

Anatomy, Head and Neck, Skull :slecture

1

**Talib
Jawad**

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At the end of the lecture must understand the followings

- General information about the skull and development and type of the bones
- **Type of joints of the skull**
- The skull composition :face and cranium
- Orbital margins and bones
- **Nasal sinuses and Foramina**
- **The bones of the skull from different view**
- Some clinical applied anatomy

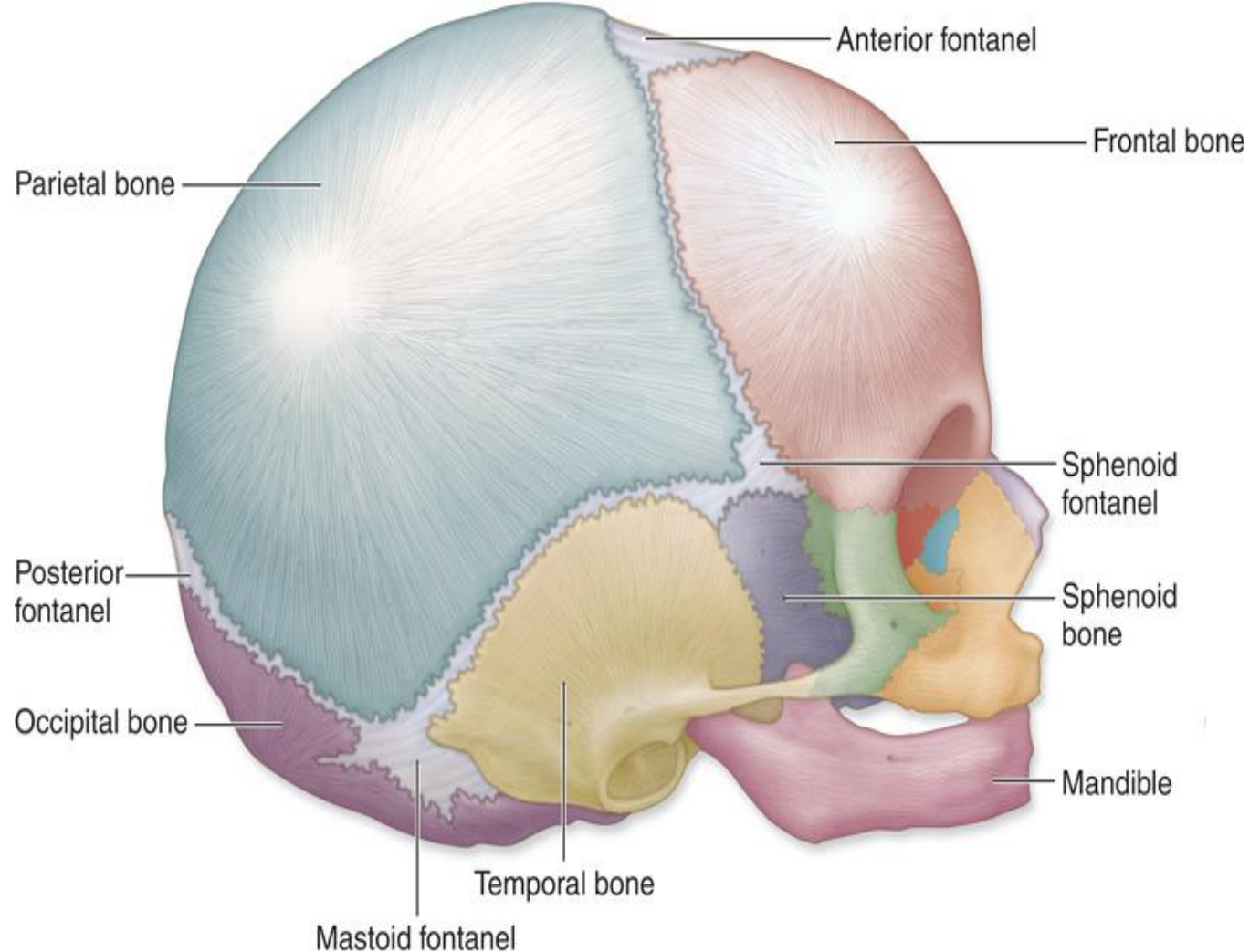
Development of the bone of the skull

Fontanel

اليافوخ

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At birth, the newborn's skull consists of five major bones (two frontal, two parietal, and one occipital) that are separated by connective tissue junctions known as cranial sutures



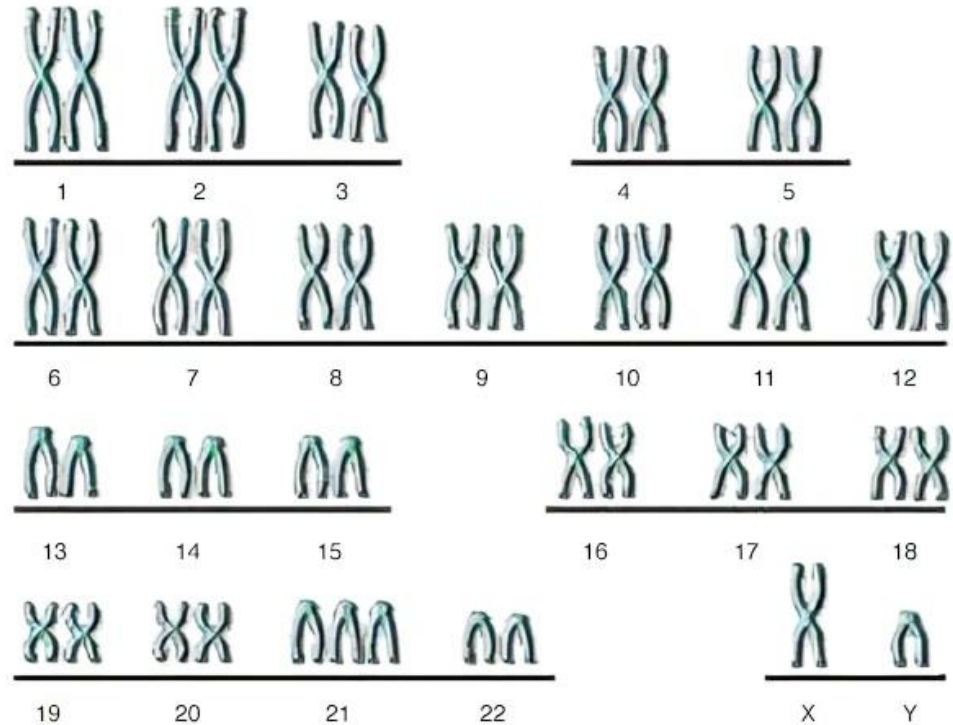
Fontanelles and cranial sutures

- The **sutures function** as seams, and they are highly necessary to facilitate the movement and **molding of the cranium through the birth canal during labor**. They also allow for **rapid postnatal growth and development of the brain**.

- However, the bones that shape the cranium begin unfused, leaving several gaps between the individual bones of the infant's skull. These gaps are composed of membranous connective tissue and are known as fontanelles. Certain conditions such as **dehydration or infection can alter the appearance of the fontanelles**, causing them to sink or bulge.
- **Achondroplasia**

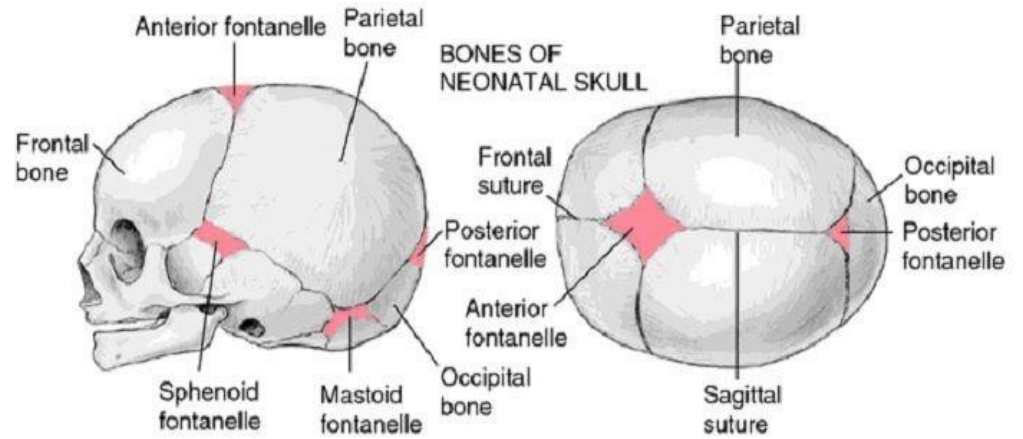
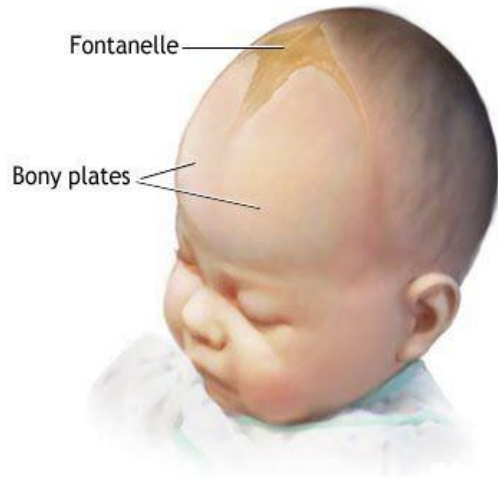


Down syndrom:born with an extra copy of their 21st chromosome

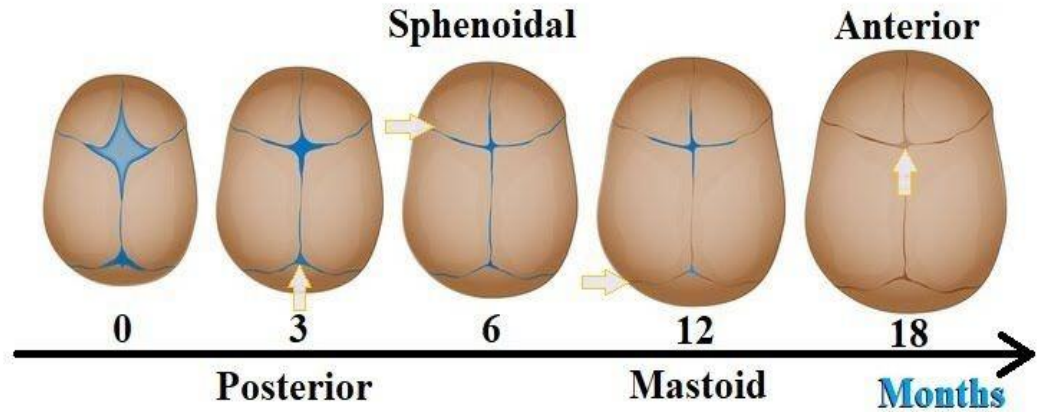


common conditions

- The most common conditions associated with a large anterior fontanelle or a delay in its closure (normally 18_24 months) as in : **Down syndrome, achondroplasia** (A type of bone growth disorder. Due to genetic mutations, the cartilage does not convert into a bone during fetal development, resulting in dwarfism)., **congenital hypothyroidism, rickets, and elevated intracranial pressures.** **The posterior closes within about six to eight weeks.**
- **Third Fontanel:** only with certain conditions like Down syndrome and congenital infections such as rubella.



Fontanelle

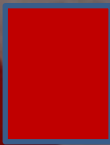


CORONAL
SUTURE

SAGITTAL SUTURE

LAMBDOID SUTURE

SAGITTAL SUTURE



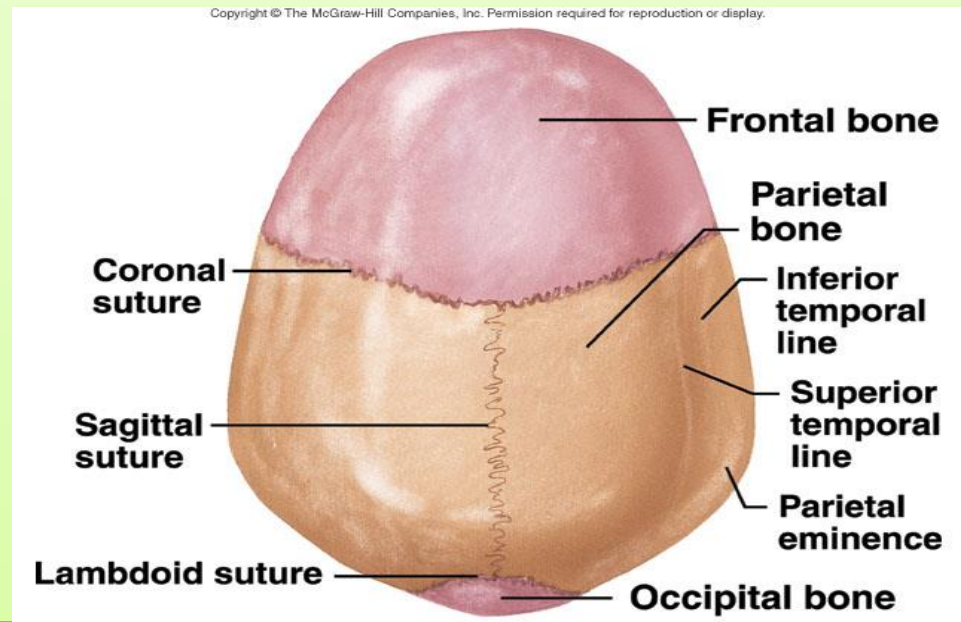
The skull composition

- **Bones of skull :**

The skull is composed of several separate bones united at immobile joints called sutural joint, connective tissue connect between the bones.

The mandible is an exception to this rule, for it is united to the skull by the mobile **temporo-**
mandibular joint

a synovial joint



- The bones of the skull can be divided into those of the **cranium** and those of the **fac**

bone of skull

cranium

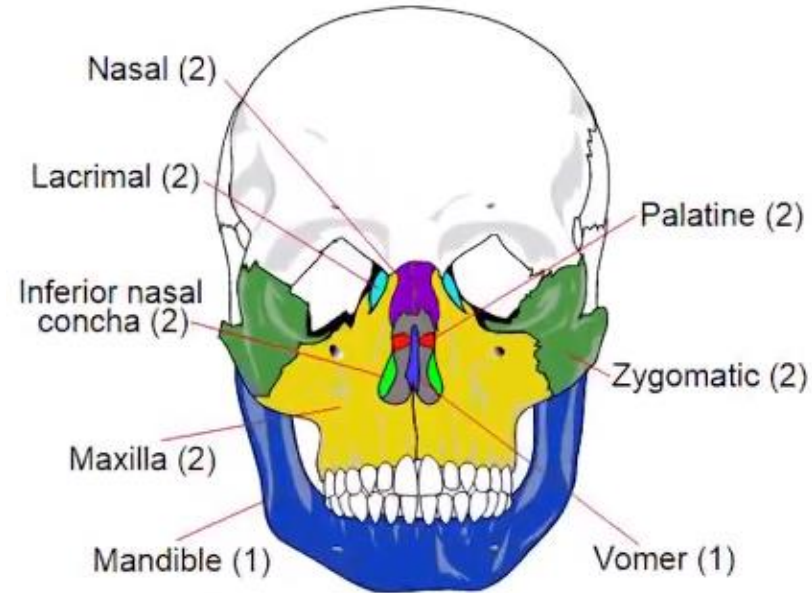
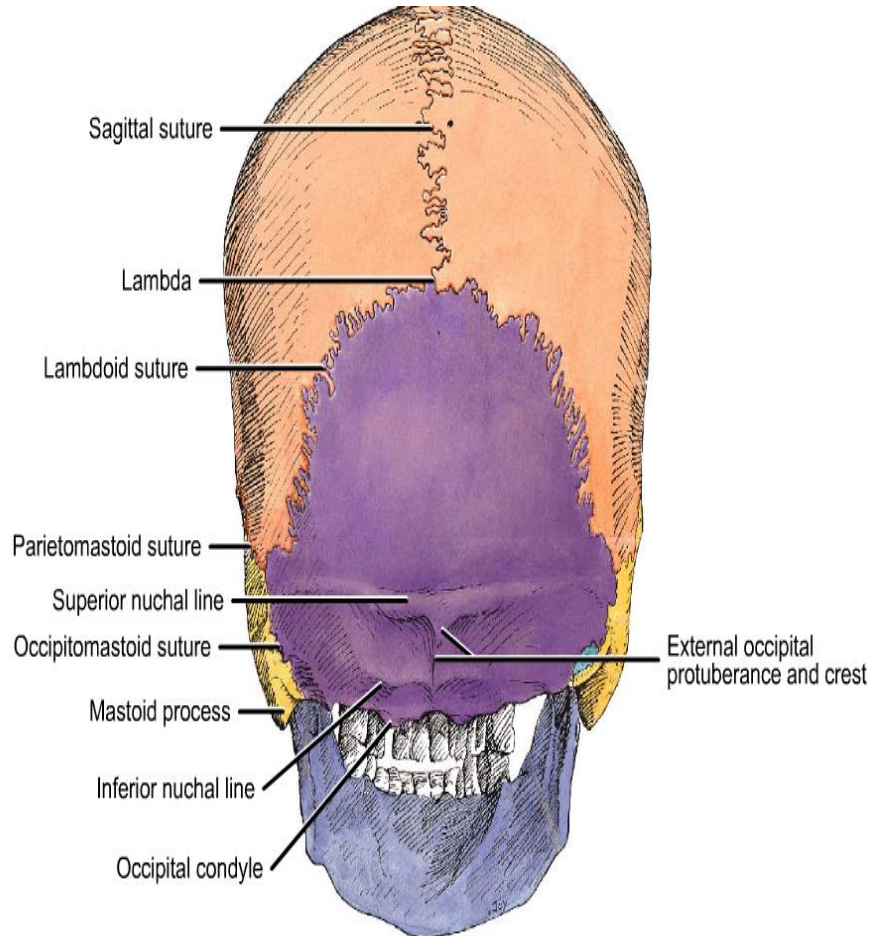
face

Vault

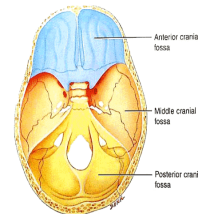
base

Upper part

lowest part



14 Facial Bones



The eight cranial bones.

Ethmoidal (1)

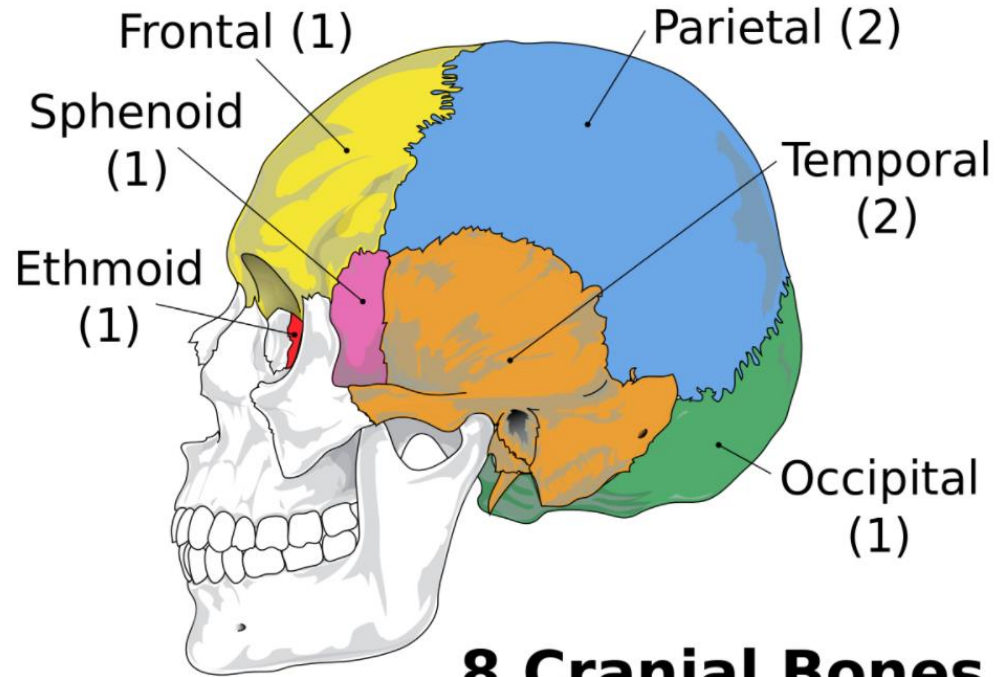
sphenoid (1)

Frontal (1)

occipital (1)

parietal (2)

temporal (2)

