

# Skull

The sup. part of axial sk., that:

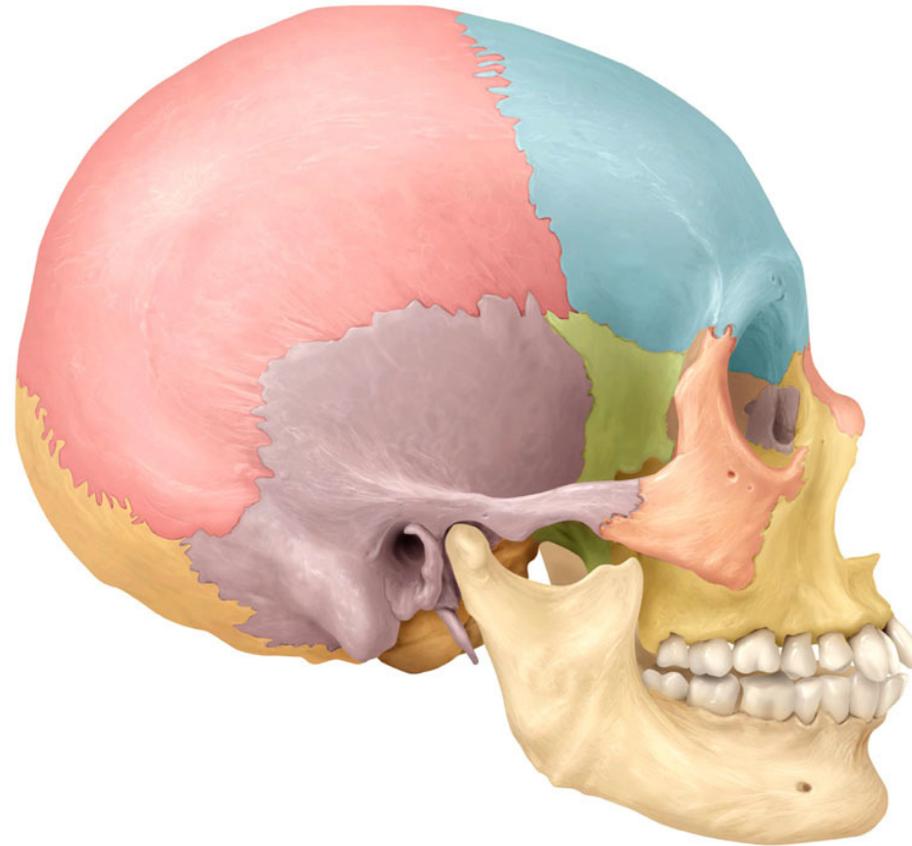
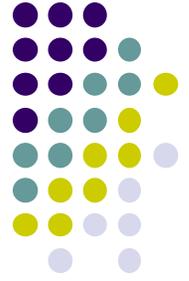
1. Covers & protect the brain
2. Provides facial sk. (shape of face)

Skull = 22 bones:

1. Cranial Bones (8) (Brain box)
2. Facial bones (14)



# Cranial Bones (8 bones)



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**Frontal**  
**(1)**

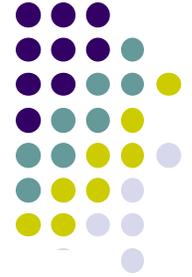
**Parietal**  
**(2)**

**Occipital**  
**(1)**

**Temporal**  
**(2)**

**Sphenoid**  
**(1)**

**Ethmoid**  
**(1)**



# Facial Bones (14 bones)

**Zygomatic (2)**

**Maxilla (2)**

**Nasal (2)**

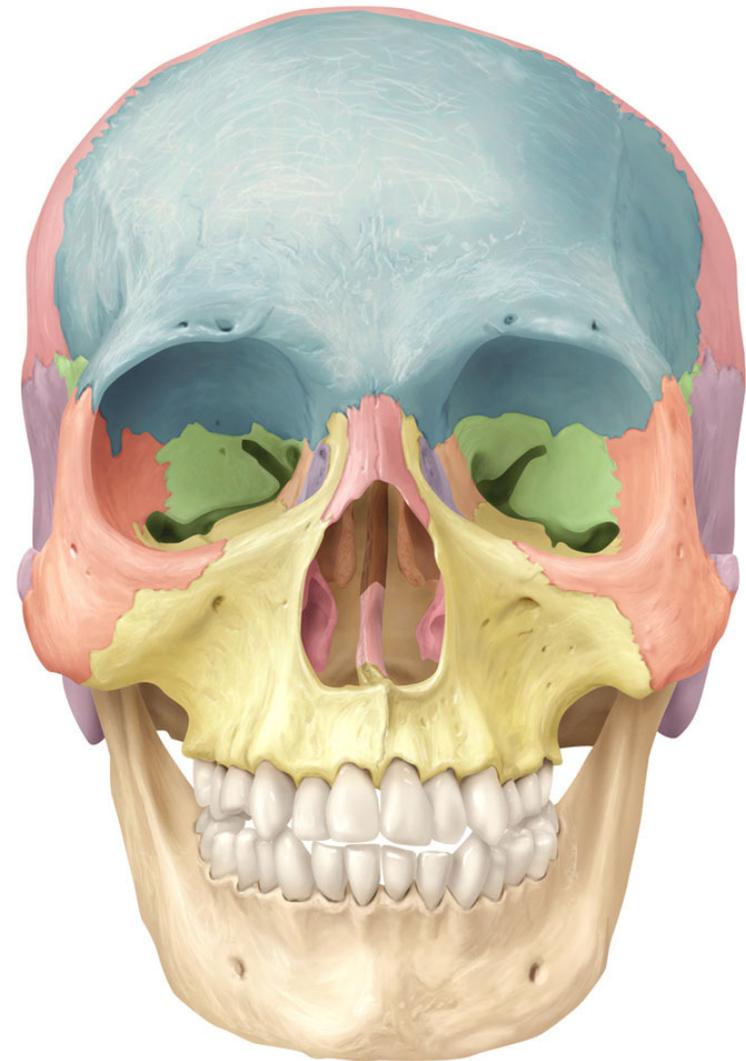
**Lacrimal (2)**

**Vomer (1)**

**Palatine (2)**

**Inferior Conchae (2)**

**Mandible (1)**





# Cranial Vault

3 sutures:

1. Coronal suture

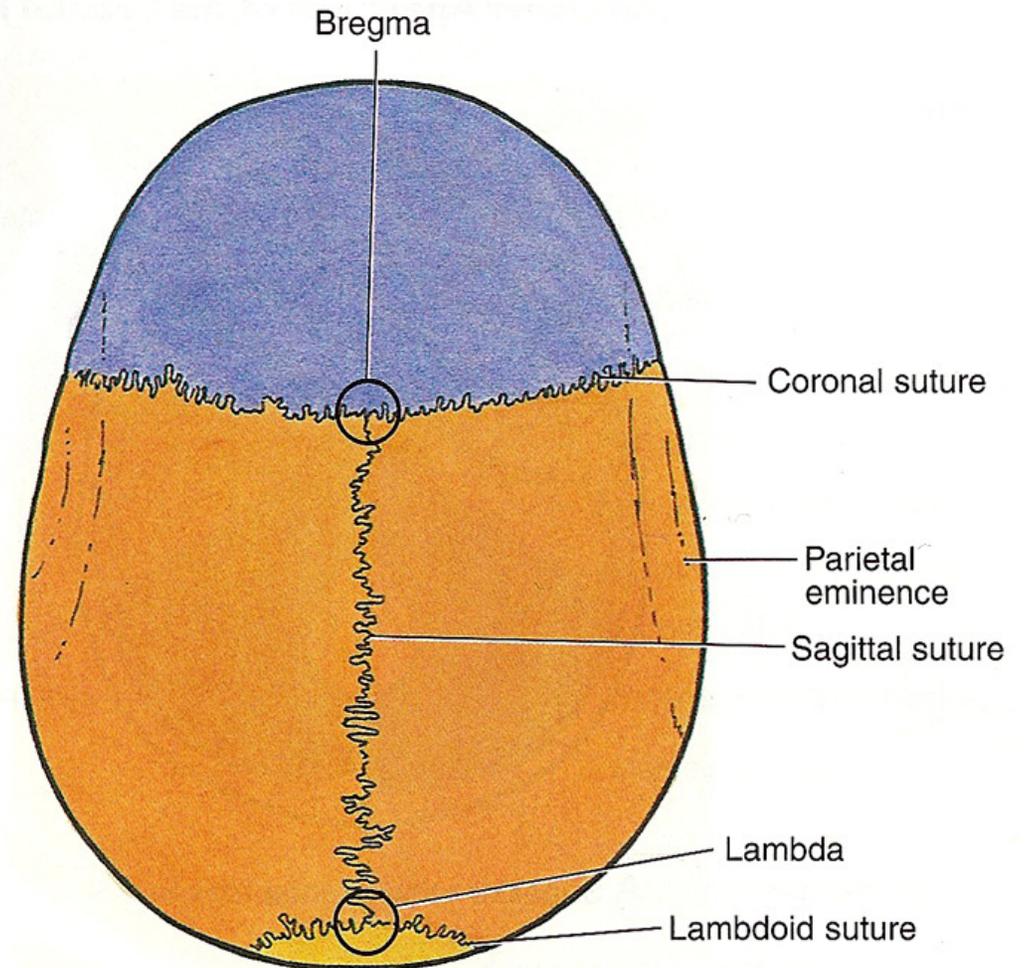
*which bones?*

2. Sagittal suture

*which bones?*

3. Lambdoid suture

*which bones?*





4 points

1. **Bregma** (*L, forehead*):

intersection of sagittal & coronal sutures

2. **Vertex**:

sup. topmost point of the cranium

3. **Lambda**:

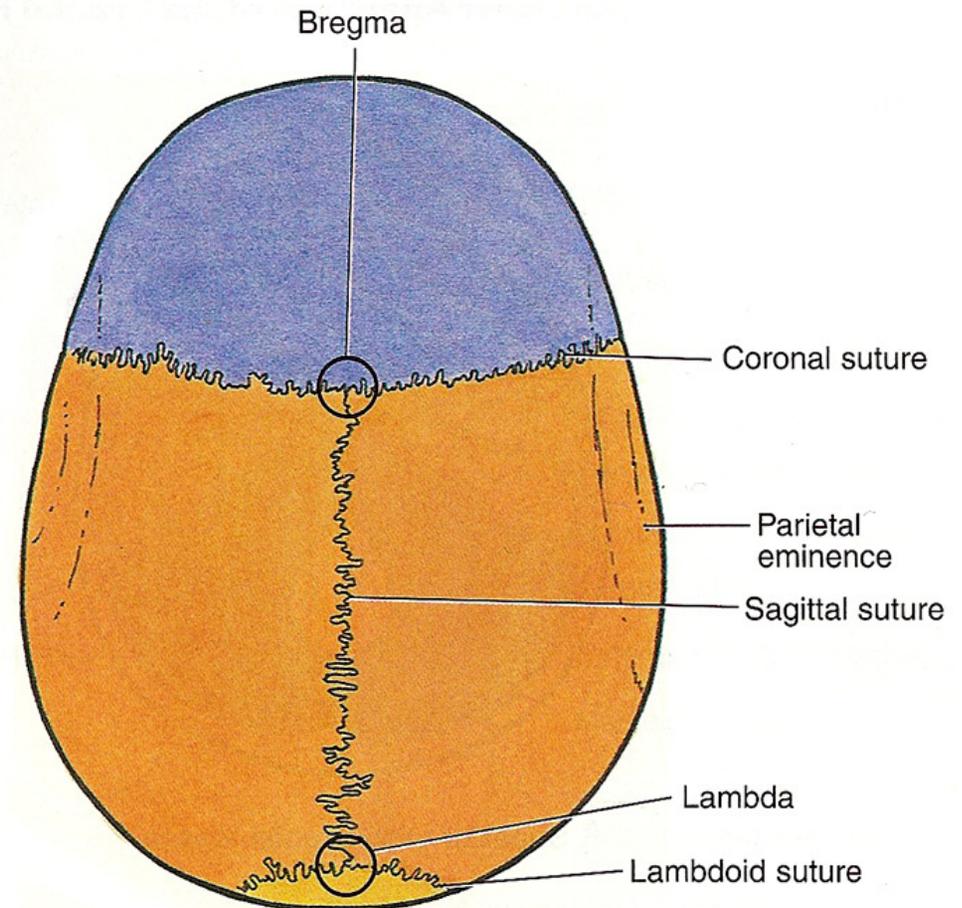
intersection of sagittal & lambdoid sutures

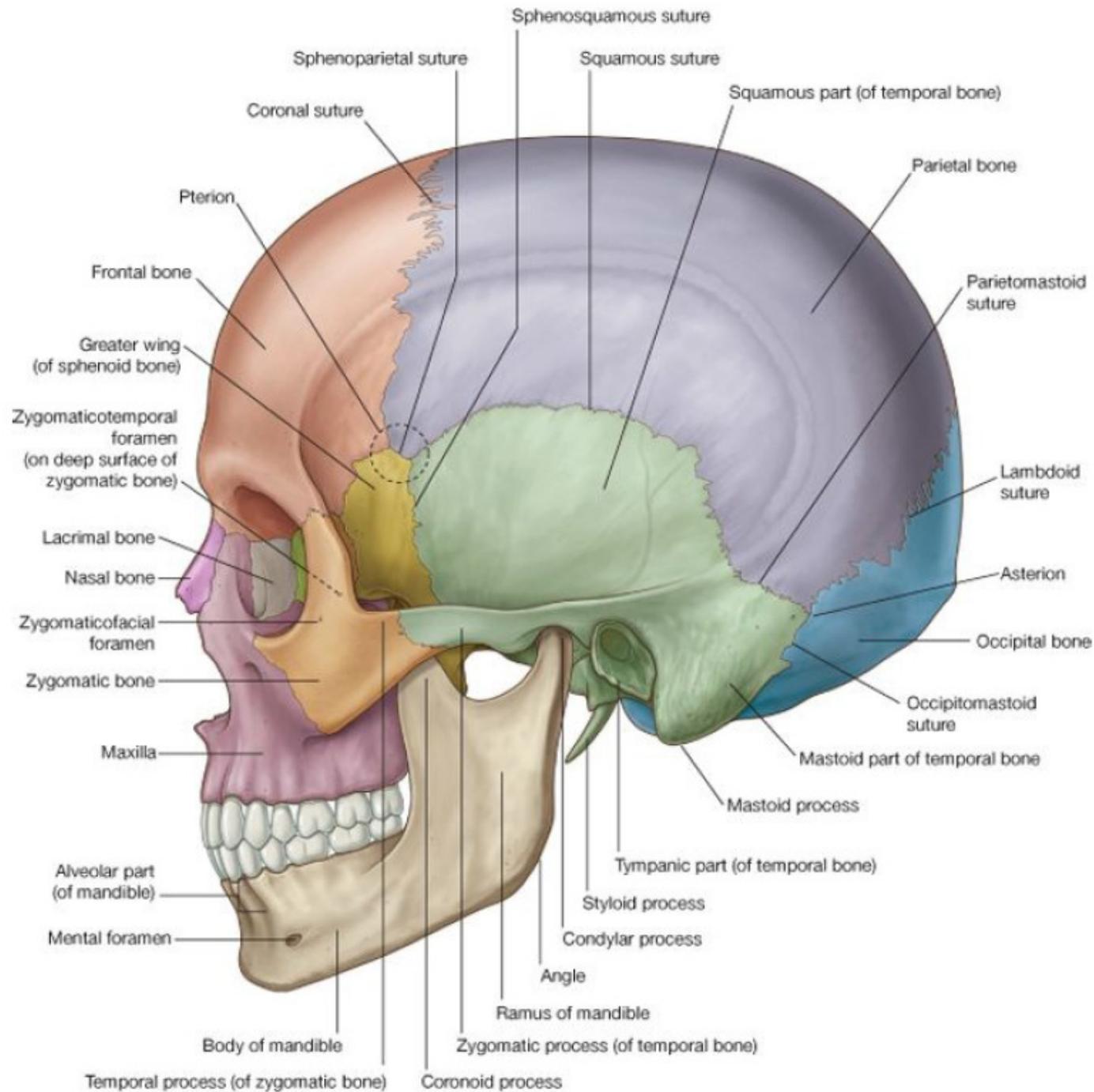
4. **Pterion**: (*G, pteron: wing*)

-sup. to midpoint of zyg. arch

-indicated by H-shaped sutures

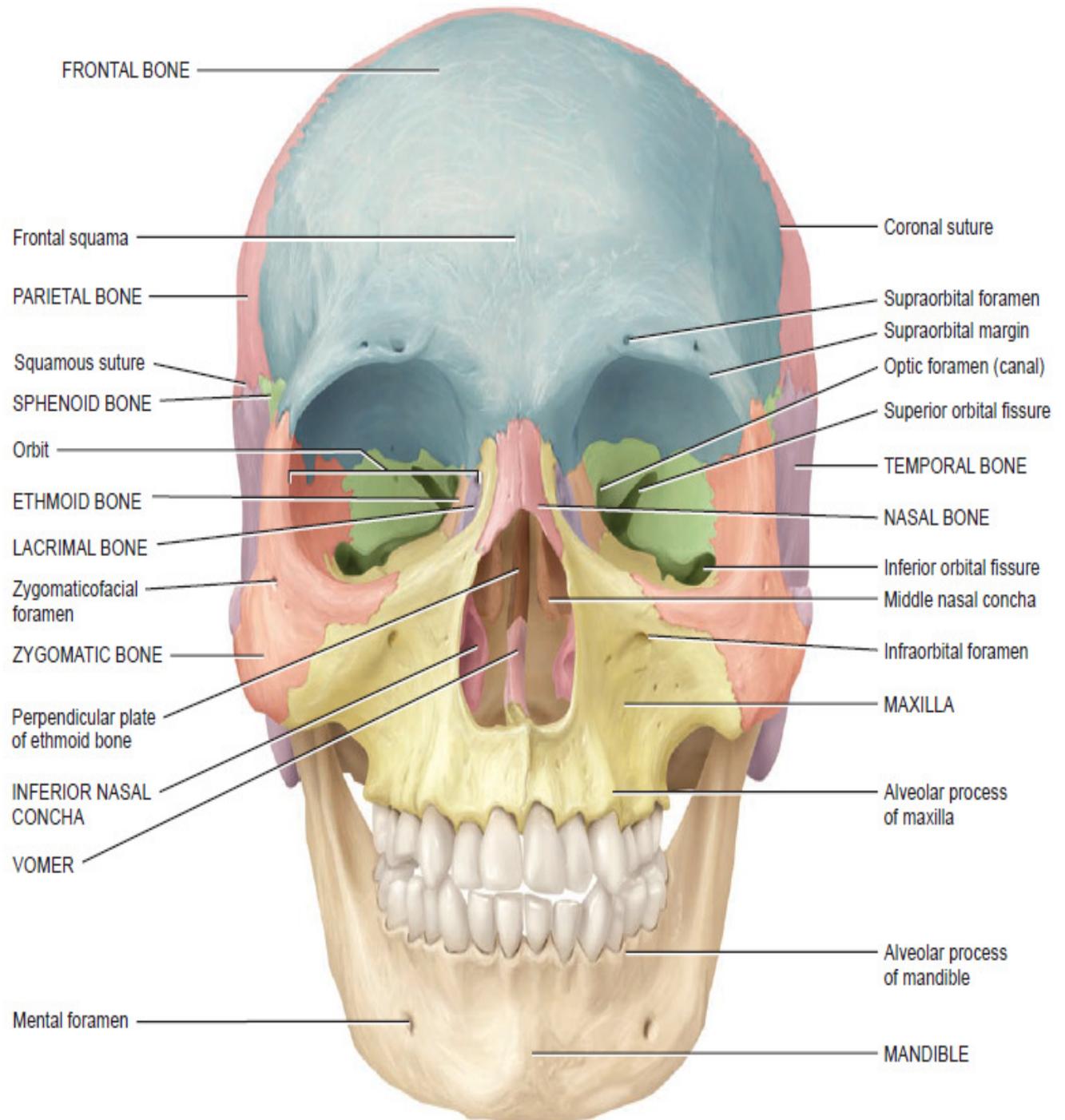
-very dangerous area (*why?*)





