Appendicular Skeleton

- Appendages and supporting girdles

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Appendicular Skeleton

• The appendicular skeleton is made up of the bones of the upper and lower limbs and their girdles

• Two girdles:
  • Pectoral girdles attach the upper limbs to the body trunk
  • Pelvic girdle secures the lower limbs
The Upper Limb

- The upper limb consists of the arm (brachium), forearm (antebrachium), and hand (manus)
- Thirty-seven (37) bones form the skeletal framework of each upper limb
Upper limbs

Pectoral Girdle (Shoulder Girdle)

- The pectoral girdle consist of a clavicle (anterior) and scapulae (posterior)
- They attach the upper limbs to the axial skeleton in a manner that maximum movement is allowed.
- They provide an attachment points for muscles that move the upper limbs
Pectoral Girdles (Shoulder Girdles)

(a) Articulated pectoral girdle
Clavicles (Collarbones)

- The clavicle are slender, curved and long bone
- lying across the superior thorax

- The acromial (or lateral) end articulates with the scapula.
- the sternal (or medial) end articulates with the sternum

- The clavicle provides attachment points for numerous muscles, and act as braces to hold the scapulae and arms out laterally away from the body
Scapulae (Shoulder Blades)

• The scapulae are triangular, flat bones lying on the dorsal (Posterior) surface of the rib cage, between the second and seventh ribs

• Has three borders and three angles

• Major markings include the supra-scapular notch, the supra-spinous and infra-spinous fossae, the spine, the acromion, and the coracoid process
Scapulae (Shoulder Blades)
The Arm (The Brachium: humerus)

- The humerus is the sole bone of the arm
- It articulates with the scapula at the shoulder joint, and the radius and ulna at the elbow joint
- Major markings
  - Proximal end (Upper Extremity):
    - Includes: head, anatomical and surgical necks, greater and lesser tubercles, and the inter-tubercular groove
  - Distal end (Lower Extremity):
    - Includes the capitulum, the trochlea, medial and lateral epicondyles, and the coronoid and olecranon fossae
  - Three surfaces:
    - Lateral, With radial groove and the deltoid process
Arm

(a) Anterior view

Greater tubercle
Lesser tubercle
Intertubercular groove
Head of humerus
Anatomical neck
Deltoid tuberosity
Coronoid fossa
Olecranon fossa
Medial epicondyle
Trochlea

(b) Posterior view

Head of humerus
Anatomical neck
Surgical neck
Radial groove
Deltoid tuberosity
Medial supracondylar ridge
Coronoid fossa
Olecranon fossa
Medial epicondyle
Trochlea
Lateral epicondyle

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The Forearm (the anti brachium)

the radius and the ulna

- The bones forming the forearm are the radius and ulna
- They articulate proximally with the humerus and distally with the wrist bones
- They articulate with each other proximally and distally at small radioulnar joints
- Interosseous membrane connects the two bones along their entire length
Forearm

(a) Anterior view

- Radial notch
- Head
- Neck
- Radial tuberosity
- Olecranon process
- Trochlear notch
- Coronoid process
- Proximal radioulnar joint
- Interosseous membrane
- Ulna
- Ulnar notch
- Head of ulna
- Styloid process of ulna
- Distal radioulnar joint

(b) Posterior view

- Olecranon process
- Head of radius
- Neck of radius
- Interosseous membrane
- Ulna
- Ulnar notch
- Head of ulna
- Styloid process of ulna
- Styloid process of radius
The Ulna

- The ulna lies medially in the forearm and is slightly longer than the radius
- Forms the major portion of the elbow joint with the humerus
- Its major markings include the olecranon, coronoid process, trochlear notch, radial notch, and the styloid process
Radius

• The radius lies opposite (lateral to) the ulna and is thin at its proximal end, large at the distal end
• The upper or proximal end is the head, articulates with the capitulum of the humerus
• Medially, the head articulates with the radial notch of the ulna
• Major markings include the radial tuberosity, ulnar notch, and styloid process
Radius

(a) Anterior view

(b) Posterior view
Lower Extremity

Pelvic Girdle (Hip bones)

- The hip is formed by a pair of hip bones.
- Together with the sacrum and the coccyx, these bones form the bony pelvis.
- The pelvis
  - Attaches the lower limbs to the axial skeleton with the strongest ligaments of the body.
  - Transmits weight of the upper body to the lower limbs.
  - Supports the visceral organs of the pelvis.
The hand

