

In the name of GOD

Musculoskeletal system

For

medicine student

By

Dr. Saeednia

Anatomy Of Skeletal System

Head

Function of skeletal body

Form of body shape

Support of spinal cord, brain and viscera

Attachment of muscles

Ca^{2+} reservation

Immune system / blood cells formation

Bone

- Compact
- Spongy

Bone

- Membranous
- Chondral

Bone

- Primary (immature)
- Secondary (mature)

Bone

- Long
- Short
- flat
- Innominate
- Sesamoid

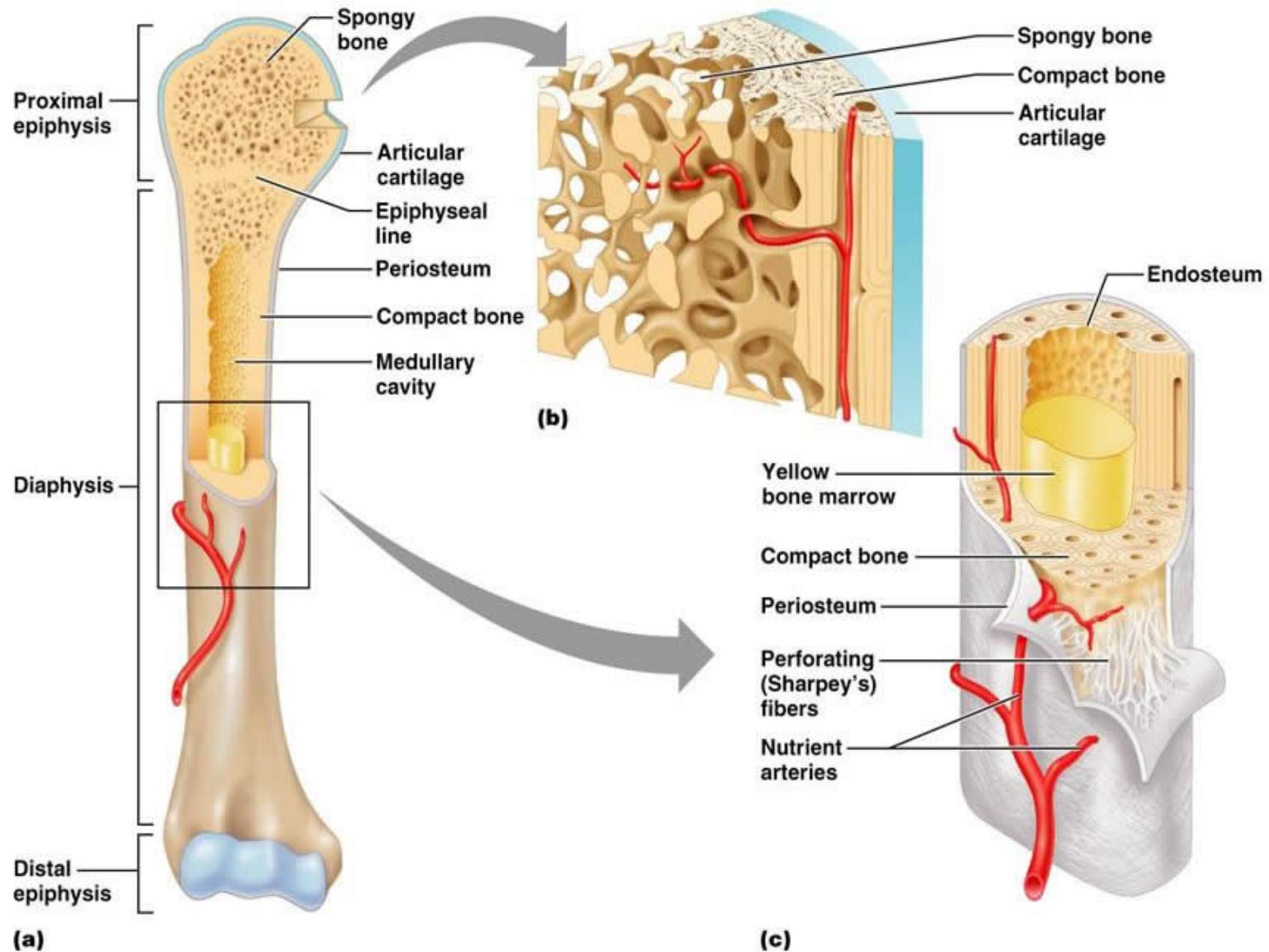
Bone

- Axial skeletal
- Appendicular skeletal

Bone tissue cells

- Osteoblast
- osteocyte
- Osteoclast

Compact And Spongy Bone



Classification by Growth & development

- ▶ **Membranous**

Mesenchymal origin

Face & calvaria

- ▶ **Cartilaginous**

Limb, vertebrate, ...

- ▶ **Membranous- Cartilaginous**

Sphenoid, clavicle, mandible



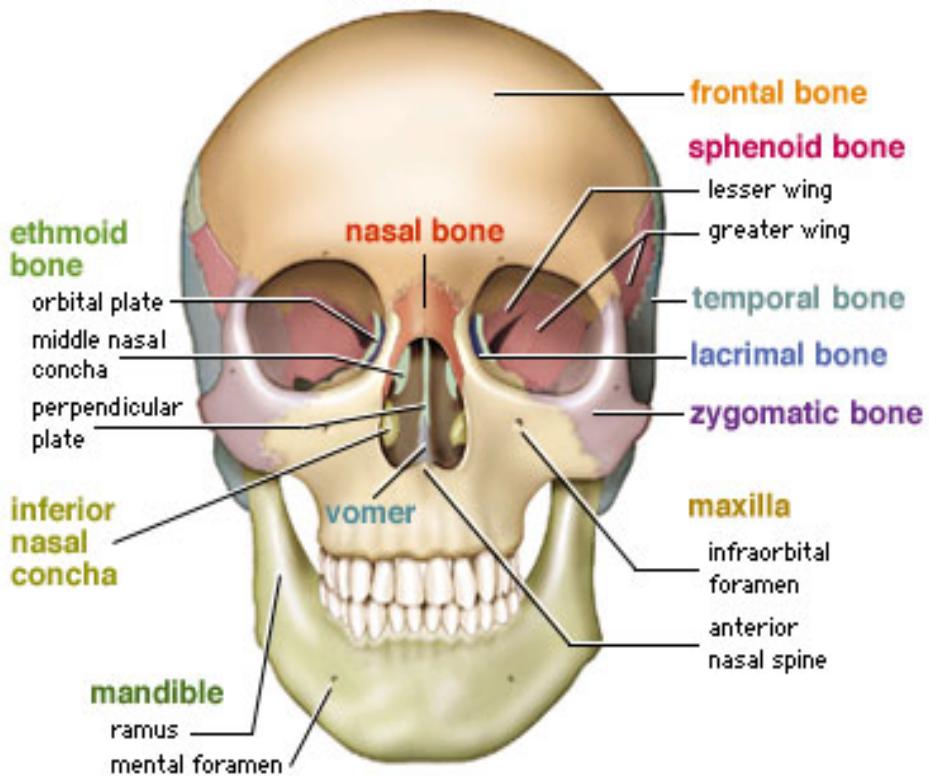
Classification By Position

Axial Skeleton

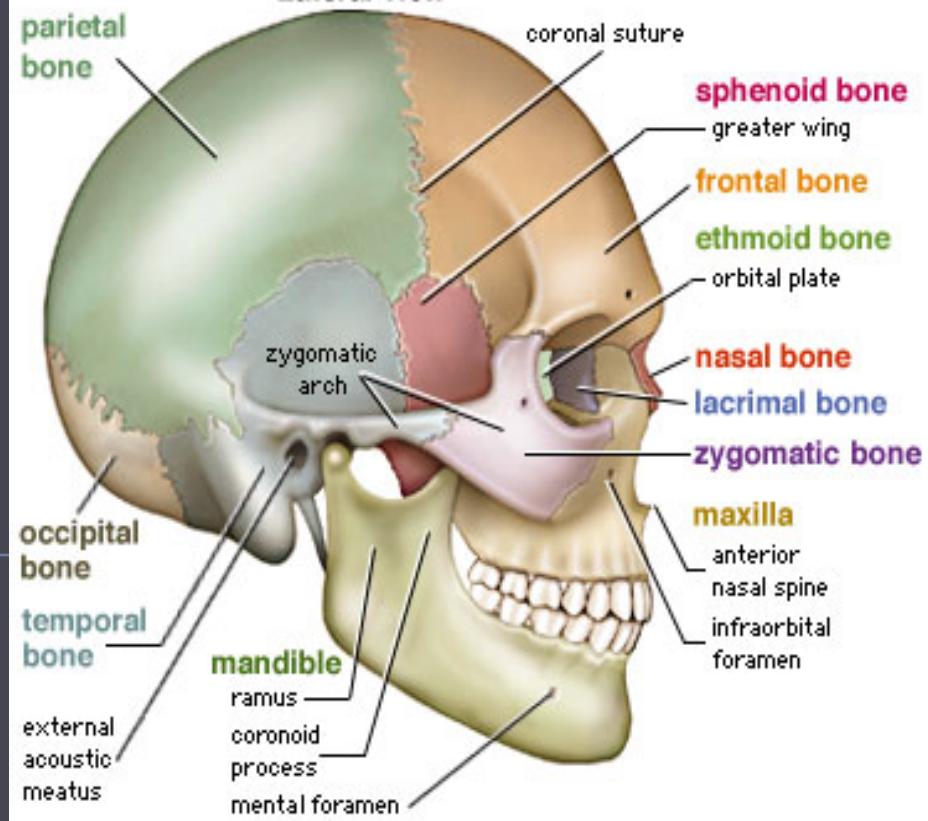
Appendicular



Frontal view



Lateral view



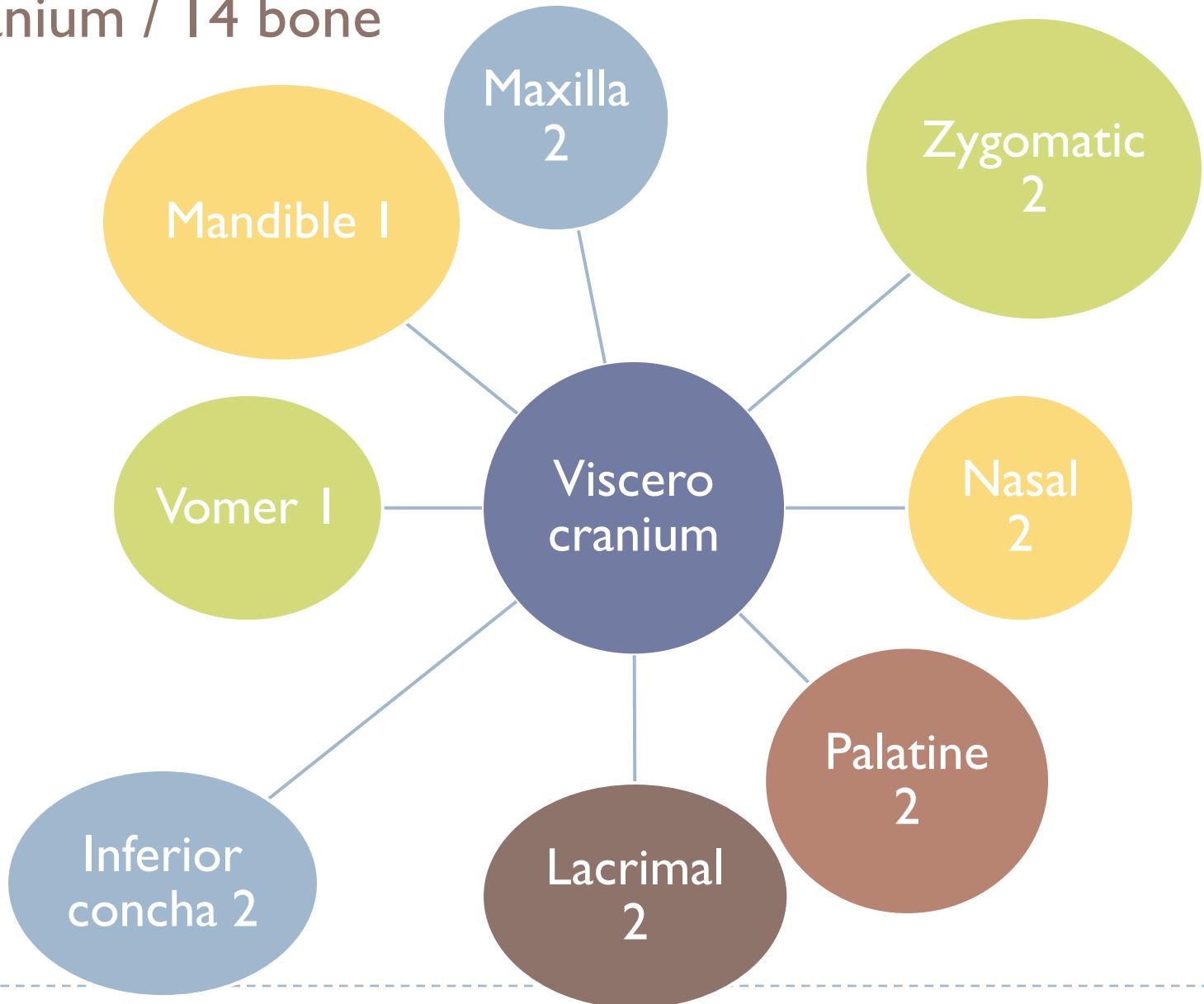
Skull Bone

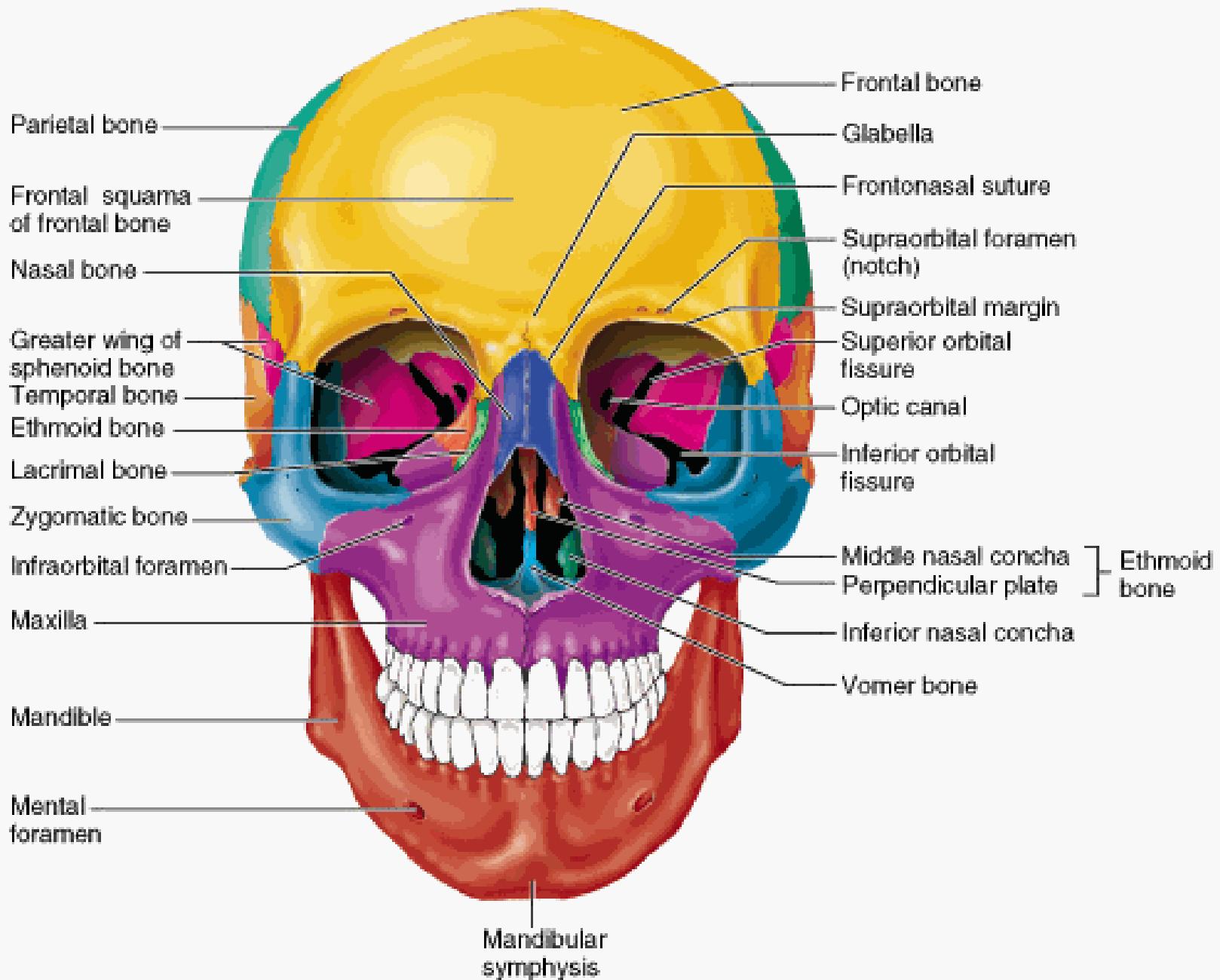
Viscerocranium = 14 bone

Neurocranium = 8 bone

Skull:

Viscero cranium / 14 bone

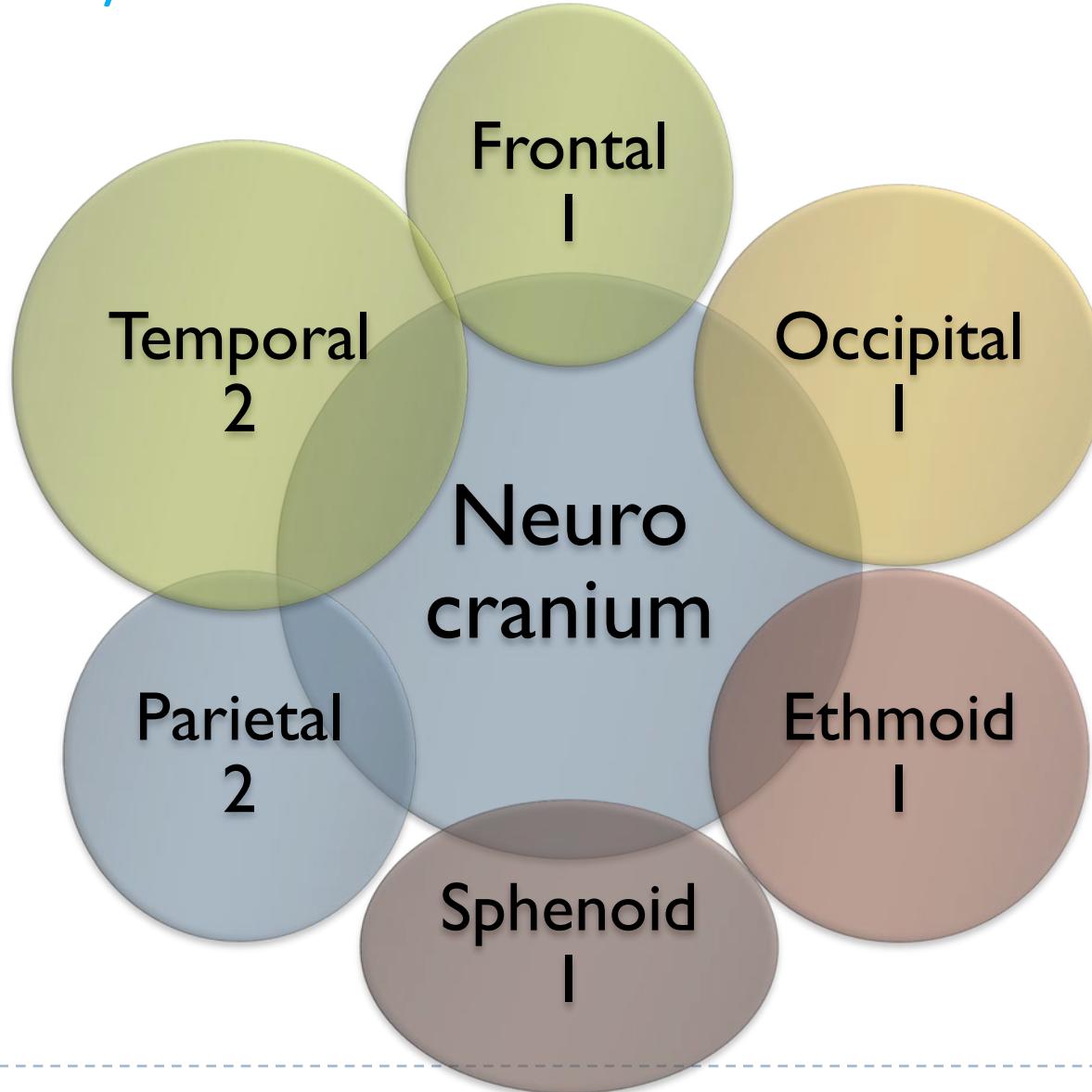


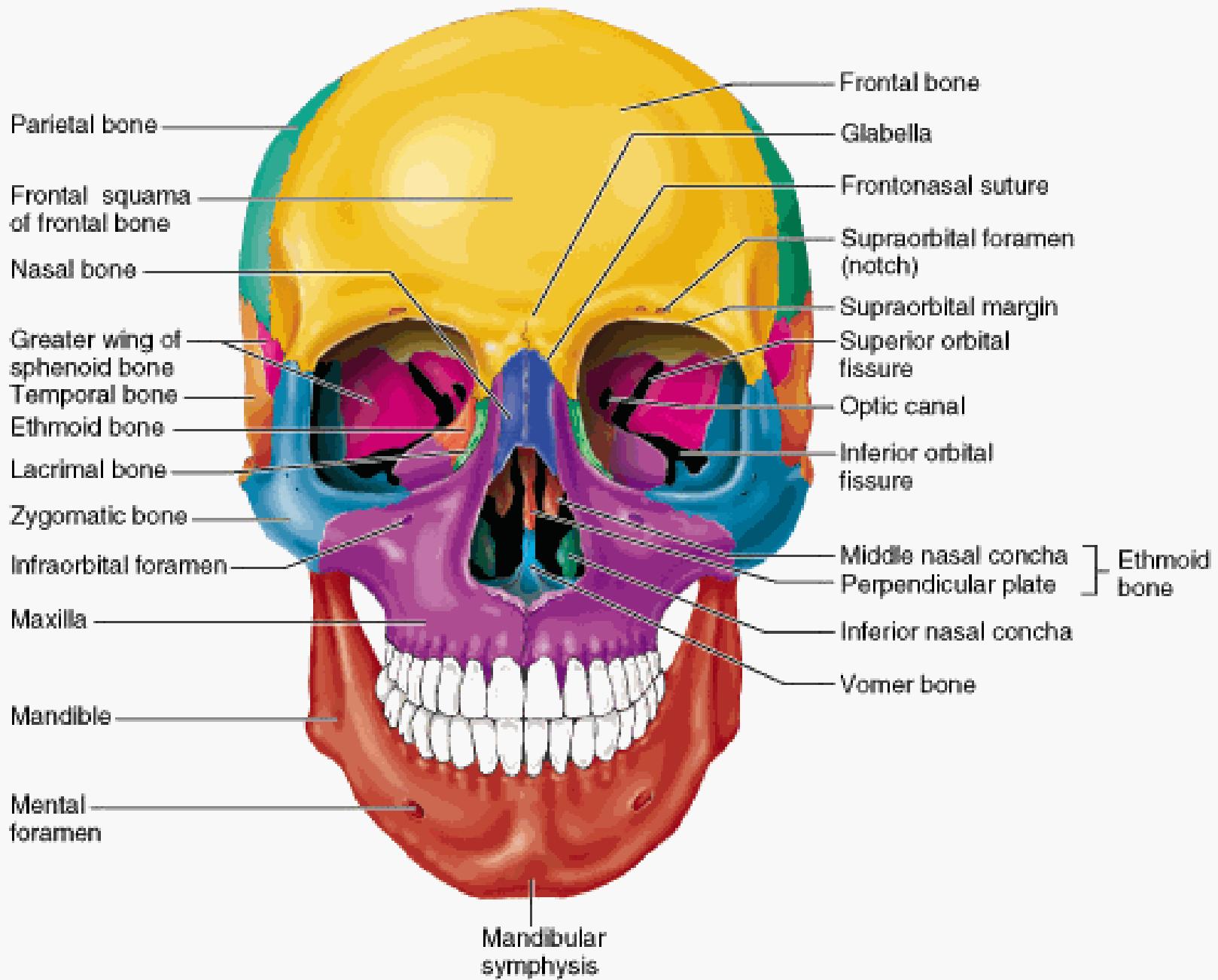


(a)

Skull:

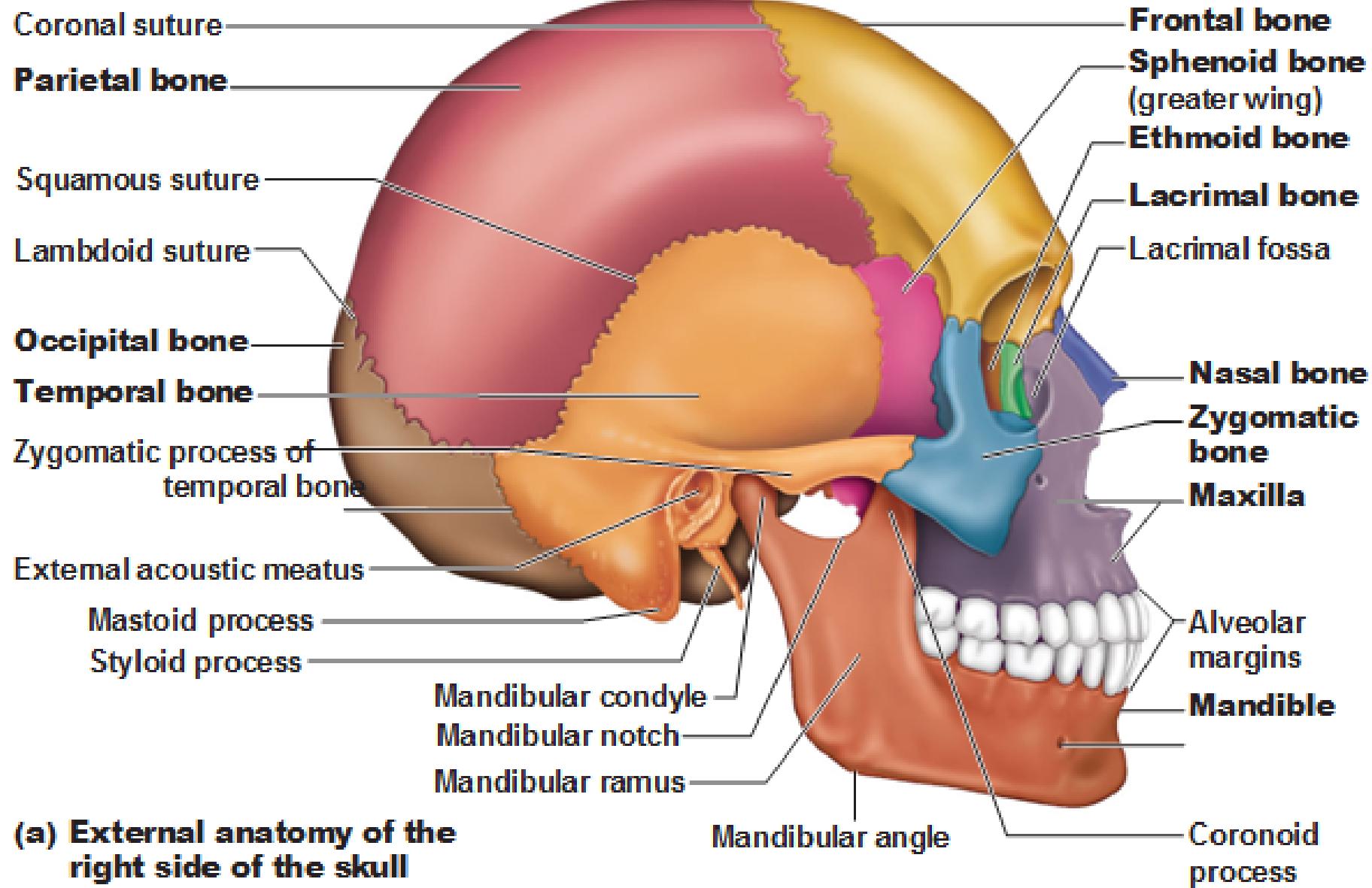
Neuro cranium/ 8 bone





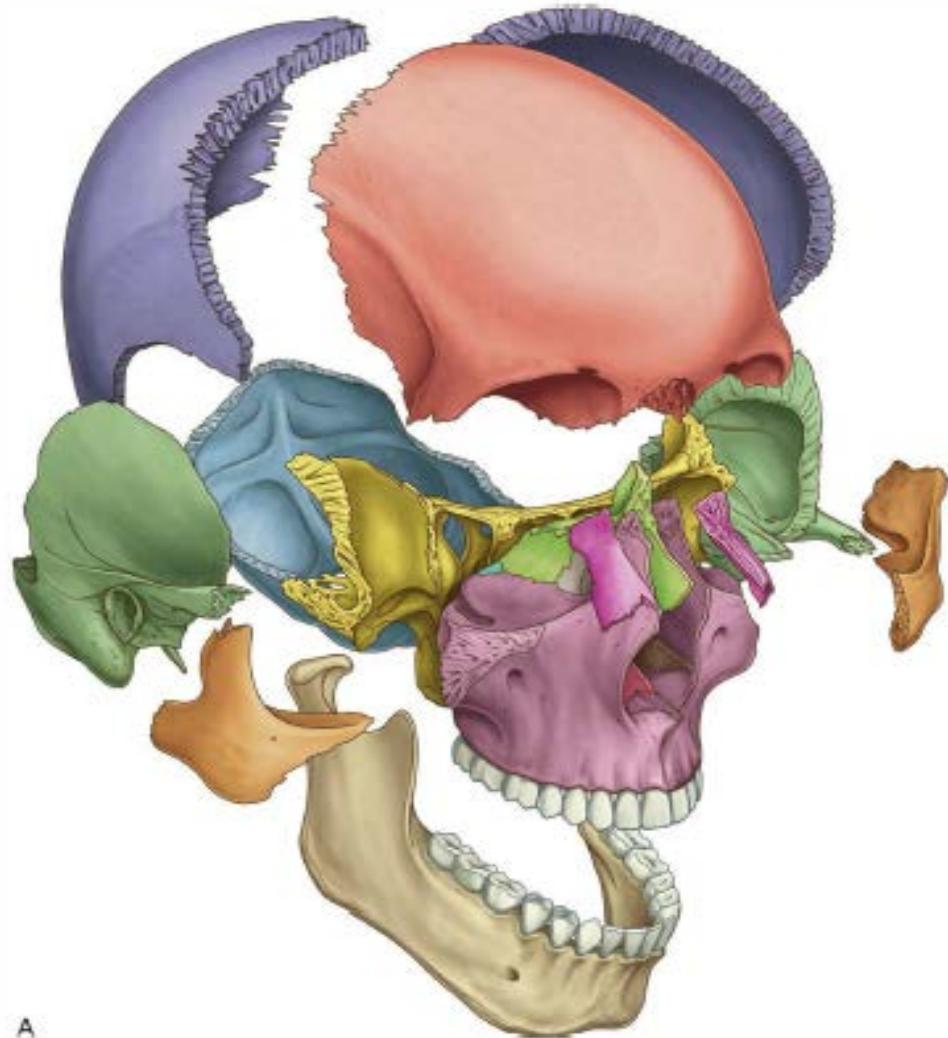
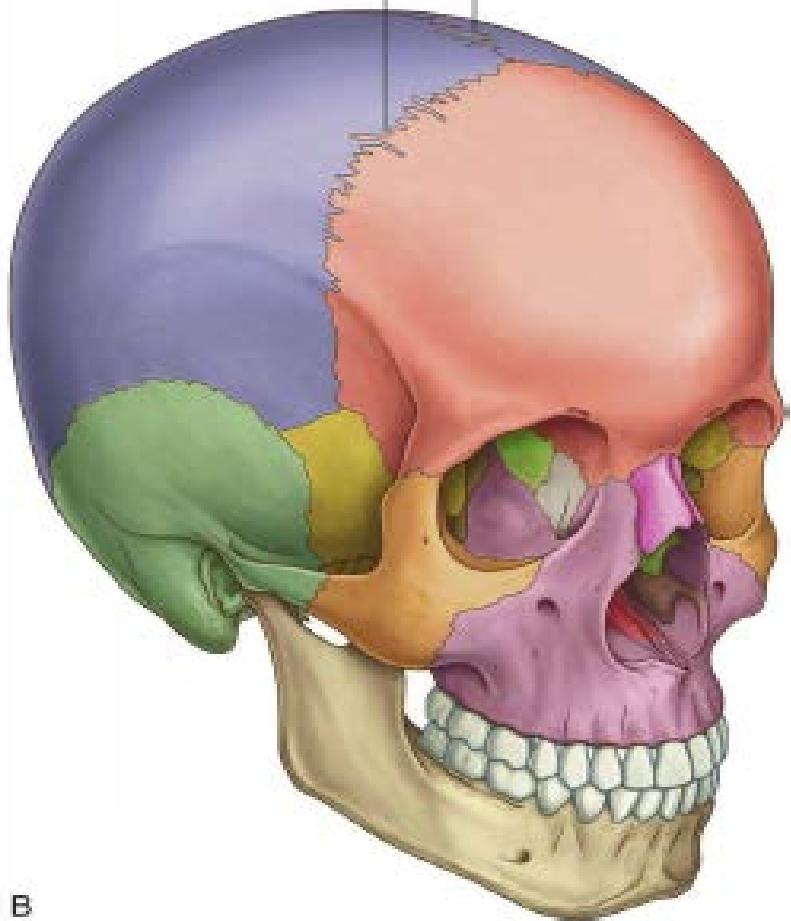
(a)

Skull – Lateral aspect



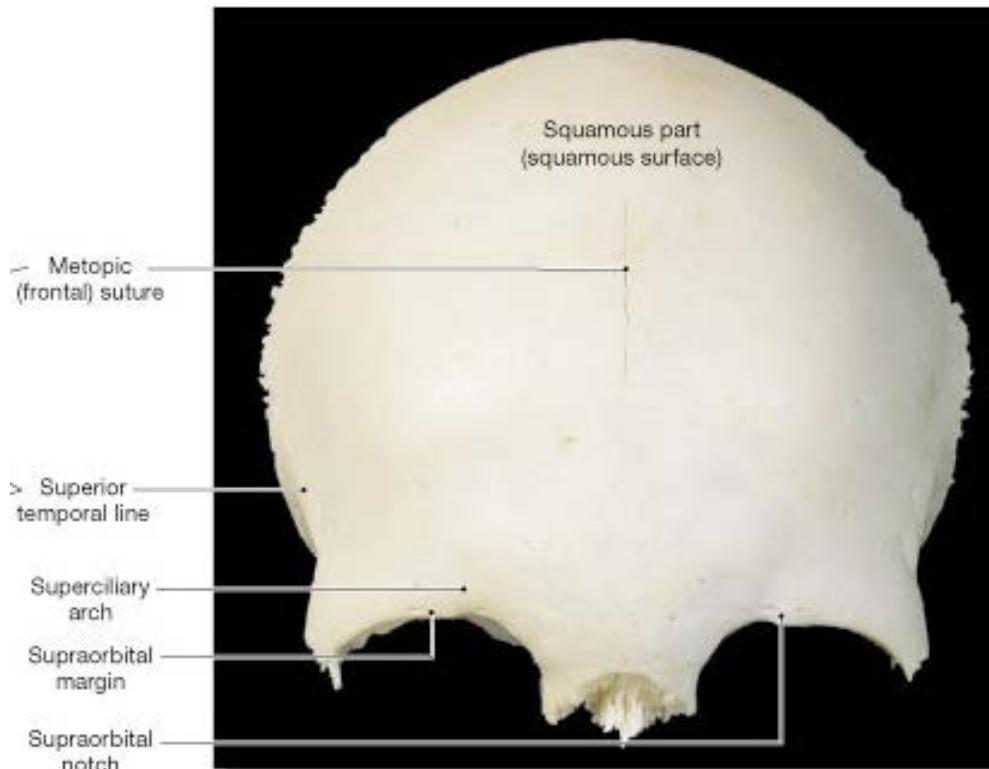
Coronal suture

Sagittal suture



Frontal:

- ❖ Vertical part
- ❖ Horizontal part
- ❖ Nasal part
- ❖ Borders: pos./ naso orbital
- ❖ Clinical point



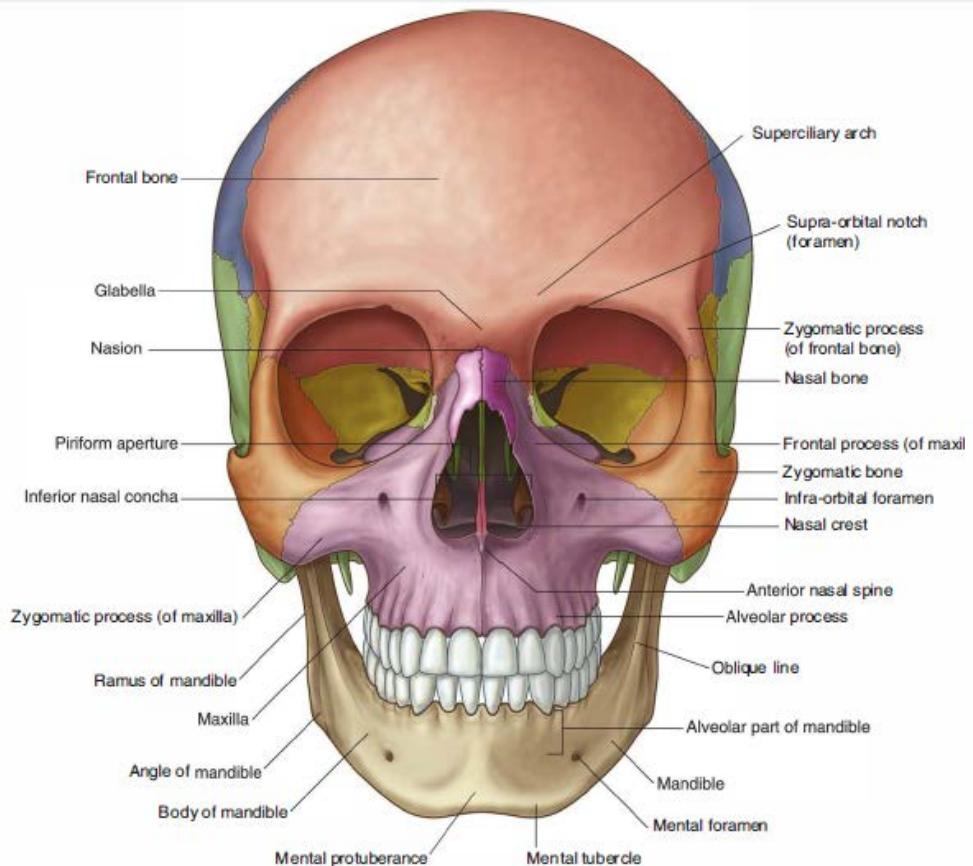


Fig. 8.18 Anterior view of the skull.

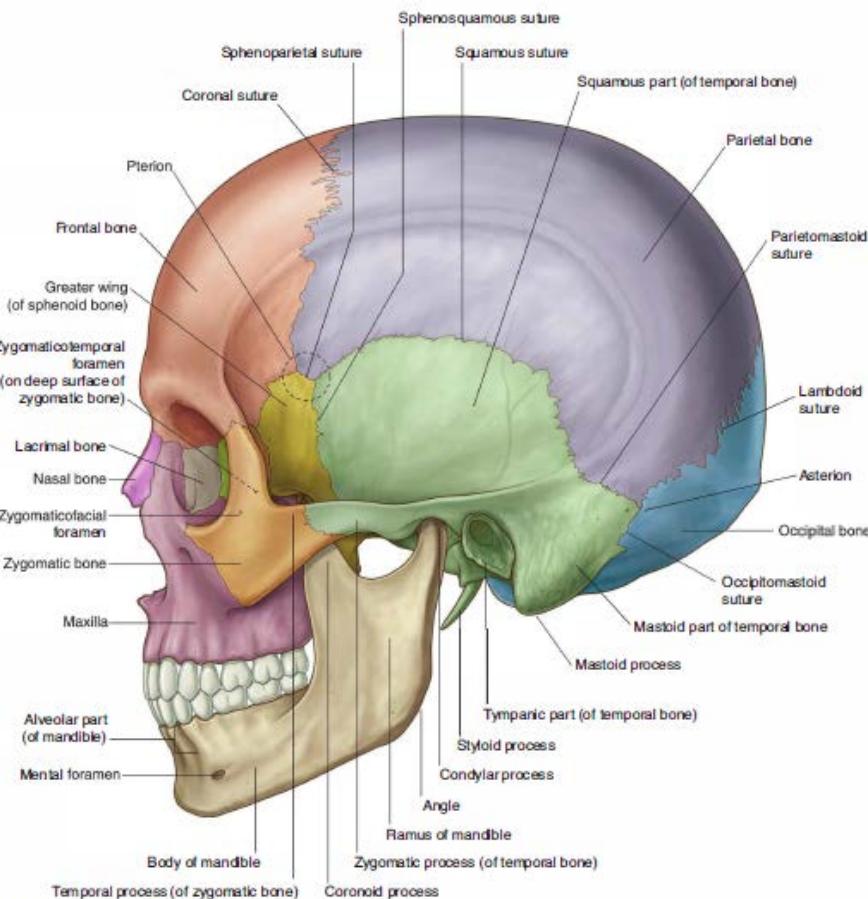
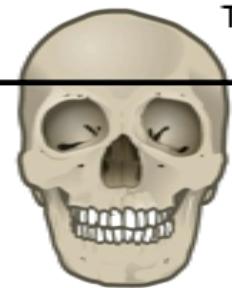
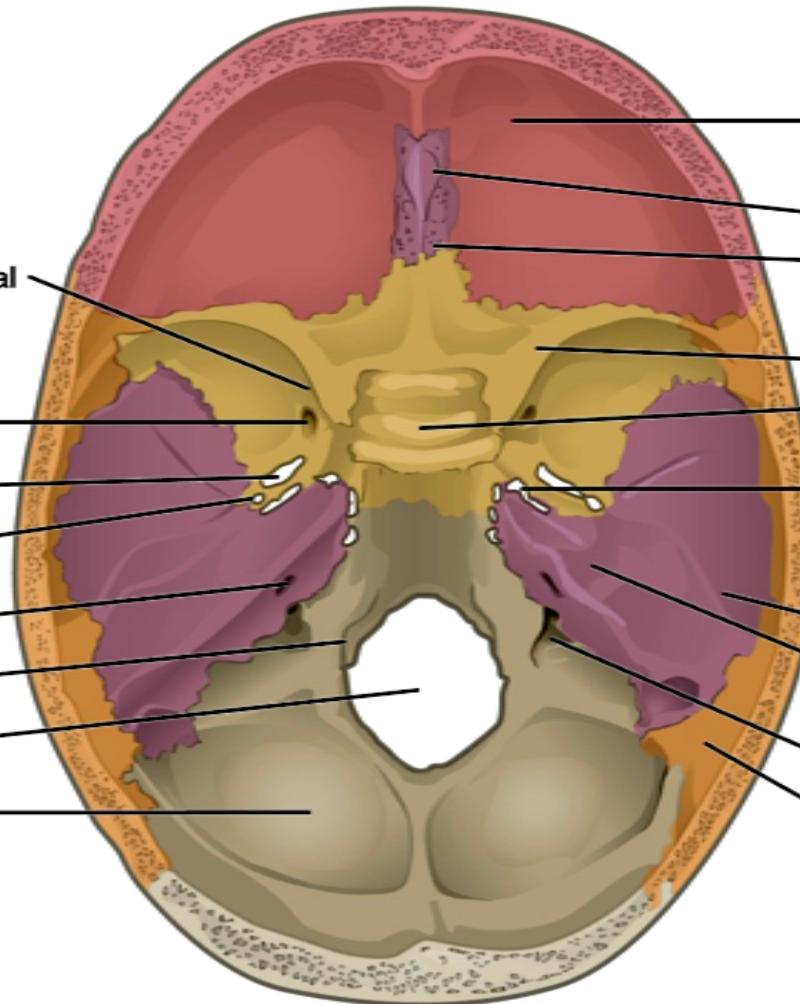


Fig. 8.19 Lateral view of the skull.

View
↓



Transverse plane



Foramen rotundum

Foramen ovale

Foramen spinosum

Internal acoustic meatus

Hypoglossal canal

Foramen magnum

Occipital bone

Frontal bone
Ethmoid bone:
Crista galli
Cribriform plate

Sphenoid bone:

Lesser wing
Hypophyseal fossa

Sella turcica

Foramen lacerum
and exit of carotid canal

Temporal bone

Petrosus portion
(petrous ridge)

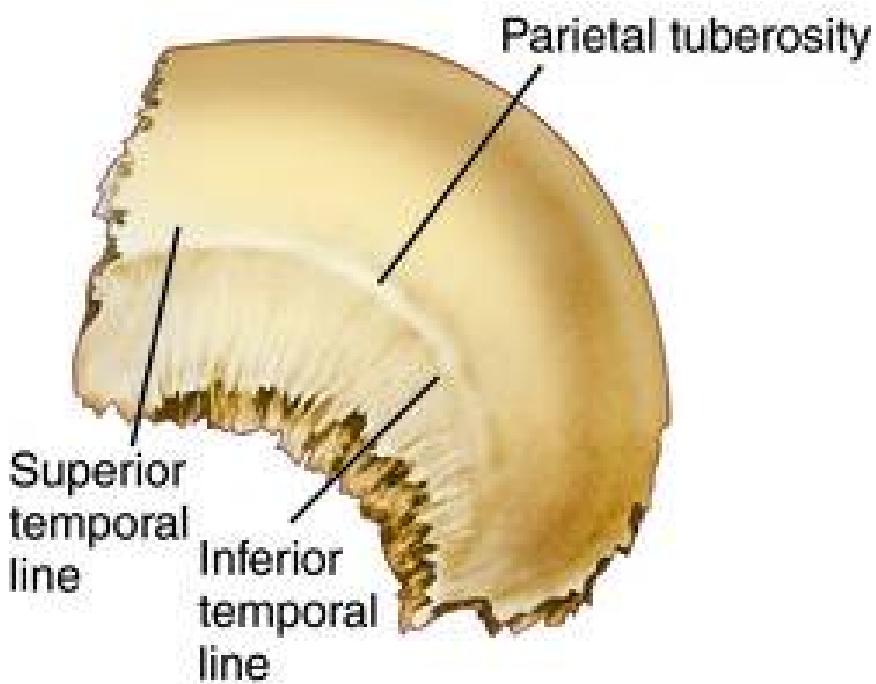
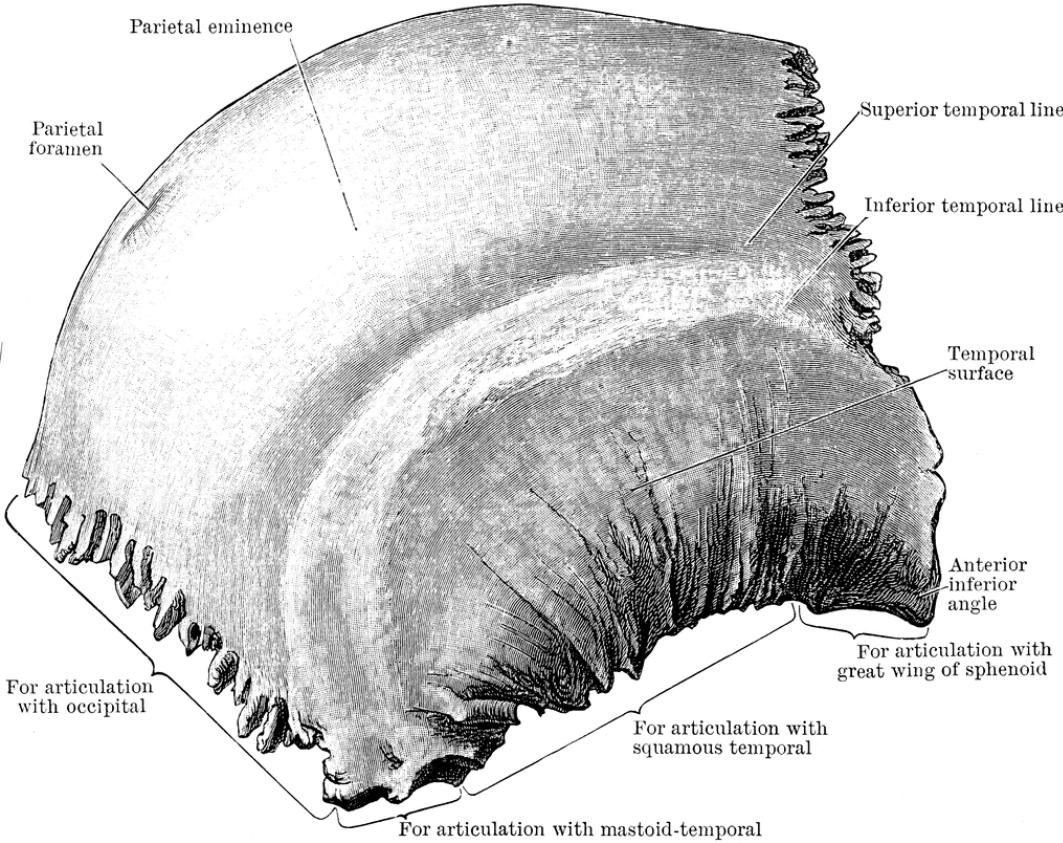
Jugular foramen

