


SKELETAL SYSTEM

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1. General concepts about skeleton
 2. The skeleton
 3. Bone as an organ
 4. Functions of bone
 5. Classification of bones

The locomotor apparatus

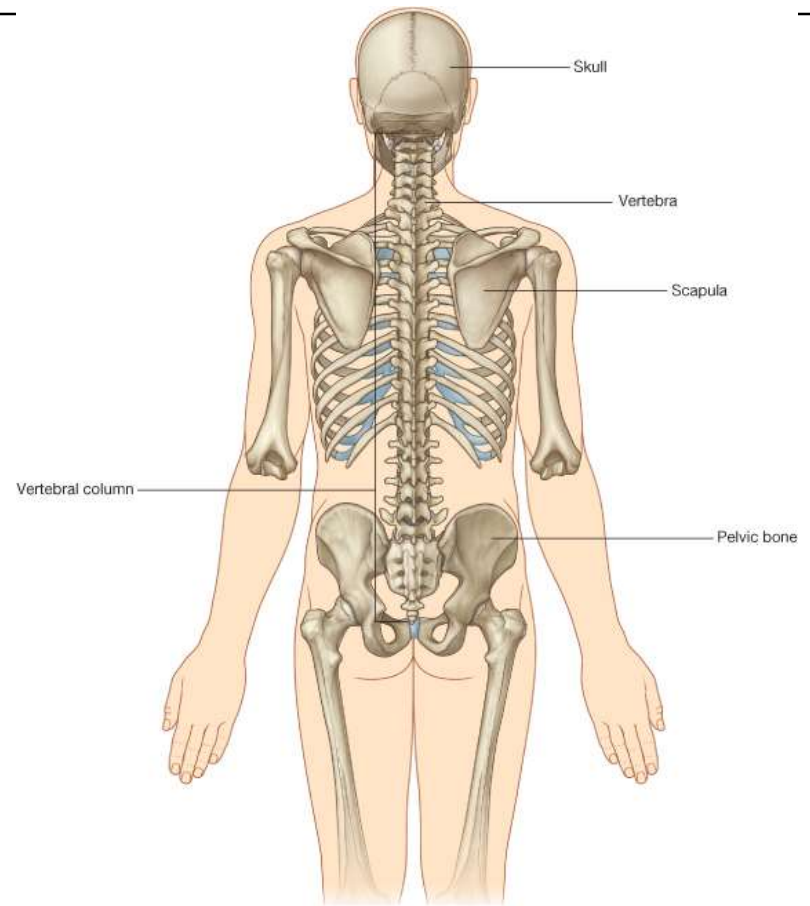
- The skeleton is a complex of hard structures of mesenchymal origin and possesses a mechanical significance.
- Composed of bones & cartilages
- The term skeleton comes from a Greek word *skeletos* meaning “dried up”.
- Forms the main supporting framework of the body.
- Designed for effective production of movements by the attached muscles.

The Skeleton

- The science concerned with the study of bones is termed **osteology**.

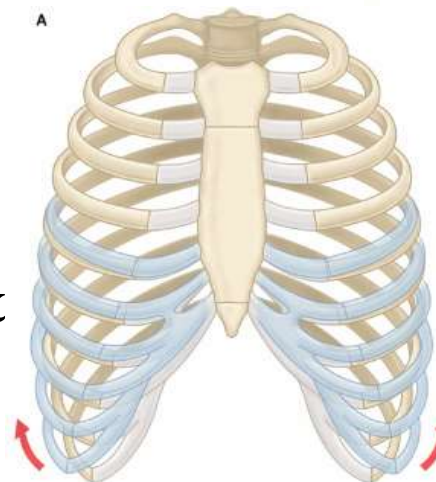
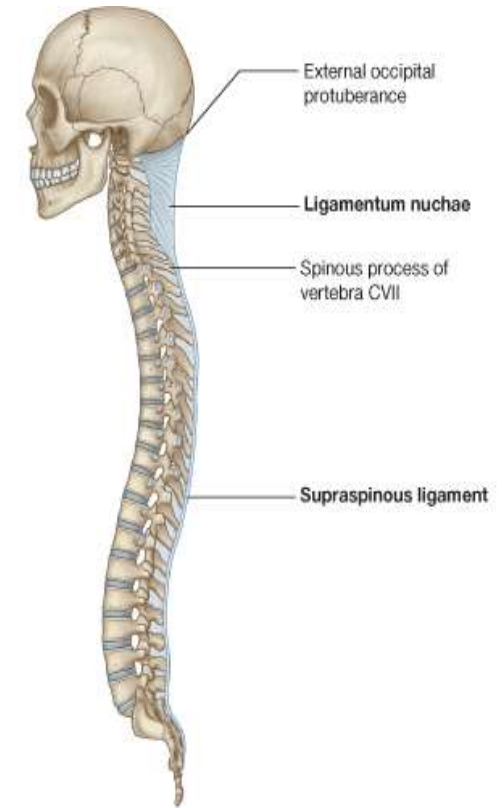
- The skeletal system of an adult is composed of approximately **206 bones**.

