

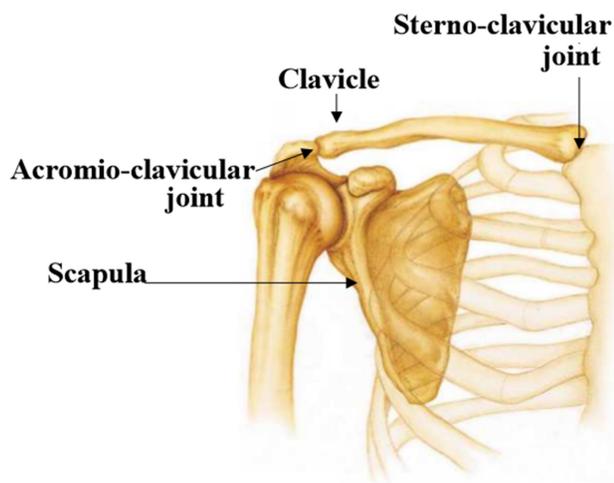
BONES OF THE APPENDICULAR SKELETON

The appendicular skeleton is composed of the 126 bones of the appendages and the pectoral and pelvic girdles, which attach the limbs to the axial skeleton.

UPPER LIMB

Thirty-two (32) separate bones form the bony framework of each upper limb. The paired pectoral girdles each consist of two bones, the anterior clavicle and the posterior scapula.

1. The shoulder (pectoral) girdles function to attach the upper limbs to the axial skeleton. The main bones of shoulder **girdles** including:



A. Clavicle: A slender, doubly-curved bone that joins the sternum to the scapula; serves as an anterior brace, or strut, to hold the arm away from the top of the thorax.