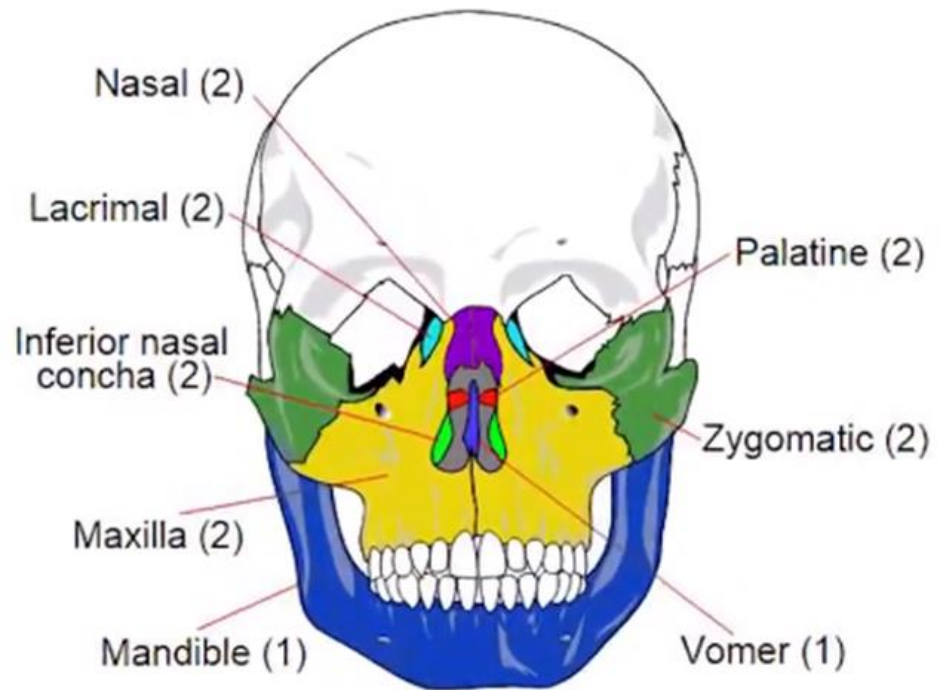


8 Cranial Bones

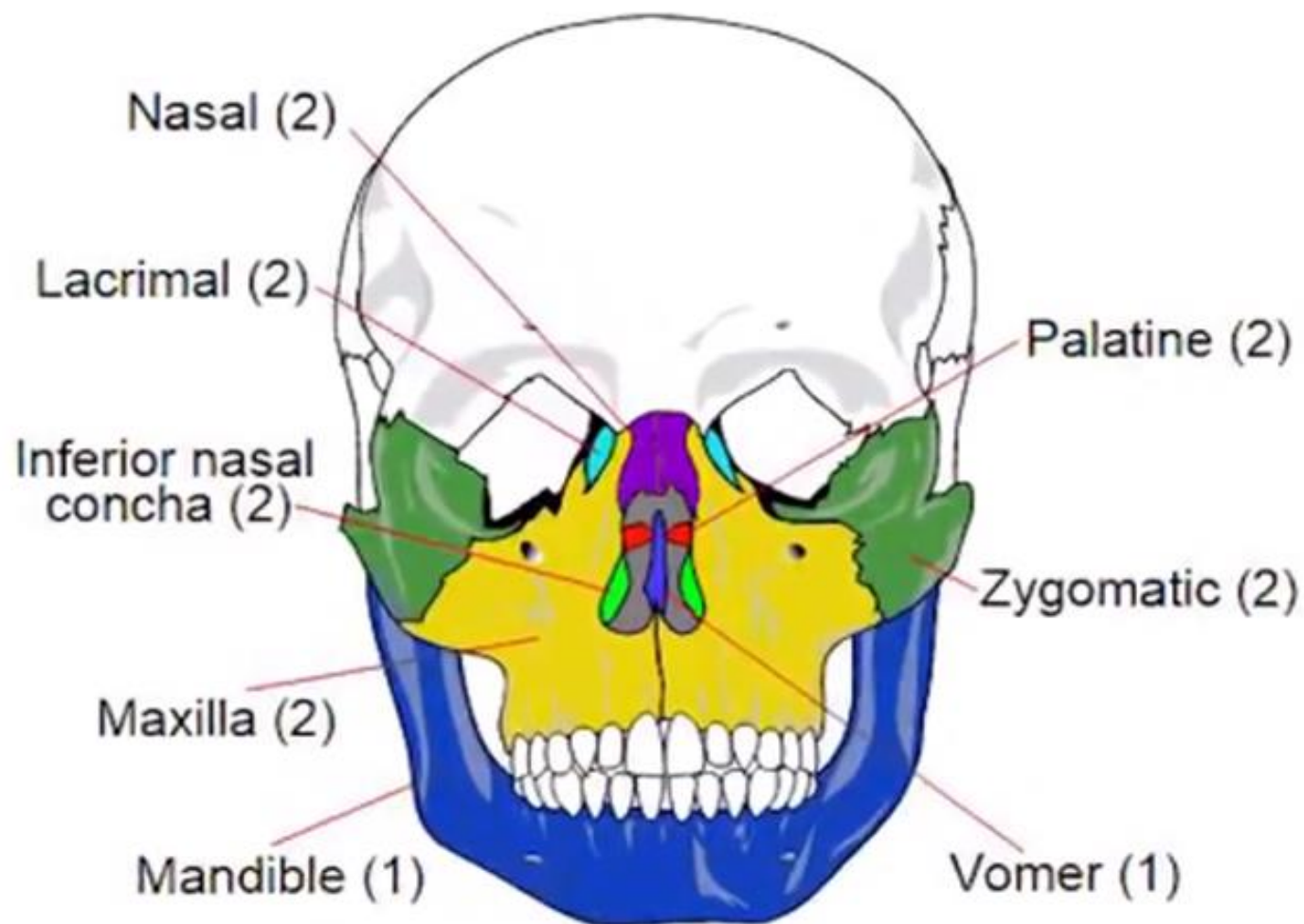
(Facial bones are shown in transparent.)

the facial skeleton consists of fourteen bones in the face

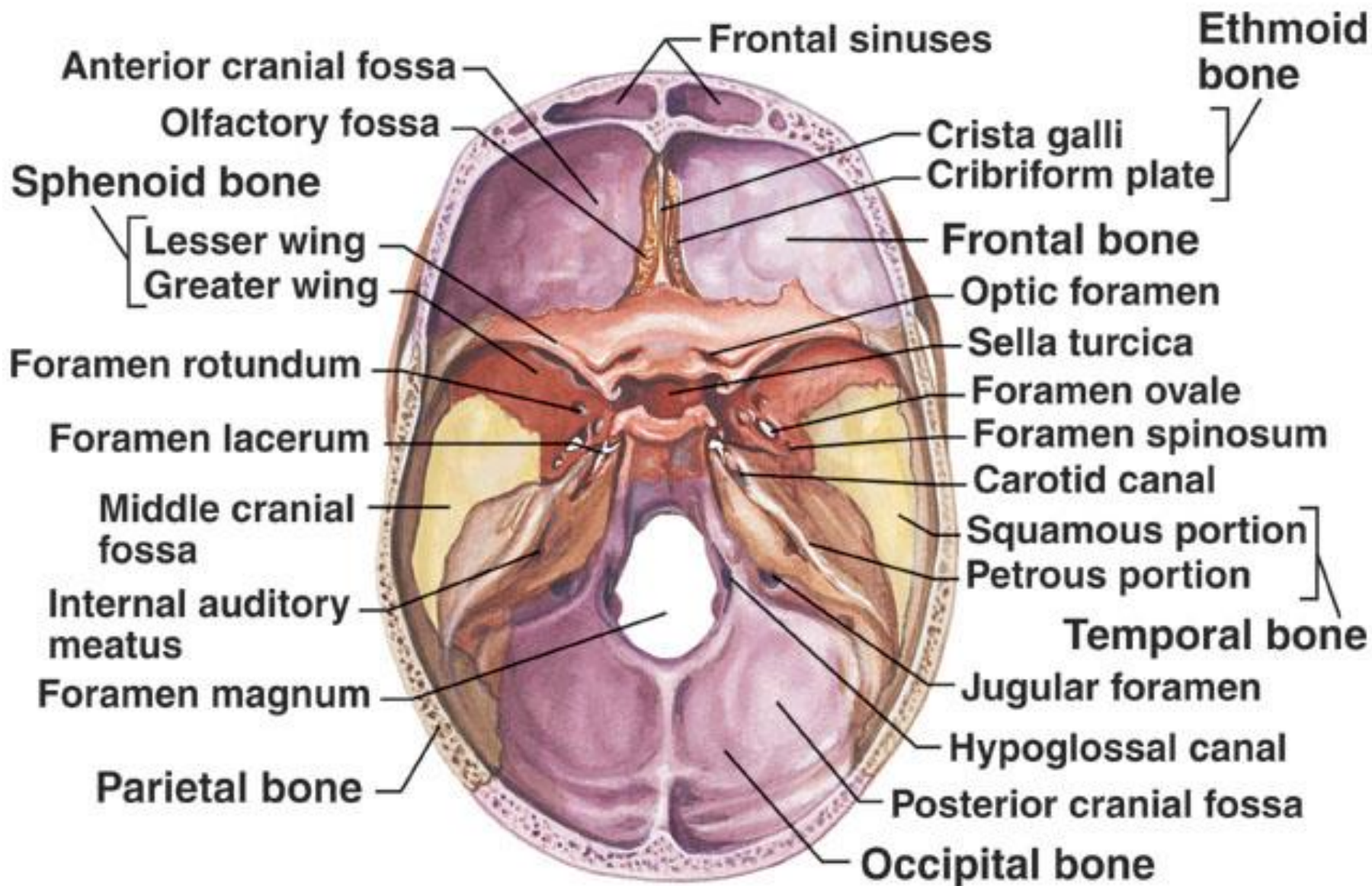
- 12
- Inferior turbinal (2)
- Lacrimal bones (2)
- Mandible
- Maxilla (2)
- Nasal bones (2)
- Palatine bones (2)
- Vomer
- Zygomatic bones (2)



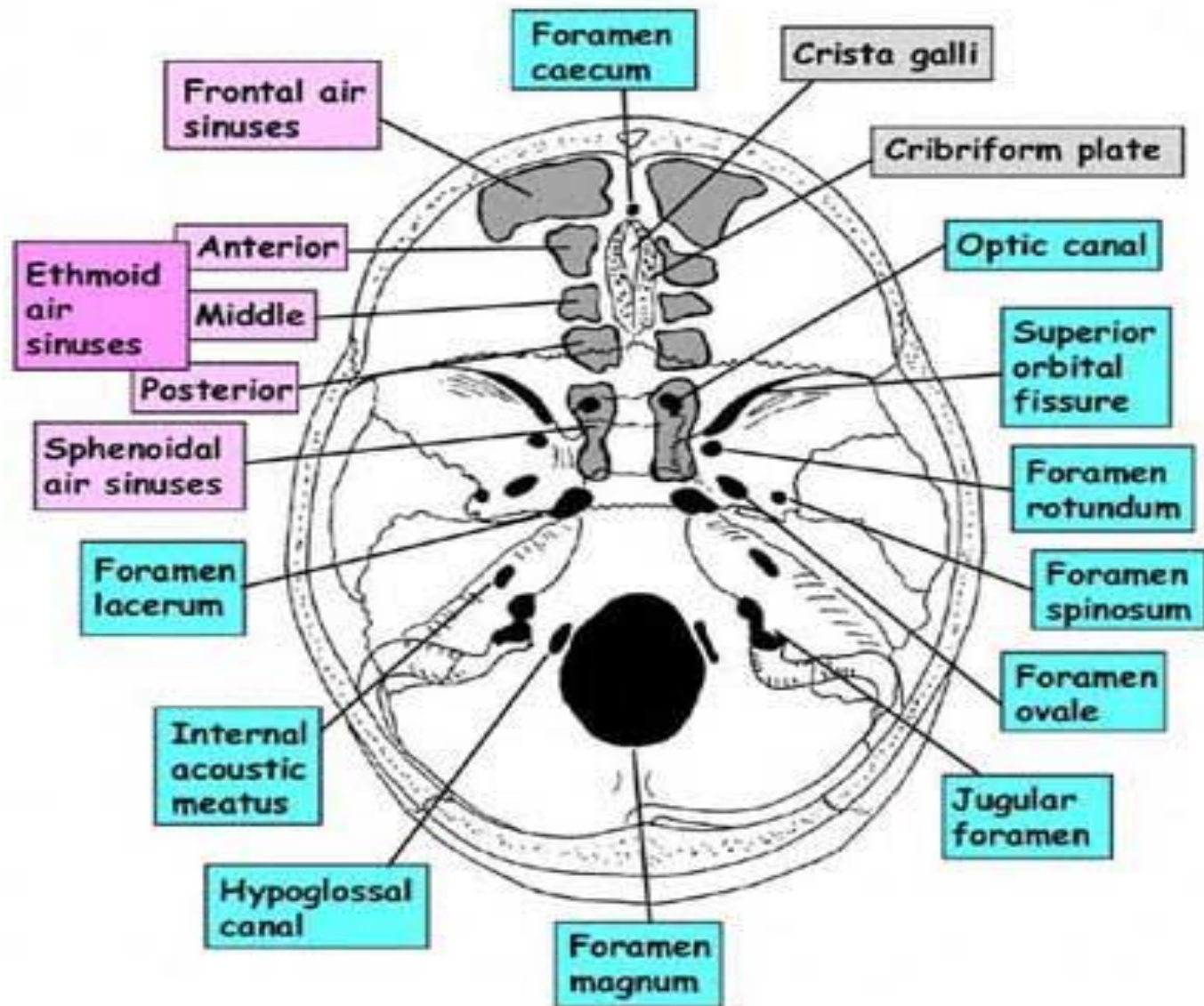
14 Facial Bones

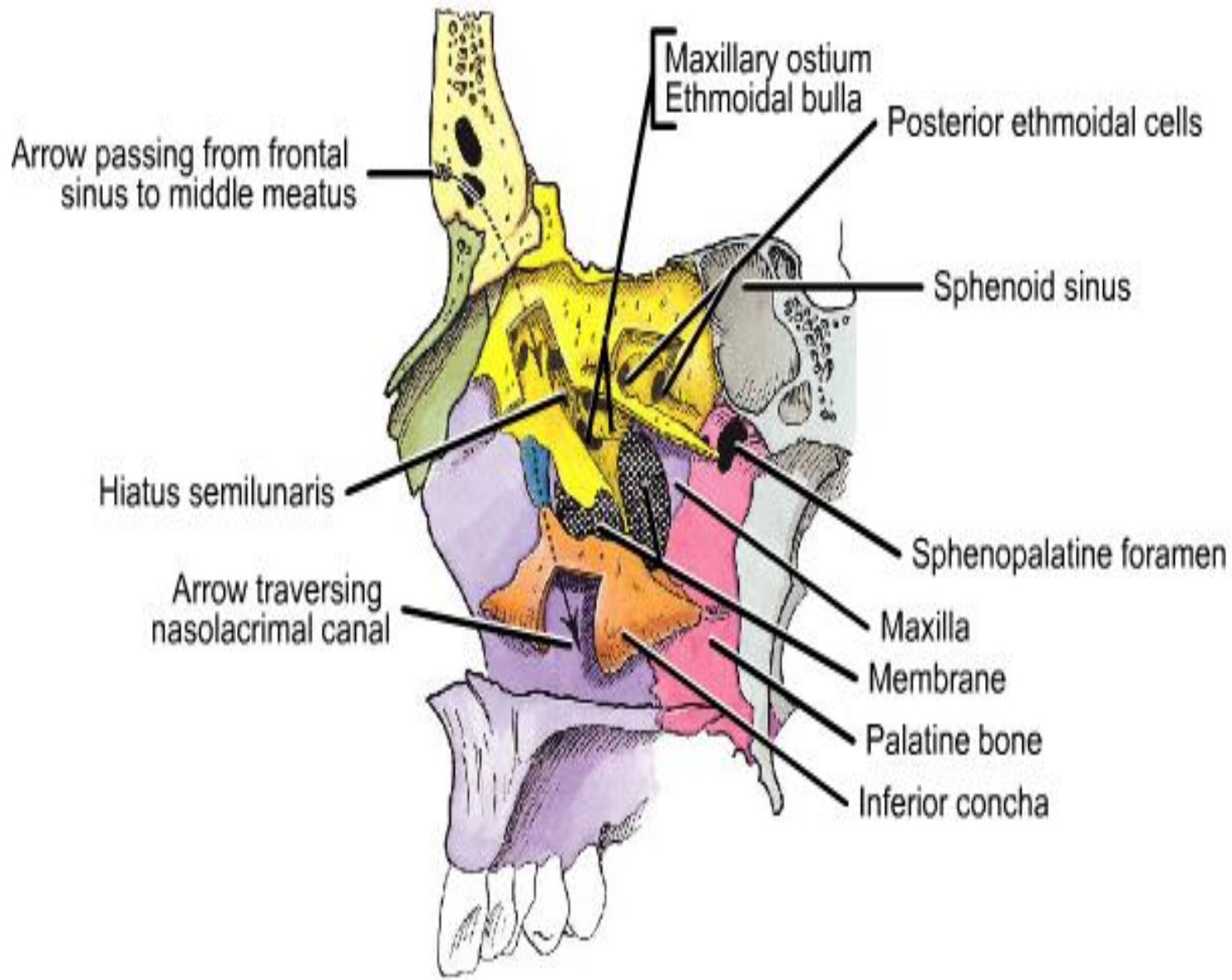


14 Facial Bones



INTERNAL VIEW OF BASE OF SKULL TO SHOW SINUSES AND FORAMINA





- The skull bones are made up of external and internal layers of compact bone separated by a layer of spongy bone called the **diploë**

skull bones



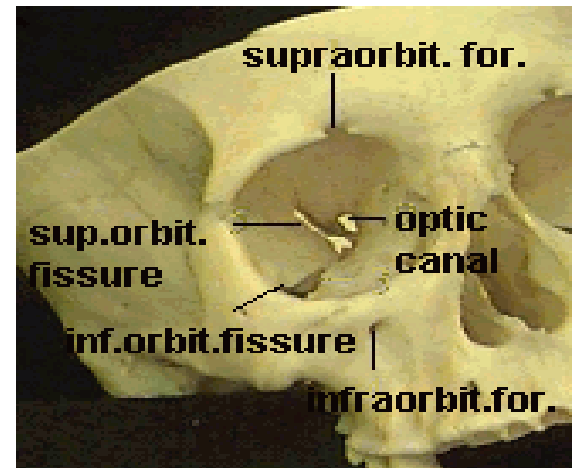
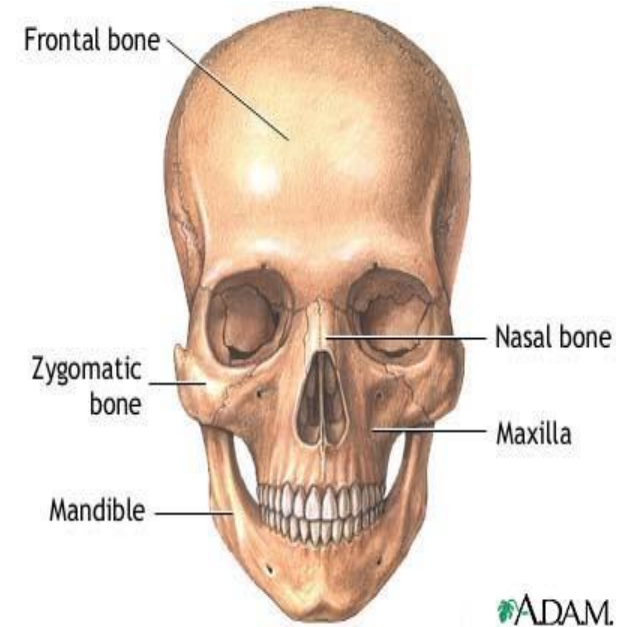
skull bones



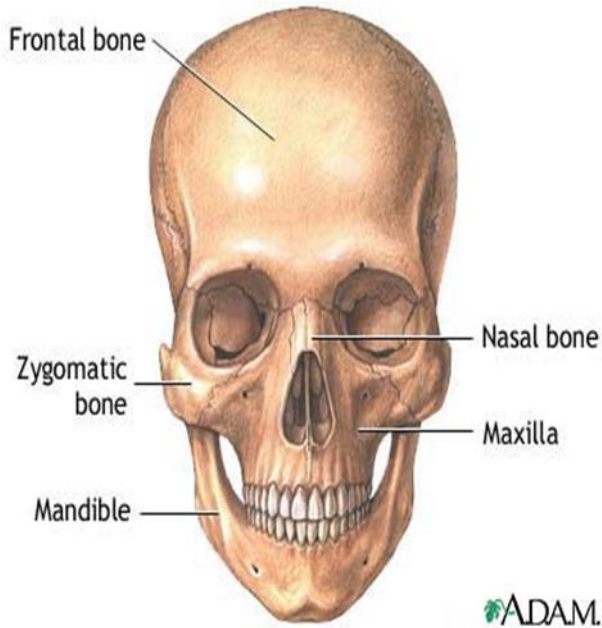
- The internal layer is thinner and more brittle هش than the external layer. The bones are covered on the outer and inner surfaces with **periosteum**.

External Views of the Skull

- **Anterior View of the Skull**
- The **frontal bone**, or **forehead bone**, curves downward to make the upper margins of the orbits .The **superciliary arches** can be seen on either side, and the **supraorbital notch**, or **foramen**, can be recognized.

