

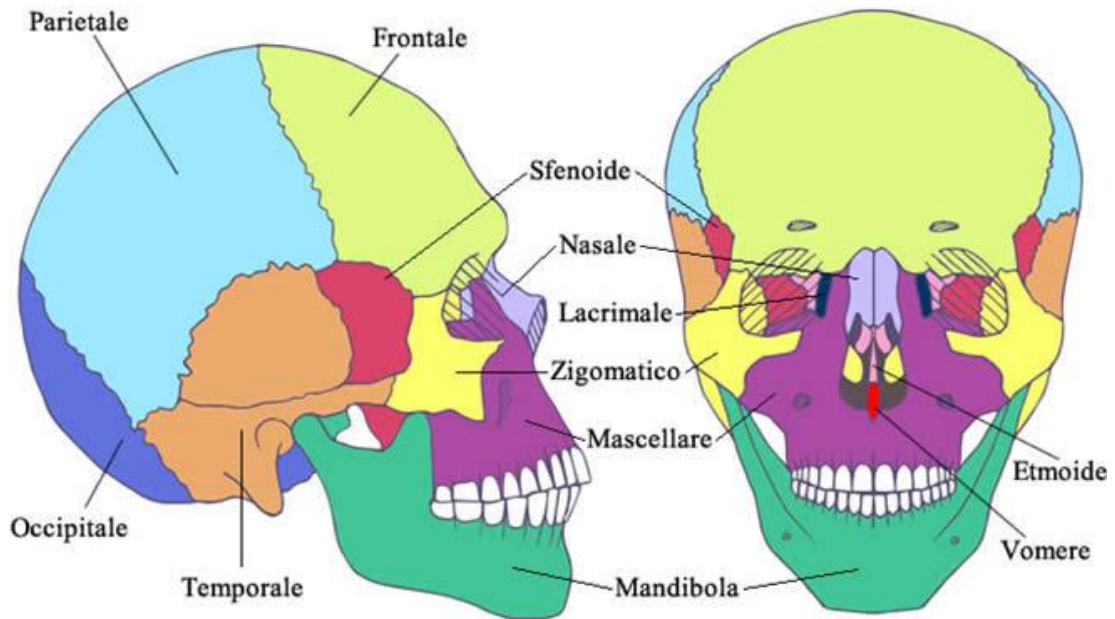
Separate Skull Bones



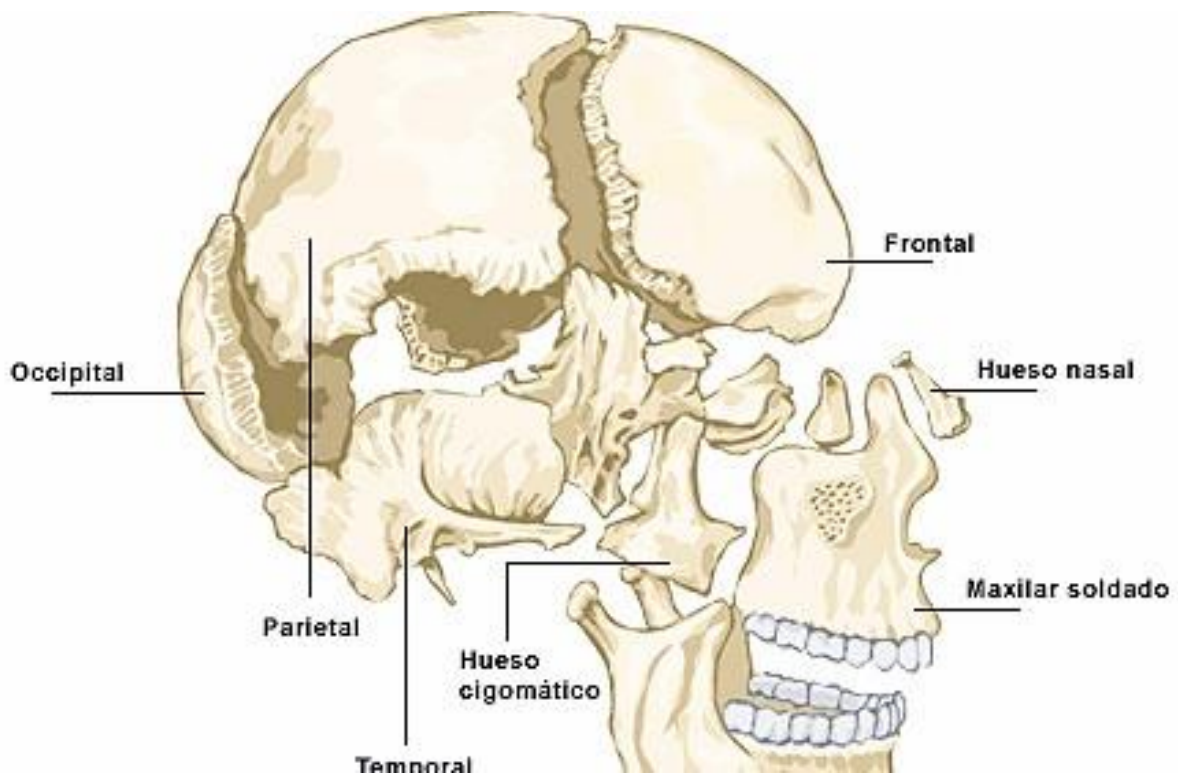
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OSSA DEL CRANIO



Separate Skull Bones



Separate Skull Bones

1. Frontal Bone

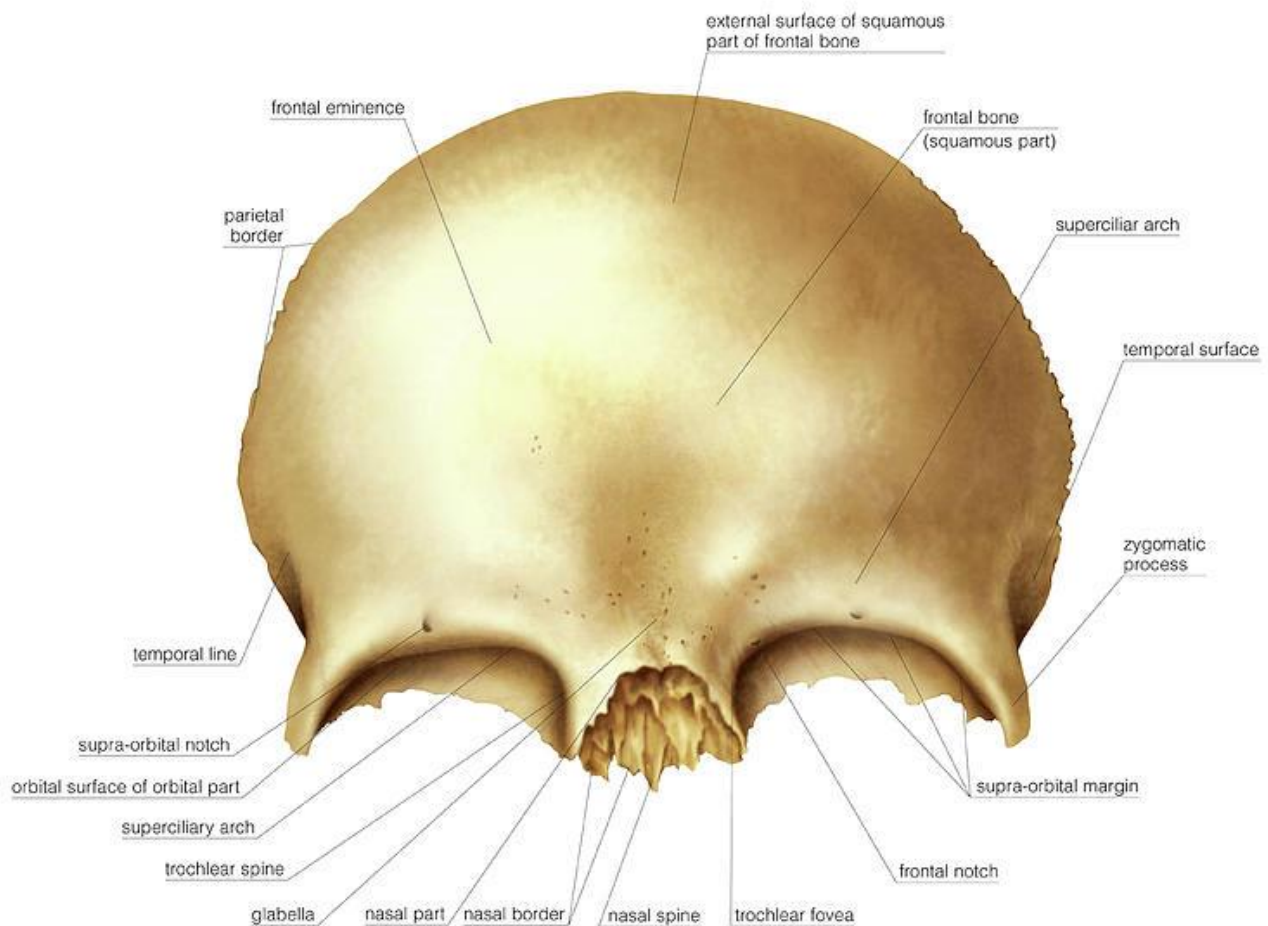
★ It consists of 2 parts (vertical part and horizontal part).