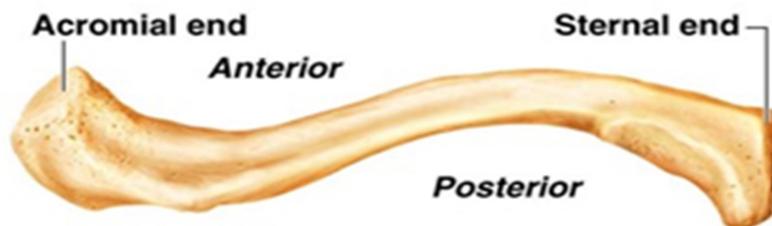


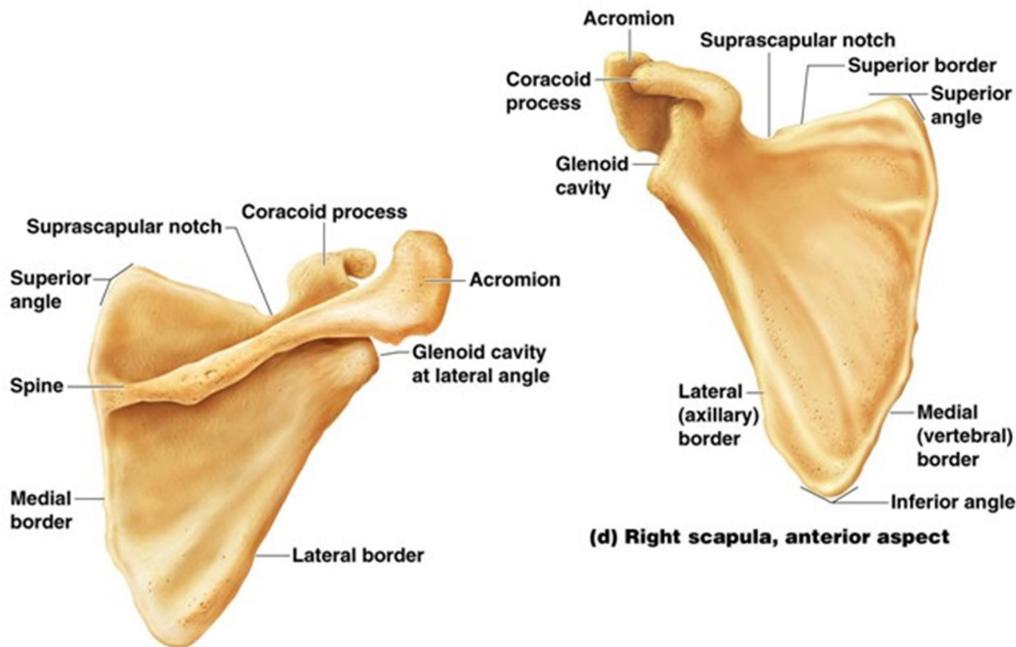
Figure:Clavicle

B. Scapula: Thin, triangular flat bone; lies on the dorsal surface of the rib cage; serves as the attachment point for the arm.

Landmarks / Markings:

- Glenoid cavity (fossa) ,articulates with humerus of the arm.

- Spine: Prominent ridge rising from the upper posterior surface .
- Acromion; articulates with the acromial end of the clavicle.
- Coracoid process, site of muscle attachment.



■ (c) Right scapula, posterior aspect

(d) Right scapula, anterior aspect

Arm bones

The arm consists of a single bone, the humerus. The largest and longest bone of the upper limb, it articulates with the scapula at the shoulder and with the radius and ulna (forearm bones) at the elbow.

Landmarks / Markings of humerus

- Head: Smooth, projection articulates with glenoid cavity of scapula.
- Anatomical neck.
- Greater Tubercle and Lesser Tubercle; site of muscle attachment.
- Surgical neck; common site of bone fracture.
- Trochlea: articulates with ulna .
- Capitulum: articulates with radius .
- Medial and lateral epicondyles; site of muscle attachment.
- Coronoid fossa: Large, depression on the anterior surface
- Radial fossa: Small, depression on the anterior surface
- Olecranon fossa: Large, depression on the posterior surface .

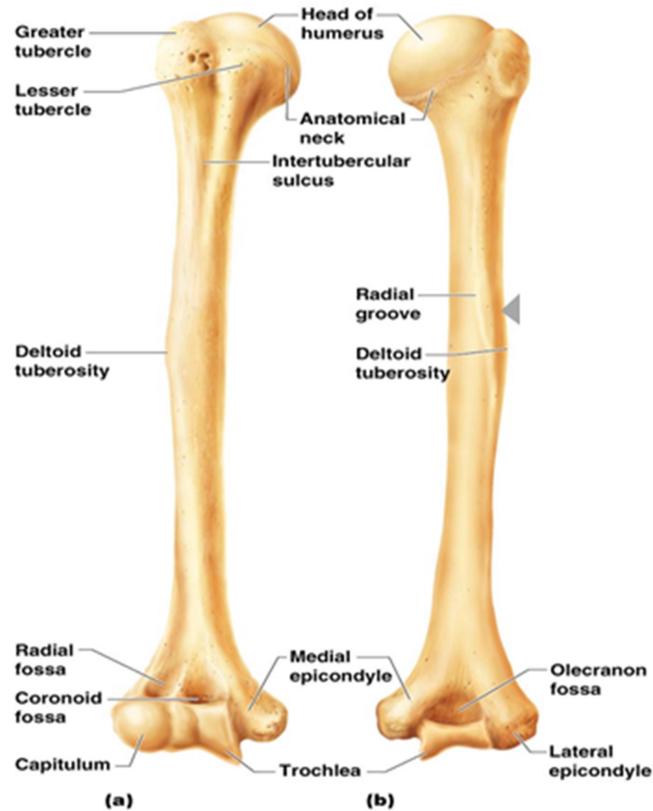


Figure: the humerus

Forearm bones

The forearm consists of two bones, the radius and the ulna, their proximal ends articulate with the humerus and their distal ends articulate with the wrist bones.

A. Ulna: Long, slender bone with a hook at the proximal end that forms the elbow joint with the humerus; lies medially in the forearm when the body is in anatomical position.

Landmarks / Markings:

- Olecranon process: Large protuberance on the proximal end of the ulna.
- Coronoid process: Small process located just distal to the olecranon process.
- Trochlear notch: Deep concavity found between the olecranon process and coronoid process.

