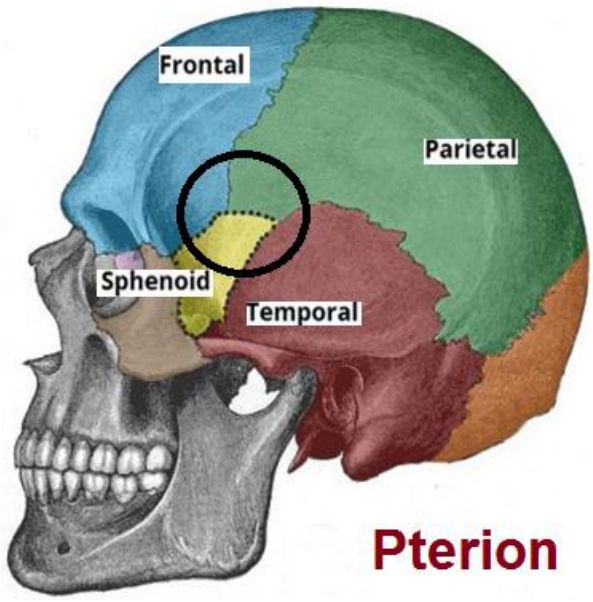
The Skull/ Part II

3- Temporal Bone

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

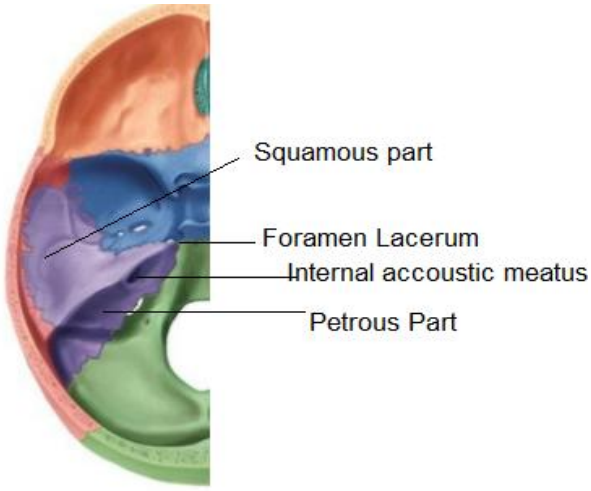
1) ***Squamous part***: is the largest and most superiorly situated part of the temporal bone, it joint the parietal bone at the squamous suture and makes part of the pterion (which is the weakest part of the skull, composed of parts of the following bones (H shaped suture): frontal, parietal, sphenoid and temporal. The middle meningeal artery runs behind the pterion within the cranium).



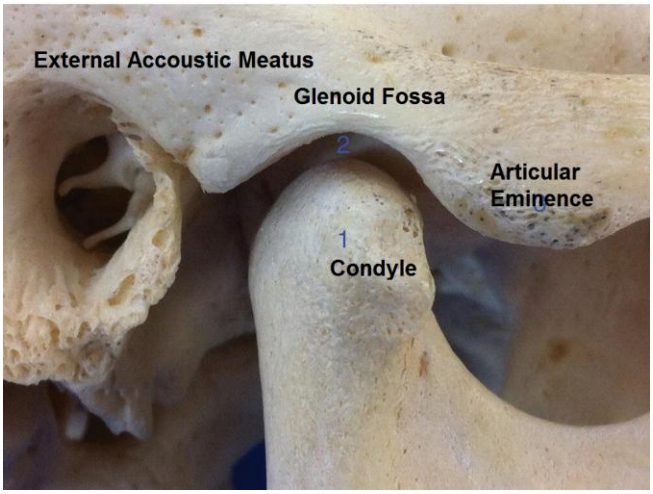
2) ***Petrous part*** (also called the pyramid) It is located in the base of the skull, it houses the internal acoustic meatus and structures of the inner ear (internal auditory canal).