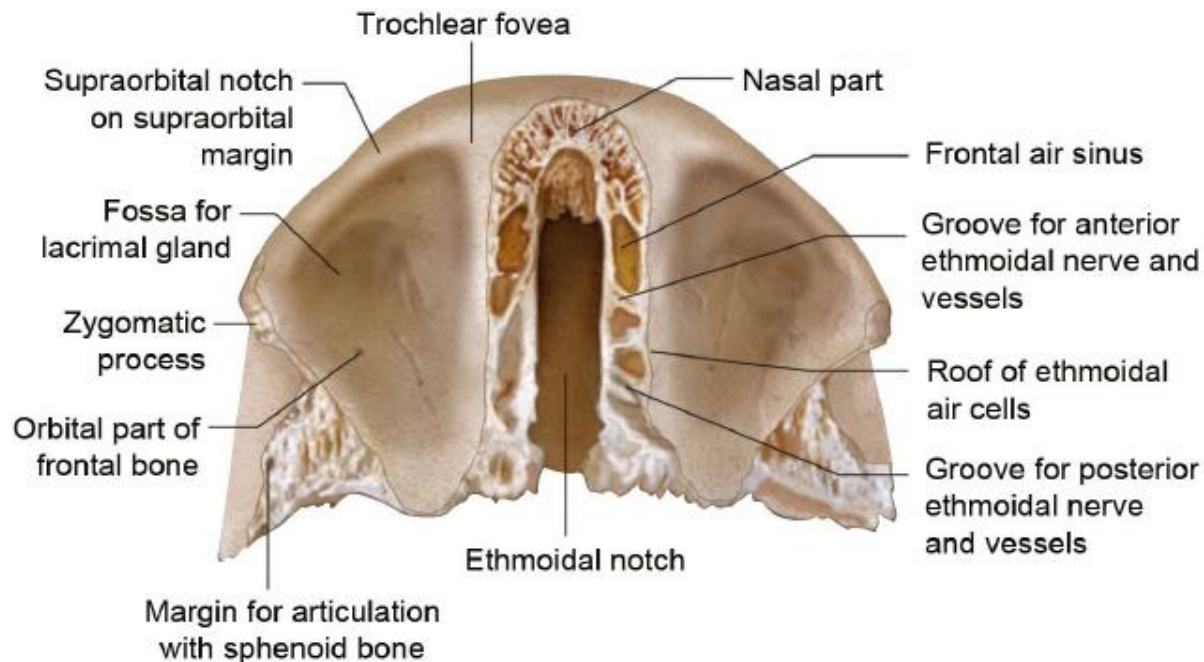
A- Vertical (squamous) part: has 2 surfaces:

1. Outer surface shows frontal eminences, superciliary arches with glabella between them and supra-orbital margins.

2. Inner surface shows frontal crest and sagittal sulcus above it.

B- Horizontal part: called **orbital plate** which forms the lateral parts of the floor of the anterior cranial fossa and the roof of orbits.





Frontal Bone(inferior view)

2. Maxillary Bones

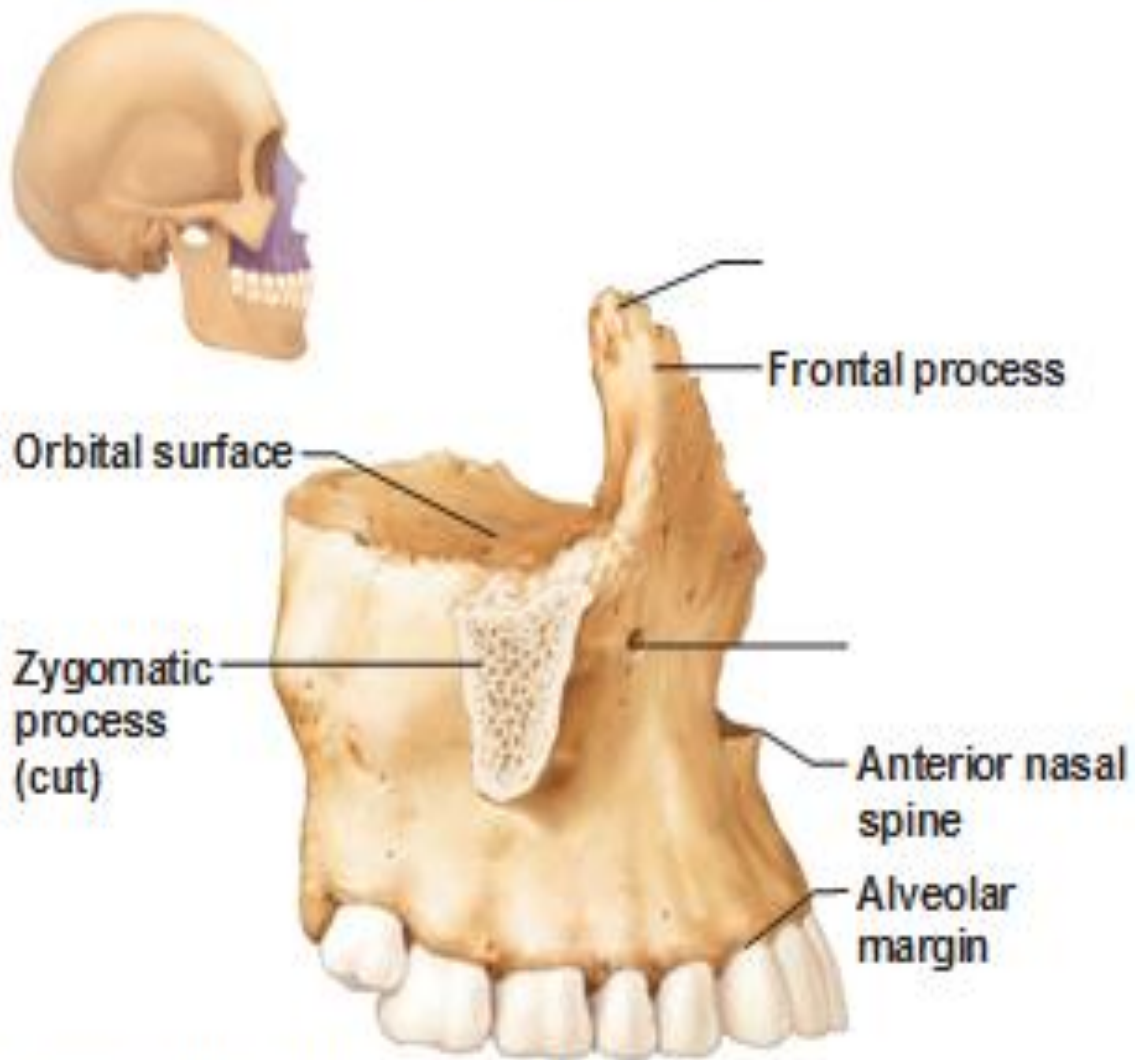
★ Each maxilla consists of body and 4 processes.

A- The body: containing maxillary air sinus and has 4 surfaces:

- 1. Anterior surface:** shows nasal notch , anterior nasal spine , canine eminence, canine fossa, incisive fossa and infraorbital foramen.
- 2. Posterior surface** contains posterior superior alveolar foramen.
- 3. Superior surface** forms great part of the floor of orbit and contains infra-orbital groove and canal.
- 4. Medial surface:** forms part of the lateral wall of nasal cavity and contains the opening of maxillary sinus.

B- Processes of maxilla: frontal, zygomatic, alveolar and palatine processes.