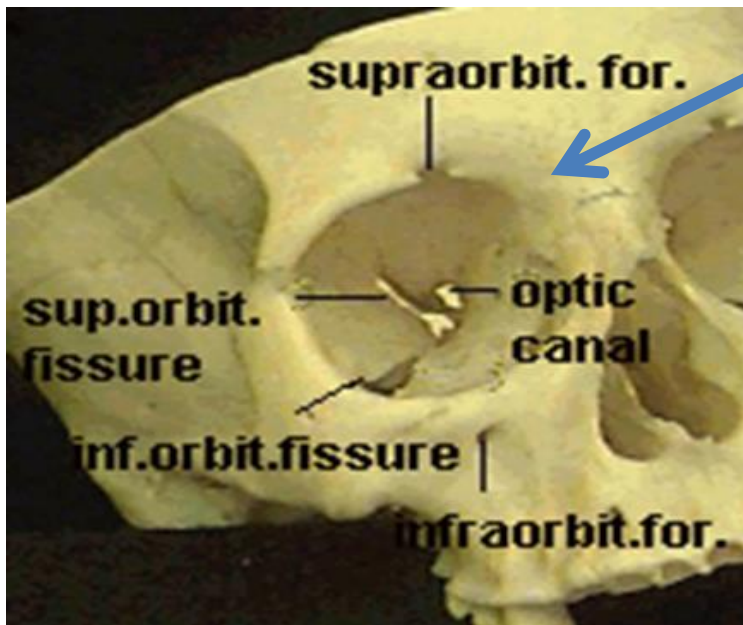


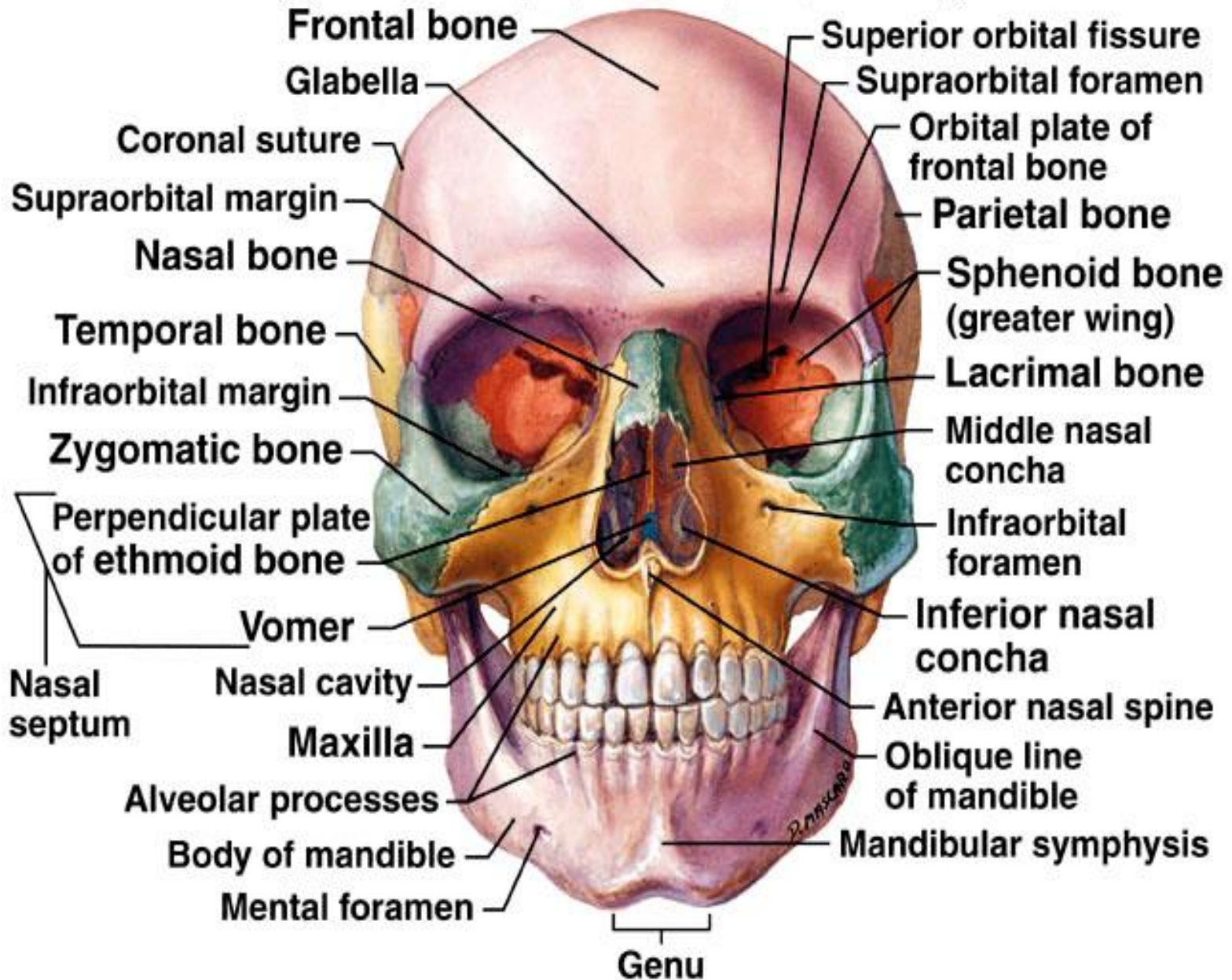
External Views of the Skull

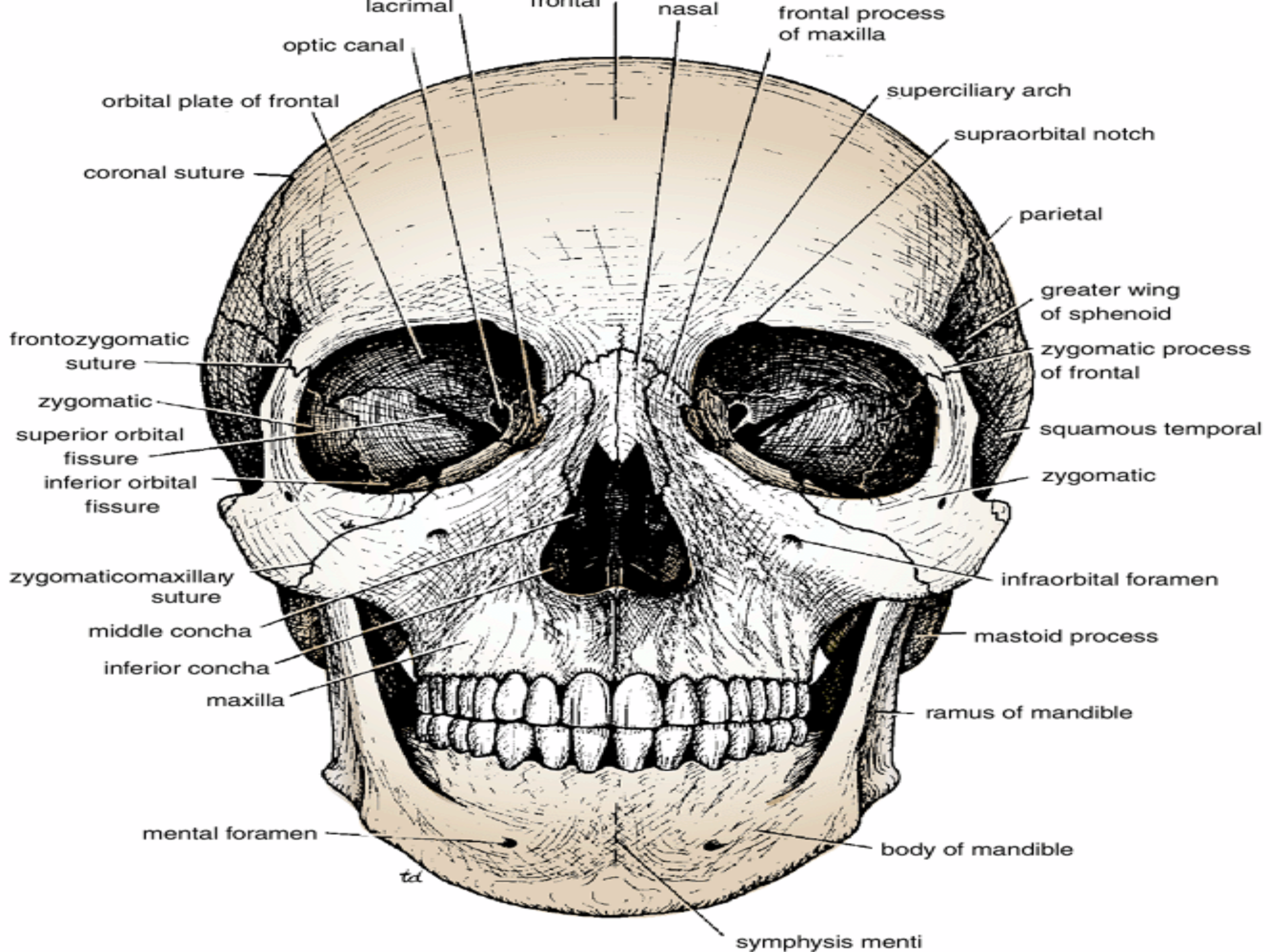


- **Medially:** the frontal bone articulates with the frontal processes of the maxillae and with the nasal bones.

Laterally: the frontal bone articulates with the zygomatic bone.



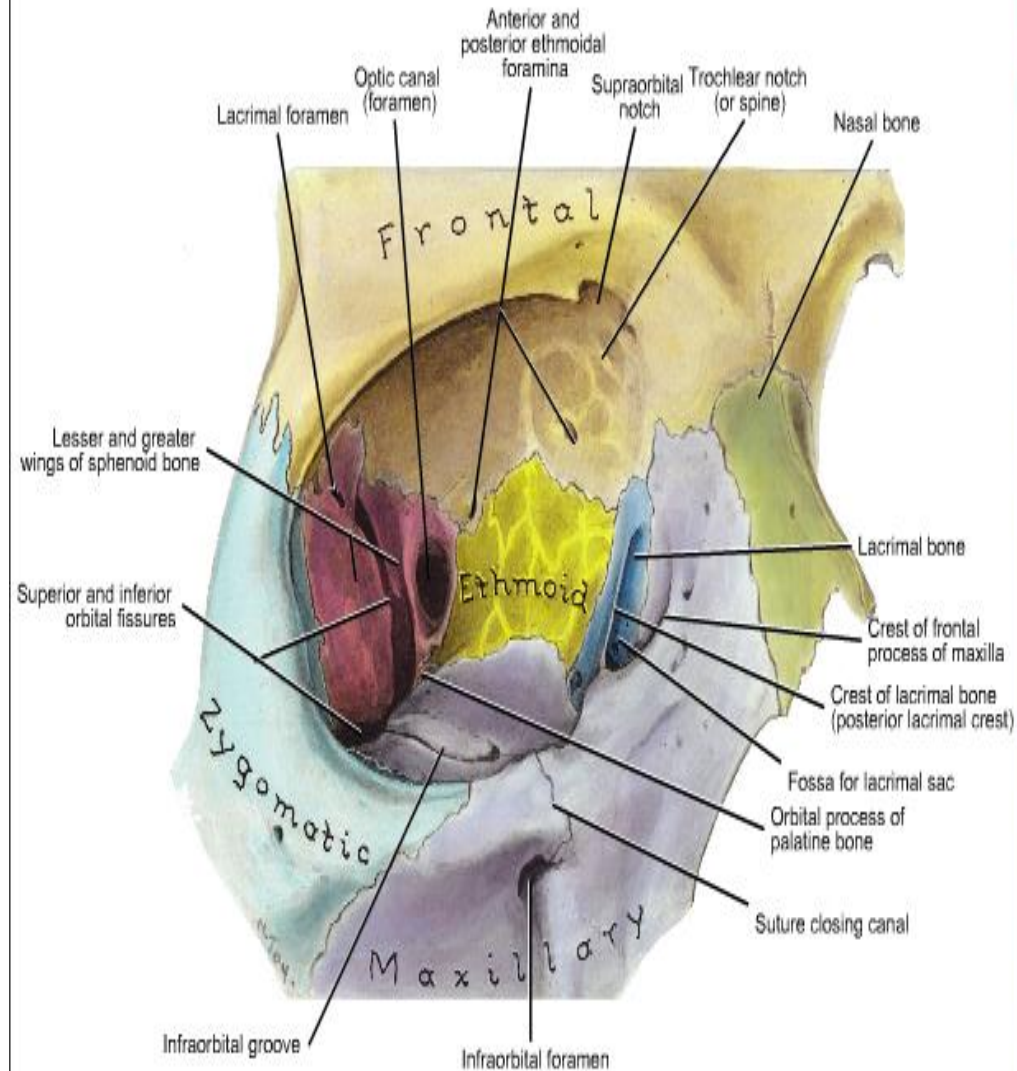




The orbital margins are

bounded by the **frontal** bone superiorly, the **zygomatic** bone laterally, the **maxilla** inferiorly, and the processes of the **maxilla and frontal** bone medially

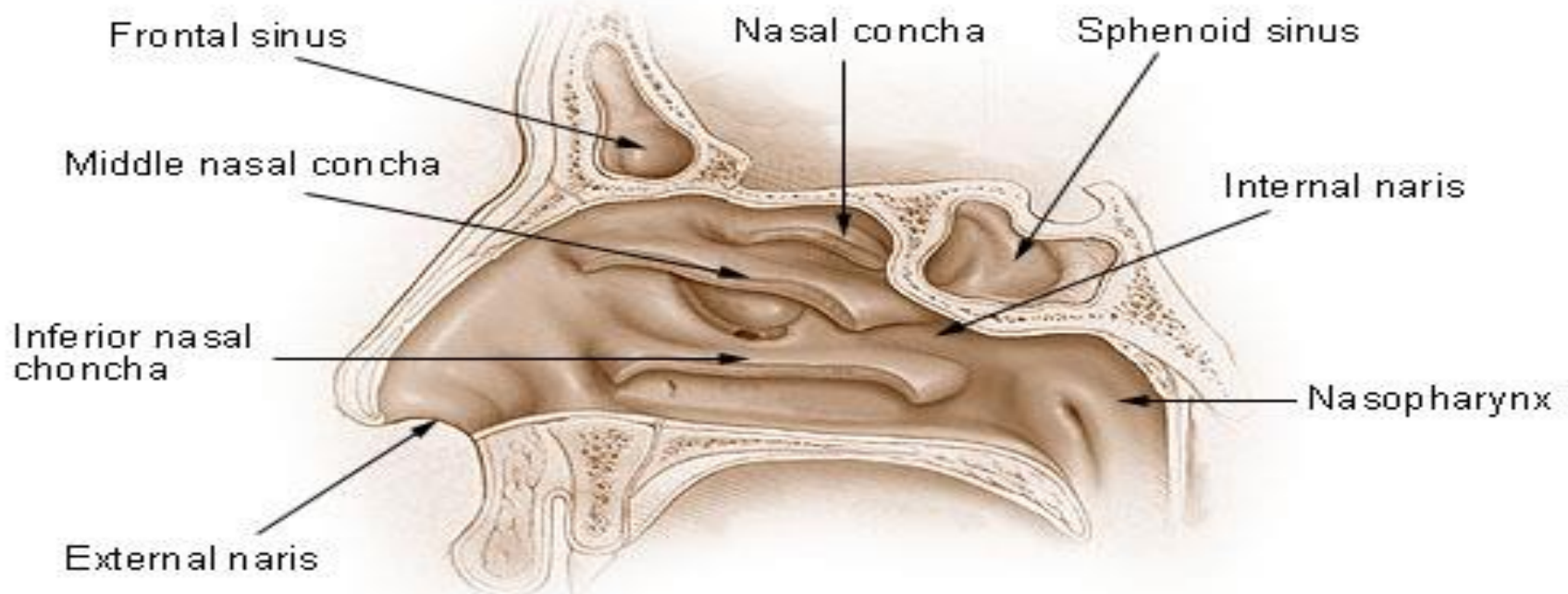
*Within the frontal bone, just above the orbital margins, are two hollow spaces lined with mucous membrane called the **frontal air sinuses**. These communicate with the nose and serve as voice resonators.*



What are the importance of the air sinuses

- The two nasal bones form the **bridge of the nose**. Their lower borders, with the maxillae, make the **anterior nasal aperture**. The nasal cavity is divided into two by the bony nasal septum, which is largely formed by the **vomer**.
- The **superior and middle** conchae are **shelves الرفوف** of bone that project into the nasal cavity from the **ethmoid bone** on each side; *the inferior conchae are separate bones*.

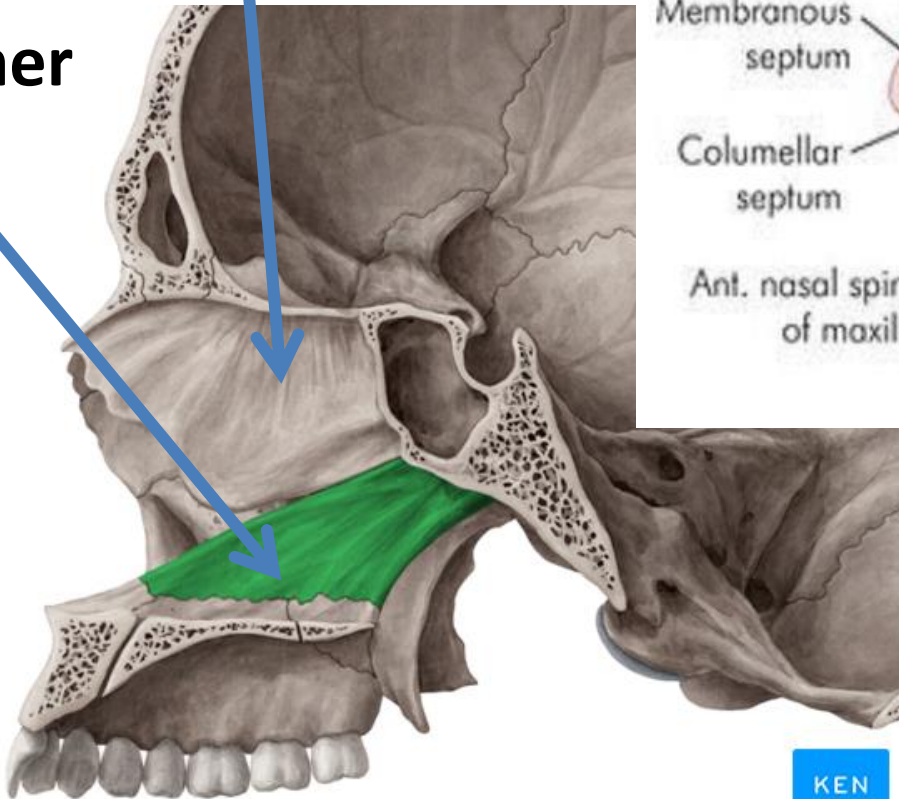
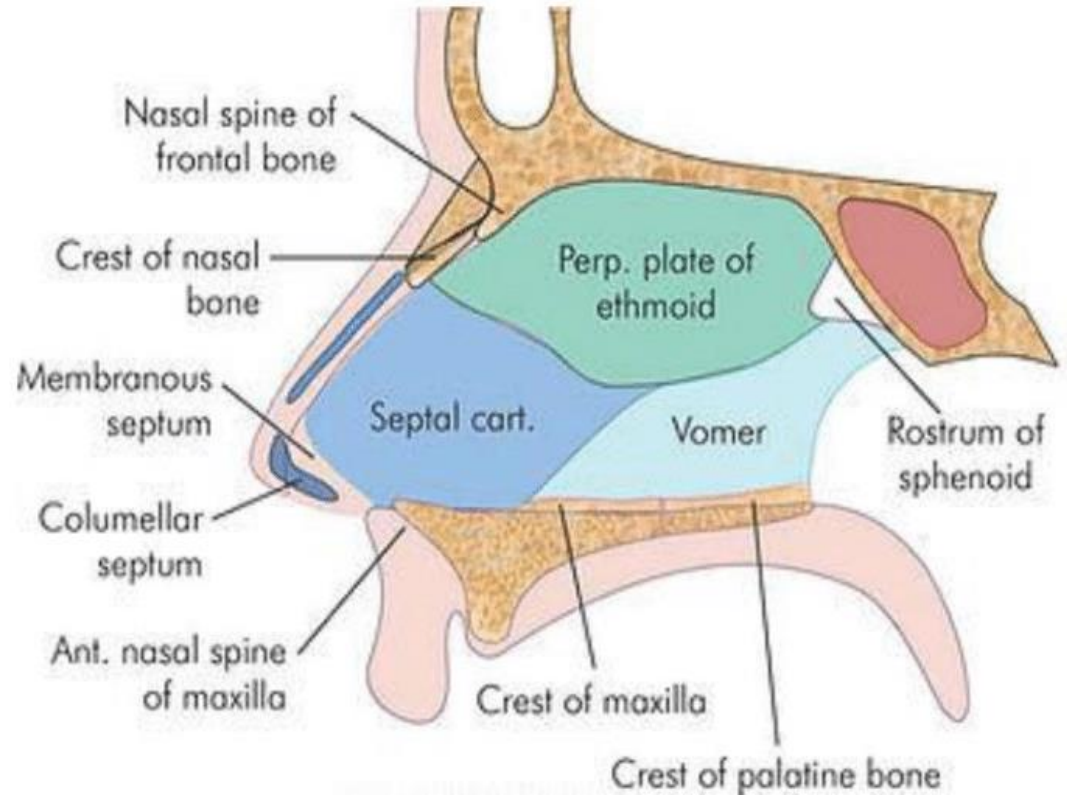
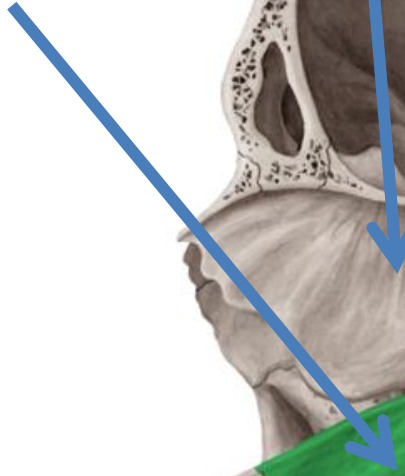
Nose and Nasal Cavities



perpendicular plate of ethmoidal bone



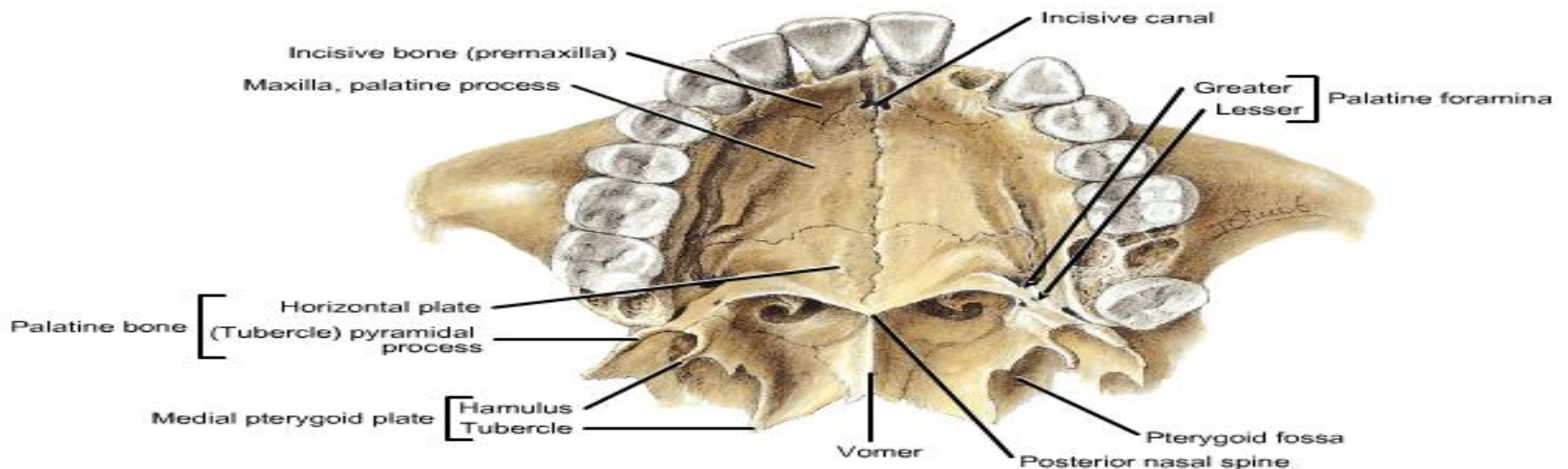
vomer



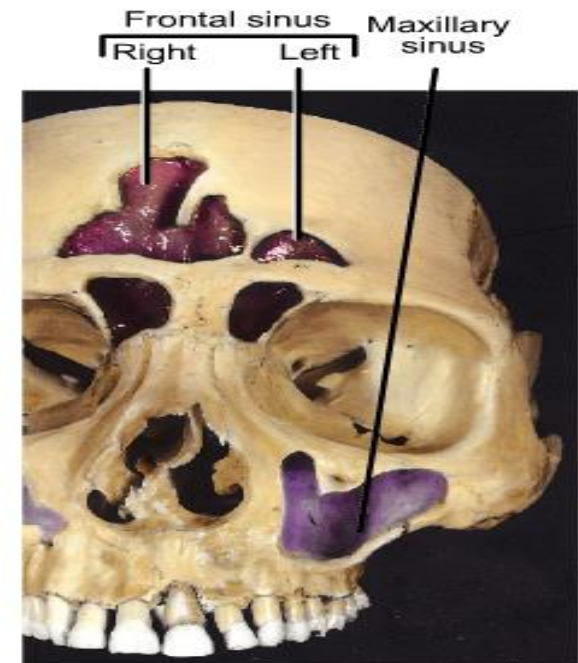
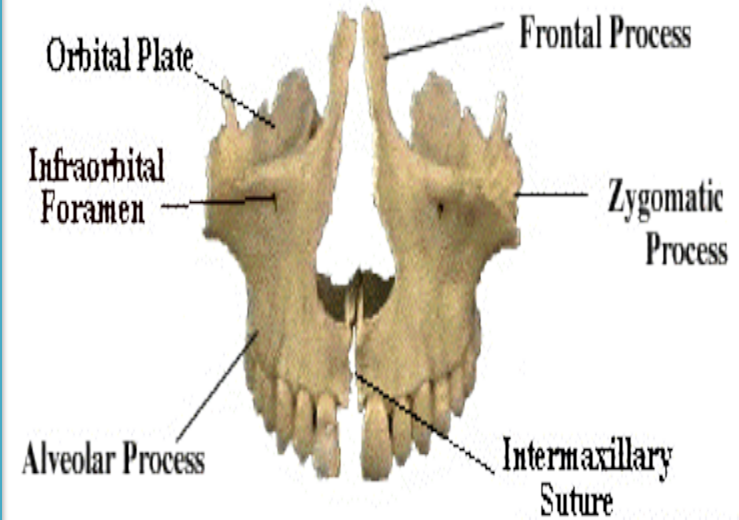
- The two maxillae form the
- upper jaw,
- the anterior part of the hard palate,
- part of the lateral walls of the nasal cavities, and part of the floors of the orbital cavities.