3) ***Mastoid process*** (contain mastoid air cells that act as reservoir of air to equalize the pressure in middle ear) is considered as down growth from petrous part and both known as petromastoid.
4) ***Tympanic part*** (contain the external auditory meatus)
5) ***Styloid process*** (gives attachment to muscle and ligaments)
6) ***Zygomatic process*** (form the zygomatic arch with the temporal process of the zygomatic bone).

- The bone's foramenae and canals are:
  i. Foramen lacerum,
  ii. Carotid canal
  iii. Internal acoustic meatus
  iv. External acoustic meatus
  v. Stylomastoid foramen

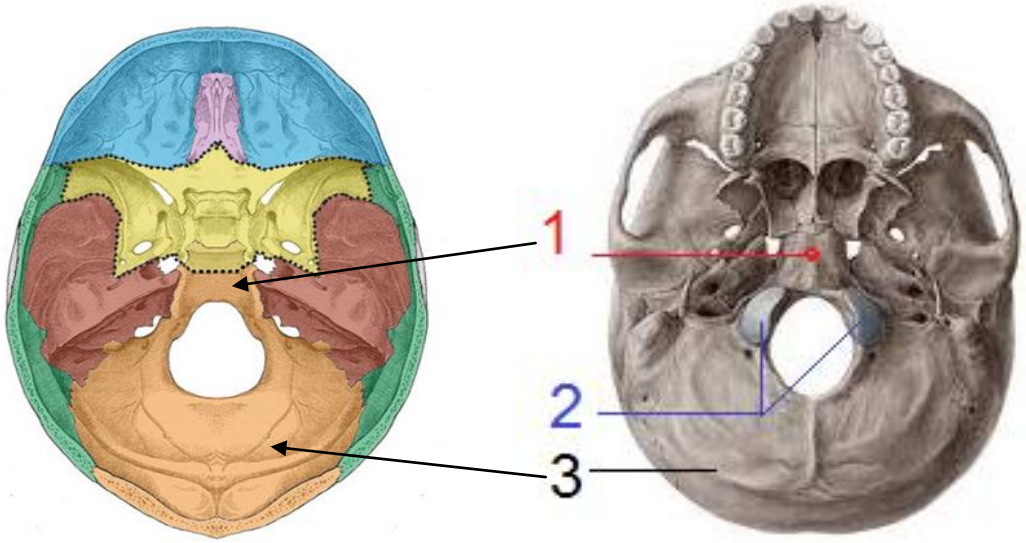


- The temporal bone articulate with the mandibular bone through the TemproMandibular Joint (TMJ), the glenoid fossa of the temporal bone (at the root of zygomatic arch) articulates with the condylar head of the mandible.