B. Radius: Long bone that is thin at its proximal end and wide at its distal end; lies laterally in the forearm, when the body is in anatomical position.

Landmarks / Markings:

- Head: Wheel-shaped proximal end of radius; articulates with capitulum of humerus and radial notch of ulna.
- Ulnar notch: Medial shallow depression on the distal end of the radius; articulates with the ulna.
- Styloid process.

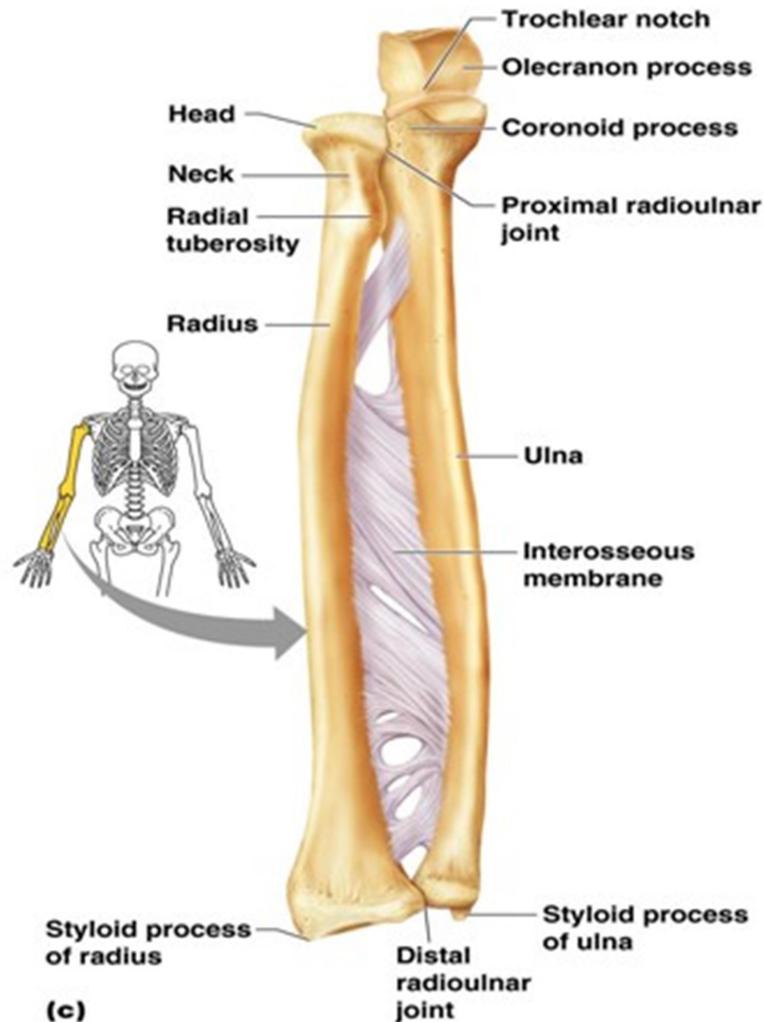


Figure: The forearm bones

The skeleton of the hand

The skeleton of the hand includes the bones of the carpus (wrist); the bones of the metacarpus (palm), and the bones of the phalanges .

A. Carpals (wrist): Eight (8) marble-size short bones closely united by ligaments; quite flexible due to gliding movements between bones.

- | | | |
|-------------|--------------|---------------|
| 1) Scaphoid | 2) Lunate | 3) Triquetrum |
| 4) Pisiform | 5) Trapezium | 6) Trapezoid |
| 7) Capitate | 8) Hamate | |