# Frontal Bone

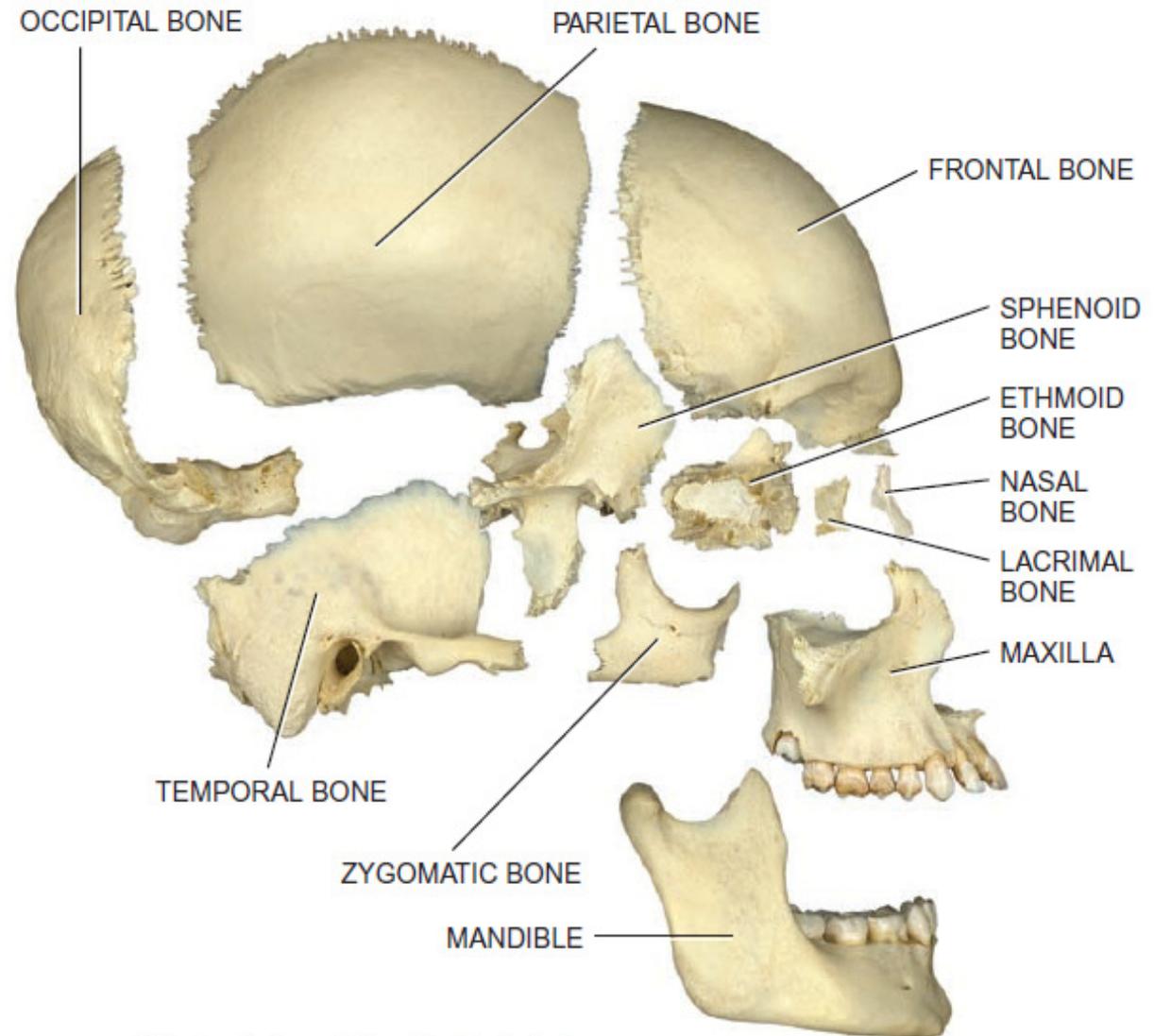
- **Frontal squama:** a thick plate of bone (forehead).
- **Supraorbital margin**
- **Supraorbital foramen**
- Forms the roof of the orbit.
- **Frontal sinuses:**



# Parietal bones



- Quadrilateral
- The inferior border : bevelled
- other borders : denticulate
- external surface convex
- internal surface concave.



(e) Lateral view of disarticulated skull

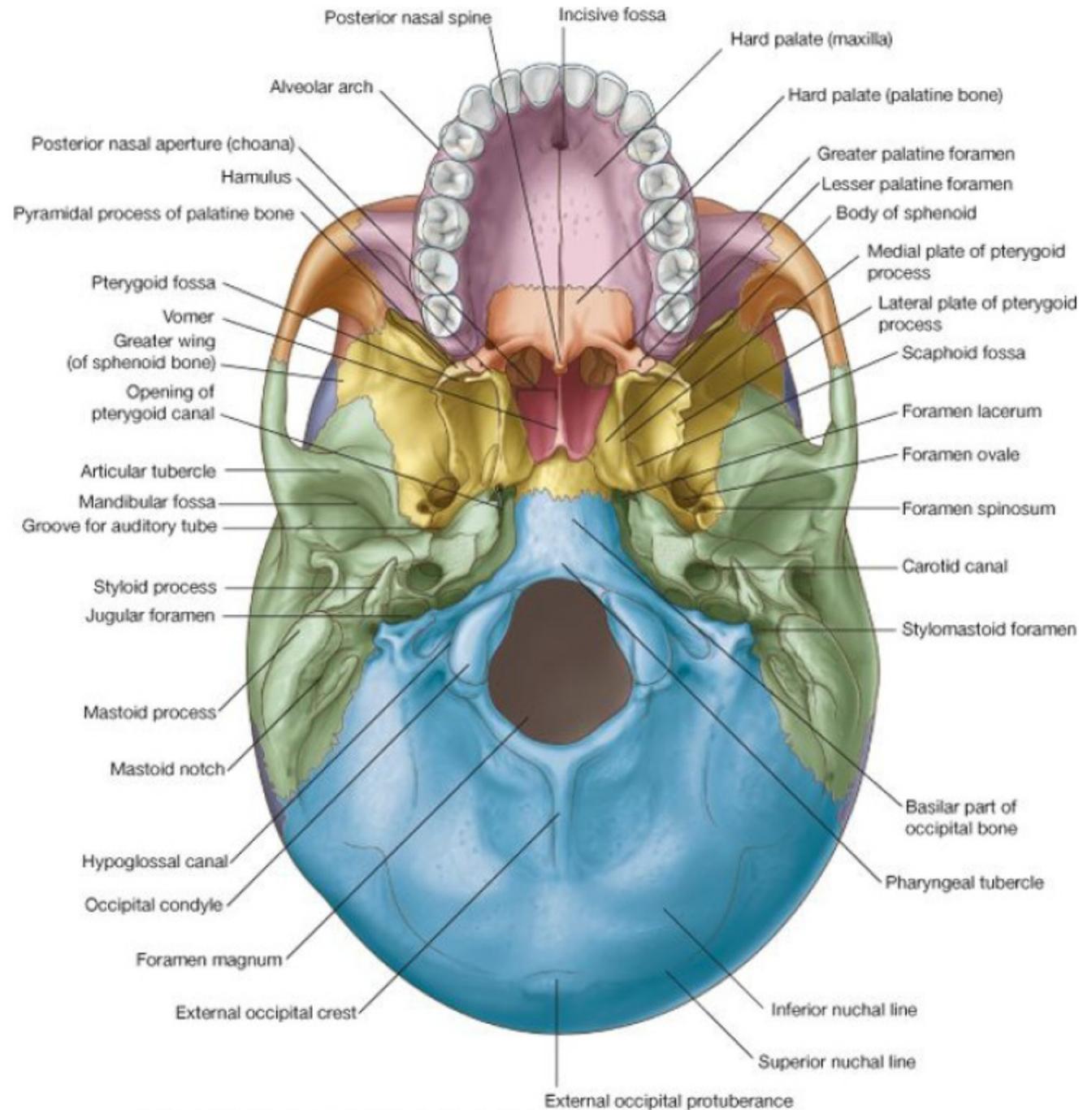
# Temporal bones

- **Temporal squama:**  
thin, flat
- **Zygomatic process**
- **Tympanic process**
- **Mastoid process:** is a rounded projection of the mastoid portion posterior and inferior to the external auditory meatus
- **Styloid process:** projects inferiorly from the inferior surface of the temporal bone



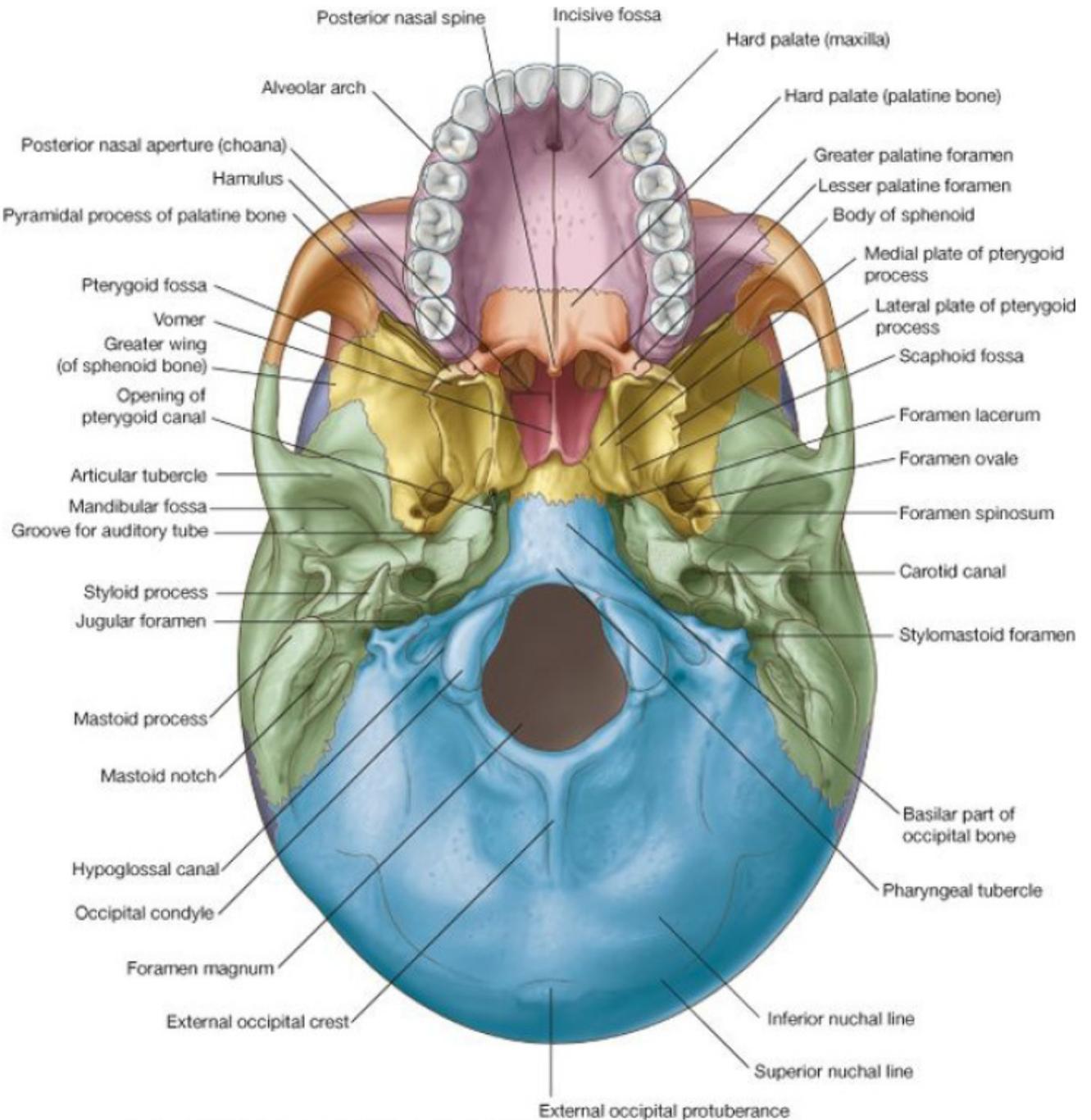
## Temporal bones

- **Mandibular fossa:** socket on the inferoposterior surface of the zygomatic process of the temporal bone.
- **Articular tubercle** rounded elevation anterior to the mandibular fossa.
- **Stylomastoid foramen:** facial (VII) nerve and Stylomastoid artery passes.

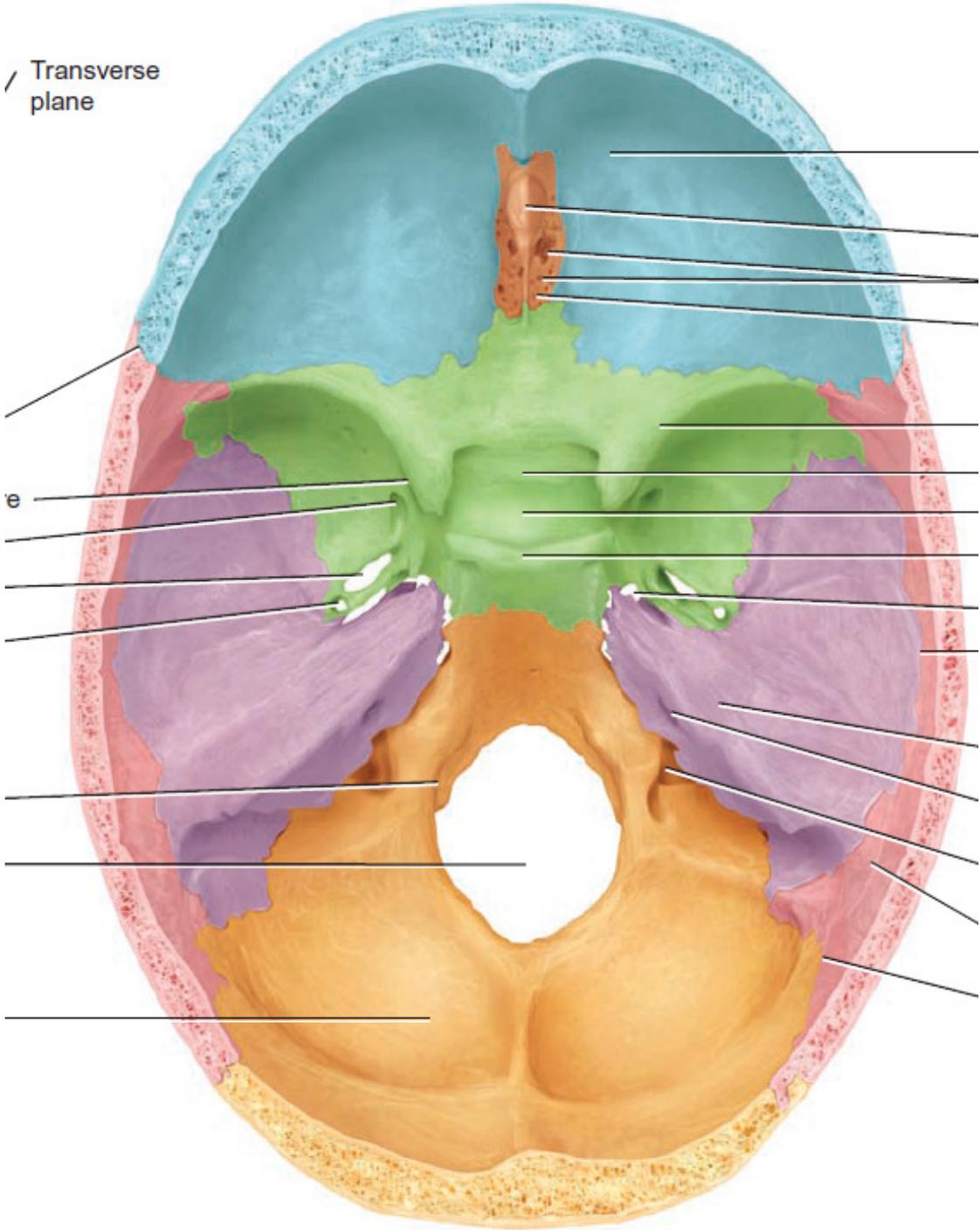


# Temporal bones

- Petrous portion:** pyramidal, located at the base of the skull between the sphenoid and occipital bones.
  - 1) internal and middle ear
  - 2) carotid foramen
  - 3) jugular foramen: posterior to the carotid foramen and anterior to occipital bone
- Internal auditory meatus:** facial (VII) and vestibulocochlear (VIII)

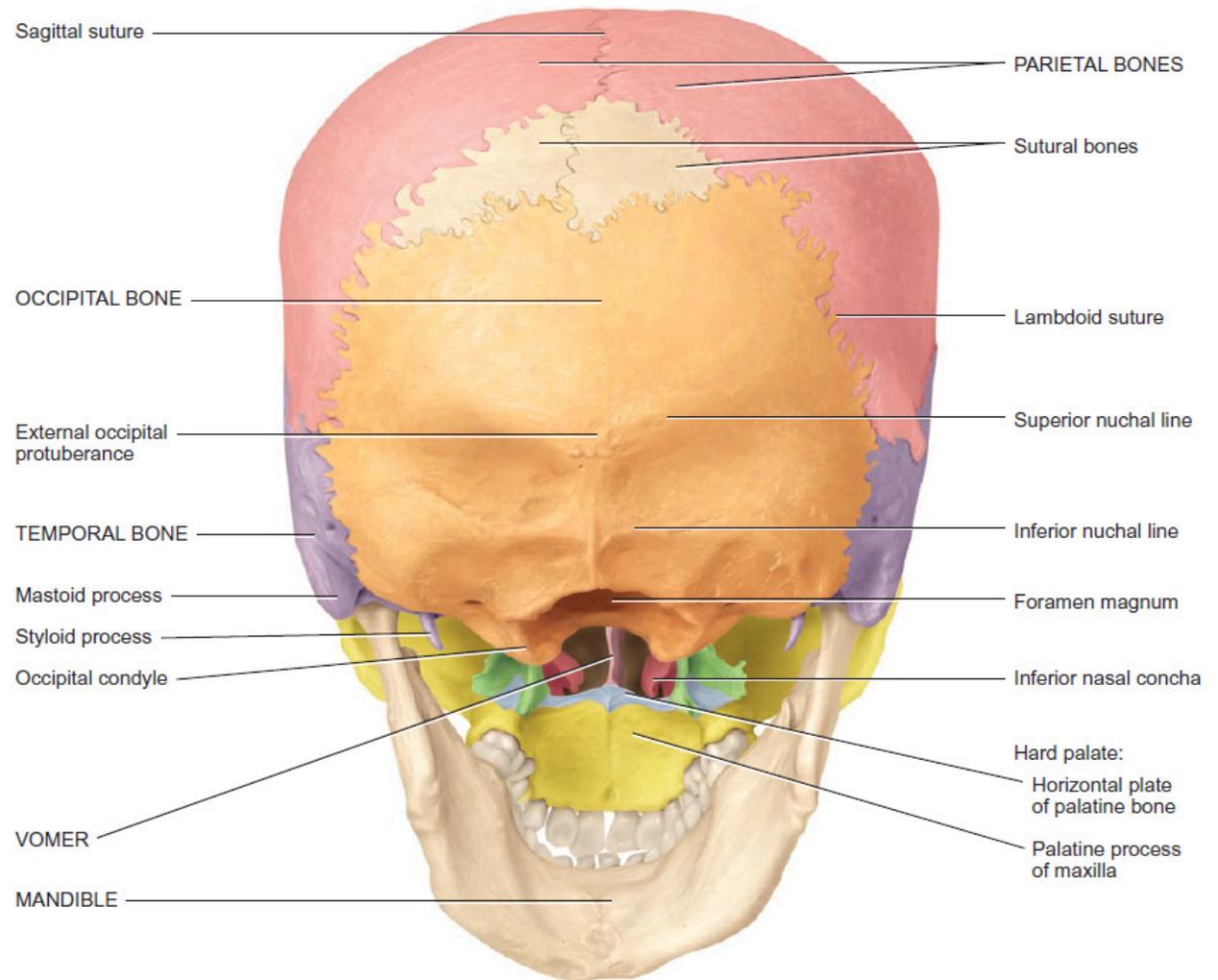


# Temporal bones



# The occipital bone

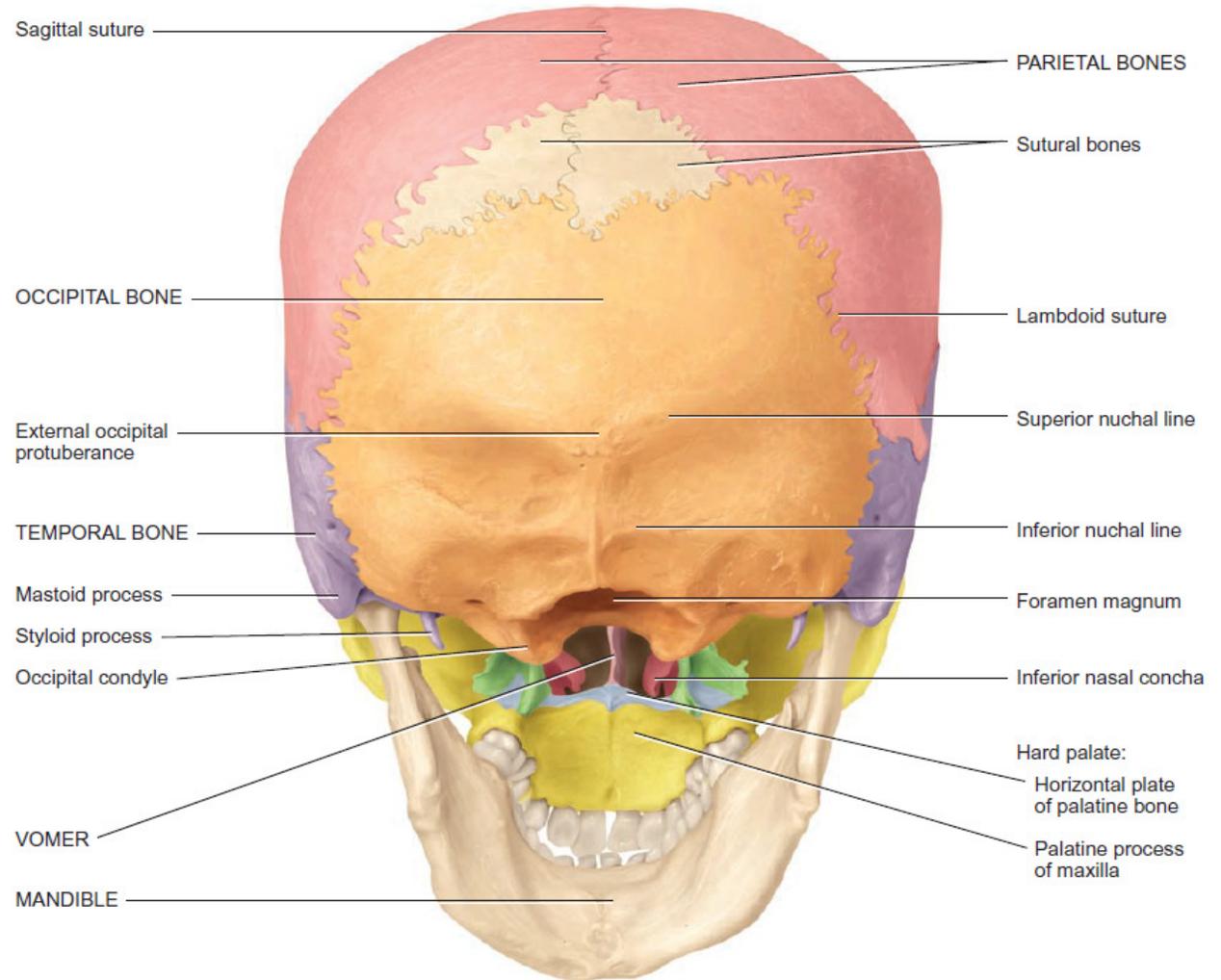
- **Foramen magnum:** Medulla oblongata, the vertebral arteries, spinal arteries, and accessory (XI) nerve.
- **Occipital condyles:** two oval processes with convex surfaces, one on either side of the foramen magnum



