

Practical Issues.

- **Anatomical Position of the body;**

Head, gaze (eyes), and toes directed anteriorly. Arms adjacent to the sides with the palms facing anteriorly and lower limbs close together with the feet parallel.

- **The recognition of main types of bones;**

Long bones;

Long bones are some of the longest bones in the body, such as the Femur, Humerus and Tibia but are also some of the smallest including the Metacarpals, Metatarsals and Phalanges. The classification of a long bone includes having a body which is longer than it is wide, with growth plates (epiphysis) at either end, having a hard outer surface of compact bone and a spongy inner known as spongy bone containing bone marrow. Both ends of the bone are covered in hyaline cartilage to help protect the bone and aid shock absorption.

Short Bones;

Short bones are defined as being approximately as wide as they are long and have a primary function of providing support and stability with little movement. Examples of short bones are the Carpals and Tarsals in the wrist and foot. They consist of only a thin layer of compact, hard bone with spongy bone on the inside along with relatively large amounts of bone marrow.

Flat Bones;

Flat bones are as they sound, strong, flat plates of bone with the main function of providing protection to the body's vital organs and being a base for muscular attachment. The classic example of a flat bone is the Scapula (shoulder blade). The Sternum (breast bone), Cranium (skull), Pelvis and Ribs are also classified as flat bones. Anterior and posterior surfaces are formed of compact bone to provide strength for protection with the centre consisting of spongy bone and varying amounts of bone marrow. In adults, the highest numbers of red blood cells are formed in flat bones.

Irregular Bones

These are bones which do not fall into any other category, due to their non-uniform shape. Good examples of these are the Vertebrae, Sacrum and Mandible (lower jaw). They primarily consist of spongy bone, with a thin outer layer of compact bone.

Sesamoid Bones;

Sesamoid bones are usually short or irregular bones, imbedded in a tendon. The most obvious example of this is the Patella (knee cap) which sits within the Patella or Quadriceps tendon. Other sesamoid bones are the Pisiform (smallest of the Carpals) and the two small bones at the base of the 1st Metatarsal. Sesamoid bones are usually present in a tendon where it passes over a joint which serves to protect the tendon.

- **Intervertebral disc;**

Intervertebral discs (or intervertebral fibrocartilage) lie between adjacent vertebrae in the spine. Each disc forms a cartilaginous joint to allow slight movement of the vertebrae, and acts as a ligament to hold the vertebrae together.

Discs consist of an outer annulus fibrosus, which surrounds the inner nucleus pulposus (88 % water). The annulus fibrosus consists of several layers of fibrocartilage. The strong annular fibers contain the nucleus pulposus and distribute pressure evenly across the disc. The nucleus of the disc acts as a shock absorber, absorbing the impact of the body's daily activities and keeping the two vertebrae separated. There is one disc between each pair of vertebrae, except for the first cervical segment, the atlas/axis and last one is between L5 and S1.,

- **Flexures of the vertebral column;**

The vertebral column in adults has **four curvatures** that occur in the **cervical, thoracic, lumbar, and sacral regions**. The **thoracic** and **sacral** regions are **concave anteriorly** whereas the **cervical** and **lumbar** regions are **concave posteriorly**. The **thoracic** and **sacral** regions are **primary curvatures** that develop during the fetal period in relationship to the fetal position. These curvatures are retained throughout life as a consequence of differences in height. The **cervical** and **lumbar** regions are **secondary curvatures** that result from extension from the flexed fetal position. They begin to appear during the late fetal period but do not become obvious until infancy. **Secondary curvatures are maintained primarily by differences in thickness between the anterior and the posterior parts of the IV discs.** **The curvatures of the vertebral column provide additional flexibility (shock-absorbing resilience).**

- **The intervertebral foramen;**

The position of the intervertebral foramen is between the superior and inferior notch of two vertebrae.

You could say that the borders of the intervertebral foramen are; superiorly (inferior vertebral notch), anteriorly (vertebral body and IV disc), inferiorly (superior vertebral notch) and posteriorly (superior and inferior articular processes = the zygapophysial joint). These foramina provide passage and protection for the spinal cord.

- **The carpal tunnel;**

The carpal tunnel is a fibro-osseous passageway on the palmar side of the wrist that connects the distal forearm to the middle compartment of the deep plane of the palm.

Its contents are a total of nine flexor tendons and one single nerve;

- Flexor digitorum profundus
- Flexor digitorum superficialis
- Flexor pollicis longus
- And the median nerve which passes between the flexor digitorum profundus and flexor digitorum superficialis.
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The carpal bones (wrist bones) make up the "floor" of the carpal tunnel and the transverse carpal tunnel ligament make up the top part of the tunnel.

- **Sternal Angle**

The sternal angle is the anterior angle formed by the junction of the manubrium and the body of the sternum in the form of a secondary cartilaginous joint (symphysis). This is also called the manubriosternal joint. The sternal angle is a palpable clinical landmark.

