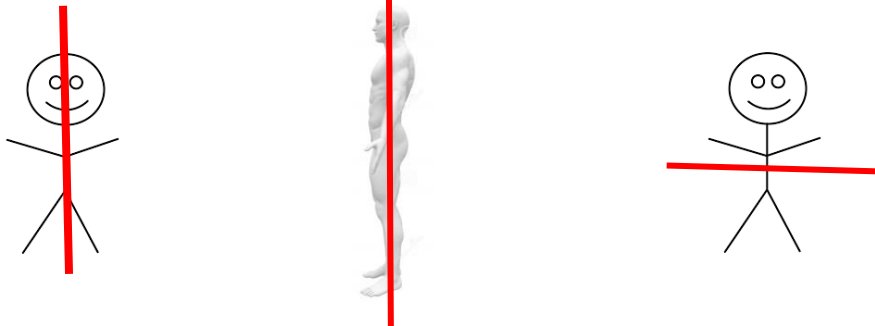


1.INTRODUCTION TO ANATOMY AND OSTEOLOGY

Anatomical Terms

- Anatomical position: body standing erect, facing forwards. Legs are together with feet parallel so toes point forwards. Arms hang by sides with palms facing forwards (thumb is lateral).
- Sagittal plane: divides body vertically into left and right parts (passes through body from front to back).
 - ➔ Median (midsagittal) plane lies on midline, dividing into 2 symmetrical halves.
 - ➔ Parasagittal planes are those not directly on the midline.
- Coronal (frontal) plane: divides body into front (anterior) and back (posterior) parts. Lies at a right angle to the sagittal plane, passing through body from top to bottom.
- Horizontal (transverse) plane: divides body into top (superior) and bottom (inferior) parts.



- Anterior (ventral): to the front; posterior (dorsal) to the back
- Superior (cephalic): above; inferior (caudal): below
- Proximal: closer to the trunk or root of limb; distal: further away from the trunk or root of the limb
- Medial: towards the median plane or midline; lateral: away from the median plane or midline
- Ipsilateral: same side of the body; contralateral: opposite side of the body.
- Superficial: closer to the surface of the body or skin; deep: further away from the body surface or skin.

The Skeleton

Axial Skeleton	Appendicular skeleton
<ul style="list-style-type: none"> ▪ Forms central axis of the body, containing 80 bones (about 40% of the body). ▪ Skull: 22 bones including 8 cranial; 14 facial and bones associated with skull (6 auditory ossicles and hyoid bone) ▪ Spine: cervical, thoracic, lumbar, sacrum, coccyx ▪ Sternum: manubrium, sternum, xiphoid ▪ Ribs 1-12 	<ul style="list-style-type: none"> ▪ Shoulder girdle→ scapula, clavicle, humerus ▪ Forearm→ radius and ulna ▪ Wrist→ 8 carpal bones ▪ Hand→ 5 metacarpals, 5 proximal phalanges, 4 middle phalanges, 5 distal phalanges ▪ Pelvic girdle→ ilium (9x2), ishium (2), pubis (2), femur (2) ▪ Lower leg→ tibia, fibula ▪ Ankle→ 7 tarsal bones ▪ Foot→ 5 metatarsals, 5 proximal phalanges, 4 mid phalanges, 5 distal phalanges

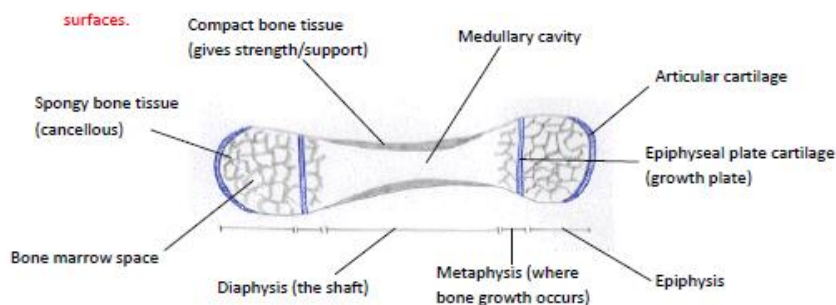
- Functions of the skeleton
 - ➔ Protect vital organs (eg. Skull protects brain, rib cage protects lungs)
 - ➔ Produce blood cells
 - ➔ Provide insertions for muscles (which in turn help us to move and breathe)
 - ➔ Provide a framework for the body (connect to make joints)
 - ➔ Store minerals, such as calcium

