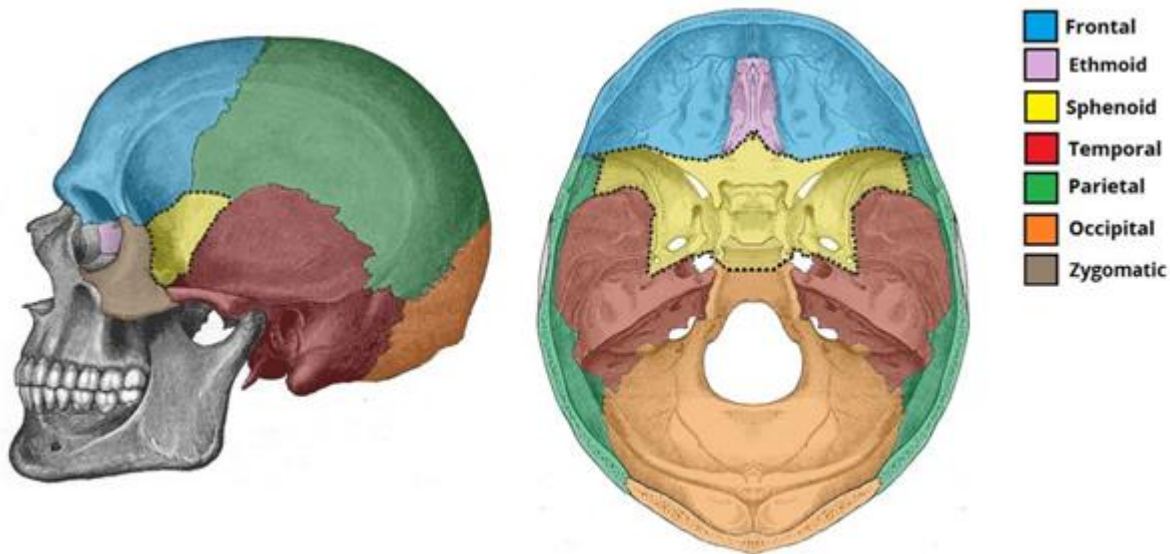


The Skull/ Part II

3- Sphenoid Bone

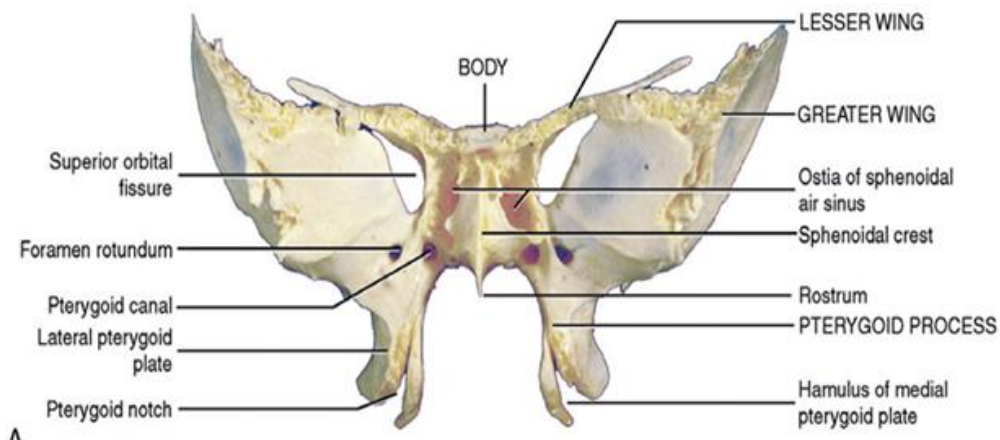
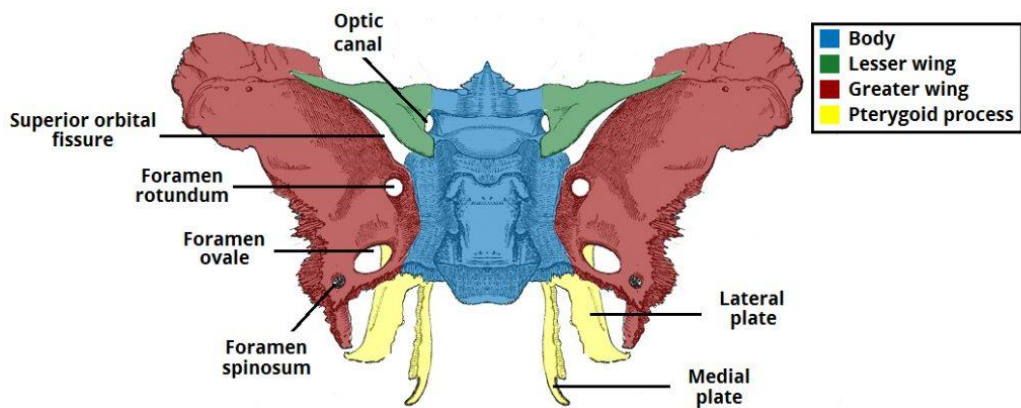
The sphenoid bone is a single bone situated at the middle of the skull base, it is a part of the anterior and middle cranial fossae. This complex bone has many processes that have delicate articulations with the adjacent cranial and facial bones. The sphenoid bone articulates with the frontal, ethmoid,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



