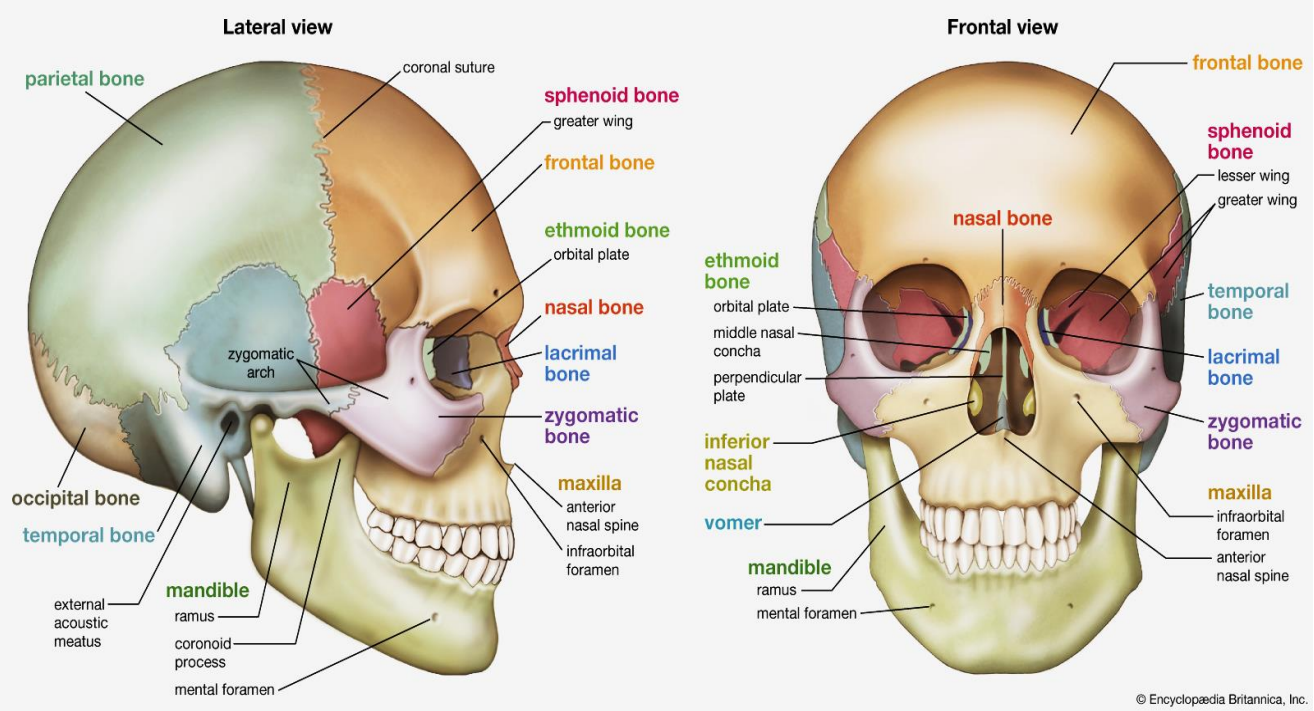
The Skull/ Part I

Introduction

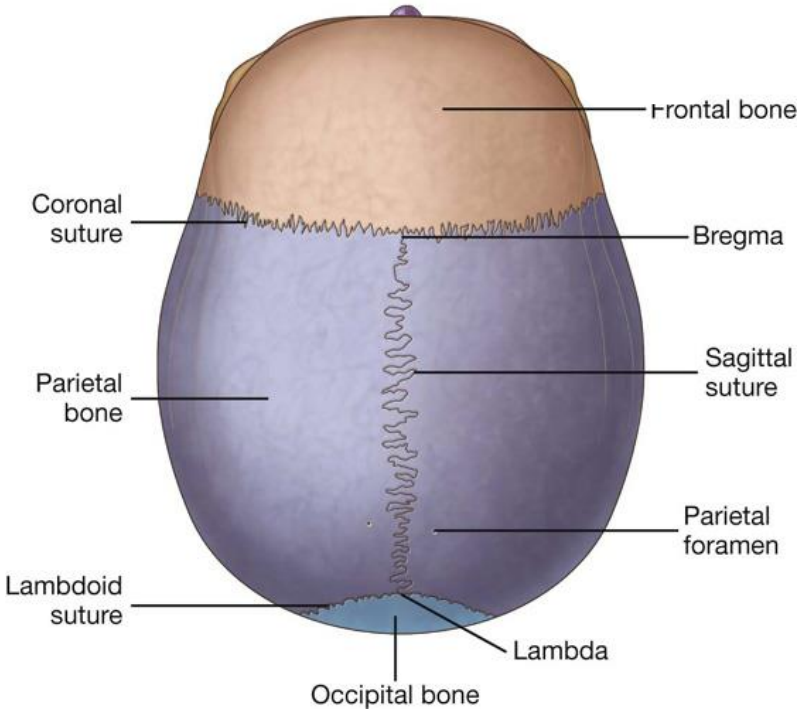
- The bones of the head and neck include the skull, middle ear ossicles, hyoid bone, and cervical vertebrae.
- The skull is composed of several separate bones united at immobile joints called sutures. The mandible is an exception to this rule, as it is united to the skull by the mobile, synovial TemproMandibular Joints (TMJ).
- The bones of the skull are 22 bones, organized into a cranial skeleton (8 bones) that surround the brain and a facial skeleton (14 bones).
- The cranial cavity is the space containing the brain. The skull vault (calvarium) is the upper part of the cranium and forms the roof and side walls of the cranial cavity.
- The base of the skull is the lowest part of the cranium and forms the floor of the cranial cavity.
- The relatively flat bones of the vault (frontal, parietals, and part of the occipital) are composed of external and internal tables of compact bone separated by a layer of spongy bone called the diploë.
- **The cranium consist of the following bones:-**
  - Frontal bone: one bone
  - Ethmoid bone: one bone
  - Sphenoid bone: one bone
  - Occipital bone: one bone
  - Parietal bones: paired (2 bones)