- 2 parts of the skeleton:
 - a) Axial
 - b) Appendicular



The axial skeleton

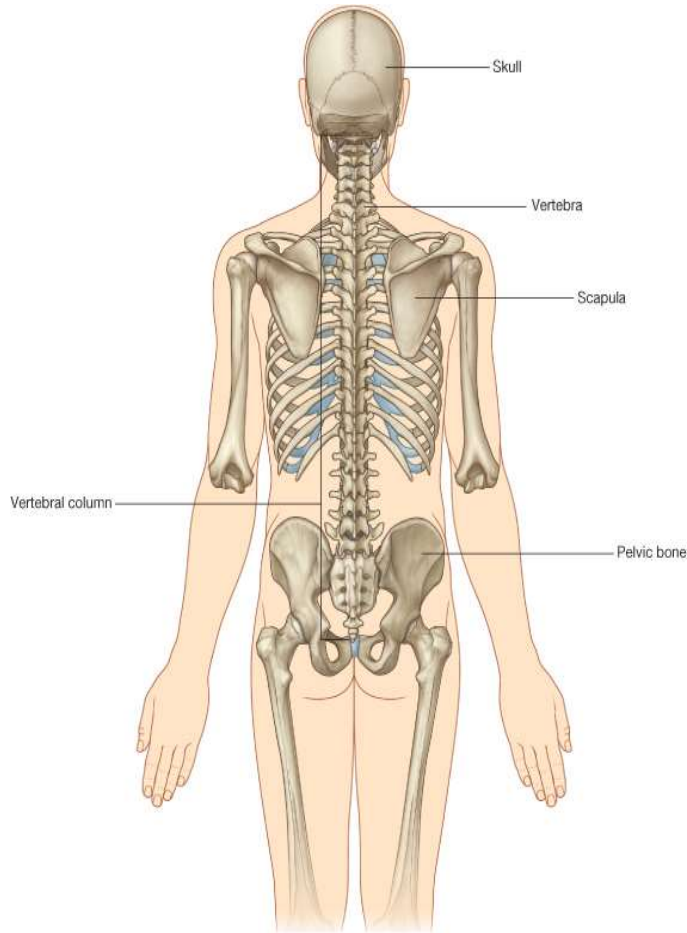
- ❑ Consists of **80 bones** that form the axis of the body which supports and protects the organs of the head, neck and trunk:
 - Skull (Cranium & face-22)
 - Auditory ossicles (6)
 - Hyoid bone (1)
 - Vertebral column (26)
 - Thoracic cage (Ribs-24 & sternum-1)



er Ltd. Drake et al: Gray's Anatomy for Students www.studentconsult.com



The appendicular skeleton



- ❑ Composed of **126 bones** of the upper (64) and lower limbs (62) and the bony girdles, which anchor the appendages to the axial skeleton.
- ❑ **The shoulder girdle** (the scapula and clavicle)
- ❑ **The upper limb** (the humerus, ulna, radius and bones of the hand)
- ❑ **The pelvic girdle** (the hip bone)
- ❑ **The lower limb** (the femur, tibia, fibula and bones of the foot)

Bone as an organ

- **Synonyms:** Os (L); Osteon (G)
- **Bone** is one of the hardest structures of the body.
- Highly vascular mineralized connective tissue consisting of cells and dense intercellular organic matrix impregnated with inorganic salts.
- Organic part (1/3)- collagen fibres: resilience
- Inorganic part (2/3)- Ca^{++} salts: hardness & rigidity



Functions of bone

- ❑ Rigid framework
- ❑ Surface for attachment of muscles, tendons & ligaments
- ❑ Serve as levers for muscles for movement
- ❑ Protection of visceras
- ❑ Contain marrow which is factory of blood cells
- ❑ Storehouse of calcium & phosphorus
- ❑ Paranasal air sinuses affect the timber of voice



Calcium

Phosphate

Magnesium

Sodium

Potassium



Classification of bones

- According to shape
- Structural classification
- Developmental classification
- Regional classification



According to shape

- ❑ Long bones
- ❑ Short bones
- ❑ Flat bones
- ❑ Irregular bones
- ❑ Pneumatic bones
- ❑ Sesamoid bones
- ❑ Accessory bones
- ❑ Heterotopic bones