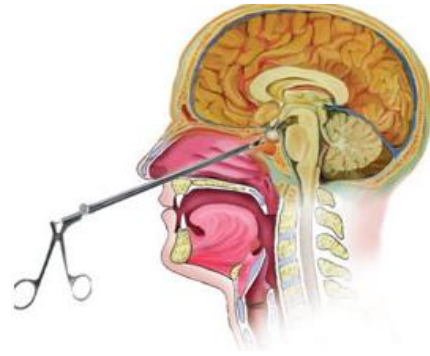
The sphenoid bone looks like a butterfly in shape; it has lesser wing, greater wing, body and pterygoid plates (2 medial and 2 lateral). Also it contains many foraminae and fissures; as the optic canal (Optic N. CNII), foramen rotundum (Maxillary N. CNV₂), foramen ovale (Mandibular N. CNV₃), foramen spinosum (middle meningeal artery) and superior orbital fissure (Oculomotor N. CNIII, Trochlear N. CNIV, Ophthalmic N. CNV₁, Abducens N. CNVI and superior Ophthalmic Vein) .

The body of the sphenoid bone is hollow and forms two cavities separated by a thin bony septum. The hollow cavities are the sphenoidal air sinuses; these drain into the superior nasal meatus. On the superior surface of the body; there is depression for the pituitary gland (hypophysis) Known as hypophysial fossa or (*Sella turcica*).

The body of the sphenoid lies on the roof of nasal cavity and that's why the pituitary gland surgery can be done by passing an endoscope through the nose (transnasal).



Transnasal approach to pituitary gland

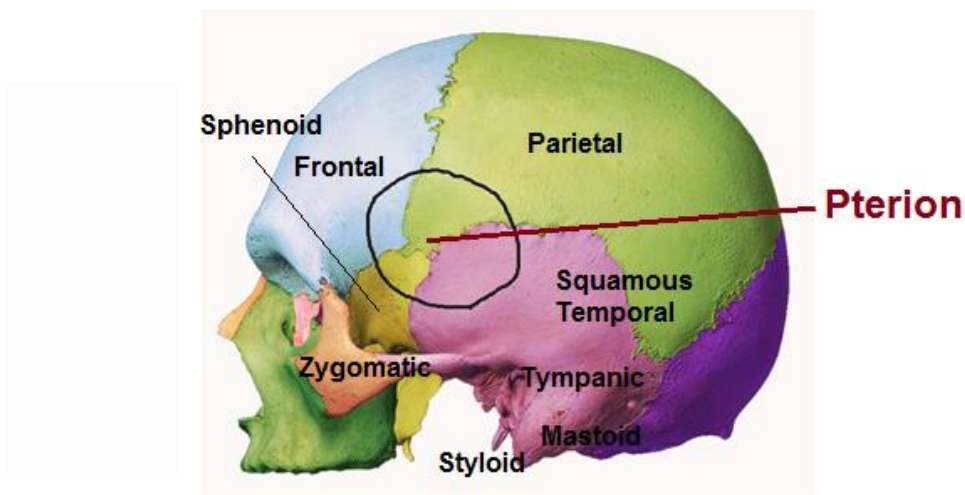


In children; the sphenoid occipital joint is cartilaginous (sphenoid occipital synchondrosis) and considered as growth center for the skull base then it will be transformed to suture at the completion of growth.