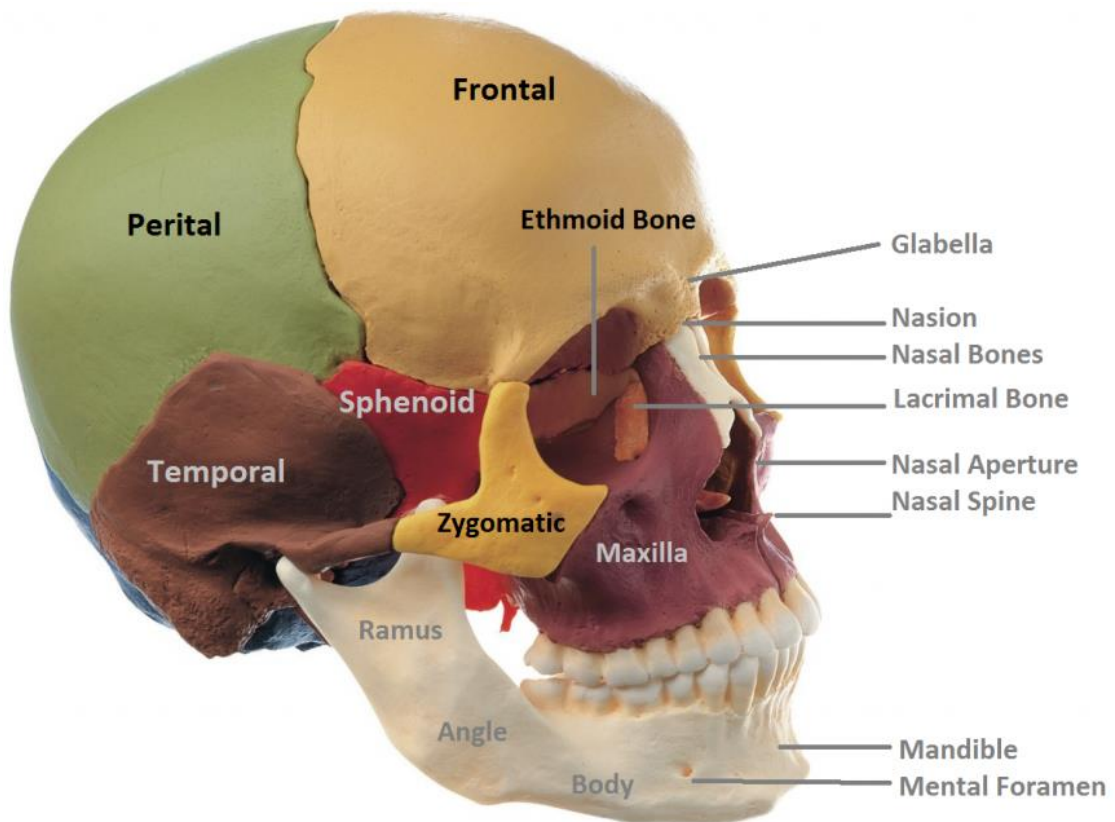
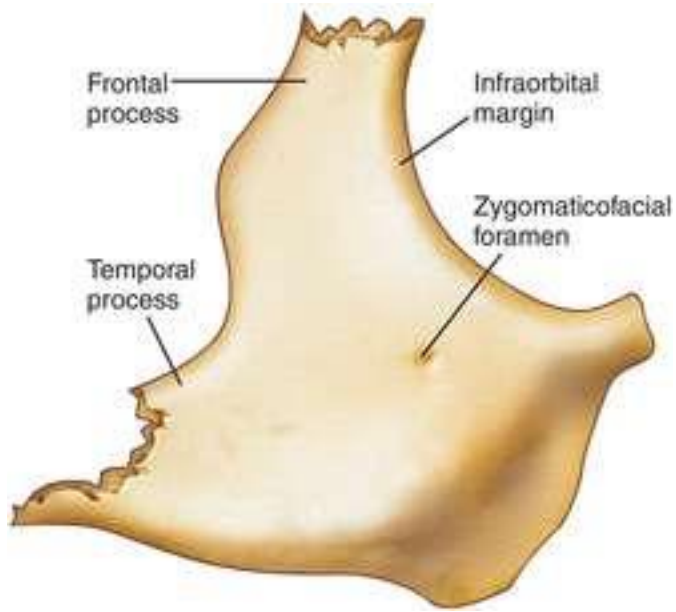
Maxillary Bones



(b) Maxilla, right lateral view

3. Zygomatic Bones

- ★ Two bones of the cheeks, each has: **3 processes** (frontal, maxillary and temporal) and a **body** showing zygomaticofacial foramen in its **facial surface** and zygomaticotemporal foramen in its **temporal surface**.
- ★ It has **orbital plate** sharing in the lateral Wall & floor of orbital cavity .



4. Occipital Bone

★It has 3 parts surrounding the foramen magnum, they are:

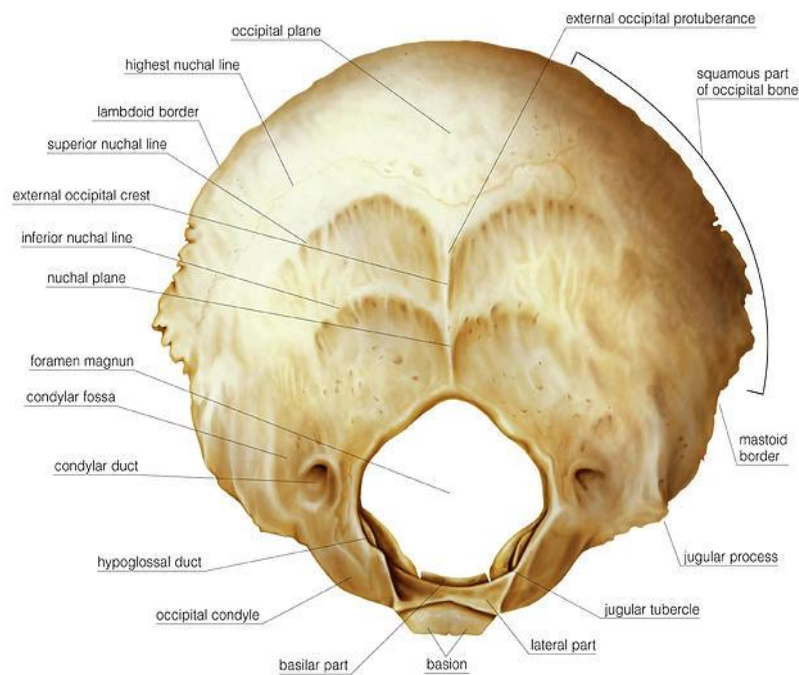
A- Squamous part: its outer surface shows the external occipital protuberance, external occipital crest and 3 nuchal lines (superior, inferior and highest). Its inner surface shows internal occipital protuberance with two transverse grooves on both sides, internal occipital crest below it and sagittal groove above it.

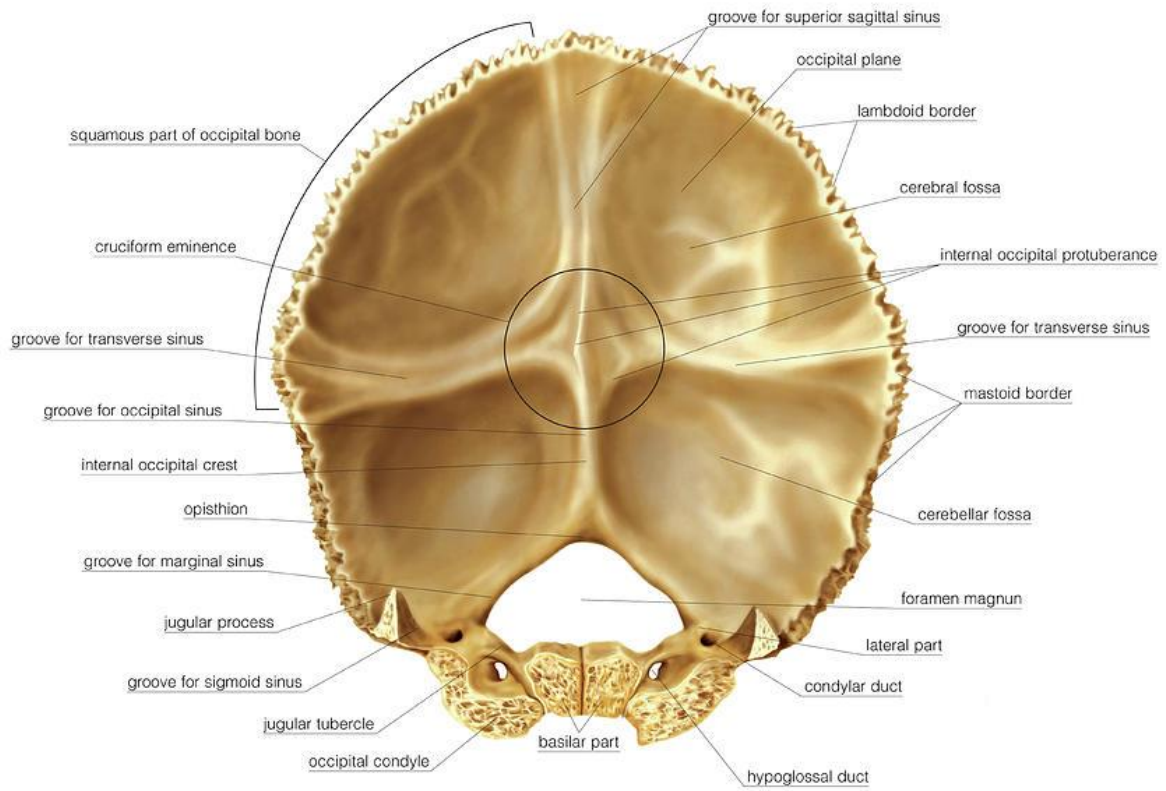
B- Lateral parts:

- The outer surface of each part shows the occipital condyle with hypoglossal canal anteriorly and condylar canal posteriorly.
- Its inner surface shows the jugular tubercle and sigmoid groove.