(a) Posteroinferior view

# The occipital bone

- **External occipital protuberance:** superior to the foramen magnum the most prominent midline projection on the posterior surface of the bone.
- **superior and inferior nuchal lines.**

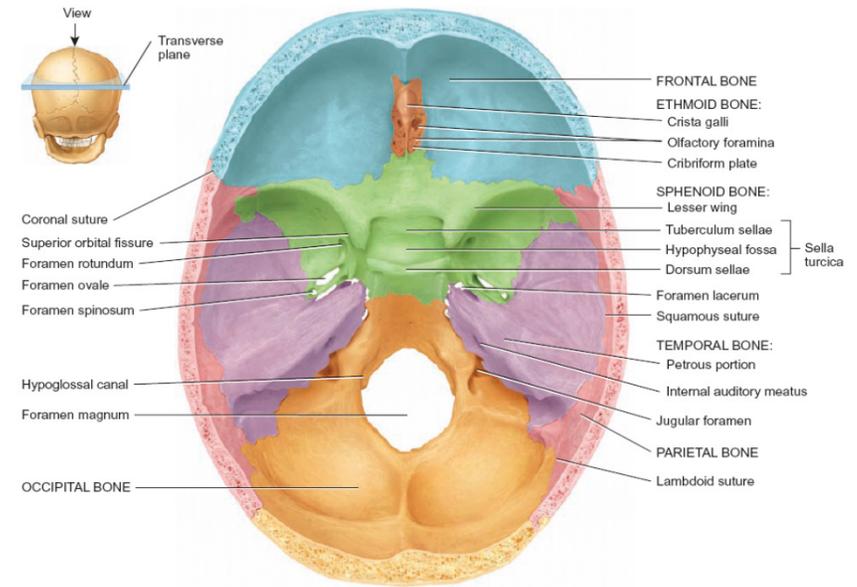


(a) Posteroinferior view

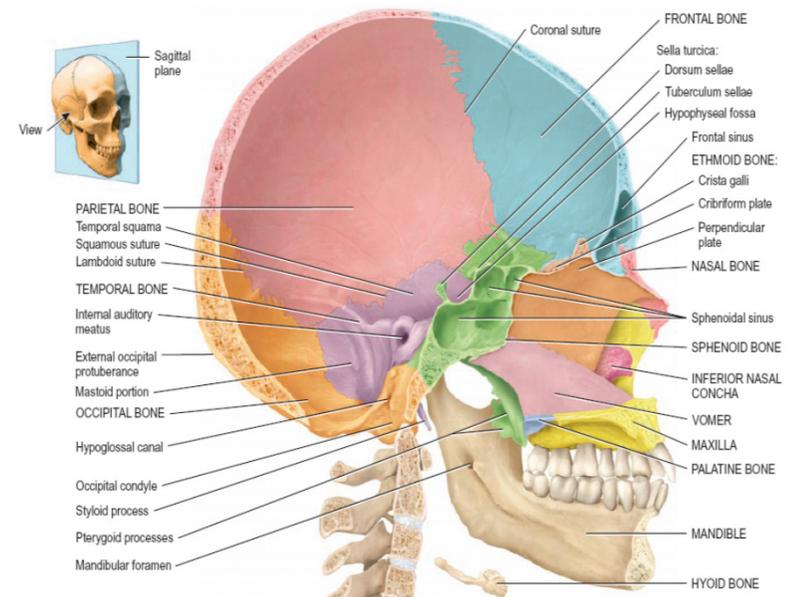


# Sphenoid bone

- Middle part of the base of the skull, keystone of the cranial floor (butterfly).
- **Body:** hollowed, cubelike medial portion between the ethmoid and occipital bones.
- **Sphenoidal sinus:** drains via a narrow opening into the superior aspect of the nasal cavity



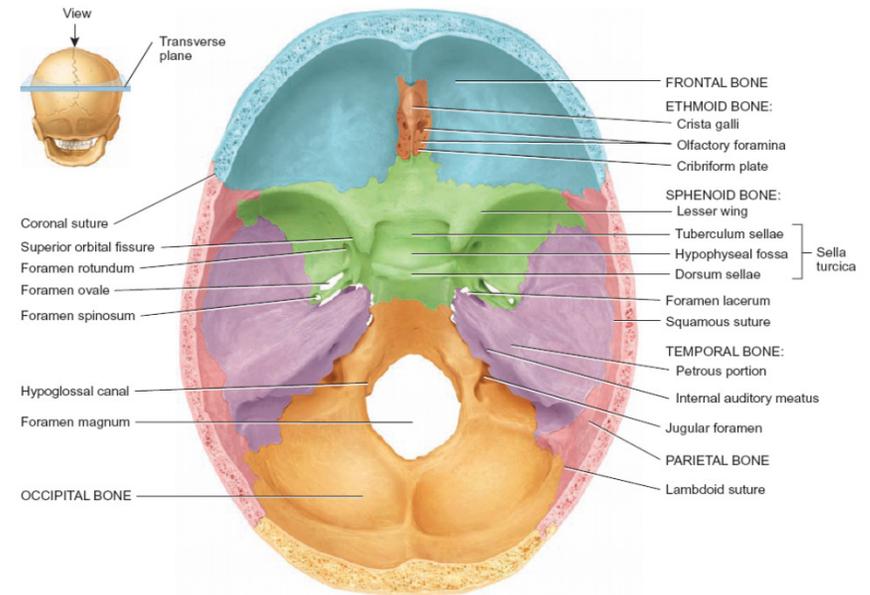
(a) Superior view of sphenoid bone in floor of cranium



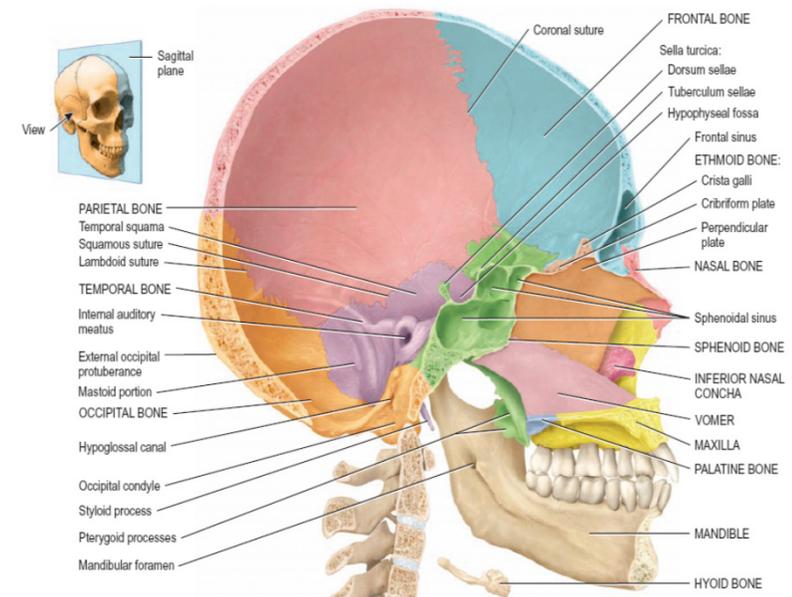
(a) Medial view of sagittal section

# Sphenoid bone

- **Sella turcica:** bony, saddle-shaped structure
  - 1) Tuberculum sellae:** (Anterior ridge)
  - 2) Hypophyseal fossa:** depression, contains the pituitary gland.
  - 3) Dorsum sellae:** forms the back of the saddle



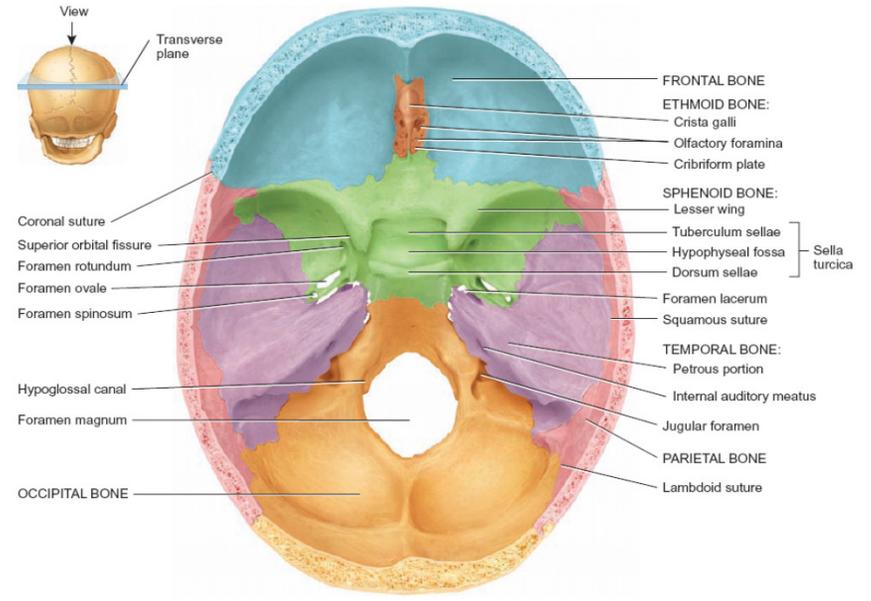
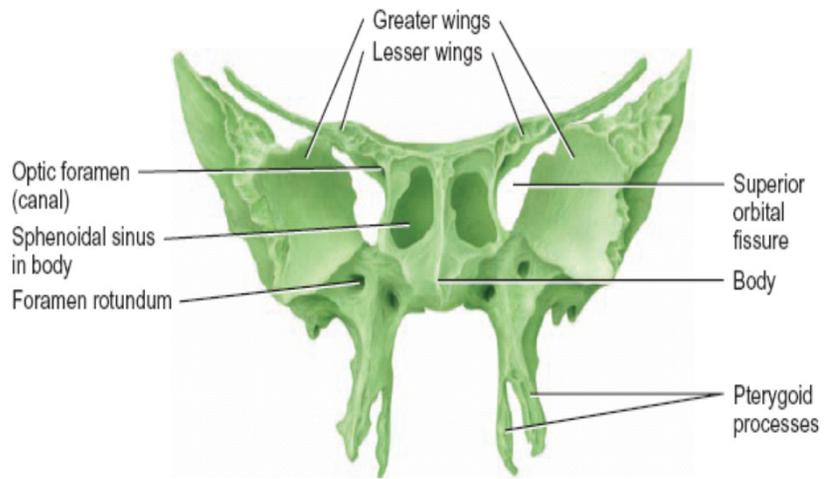
(a) Superior view of sphenoid bone in floor of cranium



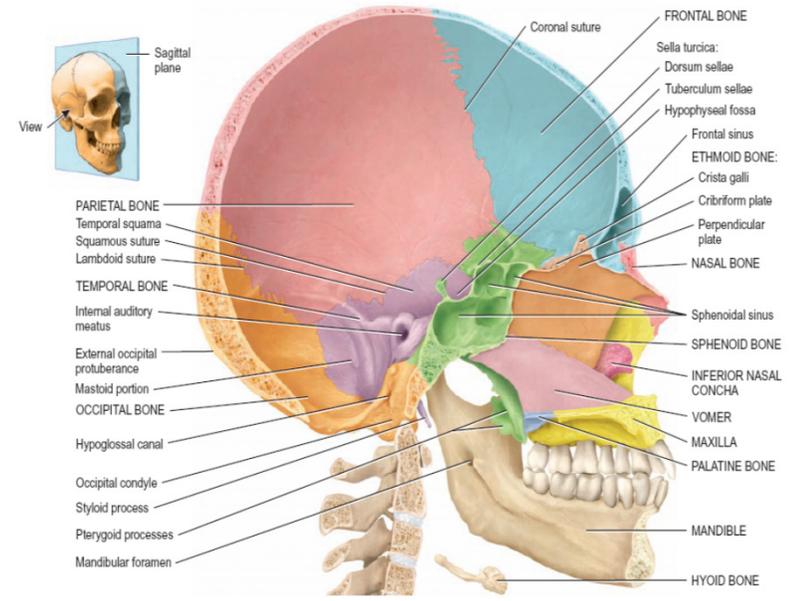
(a) Medial view of sagittal section

# Sphenoid bone

- **Greater wings:** project laterally from the body, forming the anterolateral floor of the cranium.
- **Lesser wings** anterior and superior to the greater wings. They form part of the floor of the cranium and the posterior part of the orbit of the eye.



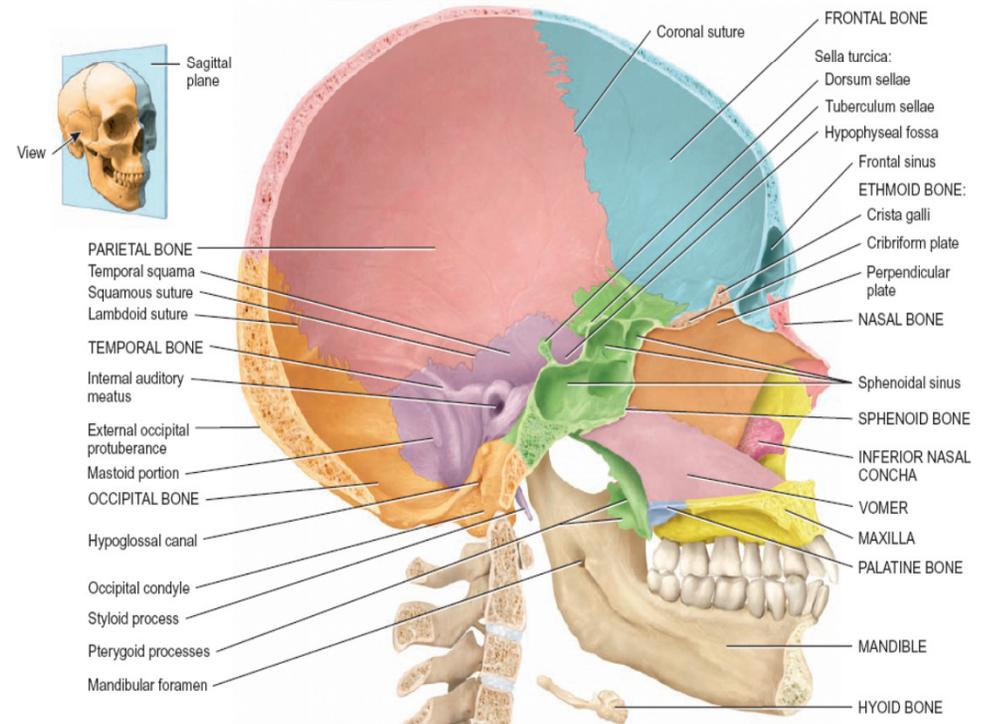
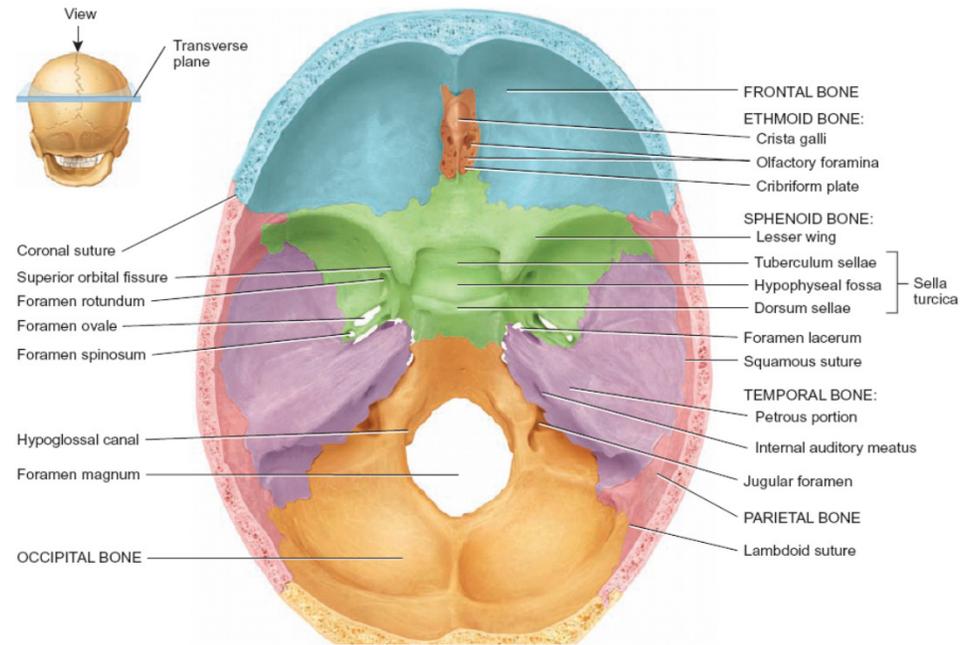
(a) Superior view of sphenoid bone in floor of cranium



(a) Medial view of sagittal section

# Sphenoid bone

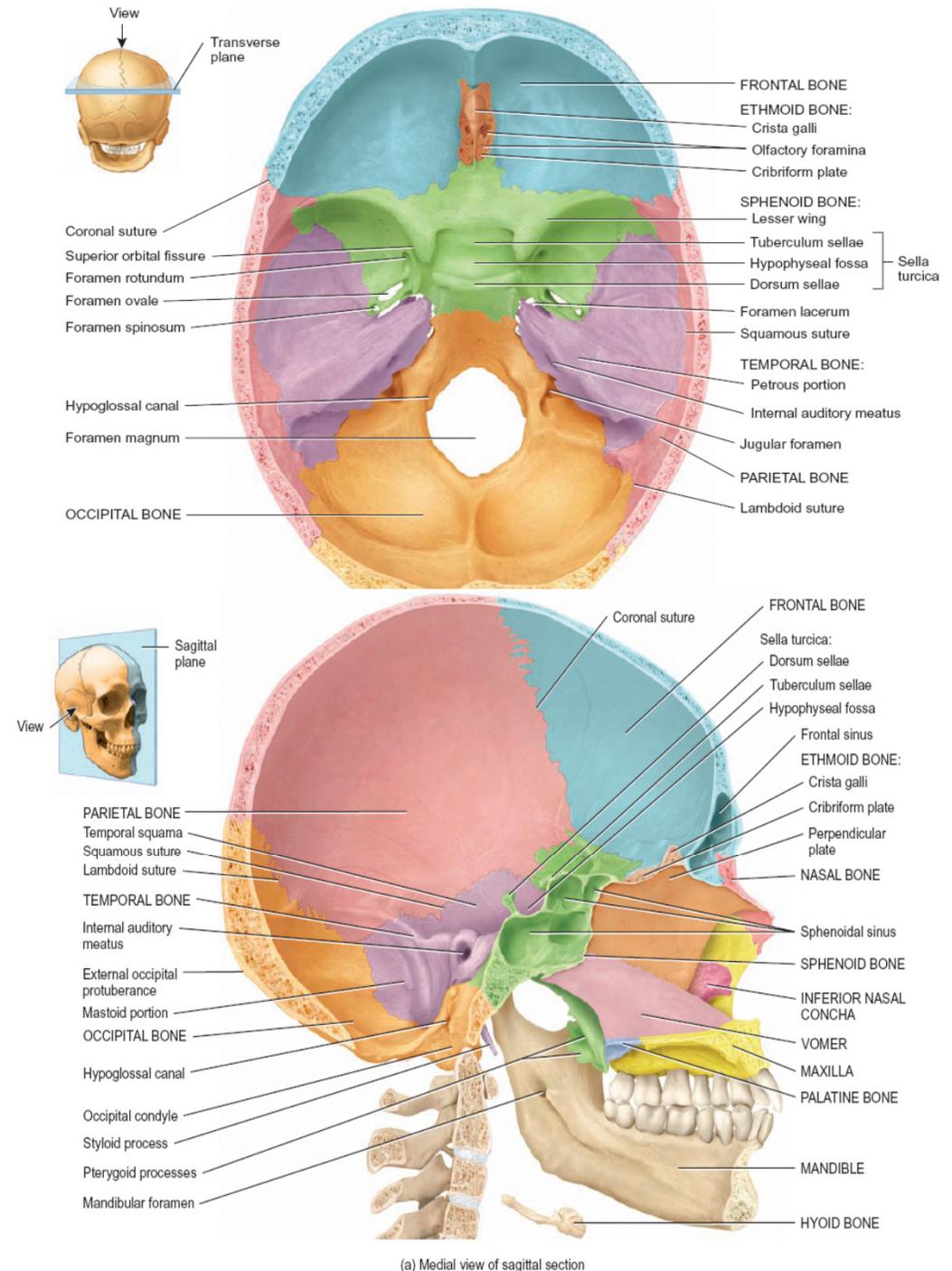
- **Optic foramen:** anterior to the sella turcica. the optic (II) nerve and ophthalmic artery pass into the orbit.
- **Superior orbital fissure:** triangular slit, lateral to the body, between the greater and lesser wings. anterior view of the orbit.
- **Pterygoid processes:** extend from the inferior part of the sphenoid bone. lateral posterior region of the nasal cavity.



