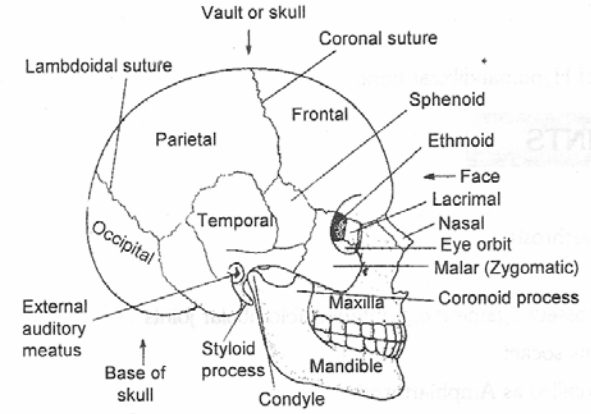
# Skull

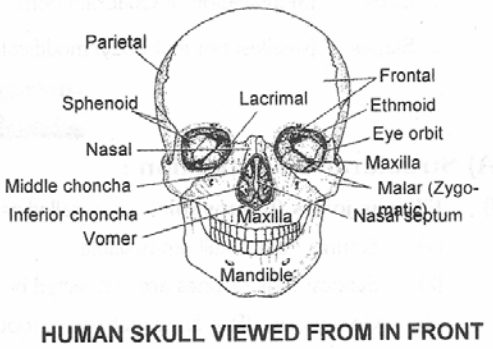
**Skull consist of 29 bones**

(i) Cranium - 8
(ii) Face - 14
(iii) Ear ossicles - 3 + = 6
(iv) Hyoid – 1

All bones except mandible & ear ossicle are immovable.

**(1) Cranium (Brain box) :-** It encloses the brain. It has large opening called foramen magnum. Human skull is dicondylic (with 2 occipital condyle) while reptilian & avian skull is mono condylic. Rabbits skull is formed of 53 bones.



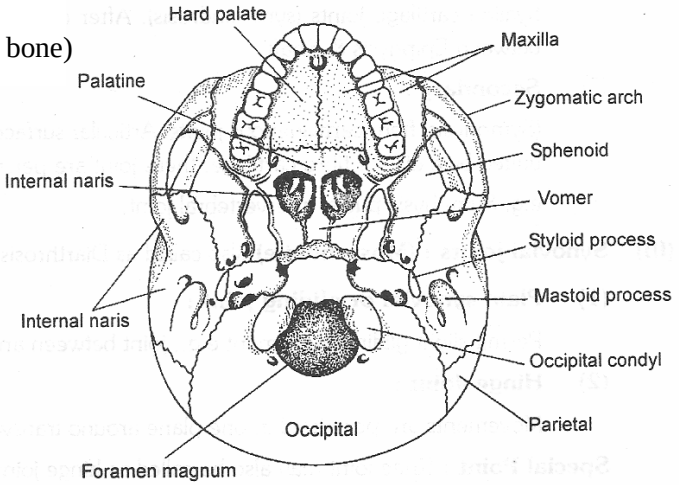




HUMAN SKULL VIEWED FROM IN FRONT

HUMAN SKULL VIEWED FROM RIGHT SIDE

Cranium formed of 8 bones (membranous bone)

1. Frontal (forehead)
2. Parietal
2. Temporal
1. Occipital
1. Ethmoid




**HUMAN SKULL VIEWED FROM BELOW**

Sella Turcica – Depression in sphenoid bone of skull. that lodges pituitary body.

largest foramen – foramen magnum which is present below brain box, through it the spinal chord comes out.

**(II) Face :-** It is made up of 14 bones

Maxillae 2 Vomer – 1

Palatines 2 Mandible – 1 (Only Movable bone apart from ear ossicles). In its posterior part a pair of condyle are present which fit in the cavity of temporal bone, so the lower jaw attaches with the cranium. This type of suspenson is called craniostylic.