C- Basilar part:

- Its outer surface shows the pharyngeal tubercle while its inner surface joins the body of sphenoid to form the clivus.





Occipital Bone

5. Parietal Bones

★Each bone has:

I. Four borders. II. Four angles. III. Two surfaces.

I. Four Borders:

a-**Superior "Sagittal" border:** Articulates with the superior border of the other parietal bone to form the sagittal suture.

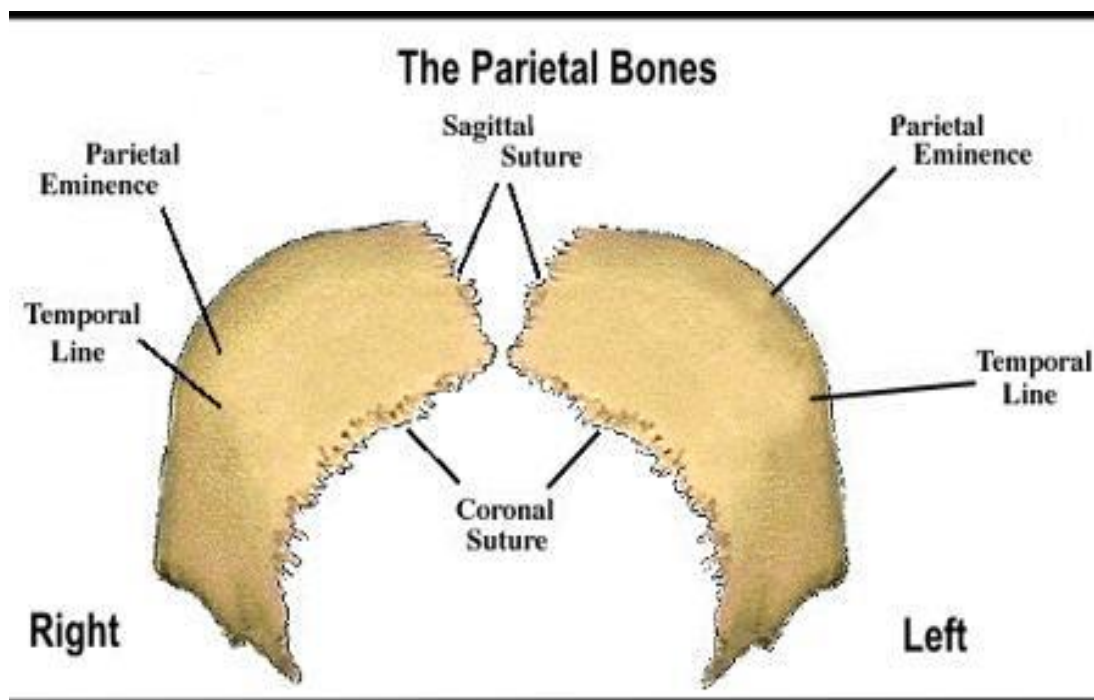
b-**Inferior "Squamous" border:** Articulates from before backwards with:

- 1- Greater wing of sphenoid bone.
- 2- Squamous part of temporal bone.
- 3- Mastoid part of temporal bone.

c-**Anterior "Frontal" border:** Articulates with the frontal bone to form ½ of the coronal suture.

d-**Posterior "Occipital" border:** Articulates with the occipital bone to form ½ of the lambdoid suture.

II. Four Angles: Frontal, occipital, sphenoid, and mastoid. These angles are, the sites of fontanelles in foetus.



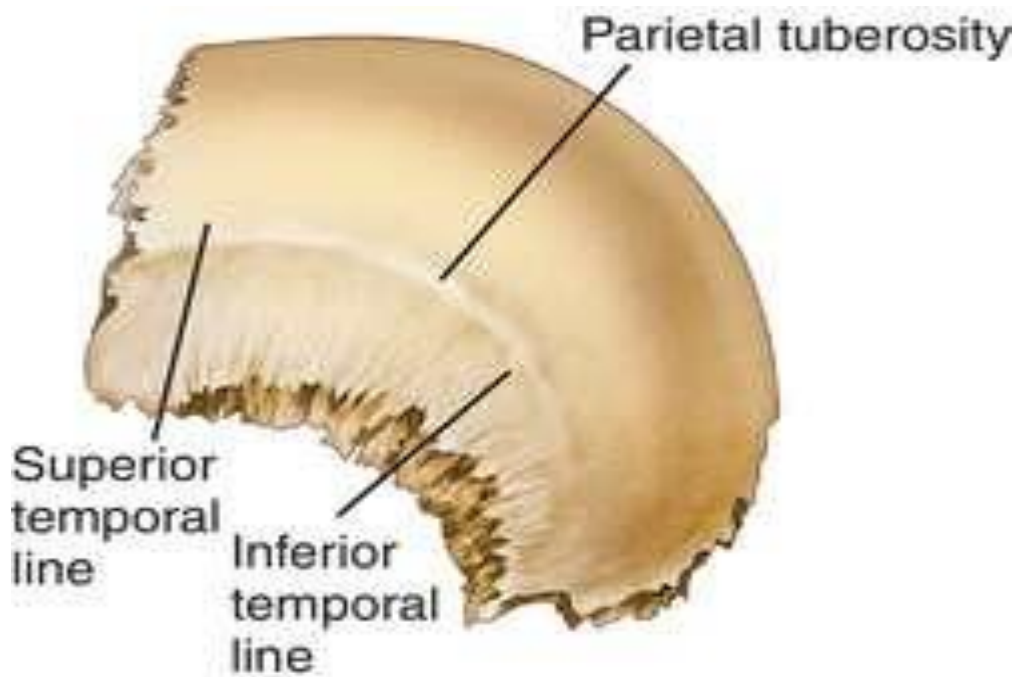
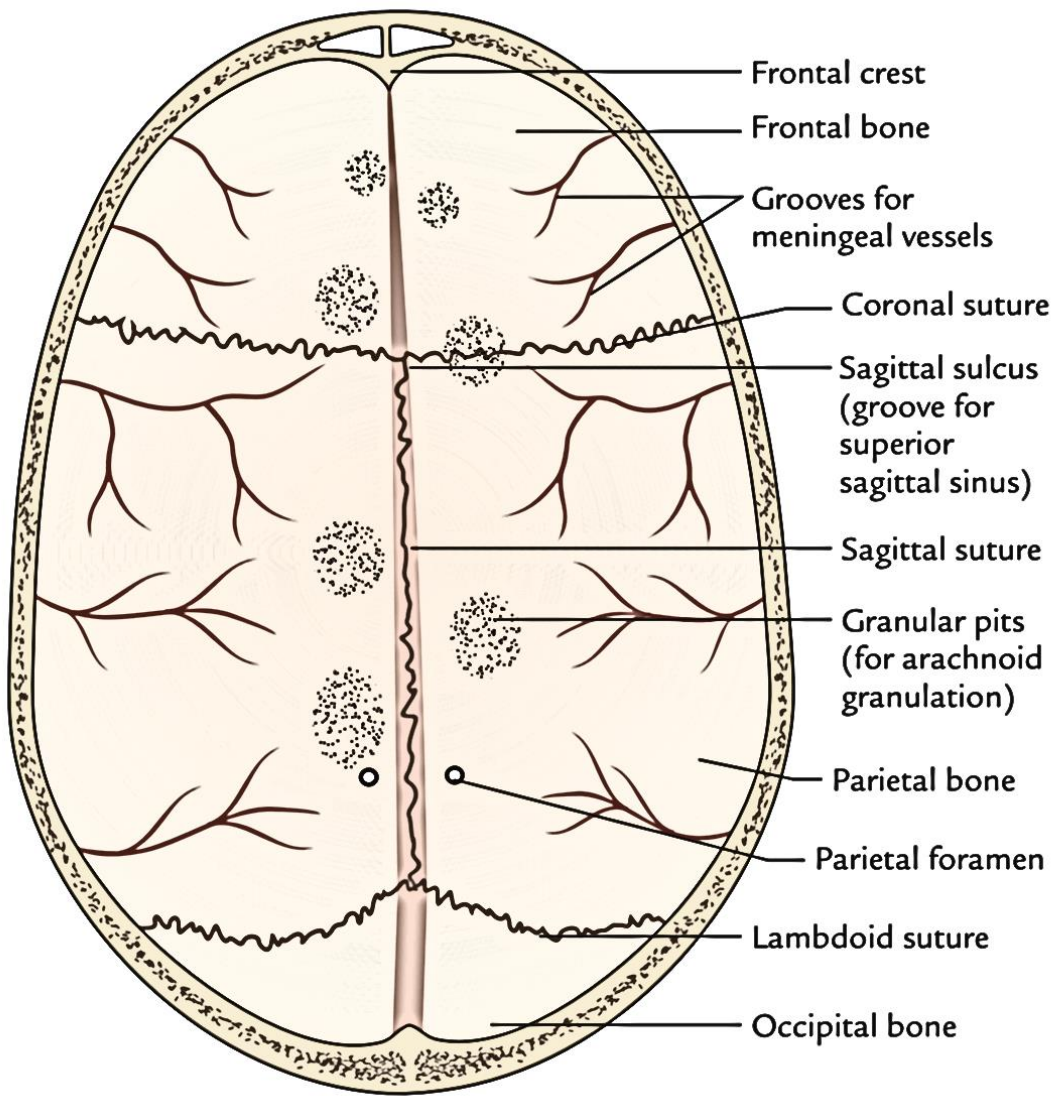
III. Two Surfaces:

a- **Inner: Characterized by 3 features:**

- 1- Groove on the inner surface of the sagittal border, called the "Sagittal sulcus" for the superior sagittal sinus.
- 2- Many grooves for the branches of the middle meningeal vessels.
- 3- Many depressions near the midline for the arachnoid granulations.