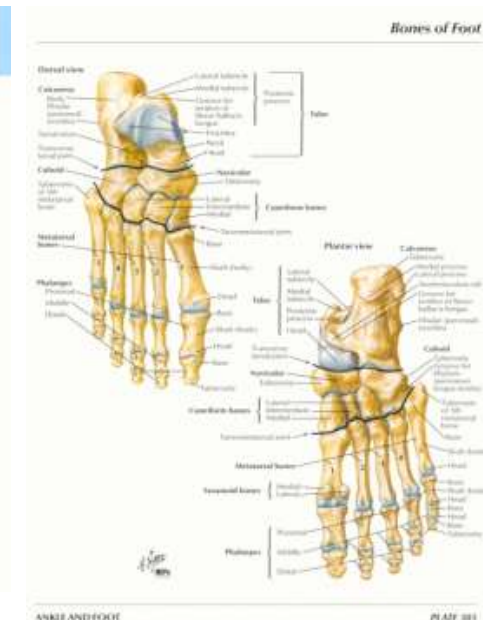
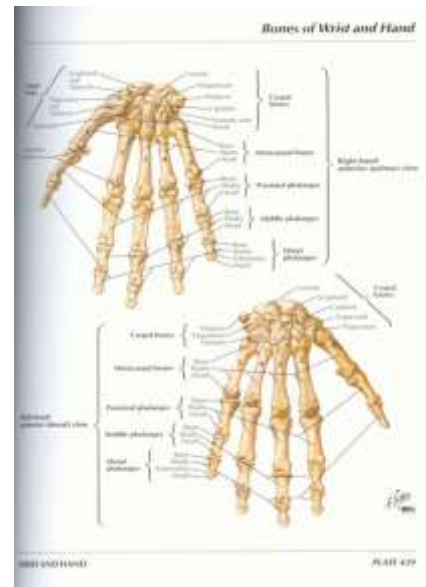
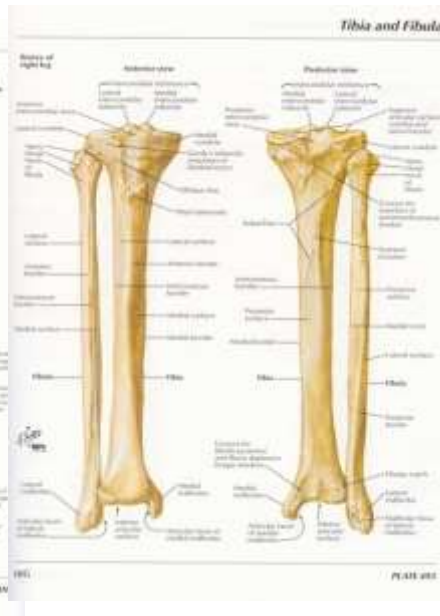
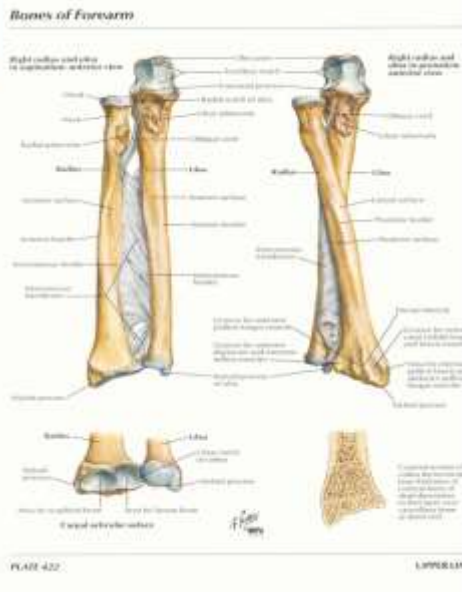
Long bones