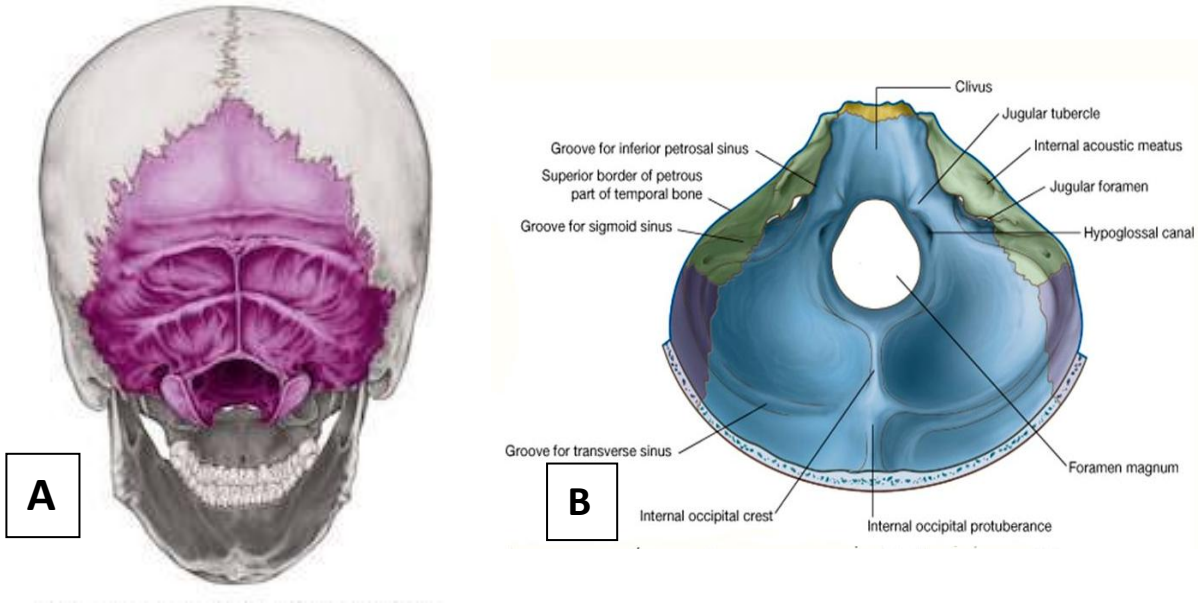
4- Occipital Bone

- The occipital bone is an unpaired 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 which are: basilar part (no.1 in the figure below), Condylar part (no.2), and the squamous part (no.3).



- The ***squamous part*** (no.3) is the largest of all; it lies posterior to foramen magnum, it is convex externally and concave internally. The external surface features external occipital protuberance (a palpable prominence lies on the midline of the external surface which serves as an attachment for the trapezius muscle), and three curved lines referred to as nuchal lines (The highest nuchal line, the superior nuchal line, and the inferior nuchal line). The internal surface

of the squamous part is marked by grooves on its internal surface due to venous cranial sinuses: the superior sagittal sinus, the transverse sinuses and the sigmoid sinus.

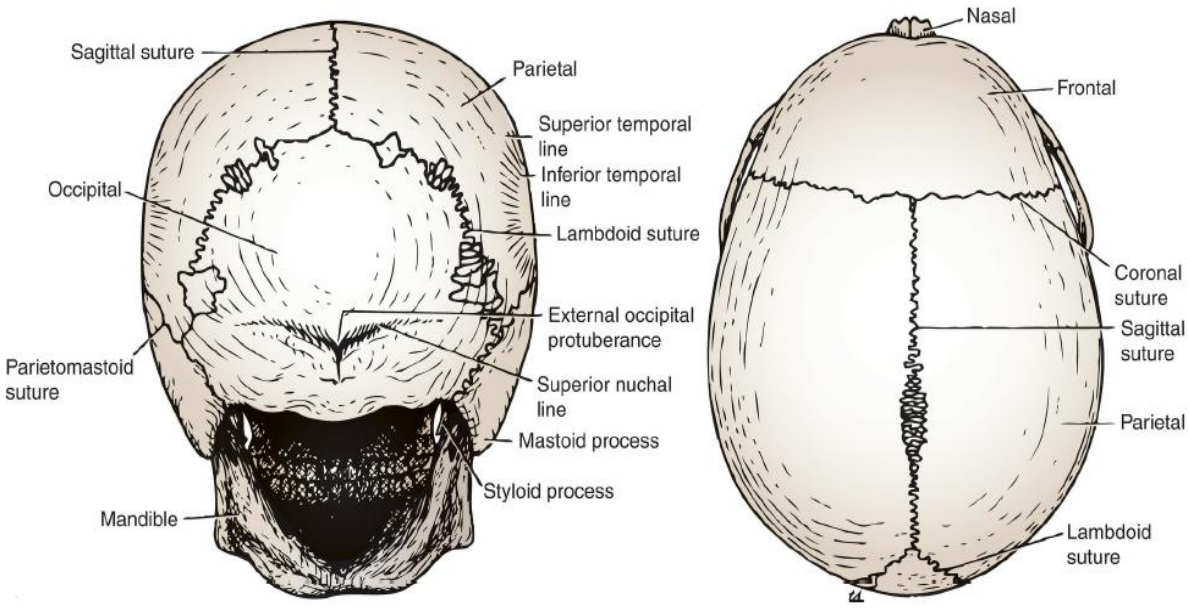


A: external view of the bone showing the protuberance and nuchal lines, B: internal view of the bone showing the grooves for venous sinuses