The two bones meet in the midline at the intermaxillary suture and form the lower margin of the nasal aperture.

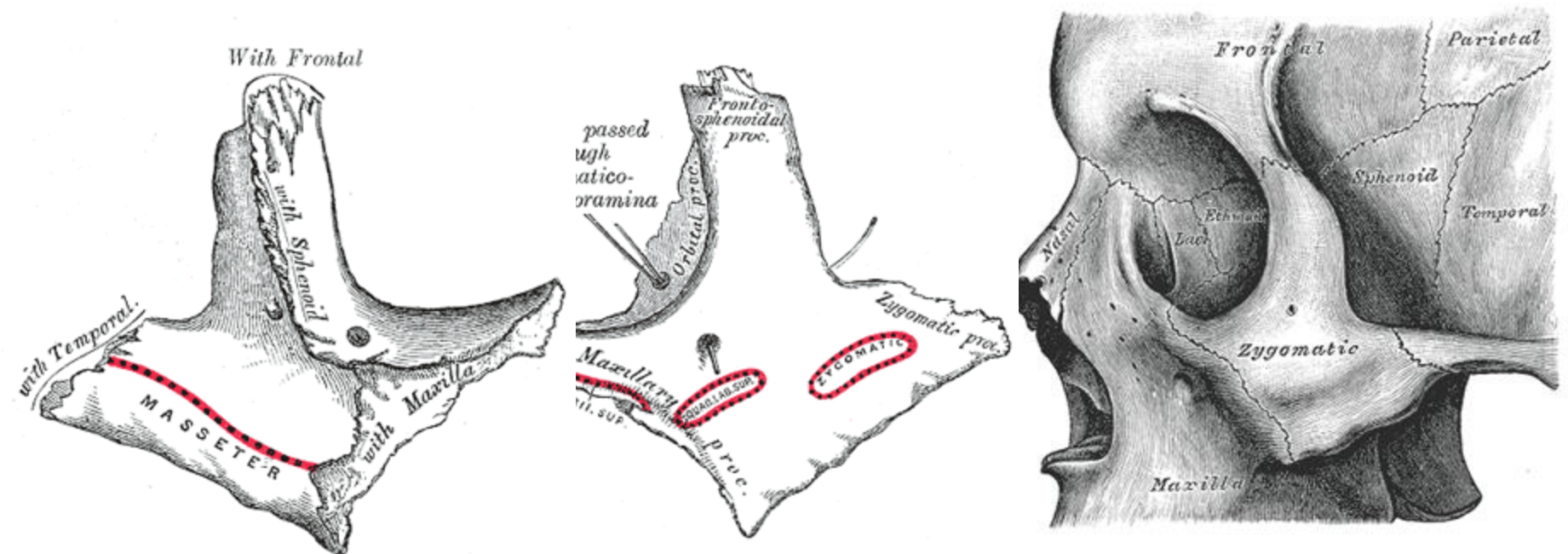
Below the orbit, the maxilla is perforated by the **infraorbital foramen**

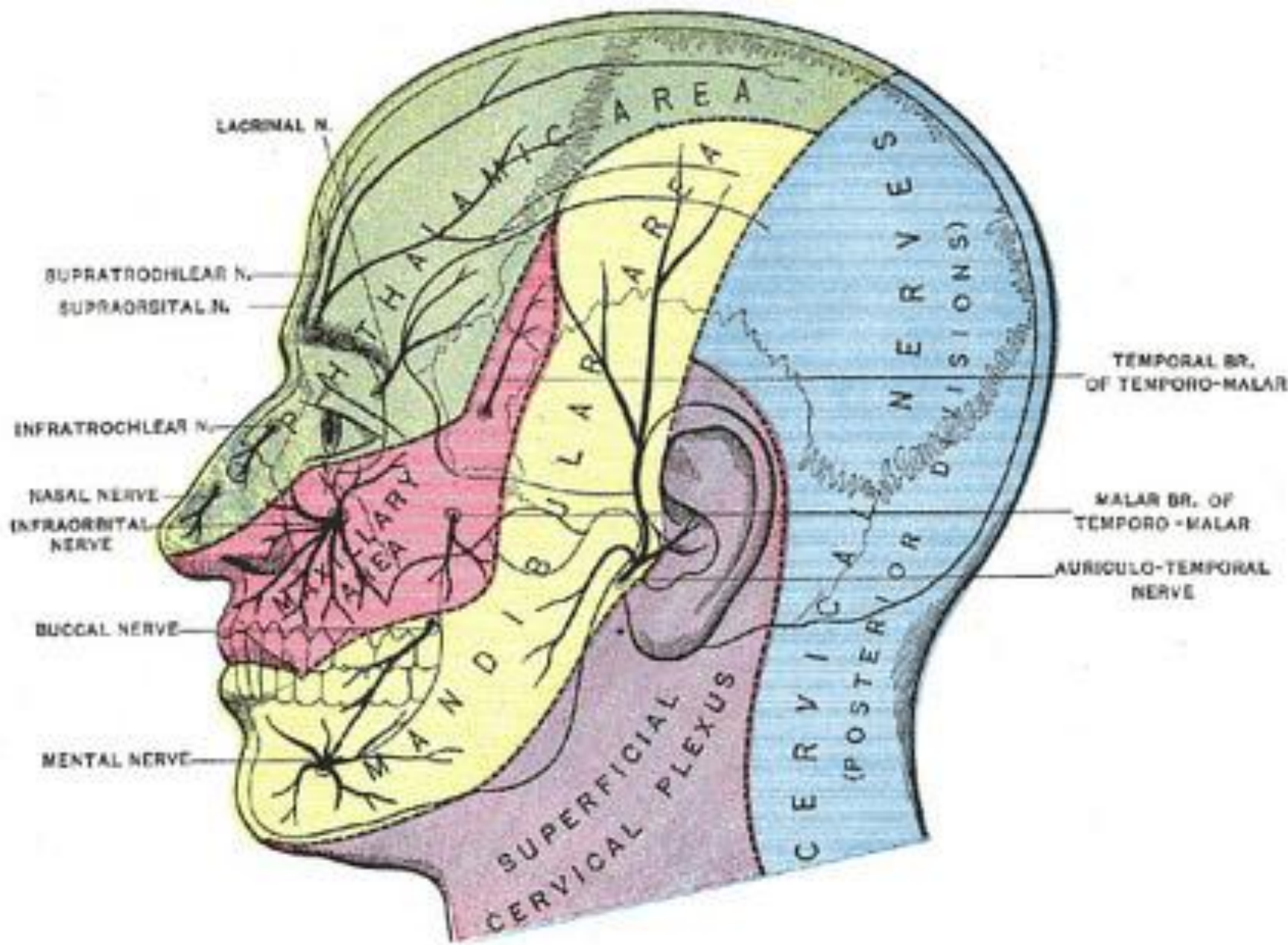


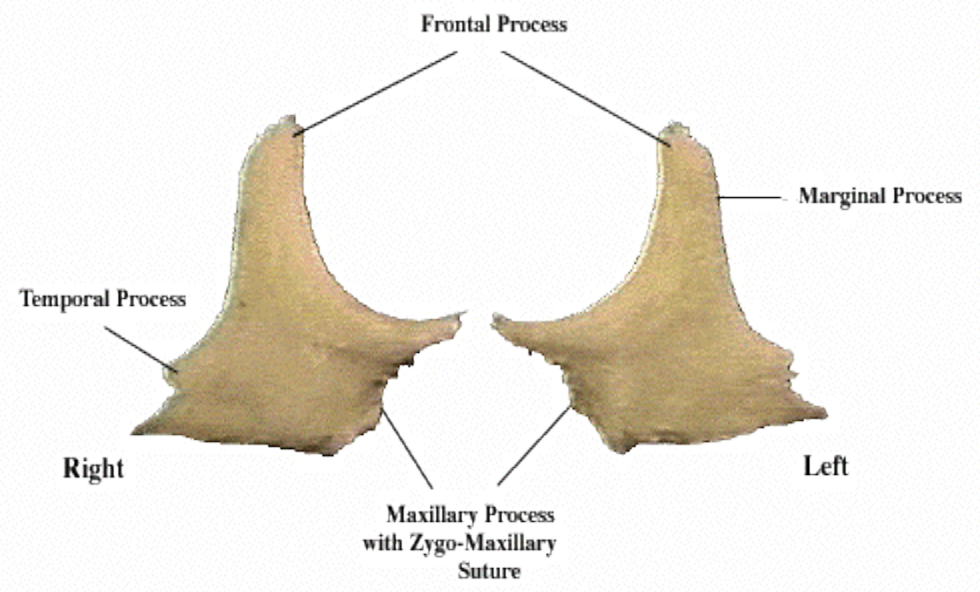
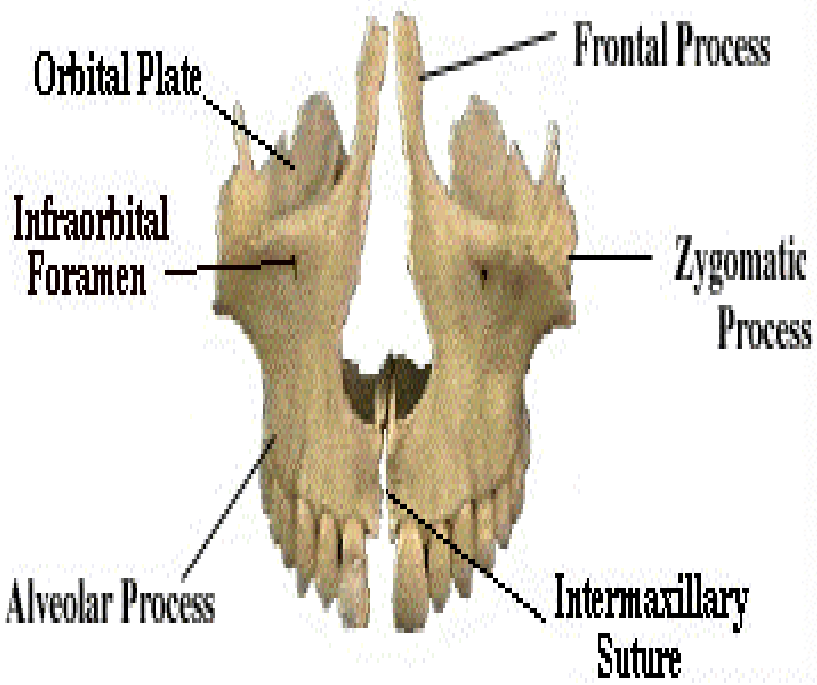
- alveolar process projects downward and, together with the fellow of the opposite side, forms the alveolar arch, which carries the upper teeth. Within each maxilla is a large, pyramid-shaped cavity lined with mucous membrane called the maxillary sinus. This communicates with the nasal cavity and serves as a voice resonator.



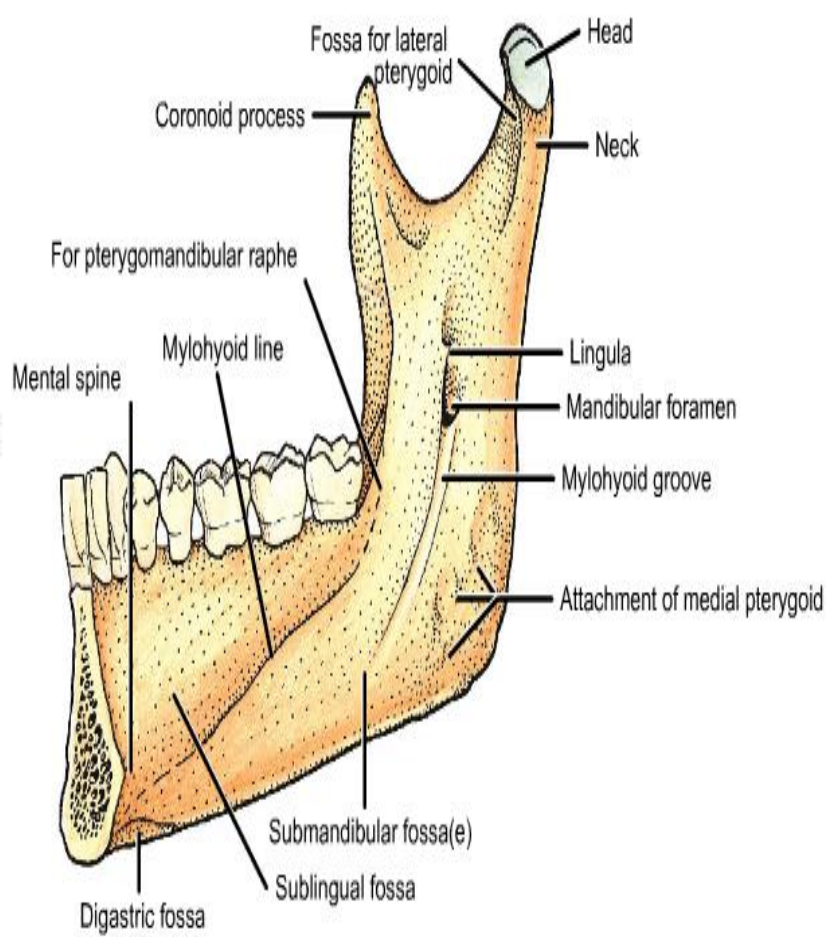
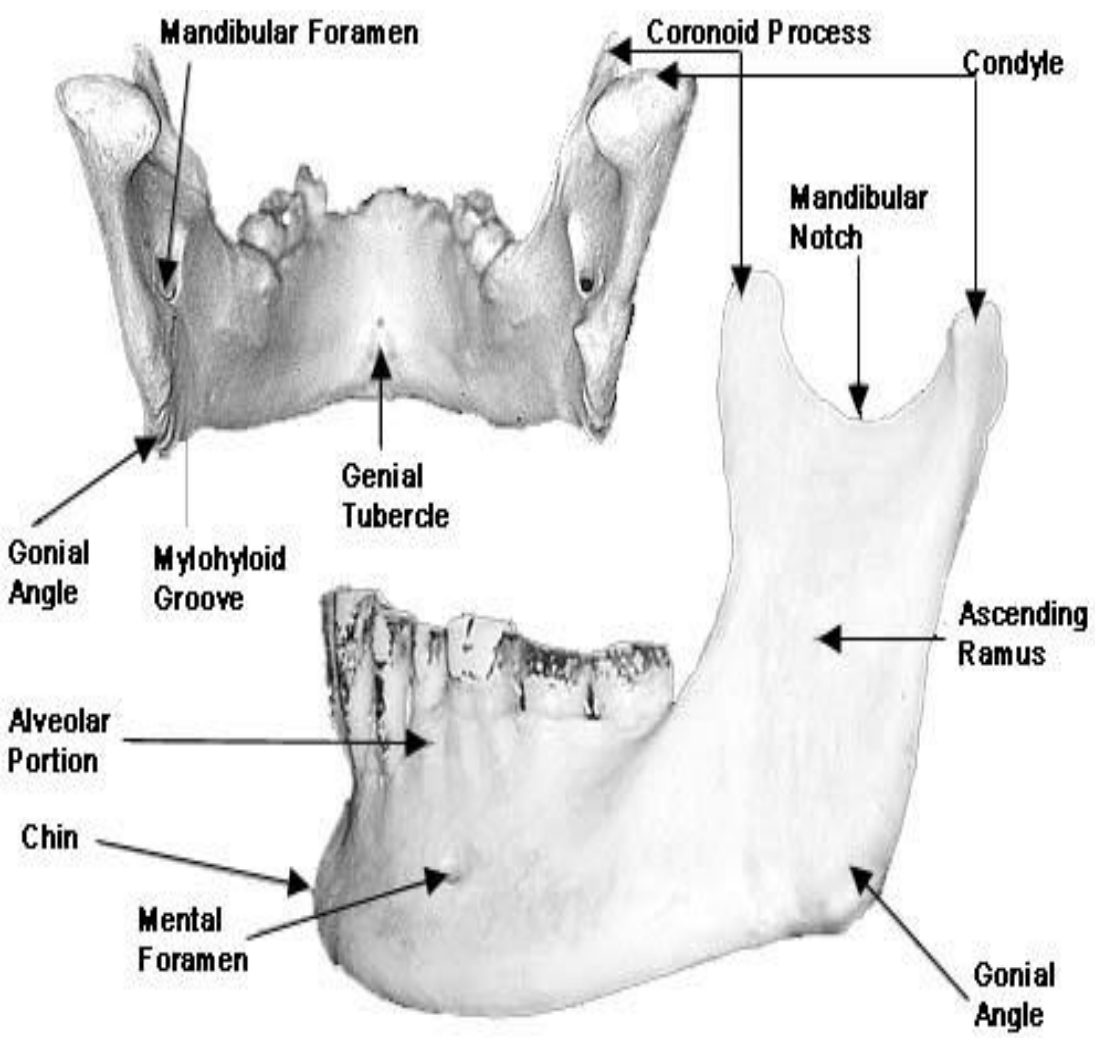
- The zygomatic bone forms the **prominence of the cheek** and part of the lateral wall and floor of the orbital cavity.
- Medially, it articulates with the maxilla and laterally it articulates with the zygomatic process of the temporal bone to form the **zygomatic arch**.
- The zygomatic bone is perforated by two foramina for the **zygomaticofacial and zygomaticotemporal nerves**.