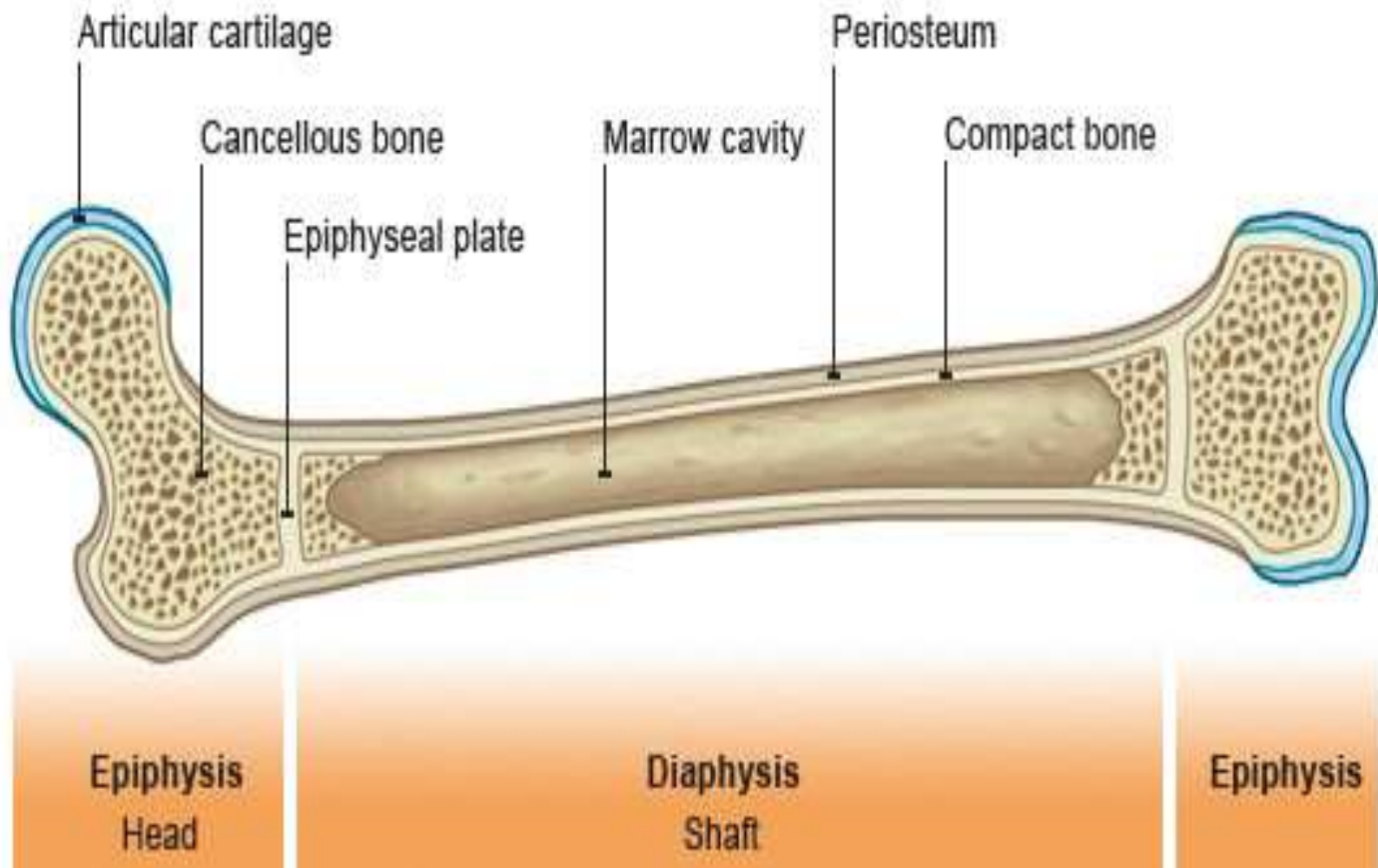
a) Long tubular bones

- humerus,
- radius, ulna,
- femur,
- tibia, fibula

b) Short tubular bones

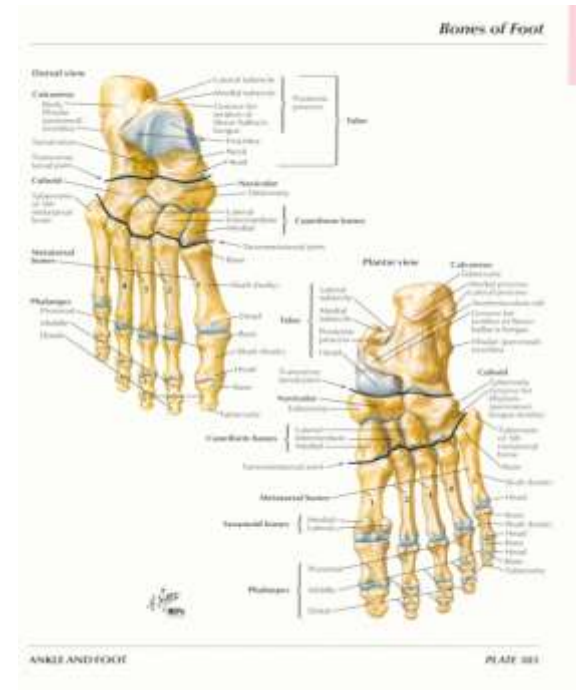
- metacarpal,
- metatarsal bones and phalanges