4- Temporal Bone

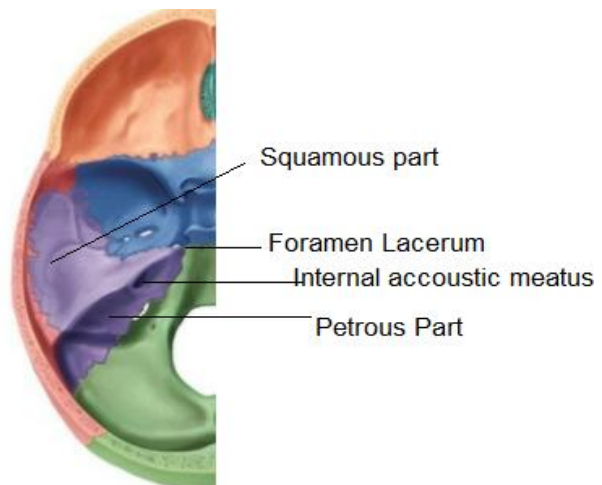
The temporal bone is a paired bone situated at the lateral side and base of the skull. Each temporal bone consists of the following parts and processes:

- **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). Mastoid process (contains 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.
- **Tympanic part** (contains the external auditory meatus)
- **Squamous part**: is the largest and most superiorly situated part of the temporal bone, it joins 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: frontal, parietal, sphenoid and temporal. The middle meningeal artery runs behind the pterion within the cranium)

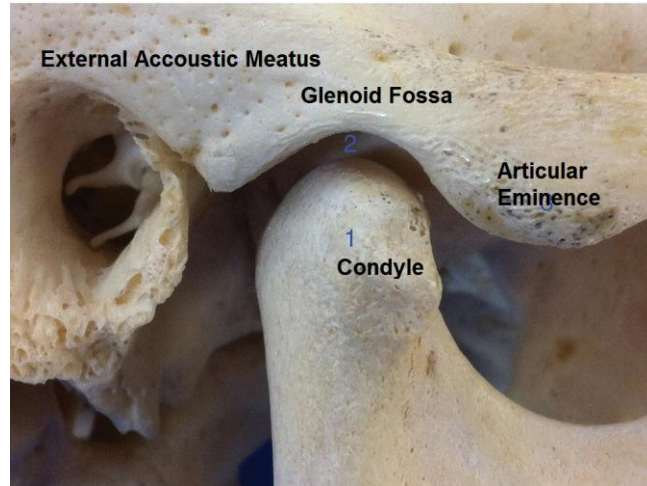


- **Styloid process** (gives attachment to muscle and ligaments)
- **Zygomatic process** (form the zygomatic arch with the temporal process of the zygomatic bone).

The foraminae and canals in the temporal bone; are: foramen lacerum, carotid canal, internal acoustic meatus, external acoustic meatus, stylomastoid foramen and facial nerve canal (the inner opening is the internal acoustic and the outer opening is the stylomastoid foramen- between styloid and mastoid).



The temporal bone articulates with the mandibular bone through the Temporomandibular Joint (TMJ), the glenoid fossa of the temporal bone (at the root of zygomatic arch) articulates with the condylar head of the mandible. The anterior boundary of the glenoid fossa is the articular eminence.