b- **Outer: Smooth and convex, it is characterized by 3 features:**

- 1- Parietal eminence.
- 2- Two temporal lines: superior and inferior, they cross the middle of the parietal bone.
- 3- Parietal foramen: near the posterior part of the sagittal suture, for emissary vein.



6. Temporal Bones

★ Each bone consists of 5 parts:

I. Squamous part: It has 2 surfaces:

1. **Outer surface:** shows the zygomatic process which articulates with the temporal process of zygomatic bone to form the zygomatic arch. The continuation of zygomatic arch posteriorly is formed of the supramastoid crest above and articular tubercle and mandibular fossa below.
2. **Inner surface:** shows the grooves of the middle meningeal vessels and cerebral impressions.

II. Mastoid part: Extends downwards as the mastoid process. Its lateral surface shows the mastoid emissary foramen, while its medial surface shows the digastric fossa and the occipital groove.

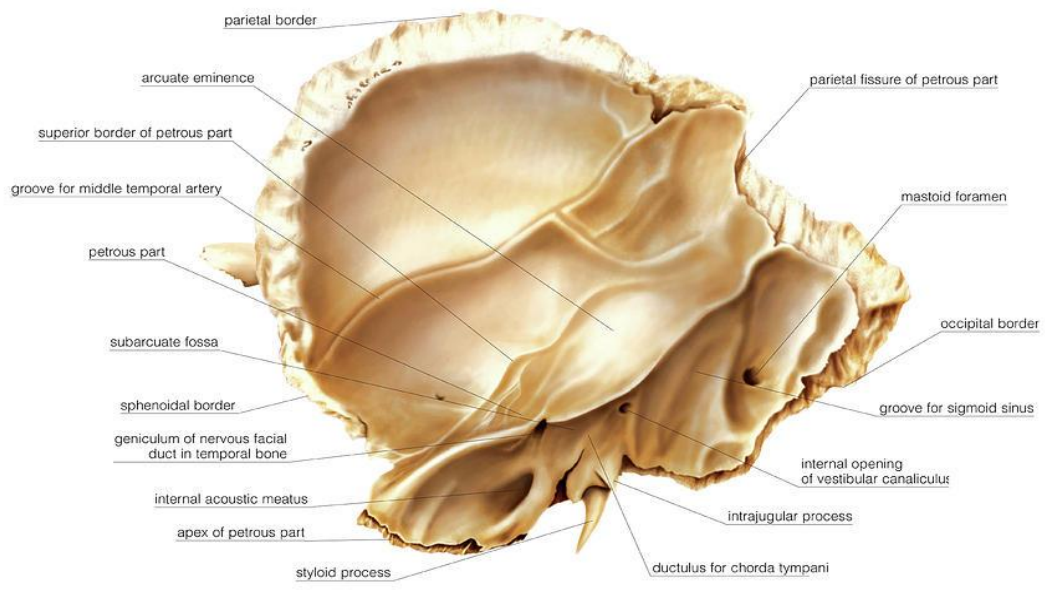
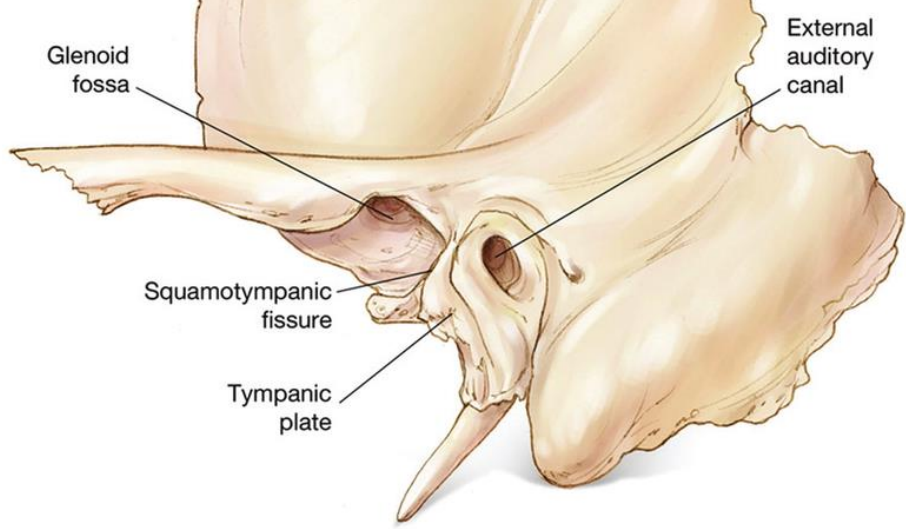
III. Tympanic part: Surrounds the external auditory meatus antero-inferiorly.

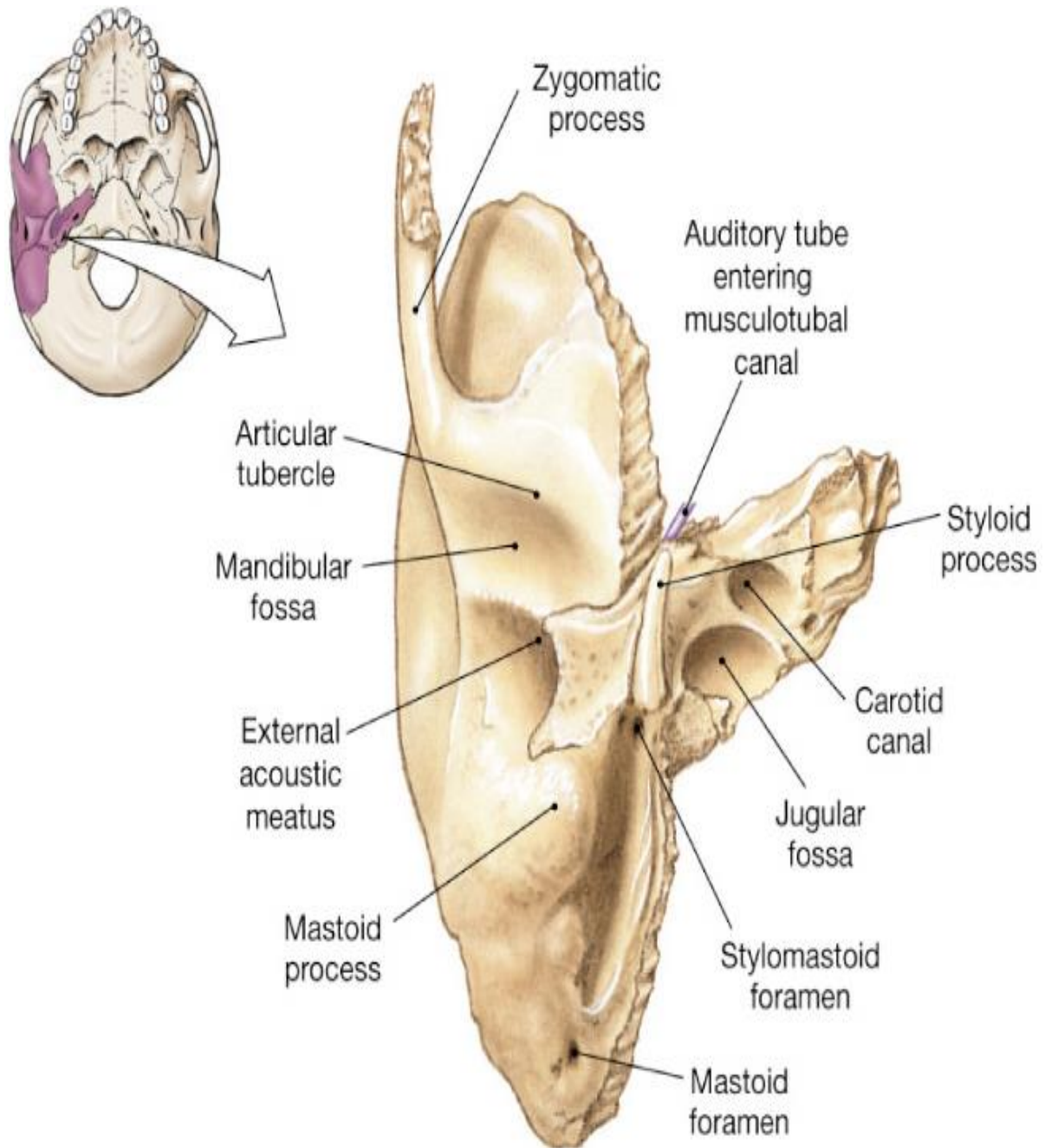
IV. Petrous part: Pyramidal in shape, present in norma basalis and contains the inner ear, middle ear, facial and carotid canals.