Parietal bone

(b) Superior view

Parietal:

- External/ internal surface
- Borders
- Angles



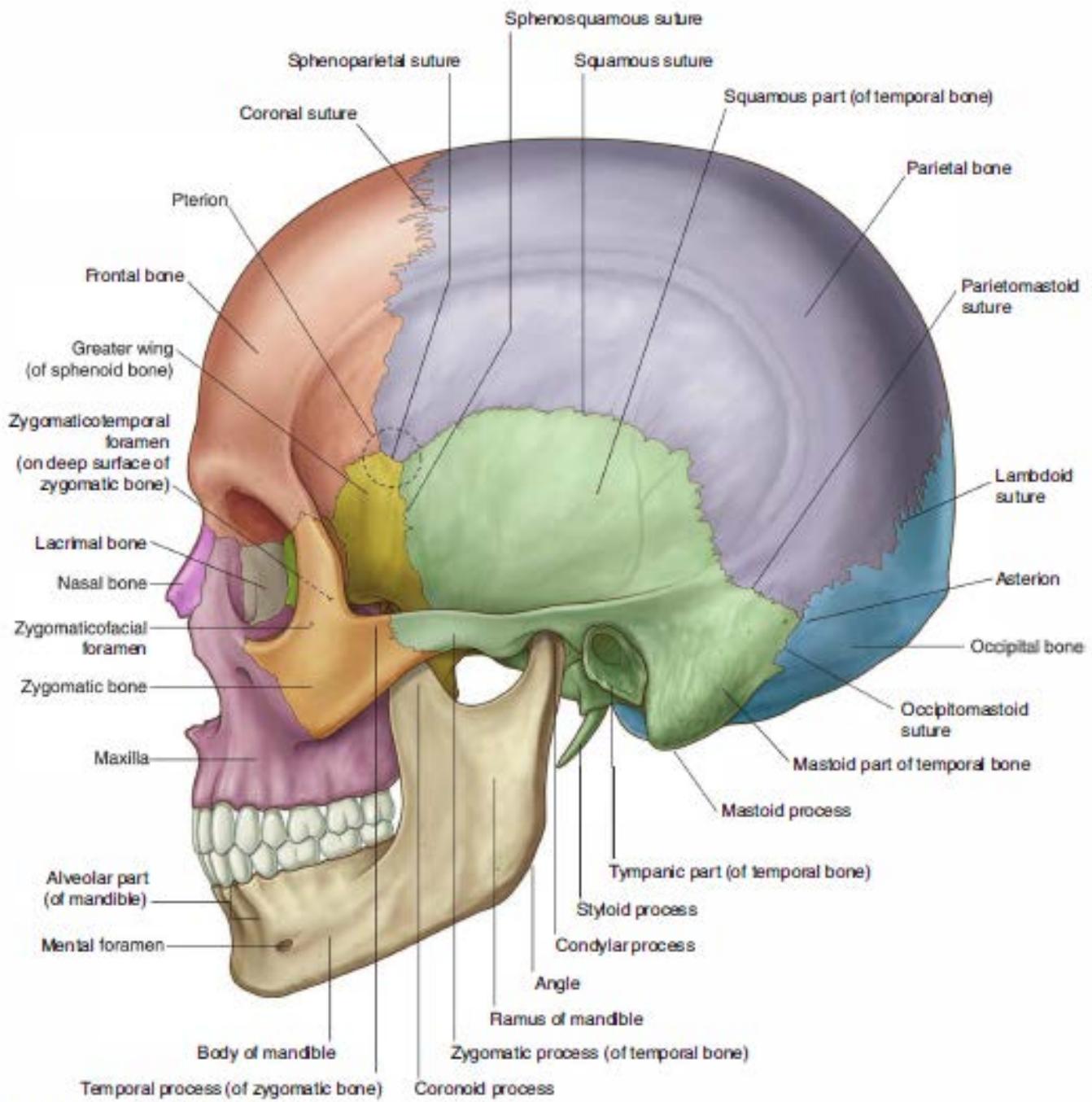
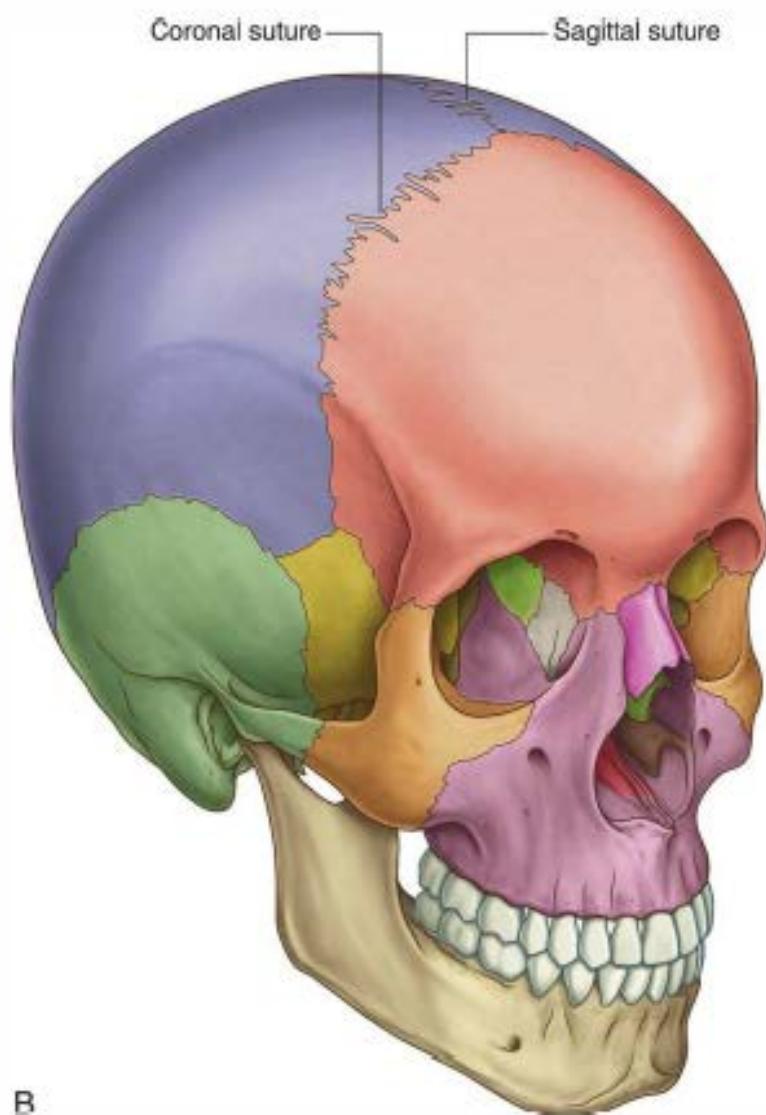
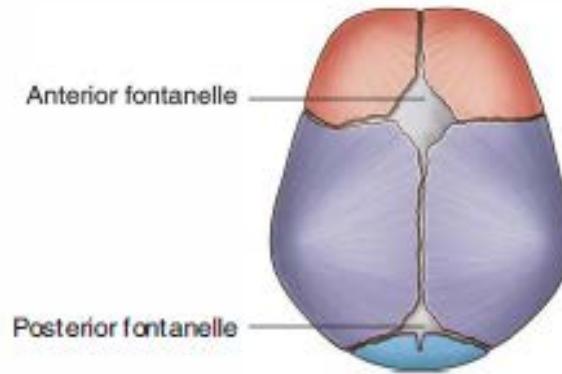
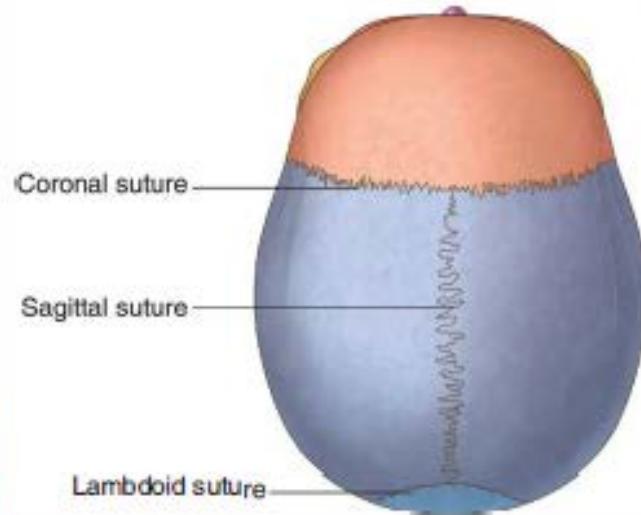


Fig. 8.19 Lateral view of the skull.



B

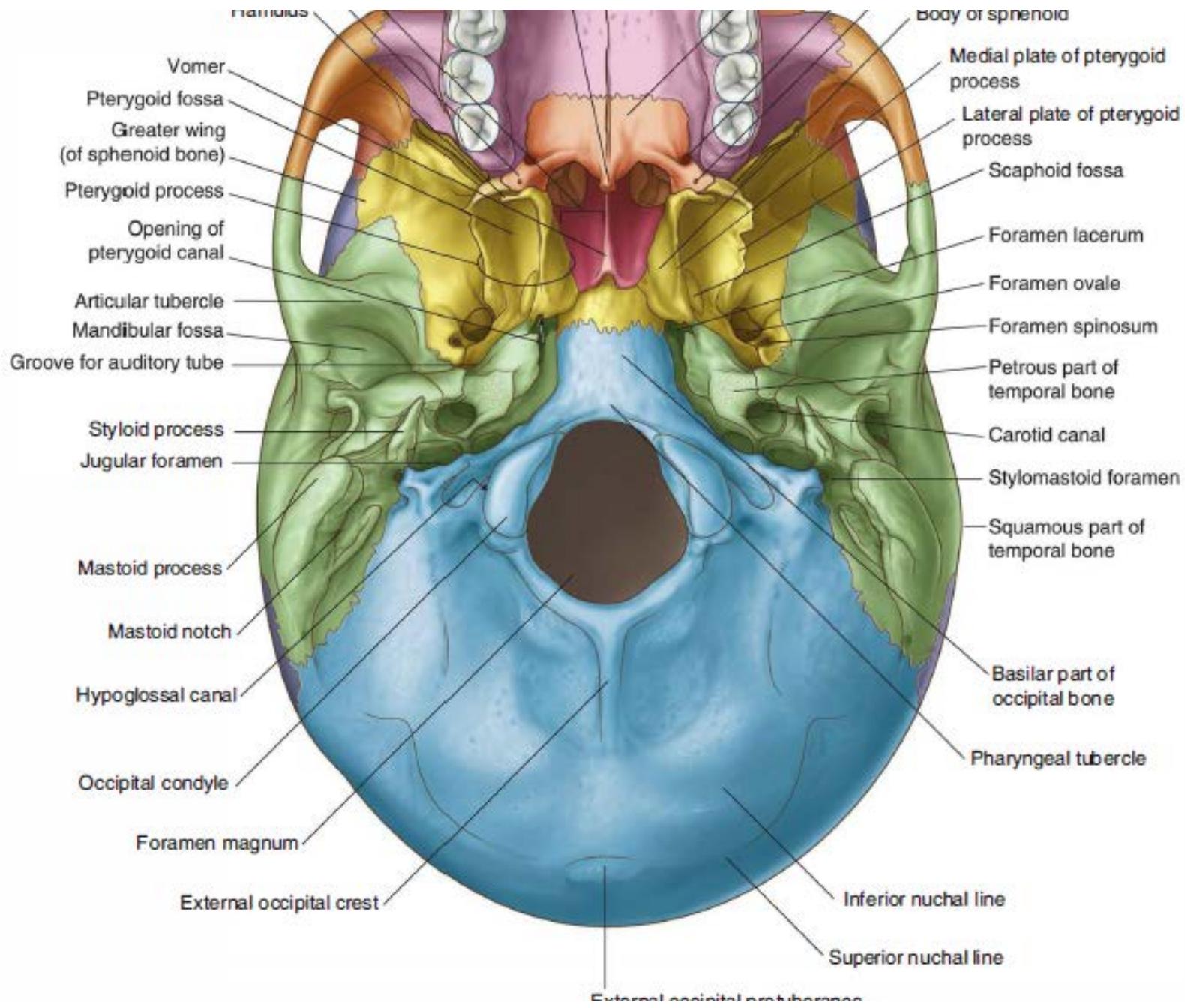


C

Fig. 8.7, cont'd Skull. **B.** Sutures. **C.** Fontanelles and lambdoid suture.

Occipital:

- ✓ Vertical part
 - ✓ (surfaces/ borders/ angles/ internal & external occipital protuberance & crest/ sagittal & transverse sinus/ sup. & inf. Occipital fossa)
 - ✓ Basilar part
(surfaces/ borders)
 - ✓ Lateral part
(surfaces/ borders/
hypoglossal canal/
condylar fossa/
jugular tubercle)
 - ✓ Foramen magnum
-
- The diagram illustrates the lateral aspect of the human skull, focusing on the occipital bone. The occipital bone is shown in purple, while the parietal bones are in blue. The lambdoid suture is visible where the parietal and occipital bones meet. The external occipital protuberance is a prominent bump on the back of the head. The mastoid process is a large, irregularly shaped projection from the side of the bone. The mastoid notch is a depression just above the mastoid process. The inferior nuchal line is a thickened ridge along the lower border of the bone. The superior nuchal line is a similar ridge located higher up. The inion is the highest point of the bone. The occipitomastoid suture is the suture line between the occipital bone and the mastoid process. The sagittal suture is the suture line running vertically through the middle of the bone. The sutural bone is a small, irregularly shaped piece of bone. The squamous part of the occipital bone is the flat, triangular area at the bottom of the bone.
- Sagittal suture
- Sutural bone
- Parietal bone
- Parietal bone
- Lambdoid suture
- External occipital protuberance
- Mastoid notch
- Mastoid process
- Inferior nuchal line
- Superior nuchal line
- External occipital crest
- Inion
- Squamous part of occipital bone
- Occipitomastoid suture



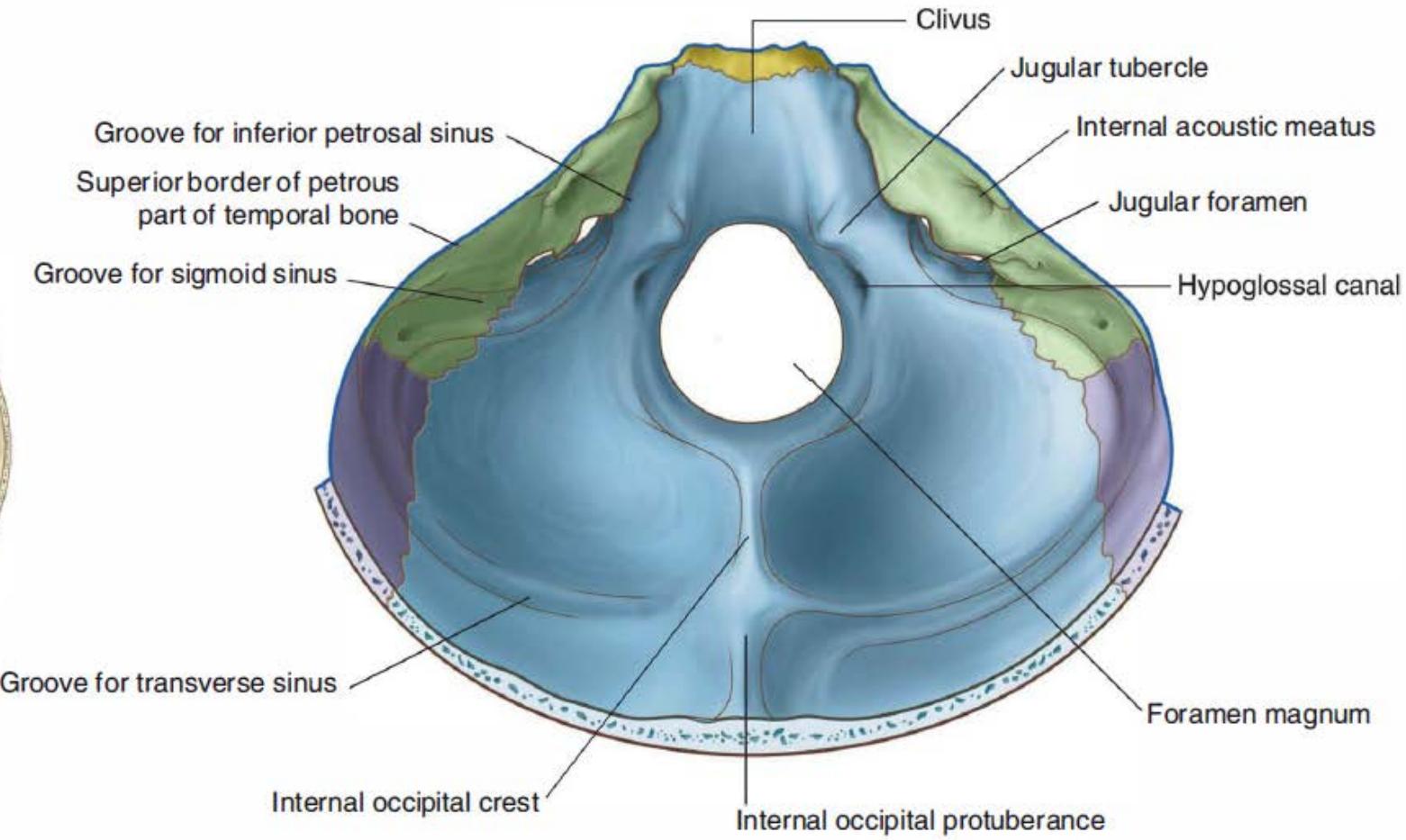
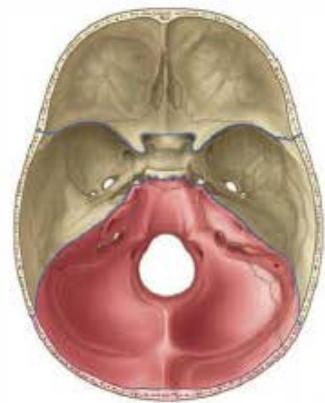
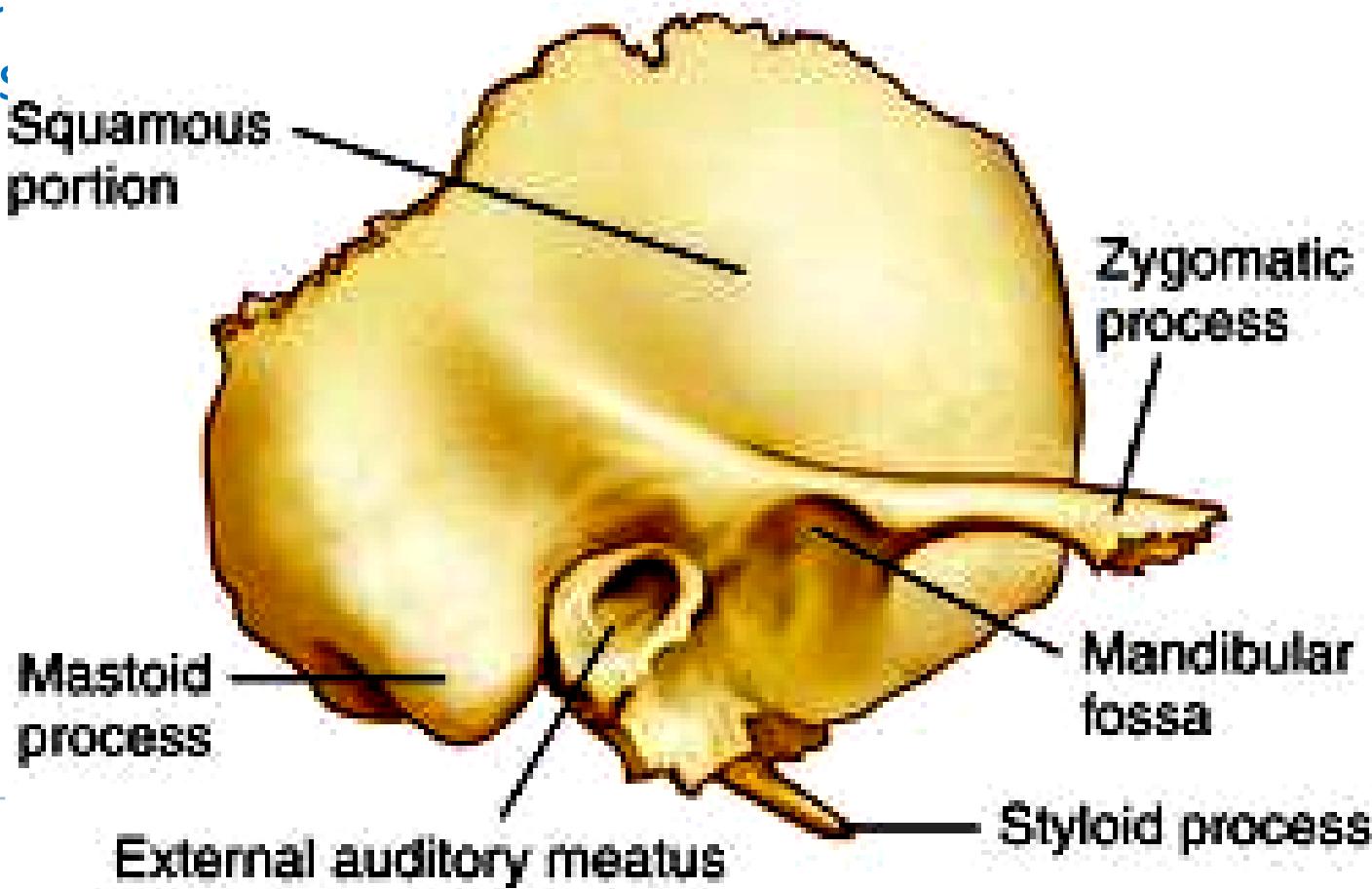


Fig. 8.27 Posterior cranial fossa.

Temporal:

- Squamous part
- Petrous part
- Mastoid part
- Tympanic part
- Styloid process



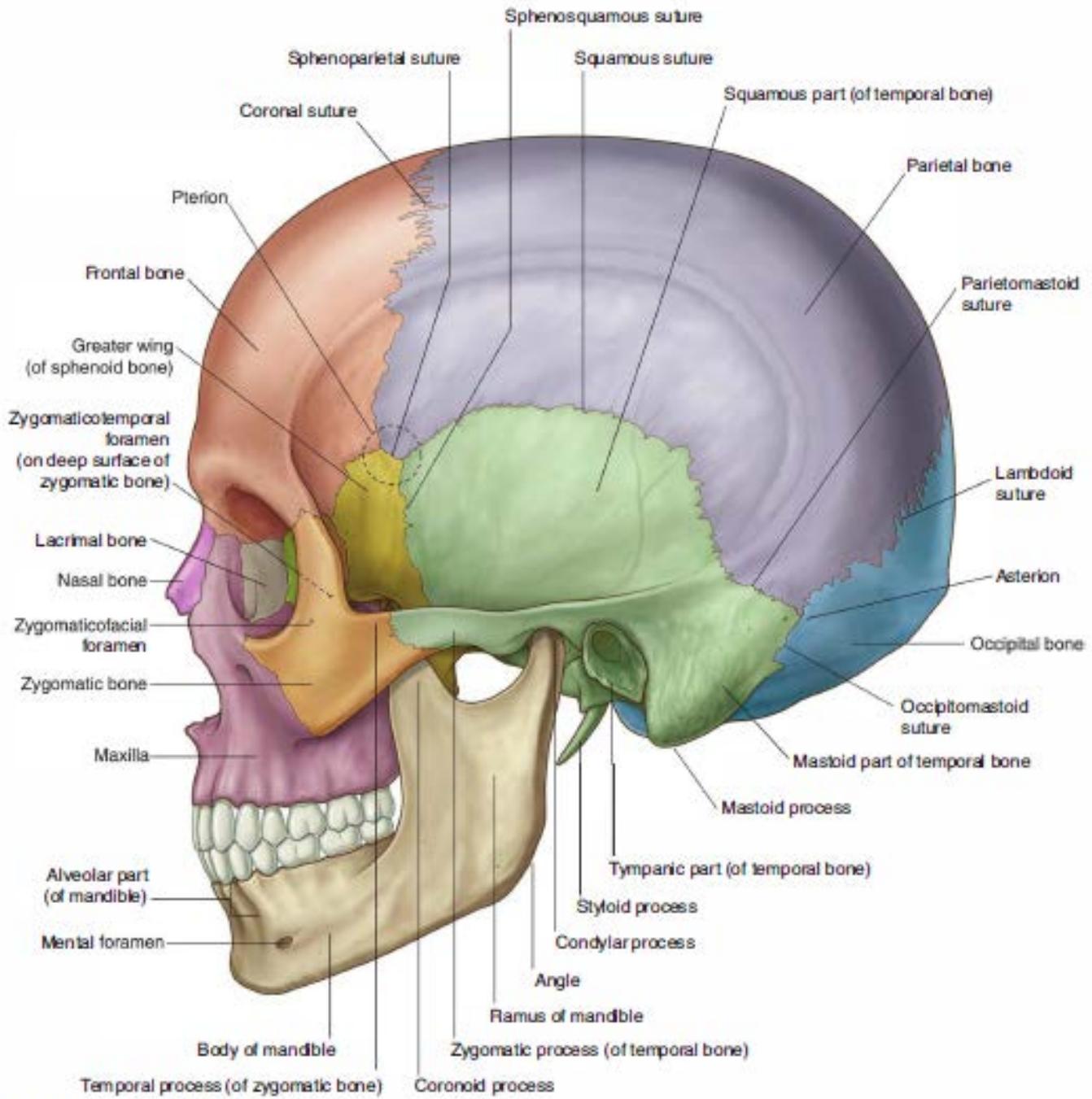


Fig. 8.19 Lateral view of the skull.