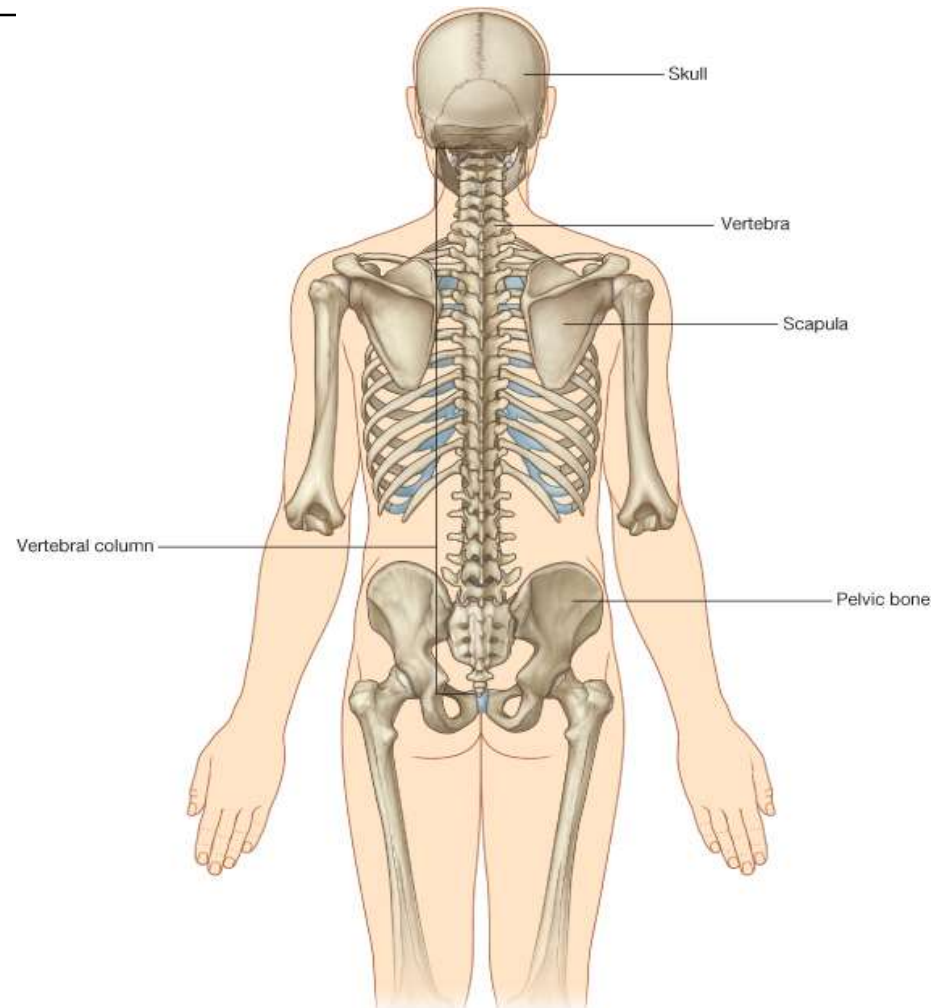
Short bones

- **Carpal and tarsal bones**



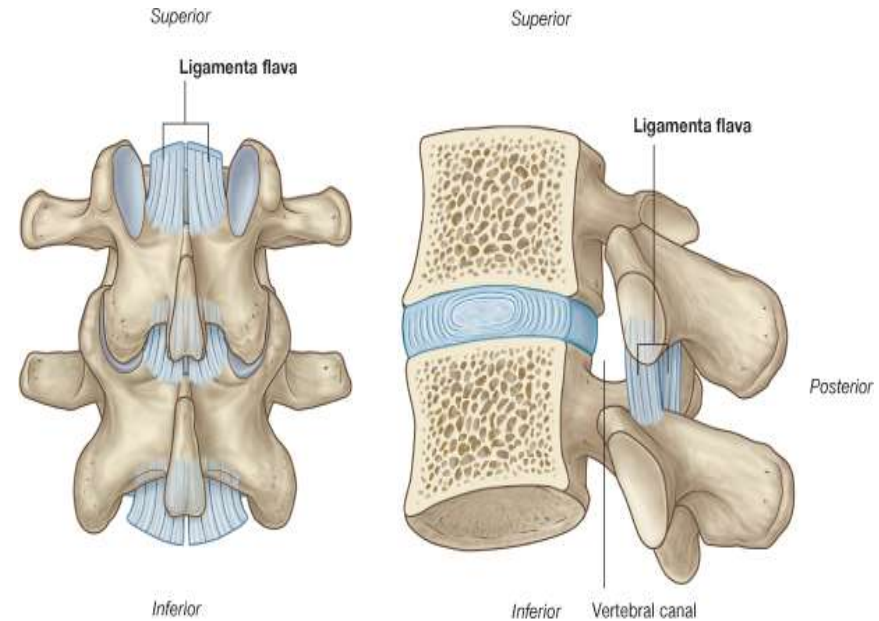
Flat bones

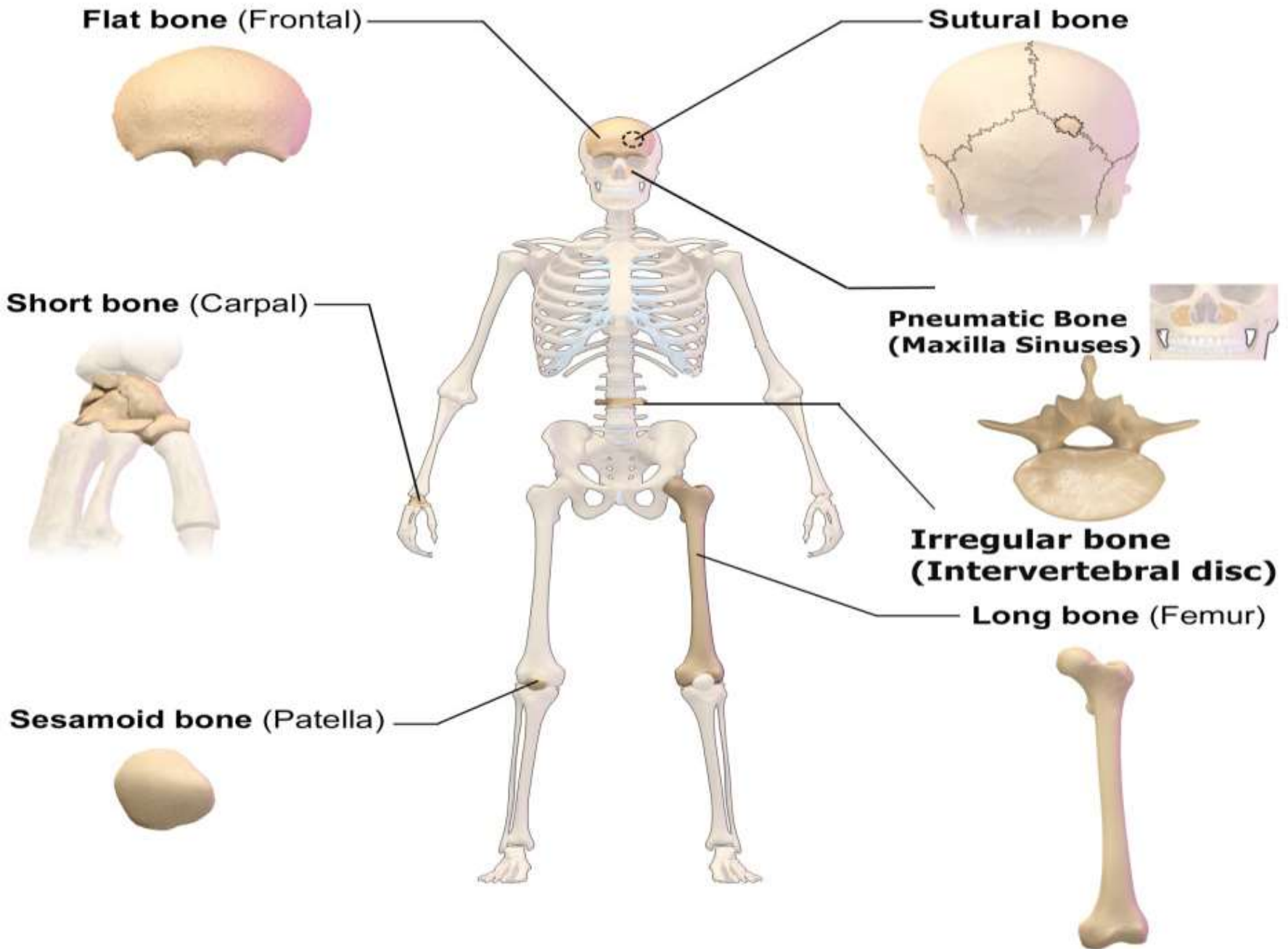
- Bones in the vault of the skull
- Ribs
- Sternum
- Scapula