(a) Medial view of sagittal section

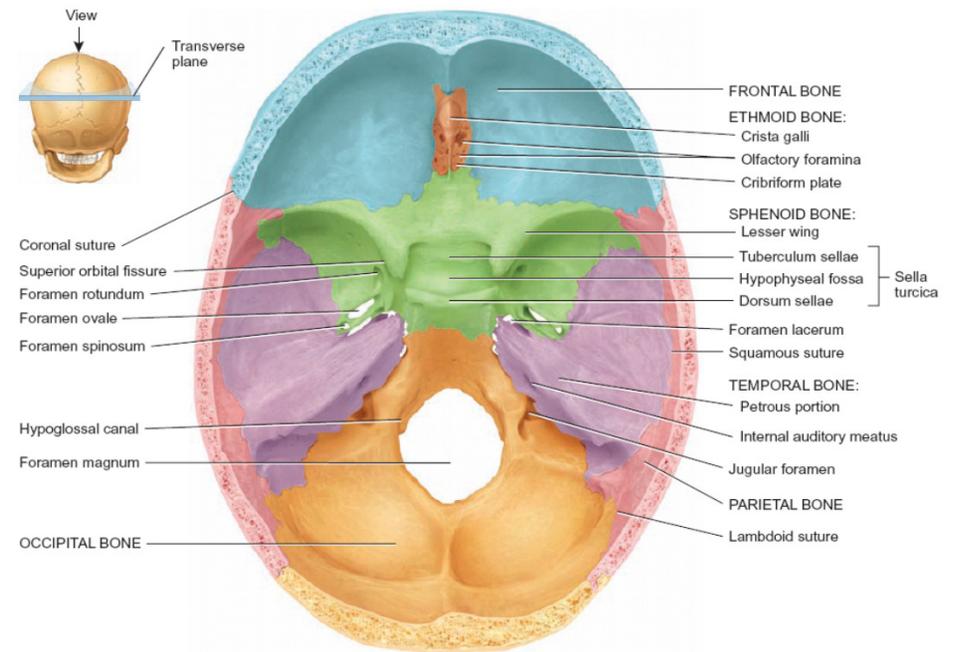
# Sphenoid bone

- **Foramen rotundum** junction of the anterior and medial parts of the sphenoid bone. The maxillary branch of trigeminal (V) nerve
- **Foramen ovale:** base of the lateral pterygoid process in the greater wing (mandibular branch of the trigeminal).
- **Foramen spinosum:** lies at the posterior angle of the sphenoid and transmits the middle meningeal blood vessels.
- **Foramen lacerum:** is bounded anteriorly by the sphenoid bone and posteriorly by the temporal and occipital bones.



# Ethmoid bone

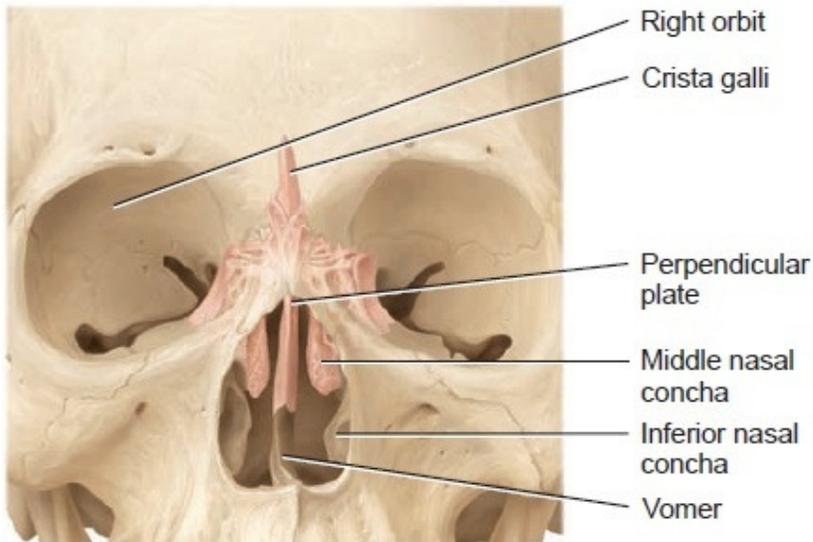
- Delicate bone located in the anterior part of the cranial floor between the two orbits. (spongelike in appearance).
- The ethmoid bone forms
  - 1) part of the anterior portion of the cranial floor
  - 2) medial wall of the orbits;
  - 3) the superior portion of the nasal septum,
  - 4) superior sidewalls of the nasal cavity.



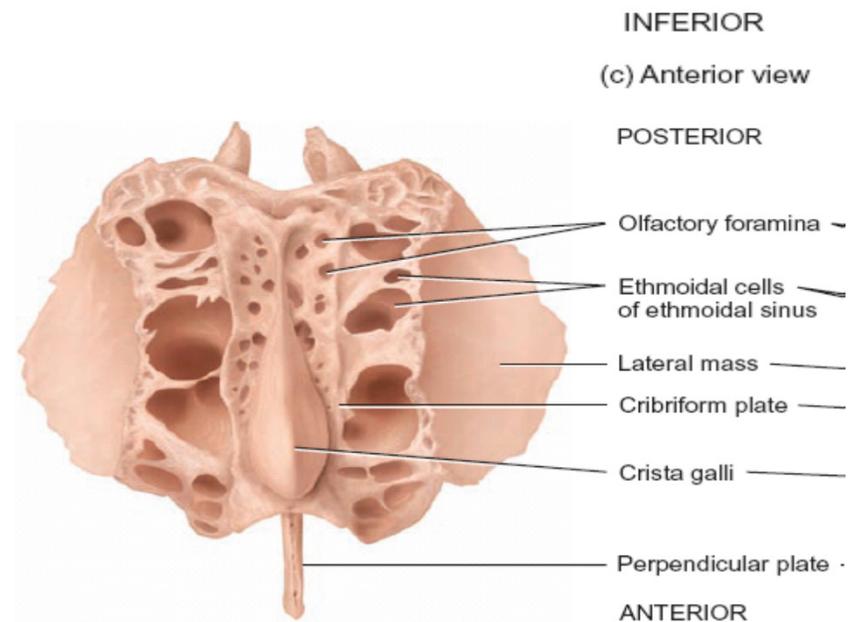
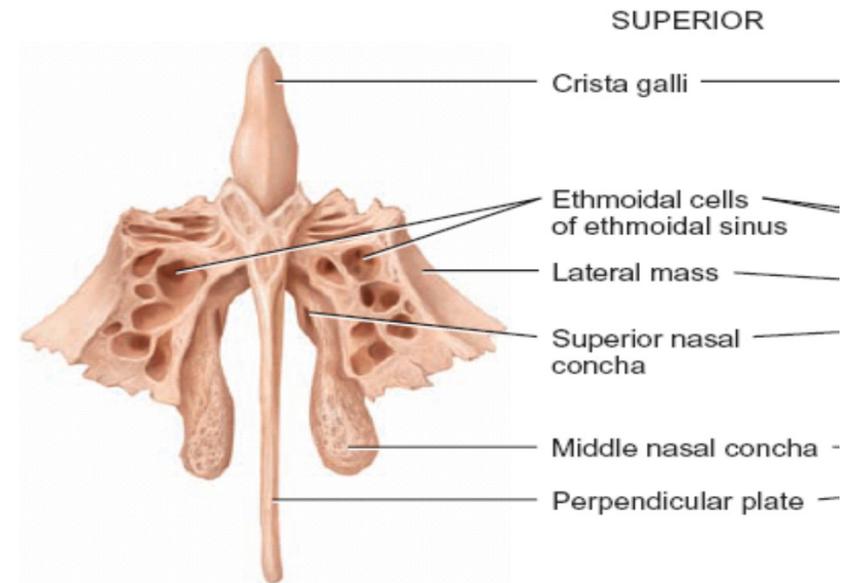
(a) Superior view of sphenoid bone in floor of cranium

# Ethmoid bone

- **Lateral masses:** the wall between the nasal cavity and the orbits.
- **Perpendicular plate:** forms the superior portion of the nasal septum
- **Cribriform plate:** (horizontal) lies in the anterior floor of the cranium and forms the roof of the nasal cavity. **olfactory foramina.** olfactory (I) nerves
- **Crista galli:** triangular process (point of attachment for the (falx cerebri)
- **Superior and middle nasal concha.**



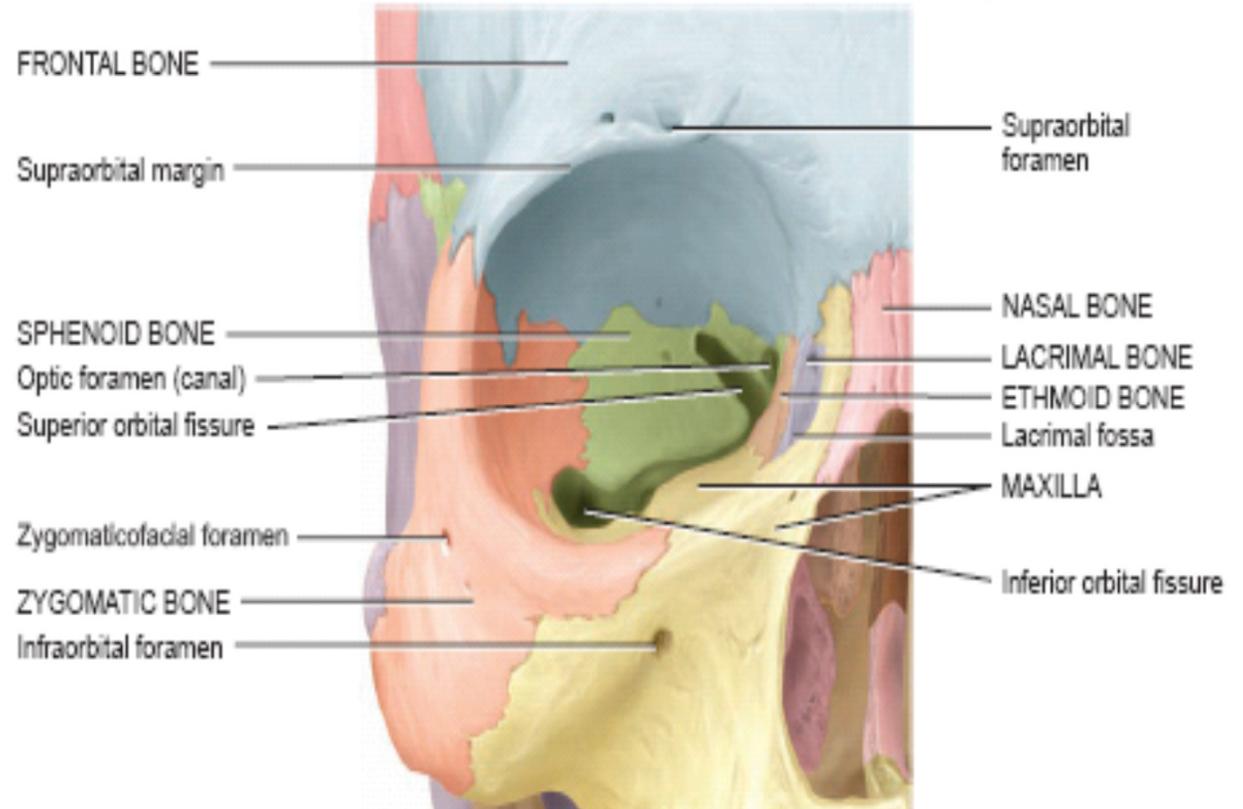
(a) Anterior view of position of ethmoid bone in skull



(b) Superior view

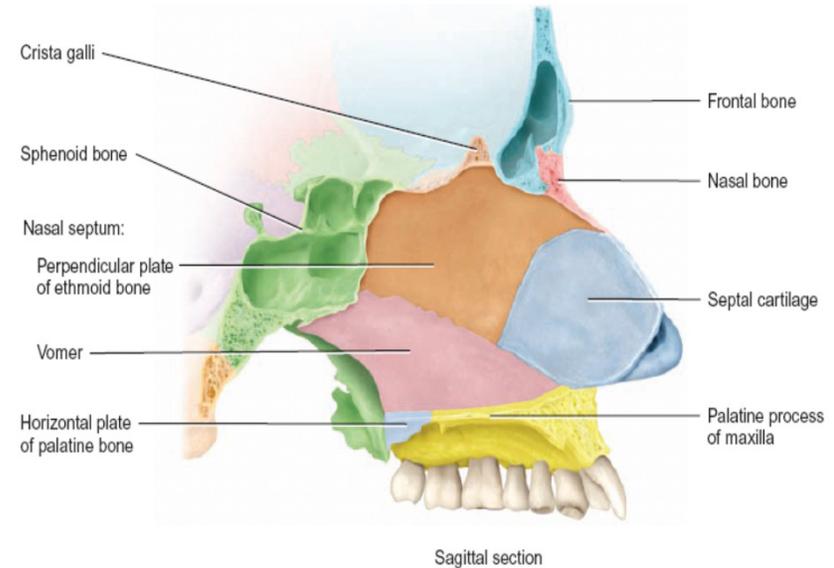
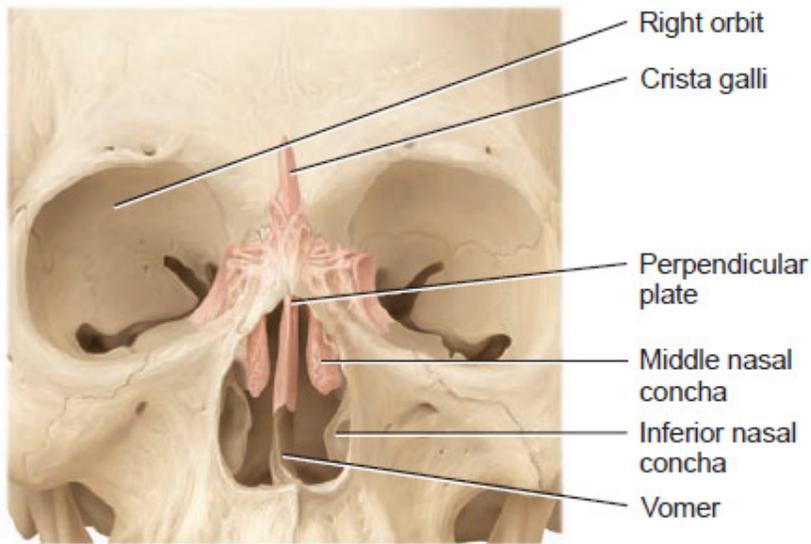
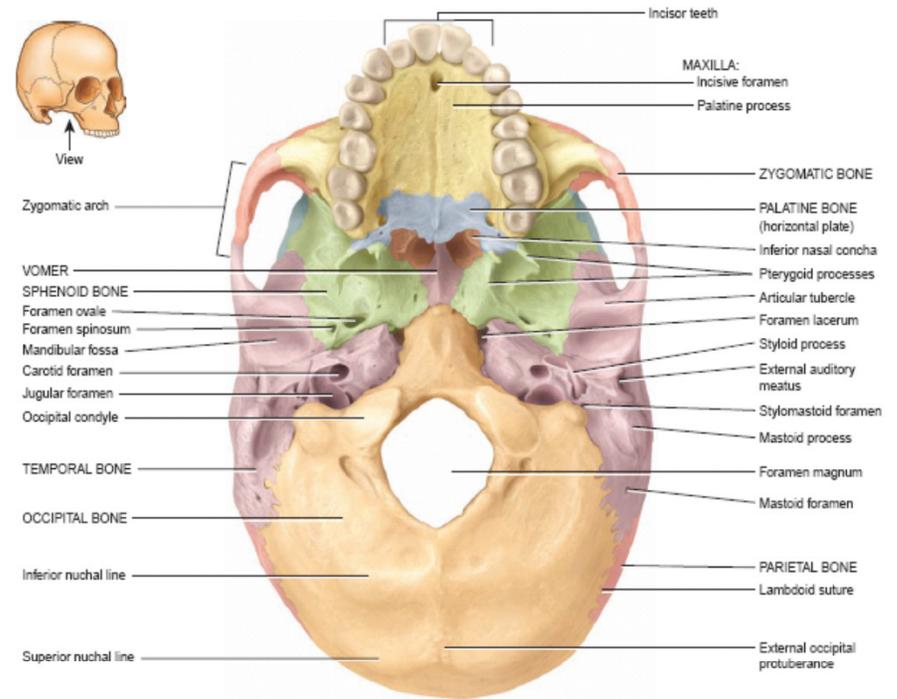
# Facial bones

- **Nasal bones:** paired, small, flattened, rectangular-shaped bones that form the bridge of the nose
- **Lacrimal bones:** paired, thin and fingernail in size and shape. posterior and lateral to the nasal bones and form a part of the medial wall of orbit. **lacrima fossa:** a vertical tunnel formed with the maxilla, (lacrima sac).