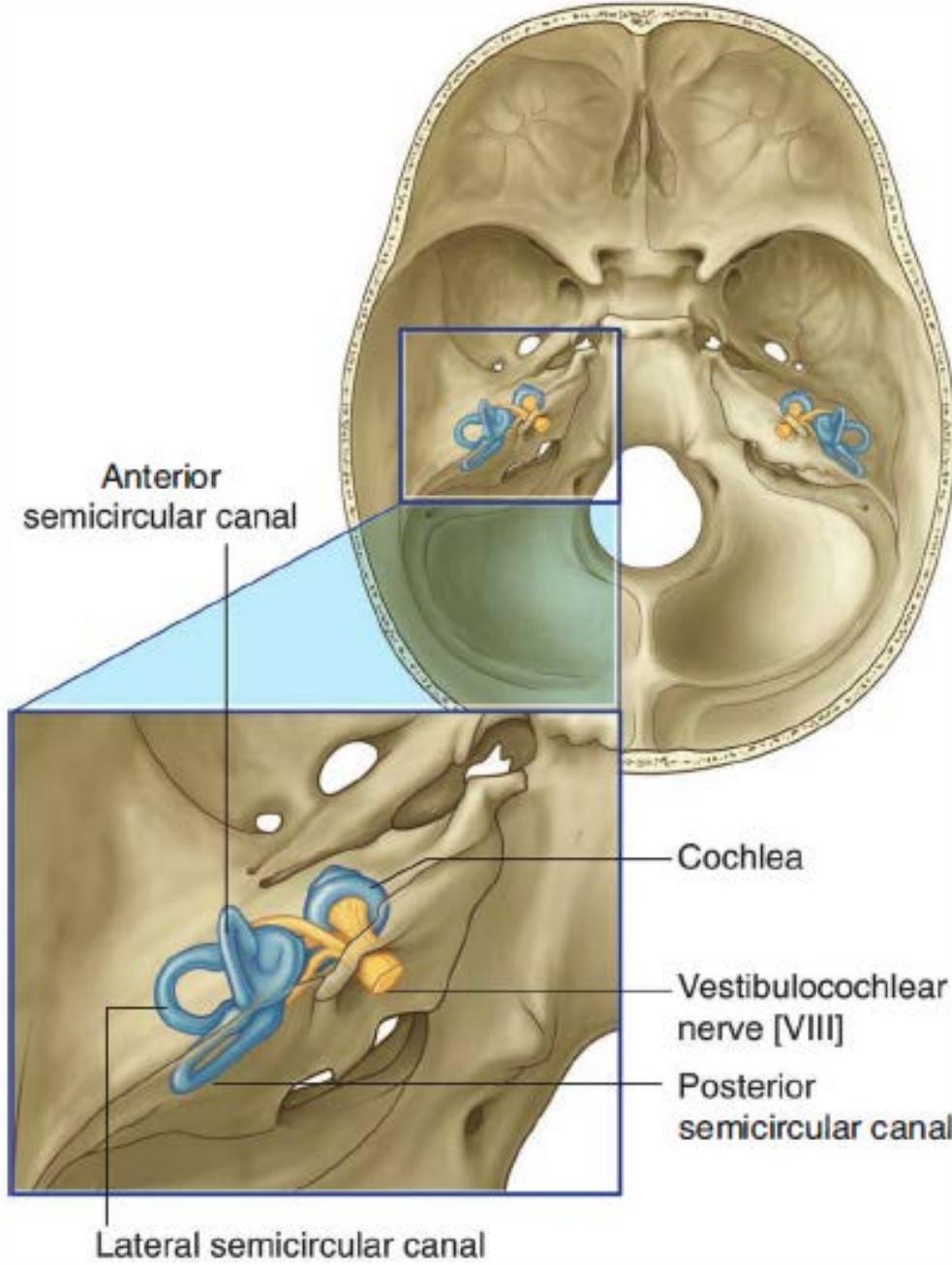
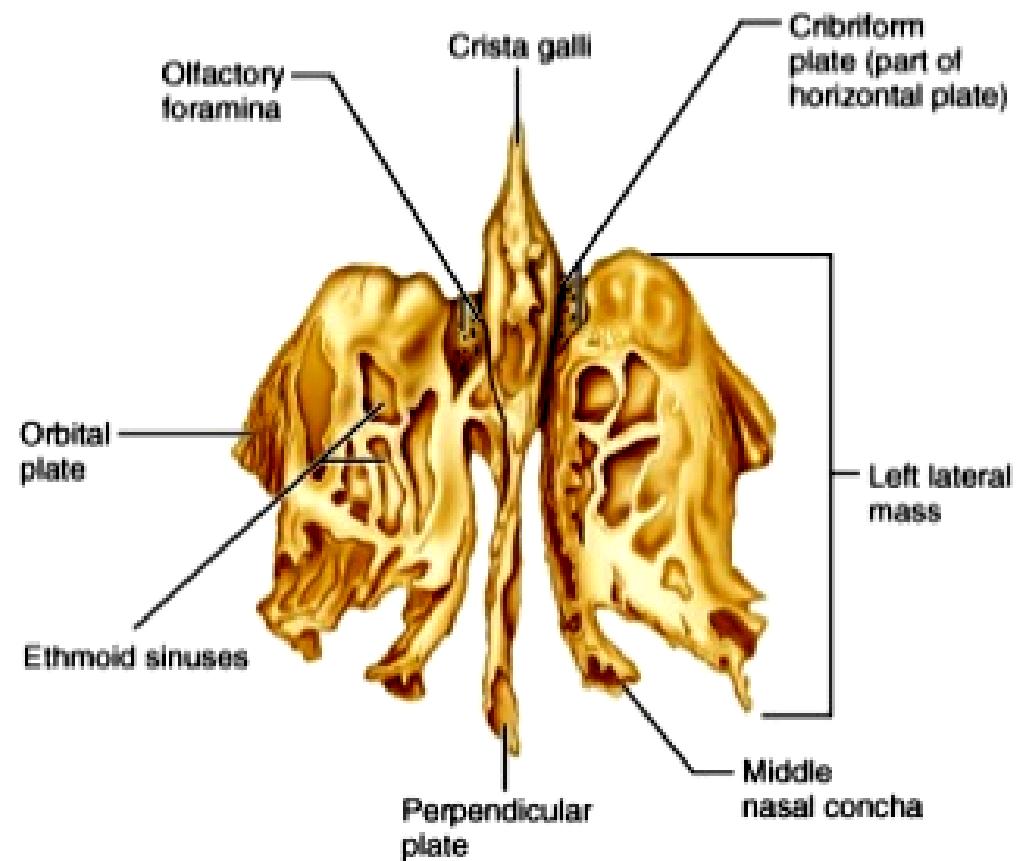


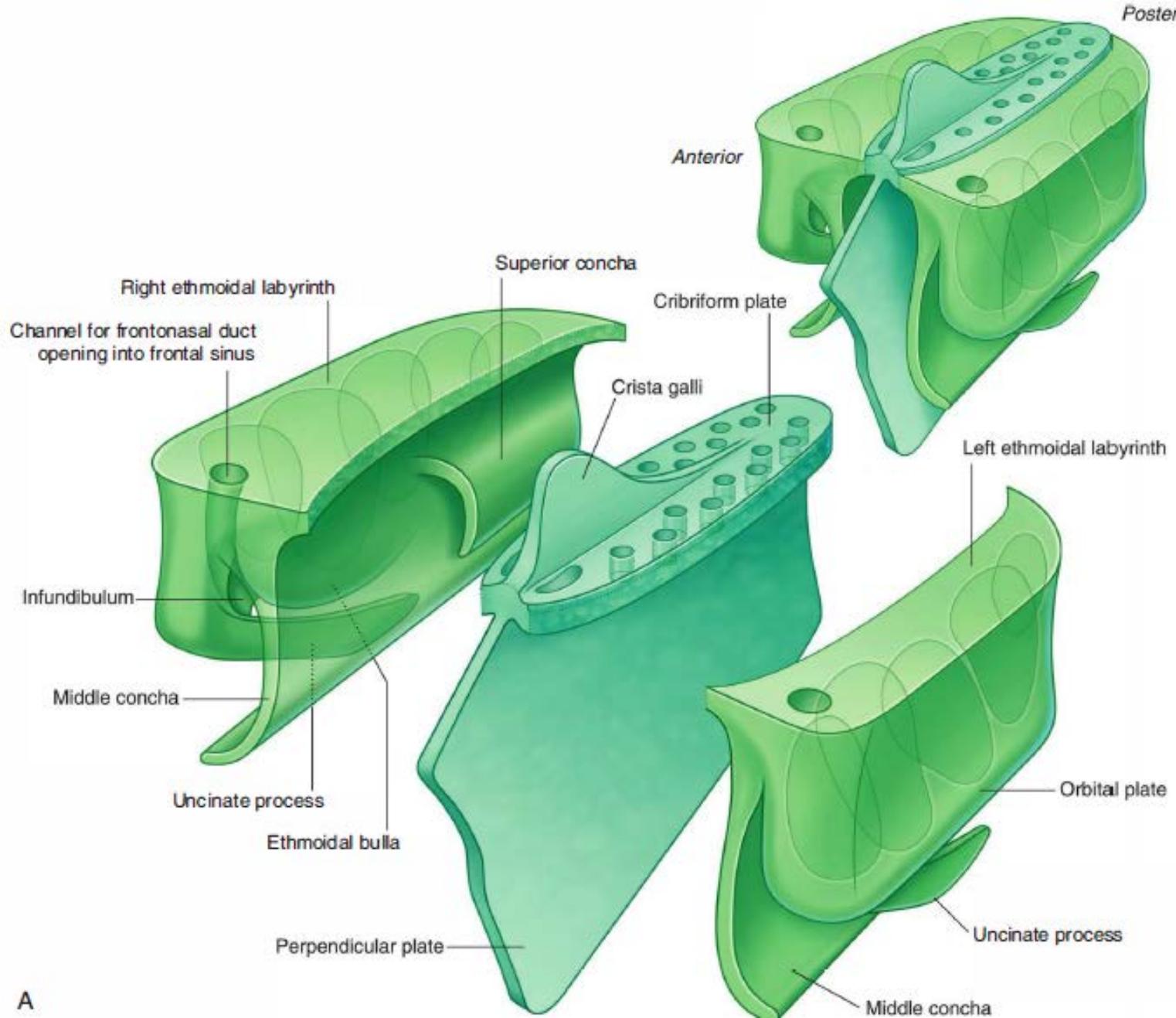
Fig. 8.123 Location of the internal ear in temporal bone.

Ethmoid:

- Cribriform plate (sup. & inf. Surfaces)
- Perpendicular plate (sup. Inf. Ant. Pos. borders)
- Labyrents (surfaces)

- Lies between nasal and sphenoid bones
- Forms most of the medial bony region between the nasal cavity and orbits





A

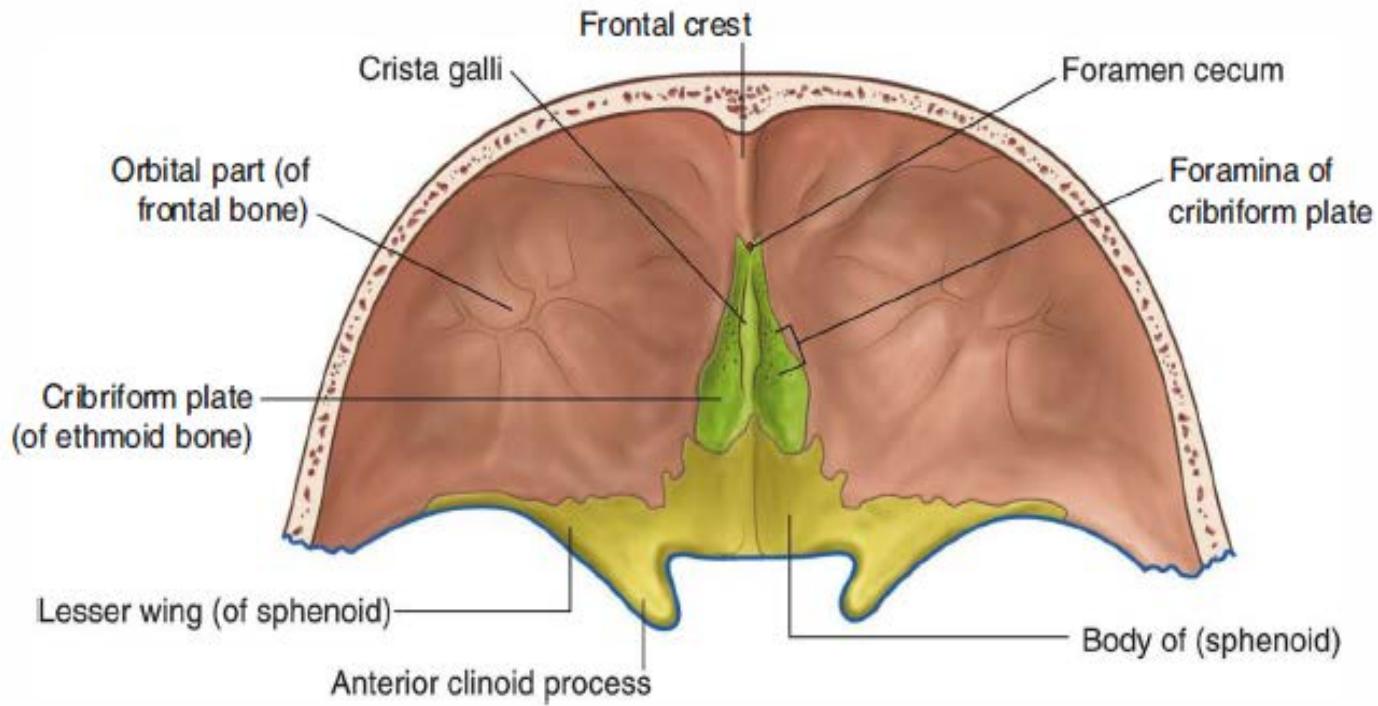
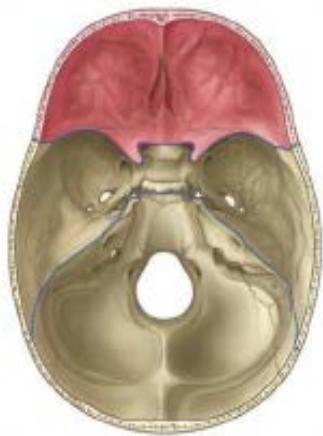
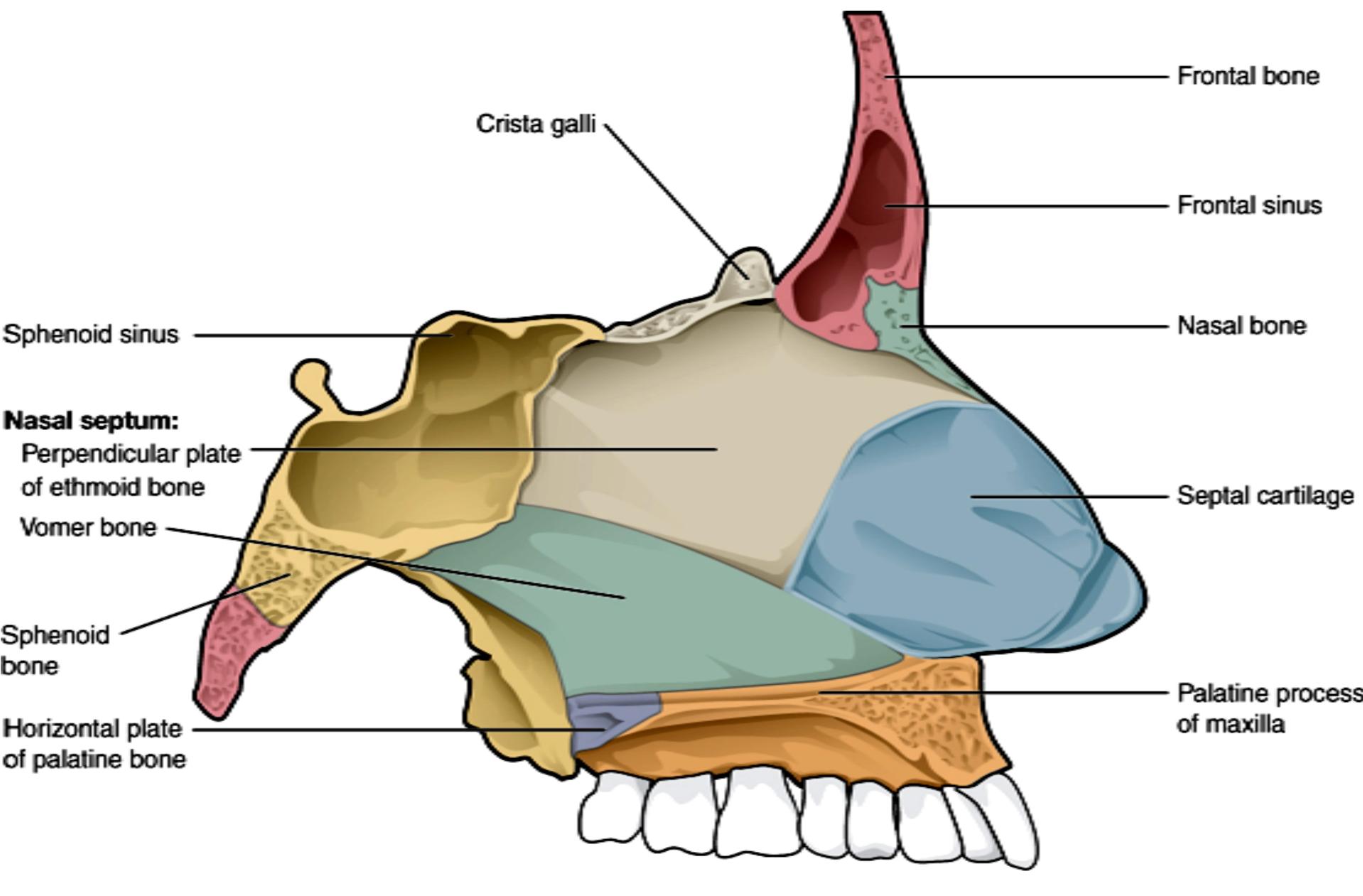


Fig. 8.25 Anterior cranial fossa.



Sagittal section

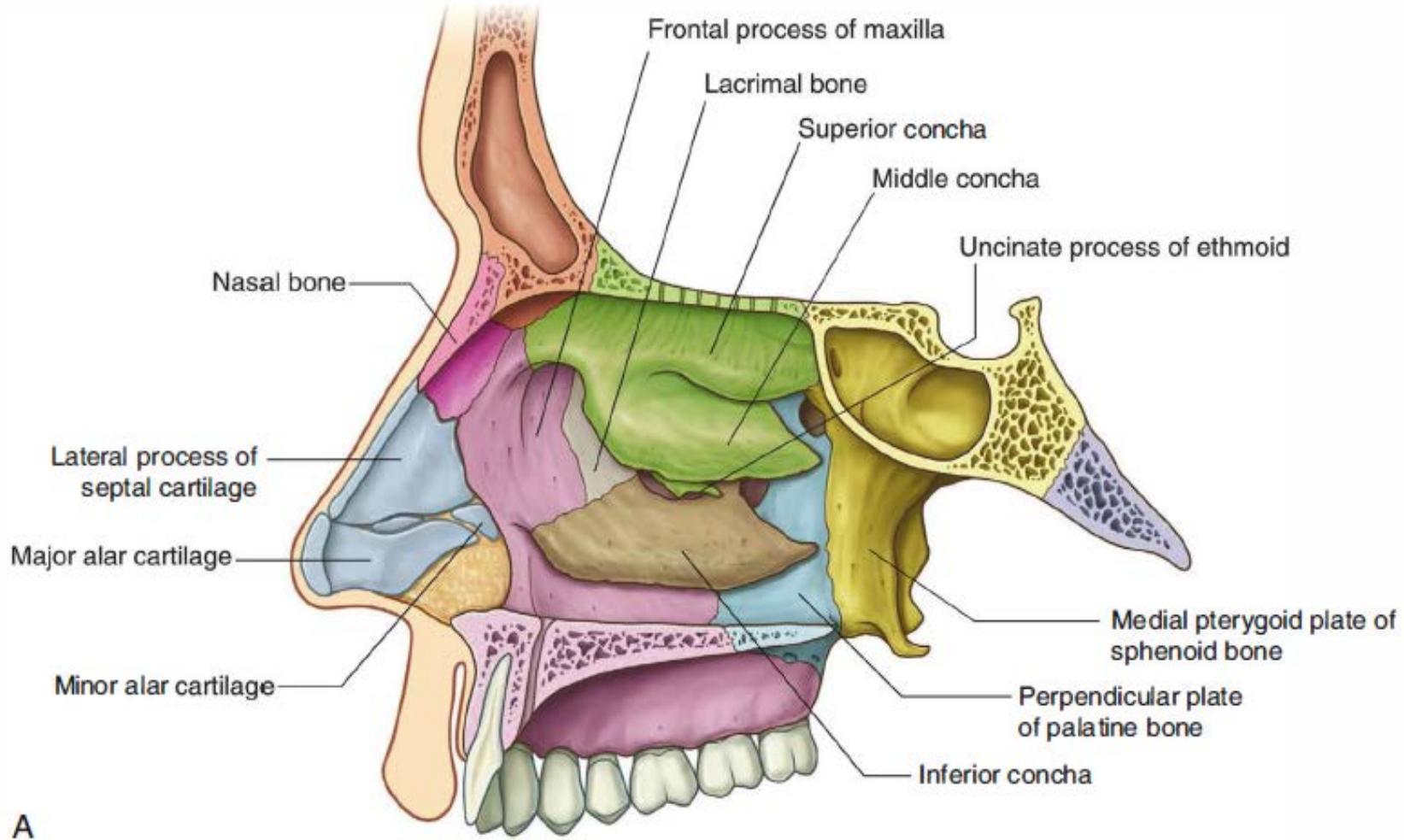
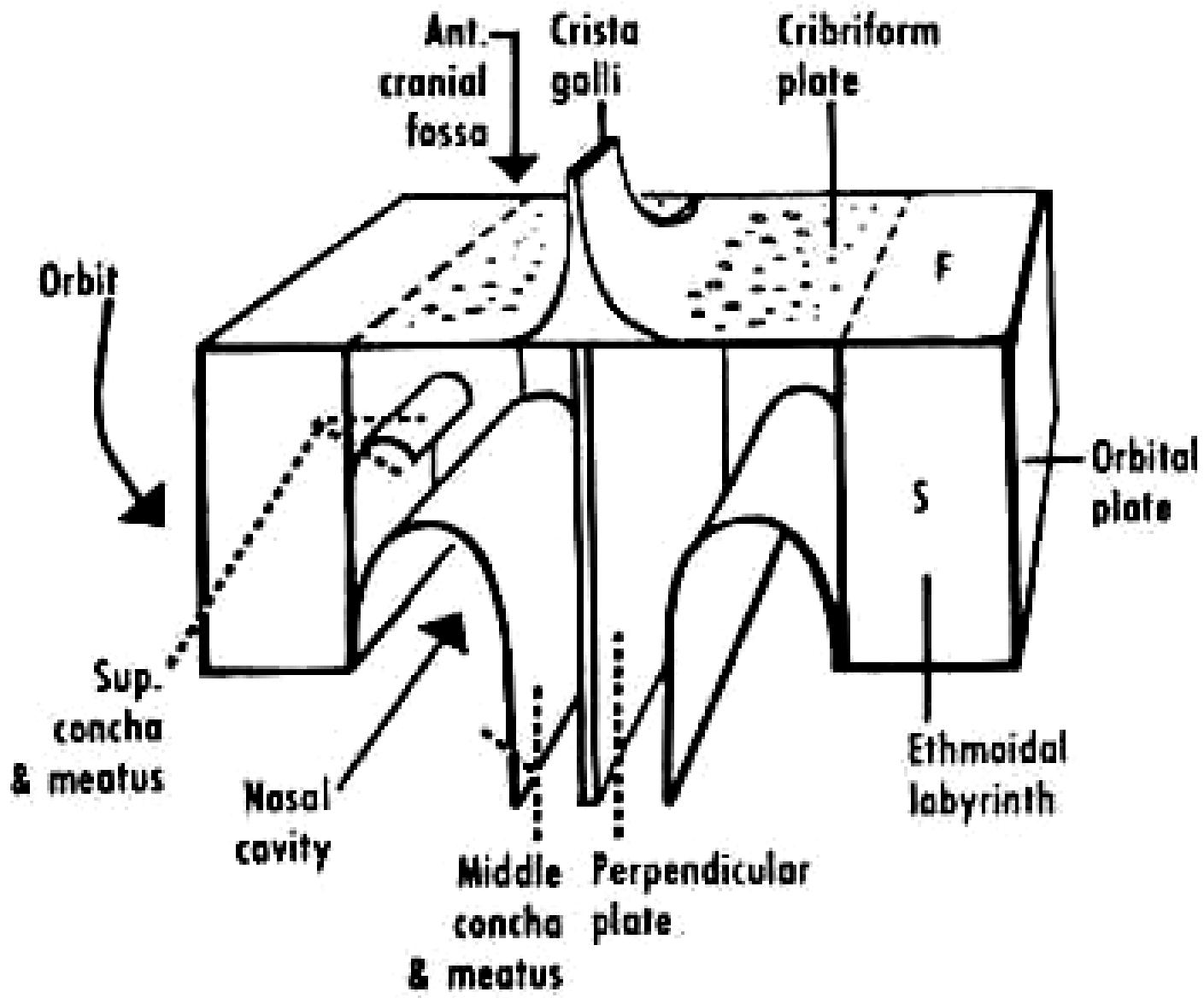


Fig. 8.235 Lateral wall of the nasal cavity. A. Bones.