Irregular bones

- Vertebrae
- Hip bone
- Bones at the base of skull





Classification of Bones by Shape

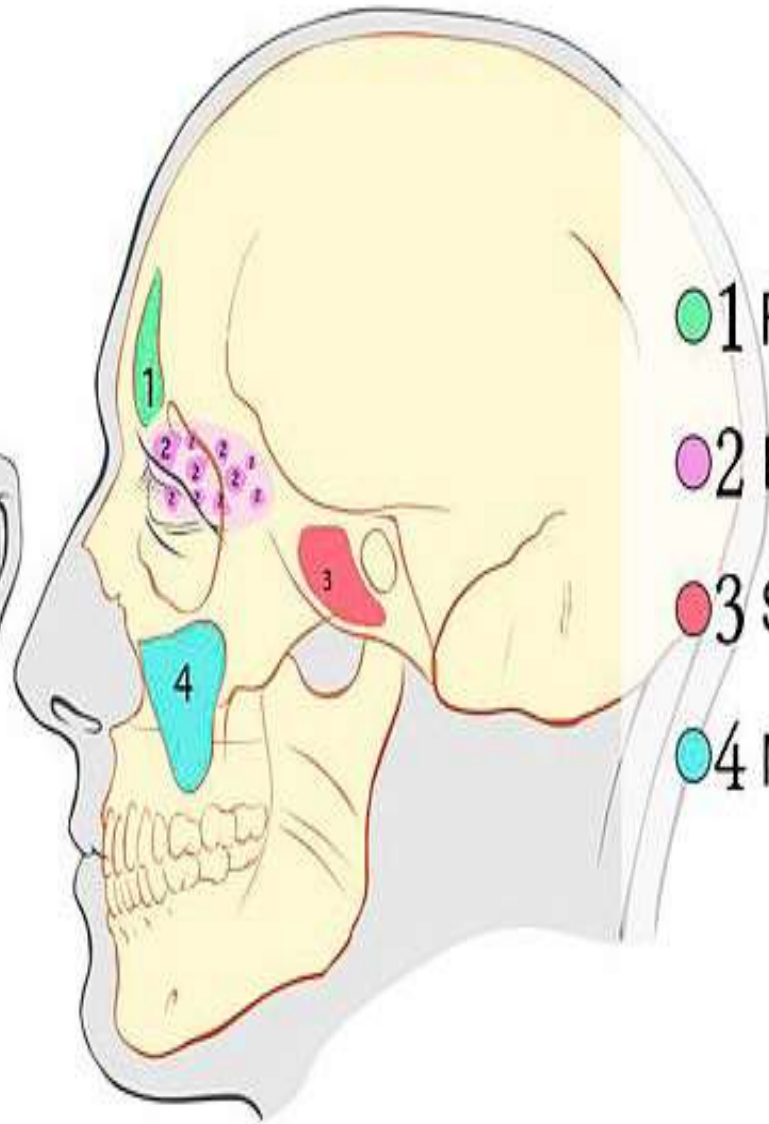
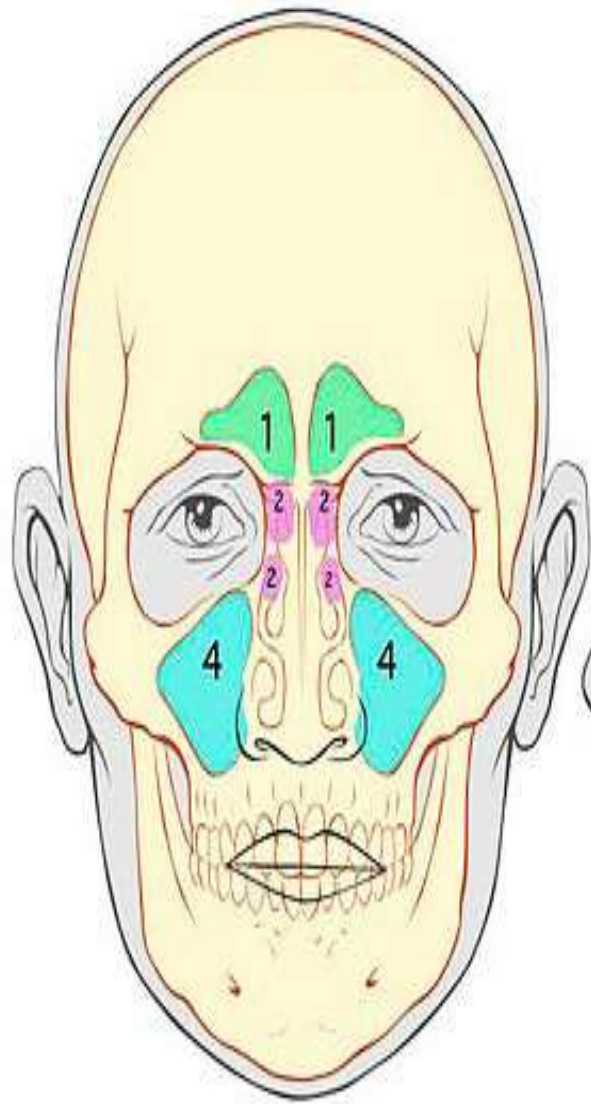


Pneumatic bones

- Maxilla
- Sphenoid
- Ethmoid

Sesamoid bones:

- Patella
- Pisiform
- Fabella



- 1 Frontal sinuses
- 2 Ethmoid sinuses
- 3 Sphenoid sinus
- 4 Maxillary sinuses

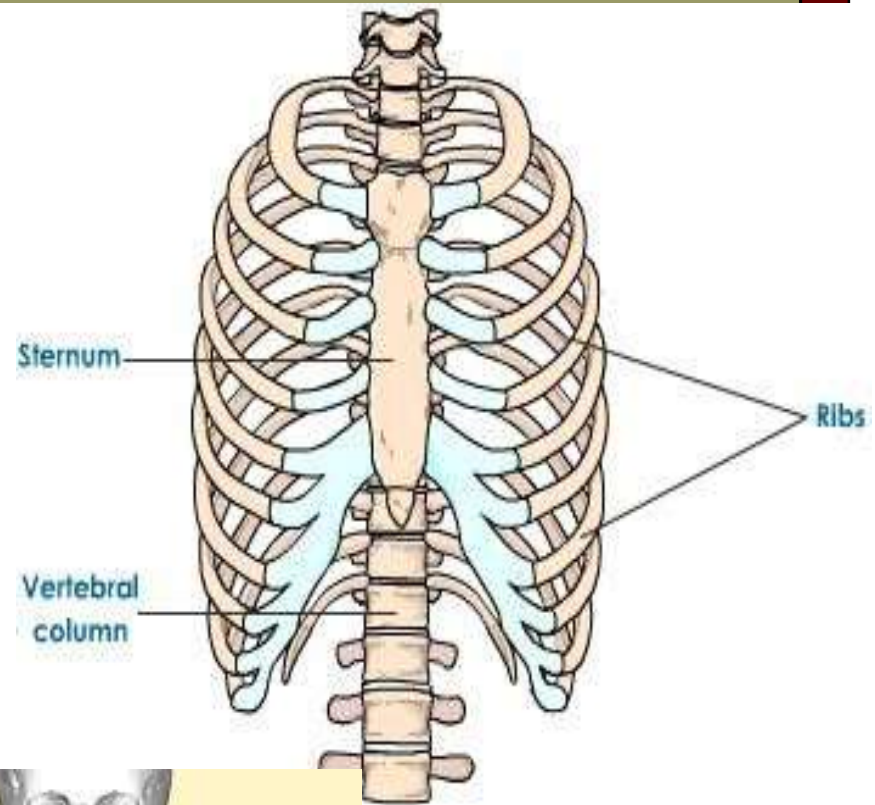
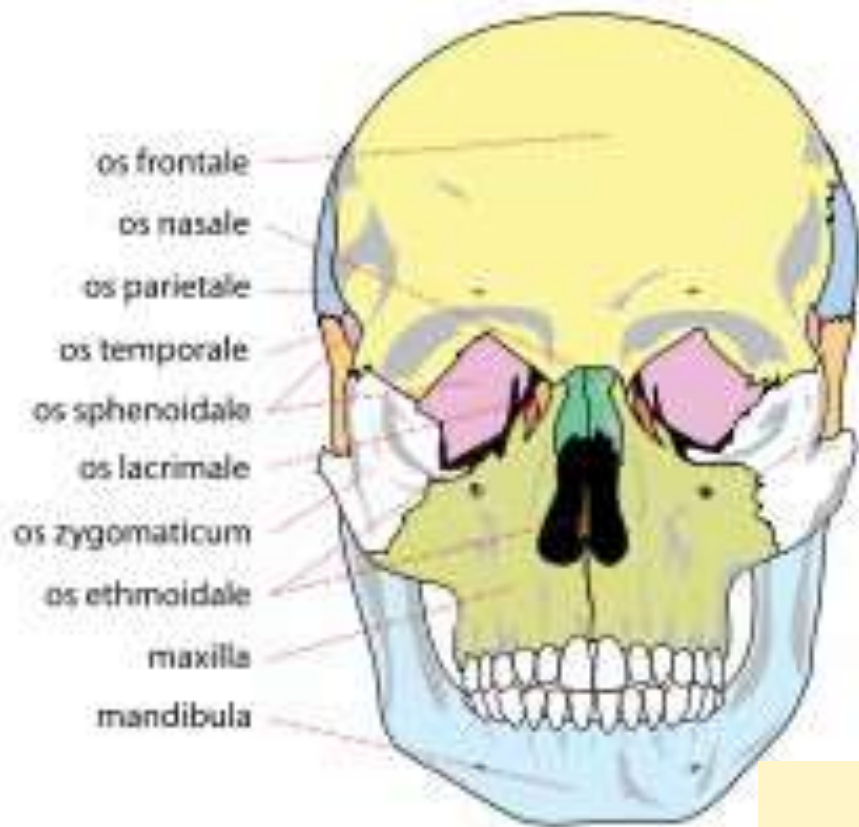
Anterolateral view
of the knee





Developmental classification

- **Membrane bones-** skull & facial bones
- **Cartilaginous bones-** limb bones, vertebral column, thoracic cage
- **Membrano-cartilaginous bones-** clavicle, mandible, occipital, temporal, sphenoid