Bones

Long Bones	<ul style="list-style-type: none"> ▪ Longer than they are wide. Generally located in limbs for 	Humerus, femur, metacarpal,
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	movement and mobility. <ul style="list-style-type: none"> Function: transfer forces a long distance (thus enhancing stability); good for muscle attachment (more surface area). 	metatarsal, clavicle
Short Bones	<ul style="list-style-type: none"> Cube shaped bones. Provide support and stability with little to no movement. 	Wrist and ankle (tarsal, carpal)
Flat Bones	<ul style="list-style-type: none"> Thin, flat and may be curved. Provide extensive protection for underlying soft tissues (greater surface area for force dispersion); broad surfaces for muscle attachment. 	Sternum, rib, cranium, ilium, skull
Irregular Bones	<ul style="list-style-type: none"> Don't fit other classifications. They have various purposes: <ul style="list-style-type: none"> Protection of nervous tissue (vertebrae → spinal cord) Multiple anchor points for muscle attachment (sacrum) Maintaining pharynx and trachea support and tongue attachment (hyoid bone) 	Vertebra, sacrum, hyoid, bones of the skull and face
Sesamoid Bones	<ul style="list-style-type: none"> Develop within a tendon. Function to increase strength and efficiency of a muscle (muscles can generate more power on a bone. The greater the force applied, more bone develops). Also for protection, eg. Patella. 	Patella, bones in thumbs, feet

- Note: there are a number of debates over the classification of bones. Functions help classify (eg. Clavicle as long bone as generates some force, but primarily flat due to shape and protection of arteries, nerves).
- Features of bones:
 - Diaphysis: compact bone surrounds a medullary cavity (contains fat in adults, bone marrow). This is the shaft of the bone.
 - Medullary cavity:
 - Epiphyseal plate cartilage: made of hyaline cartilage, this is a growth plate
 - Epiphysis: growing ends of long bones, have spongy interior; internal edge contains the physis (cartilage growth plate) which ossifies at skeletal maturity. Hyaline cartilage is on joint surfaces.
 - Periosteum:
 - Metaphysis: where bone growth occurs?



Bony Markings:

- Functions:
 - Strengthen bone
 - Provide passages of blood vessels and nerves through the bone
 - Act as sites of attachment for muscles, ligaments and tendons
 - Projections that help form joints
 - Provide surface landmarks
- Projections and processes (bumps):**
 - Ramus: extension of bone marking an angle with rest of structure. Eg. Pelvis
 - Trochanter: large, rough projection. Eg. Femur
 - Tuberosity: smaller, rough projection eg. On radius and ulna
 - Tubercle: small, rounded projection. Eg. On humerus (supraglenoid tubercle)
 - Crest: a prominent ridge. Eg. Ilium crest on pelvis
 - Line: a low ridge. Eg. Intertrochanteric line on pelvis

- ➔ Spine: a pointed or narrow process. Eg. On scapula
- ➔ Head: a single, terminal enlargement. Eg. On femur and humerus
- ➔ Neck: a narrow connection between the epiphysis and the diaphysis. Eg. Humerus
- ➔ Condyle: knuckle-shaped terminal enlargement. Eg. On femur and humerus
- ➔ Epicondyle: a projection above a condyle. Eg. Medial epicondyle on humerus.