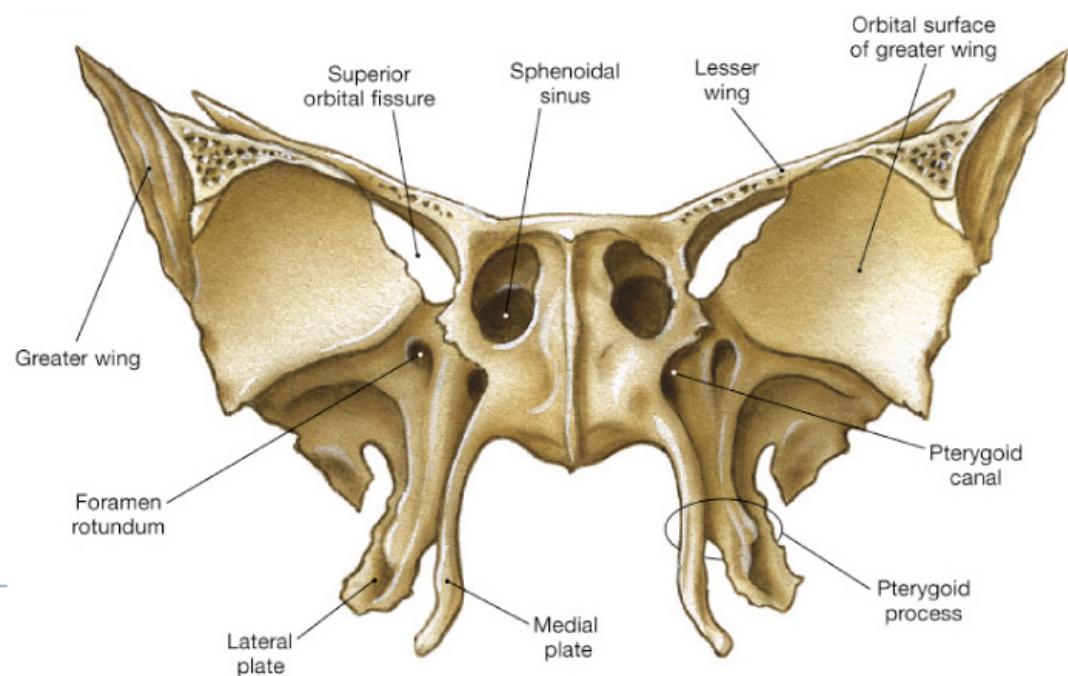
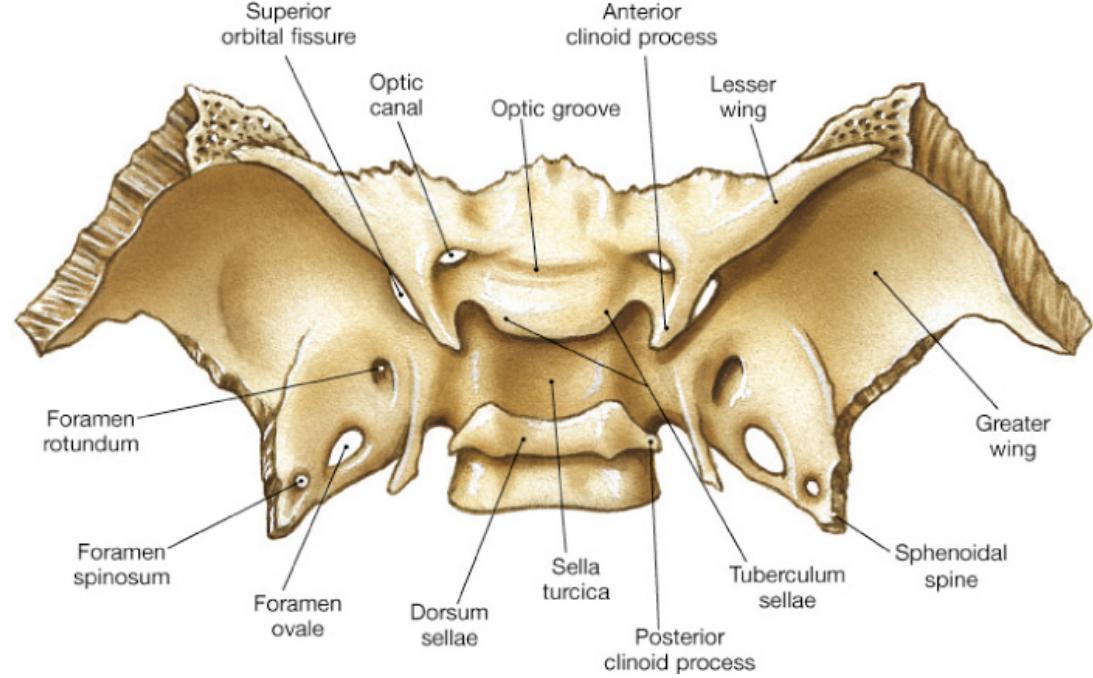


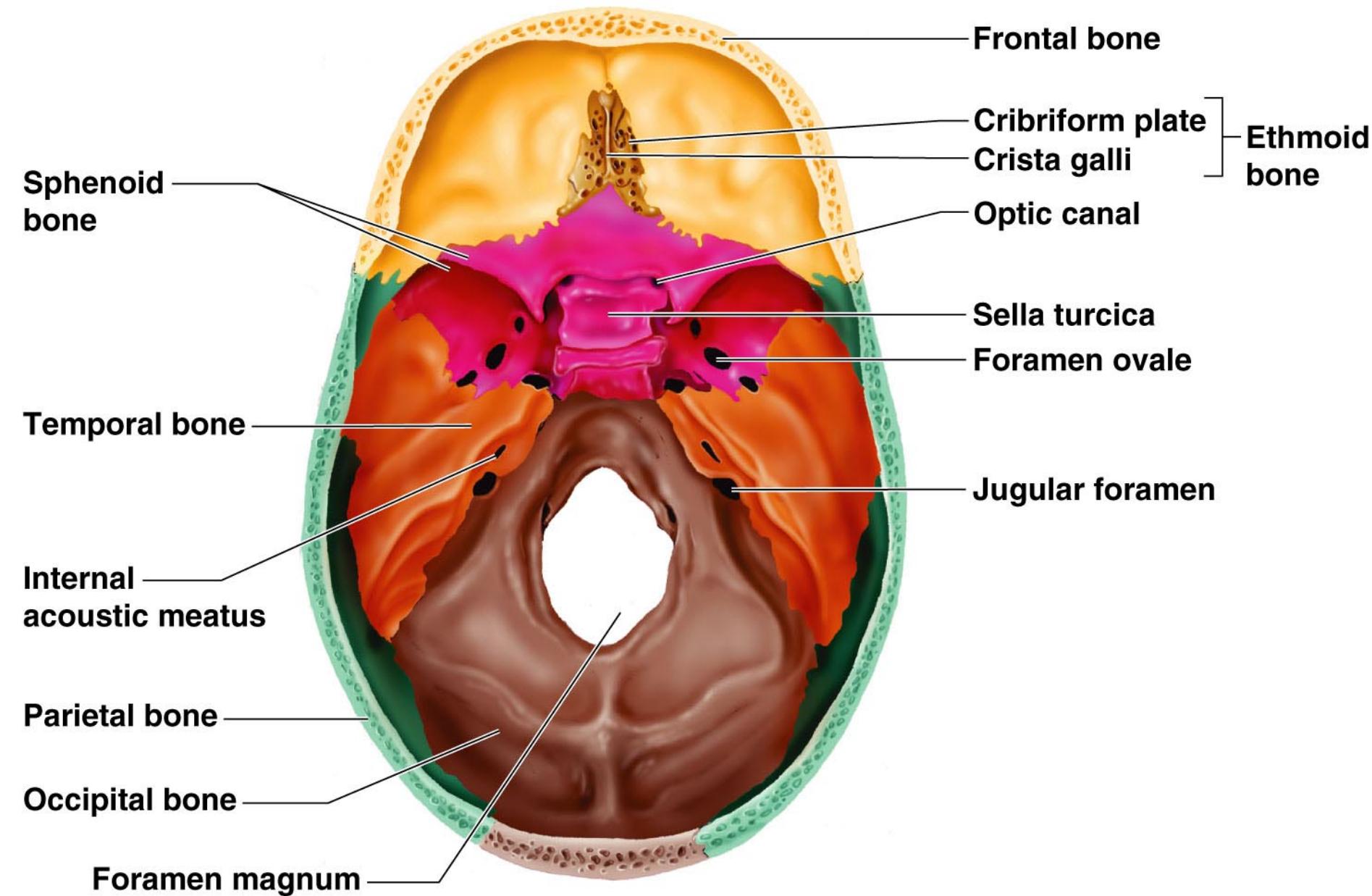
Sphenoid:

➤ Body

Surface:

- ✓ sup. (sella turcica/ sulcus chiasmatic / carotid sulcus)
- ✓ inf. (rostrum)
- ✓ Ant. (sphenoidal crest/ opening of sphenoid sinus)
- ✓ pos.
- ✓ lat.





Mandible:

Largest, strongest and the only bone that have motion in skull

Parts:

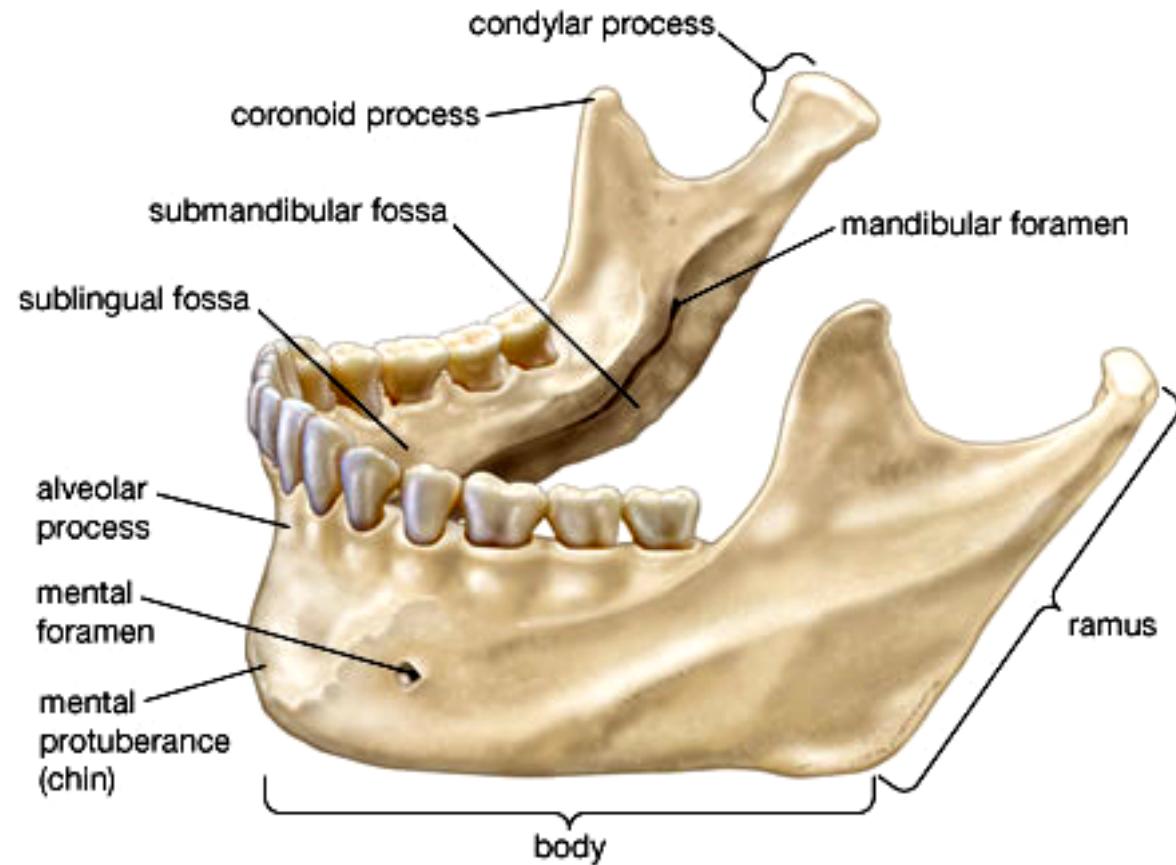
Body : mylohyoid line / sumandibular & sublingual fossa)

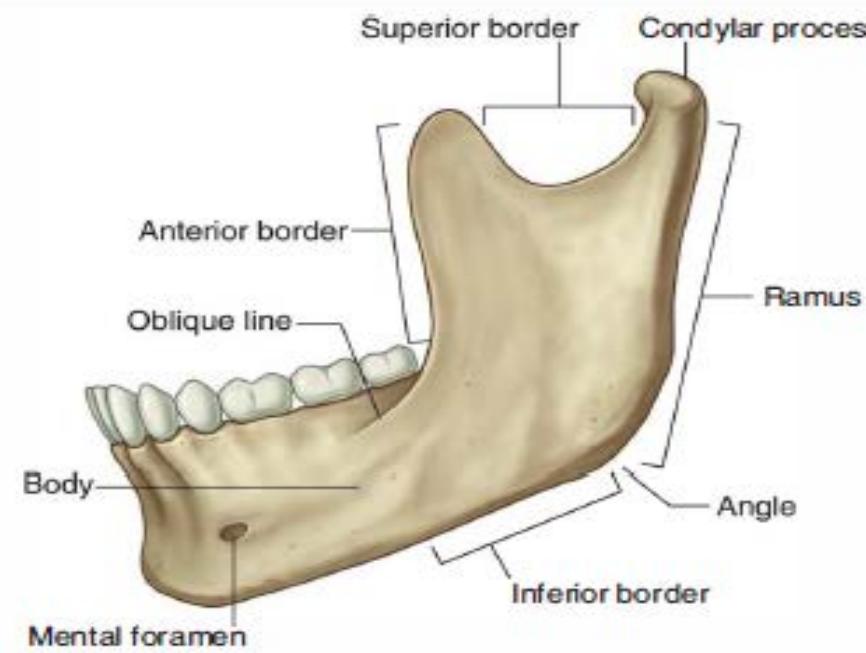
Ramus :

Med. / lat. Surfaces

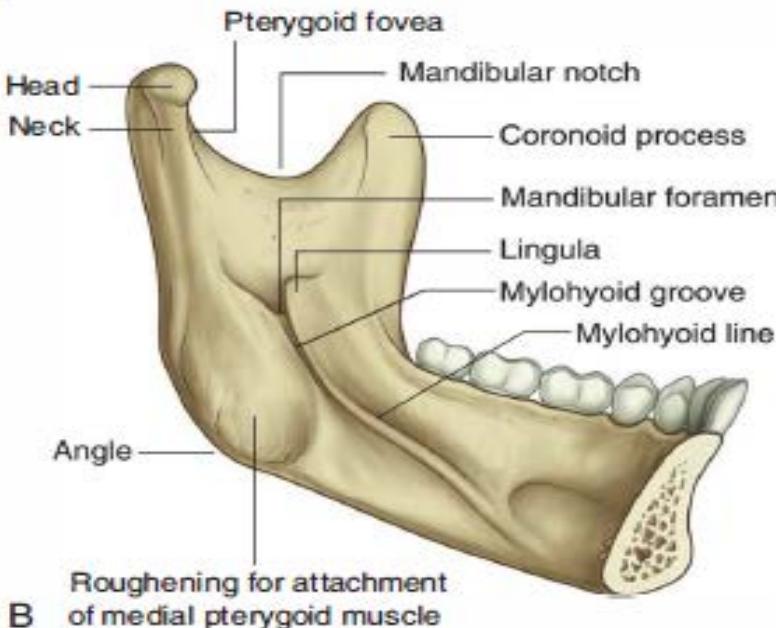
Ant. pos. sup. Inf. borders

Coronoid & condyloid process





A



B

Fig. 8.133 Mandible. A. Lateral view of left side. B. Medial view of left side.

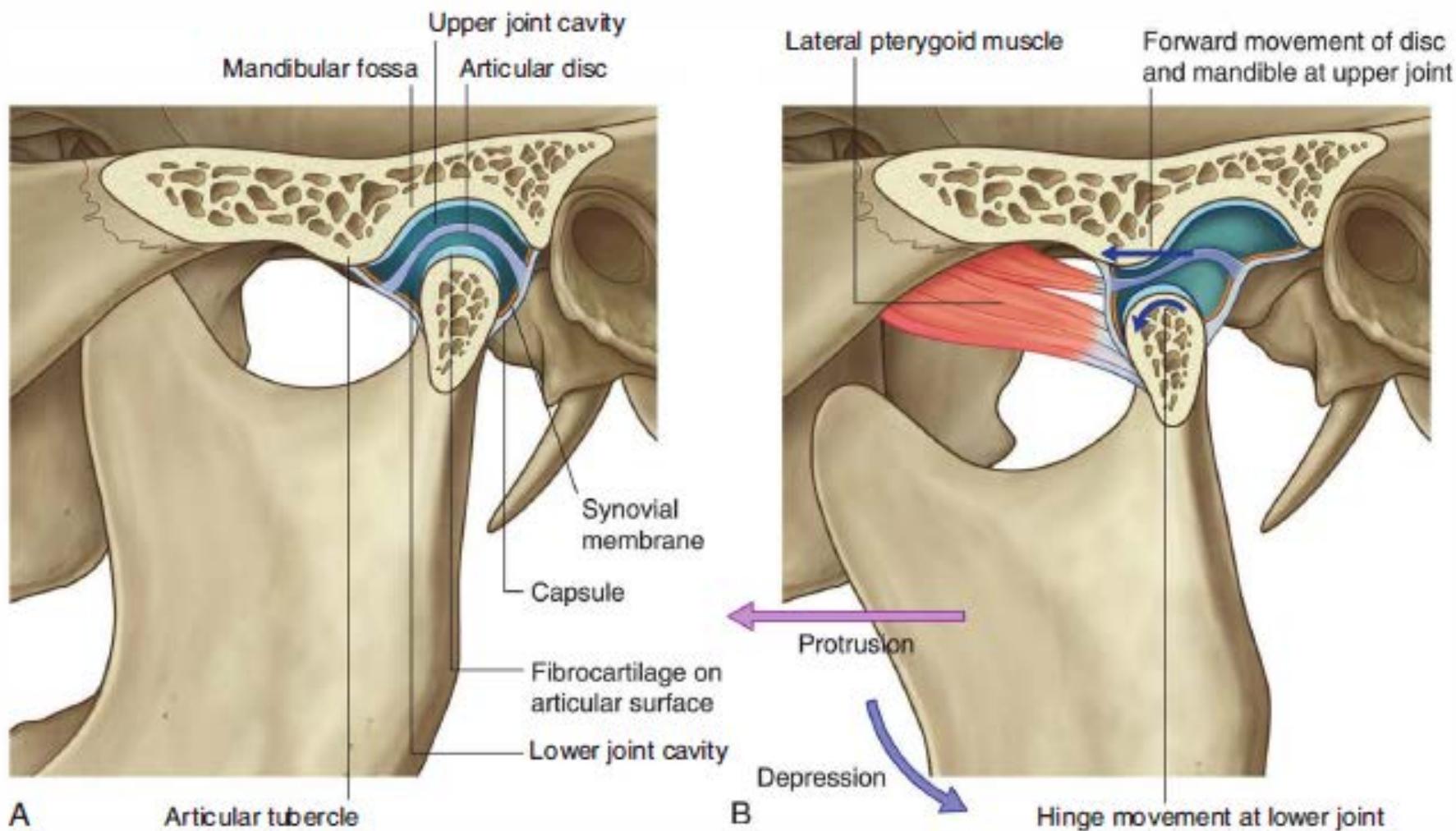
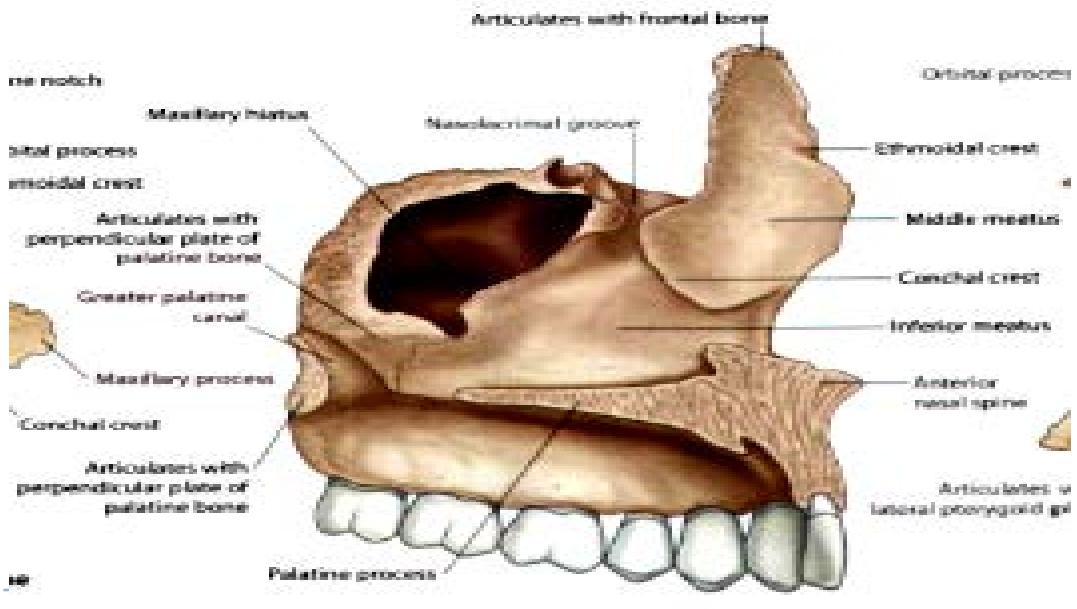
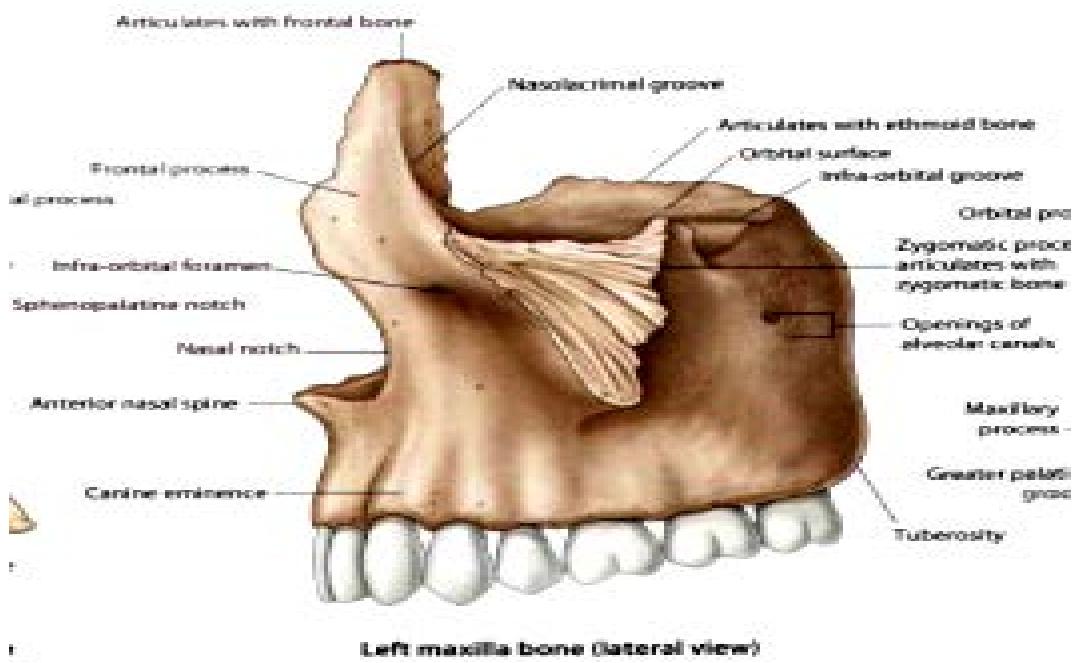


Fig. 8.134 Temporomandibular joint. **A.** Mouth closed. **B.** Mouth open.