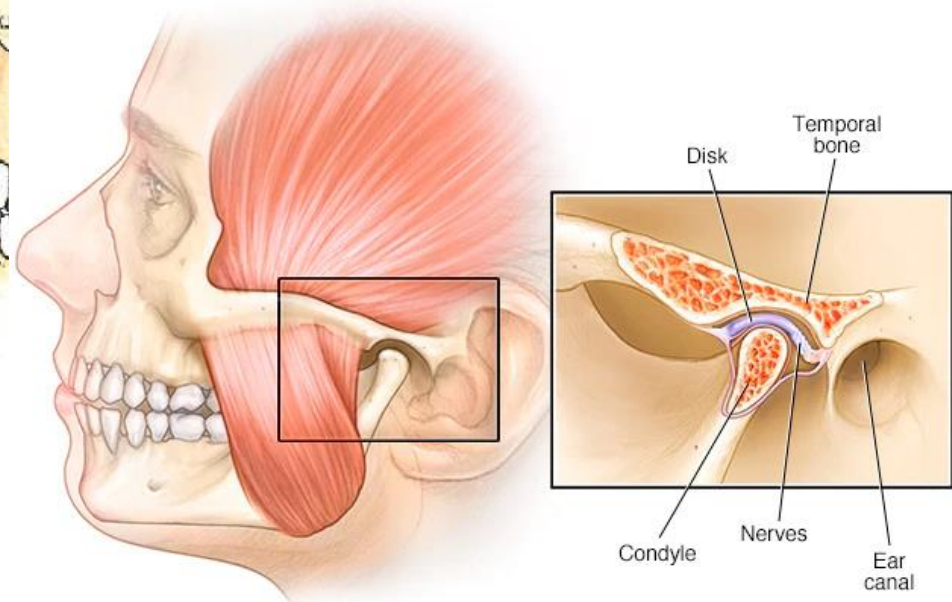
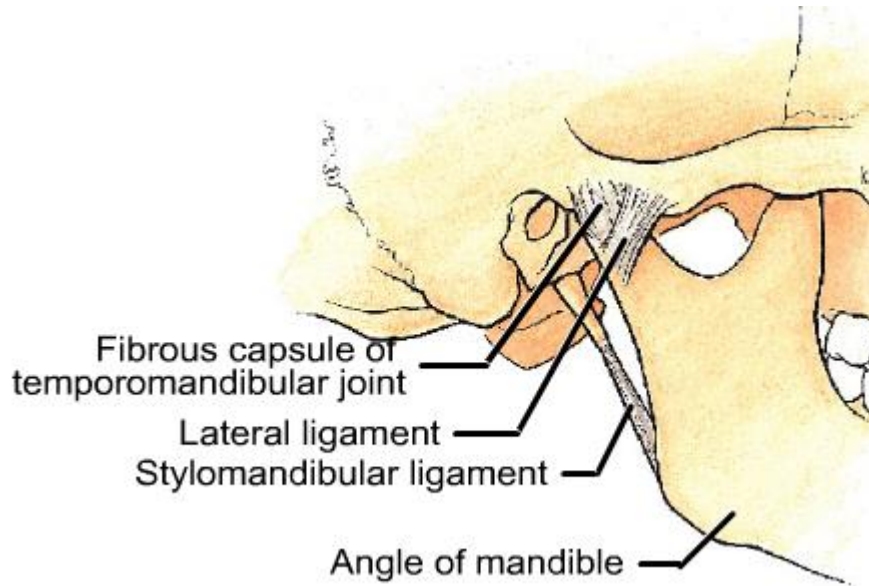
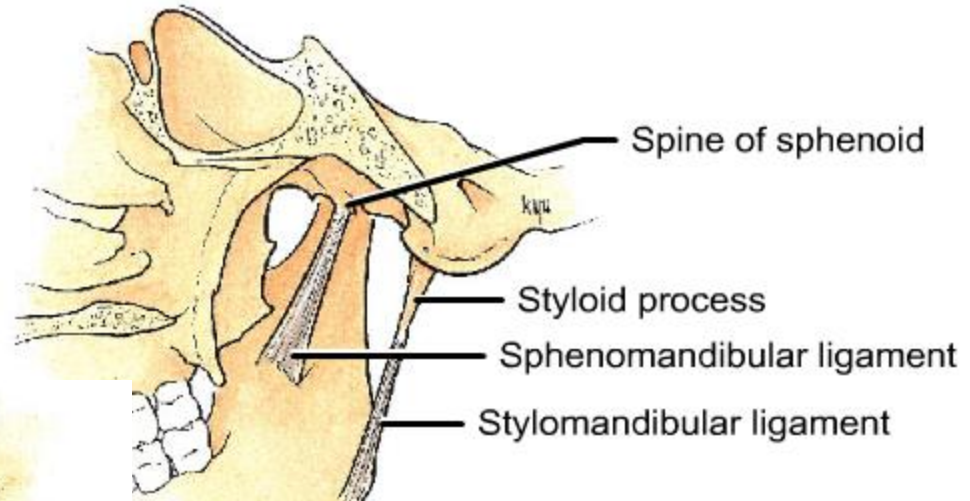




- The mandible, or lower jaw, consists of a horizontal body and two vertical rami



Temporomandibular joint and stylomandibular ligament

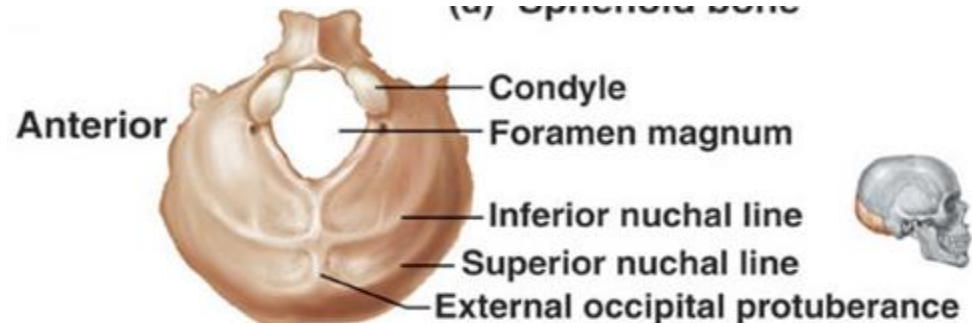
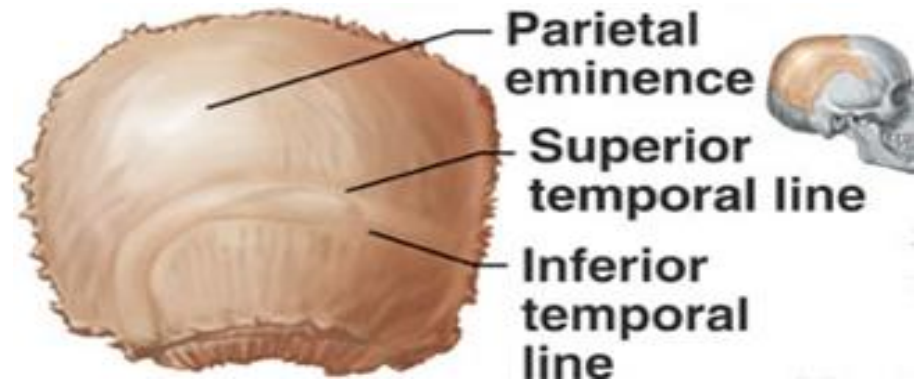
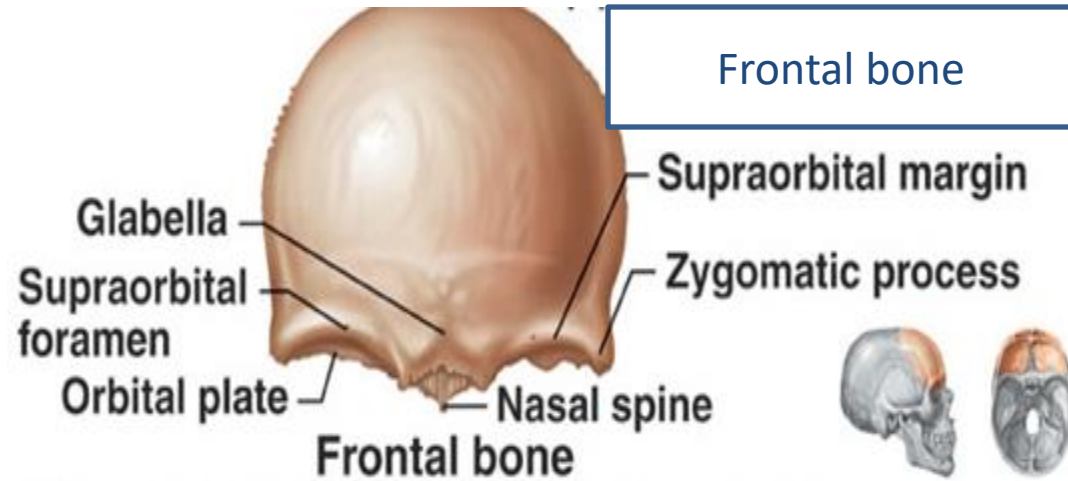


NCAMC

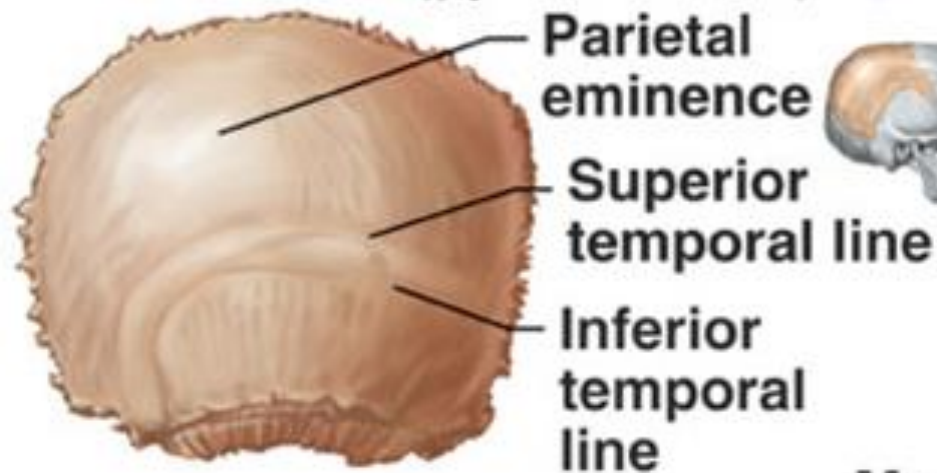


Views of the Skull

- The **frontal bone** forms the anterior part of the side of the skull and articulates with the parietal bone at the coronal suture
- The **parietal bones** form the sides and roof of the cranium and articulate with each other in the midline at the sagittal suture. They articulate with the **occipital bone** behind, at the lambdoid suture.



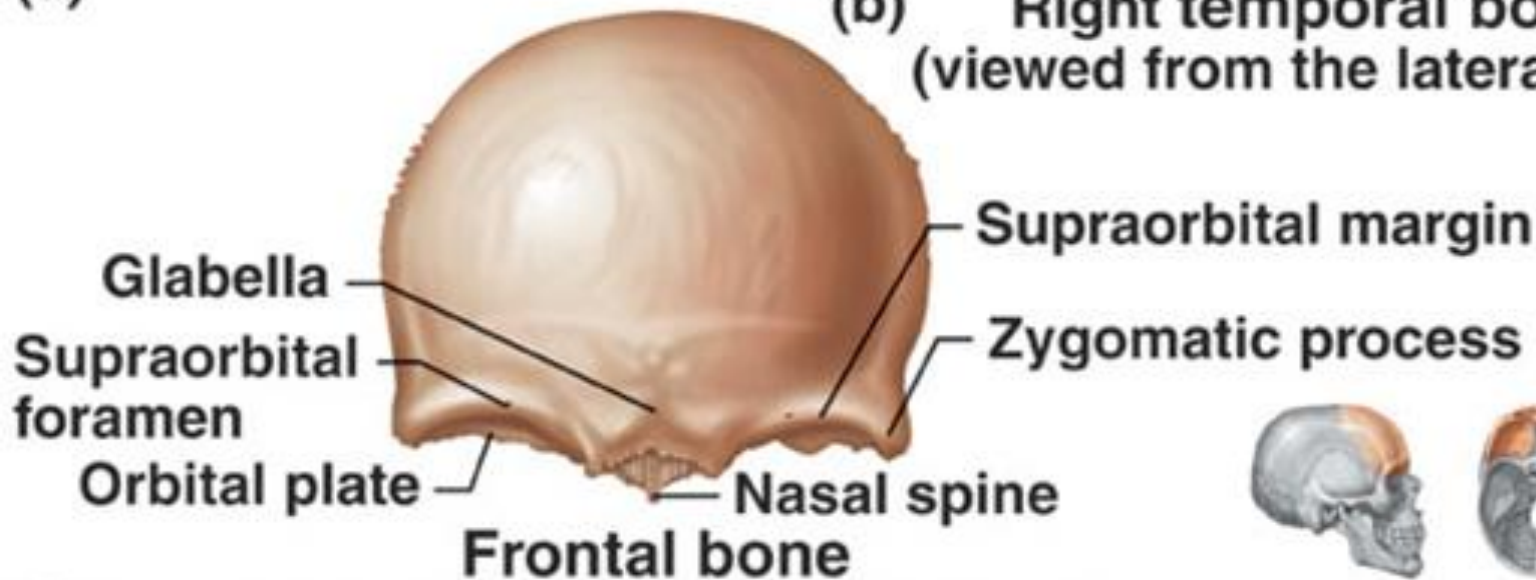
(e) Posterior Occipital bone (viewed from below)



Right parietal bone
(viewed from the lateral side)
(a)

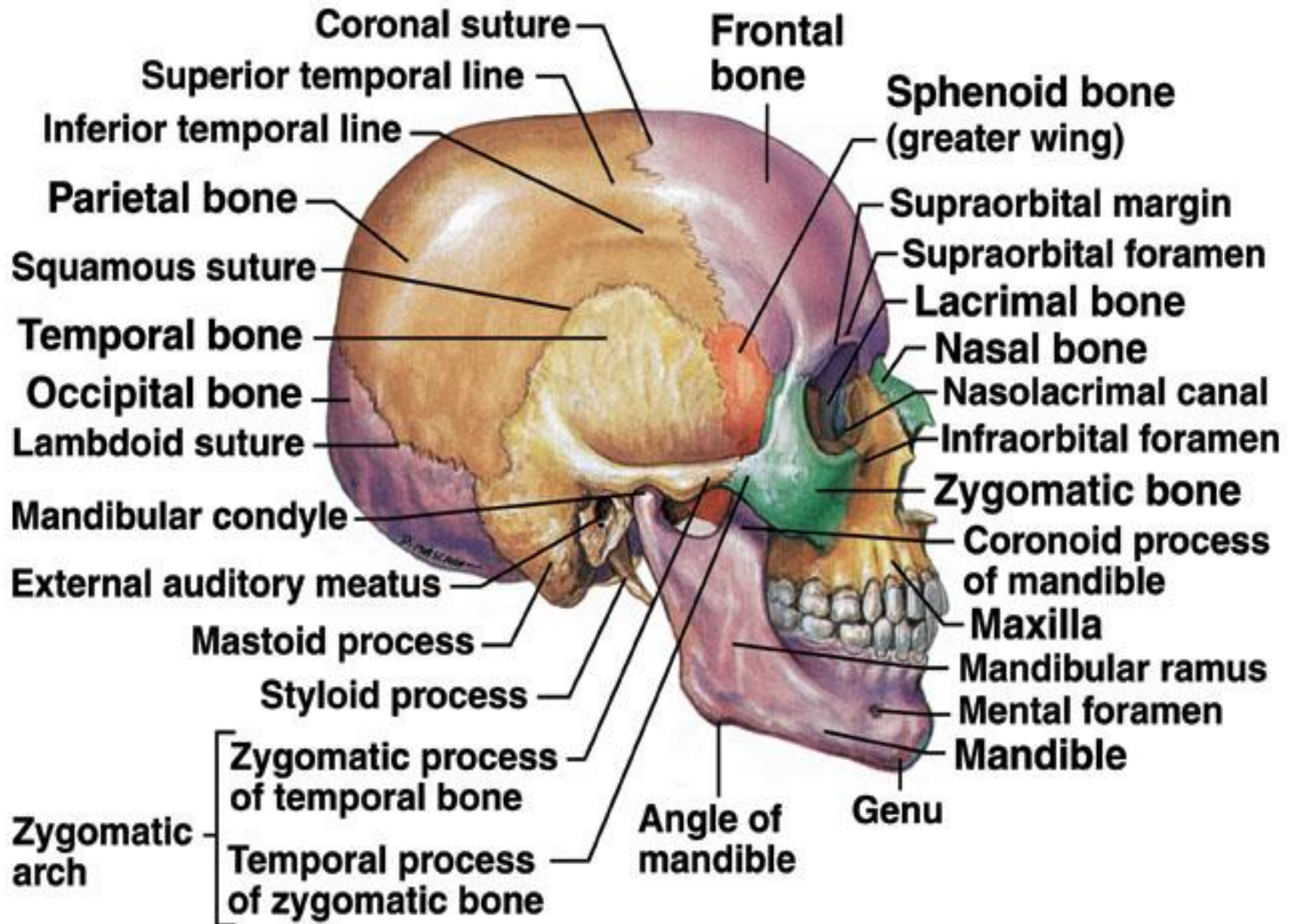


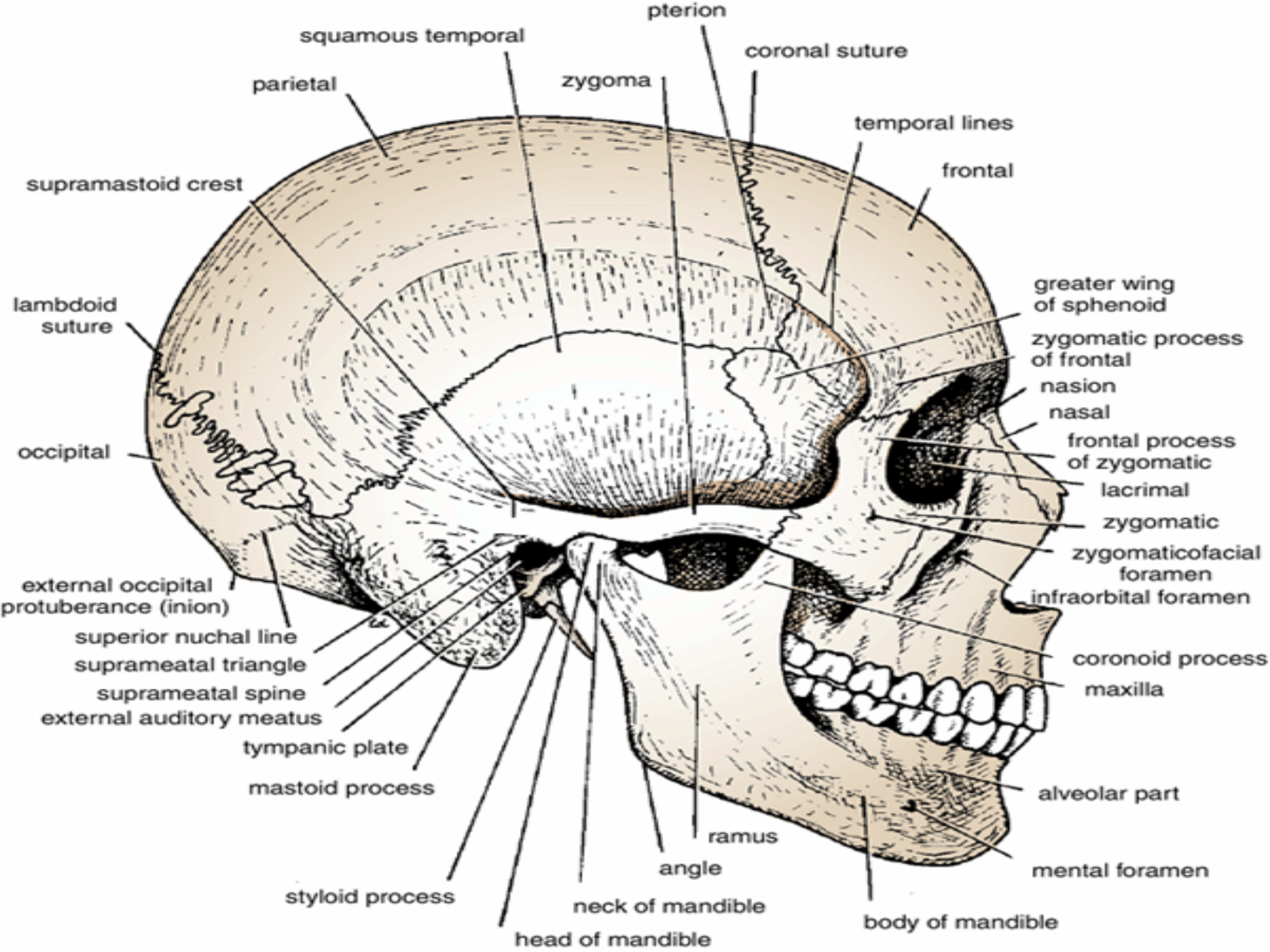
Right temporal bone
(viewed from the lateral side)
(b)



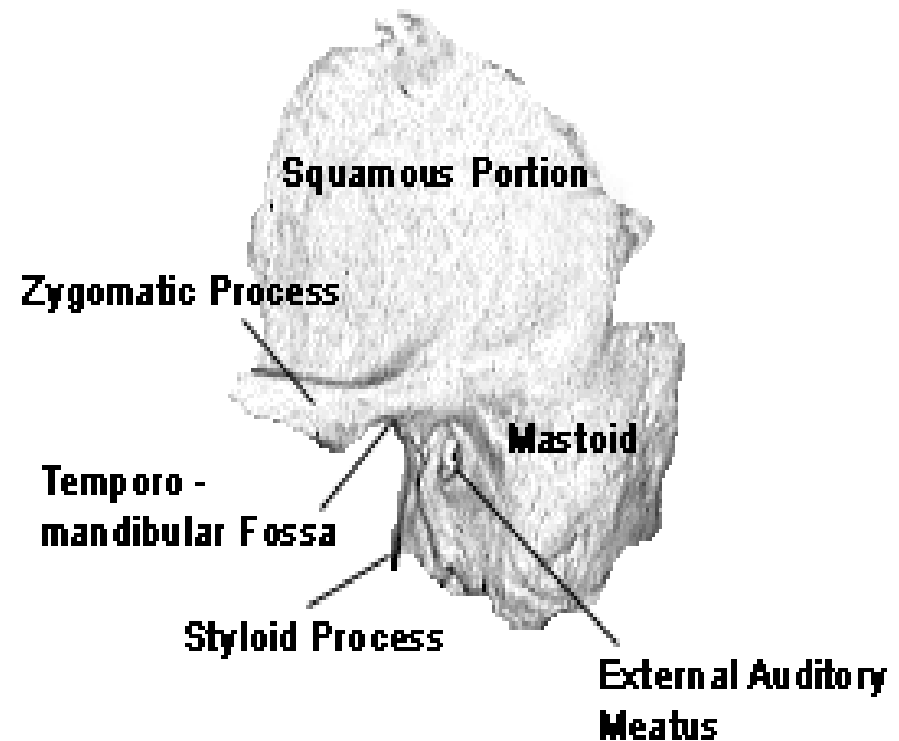
(c) (viewed from in front and slightly above)

