Skeletal System: Appendicular Skeleton

Pectoral girdle
Pelvic girdle
Upper limbs
Lower limbs



Pectoral (Shoulder) Girdle

- Consists of **scapula** and **clavicle**
- Clavicle articulates with sternum (sternoclavicular joint)
- Clavicle articulates with scapula (acromioclavicular joint)
- Scapula held in place by muscle only
- Upper limb attached to pectoral girdle at shoulder (glenohumeral joint)



- S-shaped bone with two curves
 - o medial curve convex anteriorly/lateral one concave anteriorly
- Extends from sternum to scapula above 1st rib
- Fracture site is junction of curves
- Ligaments attached to clavicle stabilize its position.

Posterior Surface of Scapula



- Triangular flat bone found in upper back region
- Scapular spine ends at acromion process
 a sharp ridge widening to a flat process
- Glenoid cavity forms shoulder joint with head of humerus
- Supraspinous & infraspinous fossa for muscular attachments

Anterior Surface of Scapula



- Subscapular fossa filled with muscle
- Coracoid process for muscle attachment

Upper Extremity



Each upper limb = 30 bones
humerus within the arm
ulna & radius within the forearm
carpal bones within the wrist
metacarpal bones within the palm
phalanges in the fingers

Joints

 shoulder (glenohumeral), elbow, wrist, metacarpophalangeal, interphalangeal

Humerus --- Proximal End

- Part of shoulder joint
- Head & anatomical neck
- Greater & lesser tubercles for muscle attachments
- Intertubercular sulcus or bicipital groove
- Surgical neck is fracture site
- Deltoid tuberosity
- Shaft (body)



Humerus --- Distal End

- Forms elbow joint with ulna and radius
- Capitulum
 articulates with head of radius
- Trochlea
 - o articulation with ulna
- Olecranon fossa
 - posterior depression for olecranon process of ulna
- Medial & lateral epicondyles

 attachment of forearm muscles





Ulna & Radius --- Proximal End

Ulna (on little finger side)

 trochlear notch articulates with humerus & radial notch with radius
 olecranon process forms point of elbow



• Radius (on thumb side)

 head articulates with capitulum of humerus & radial notch of ulna

o tuberosity for muscle attachment







- Articulation of humerus with ulna and radius
- Ulna articulates with trochlea of humerus
- Radius articulates with capitulum of humerus

Ulna and Radius - Distal End



• Ulna --styloid process

head separated from wrist joint by fibrocartilage disc

• Radius

o forms wrist joint with scaphoid, lunate & triquetrum
o forms distal radioulnar joint with head of ulna

8 Carpal Bones (wrist)



- Carpal tunnel--tunnel of bone & flexor retinaculum
- Below is the pneumonic
- So Long Top Part, Here Comes The Thumb

Metacarpals and Phalanges



Metacarpals

knuckles (metacarpophalangeal joints)

Phalanges

- 14 total: each is called phalanx
 proximal, middle, distal on each finger, except thumb
- o base, shaft, head

Pelvic Girdle and Hip Bones



- Pelvic girdle = two hipbones united at pubic symphysis
 o articulate posteriorly with sacrum at sacroiliac joints
- Each hip bone = ilium, pubis, and ischium
 fuse after birth at acetabulum
- Bony pelvis = 2 hip bones, sacrum and coccyx

Ischium and Pubis



• Ischium

- o ischial spine & tuberosity
- o lesser sciatic notch
- o ramus

• Pubis

- o body
- o superior & inferior ramus
- pubic symphysis is pad of fibrocartilage between 2 pubic bones

Female and Male Skeletons





• Male skeleton

- o larger and heavier
- larger articular surfaces
- larger muscle attachments
- Female pelvis
 - o wider & shallower
 - larger pelvic inlet & outlet
 - o more space in true pelvis
 - o pubic arch >90

degrees



Lower Extremity



- Each lower limb = 30 bones
 femur and patella within the thigh
 - o tibia & fibula within the leg
 - o tarsal bones in the foot
 - o metatarsals within the forefoot
 - o phalanges in the toes

• Joints

- o hip, knee, ankle
- o proximal & distal tibiofibular
- o metatarsophalangeal

Femur and Patella

• Femur (thighbone)

- o longest & strongest bone in body
- head articulates with acetabulum (attached by ligament of head of femur)
- o neck is common fracture site
- greater & lesser trochanters, linea aspera,
 & gluteal tuberosity-- muscle attachments
- medial & lateral condyles articulate with tibia
- patellar surface anteriorly between condyles
- Patella
 - o triangular sesamoid



Tibia and Fibula



Tibia

o medial & larger bone of leg o weight-bearing bone o lateral & medial condyles o tibial tuberosity for patellar lig. o proximal tibiofibular joint o medial malleolus at ankle Fibula o not part of knee joint o muscle attachment only

o lateral malleolus at ankle



- Talus = ankle bone (articulates with tibia & fibula)
- Calcaneus heel bone

Metatarsus and Phalanges



Metatarsus

midregion of the foot

Phalanges

distal portion of the foot
similar in number and arrangement to the hand

Arches of the Foot

- Function
 - o distribute body weight over foot
 o yield & spring back when weight is lifted
- Longitudinal arches along each side of foot
- Transverse arch across midfoot region
 - o navicular. cuneiforms & bases of metatarsals



Clinical Problems

• Flatfoot

- weakened ligaments allow bones of medial L arch to drop
- Clawfoot
 - medial L arch is too elevated



Types of Joint

• Fibrous Joints

• Unites 2 bones by fibrous connective tissue

× Ex. Tooth and bone of mandible

Cartilaginous Joints

- Unites 2 bones with hyaline or fibrocartilage
 - × Ex. Pubis symphysis

Synovial Joints

- Freely moveable joint containing fluid
 - × Ex. Most joints of the appendicular skeleton

Types of Synovial Joints

- Plane- 2 opposite flat surfaces with slight movement
 - Ex. Between vertebrae
- Pivot- cylindrical bony processes for rotation
 Ex. Radius and ulna
- Hinge- convex cylinder to a concave location with movement of one of the 2 bones
 - Ex. Knee or elbow
- Ball & Socket- ball fits into socket on other bone for range of movement in all directions
 - Ex. Hip (coxal bone & femur) & shoulder (scapula & humerus)

Types of Synovial Joints Cont.

 Elipsoid - modified ball & socket for less range then a full ball & socket

• Ex. Wrist (radius & carpals) & atlas & occipital bone

 Saddle – 2 saddle shaped articular surfaces at right angles of each other for some slight movement

• Ex. Carpals and metacarpals of thumb & between carpals

Knee Joint

• This is a modified hinge joint

- The 2 collateral ligaments prevent side to side movement
- The 2 cruciate ligaments prevent over extension
- The meniscus is for cushioning

• Patella

• Hold the tendon of the quads away from the end of the femur which allows for increased force to be placed on the tibia from the thigh



Knee Injury

- Block or tackle to the lateral side of knee tears the medial collateral ligament (football)
- Bursitis- sack of synovial fluid for cushioning is inflamed
- Hemarthroisis- fluid on the knee (blood)



What do I need to Know

- Bones of the pectoral girdle
- Arm bones along with articulating carpals, metacarpals, and phalanges
- Bones of the pelvic girdle
- Leg bones along with calcaneus, talus, metatarsals, and phalanges
- 3 types of joints
- 5 types of synovial joints