  - Temporal bones: paired (2 bones)

- **The facial skeleton consists of the following bones:**
  - Zygomatic bones: paired (2 bones)
  - Maxillae: paired (2 bones)
  - Nasal bones: paired (2 bones)
  - Lacrimal bones: paired (2 bones)
  - Palatine bones: paired (2 bones)
  - Inferior conchae: paired (2 bones)
  - Mandible: one bone
  - Vomer: one bone



The Skull (lateral and frontal view)

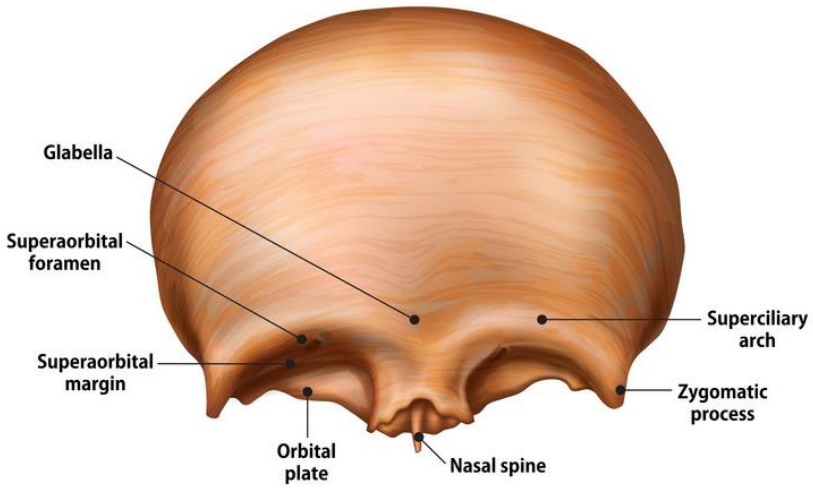
The Skull Vault (Calvaria)



The Cranial Bones:-

1- Frontal Bone

- The frontal bone is a single cranial bone that forms the anterior portion of the calvaria and upper third of the face (forehead).
- The frontal bone articulates with zygoma, maxilla, nasal bones
- In the Base of the skull; in anterior cranial fossa; it articulates with the ethmoid, and with the wings of the sphenoid bone.
- In the vault; it articulates with the parietal bones at coronal suture.
- The frontal bone forms a great portion of the roof of the orbit.
- The thickening of the frontal bone in the anterior region forms the superciliary arches (supraorbital ridges). These curved elevations give the prominence of eye brow region. The supraorbital notch or foramen crosses this rim and transmits the supra orbital nerve and vessel.