# Facial bones

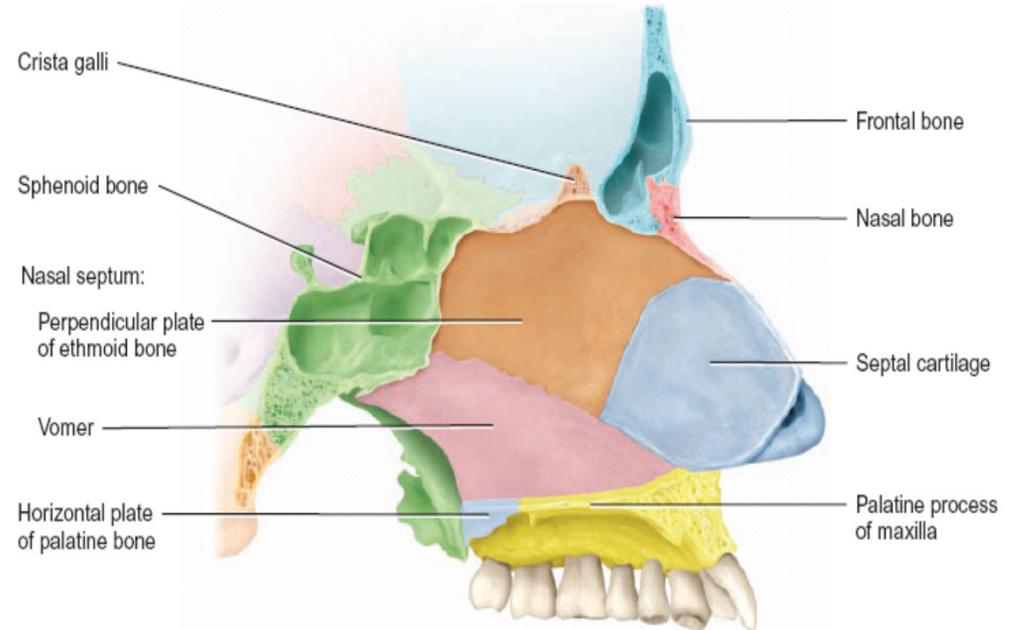
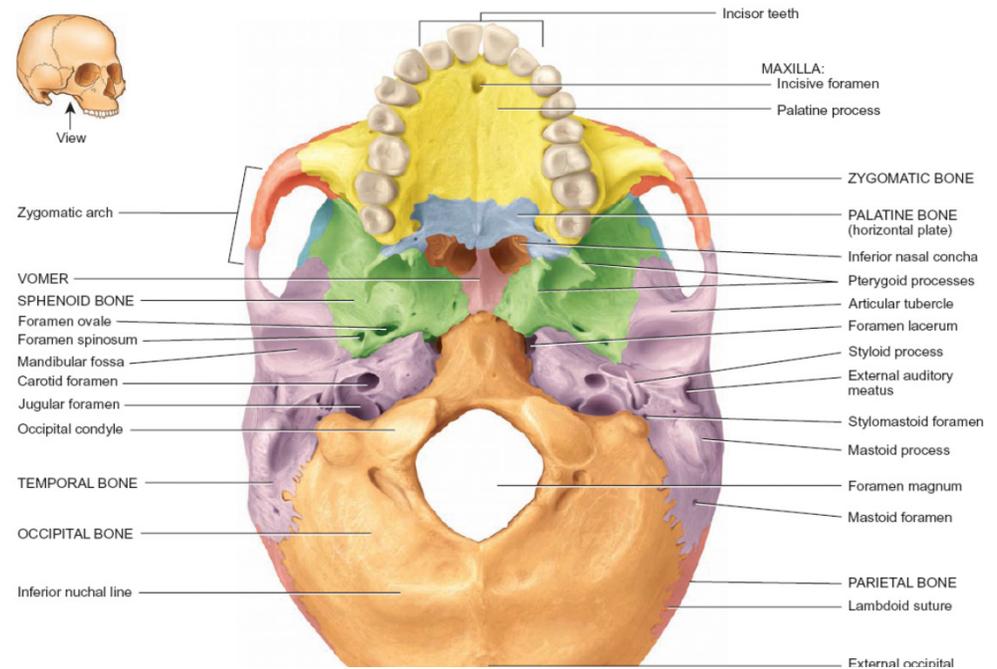
- **Palatine bones:** paired posterior portion of the hard palate. **horizontal plates** separates the nasal cavity from the oral cavity.
- **Inferior nasal conchae:** inferior to the middle nasal conchae of the ethmoid bone



(d) Anterior view of position of ethmoid bone in skull

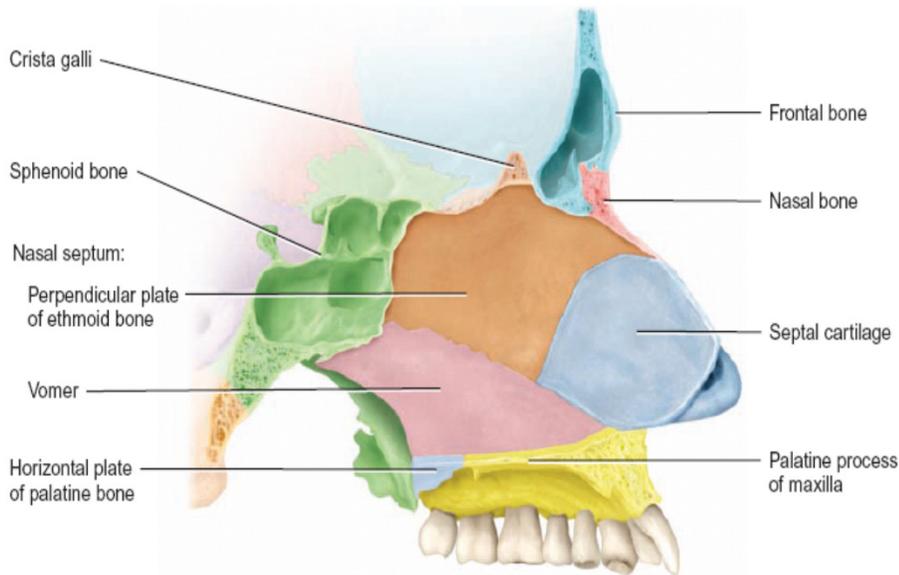
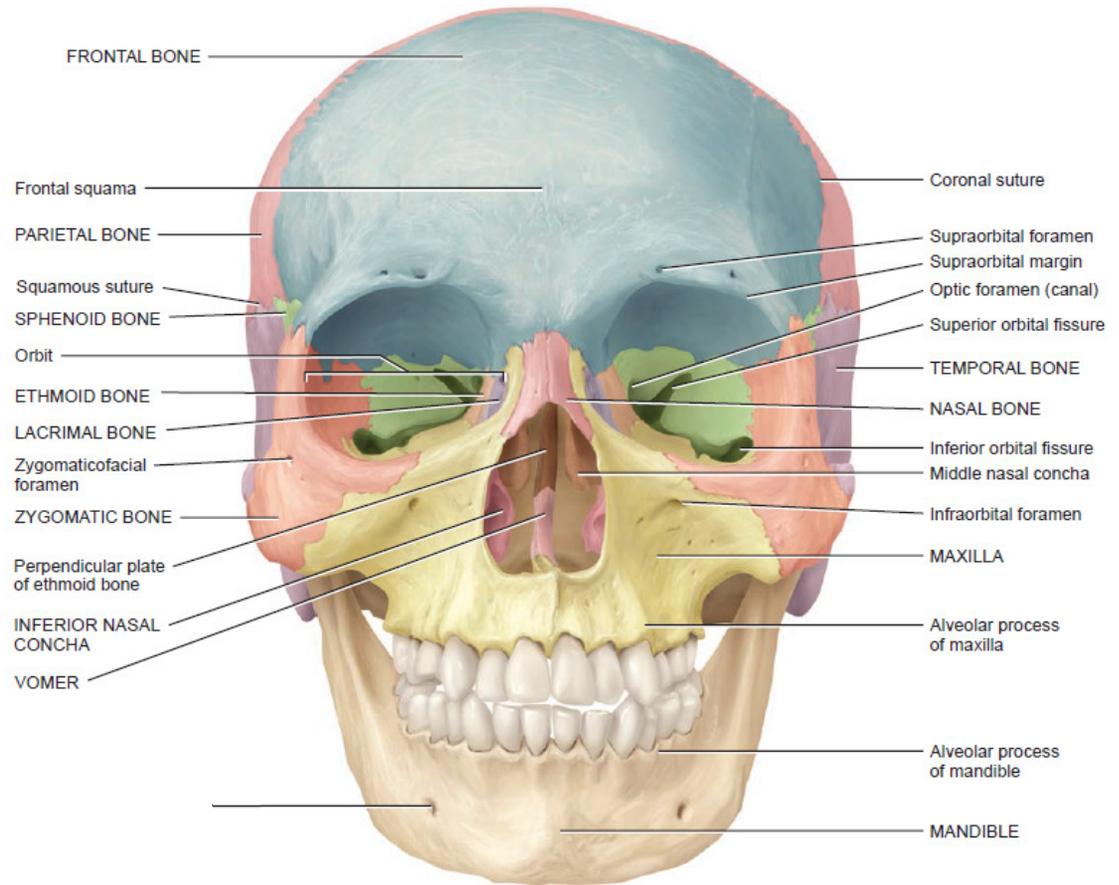
# Facial bones

- **Vomer:** unpaired triangular bone
- **Articulations of Vomer:**
  - 1) Superiorly:** with the perpendicular plate of the ethmoid bone and the inferior surface the sphenoid bone.
  - 2) Inferiorly:** with both the maxillae and palatine forms the inferior portion of the bony nasal septum.



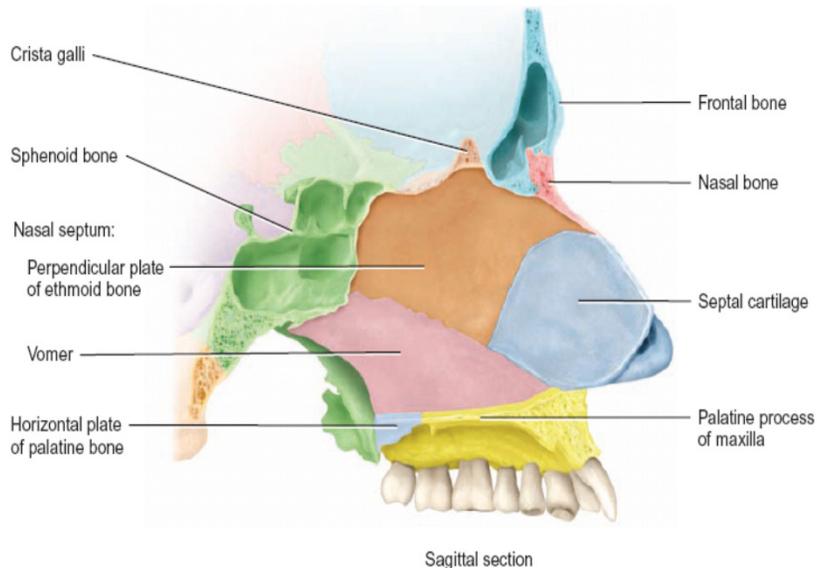
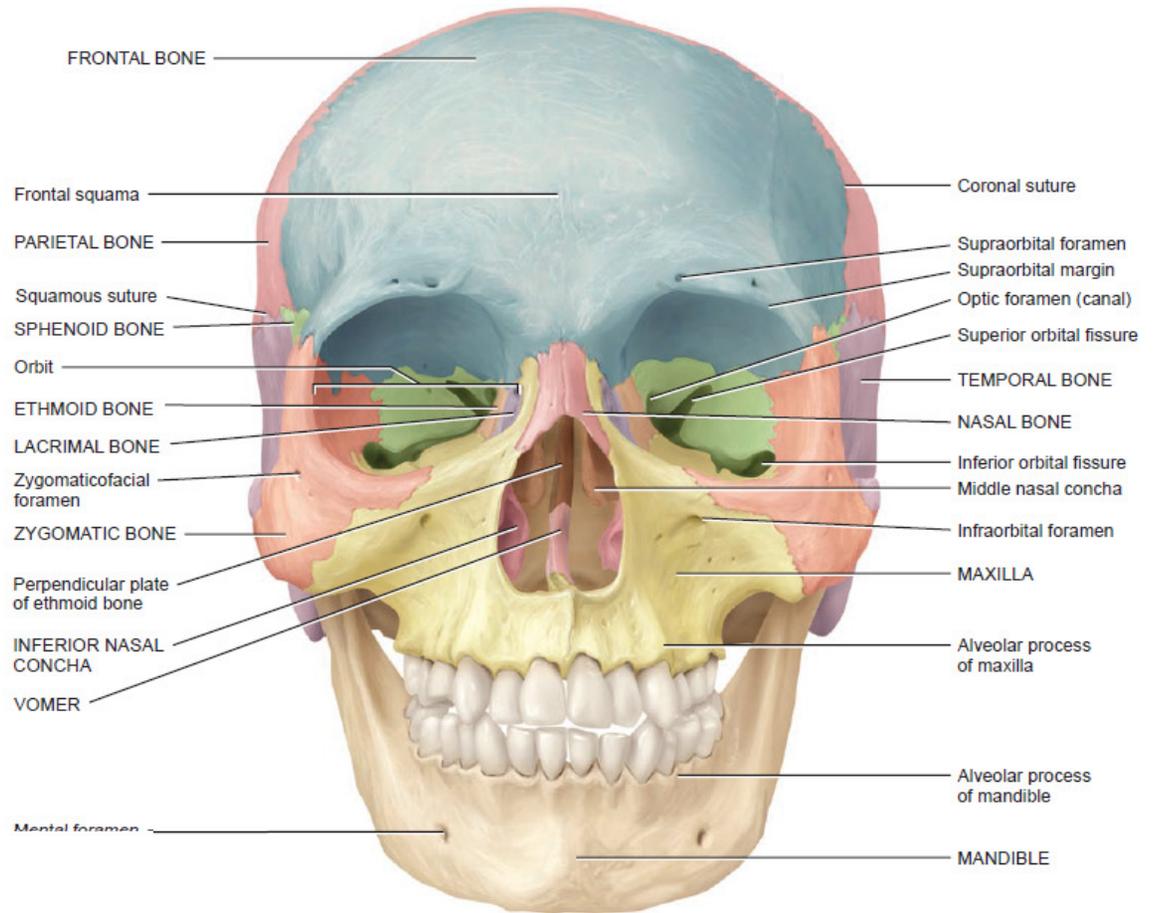
Sagittal section

- **Maxillae** :paired, form part of the floors of the orbits, part of the lateral walls and floor of the nasal cavity, and most of the hard palate.
- **Maxillary sinus**: central body
- **Alveolar process**: ridge-like arch that contains the alveoli



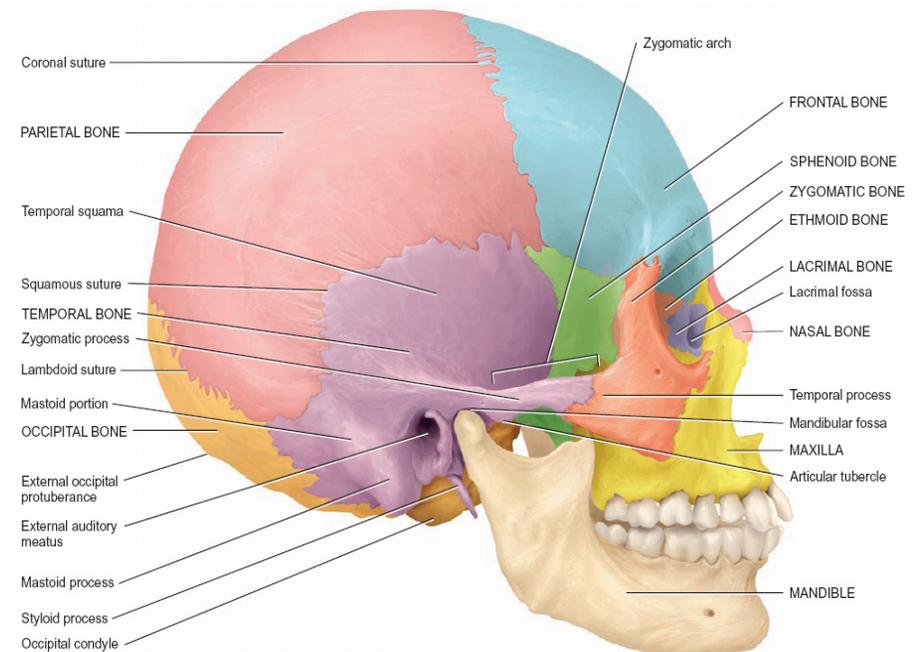
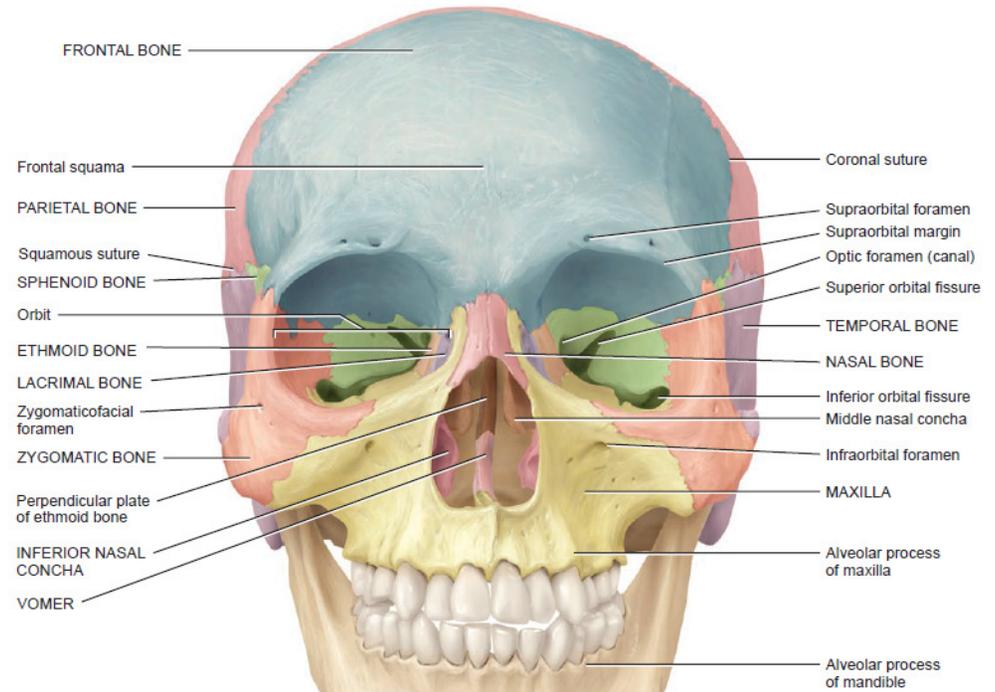
Sagittal section

- **Palatine process:** horizontal projection of the maxilla that forms the anterior three-quarters of the hard palate
- **Infraorbital foramen**
- **Inferior orbital fissure:** between the greater wing of the sphenoid and the posterior aspect of the maxilla.



# Zygomatic bones

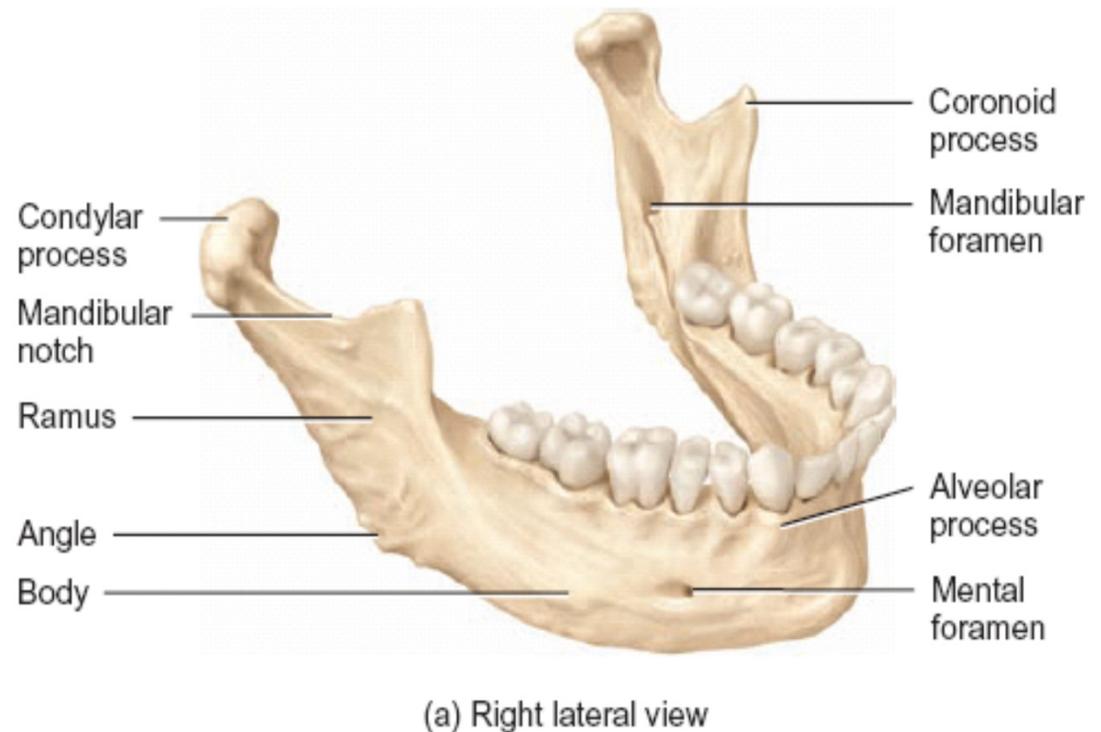
- Lateral wall and floor of each orbit
- **Temporal process:** projects posteriorly and articulates with the zygomatic process of the temporal bone (zygomatic arch)
- **Zygomatofacial foramen:** center of the zygomatic bone zygomatofacial nerve and vessels.