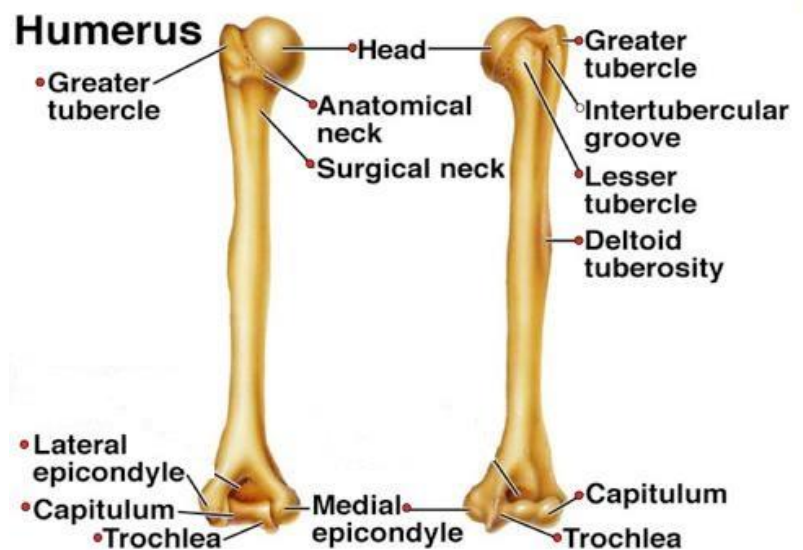
▪ Depressions (dips):

- ➔ Facet: small, flat, articular surface that juts out. Eg. On femur
- ➔ Fossa: a shallow depression. Eg. Glenoid fossa
- ➔ Sulcus: a narrow groove. Eg. On humerus
- ➔ Foramen: a rounded passageway for blood vessels or nerves. Eg. On skull
- ➔ Canal/meatus: passageway through the substance of a bone. Eg. On skull
- ➔ Fissure: an elongated cleft. Eg. On skull
- ➔ Sinus/antrum: a chamber within a bone, normally filled with air. Eg. On skull
- ➔ Groove: eg. intertubercular groove.

3. BONES OF THE SHOULDER REGION

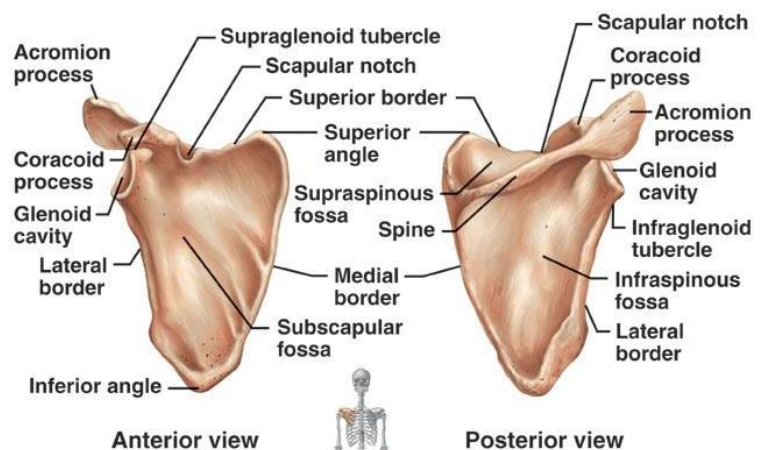
The Humerus

- A long bone located in the upper arm.
- Surgical head is more vulnerable to fractures amongst the elderly.
- To orientate:
 - ➔ Superior and inferior: superior is side with the large round head
 - ➔ Medial and lateral: larger epicondyle is the medial one, humeral head is medial to attach to glenoid fossa.
 - ➔ Anterior and posterior: front has groove down middle (radial groove and deltoid tuberosity).



The Scapula

- Arguably a flat or irregular bone located at the posterior of the shoulder.
- Orientation:
 - ➔ Superior side is where all tubercles, processes and notches are located
 - ➔ Medial side is the longer straight side and lateral side cuts diagonally
 - ➔ Anterior side is the indented side



The Clavicle

- Arguably a long or flat bone located at the chest (the collarbone).
- Smooth superior surface, roughened inferior surface.

