fractures common in direct trauma
Tibia	Medial bone of leg (shin bone)	Medial & lateral condyles, tibial tuberosity, anterior crest, medial malleolus	- Proximally with femur & fibula- Distally with talus & fibula	Major weight-bearing bone of leg; forms knee & ankle joints	Commonly fractured; shin splints; Pott's fracture (ankle)
Fibula	Lateral bone of leg	Head, neck, shaft, lateral malleolus	- Proximally with tibia- Distally with talus & tibia	Provides lateral stability to ankle; muscle attachment site	Fibular fractures; important for grafting (non-weight-bearing bone)