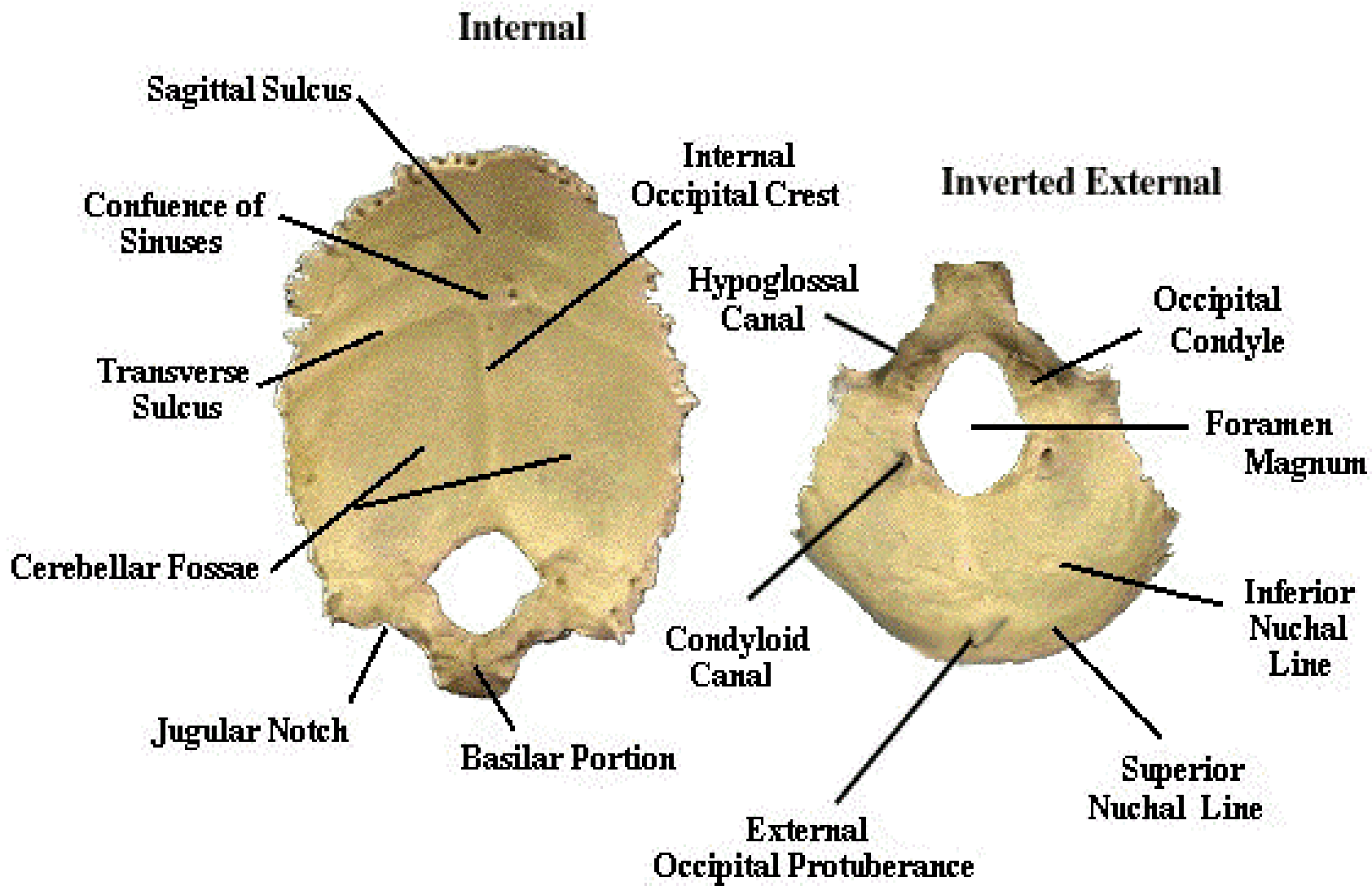




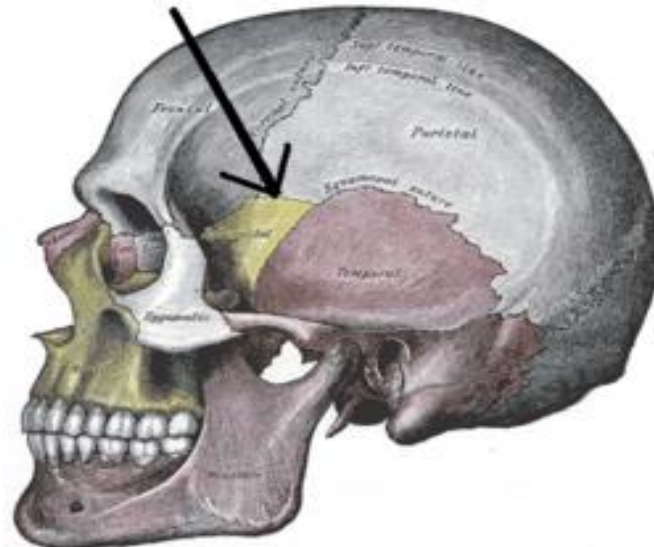
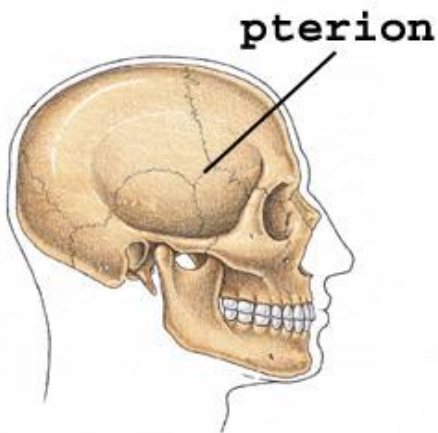
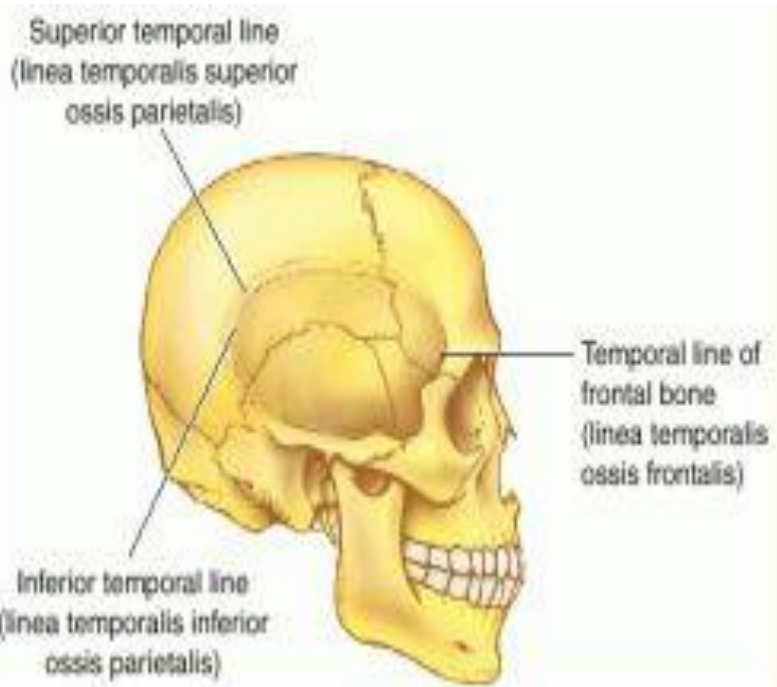


- The skull is completed at the side by the squamous part of the **occipital bone**; **parts of the temporal bone**, namely,
 - ❑ the squamous, tympanic,
 - ❑ mastoid process,
 - ❑ styloid process, and
 - ❑ zygomatic process; and the
- **greater wing of the sphenoid.**



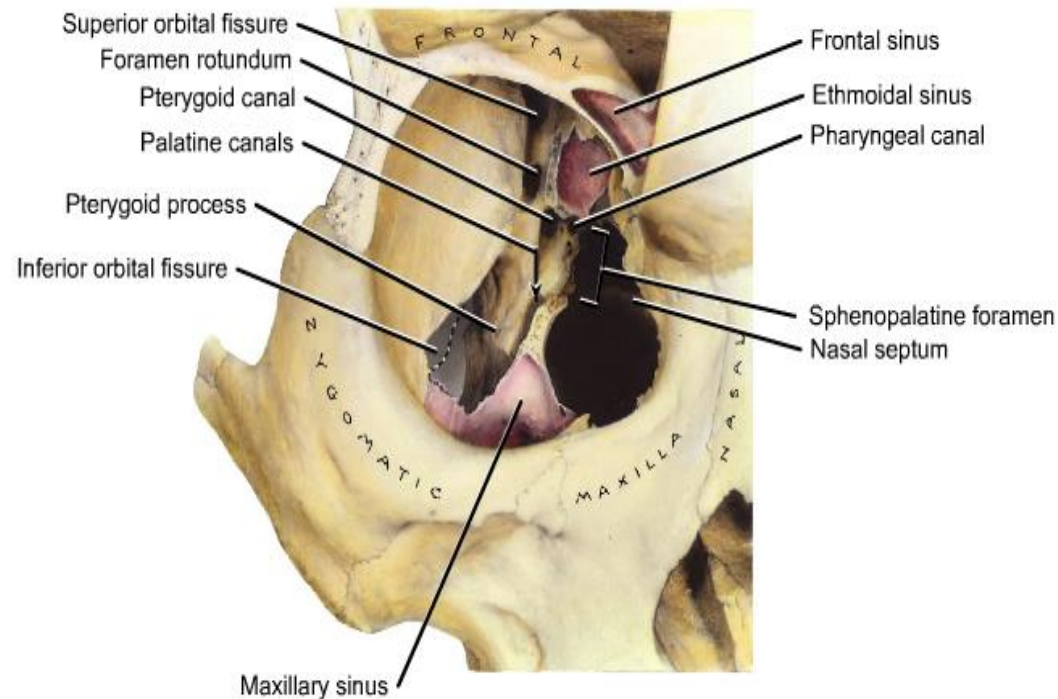


- Note that the thinnest part of the lateral wall of the skull is where the anteroinferior corner of the parietal bone articulates with the greater wing of the sphenoid; this point is referred to as the **pterion**
- Clinically, the **pterion** is an important area because it overlies the anterior division of the **middle meningeal artery and vein**.

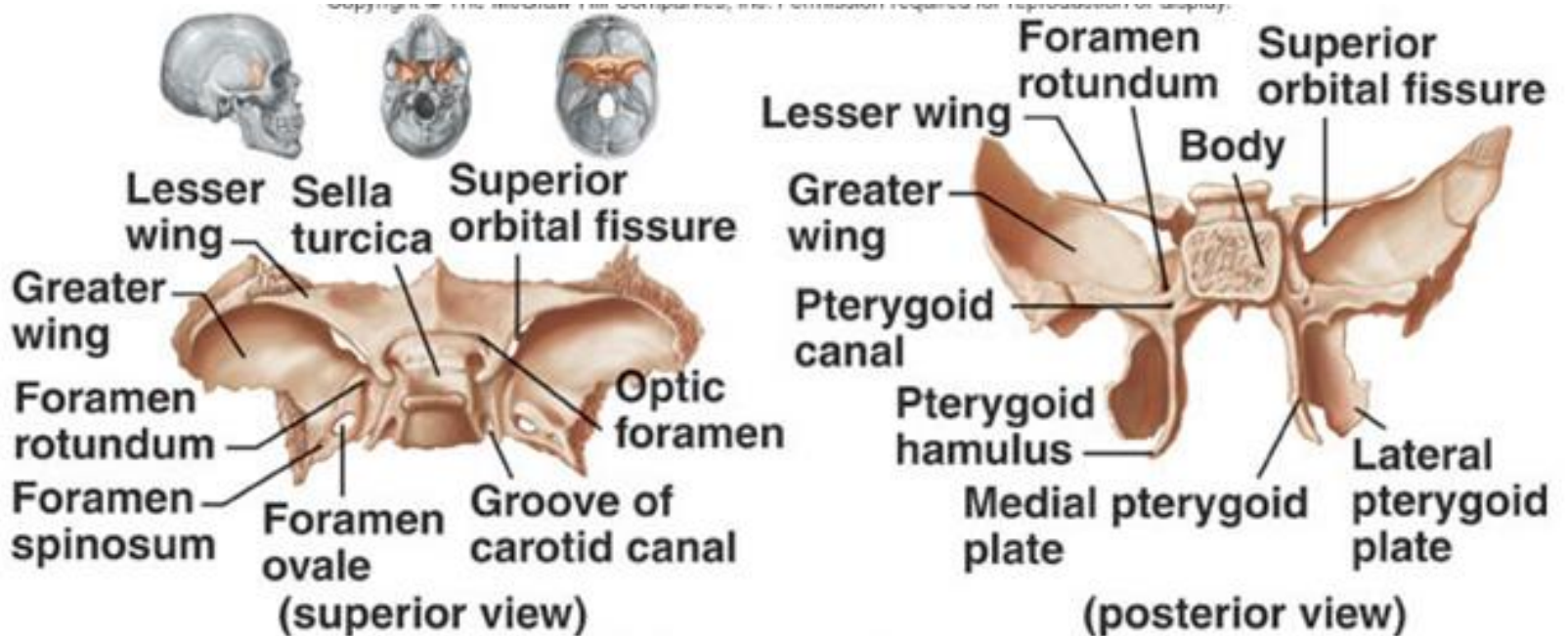




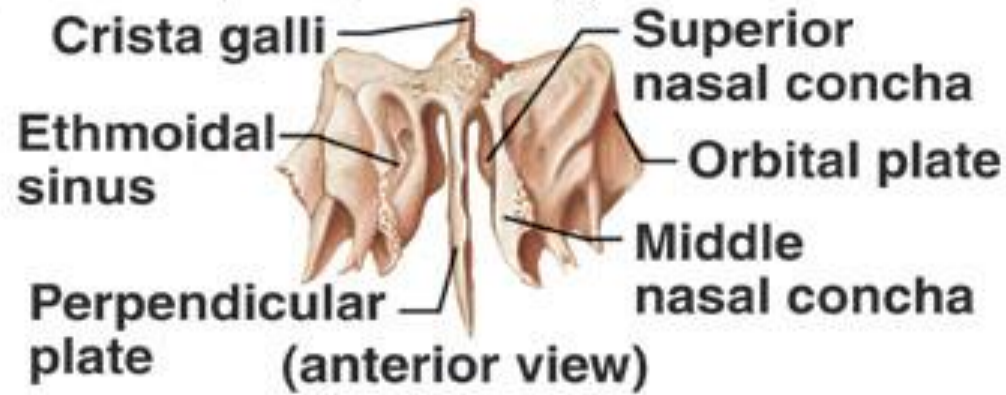
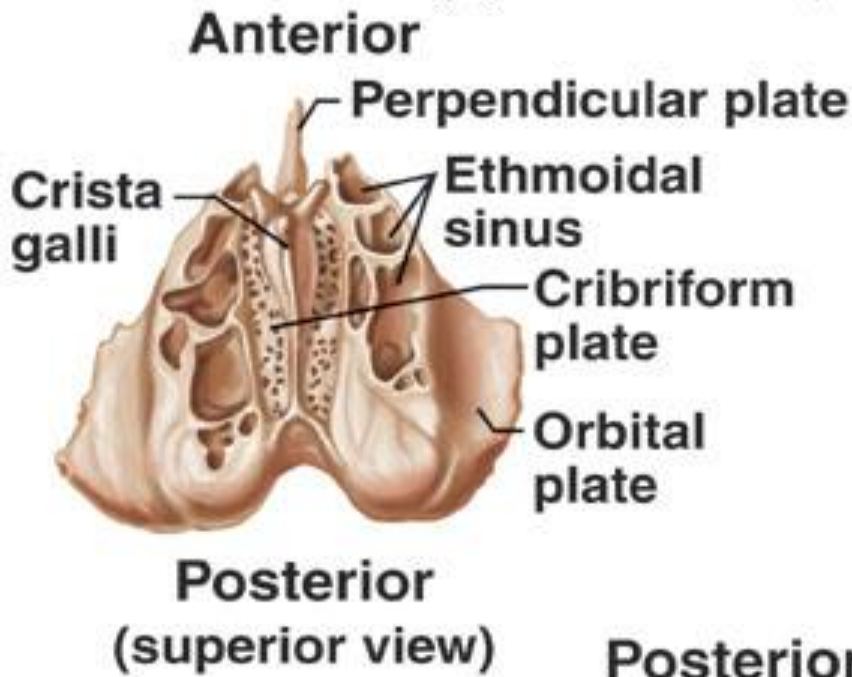
- **The infratemporal fossa lies** below the infratemporal crest on the greater wing of the sphenoid.
- The **pterygomaxillary fissure** is a vertical fissure that lies within the fossa between the pterygoid process of the sphenoid bone and back of the maxilla. It leads medially into the **pterygopalatine fossa**.
- The **inferior orbital fissure is** a horizontal fissure between the greater wing of the sphenoid bone and the maxilla. It leads forward into the orbit.



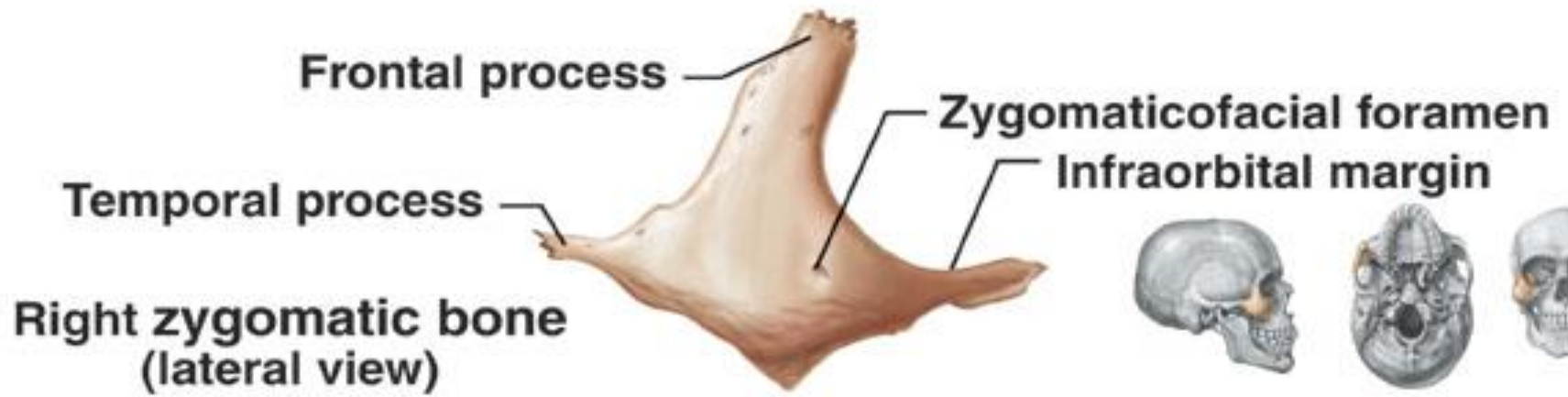
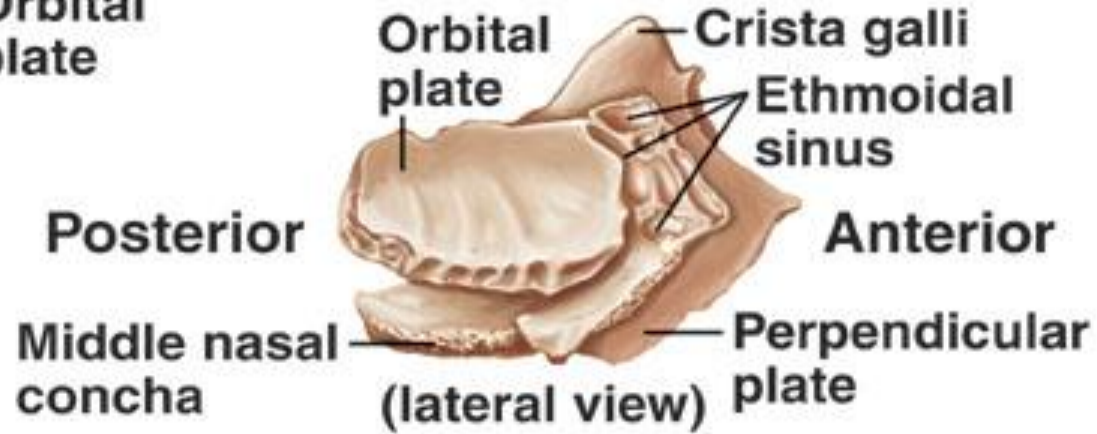
- The **pterygopalatine fossa** is a small space behind and below the orbital cavity. It communicates laterally with the **infratemporal fossa** through the **pterygomaxillary fissure**, medially with the nasal cavity through the **sphenopalatine foramen**, superiorly with the skull through the **foramen rotundum**, and anteriorly with the orbit through the **inferior orbital fissure**.