- The ***basilar part*** lies anterior to the foramen magnum and adjacent to the petrous part of the temporal bone. Anteriorly it articulates with the sphenoid bone.
- The ***condylar parts*** (occipital condyle) are located lateral to the foramen magnum. They comprise two kidney-shaped prominences (occipital condyles) that articulate with the first cervical vertebra (atlanto-occipital joint).
- The bone's foramenae and canals are:
  i. Foramen magnum
  ii. The hypoglossal canal
  iii. The jugular foramen

5- Parietal Bones

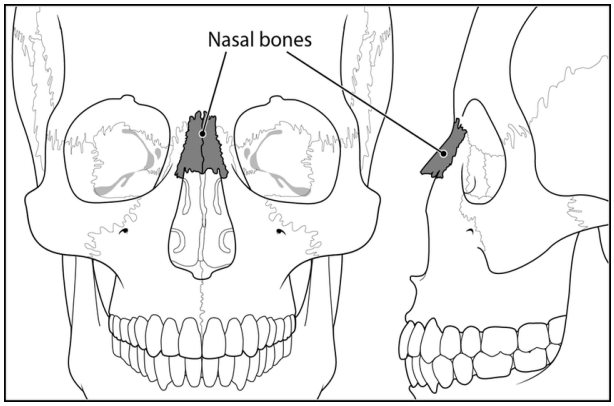
- Parietal bones are two flat bones that form the majority of the vault of the skull (calvaria), they articulate with each other in the midline at the sagittal suture.
- Anteriorly they articulate with the frontal bone at the coronal suture. The area of joint between the coronal suture and the sagittal suture known as Bregma.
- Posteriorly the paired bones 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 the bones 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).



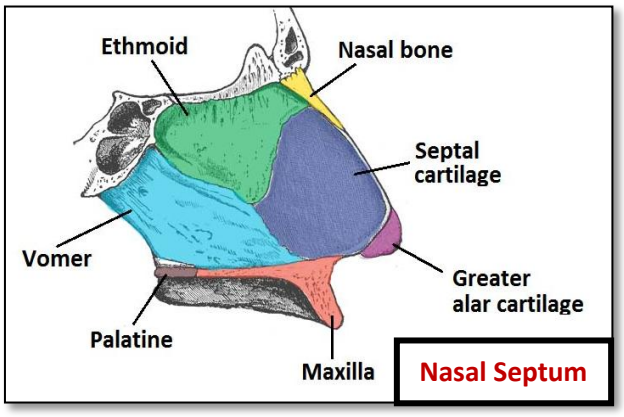
The Facial Bones:-

1) The Nasal Bones

The nasal bones are rectangular bones, they form the bridge of the nose, they articulate with the frontal bone superiorly and with each other at the midline. At the superior articulation, they are relatively thick, but inferiorly, they are most fractured facial bones. The nasal bones articulate posteriorly with the frontal process of the maxilla.



The nasal cavity is divided into two cavities by the nasal septum, which is formed by the vomer, the perpendicular plate of the ethmoid and septal cartilage.



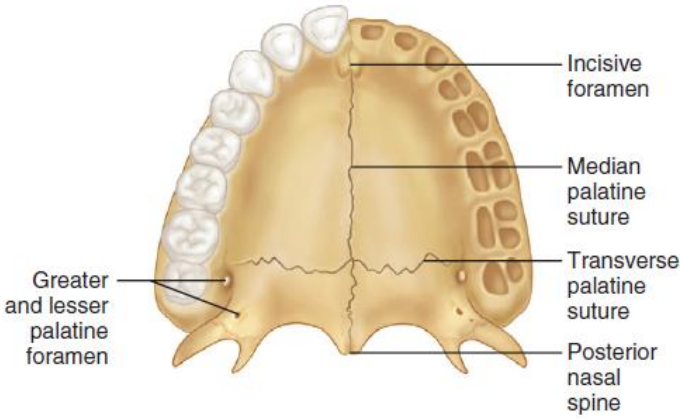
2) The Maxillary Bones

The two maxillae form the upper jaw, the anterior part of the hard palate, part of the lateral walls of the nasal cavities, and part of the floors of the orbital cavities. The two bones meet in the midline at the intermaxillary suture and form the lower margin of the nasal aperture.