V. Styloid process: Downward pointing projection of variable length, seen in norma lateralis and basalis and is separated from mastoid process by stylomastoid foramen.

Temporal Bone

Lateral View





(c) Right temporal bone, inferior view

7. Sphenoid Bone

★It is a butterfly-shaped bone with extended wings and dependant legs, it has 4 parts:

I) Body: A cube-like structure present in the **median part** of norma basalis and contains the right and left **sphenoid air sinuses** separated by a bony septum, it has 6 surfaces:

1. **Superior surface:** shows the following features from before backwards, jugum sphenoidale, chiasmatic groove, sella turcica with its 3 parts; tuberculum sellae, pituitary fossa and dorsum sellae.
2. **Two lateral surfaces:** showing the grooves for internal carotid arteries.
3. **Posterior surface:** articulates with the basilar part of the occipital bone forming the **clivus**.
4. **Inferior surface:** forms a small part in norma basalis externa behind the vomer.
5. **Anterior surface:** articulates with the ethmoid bone.

II) Two lesser wings:

- Each wing arises from the upper anterior part of the body of sphenoid by 2 roots enclosing the optic foramen in between.
- The posterior border is concave and ends medially as anterior clinoid process.
- Anteriorly it articulates with the orbital plate of frontal bone forming the lateral part of the floor of anterior cranial fossa.

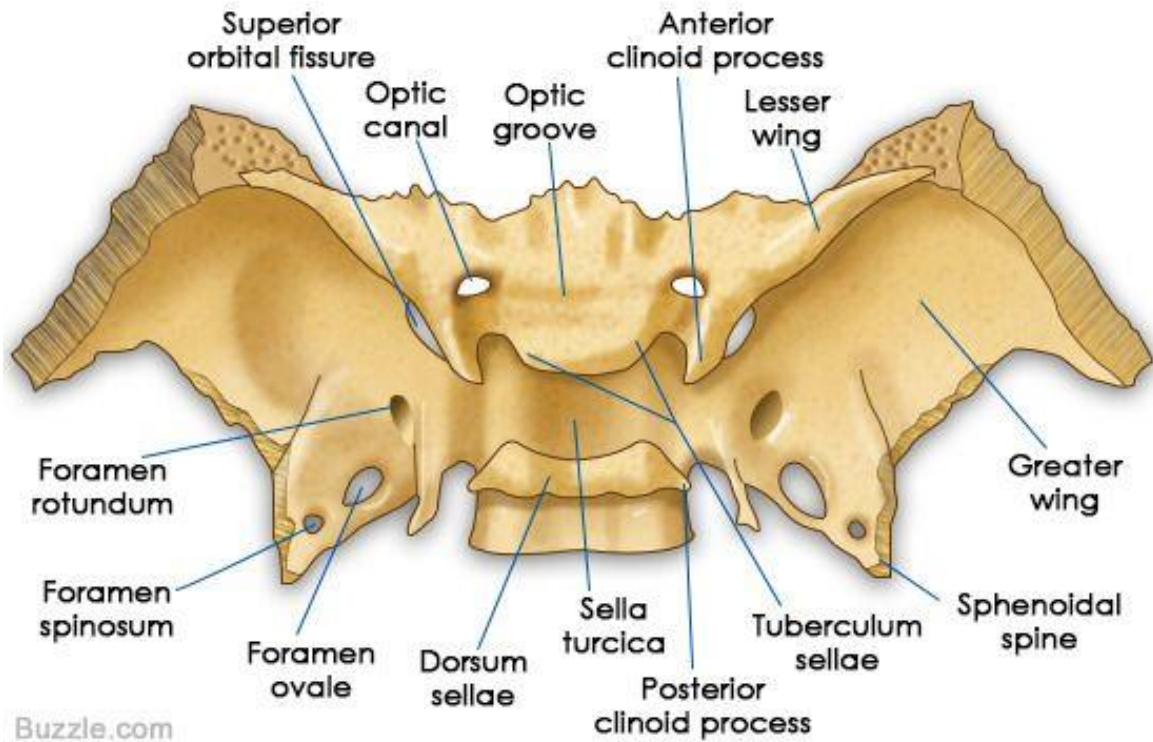
III) Two greater wings: Each wing is attached to the side of the body of the sphenoid and has 3 surfaces:

1. **Cerebral surface:** Concave and forms the anterolateral part of the middle cranial fossa, and contains foramen rotundum, ovale, spinosum and sometimes an emissary foramen.
2. **Orbital surface:** Flat and forms the posterior part of the lateral wall of orbit.
3. **Lateral surface:**
 - Present in norma lateralis and it divided by infratemporal crest into upper and lower parts.
 - In the cranial cavity the lesser and greater wings are separated by superior orbital fissures.
 - In norma basalis externa, spine of sphenoid projects downwards, posterolateral to foramen spinosum.

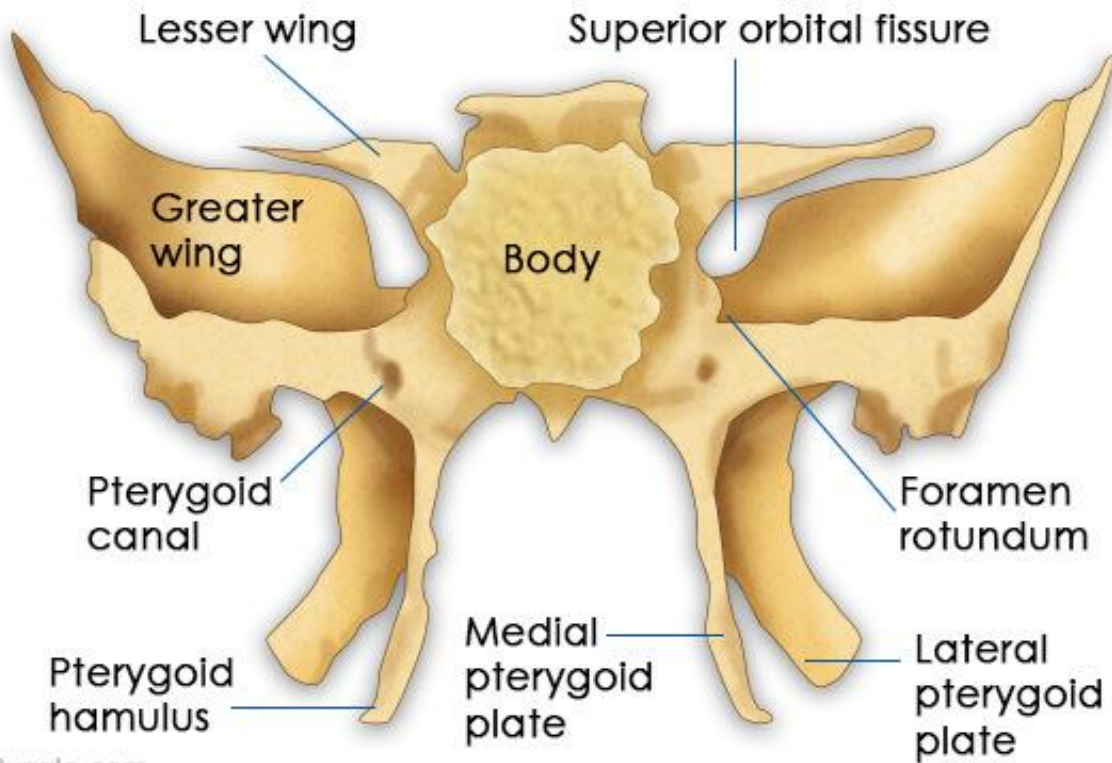
IV. Two pterygoid processes: Each process is formed of 2 plates:

- a- **Medial pterygoid plate:** Long narrow plate forming the pterygoid hamulus below and divides to enclose the scaphoid fossa above.
- b- **Lateral pterygoid plate:** Broad thin and everted plate, separated from the medial plate by the pterygoid fossa. They are present in norma basalis externa lateral to posterior nasal openings.