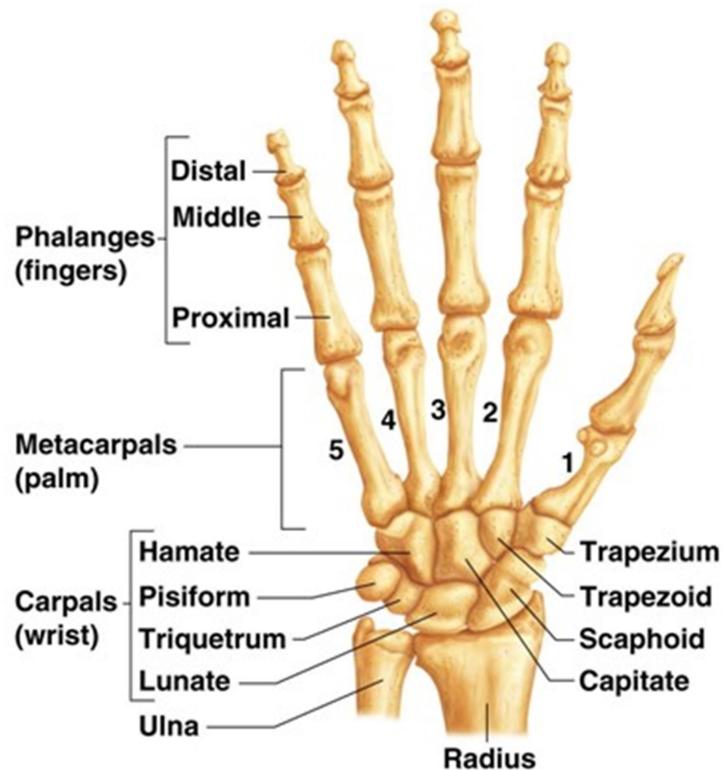


Figure: The skeleton of the hand

B. Metacarpals: Five (5) small long bones radiating from the wrist like spokes; numbered 1 – 5 from the thumb to the little finger.

C. Phalanges: Fourteen (14) miniature long bones that form the fingers; numbered 1 – 5 from the thumb (pollex) to the little finger.

- 1) Proximal phalange (1 – 5)
- 2) Middle phalange (2 – 5)
- 3) Distal phalange (1 – 5)

The Pelvic Girdle

Made up of two hip bones (**coxal bones**), they are strong bone bear body weight and stress of movement

Part of the *pelvis*

The pelvis consists of 2 Coxal bones each made up of three fused bones

- **Ilium** (articulates with sacrum)
- **Ischium**
- **Pubis**

The two hip bones meet anteriorly at the pubic symphysis. Together with the sacrum, they form a ring termed the bony pelvis. The pelvis contains the reproductive organ, urinary bladder and part of large intestine. The three parts of each coxal bone are fused at the acetabulum to form a single bone. The hip bone connects the trunk to the lower limb by extending from the sacrum to the femur.

The **acetabulum** also called the *hip socket* is the meeting point of the ilium, ischium, and pubis. It lies on the lateral surface of the hip bone (coxal bone) and articulates with the head of the femur.