Regional classification

- Axial skeleton
- Appendicular skeleton

Structural classification

- **Macroscopically-**

1. Compact bone
2. Cancellous or Spongy bone

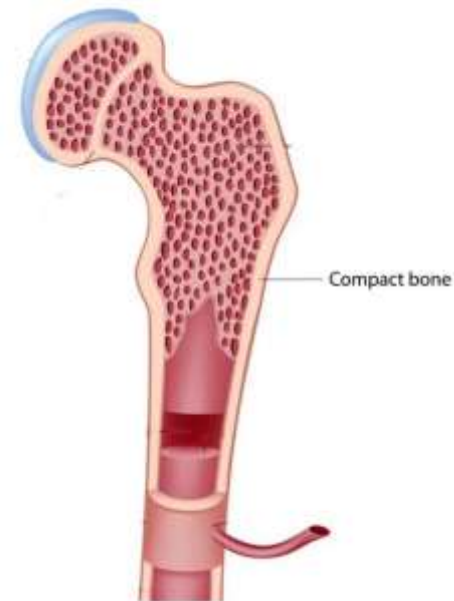
- **Microscopically-**

1. Lamellar bone
2. Woven bone
3. Fibrous bone
4. Dentine
5. Cement

a. Compact Bone:

- Compact bone is dense in texture but is

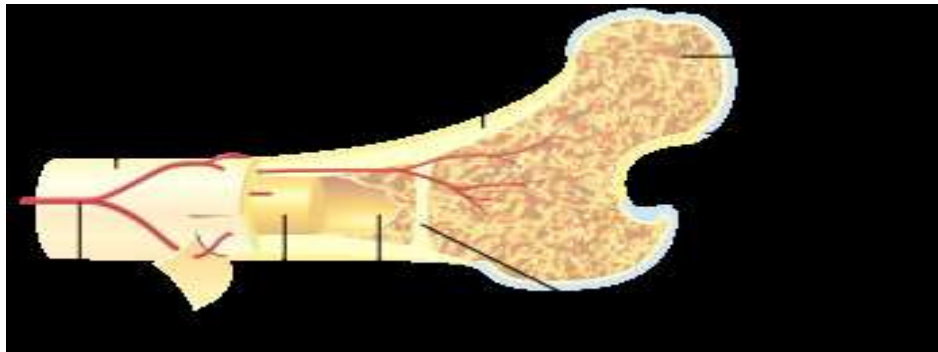
- extremely
- porous.
- Example: In the cortex of long bones.



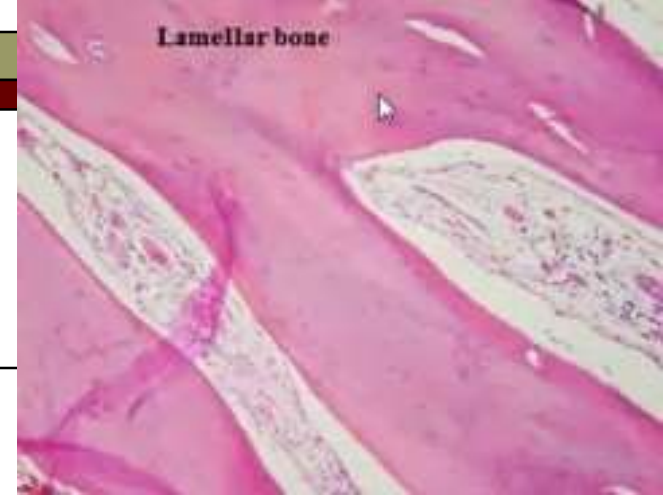
b. Cancellous OR Spongy Bone:

The part of bone where there is more empty space
and
less bone tissue.

Example: The inner part of Long
Bones.



b. Lamellar Bone:



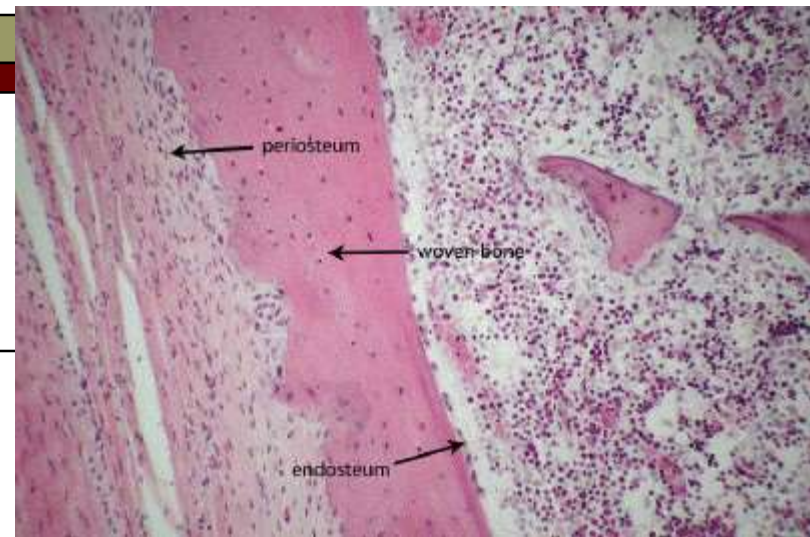
Most of the mature human bones, whether compact or Cancellous, are composed of thin plates of bony tissue called lamellae.

Example: Formed on the periosteal surface of diaphysis.

c. Woven Bone:

Occurs initially in fetal bones. In adults woven bone is created after fractures.

Example: Seen in fetal bone, fracture repair and in cancer of bone.



d. Cementum and Dentine:

Cementum is a specialized calcified substance covering the root of a tooth. It hardens to act as an adhesive glue.

Dentine is one of the hard tissues of the teeth which constitutes most of its bulk.

Example: Occur in teeth.