(c) Right lateral view

# Mandible

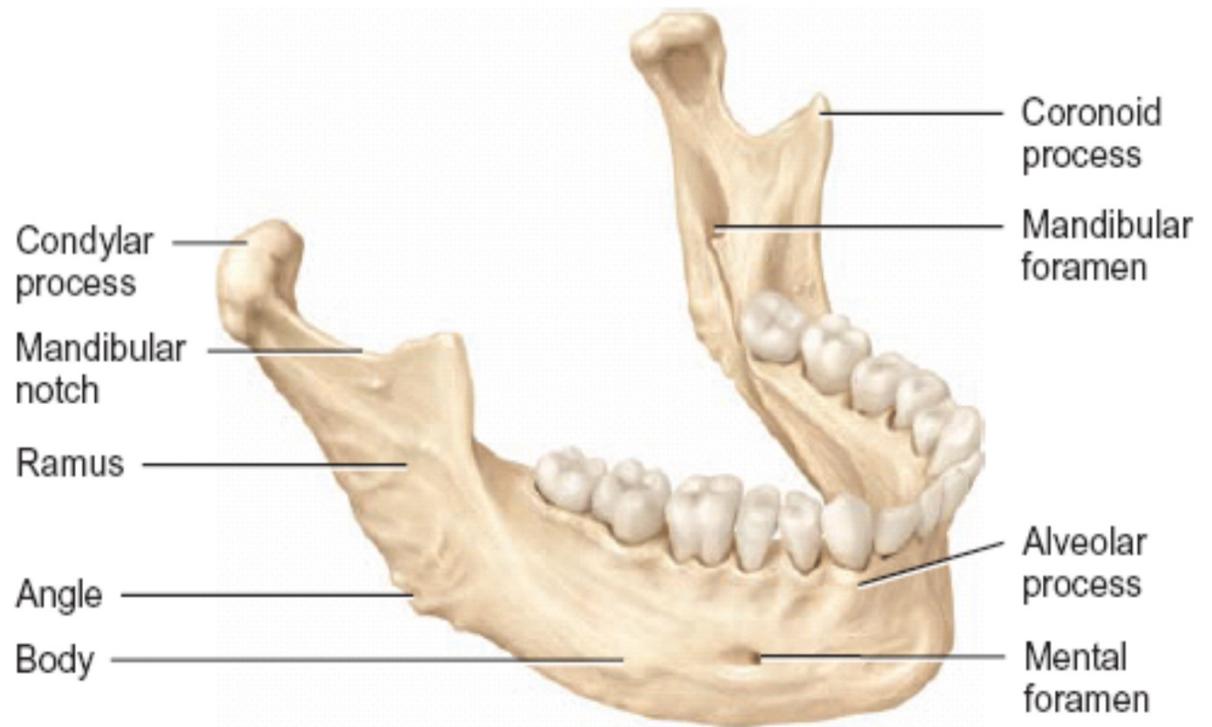
- Archshaped bone largest, strongest facial bone, the only movable skull bone.
- **Body:** curved, horizontal portion.
- **Rami:** two perpendicular portions
- **Condylar process:** articulates with the mandibular fossa and articular tubercle of the temporal bone
- **Angle:** body meets the ramus.
- **Coronoid process:** temporalis muscle attachment.



# Mandible



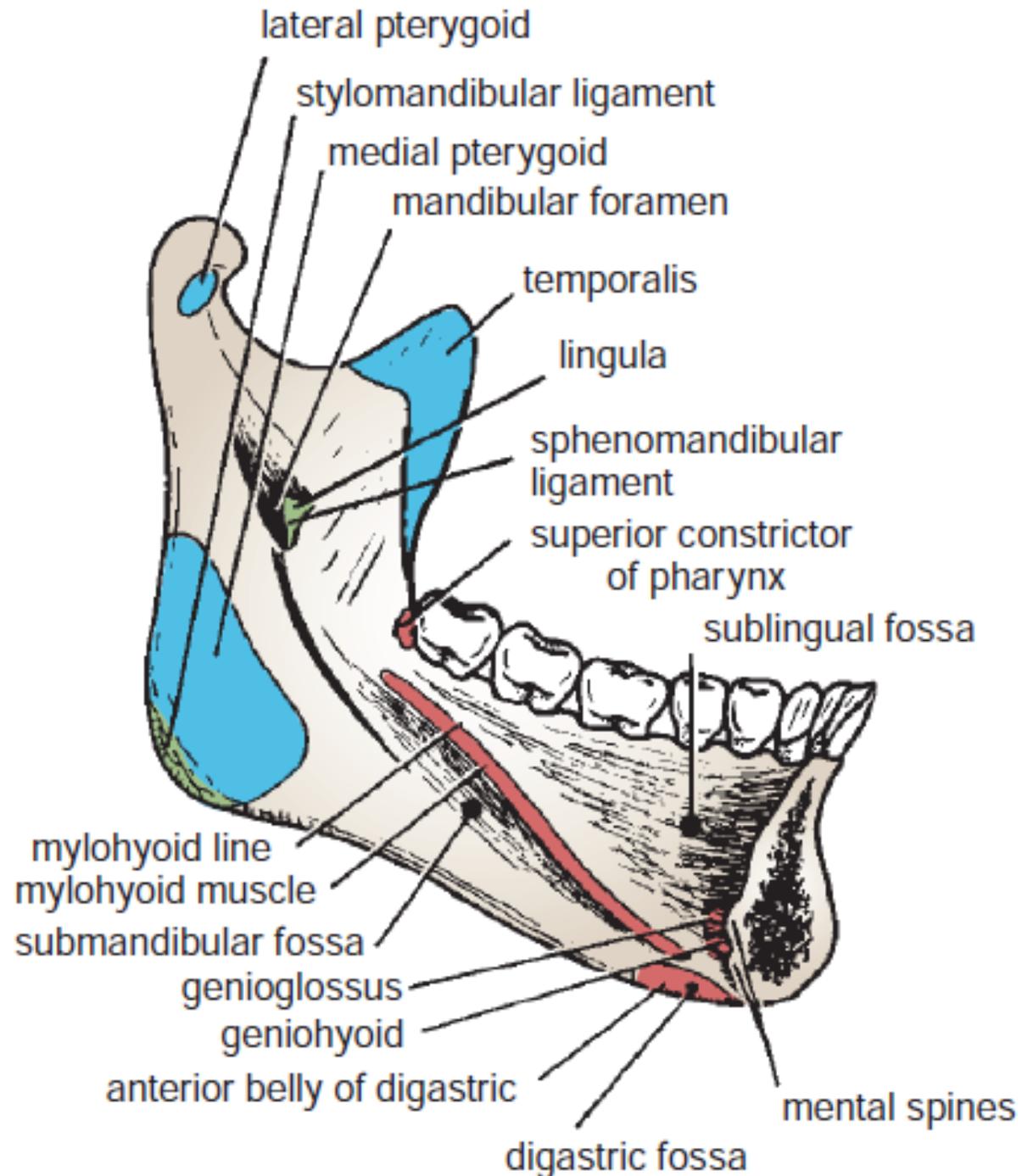
- **Mandibular notch:** depression between the coronoid and condylar processes.
- **Alveolar process:** ridge-like arch containing the alveoli mandibular teeth.
- **Mandibular foramen:** on the medial surface of each ramus
- **Mental foramen:** inferior to the second premolar tooth.



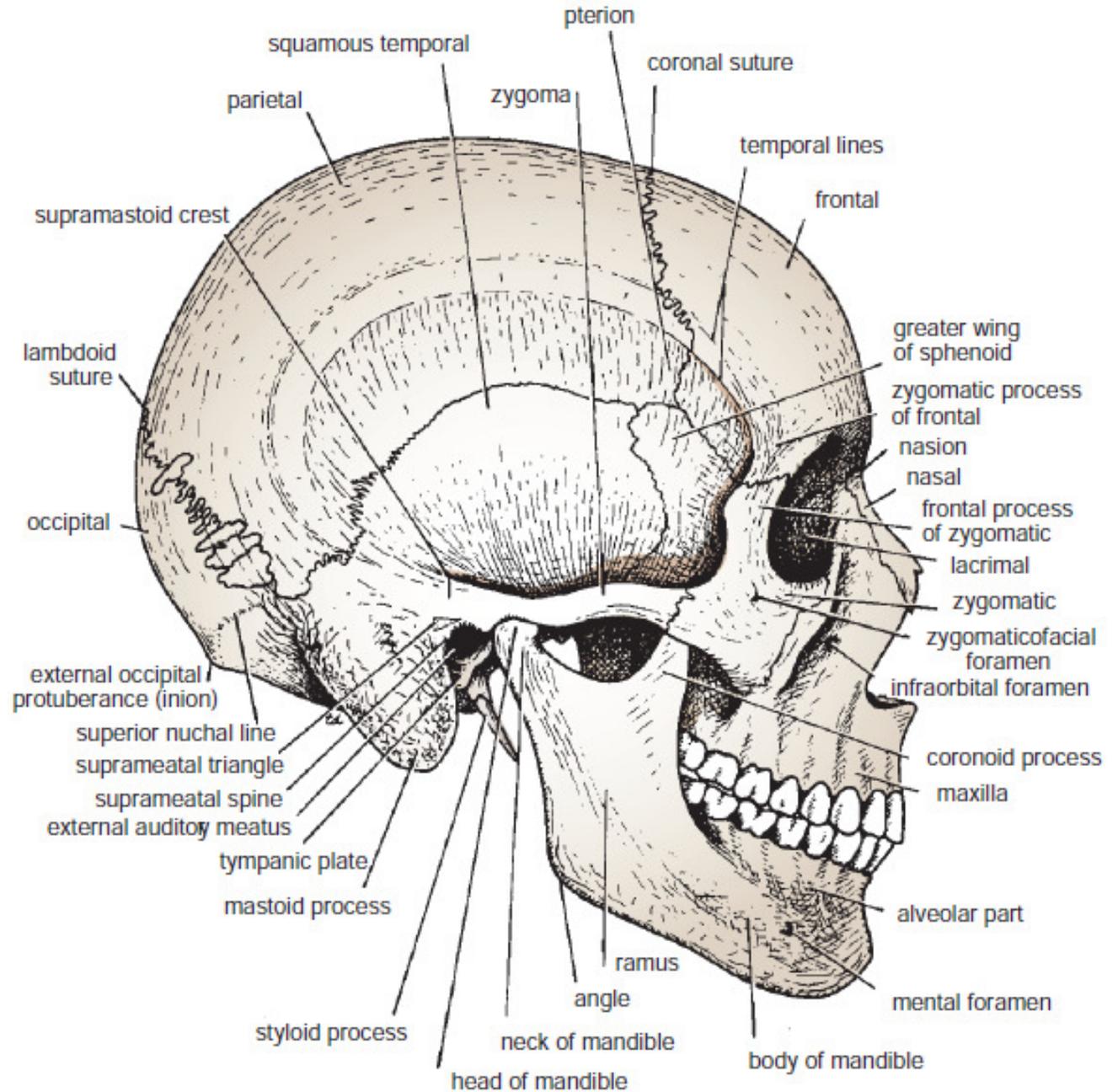
(a) Right lateral view

# Mandible

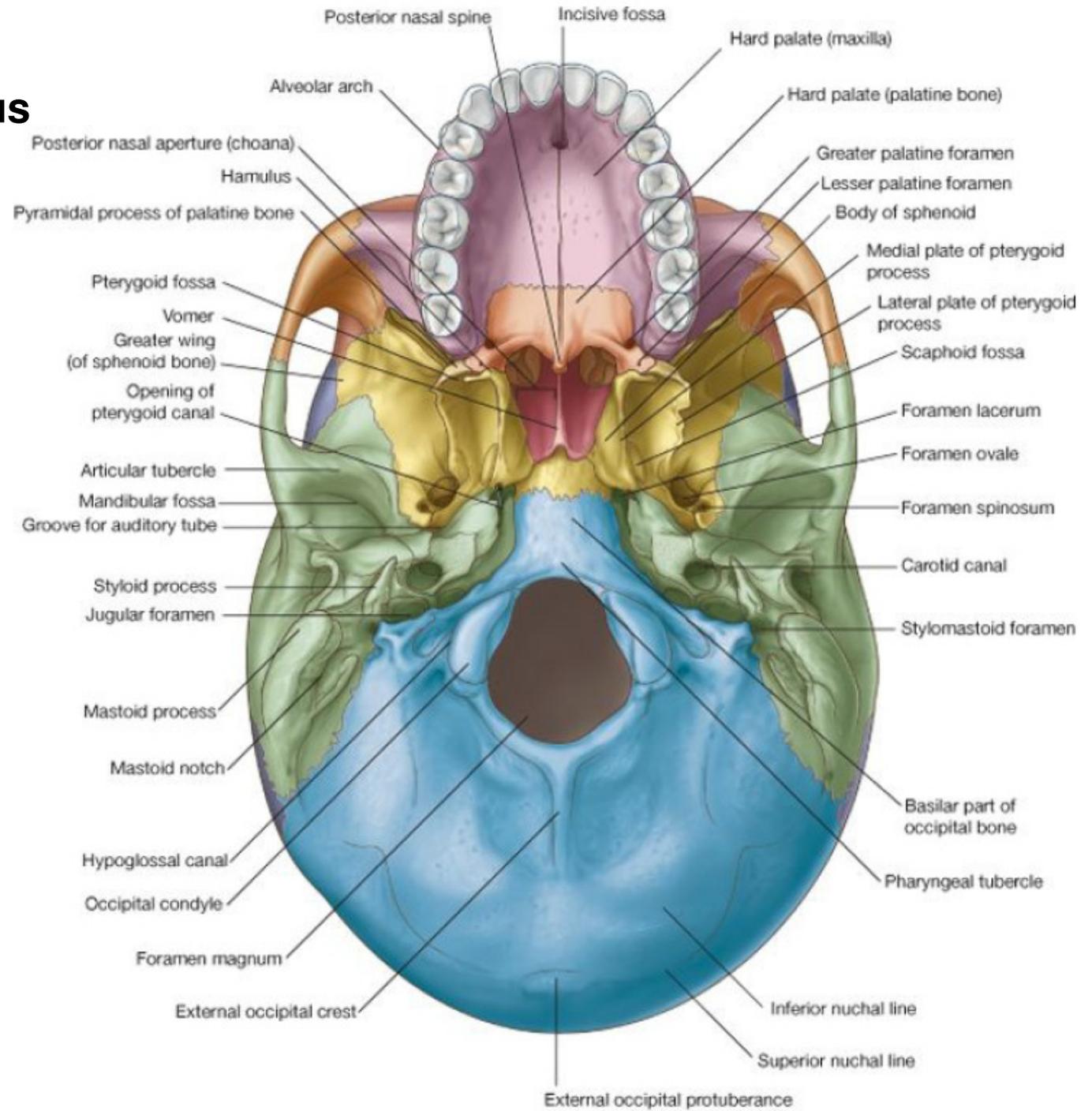
- **Mental spines**
- **Mylohyoid line:** mental spines to an area below and behind the third molar tooth
- **Submandibular fossa**
- **Sublingual fossa**
- **Digastric fossa**
- **Mandibular foramen:** on the medial surface of each ramus
- **Lingula:** for the attachment of the sphenomandibular L

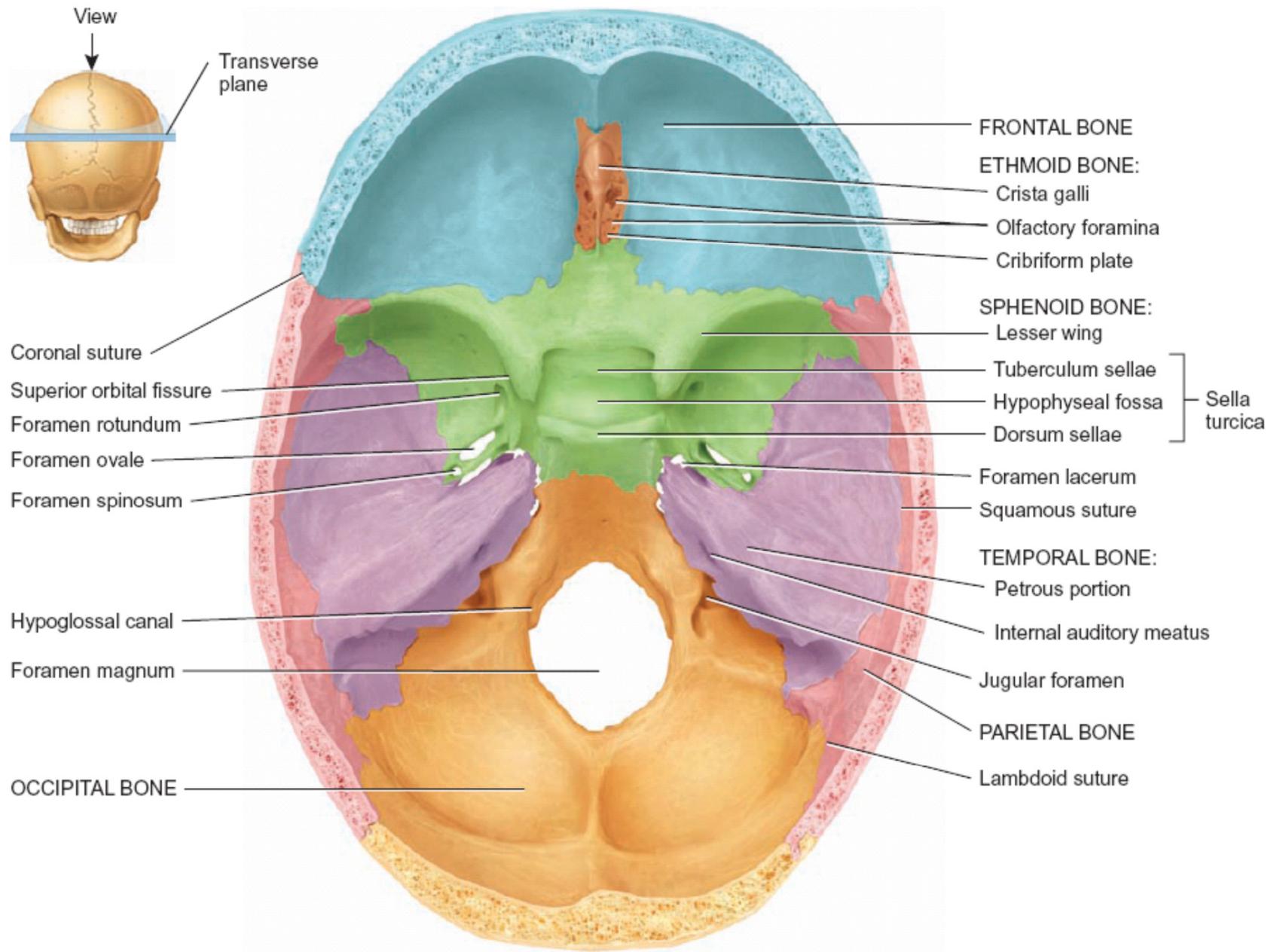


- Superior and inferior temporal lines
- Temporal fossa
- Infratemporal crest
- Infratemporal fossa
- Suprameatal triangle
- Suprameatal spine



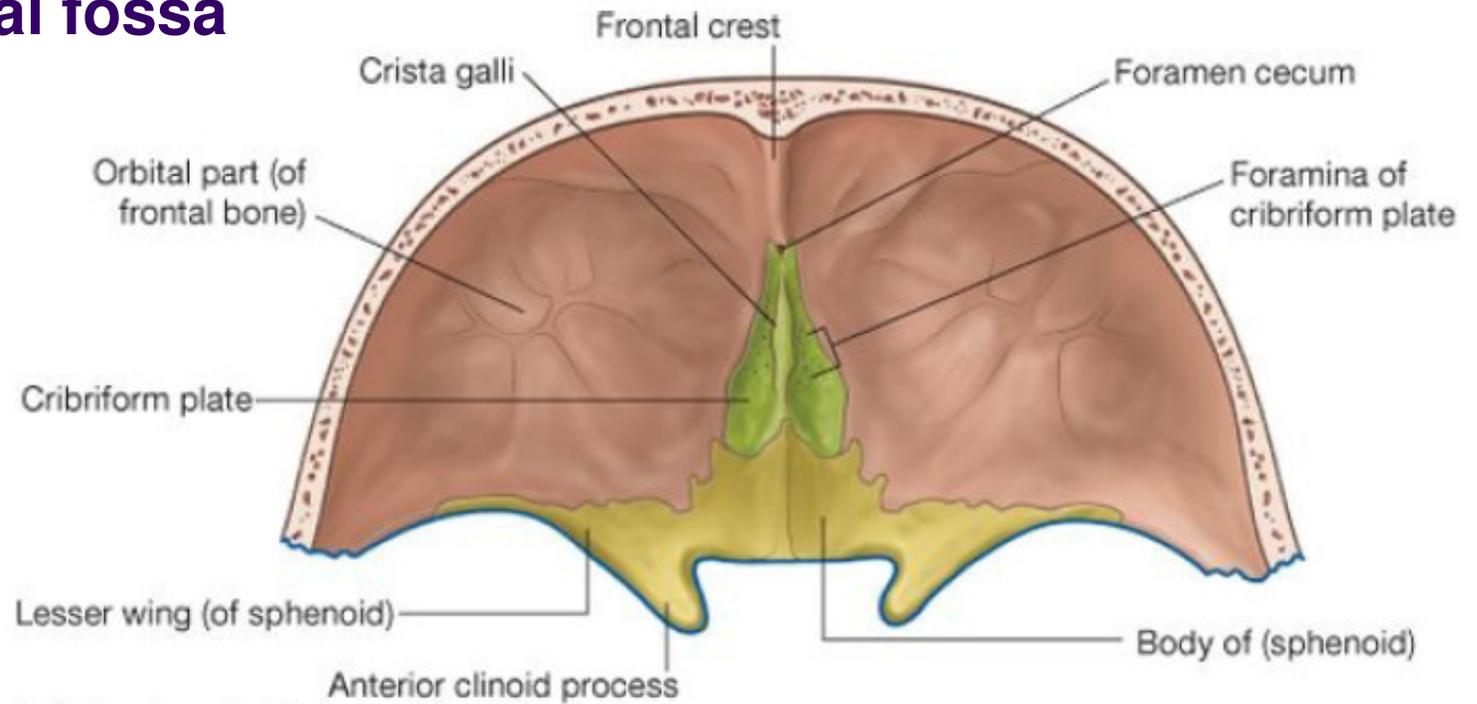
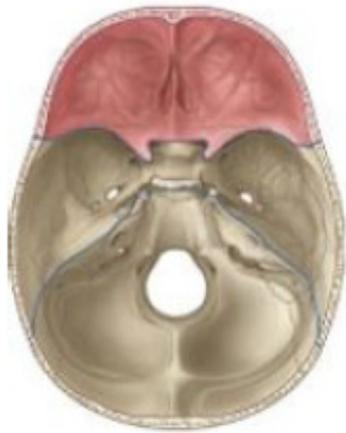
- Pterygoid hamulus
- Scaphoid fossa