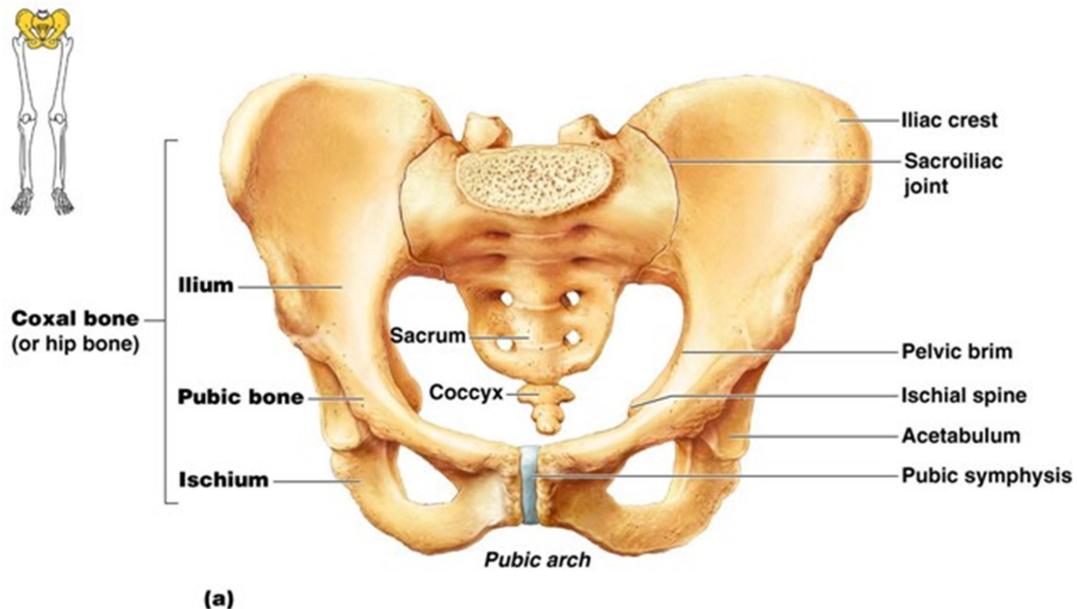


Figure: the pelvis

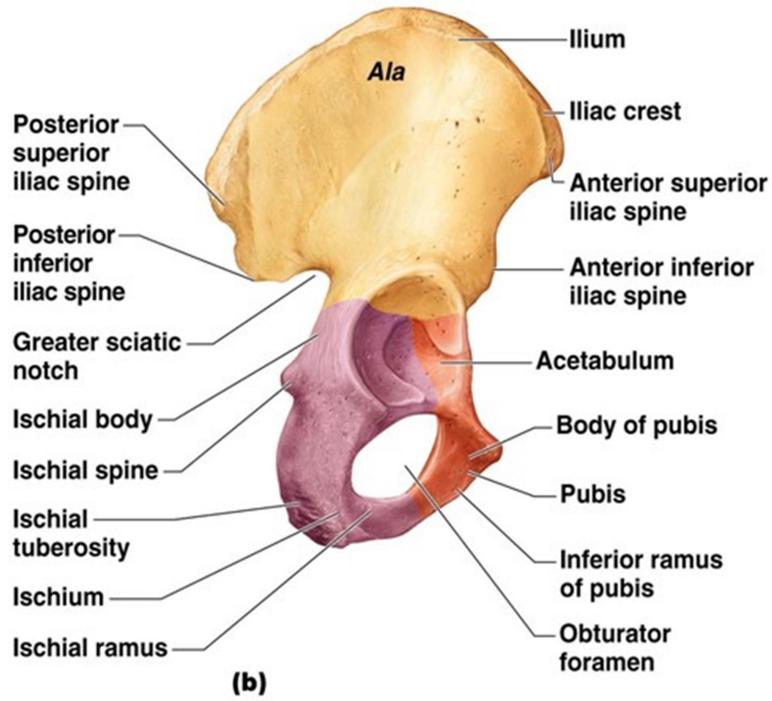
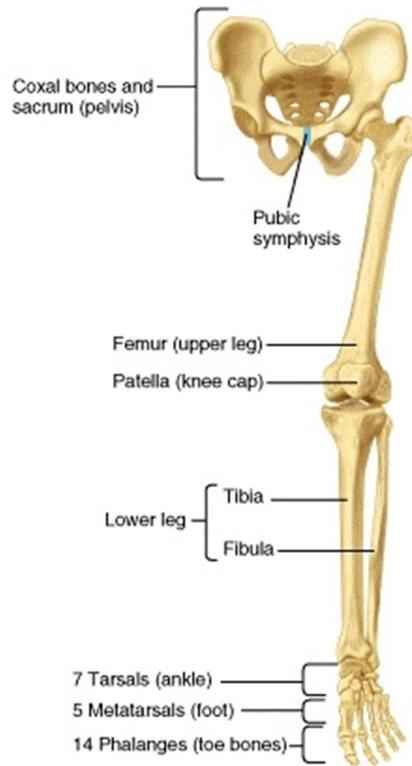
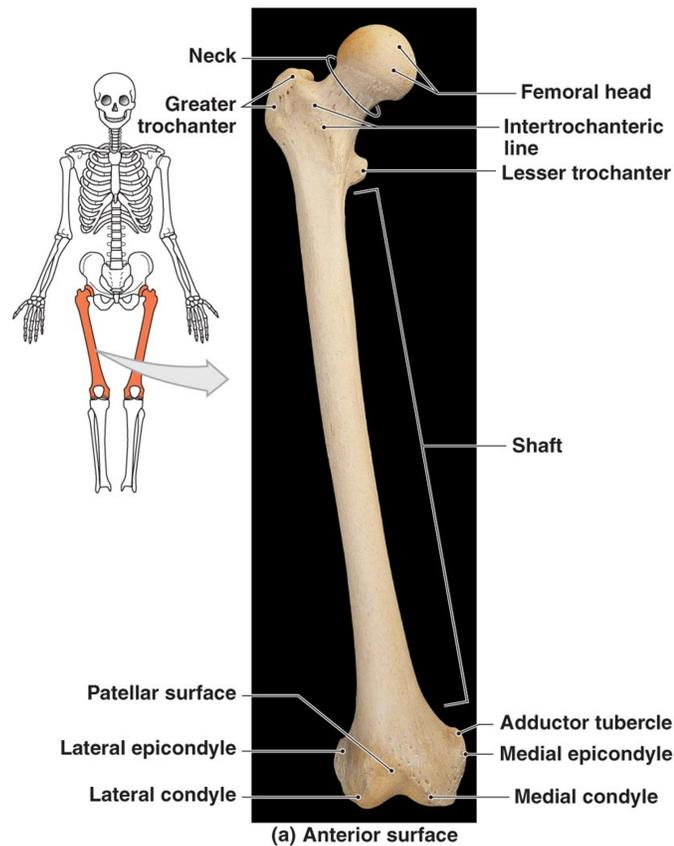