(d) Sphenoid bone



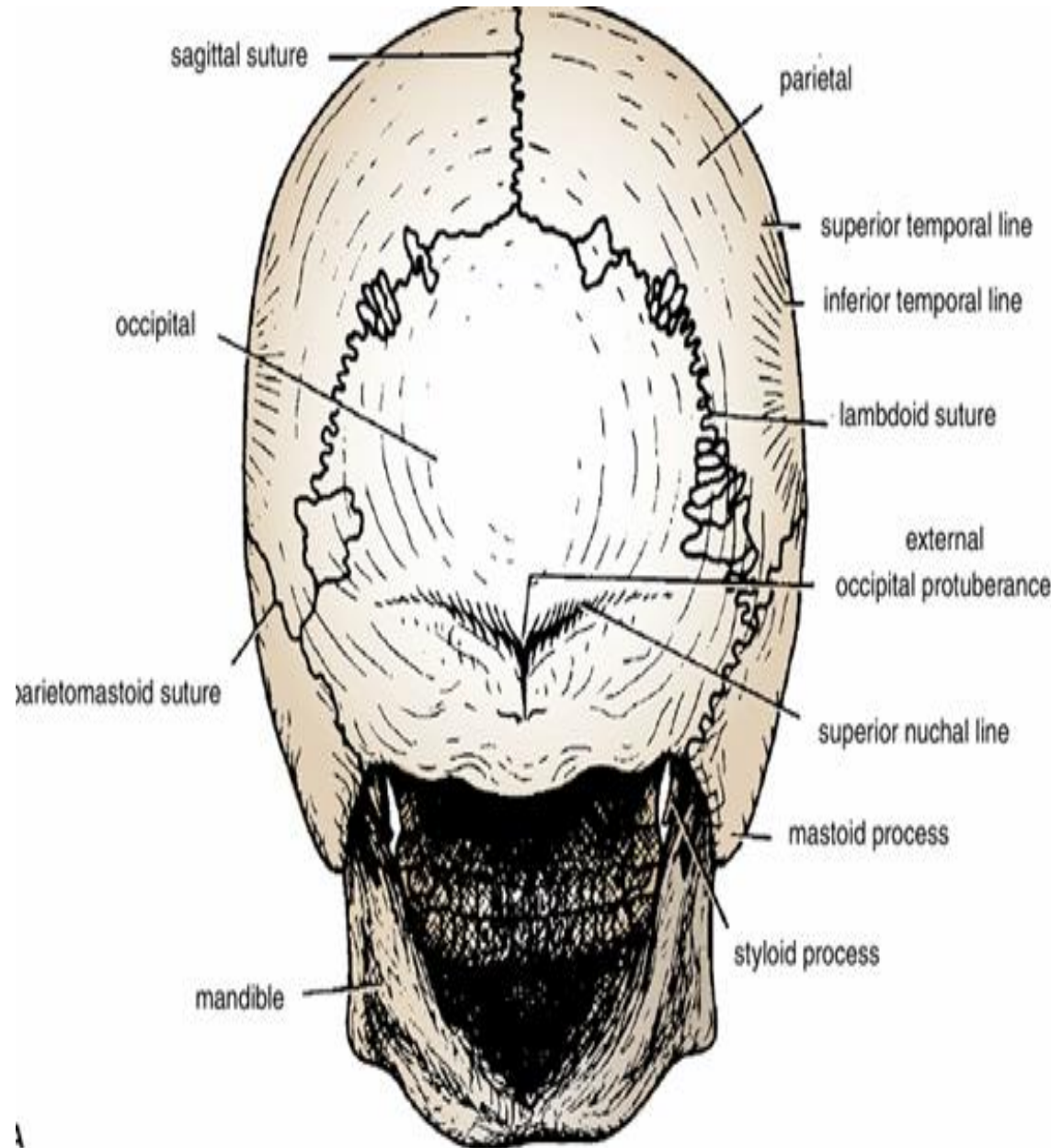
(f) Ethmoid bone

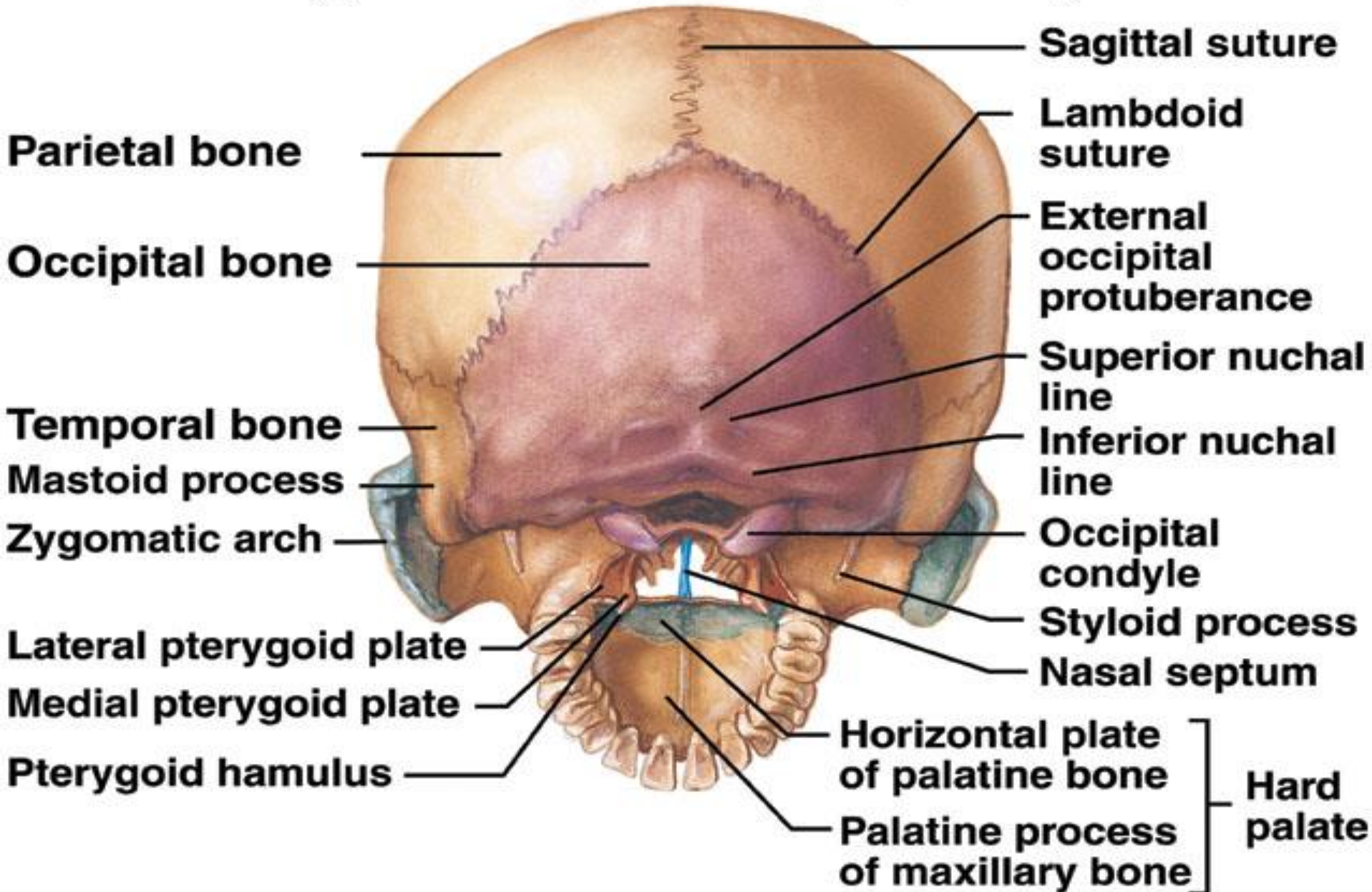


(g)

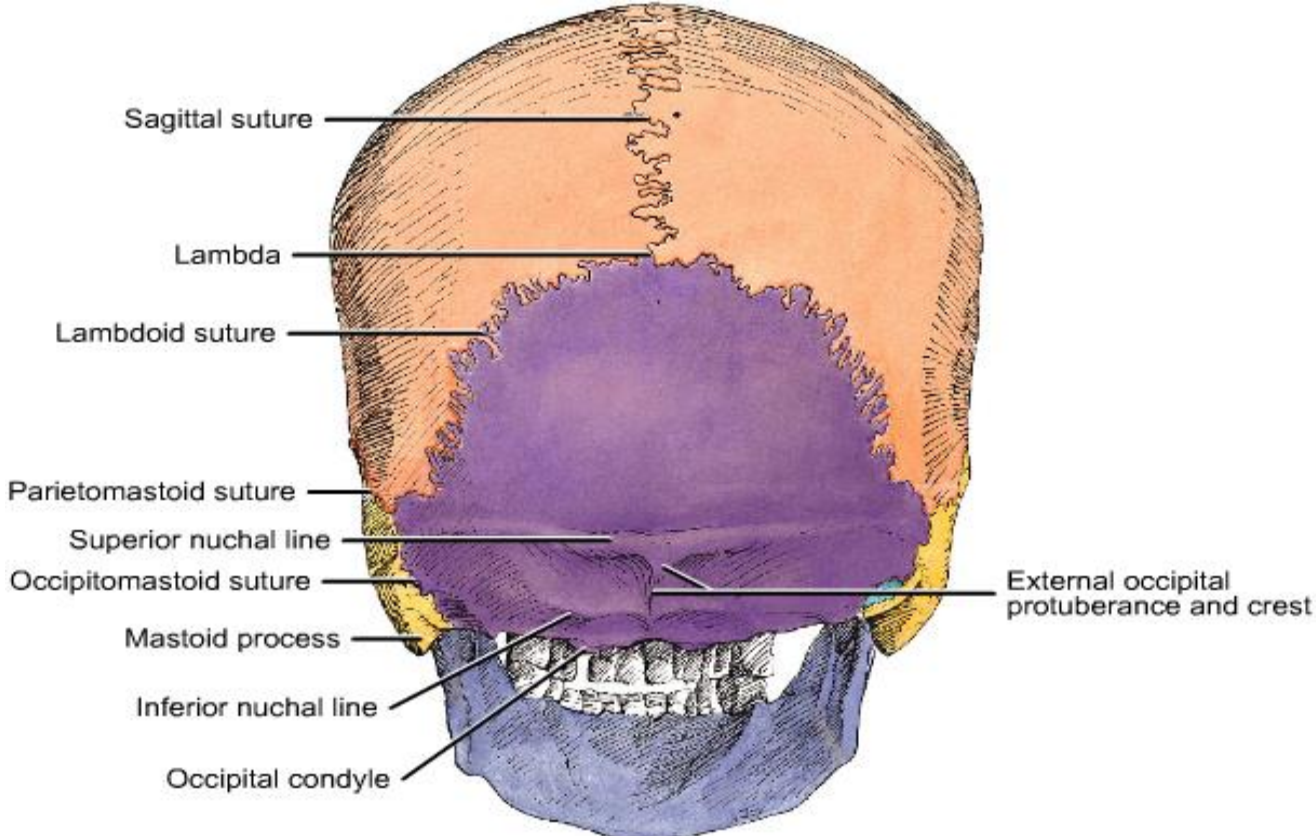
Posterior View of the Skull

- The posterior parts of the two parietal bones with the intervening sagittal suture are seen above. Below, the parietal bones articulate with the squamous part of the occipital bone at the lambdoid suture. On each side the occipital bone articulates with the temporal bone.





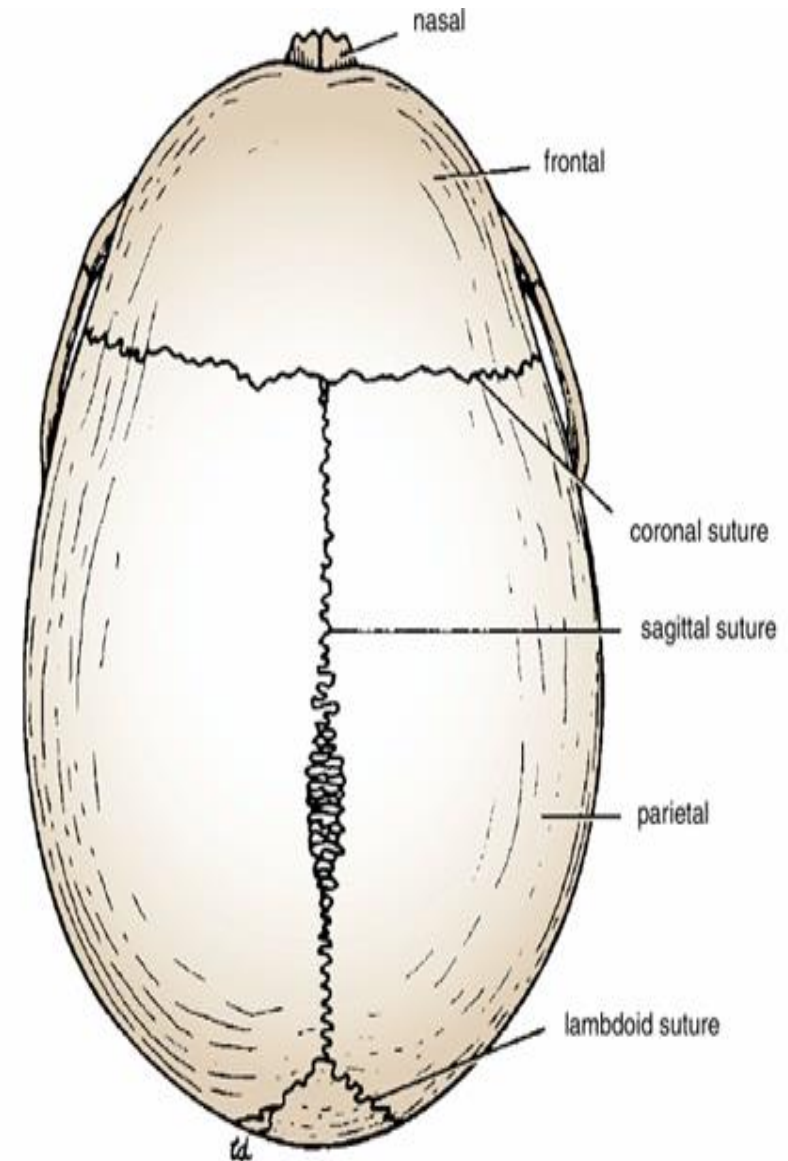
- In the midline of the occipital bone is a roughened elevation called the external **occipital protuberance**, which gives attachment to muscles and the ligamentum nuchae. On either side of the protuberance the superior nuchal lines extend laterally toward the temporal bone.





Superior View of the Skull

- Anteriorly, the frontal bone articulates with the two parietal bones at the **coronal suture**. Occasionally, the two halves of the frontal bone fail to fuse, leaving a midline **metopic suture**. Behind, the two parietal bones articulate in the midline at the **sagittal suture**.



- **Inferior View of the Skull**
- If the mandible is discarded, the anterior part of this aspect of the skull is seen to be formed by the hard

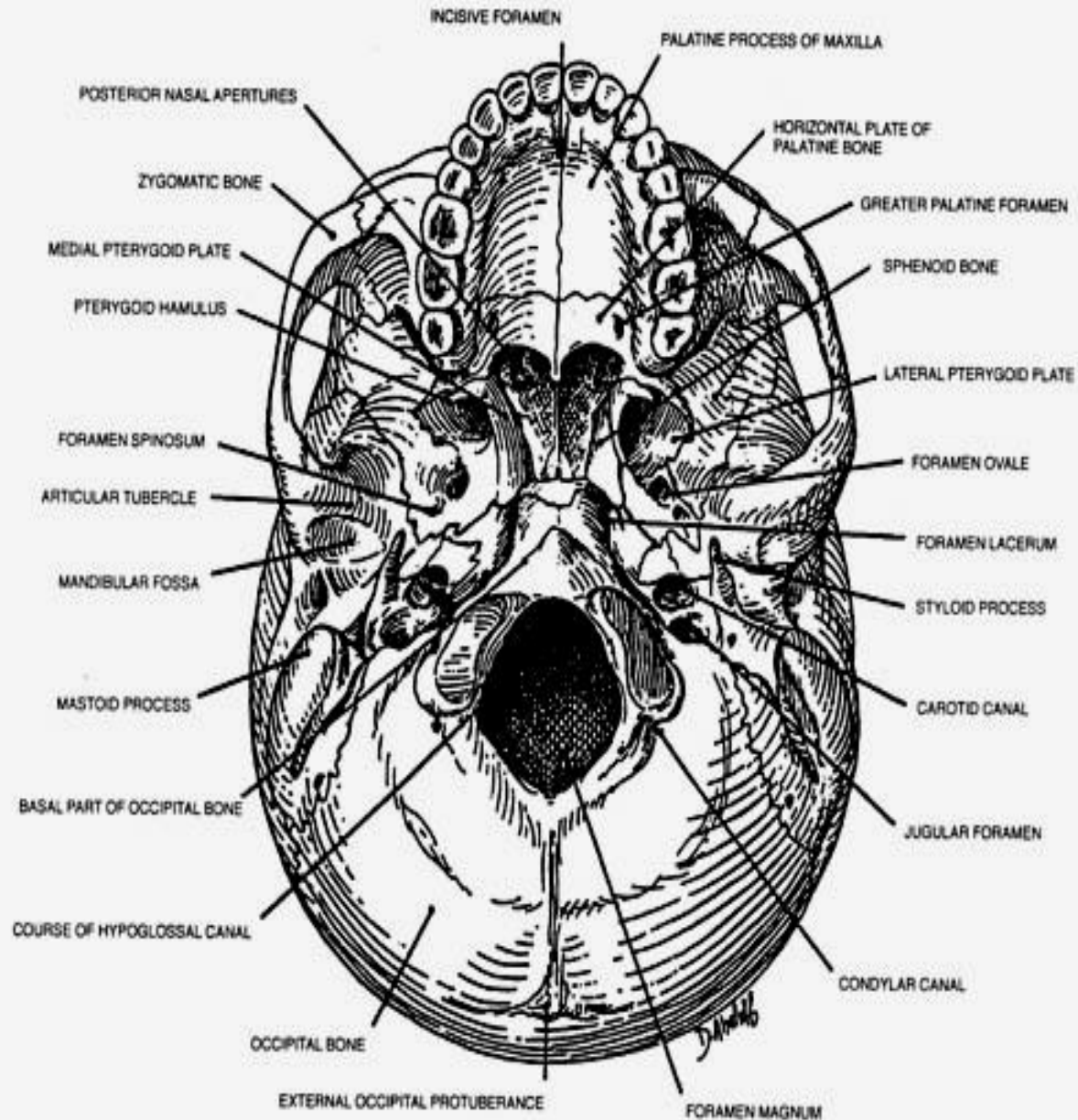
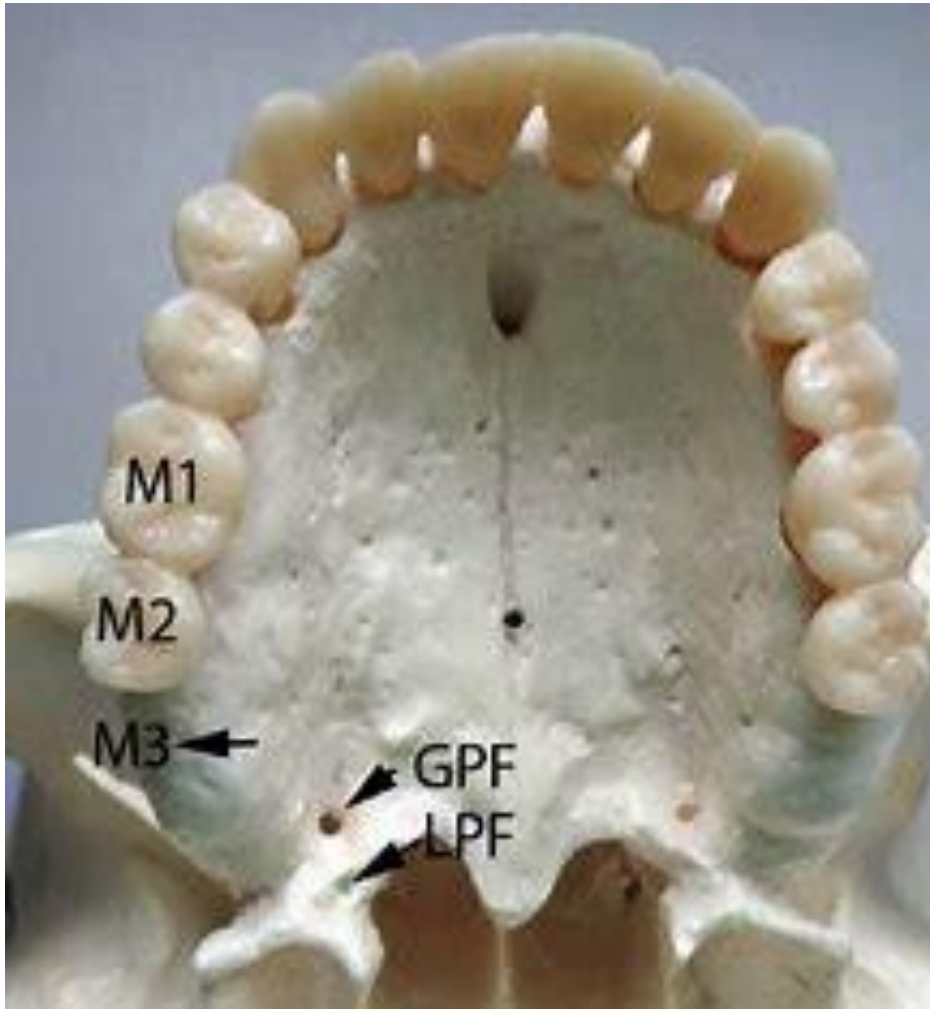