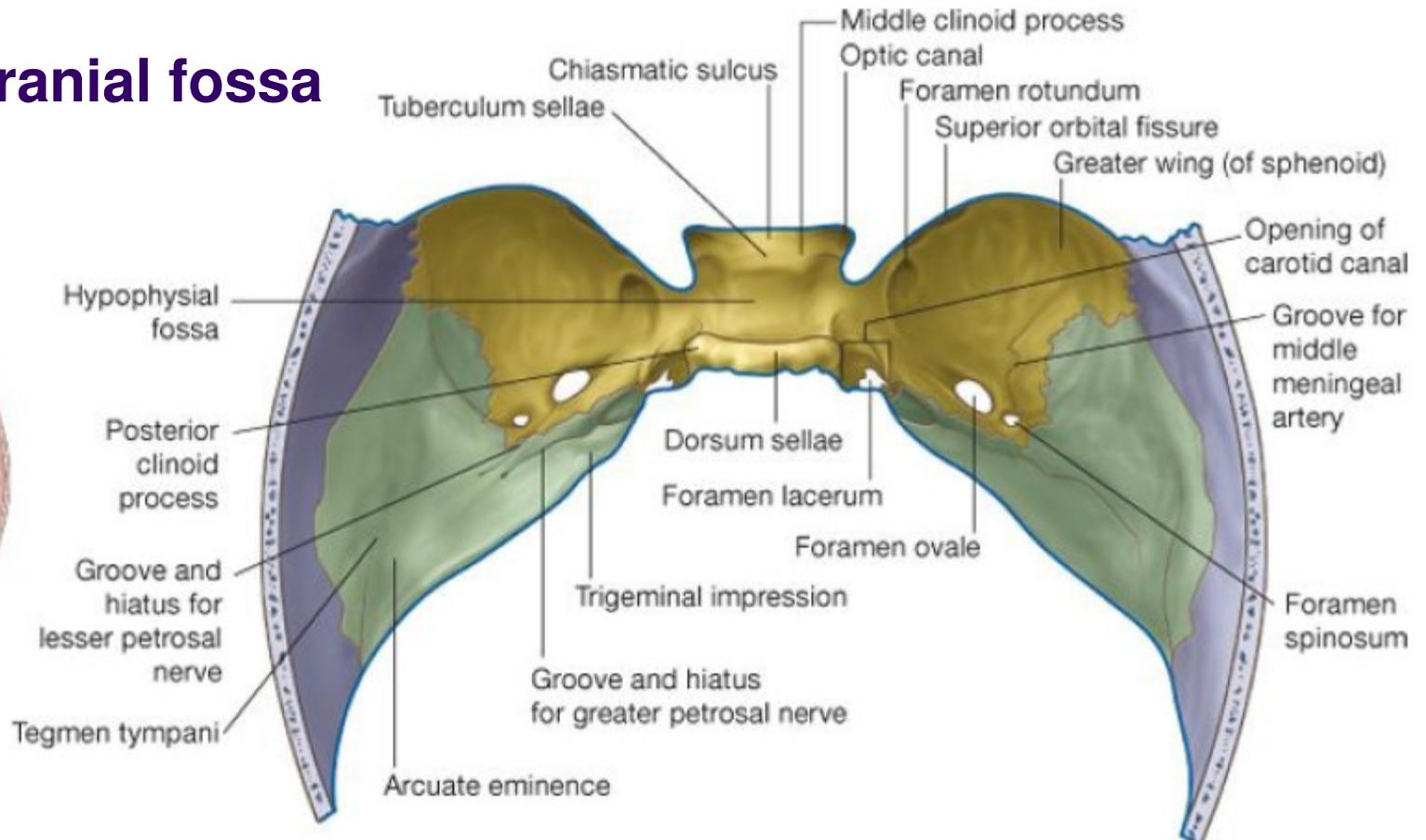
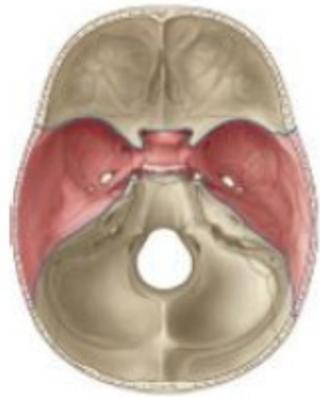
(a) Superior view of sphenoid bone in floor of cranium

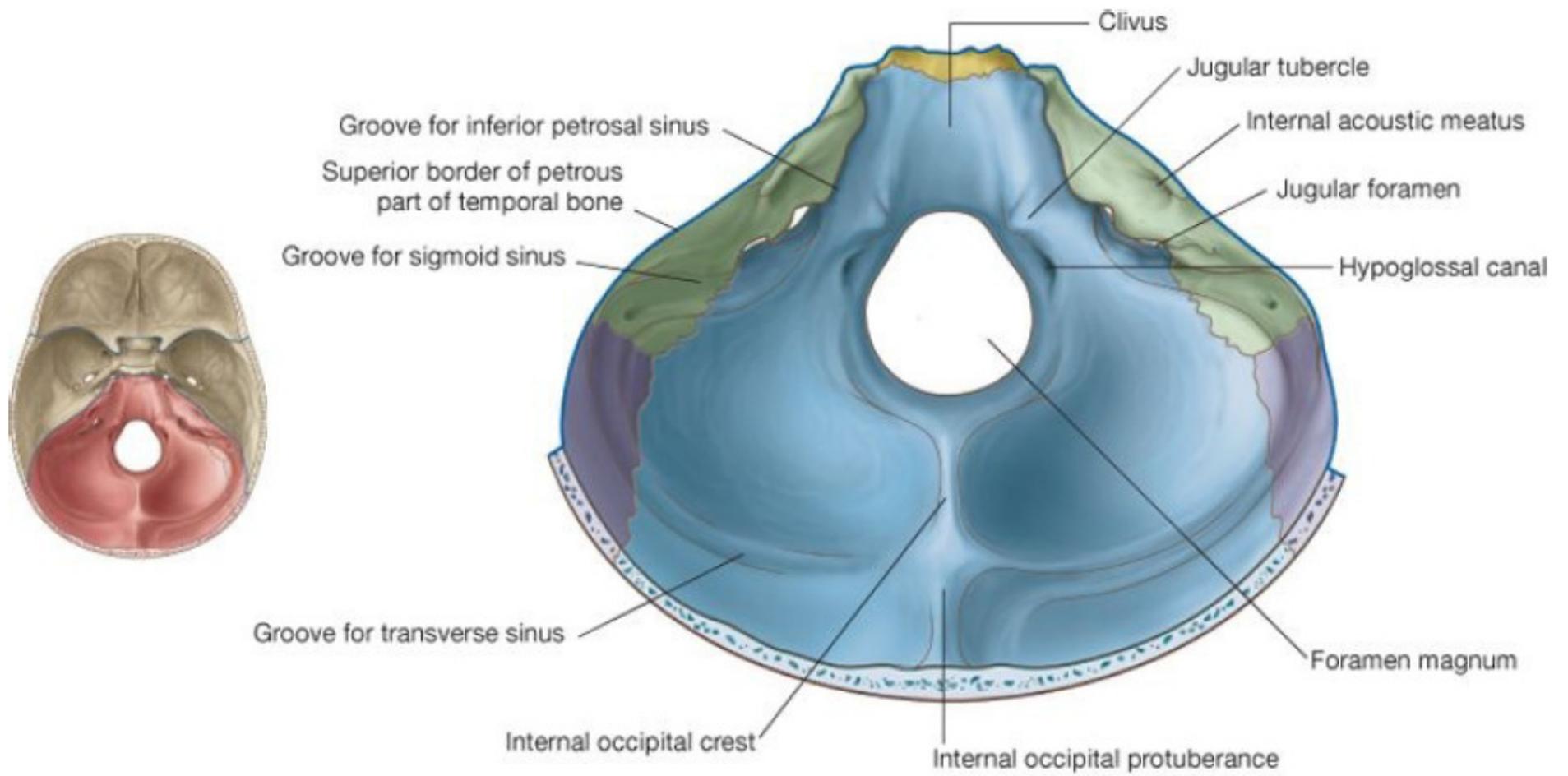
# Anterior cranial fossa

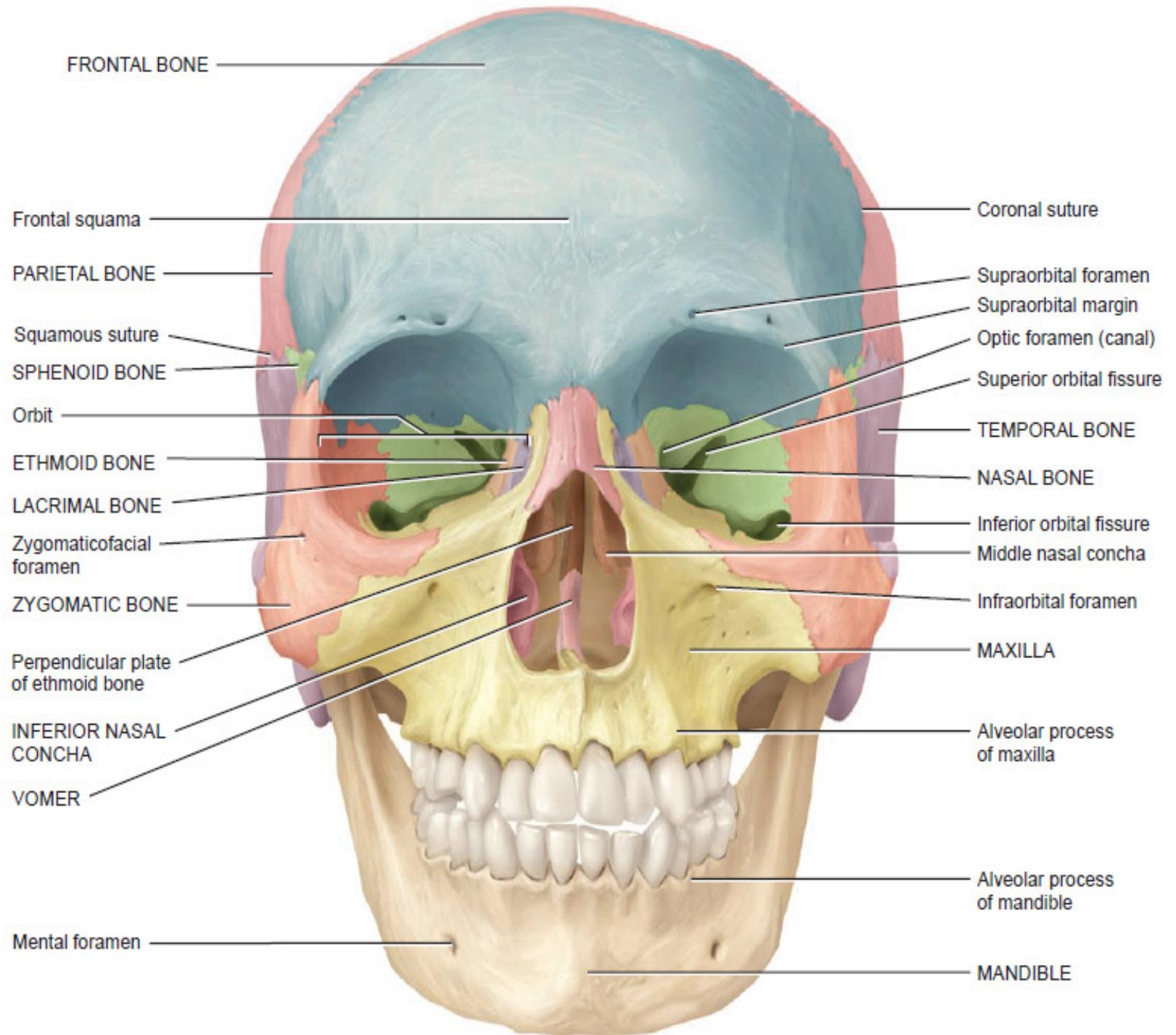


- **Crista galli:** falx cerebri
- **Anterior clinoid Process:** tentorium cerebelli

# Middle cranial fossa



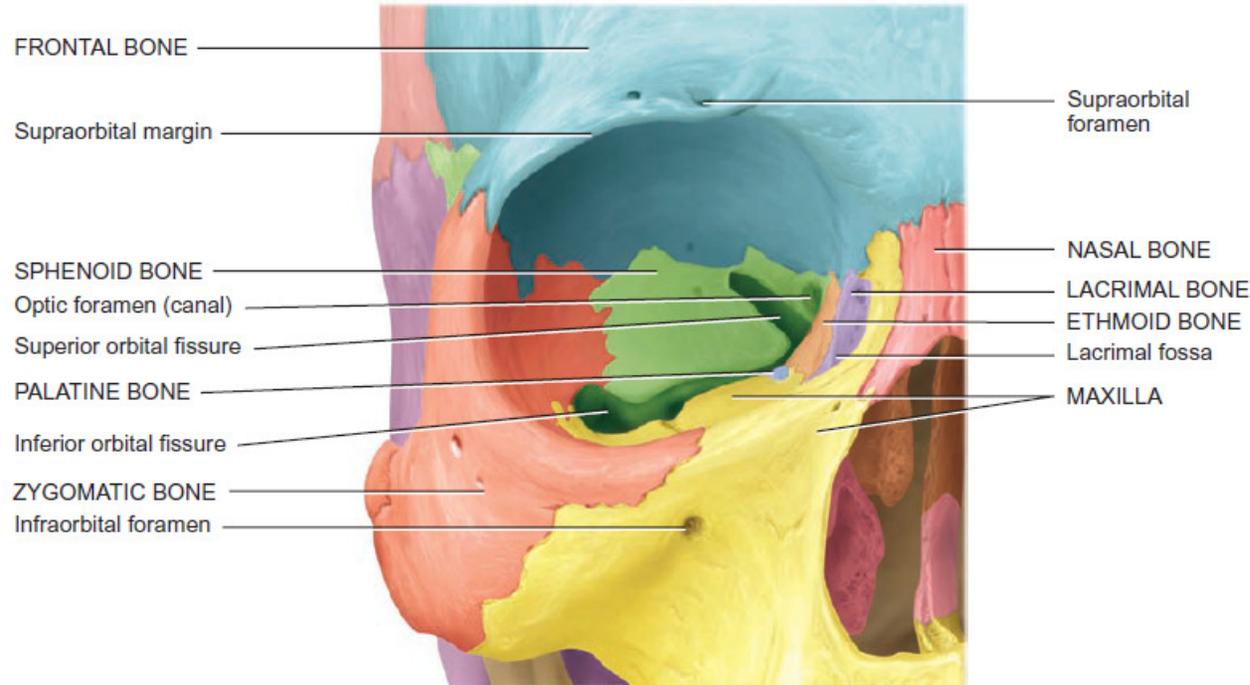


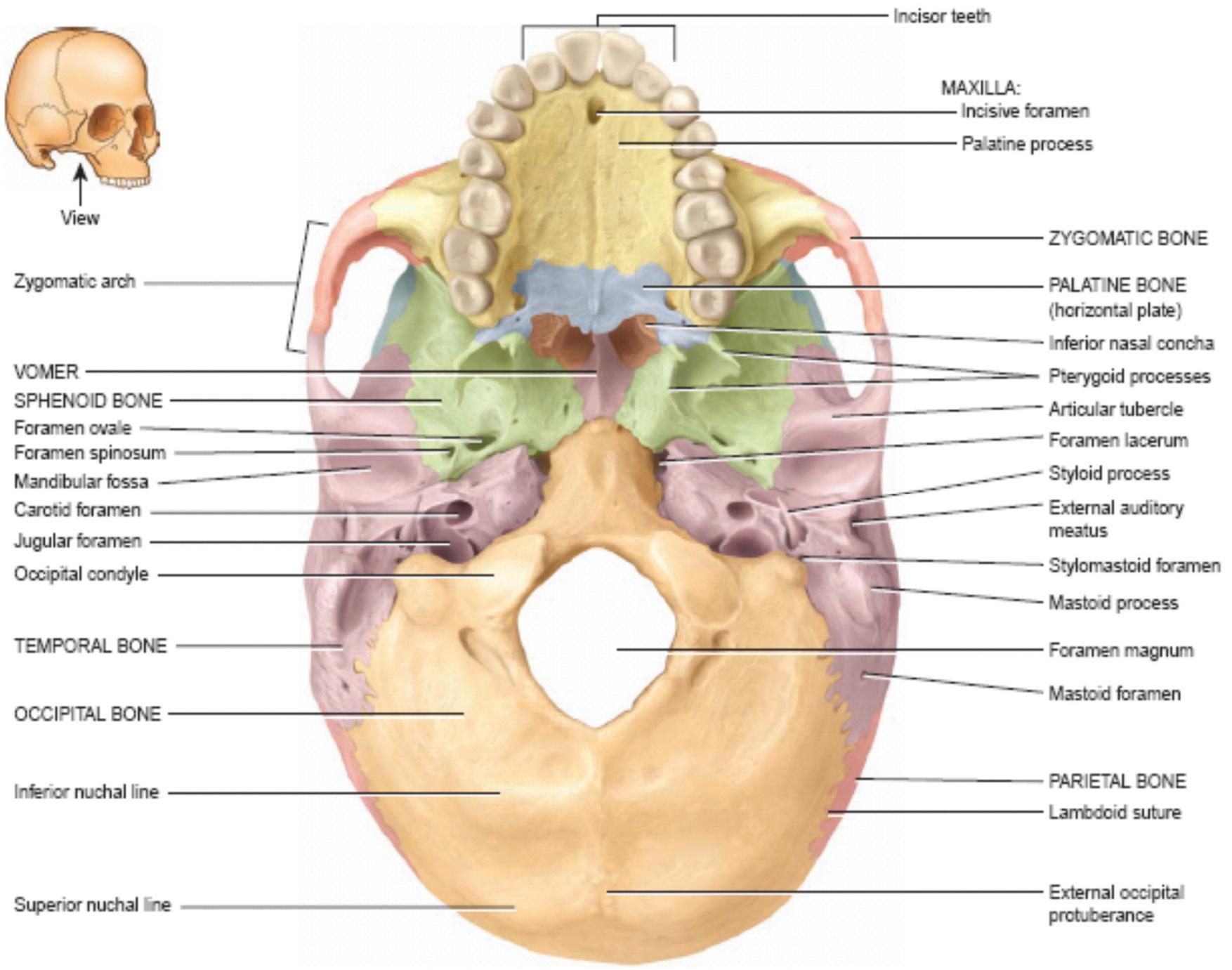
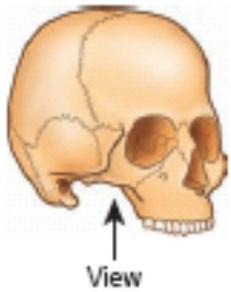