SUPERIOR VIEW



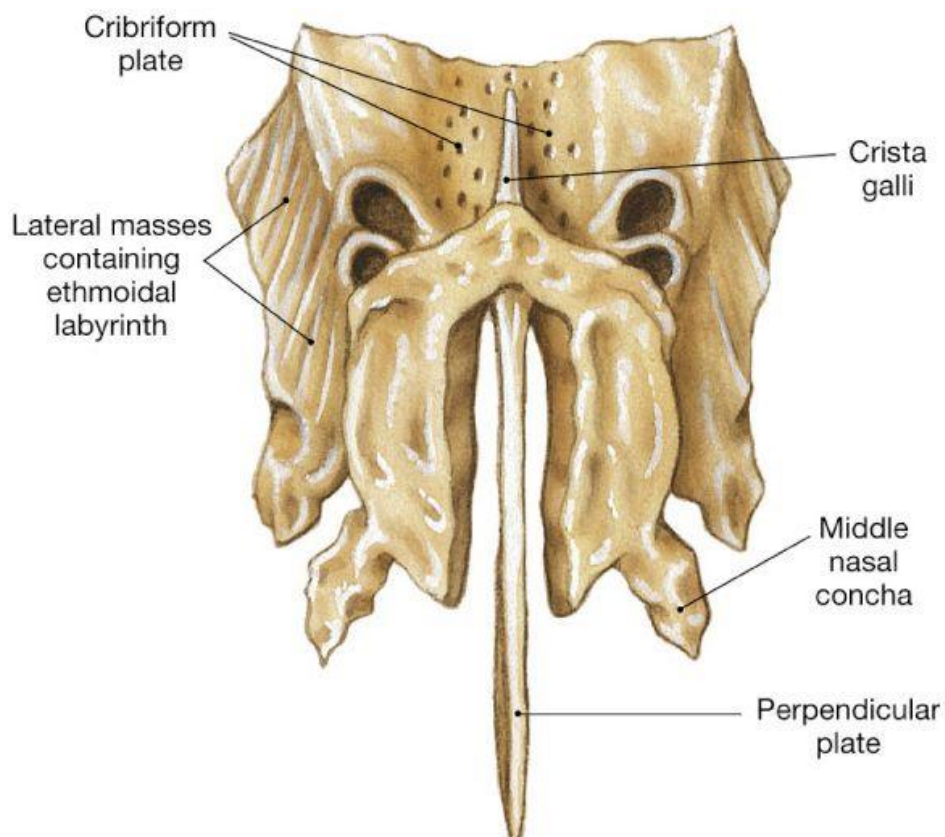
POSTERIOR VIEW



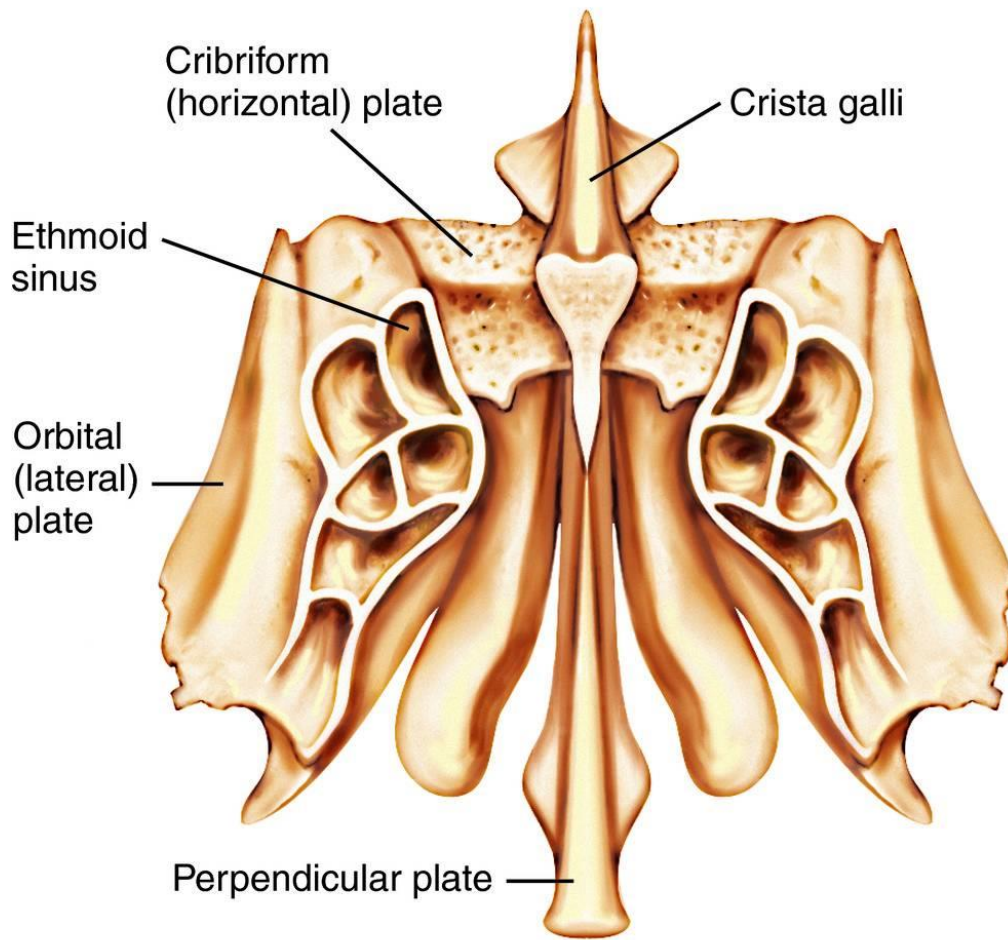
8. Ethmoid Bone

★ Single bone formed by the following parts:

1. Crista galli: projecting upwards in the anterior cranial fossa.
2. Perpendicular plate: Projecting downwards in line with the crista galli forming upper posterior part of nasal septum.
3. Cribriform plate: Found in the anterior cranial fossa on either side of crista galli, forming the roof of nose.
4. Two orbital plates: Smooth, thin oblong plates which cover the ethmoidal sinuses. Each forms a large part of the medial wall of the orbit.
5. Three pairs of ethmoid air cells (anterior, middle and posterior), forming the ethmoid labyrinth.
6. Two pairs of superior and middle nasal conchae.