Nasal – 2, Lacrimal – 2

Inferior turbinals – 2

Malar bone (Zygomatic bone) – 2

all these bones of skull are joined together by suture

Eg. (1) Coronal suture : Between the frontal & parietal bone

(2) Lambdoidal suture : Between parietal & - occipital

**(III) Tongue bone.** (Hyoid bone) – supports the Tongue. It is not articulating with any other bone.

**(IV) Sensory capsule :-** Ear is surrounded by bony auditory capsules, middle ear has 3 movable ear ossicles

1. Maleus (Modification of articular bone)
2. Incus (Modification of Quadrate bone)
3. Stapes (smallest bone of body) modification of Hypomandibular bone.

## JOINTS

**(A) Structural Classification :**

**(I) Fibrous joints (Immovable) :** also called as Synarthrosis.

(1) Sutures : e.g. Skull, immovable

(2) Syndesmosis : Bones are connected by interosseus ligament e.g. inferior tibio fibular joints

(3) Gomphosis : (Peg & Socket) – e.g. tooth in its socket

**(II) Cartilagenous joints : (Slightly movable)**

**(1) Primary :**
hyaline cartilage joints (synchondrosis). After certain age the cartilage is replaced by bone. e.g. joint between Epiphysis & Shaft.

**(2) Secondary :**
(Symphysis) fibro cartilaginous joints. Articular surface are covered by a thin layer of hyaline cartilage & united by a disc of fibro cartilage. there joint are persistant throughout life.
e.g. Symphysis pubis, intervertebral joint.

**(III) Synovial joints : (Most mobile)** also called as Diarthrosis.

**(1) Plain synovial or gliding joint :**
Permit slight gliding movement e.g., joint between articular processes of vetebrae

**(2) Hinge Joint :**
Movements are permitted in one plane around transverse axis e.g. elbow, ankle, intephalangeal joint.

**Special Point :** Knee joint may alsobe called as hinge joint.

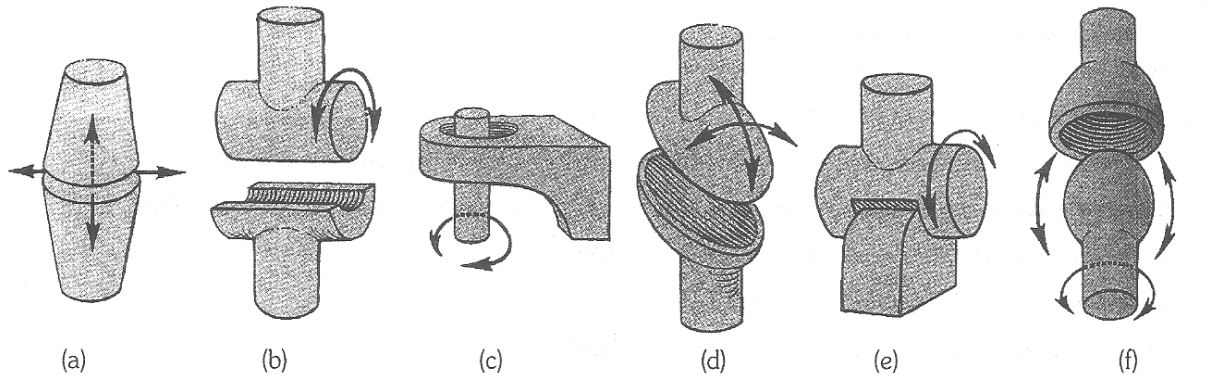
**(3) Pivot Joints :** Articular surfaces comprise of
- a central bony pivot
- surrounded by osteoligamentous ring
movement are permitted in one plane around vertical axis. e.g. radioulnar joint, median atlanto axial joint.

**(4) Condylar Joint :**
Articular surface include two distinct condyles Movement are permitted in both transverse & vertical axis. Rt. & left – Jaw joint

**(5) Ellipsoid Joint** e.g. wrist, Metacarpophalengeal joint. movement are permitted in both axis, but articular surfaces are not in form of condyles.