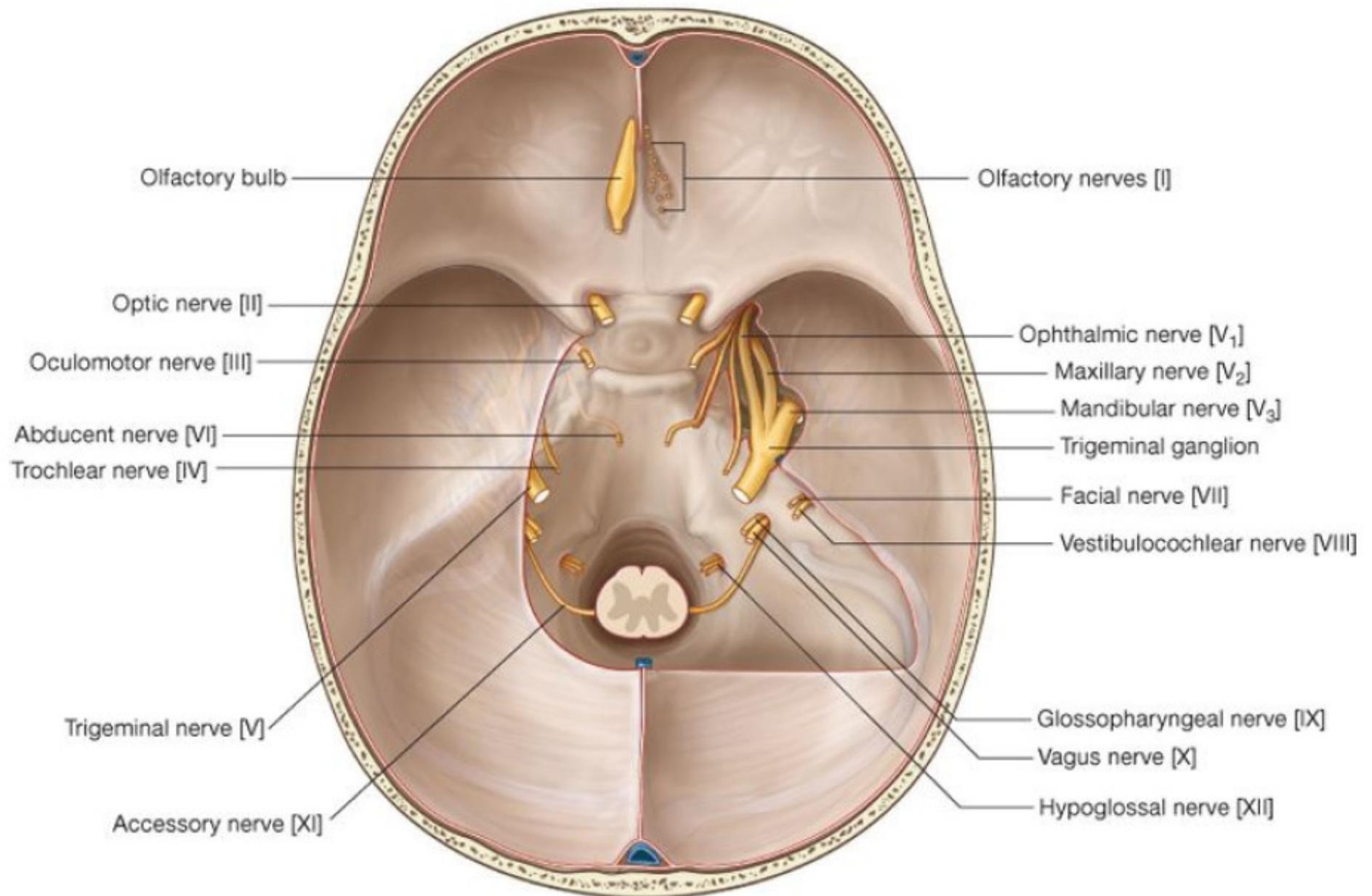
# orbit



- **1. Roof:** parts of the frontal and sphenoid bones
- **2. Lateral wall:** parts of the zygomatic and sphenoid bones
- **3. Floor:** parts of the maxilla, zygomatic, and palatine bones.
- **4. Medial wall:** parts of the maxilla, lacrimal, ethmoid, and sphenoid



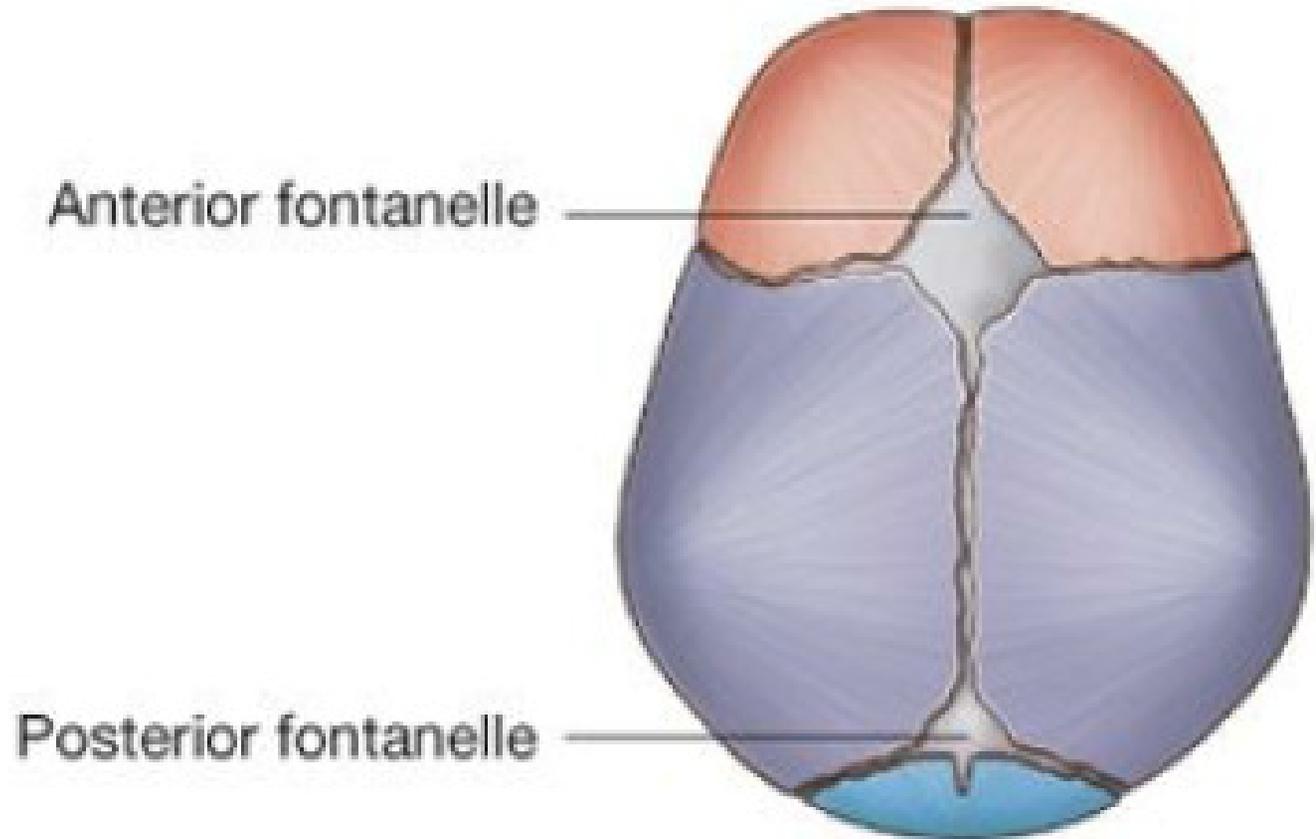




➤ ***Remember foramina from which cranial nerves exit the Skull***

# Neonatal Skull

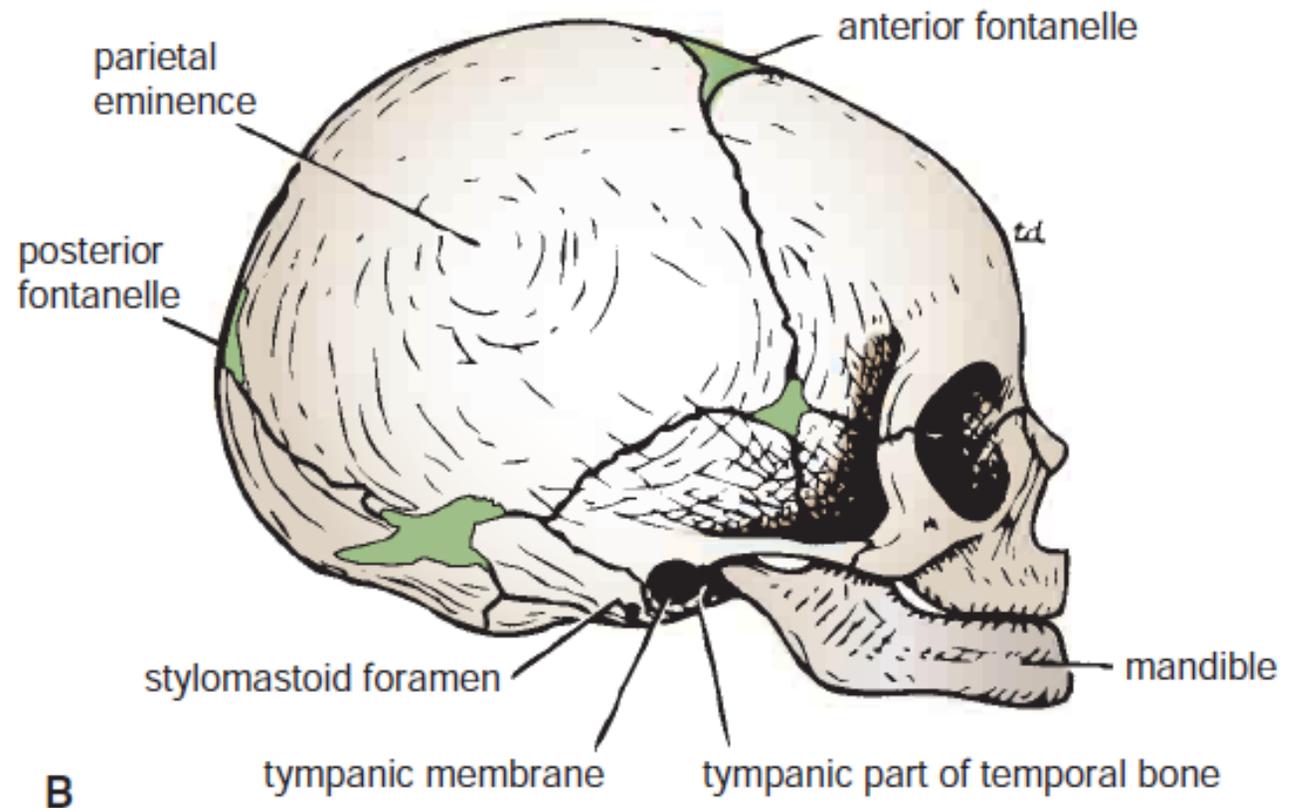
- **Fontanelles:**  
unossified  
membranous  
intervals
- **Anterior  
fontanelle:**  
(diamond)  
closed by 18  
months
- **Posterior  
fontanelle:**  
(triangular)  
closed by 12  
months
- Important  
clinically,  
*why?*



# Neonatal Skull

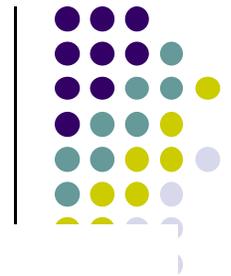


- Large cranium relative to the face
- No mastoid process
- Angle of the mandible is obtuse



➤ Facial nerve can be damaged by forceps in a difficult delivery. **Why?**

# Structure of Typical Vertebra

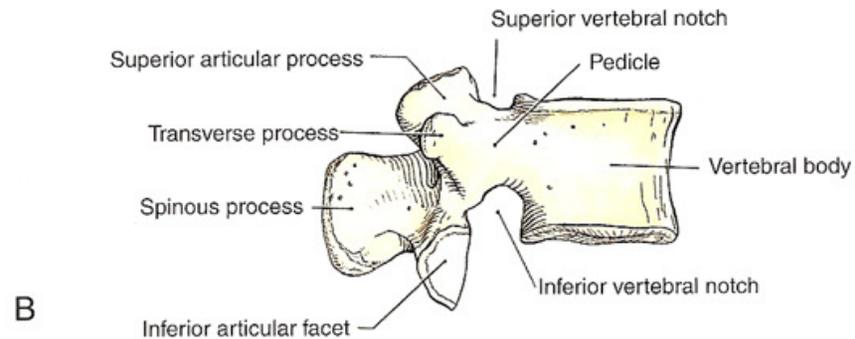
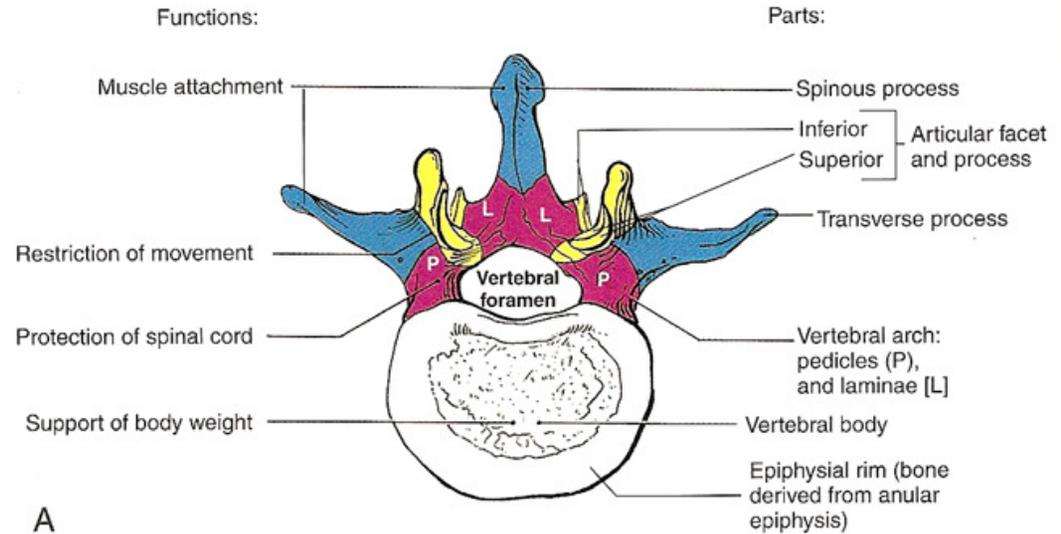


## Body

## Vertebral arch

(P & L)

## 7 processes



**Parts and functions of typical vertebra. A. Superior view. B. Lateral view.**

# Atlas (C1)

1<sup>st</sup> cervical V. (ring-like bone)

Named after **Greek** myth. *Atlas*

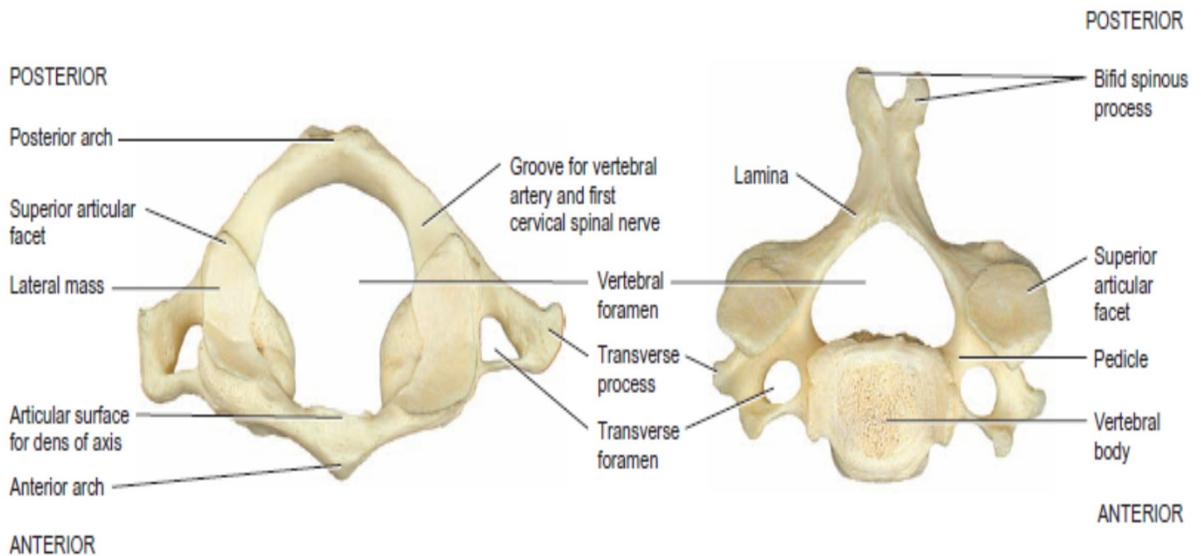
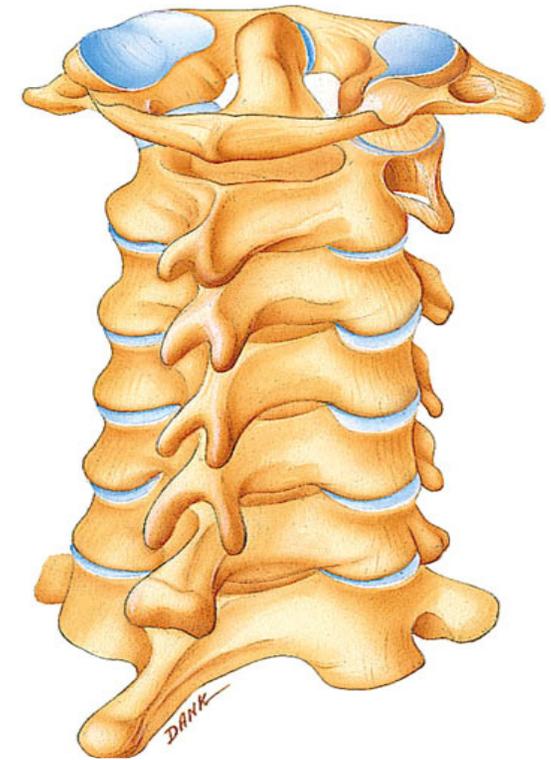
Communicates:

sup: skull (*atlanto occipital j.*)

inf: axis (*atlanto-axial j.*)

**Characteristics:**

1. no body
2. no spinous process
3. ant. & post. arches
4. 2 lateral masses
5. 2 transverse foramina



(b) Superior view of atlas (C1)

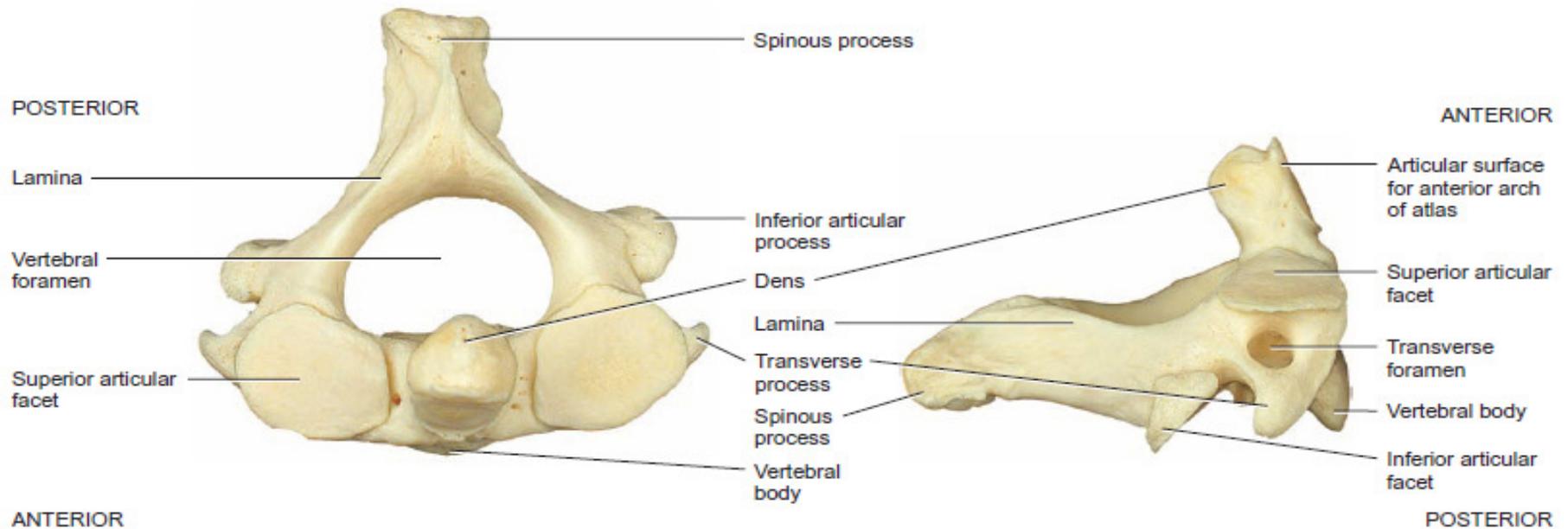
(c) Superior view of a typical cervical vertebra

# Axis (C2)

2<sup>nd</sup> cervical vertebra

\*Odontoid process (*dens= tooth*): binds to atlas at A-A joint

*\* Dens represents the body of atlas that has fused with body of axis*

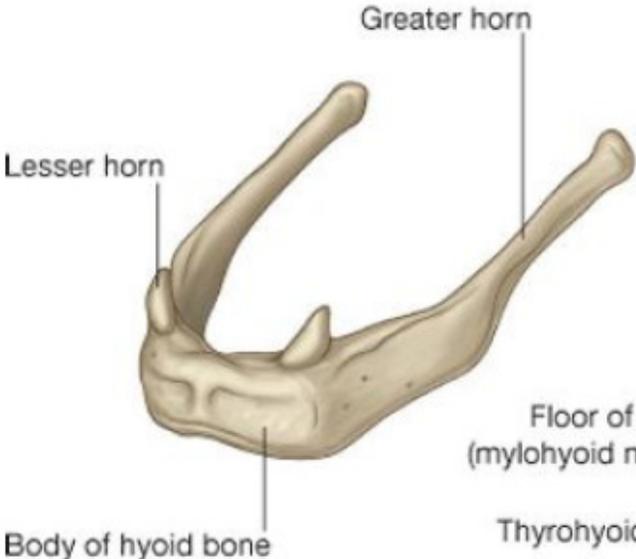


(d) Superior view of axis (C2)

(e) Right lateral view of axis (C2)

# Hyoid bone

A



B