Maxilla:

- Body
- Process:
 - frontal
 - zygomatic
 - alveolar
 - Palatine

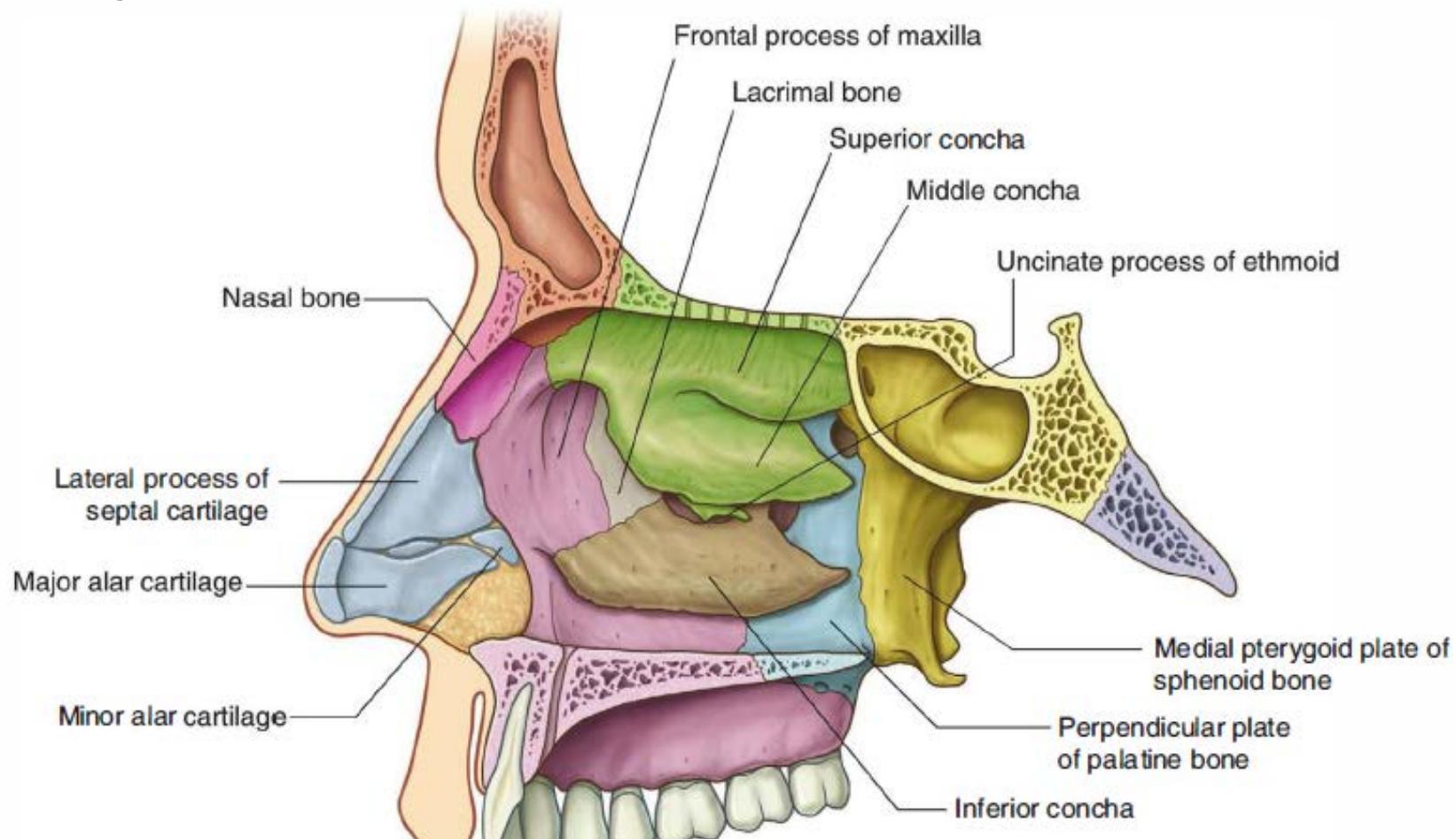
➤ Maxillary sinus



Palatine:

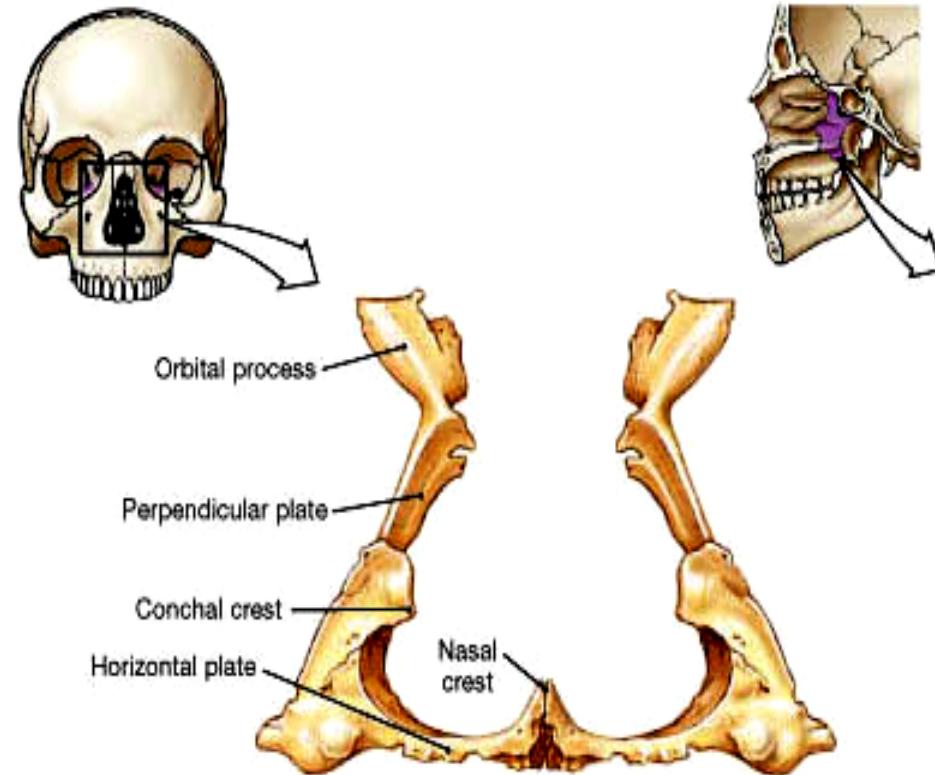
Horizontal plate

Perpendicular plate

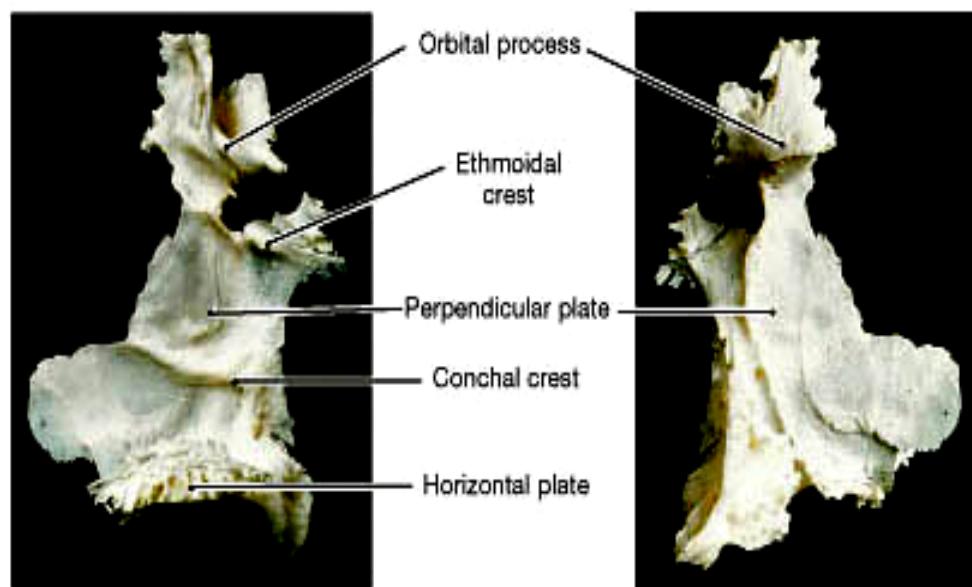


A

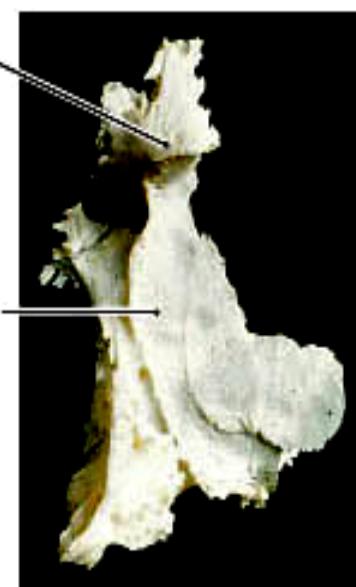
Fig. 8.235 Lateral wall of the nasal cavity. A. Bones.



(a) Palatine bones, anterior view



(b) Palatine bone, medial view



(c) Palatine bone, lateral view

Zygomatic:

- Surfaces : Lat./ Temporal/ Orbital
- Borders : Sup.Ant/Inf.Ant./Sup. Pos/ Sup. Inf. / Med. Pos.
- Fossa : Forms Part Of Orbit Surfaces & Temporal And Infra Temporal
- Process : Frontal / Temporal

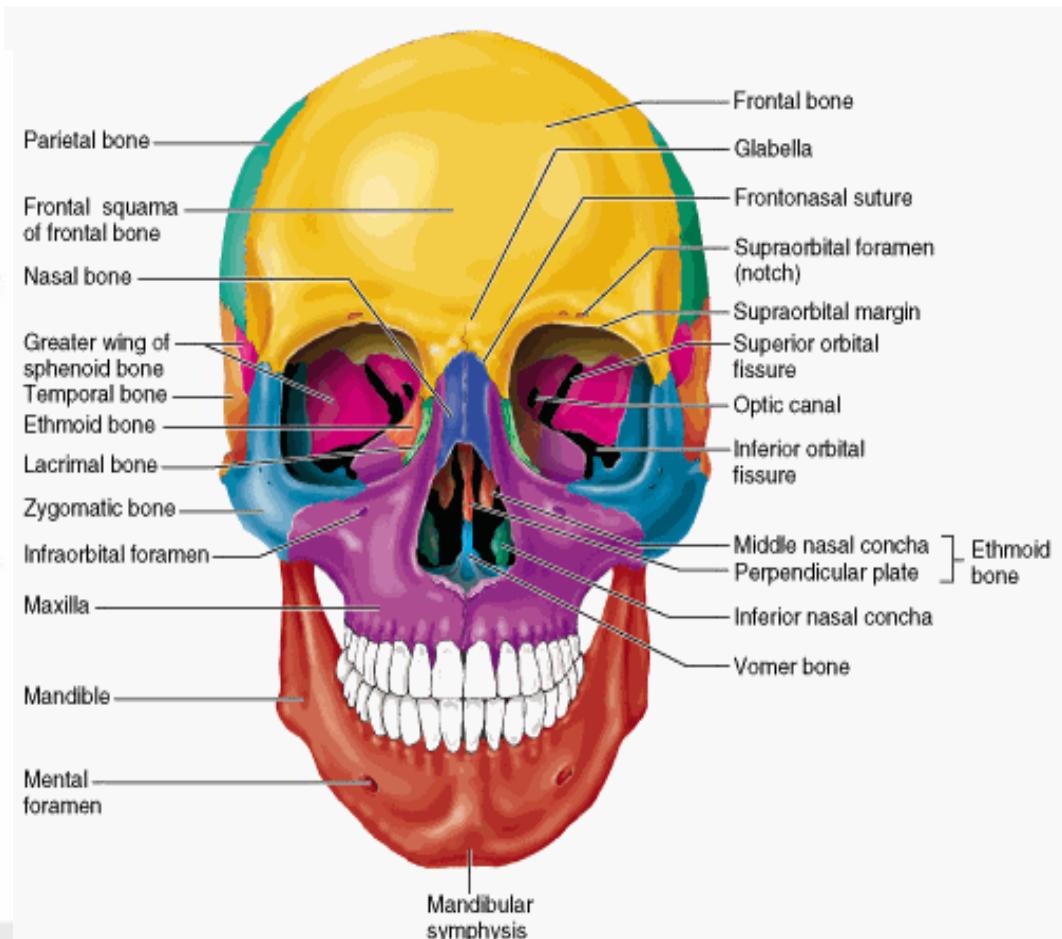
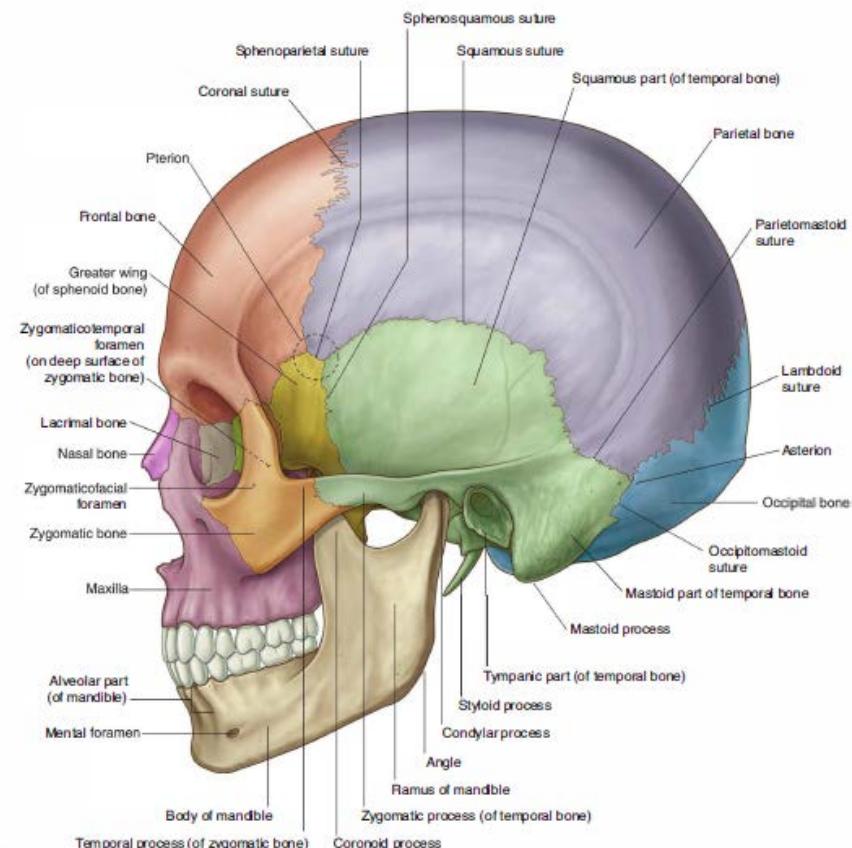
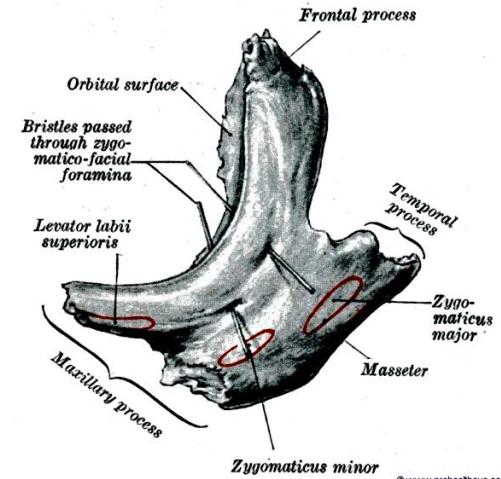


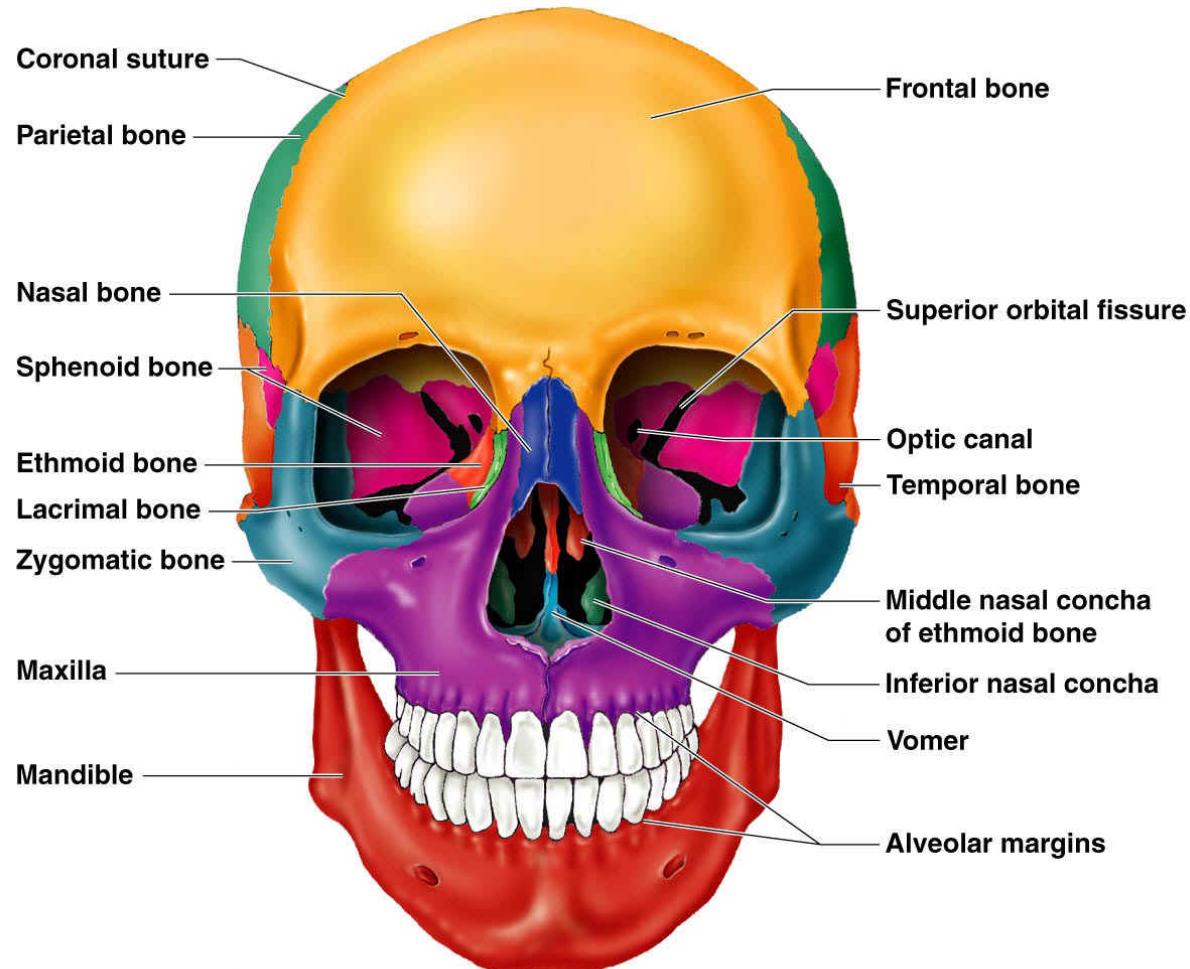
Fig. 8.19 Lateral view of the skull.

Nasal bone:

Is susceptible to broken

Surfaces: med./lat.

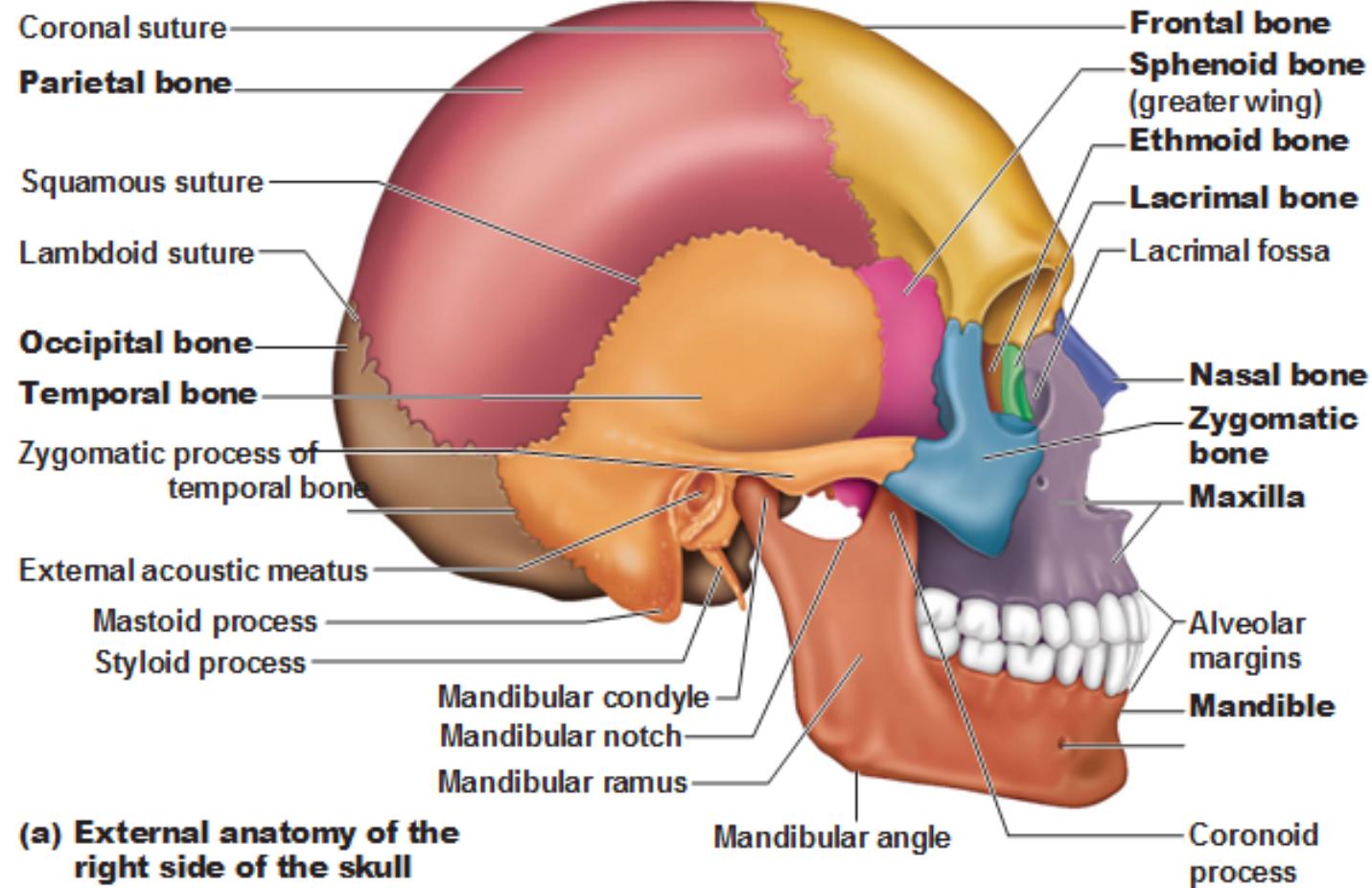
Borders: ant./ pos./ sup./ inf.