- triquetrum
- lunate
- scaphoid
- capitate
- trapezoid
- trapezium
- pisiform
- hamate
- metacarpal bones
- proximal phalanges
- sesamoid bone
- middle phalanges
- distal phalanges
Pelvic Girdle (Hip)
The Illium

- The ilium is a large flaring bone that forms the superior region of the coxal bone
- It consists of a body and a superior wing-like portion called the *ala*
- The broad posterolateral surface is called the *gluteal surface*
- The auricular surface articulates with the sacrum (sacroiliac joint)
- Major markings include the iliac crests, four spines, greater sciatic notch, iliac fossa, arcuate line, and the pelvic brim
The Illium (Lateral surface)

- Tubercle of the iliac crest
- Anterior gluteal line
- Posterior gluteal line
- Posterior superior iliac spine
- Posterior inferior iliac spine
- Greater sciatic notch
- Ischial body
- Ischial spine
- Lesser sciatic notch
- Ischial tuberosity
- Ischium
- Ischial ramus
- Ala
- Ilium
- Iliac crest
- Acetabulum
- Anterior superior iliac spine
- Inferior gluteal line
- Anterior inferior iliac spine
- Pubic body
- Pubis
- Inferior ramus of pubis
The Illium (medial surface)
The Ischium

- The ischium forms the posteroinferior part of the hip bone
- The thick body articulates with the ilium, and the thinner ramus articulates with the pubis
- Major markings include the ischial spine, lesser sciatic notch, and the ischial tuberosity
Pubis

- Ilium
- Iliac crest
- Anterior superior iliac spine
- Anterior inferior iliac spine
- Arcuate line
- Superior ramus of pubis
- Pubic tubercle
- Pubic crest
- Inferior ramus of pubis
- Articular surface of pubis (at pubic symphysis)
- Iliac fossa
- Posterior superior iliac spine
- Posterior inferior iliac spine
- Auricular surface
- Ischial spine
- Obturator foramen
- Ischium
- Ischial ramus
The Pubis

- The pubis forms the anterior portion of the hip bone
- It articulates with the ischium and the ilium
- Major markings include superior and inferior rami, the pubic crest, pubic tubercle, public arch, pubic symphysis, and obturator foramen (along with ilium and ischium)
Pubis

- Tubercle of the iliac crest
- Anterior gluteal line
- Posterior gluteal line
- Posterior superior iliac spine
- Posterior inferior iliac spine
- Greater sciatic notch
- Ischial body
- Ischial spine
- Lesser sciatic notch
- Ischial tuberosity
- Ischium
- Ischial ramus
- Ala
- Ilium
- Iliac crest
- Anterior superior iliac spine
- Inferior gluteal line
- Anterior inferior iliac spine
- Acetabulum
- Pubic body
- Pubis
- Inferior ramus of pubis
Comparison of Male and Female Pelvic Structure

• Female pelvis
  • Tilted forward, adapted for childbearing
  • True pelvis defines birth canal
  • Cavity of the true pelvis is broad, shallow, and has greater capacity

• Male pelvis
  • Tilted less forward
  • Adapted for support of heavier male build and stronger muscles
  • Cavity of true pelvis is narrow and deep
Comparison of Male and Female Pelvic Structure

Pelvic brim

Pubic arch
Lower Limbs

- The three segments of the lower limb are the thigh, leg, and foot
- They carry the weight of the erect body, and are subjected to exceptional forces when one jumps or runs
Femur

- The sole bone of the thigh is the femur, the largest and strongest bone in the body.
- It articulates proximally with the hip and distally with the tibia and fibula.
- Major markings include the head, fovea capitis, greater and lesser trochanters, gluteal tuberosity, lateral and medial condyles and epicondyles, linea aspera, patellar surface, and the intercondylar notch.
Leg

- The tibia and fibula form the skeleton of the leg
- They are connected to each other by the interosseous membrane
- They articulate with the femur proximally and with the ankle bones distally
- They also articulate with each other via the immovable tibiofibular joints

Tibia

- Receives the weight of the body from the femur and transmits it to the foot
- Major markings include medial and lateral condyles, intercondylar eminence, the tibial tuberosity, anterior crest, medial malleolus, and fibular notch

Fibula

- Sticklike bone with slightly expanded ends located laterally to the tibia
- Major markings include the head and lateral malleolus
Tibia

(a) Anterior view

(b) Posterior view
The foot

- Hallux
- Distal
- Middle
- Proximal
- Phalanges
- Metatarsals
- Medial cuneiform
- Intermediate cuneiform
- Navicular
- Lateral cuneiform
- Cuboid
- Talus
- Calcaneus

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