It marks the level of the 2nd pair of costal cartilages and the level of the intervertebral disc between T4 and T5.

- **The working knowledge of the examples of main types of synovial joints;**

Gliding joints (or planar joints):

The carpals of the wrist, acromioclavicular joint.

These joints allow only gliding or sliding movements.

Hinge joints:

The elbow (between the Humerus and the ulna).

These joints act like a door hinge, allowing flexion and extension in just one plane.

Pivot joints:

Atlanto-axial joint, proximal radioulnar joint, and distal radioulnar joint.

One bone rotates about another.

Condyloid joints (or ellipsoidal joints):

The wrist joint (radiocarpal joint).

A Condyloid joint is where two bones fit together with an odd shape (e.g. an ellipse), and one bone is concave, the other convex. Some classifications make a distinction between Condyloid and ellipsoid joints.

Saddle joints:

Carpometacarpal or Trapeziometacarpal Joint of thumb (between the metacarpal and carpal - the trapezium), sternoclavicular joint

Saddle joints, which resemble a saddle, permit the same movements as the condyloid joints.

Ball and socket joints:

The shoulder (glenohumeral), and hip joints.

These allow a wide range of movement.

Compound joints:

The knee joint.

Condylar joint (condyles of femur join with condyles of tibia) and saddle joint (lower end of femur joins with patella).

- **Recognition of the right and left sided bones of the limbs;**

Humerus;

Hold the bone so that the capitulum and trochlea face YOU (anterior), if the head faces left, it is a left Humerus.

Ulna;

Face the trochlear notch away from you (U-shaped process) and look at the olecranon ask yourself on what side is the radial notch? If it is on the right, it is a right ulna.

Radius;

Orient the bone with the round head UP and the distal end DOWN, look at “bumps” at the distal end, look for the styloid process at the distal end, if it is on the right side, it is a right radius.

Scapula;

Hold the bone with the spine facing YOU and the apex facing DOWN, if the acromion faces left, it is a left scapula. NOTE; the corocoid process is spelled with a “c” and so is “scapula”.

Femur;

The head must face IN and the lesser trochanter must be on the BACK side of the bone, so hold the bone so that the head is on top and the trochanters are on the BACK surface of the bone, if the head faces left, it is a left femur.

Tibia;

Hold the bone so that the intercondylar eminence is towards the top and you are looking at the tibial tuberosity, if the medial malleolus on the distal end is on the left side, it is a left tibia.

Clavicle;

Point the flat sternal end toward the midline, the clavicle bulges OUT then IN, the conoid tubercle must point DOWN.

- **The cranial fontanel;**

Fontanelles are soft spots on a baby's head which, during birth, enable the bony plates of the skull to flex, allowing the child's head to pass through the birth canal. The ossification of the bones of the skull cause the fontanelles to close over by a child's second birthday. The skull of a newborn consists of five main bones: two frontal bones, two parietal bones, and one occipital bone. These are joined by fibrous sutures, which allow movement that facilitates childbirth and brain growth.

- At birth, the skull features a small posterior fontanelle, an open area covered by a tough membrane, where the two parietal bones adjoin the occipital bone (at the lambda). This fontanelle usually closes during the first several months of an infant's life. This is called intramembranous ossification. The mesenchymal connective tissue turns into bone tissue.

- The much larger, diamond-shaped anterior fontanelle where the two frontal and two parietal bones join generally remains open until the child is about two years of age, however, in cleidocranial dysostosis it is often late in closing or may never close. The anterior fontanelle is useful clinically. Examination of an infant includes palpating the anterior fontanelle.

- Two smaller fontanelles are located on each side of the head, more anteriorly the sphenoidal (between the sphenoid, parietal, temporal, and frontal bones) and more posteriorly the mastoid (between the temporal, occipital, and parietal bones).

A sunken fontanelle indicates dehydration, whereas a very tense or bulging anterior fontanelle indicates raised intracranial pressure.

- **The pelvic inlet and outlet (boundaries and significance).**

Pelvic inlet;

The pelvic inlet has the following boundaries;

Anteriorly

by the pubic crest (or pubic symphysis)

Laterally

by the pectineal line (or iliopectineal line) and arcuate lines

Posteriorly

by the anterior margin of the base of the sacrum (or the ala of sacrum) and sacrovertebral angle (or sacral promontory)

The pelvic inlet has the following diameters;

Anteroposterior or *conjugate* diameter about 110 mm.

Transverse diameter about 135 mm.

Oblique diameter about 125 mm.

Pelvic outlet;

Pelvic outlet has the following boundaries:

Anteriorly

the pubic arch

Laterally

the **ischial tuberosities**

Posterolaterally

the inferior margin of the sacrotuberous ligament

Posteriorly

the tip of the **coccyx**

- **See flashcards.**