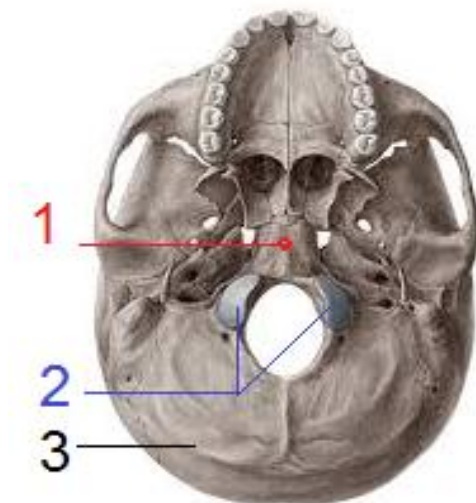


5- Occipital Bone

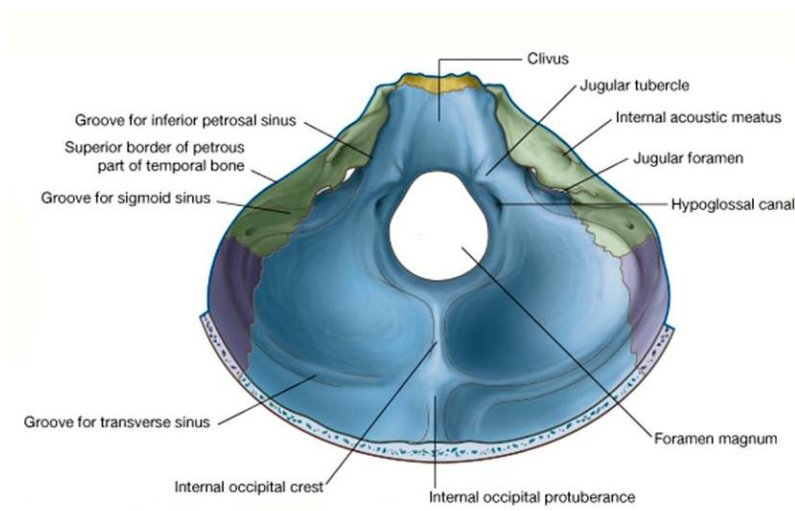
The occipital bone is an unpaired trapezoidal bone which is the main bone of back of the skull (occiput). It makes up a large portion of the basilar part of the neurocranium and entirely houses the cerebellum.

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) which is placed laterally to the foramen magnum.



The squamous part is the largest of all; it lies posterior to foramen magnum, it is curved from above downward (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 (provide attachments to muscles and ligaments): The highest nuchal line, the superior nuchal line runs slightly inferior and the inferior nuchal line runs further inferiorly. 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.



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, *Condylus occipitalis*) 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 hypoglossal nerve exits the neurocranium through the hypoglossal canal which

pierces through the condylar part of the occipital bone. The jugular foramen lies between the occipital bone and petrous part of the temporal bone (contents: internal jugular vein, Glossopharyngeal N., Vagus N. and Accessory N.)

6- Parietal Bones

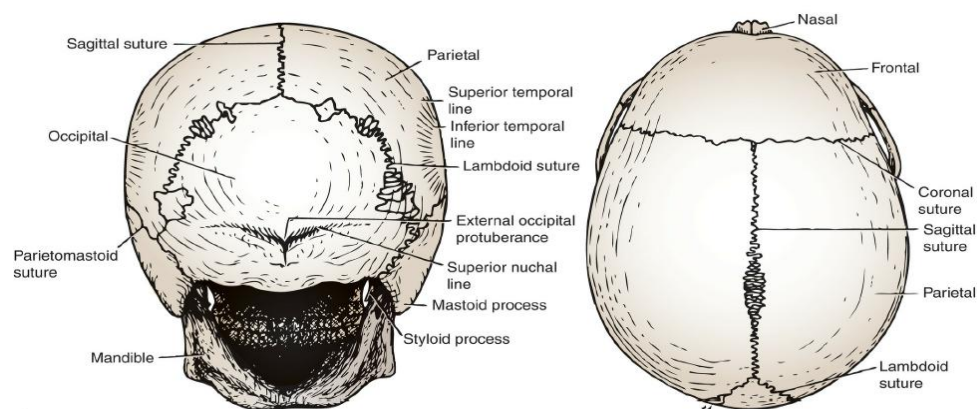
Parietal bones are two flat bones that form the majority of the vault of the skull (calvaria), it articulate with each other in the midline at the sagittal suture.

Anteriorly it articulates 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 foraminae (one in each bone), known as parital foramen and contain an emissary vein.