**(6) Saddle Joint :**
Articulating surface are reciprocally concavo convex. these are improperly ball & socket joints e.g. first carpometacarpal joint and calcaneocuboid joint.

**(7) Ball & socket joint :** Here one articular surface is like a ball and other of the shape of socket. Movements are around infinite axises. e.g. Shoulder & Hip joint.

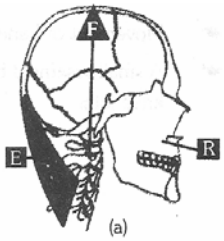



Simplified representations of subtypes of synovial joints. (a) Gliding. (b) Hinge. (c) Pivot. (d) Ellipsoidal. (e) Saddle (f) Ball-and-socket.

## ROLE OF MUSCLES AND BONES IN MOVEMENT

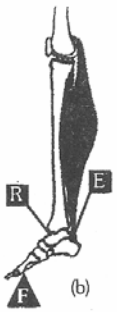
Movement of an organ occurs due to the pulling of the bones caused by the force generated by contraction in muscles. Movements take place along the joints which act as fulcrum of the Lever.
Theree types functioning can be observed in movements of human joints.

**Class I lever :** Here Fulcrum is between effort & resistance.



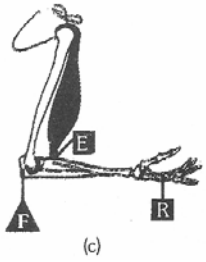

Example : Joint between the first vertebre (ATLAS) and occipital bone of skull.
**Fulcrum :** is the joint.
**Effort :** Is contraction of back muscles.
**Resistance :** Weight of the facial bone of skull.

**Class II lever :** Here resistance is between effort & fulcrum.




Example : Human body resting on toe.
**Fulcrum :** is the toe.
**Effort :** Is contraction of calf muscles.
**Resistance : Is body** Weight.

**Class III lever :** Here effort is between resistance and fulcrum.




Example : Flexing movement of the elbow of forearm.
**Fulcrum :** is the elbow joint.
**Effort :** Is contraction in Biceps muscles.
**Resistance :** Weight of distal part of hand.

**Disorders of Muscular and Skeletal System :**

**Arthritis : Inflammation of joints.**

**Osteoporosis :** Age-related disorder characterised by decreased bone mass and increased chances of fractures. Decreased levels of estrogen is a common cause.

**Gout :** Inflammation of joints due to accumulation of uric acid crystals.

## Special Points :

- ☞ Talus in Rabbit is called as Astragalus.
- ☞ Weberian ossicles are found in fishes.
- ☞ Avian (bird) skull is monocondylic
- ☞ Fontanelles are temporary apertures present in the skull of a new born baby.
- ☞ Superior and inferior articular processes of vertebrae are also called as per and post zygapophysis respectively.
- ☞ In Rabbit elbow and knee joints are also called ginglymoid joints.
- ☞ Cnemial crest is a ridge found in Tibia of Rabbit.
- ☞ Trochlear notch of Rabbit is also called as sigmoid notch.
- ☞ Zygomatic arch of rabbit is formed of maxilla, squamosal and jugal bone.
- ☞ Pelvic girdles are made of two hip bones which are also called as Innominates.
- ☞ Dentary is a membranous bone found in the lower jaw of some vertebrates like frog.
- ☞ Jaw suspension of mammals is craniostylic.
- ☞ Pterygoid bone is a wing shaped extension of sphenoid bone in Rabbit's skull.
- ☞ Longest bone of frog is Tibio-Fibula.
- ☞ Patella and pisciform are sessamoid bones found in humans.
- ☞ Sternum of mammals is formed of six sternebrae, xiphisternum and xiphoid process.
- ☞ Movement of hands while walking occurs for balancing.
- ☞ A small sesamoid bone Fabella often develops in the tendon of lateral head of gastronemius muscle behind the knee joint.