The infraorbital foramen perforates the maxilla below the orbit. The alveolar process projects downward and, together with the opposite side, forms the alveolar arch, which carries the upper teeth.

Each hemimaxilla contains a large pyramid-shaped hollow body, the maxillary sinus (antrum of Highmore), and four prominent processes—the frontal, alveolar, zygomatic, and palatine processes.

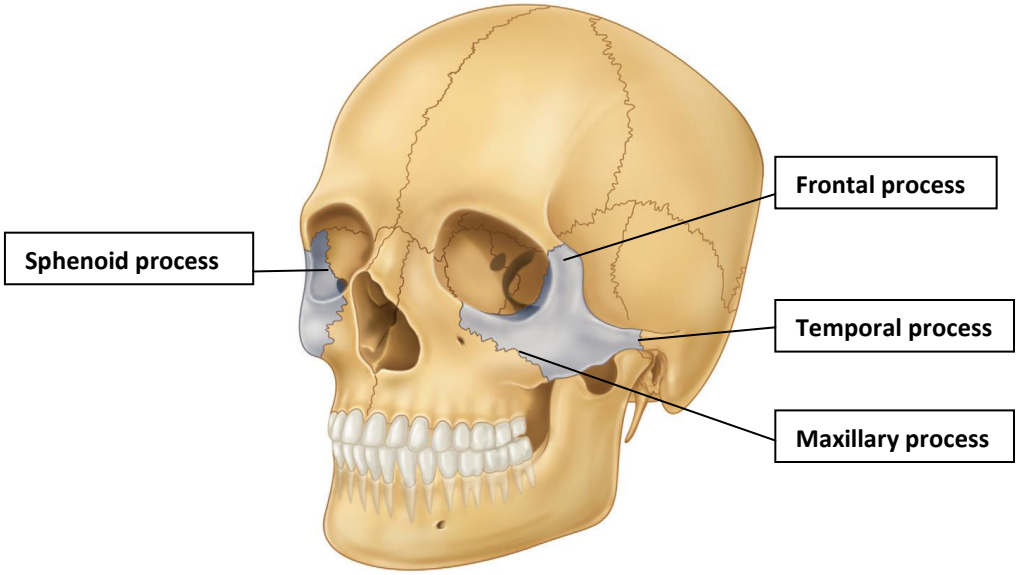
The anterior wall of the sinus is the facial surface of the maxilla and is usually thin. The medial wall is the lateral nasal wall. The superior wall or roof of the sinus is the orbital floor, and the floor of the sinus is the palatine and alveolar processes of the maxilla. The sinus opens superiorly and medially into the nasal cavity at the the middle meatus.



3) The Zygoma

The zygoma (zygomatic bone, malar bone) is a paired bone that makes up the cheek prominence. This thick, strong, diamond-shaped bone forms is composed of four processes (frontal process, sphenoid process, temporal process, and the maxillary process) which articulates with the four mentioned bones.

The only foramina of the zygomatic bone are the zygomaticofacial foramen, and the zygomaticotemporal which contain the zygomaticofacial and zygomatico-temporal branches of the second division (maxillary division) of the trigeminal nerve.



Clinical note: On the inferior aspect, there is the insertion of the masseter muscle. The direction of force for this muscle is down and backward and its contraction contributes to displacement of the complex fracture of the zygoma

Masseter Muscle

This is the End of the Lecture – Good Luck