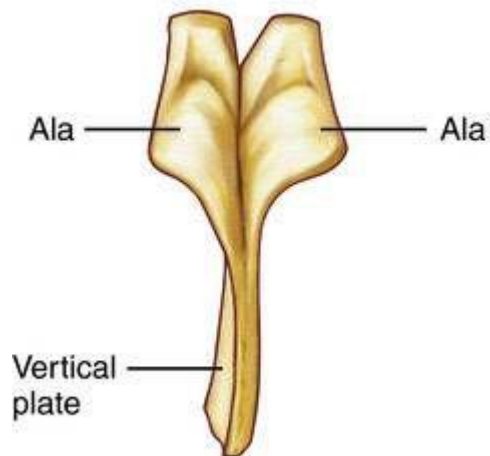
(b) Anterior view

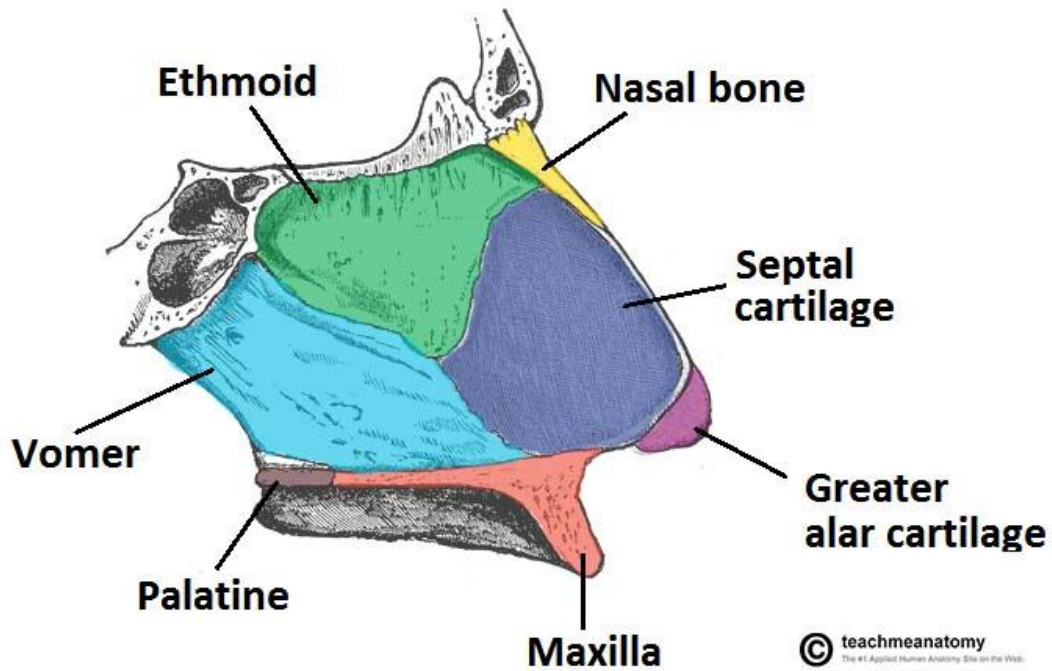


Ethmoid Bone

9. Vomer

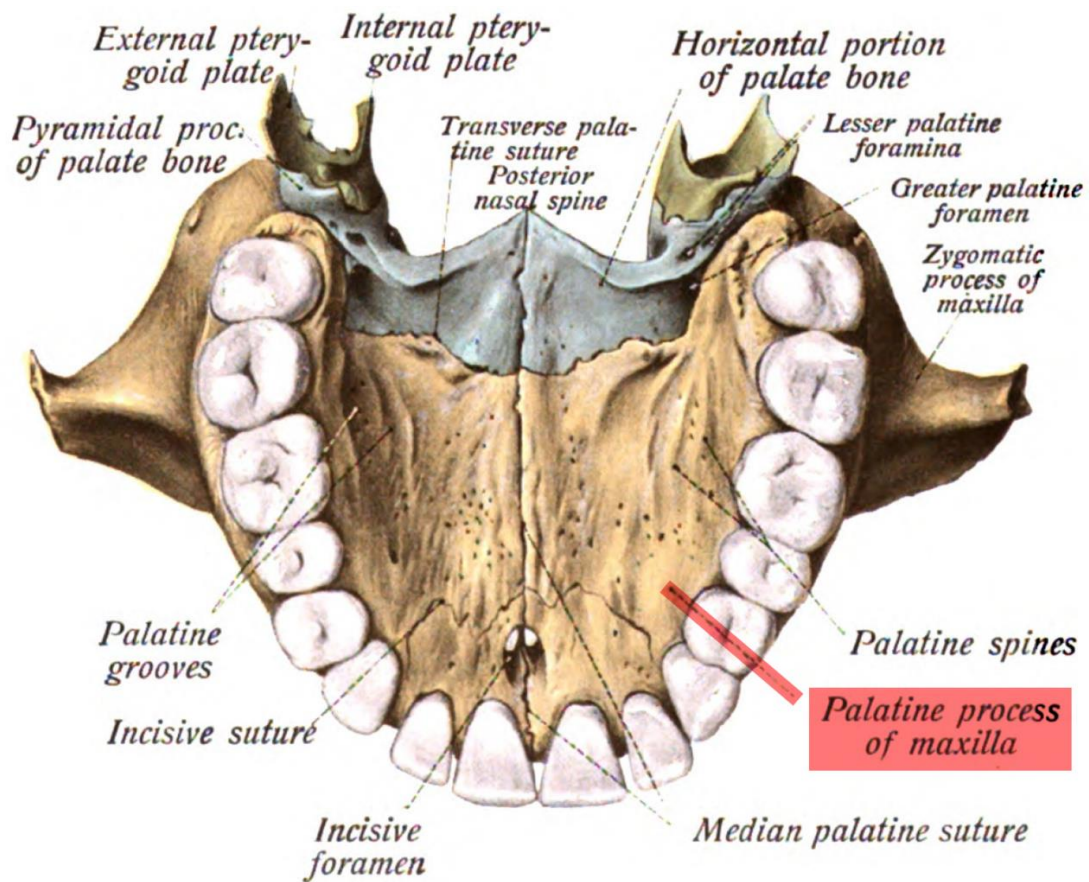
- ★ Single triangular bone having an apex directed anteriorly and a base directed posteriorly between the two posterior nasal openings.
- ★The vomer forms the lower posterior part of the nasal septum.
- ★It has 2 alae & a vertical plate .



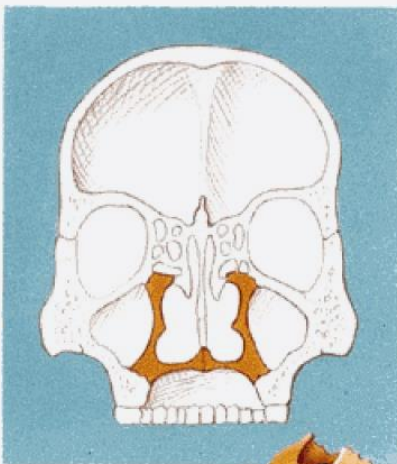


10. Palatine Bones

- ★ Two L-shaped bones, each has two parts:
 - a- **Horizontal plate:** forming the posterior part of hard palate.
 - b- **Perpendicular plate:** In the lateral wall of the nasal cavity, in front of the medial pterygoid plate.

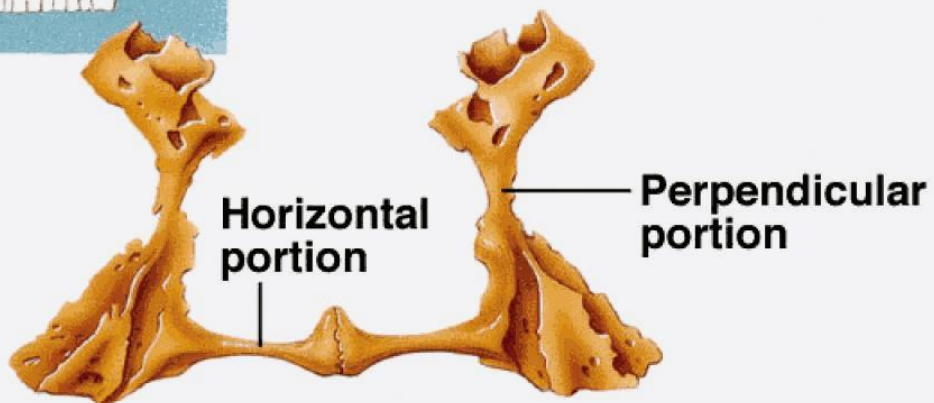


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Coronal section

Palatine Bones

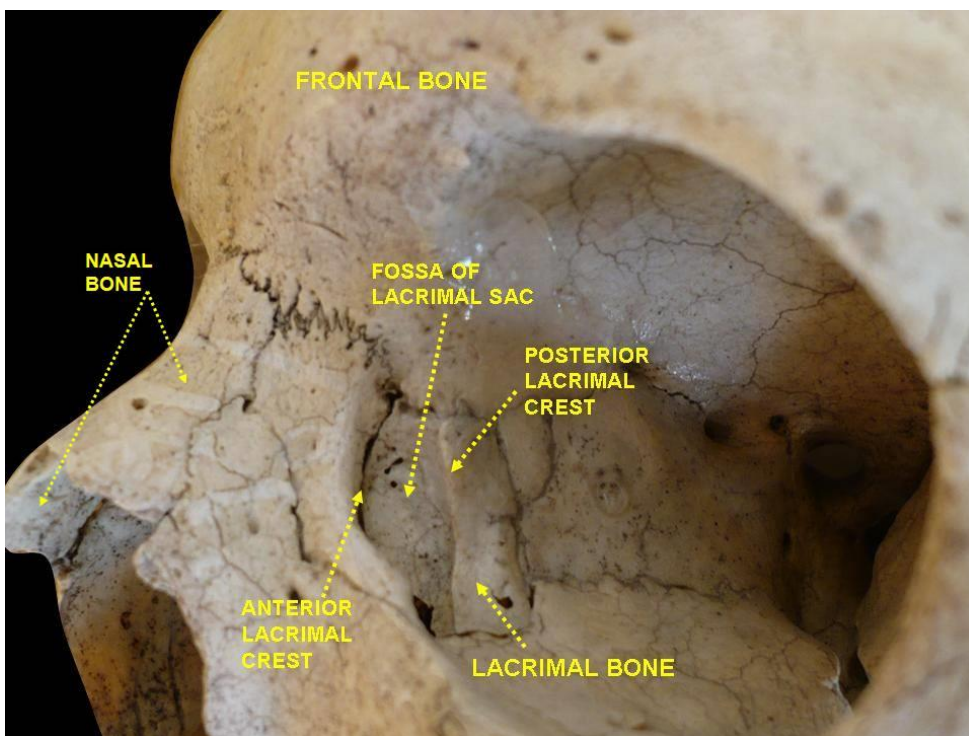


11. Nasal Bones

- ★ Two bones forming the roof of nose. They articulate together, with the frontal bone and with the frontal process of maxilla.

12. Lacrimal Bones

- ★ Each one lies in the anterior part of the medial wall of the orbit and has a fossa for the lacrimal sac.



Nasal Bones & Lacrimal Bones