Figure: coxal bone



The femur

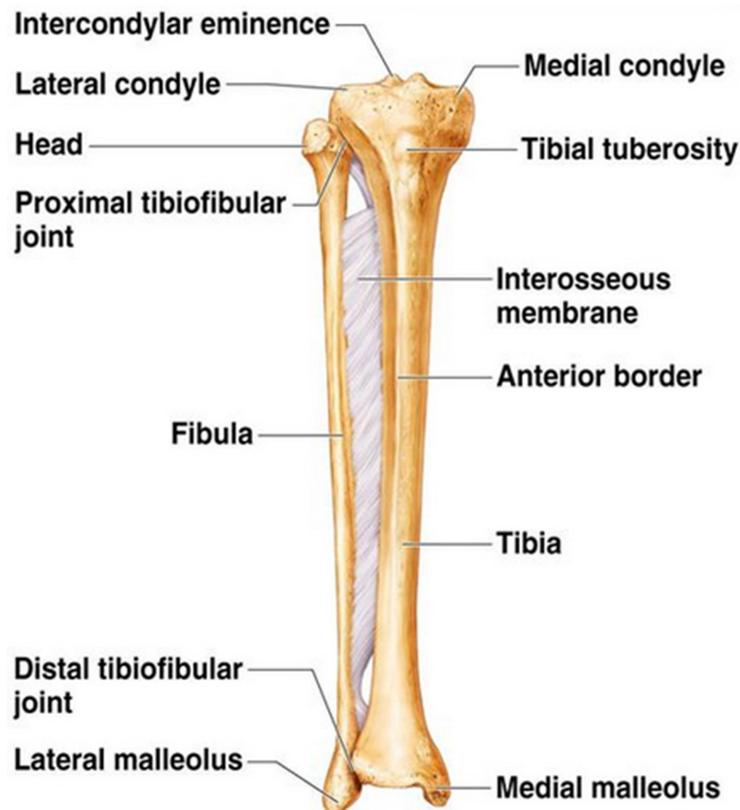
The femur, or thigh bone, is the single bone of the thigh region. It is the longest and strongest bone of the body, and accounts for approximately one-quarter of a person's total height. The rounded, proximal end is the **head of the femur**, which articulates with the acetabulum of the hip bone to form the **hip joint**. The narrowed region below the head is the **neck of the femur**. This is a common area for fractures of the femur. The **greater trochanter** and **lesser trochanter** are bony projections located at the base of the neck. The neck connected to the shaft. The femur shaft ends at distal end by lateral condyle and medial condyle of the femur. Each condyle has a roughened surface called the lateral and medial epicondyle of the femur.