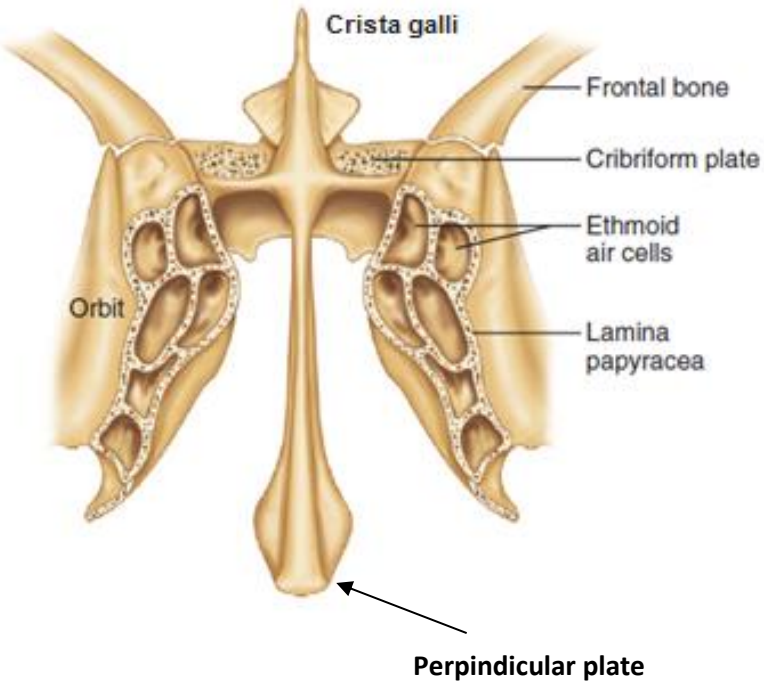
- The frontal bone contains the frontal air sinuses (paranasal sinus).

(The paranasal sinuses are mucous membrane lined air filled bone cavities, they are four in number: Maxillary (the largest), Frontal, sphenoid and ethmoid paranasal sinuses, they communicate with the nose and serve to lighten the facial skeleton and act as voice resonators.)

2- Ethmoid Bone

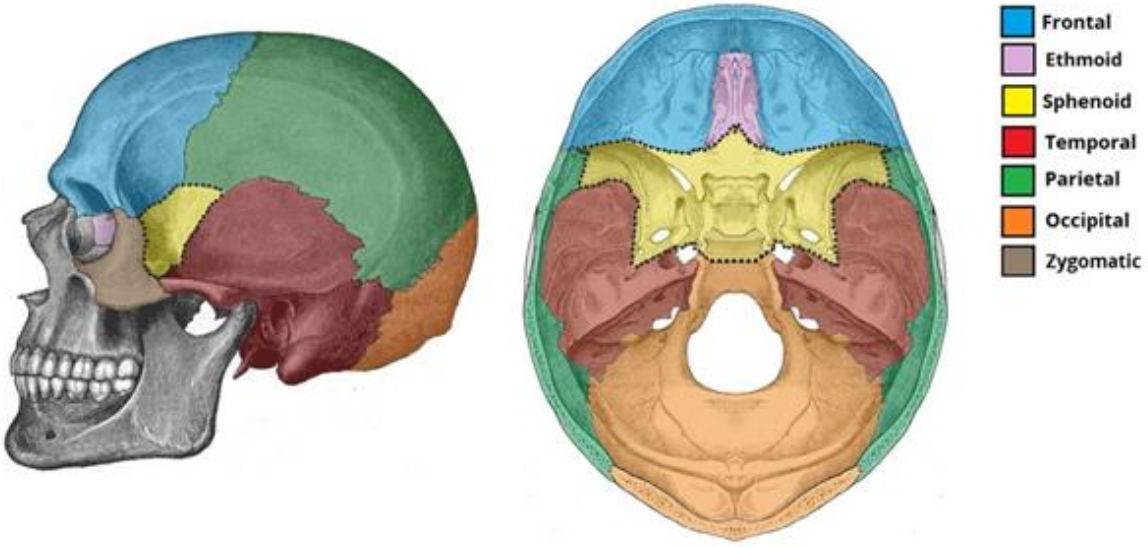
- The ethmoid bone is a single bone that lies in the mid area of the anterior cranial fossa.
- It constitutes part of the: nasal septum and medial orbital walls.
- Ethmoid bone is a pneumatic bone; contain the ethmoid air cells (ethmoid paranasal sinus).