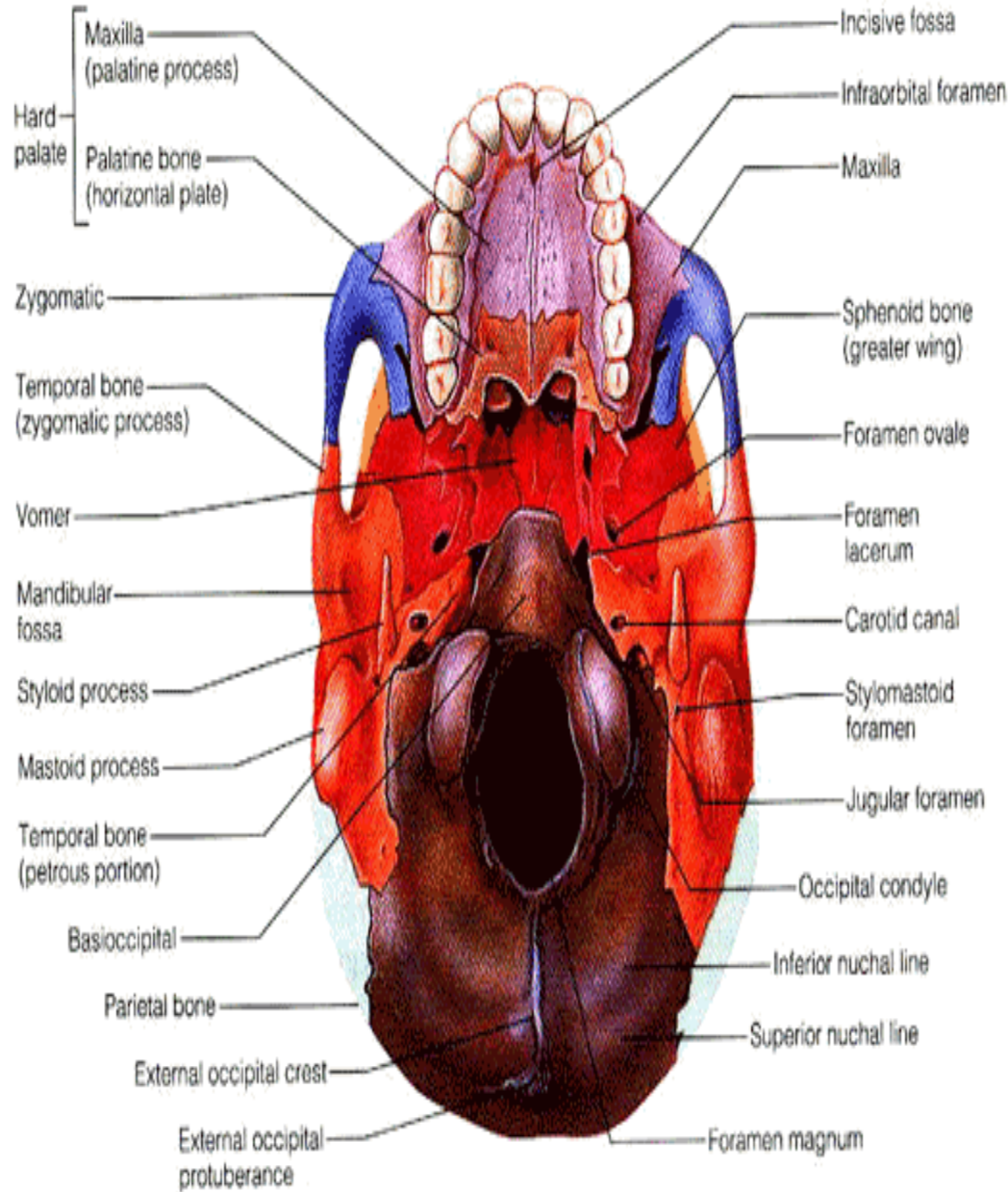
FIGURE 3

Inferior View of the Skull



- The palatal processes of the maxillae and the horizontal plates of the palatine bones can be identified. In the midline anteriorly is the incisive fossa and foramen. Posterolaterally are the **greater and lesser palatine foramina.**

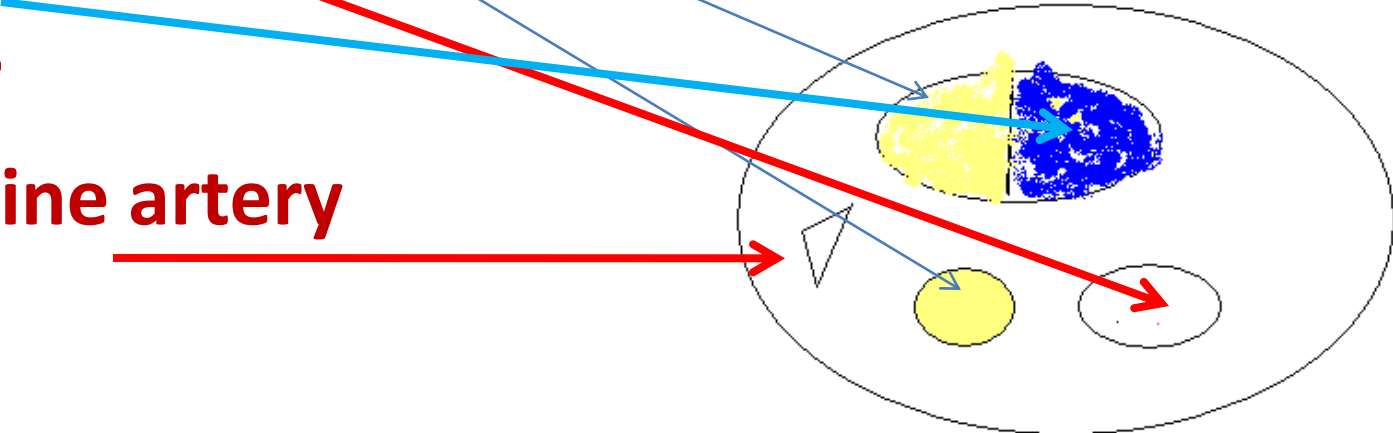
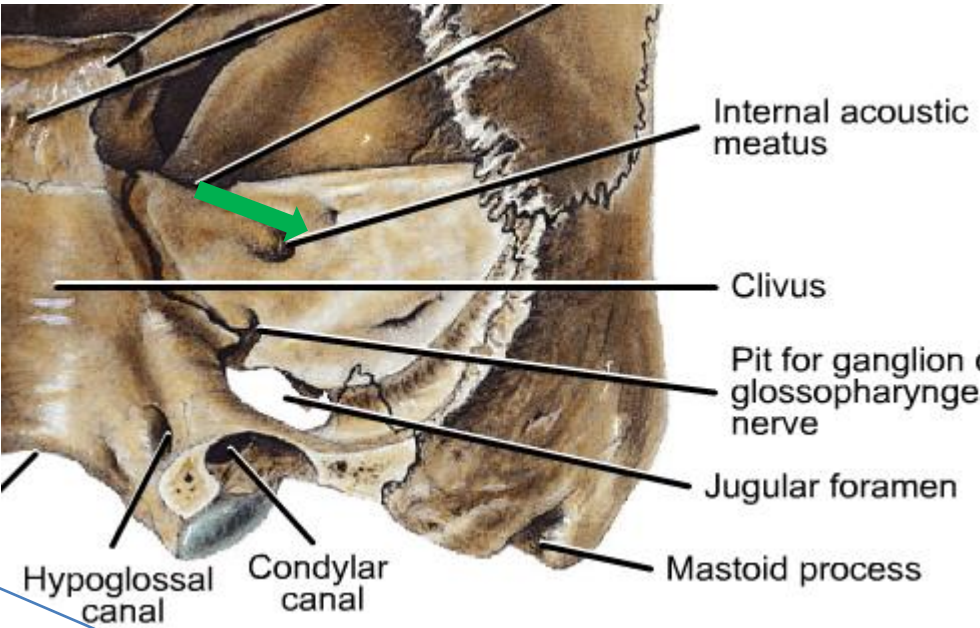
- Above the posterior edge of the hard palate are the **choanae** (posterior nasal apertures). These are separated from each other by the posterior margin of the **vomer** and are bounded laterally by the **medial pterygoid plates** of the sphenoid bone. The inferior end of the medial pterygoid plate is prolonged as a curved spike of bone, the **pterygoid hamulus**.



Internal acoustic meatus : posterior surface to Petrous bone ;

transmit :

- a. Vestibul+
- b. cochler nerve
- c. Facial sensory and motor
- C- labyrinthine artery

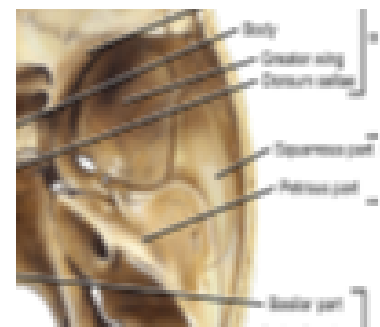


Foramenae :

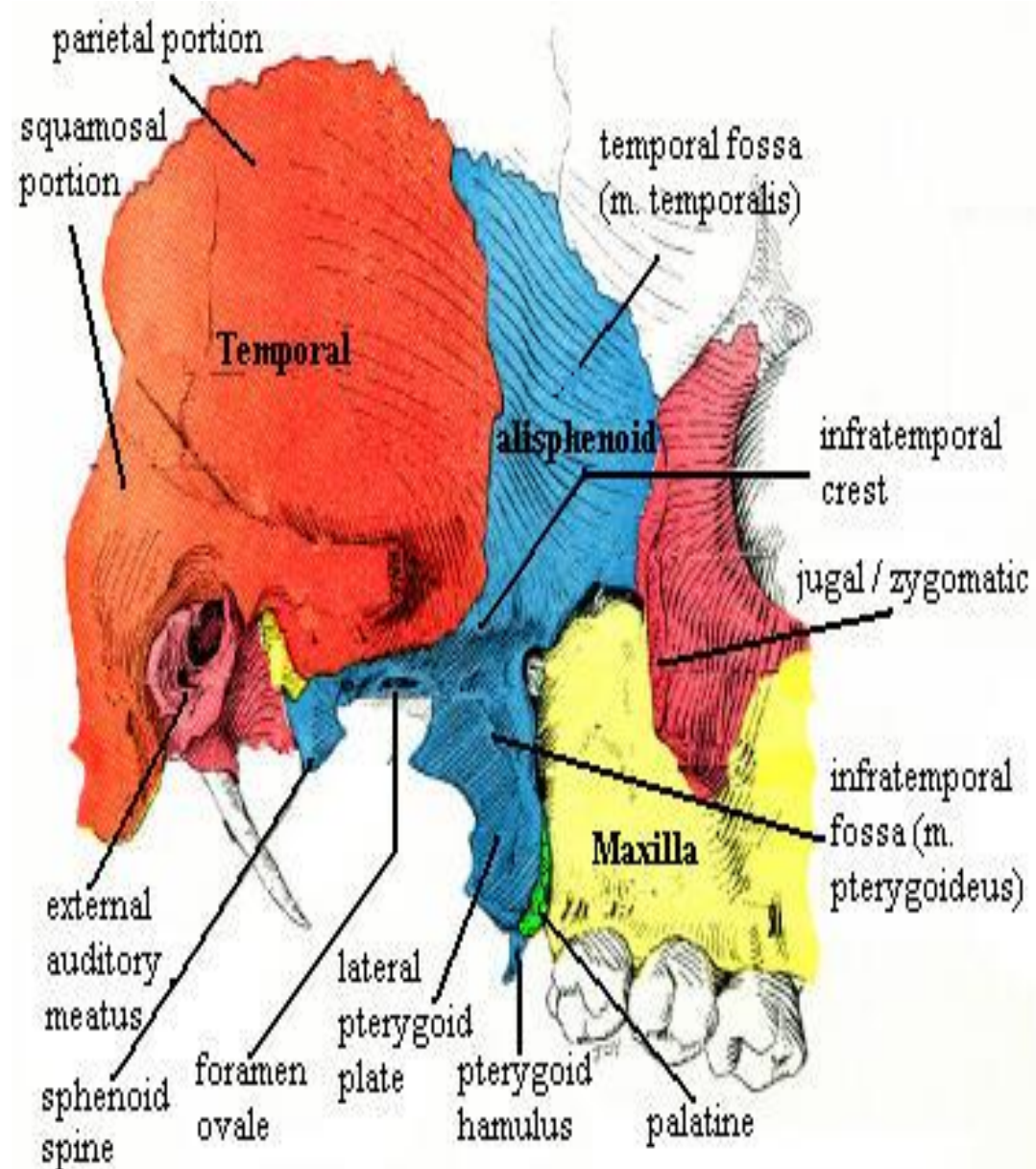
- ***Rotundum: maxillary***
- ***Ovale : mandibular n. lesser petrosal n., meningeal branch of mandibular***
- ***Spinosum : middle meningeal artery***
- ***Lacerum: small vessels + cartilage + fibrous tissue + gr. Petrosal n.***

=form medial wall of temporal fossa

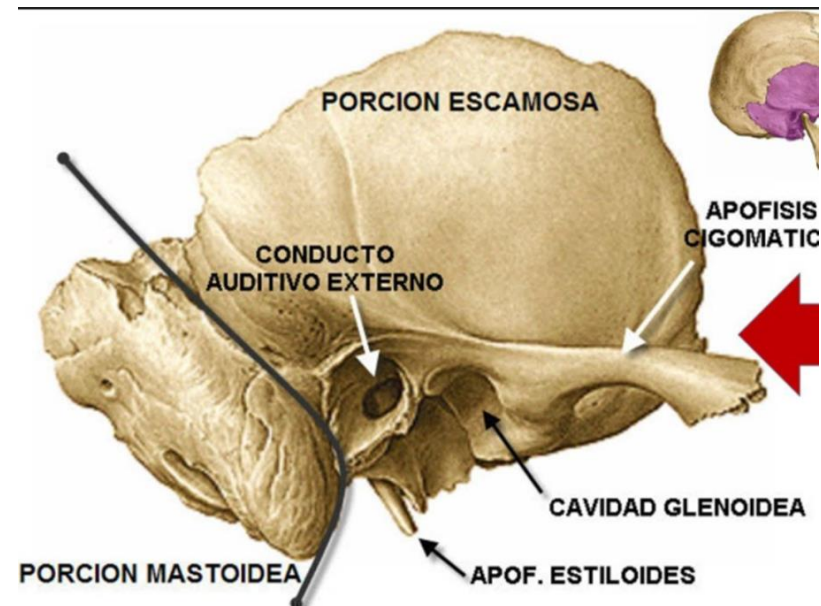
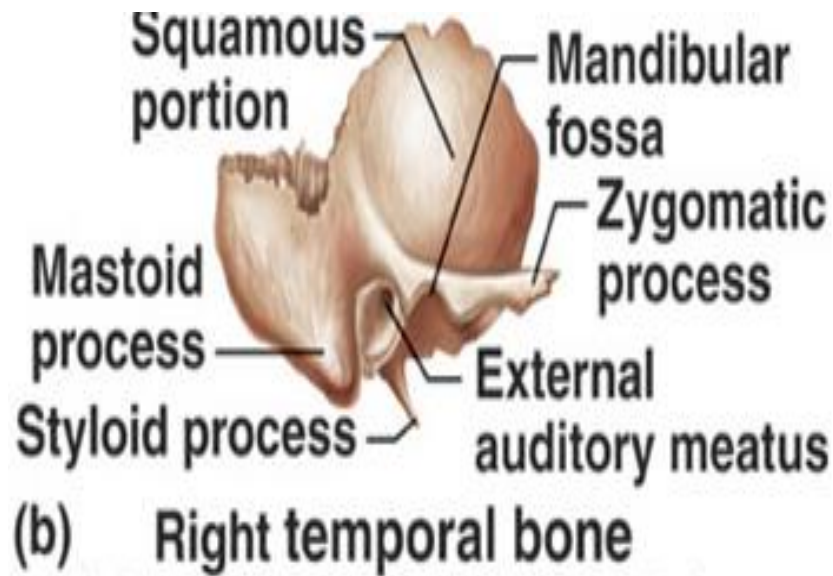
Infra temporal crest in its inferior surface



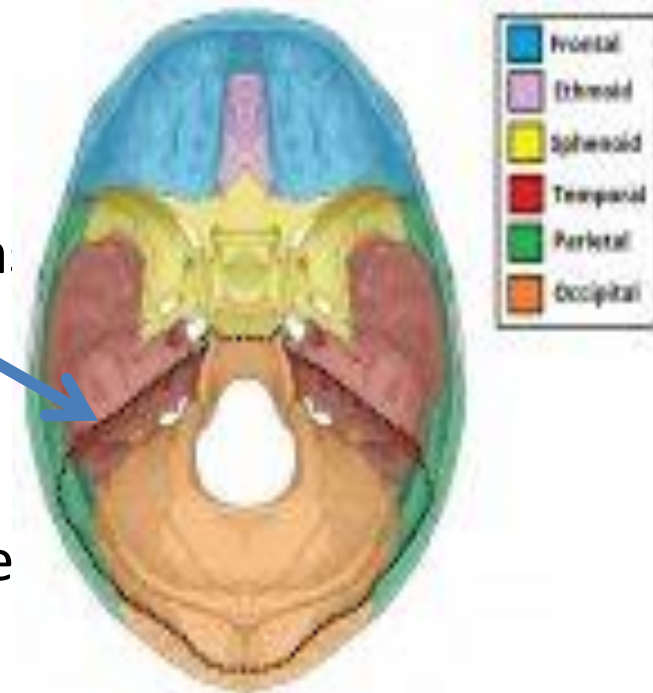
- The mandibular fossa of the temporal bone and the articular tubercle form the upper articular surfaces for the temporomandibular joint. Separating the mandibular fossa from the tympanic plate posteriorly is the squamotympanic fissure, through the medial end of which the chorda tympani nerve exits from the tympanic cavity.



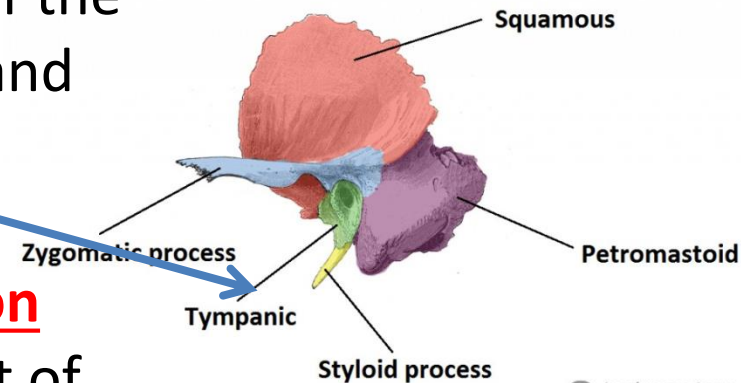
- The styloid process of the temporal bone projects downward and forward from its inferior aspect. The opening of the carotid canal can be seen on the inferior surface of the petrous part of the temporal bone.



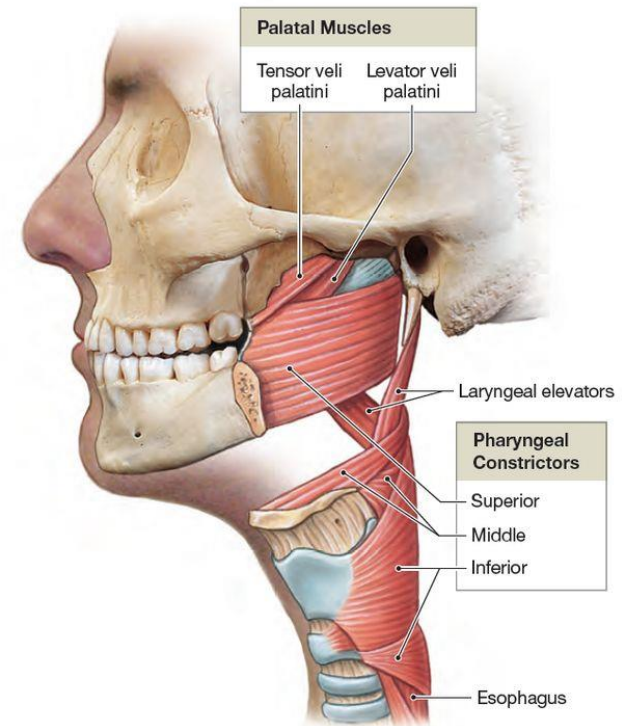
- The medial end of the **petrous part** of the temporal bone is irregular and, together with the basilar part of the occipital bone and the greater wing of the sphenoid, form the **foramen lacerum**. During life, the foramen lacerum is closed with fibrous tissue, and only a few small vessels pass through this foramen from the cavity of the skull to the exterior.



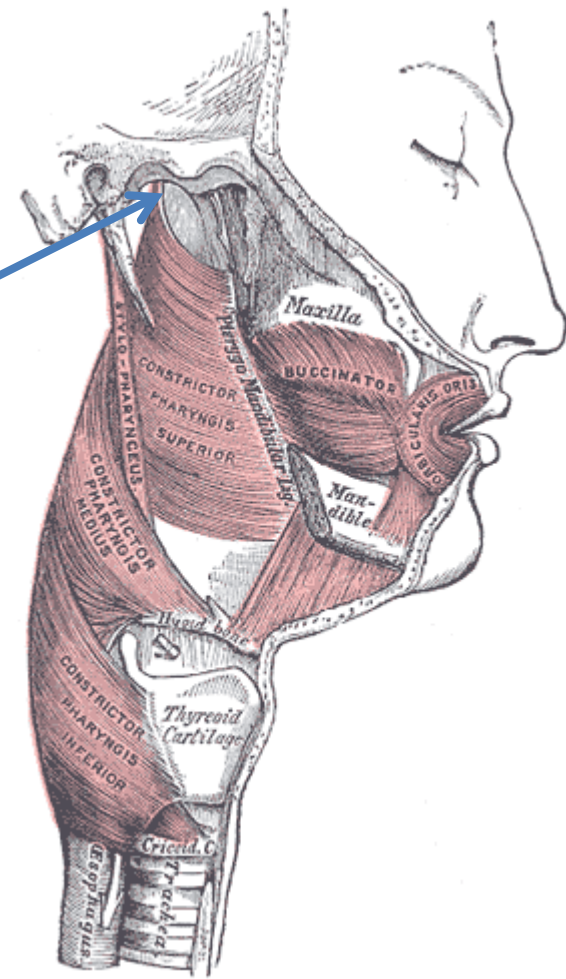
- The **tympanic plate**, which forms part of the temporal bone, is C shaped on section and forms the bony part of the **external auditory meatus**. While examining this region, identify the **suprameatal crest on** the lateral surface of the squamous part of the temporal bone, the **suprameatal triangle**, and the **suprameatal spine**.



- In the interval between the styloid and mastoid processes, the **stylomastoid foramen** can be seen.
- Medial to the styloid process, the petrous part of the temporal bone has a deep notch, which, together with a shallower notch on the occipital bone, forms the **jugular foramen**.



- Behind the posterior apertures of the nose and in front of the foramen magnum are the **sphenoid bone** and the basilar part of the occipital bone. The **pharyngeal tubercle is a small prominence on the undersurface of the basilar part of the occipital bone in the midline.**



- The **occipital condyles**; they articulate with the superior aspect of the lateral mass of the **first cervical vertebra**, the atlas.
- Superior to the occipital condyle is the hypoglossal canal for transmission of the hypoglossal nerve.
- The condylar foramen Emissary veins, connecting the sigmoid sinus to the occipital vein

- meningeal branch of the occipital artery . Condylar artery
- Posterior to the foramen magnum in the midline is the external occipital protuberance. The superior nuchal lines should be identified as they curve laterally on each side.

Summery

• ***Thanks for good listening***

• ***Prof. Dr. Talib Jawad***