The femur

The patella (kneecap) is the largest sesamoid bone of the body. It is incorporated in the tendon of the quadriceps femoris muscle, the large muscle of the anterior thigh that passes across the anterior knee to attach to the tibia. The patella articulates with the patellar surface of the femur and thus prevents rubbing of the muscle tendon against the distal femur.

The tibia (shin bone) is the medial bone of the leg and is larger than the fibula, the tibia is the main weight-bearing bone of the lower leg and the second longest bone of the body, after the femur. The proximal end of the tibia articulates with the medial and lateral condyles of the femur to form the **knee joint**. The large expansion found on the medial side of the distal tibia is the **medial malleolus** (“little hammer”) it articulates with the talus bone of the foot as part of the ankle joint.



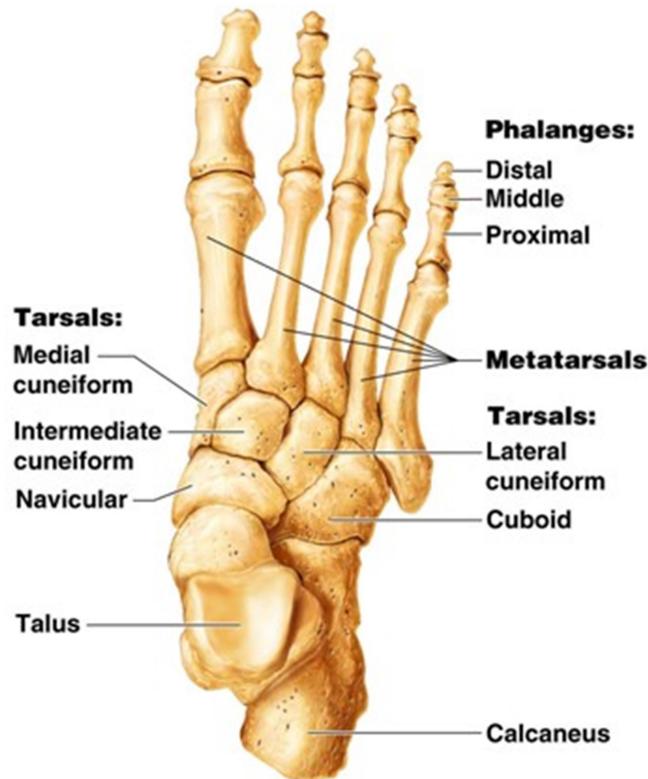
Fibula

The fibula is the slender bone located on the lateral side of the leg. The fibula does not bear weight. It serves primarily for muscle attachments and thus is largely surrounded by muscles. Only the proximal and distal ends of the fibula can be palpated.

The **head of the fibula** is the small, knob-like, It articulates with tibial condyle, forming the **proximal tibiofibular joint**. The thin **shaft of the fibula** ends at the **lateral malleolus**, which forms the easily palpated bony bump on the lateral side of the ankle.

Tarsal Bones

The posterior half of the foot is formed by seven tarsal bones. The most superior bone is the **talus**. This has a relatively square-shaped, upper surface that articulates with the tibia and fibula to form the **ankle joint**. Inferiorly, the talus articulates with the **calcaneus** (heel bone), the largest bone of the foot, which forms the heel. Body weight is transferred from the tibia to the talus to the calcaneus, which rests on the ground.



Metatarsus

The tarsus is connected to the phalanges by five metatarsal bones, referred to collectively as the metatarsus. They are numbered from 1 to 5, from medial to lateral.

Phalanges

The great toe (and frequently the little toe) has two phalanges, whereas each of the other toes has three. They are designated proximal, middle, and distal.