- **Parts of Ethmoid bone:**
  i. The **(*crista galli*):** is a bony projection upward that gives attachment to Falx cerebri (meningeal layer of dura mater).
  ii. The ***perpendicular plate of ethmoid*** descends downward in the midline of nasal cavity to form part of the nasal septum. It articulates with the vomer and with septal cartilage to form the nasal septum.
  iii. The ***cribriform plate*** (perforated bony plates): by which filaments of olfactory nerve (cranial nerve I) are pass through.
  iv. The ***superior and middle nasal conchae*** which descend bilaterally in the nasal cavity.
  v. The ***lamina papyracea*** -paper like- is an extemely thin plate of ethmoid bone, constitutes most of the medial orbital wall.
  vi. ***Ethmoid air cell***: which lies lateral to lamina papracea

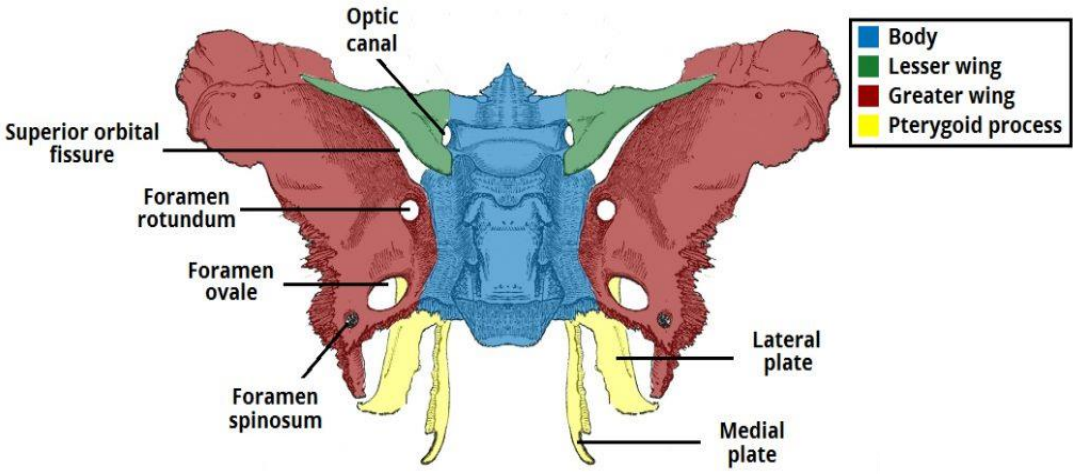


3- Sphenoid Bone

- The sphenoid bone is a single bone situated at the middle of the skull base, it is a part of the anterior and middle cranial fossae.
- This complex bone has many processes that articulate with the frontal, ethmoid, parietal, temporal, occipital, vomer, zygoma, palatine bones, and the tuberosity of the maxilla.



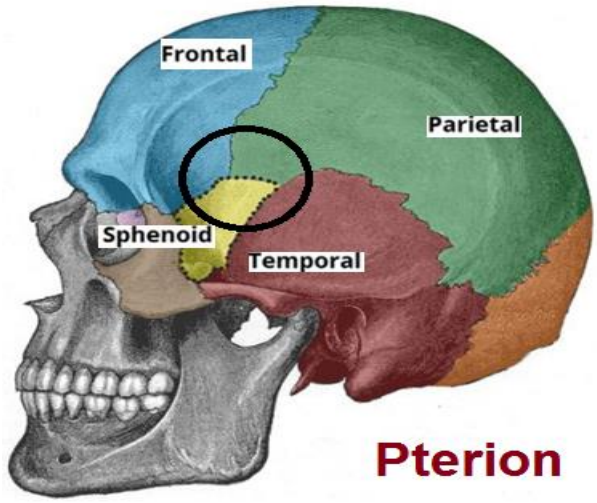
- The sphenoid bone looks like a butterfly in shape; with the following parts:
  - ***Lesser wing***
  - ***Greater wing***
  - ***Body***
  - ***Sphenoidal air sinuses*** (within the body)
  - ***Sella turcica or (hypophysial fossa):*** depression on the roof of the body for the pituitary gland (hypophysis).
  - ***Pterygoid plates*** (2 medial and 2 lateral).



