Appendicular Skeleton

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Anatomy 35
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- Pectoral girdle
  - clavicle
  - scapula
- Upper limb
  - brachium
  - antebrachium
  - carpus
  - manus
- Pelvic girdle
  - os coxae
- Lower limb
  - femoral region
  - crural region
  - tarsal region
  - pedal region
Pectoral girdle

- Shoulder girdle
- Composed of:
  - 2 clavicles
  - 2 scapulae
- Loose attachments
  - Joints
    - Sternoclavicular joint
    - Acromioclavicular joint
    - Humeroscapular joint
  - allows for wide range of motion
  - Easy to dislocate
- not weight bearing
Clavicle

- Braces the shoulder
- Usually stronger on right than left
- Most commonly fractured bone in body
Scapula

- **Borders**
  - Superior
  - Medial
  - Lateral

- **Angles**
  - Superior
  - Inferior
  - Lateral
    - Acromion
    - Coracoid process
    - Glenoid cavity

- **Suprascapular notch**
- **Subscapular fossa**
- **Posterior surface**
  - Spine
  - Supraspinous fossa
  - Infraspinous fossa
Upper limb

- Brachium
  - Shoulder to elbow
  - Humerus
- Antebrachium
  - Forearm
  - Radius
  - Ulna
- Carpus
  - Wrist
  - 8 bones in two rows
- Manus
  - Hand
  - 19 bones
    - 5 metacarpals
    - 14 phalanges
**Humerus**

- Articulates with glenoid cavity of scapula
- Common fracture site
- Attachment for biceps muscle
- Attachment for deltoïd muscle
- Articulates with radius
- Accommodates olecranon of ulna when elbow is flexed
- Articulates with ulna
"Funny bone"
Protects ulnar nerve

Accommodates olecranon of ulna when elbow is extended
Ulna

Radius

Art. with scaphoid & lunate bones

Art. with end of ulna

Wraps around trochlea of humerus

Insertion of biceps

Palpable proximal to thumb

Styloid process (a)

Articular facets

Ulnar notch of radius

Head of ulna

Interosseous membrane

Interosseous margins

Trochlear notch

Coronoid process

Tuberosity of ulna

Tuberosity of radius

Head of radius

Neck of radius

Radial notch of ulna

Olecranon
Bony point of elbow

Attaches radius and ulna
Carpal bones

- **Form wrist**
- **Two rows with four bones each**
  - **Proximal row**
    - Scaphoid (navicular)
    - Lunate
    - Triquetral
    - Pisiform
      - Sesamoid bone
  - **Distal row**
    - Trapezium
    - Trapezoid
    - Capitate
    - Hamate
      - Hamulus (hook)
Mnemonics

- **New terms**
  - A=Scaphoid, B=Lunate
  - C=Triquetral, D=Pisiform
  - E=Trapezium, F=Trapezoid
  - G=Capitate, H=Hamate

- **Old terms**
  - A=Navicular, B=Lunate
  - C=Triquetrum, D=Pisiform
  - E=Greater multangular
  - F=Lesser multangular
  - G=Capitate, H=Hamate

- **New terms**
  - Sally Left the Party to Take Carl Home

- **Old terms**
  - Never Lower Tillie’s Pants, GrandMa Lucy Might Come Home
Carpals, metacarpals, and phalanges

- Head
- Body
- Base

- Distal
- Middle
- Proximal

- Phalanges

- Metacarpus

- Carpus

- Hamulus of hamate
- Hamate
- Pisiform
- Triquetrum
- Lunate

- Distal phalanx
- Proximal phalanx

- First metacarpal
- Trapezoid
- Trapezium
- Capitate
- Scaphoid

- Distal bones of carpus
- Proximal bones of carpus

polex
Pelvic girdle

- **Composed of:**
  - *Os coxae* (innominate bone)

- **Function**
  - Supports trunk on legs
  - Encloses and protects viscera of pelvic cavity

*Note: the pelvic girdle is completed by the sacrum, which is part of the axial skeleton.*
Interpubic disc joins pelvis at pubic symphysis
Fuse in childhood
Bipedalism and childbirth

• Supports weight of abdominal viscera
• Result: narrowing of pelvic outlet
  - Possible explanation for birth of children in more immature state than that of primates
  - Cephalic birth prior to cranial fusion
Sexual dimorphism of pelvis

- **Male pelvis**
  - Thicker and heavier
  - Sacrum is narrower and deeper
  - Less movable coccyx
  - Smaller, heart-shaped pelvic outlet
  - Pubic arch $\leq 90^\circ$
Sexual dimorphism of pelvis

- Female pelvis
  - Wider and shallower
  - Larger pelvic inlet and outlet
  - Coccyx more movable
  - Pelvic inlet is round or oval
  - Hips more flared
  - Pubic angle >100°
Anatomic variation of pelvis by gender
Lower Limb

- Adapted for weight bearing and locomotion
- Four regions with 30 bones per limb
  - Femoral
    - Femur
    - Patella (sesamoid bone)
  - Crural
    - Tibia
    - Fibula
  - Tarsal
    - Ankle (treated as part of foot)
  - Pedal
    - 7 tarsal bones
    - 5 metatarsal bones
    - 14 phalanges
Attached via ligament to acetabulum

Anterior view of Femur

Greater trochanter
Intertrochanteric line
Fovea capitis
Head
Neck
Lesser trochanter
Shaft

Lateral epicondyle
Patellar surface
Base of patella
Apex of patella (a)

Sesamoid bone develops when child begins to walk
Inferior view of Femur

- Fovea capitis
- Head
- Neck
- Greater trochanter
- Intertrochanteric crest
- Lesser trochanter
- Linea aspera
- Shaft
- Medial epicondyle
- Medial condyle
- Lateral condyle
- Lateral epicondyle
- Intercondylar fossa
- Articular facets
Tibia and Fibula

Intercondylar eminence

Medial condyle

Tibial tuberosity

Lateral condyle

Apex

Head of fibula

Proximal tibiofibular joint

Lateral surface

Anterior crest

Fibula

Tibia

Fibula

Distal tibiofibular joint

Lateral malleolus

Medial malleolus

Lateral malleolus

(a) Anterior view

(b) Posterior view
Foot

- Tarsals
  - Proximal
    - Talus
    - Calcaneus
    - Navicular
  - Distal
    - 1st, 2nd, 3rd cuneiforms
    - Cuboid

- Metatarsals
  - I-V

- Phalanges

- Arches
  - Medial longitudinal
  - Lateral longitudinal
  - Transverse
Superior (dorsal) view of foot

- Distal phalanx
- Proximal phalanx
- First metatarsal
- Distal phalanx
- Middle phalanx
- Proximal phalanx
- Fifth metatarsal
- Medial cuneiform
- Intermediate cuneiform
- Lateral cuneiform
- Navicular
- Cuboid
- Talus
- Trochlear surface of talus
- Calcaneus
- Tuberosity of calcaneus
Inferior (plantar) view

- Distal phalanx
- Middle phalanx
- Proximal phalanx
- Fifth metatarsal
- Cuboid
- Calcaneus
- Tuberosity of calcaneus

- Hallux
- Phalanges
- Metatarsals
- Base
- Shaft
- Head
- Tarsals

(b) Tuberosity of calcaneus
Prehensile hallux
Flat-footed

Nonprehensile hallux
Strong, springy arches
Polydactyly

hemimelia

Congenital condition in which all or half of distal limb is missing