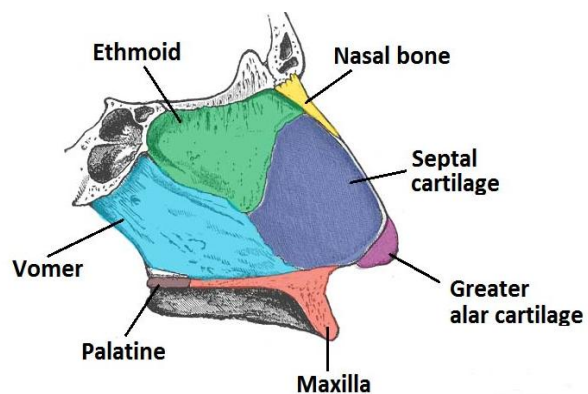
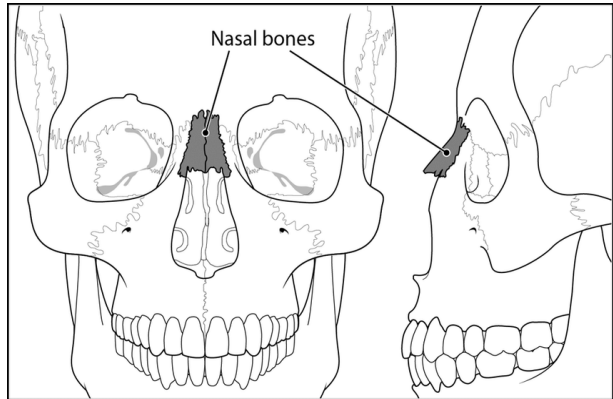


The Facial Bones:-

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 much thinner. The nasal bones are the most fractured facial bones. The nasal bones articulate posteriorly with the frontal process of the maxilla. The lower borders with the maxilla form the anterior nasal aperture.

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 (the above figure on the right). The superior and middle conchae are shelves of bone that project into the nasal cavity from the ethmoid on each side. The inferior conchae are separate bones.



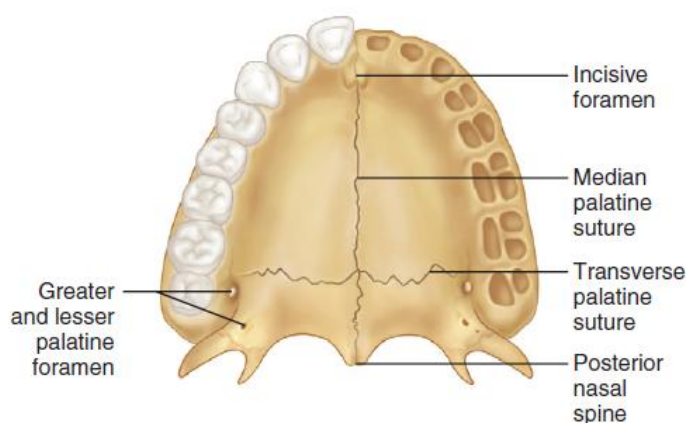
2) The Maxillary Bones

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.

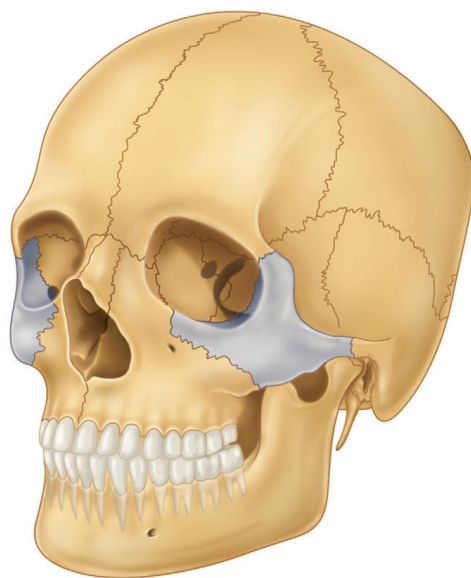
Each hemimaxilla contains a large pyramid-shaped hollow body, the maxillary sinus (antrum of Highmore), and four prominent processes—the frontal, alveolar, zygomatic, and palatine processes.

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 essence of the cheek prominence. This thick, strong, diamond-shaped bone forms the lateral and anterior projections to the midface and is composed of four processes. The frontal process with the frontal bone forms the lateral orbital rim at the frontozygomatic suture. The sphenoid process articulates with the greater wing of sphenoid bone to form the lateral orbital wall. The temporal process forms the zygomatic arch and articulates with the temporal bone. The maxillary process articulates with the maxilla to form the infraorbital rim and part of the floor of the orbit and downward to join the maxilla on the lateral wall, producing the zygomatic eminence, this is an area of thickened bone that is usually available for fixation in the treatment of zygomaticomaxillary complex (ZMC) fractures.



The only foramina of the zygomatic bone are the zygomaticofacial foramen, and the zygomaticotemporal. The zygomaticofacial and zygomaticotemporal branches of the second division of the trigeminal nerve pass from within the orbit to the surface and give sensory innervation to the associated structures.

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