4- Temporal Bone

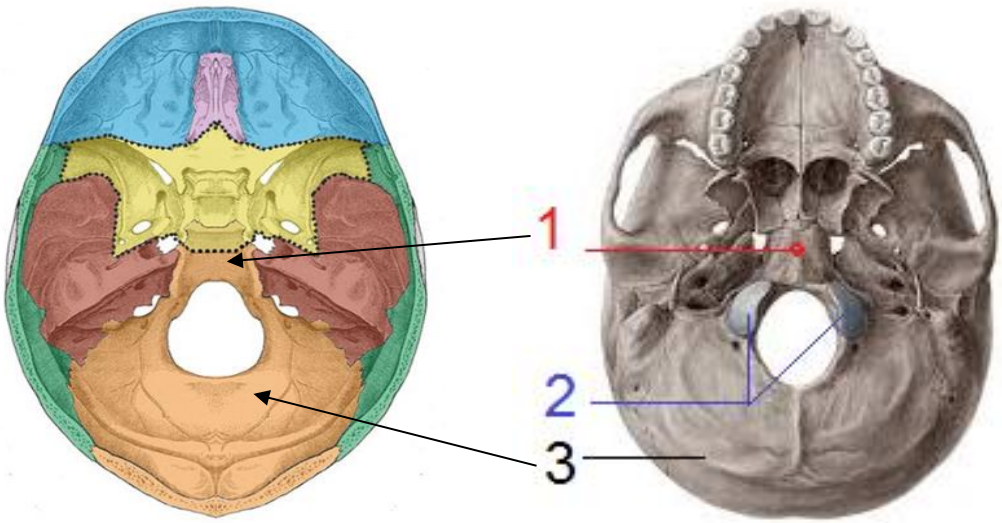
- It is a paired bone situated at the lateral side and base of the skull.
- Each temporal bone consists of the following parts and processes:

1) ***Squamous part***: is the largest and most superior part of the temporal bone, it joint the parietal bone at the squamous suture and makes part of the pterion (which is the weakest part of the skull, composed of the following bones (H shaped suture): frontal, parietal, sphenoid and temporal. Middle meningeal artery runs behind the pterion within the cranium).
2) ***Petrous part*** (also called the pyramid) It is located in the base of the skull, it houses the internal acoustic meatus and structures of the inner ear.
3) ***Mastoid process*** (contain mastoid air cells that act as reservoir of air to equalize the pressure in middle ear).
4) ***Tympanic part*** (contain the external auditory meatus)
5) ***Styloid process*** (gives attachment to muscle and ligaments)
6) ***Zygomatic process***: forms the zygomatic arch with the temporal bone.
7) ***Glenoid Fossa***: which articulates with the mandibular condyle to form the Tempromandibular joint TMJ.



5- Occipital Bone

- The occipital bone is single trapezoidal bone which is the main bone of back of the skull (occiput). It makes up a large portion of the basilar part of the neurocranium and entirely houses the cerebellum.
- Superiorly the occipital bone articulates with the parietal bones at the lambdoid suture and constitutes a part of the vault of the skull. Inferiorly; it is the only cranial bone to articulate with the cervical spine. Anteriorly it articulates with the sphenoid at the skull base.
- The occipital bone is composed of the following parts:
  - ***Squamous part*** (no.3) is the largest of all; it lies posterior to foramen magnum. The external surface features external occipital protuberance , and three curved lines referred to as nuchal lines.
  - ***Basilar part*** (no.1) lies anterior to the foramen magnum and adjacent to the petrous part of the temporal bone. Anteriorly it articulates with the sphenoid .
  - ***Condylar parts*** (no.2): are located lateral to the foramen magnum. They comprise two kidney-shaped prominences (occipital condyles) that articulate with the first cervical vertebra at (atlanto-occipital joint).



6- Parietal Bones

- Parietal bones are two flat bones that form the majority of the vault of the skull (calvaria), they articulate with each other in the midline at the sagittal suture.
- Anteriorly they articulate with the frontal bone at the coronal suture. The joint between the coronal suture and the sagittal suture known as Bregma.
- Posteriorly they articulate with the occipital bone at the lambdoid suture. The area of joining the sagittal suture with the lambdoid suture is known as lambda.
- Laterally they articulate with squamous temporal bone at the squamous suture.
- The bones have paired foramenae (one in each bone), known as parietal foramen and contain an emissary vein (emissary vein is the vein that connect between intracranial veins and extra cranial veins).
- ***Return to the figure in Page 3.***

This is the End of the Lecture – Good Luck