Lacrimal:

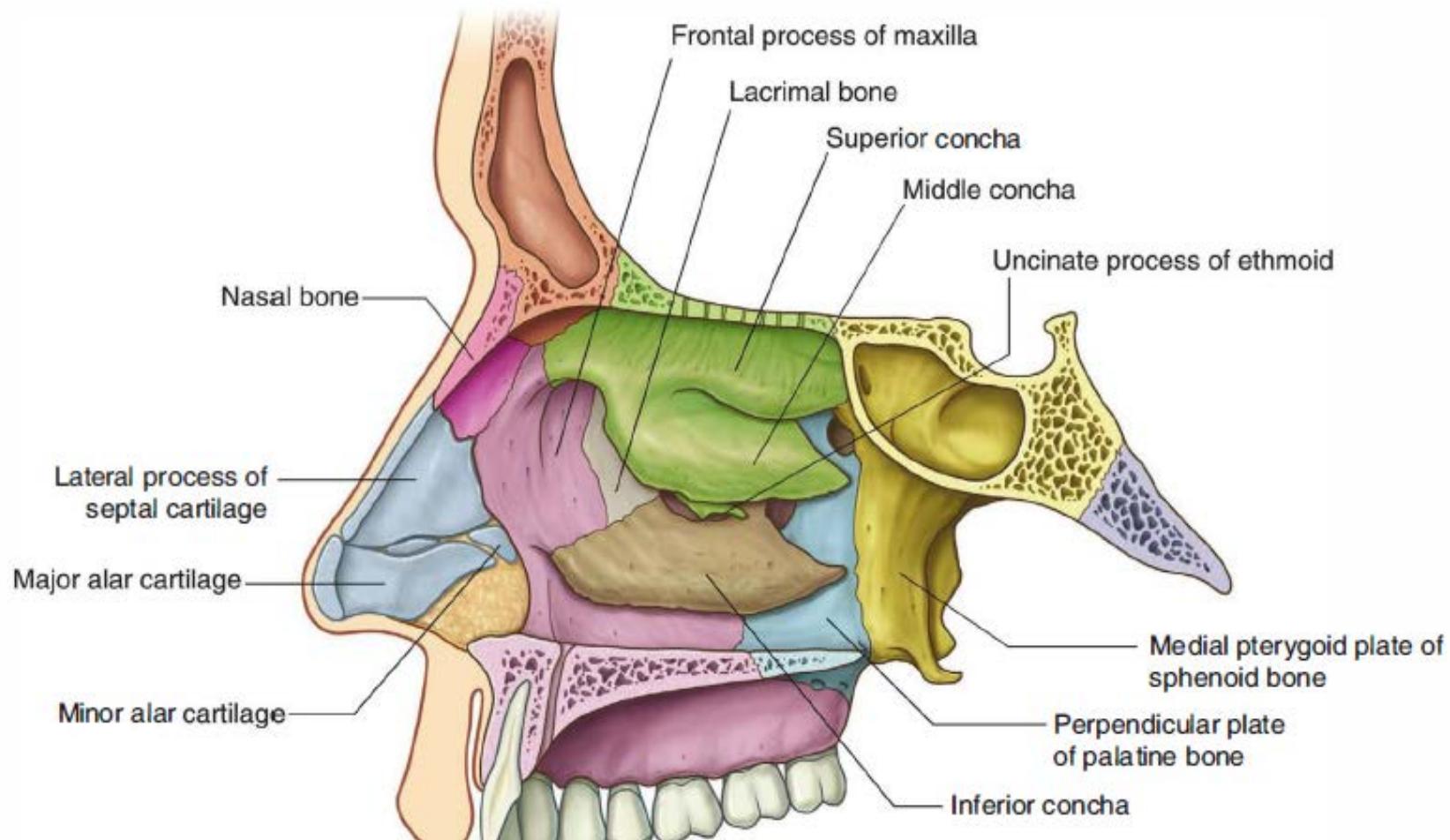
- ✓ The Smallest Skull Bone
- Contributes To Form Part Of Orbital & Nasal Walls
- ✓ Surfaces: Med./ Lat.
- ✓ 4 Borders: ant. / post. / sup. / inf.

Skull – Lateral aspect



Inf. Concha:

Forms inf. Part of lat. Wall of nasal cavity



A

Fig. 8.235 Lateral wall of the nasal cavity. A. Bones.

Vomer:

Forms postero inferior part of nasal septum

Borders: sup./ inf./ ant./ pos.

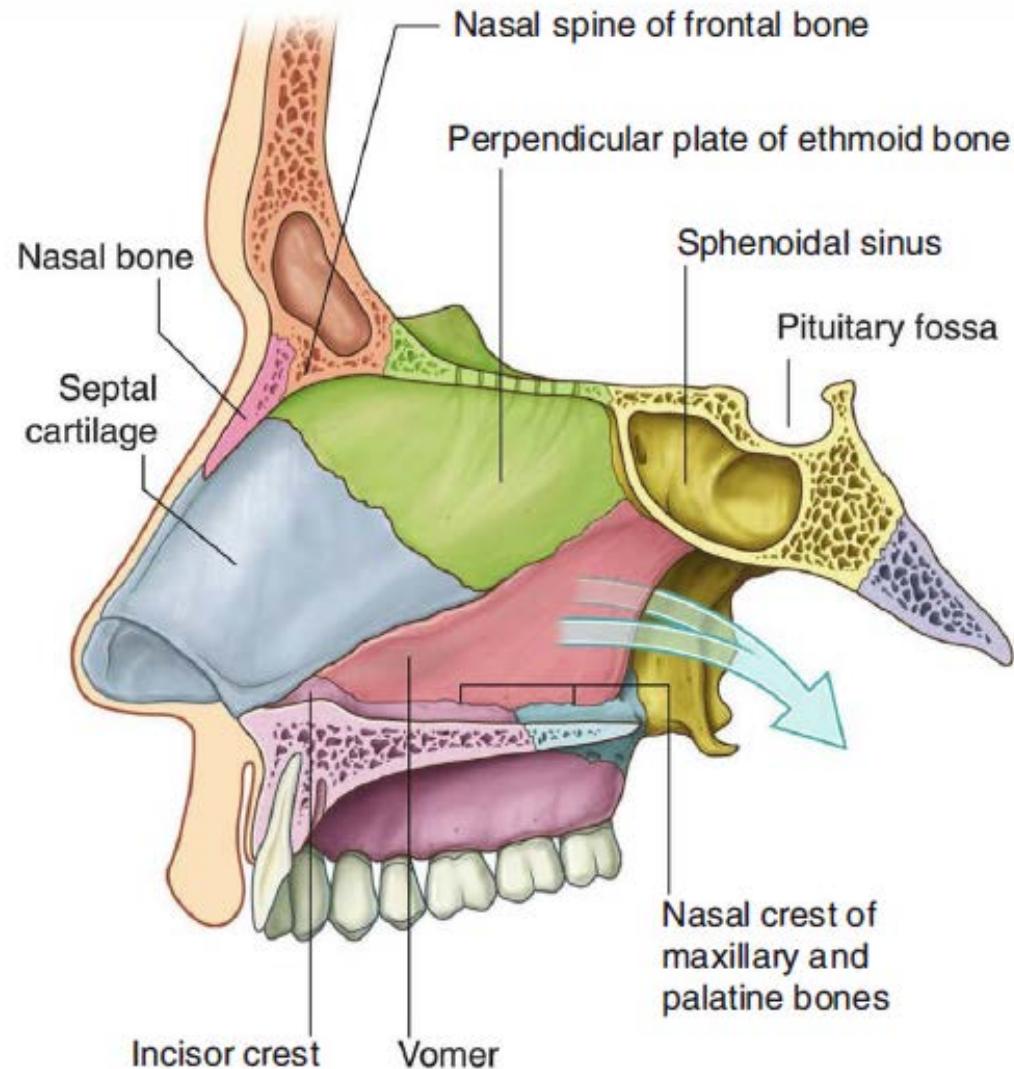


Fig. 8.232 Medial wall of the nasal cavity—the nasal septum.

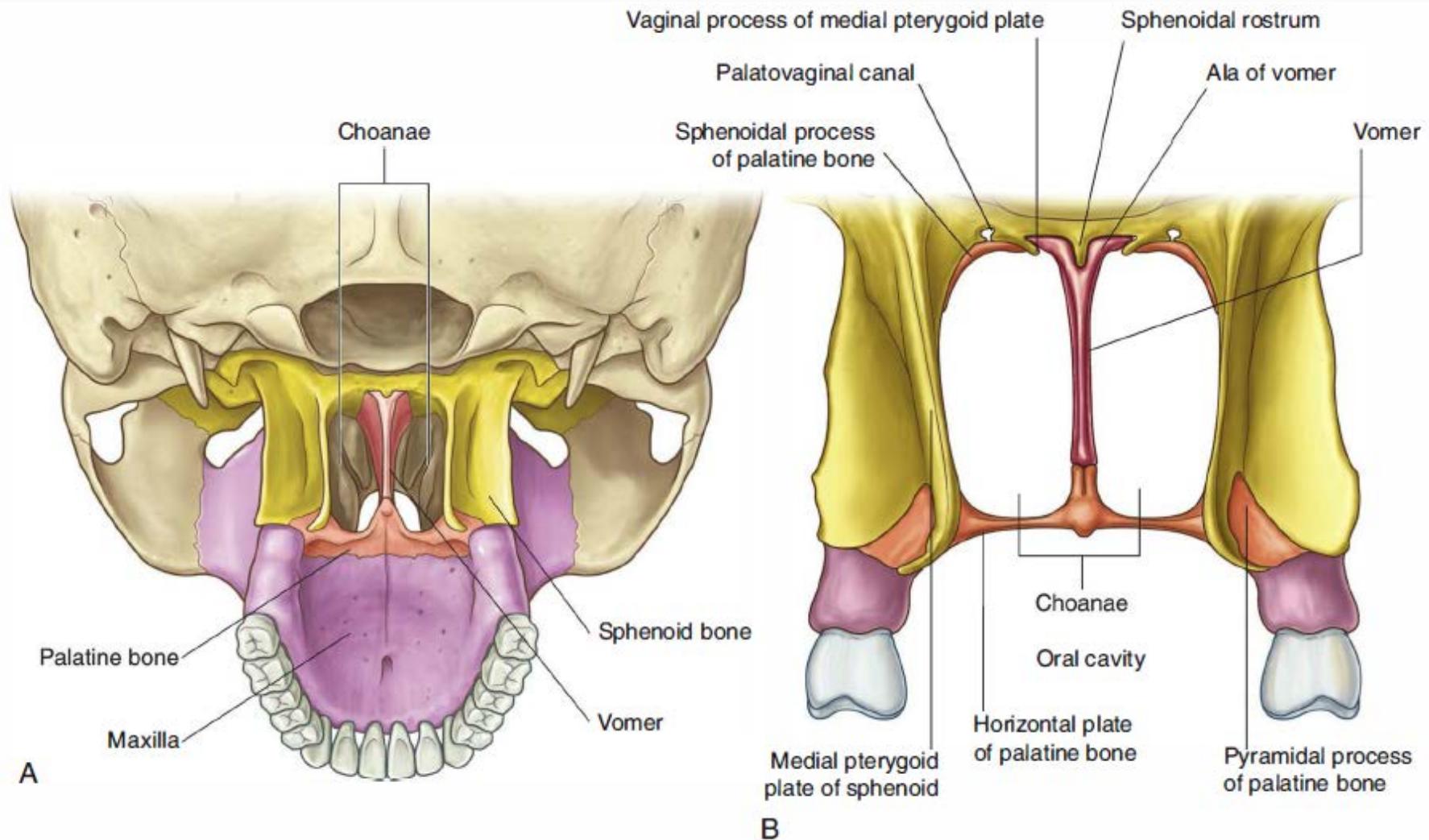


Fig. 8.237 Choanae (posterior view). **A.** Overview. **B.** Magnified view.

Norma verticalis:

Frontal/ parietal/ occipital

Sutures:

Cronal

Sagittal

Lambdoid

Vault

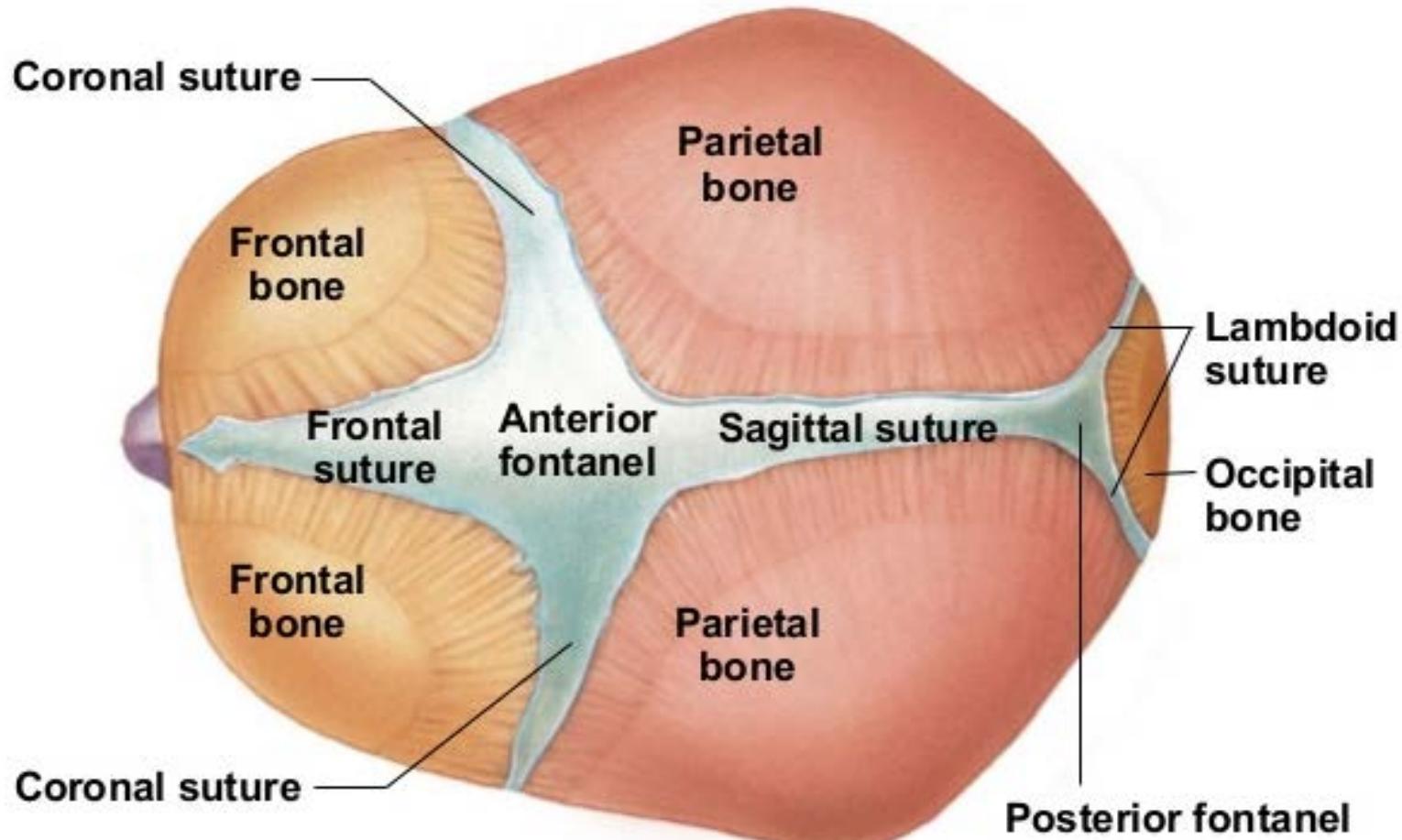
Vertex

Lambda

Bregma

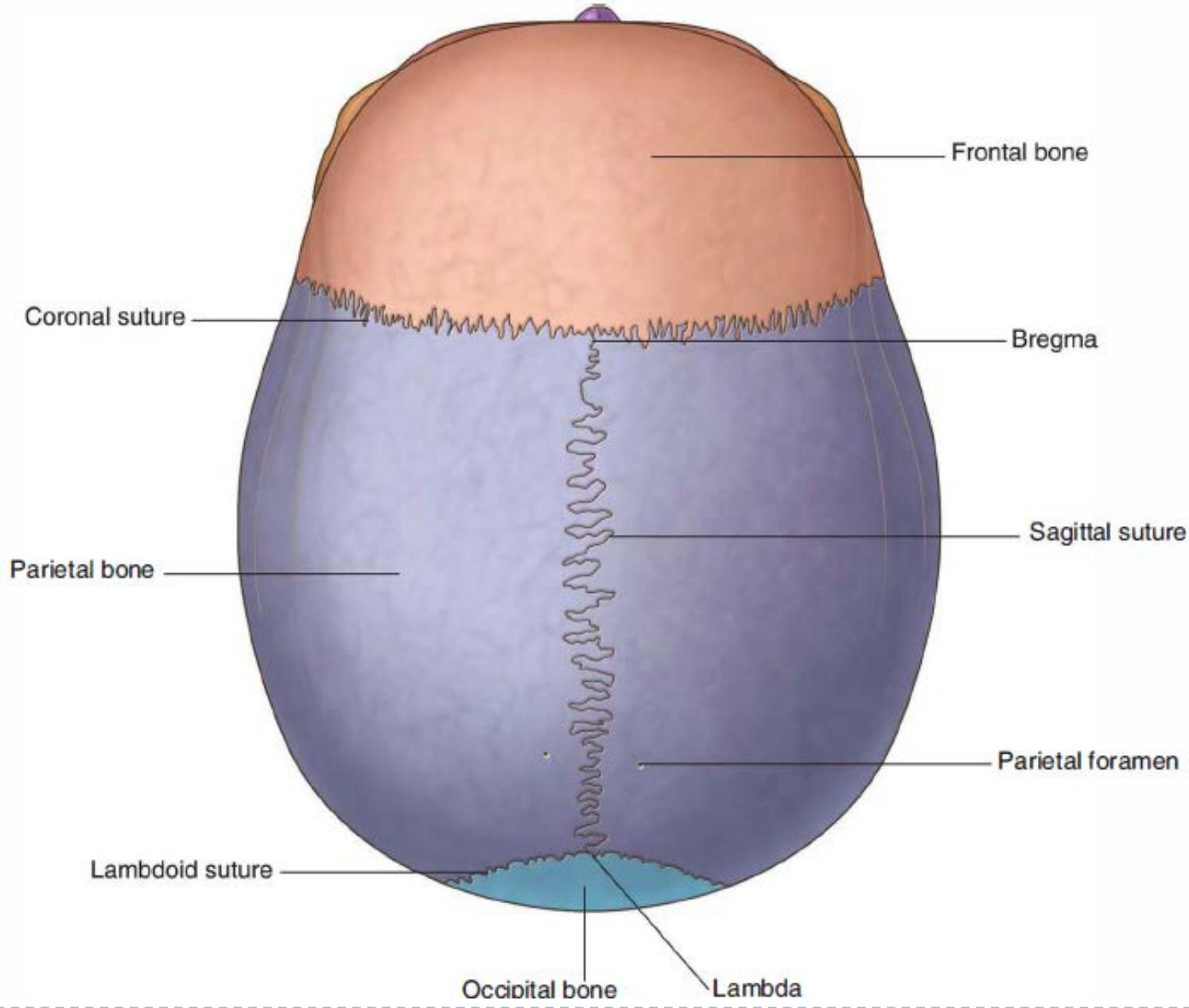
Peterion

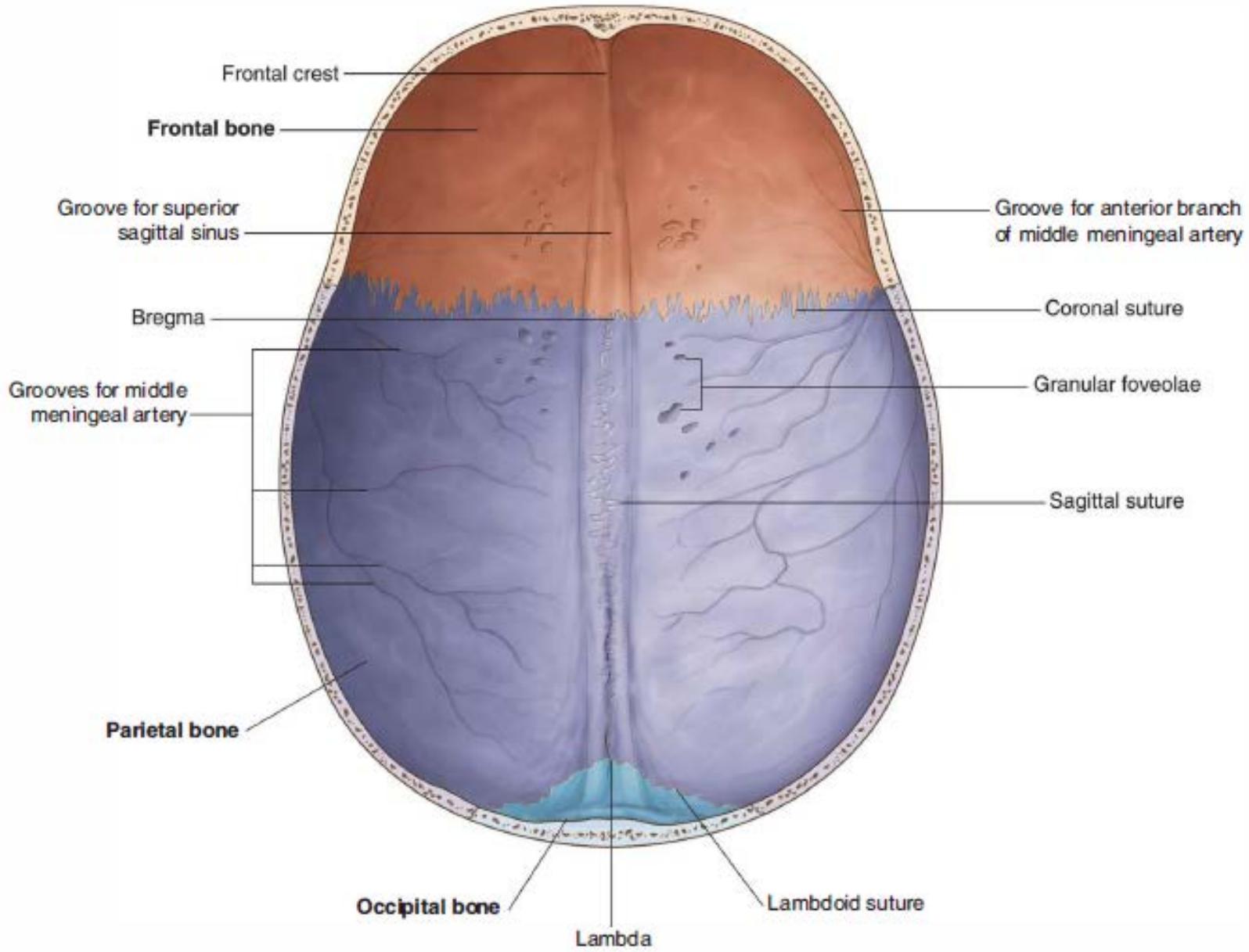
Asterion



c

Superior view





Norma frontalis:

Frontal

Maxilla

Zygomatic

Nasal

Mandible

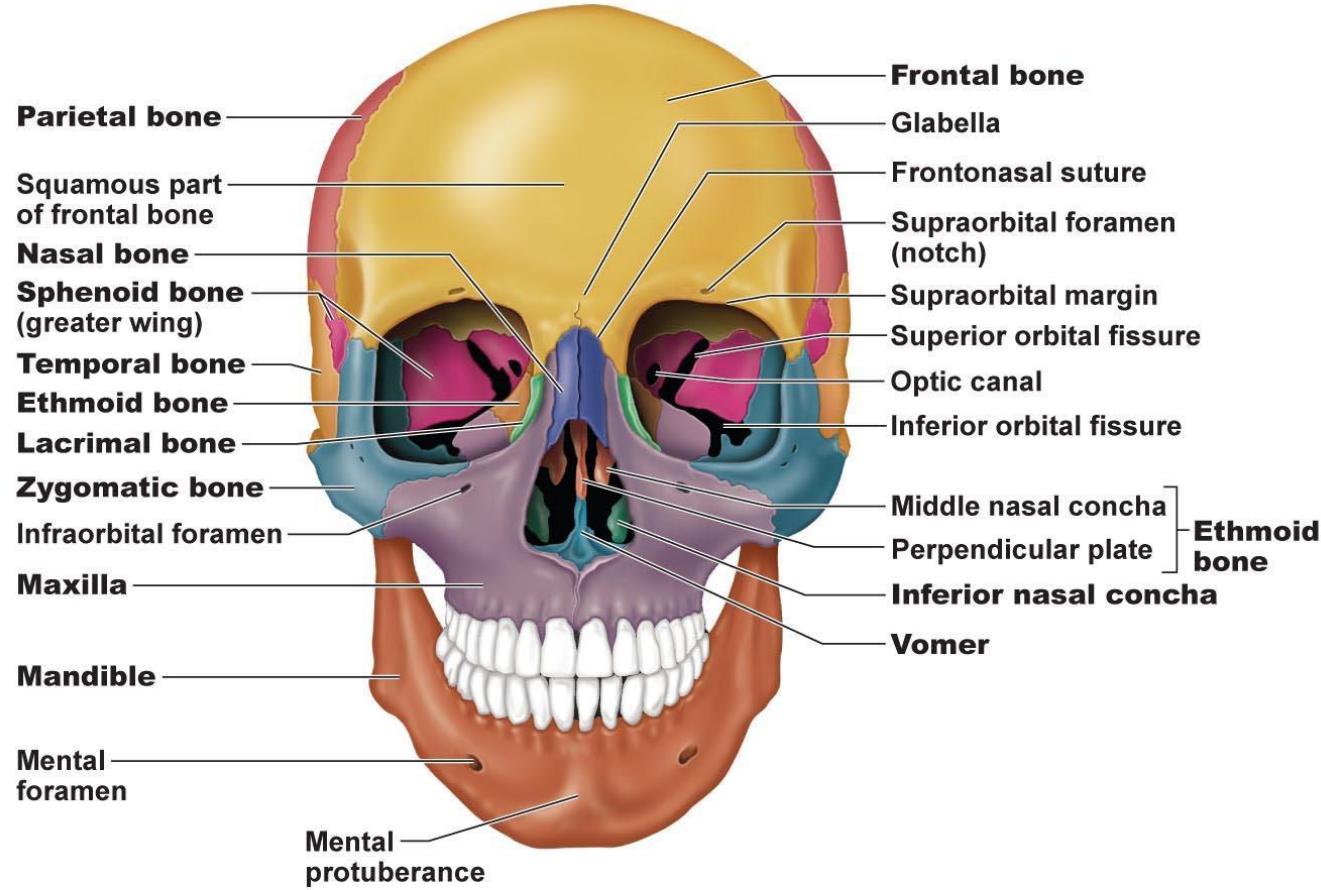
Orbit

Supra ciliary arch

Frontal sinuse

Infra orbital foramen

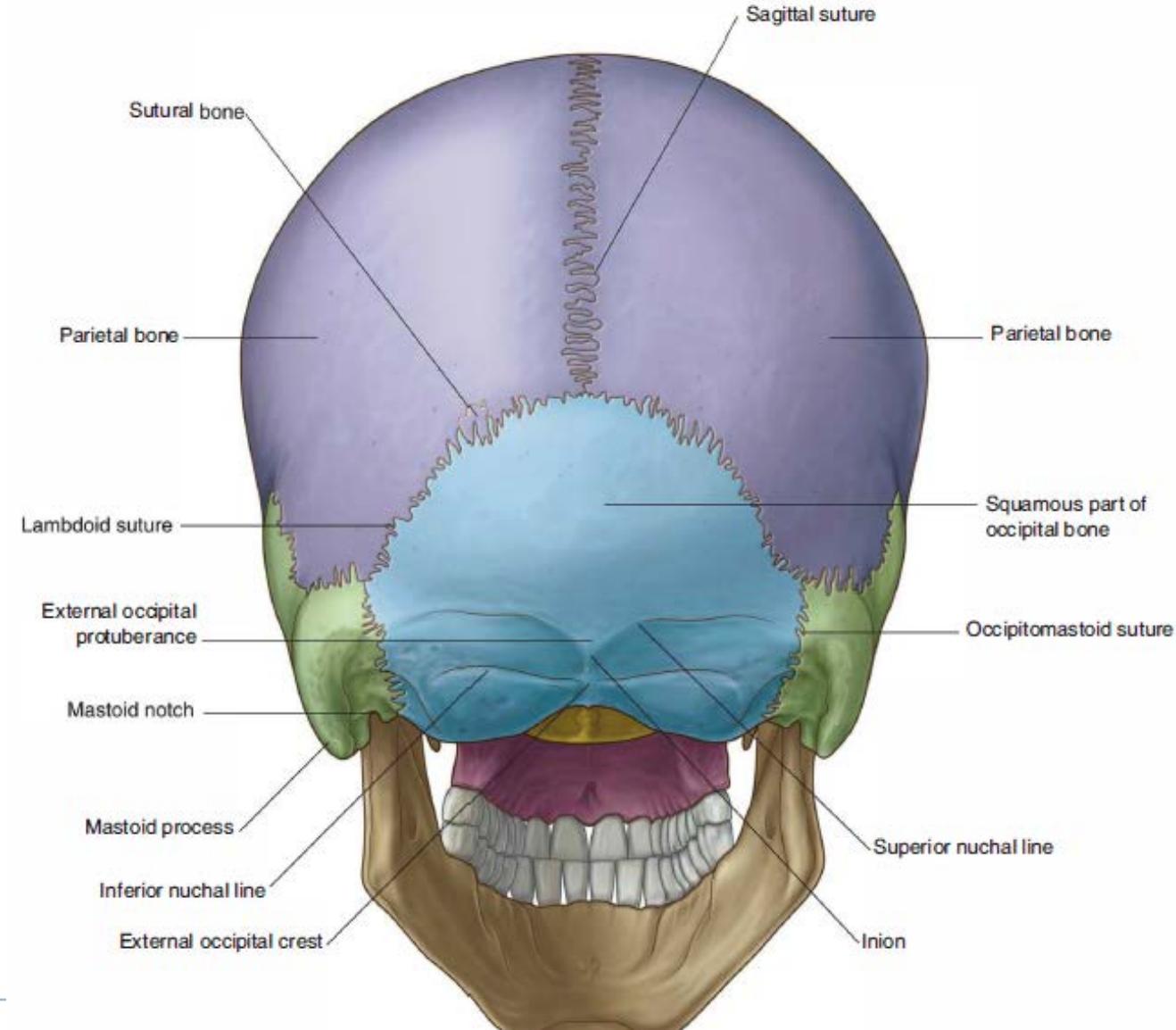
Mental foramen



(a) Anterior view of skull

Norma occipitalis:

Parietal
Occipital
Temporal
Lambdoid
Sagittal
Masto occipital
Masto parietal
Ext. occipital protobrane
Sup. Nuchal line
Ext. occipital crest



Norma lateralis:

Frontal/ parietal/ occipital

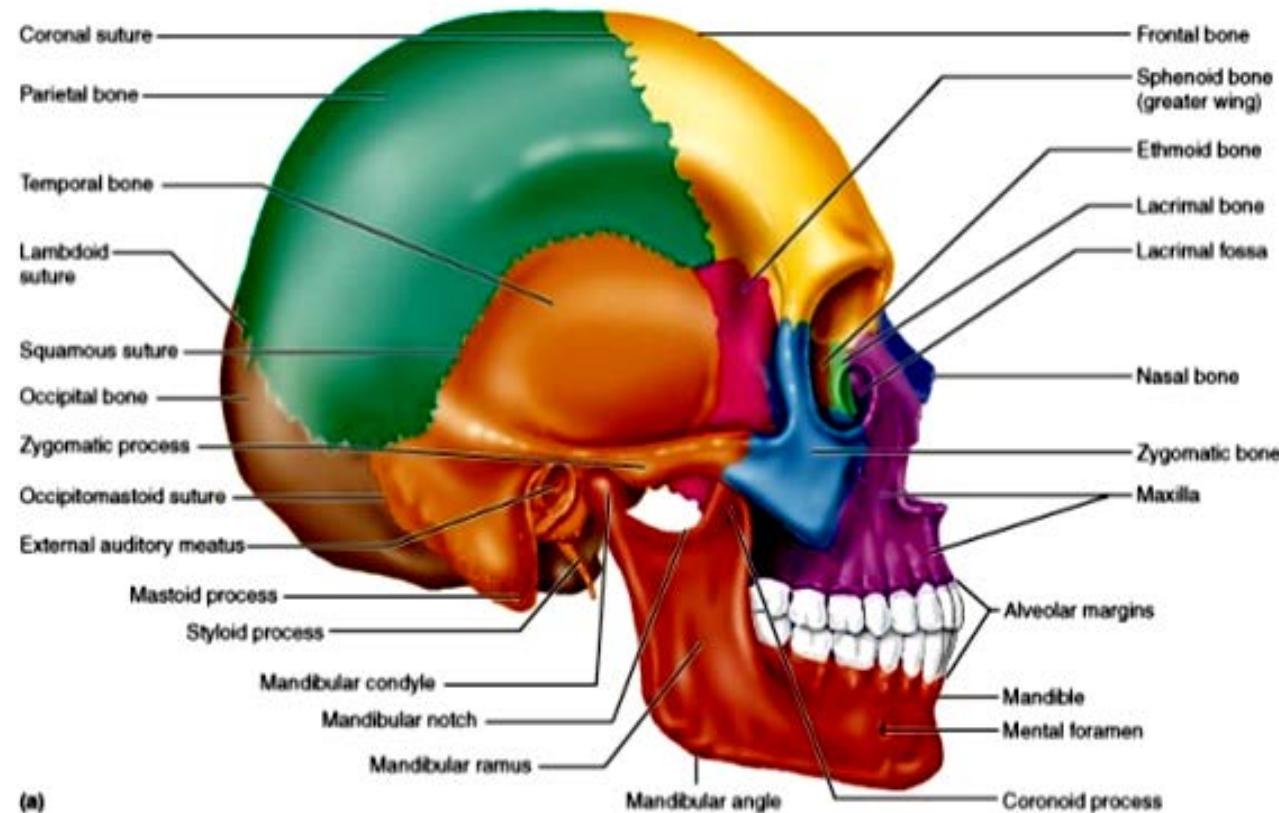
Temporal/ zygomatic/ ethmoid/ maxilla/ mandible/ nasal

Sup. Temporal line/ inf. Temporal line

Temporal / infra temporal fossa

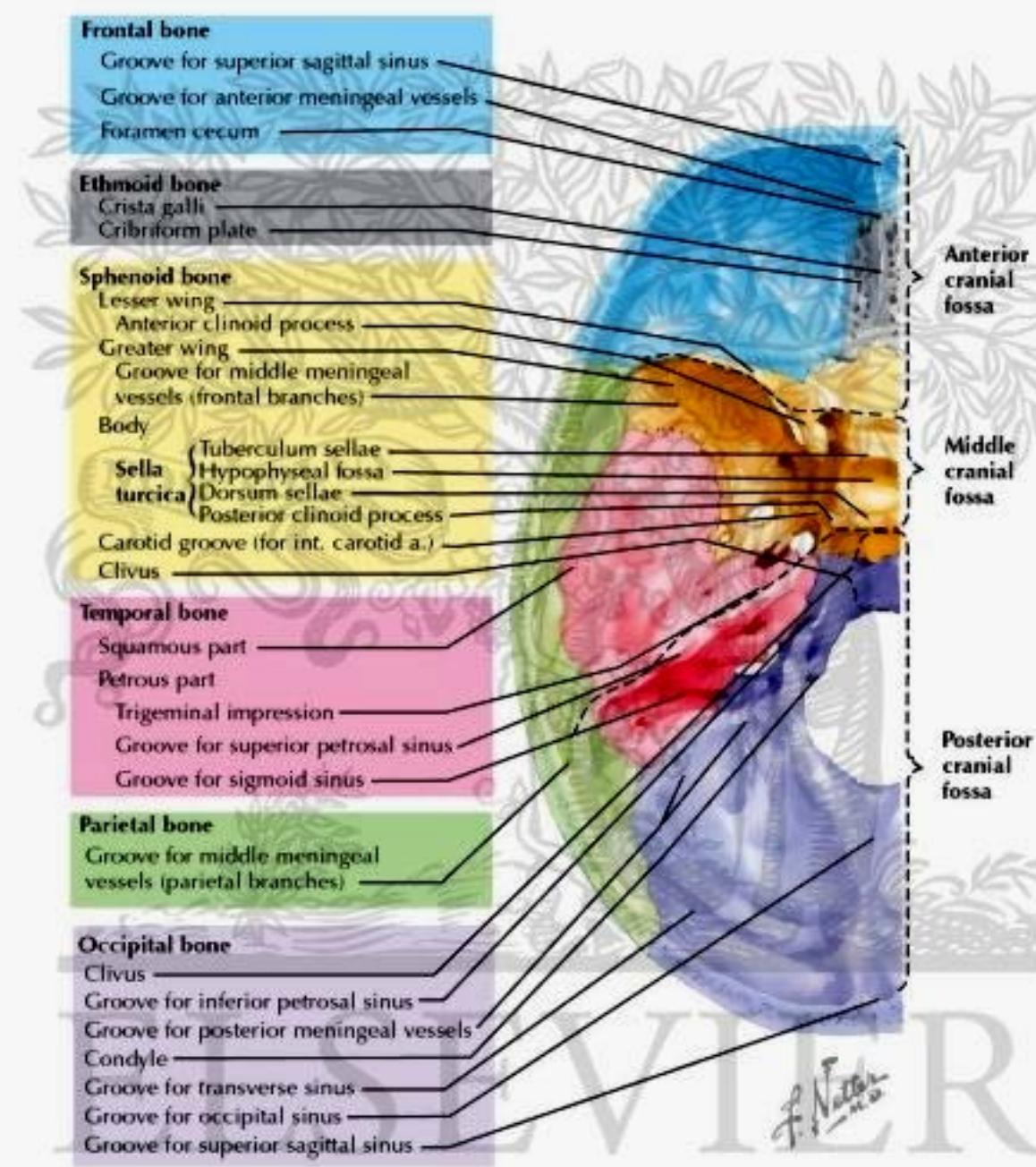
Mastoid/ styloid process

Ext. aqustic meatus



Base of skull:

Ant. Cranial fossa
Middle cranial fossa
Pos. cranial fossa



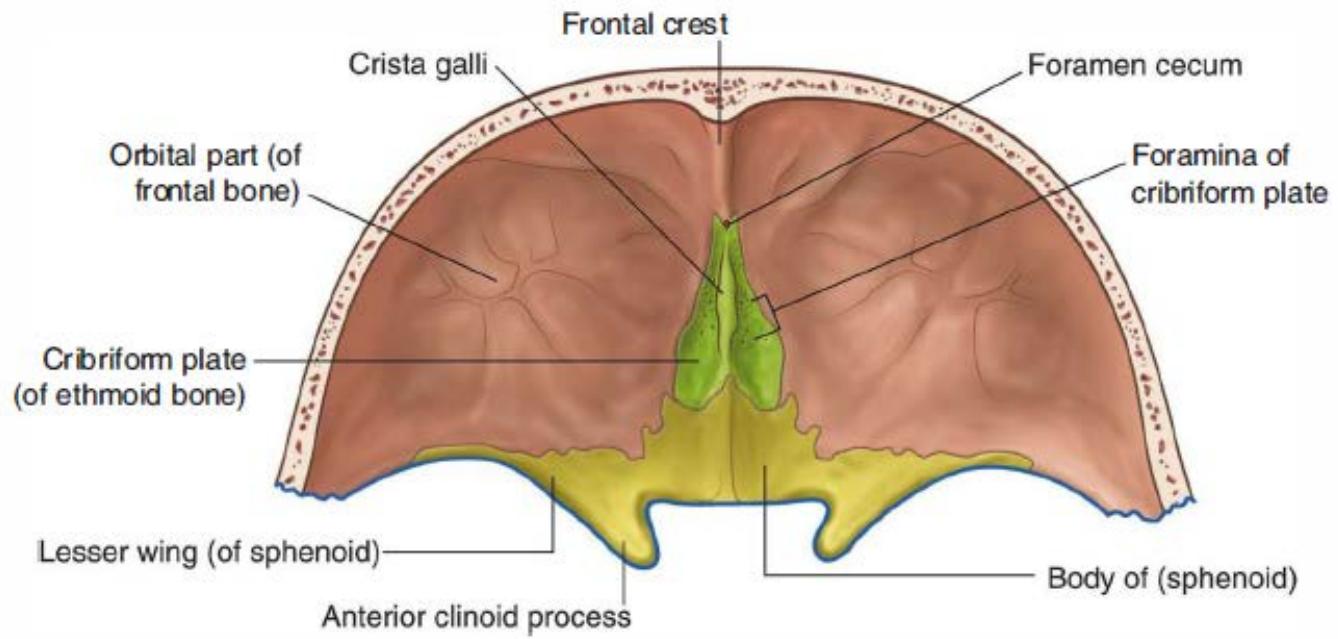
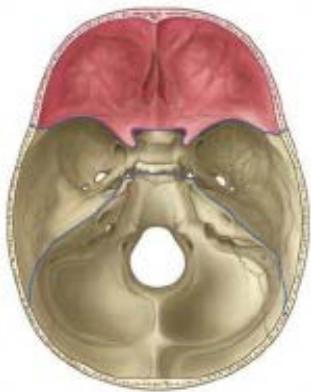


Fig. 8.25 Anterior cranial fossa.

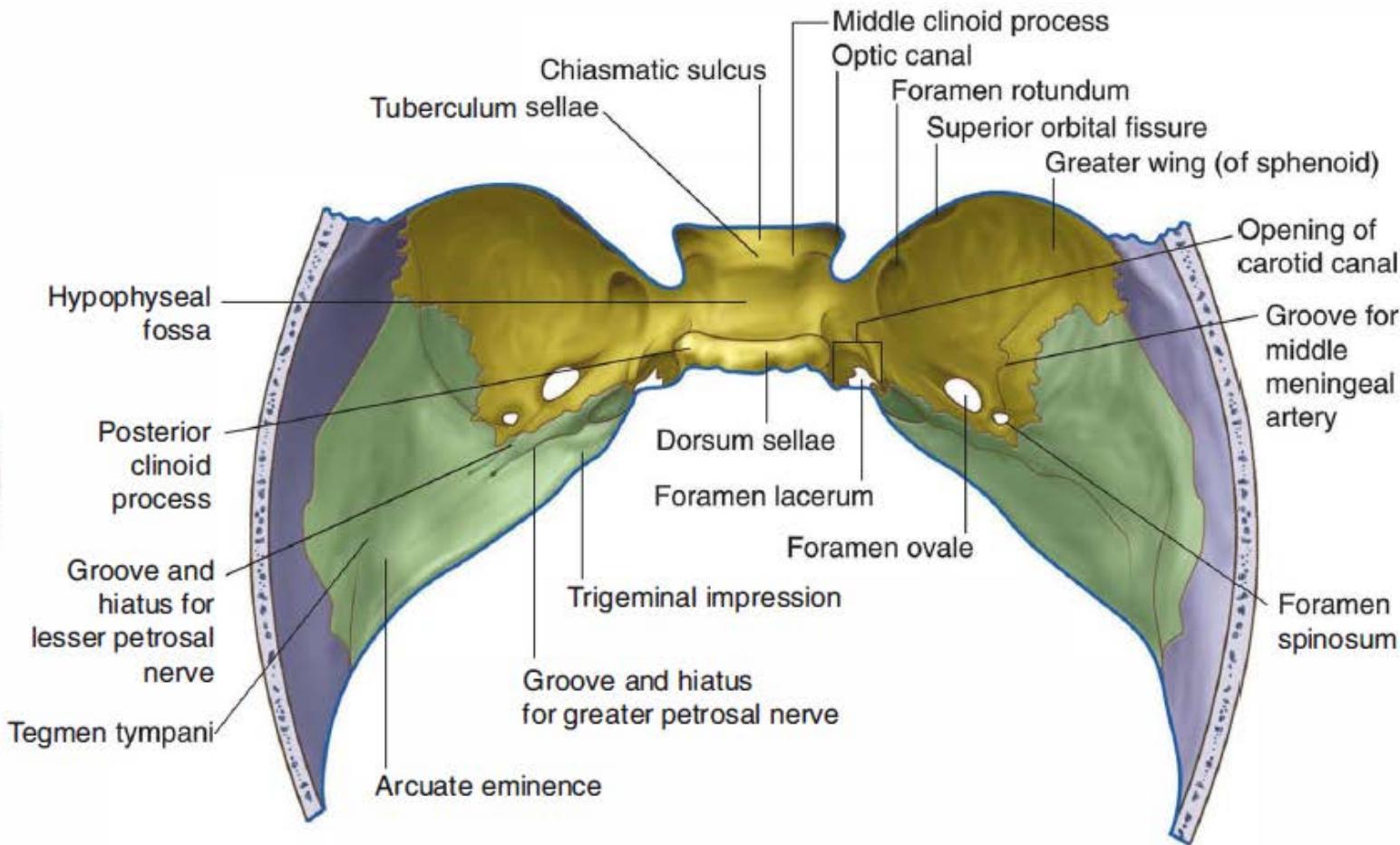
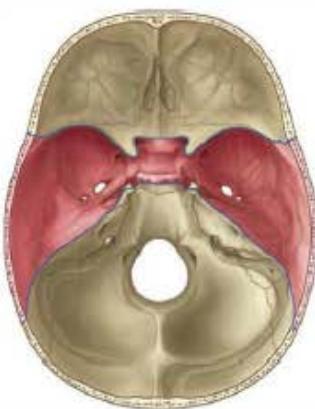


Fig. 8.26 Middle cranial fossa.

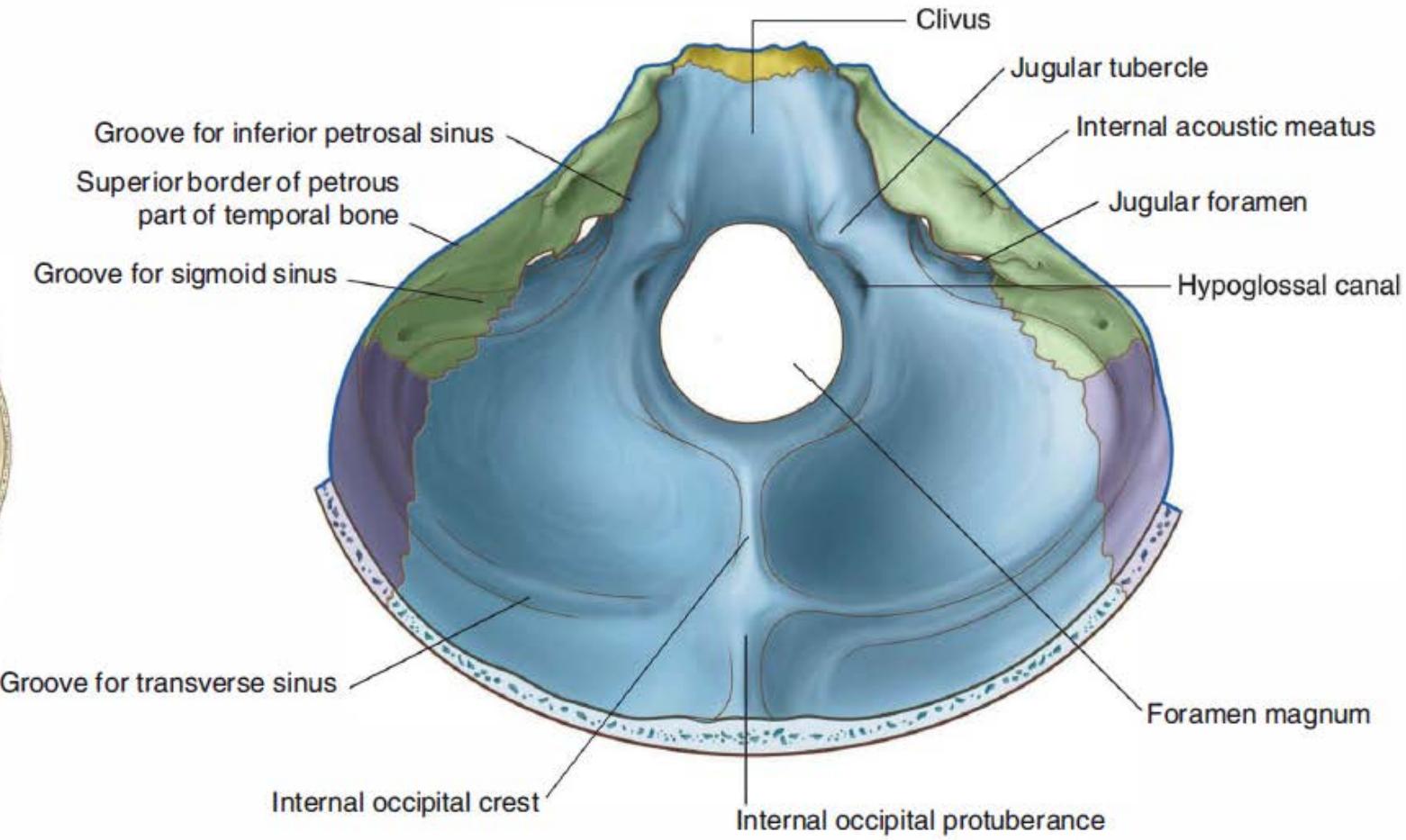
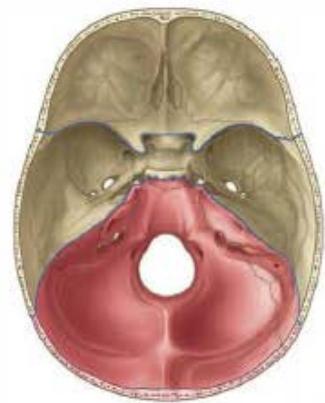


Fig. 8.27 Posterior cranial fossa.

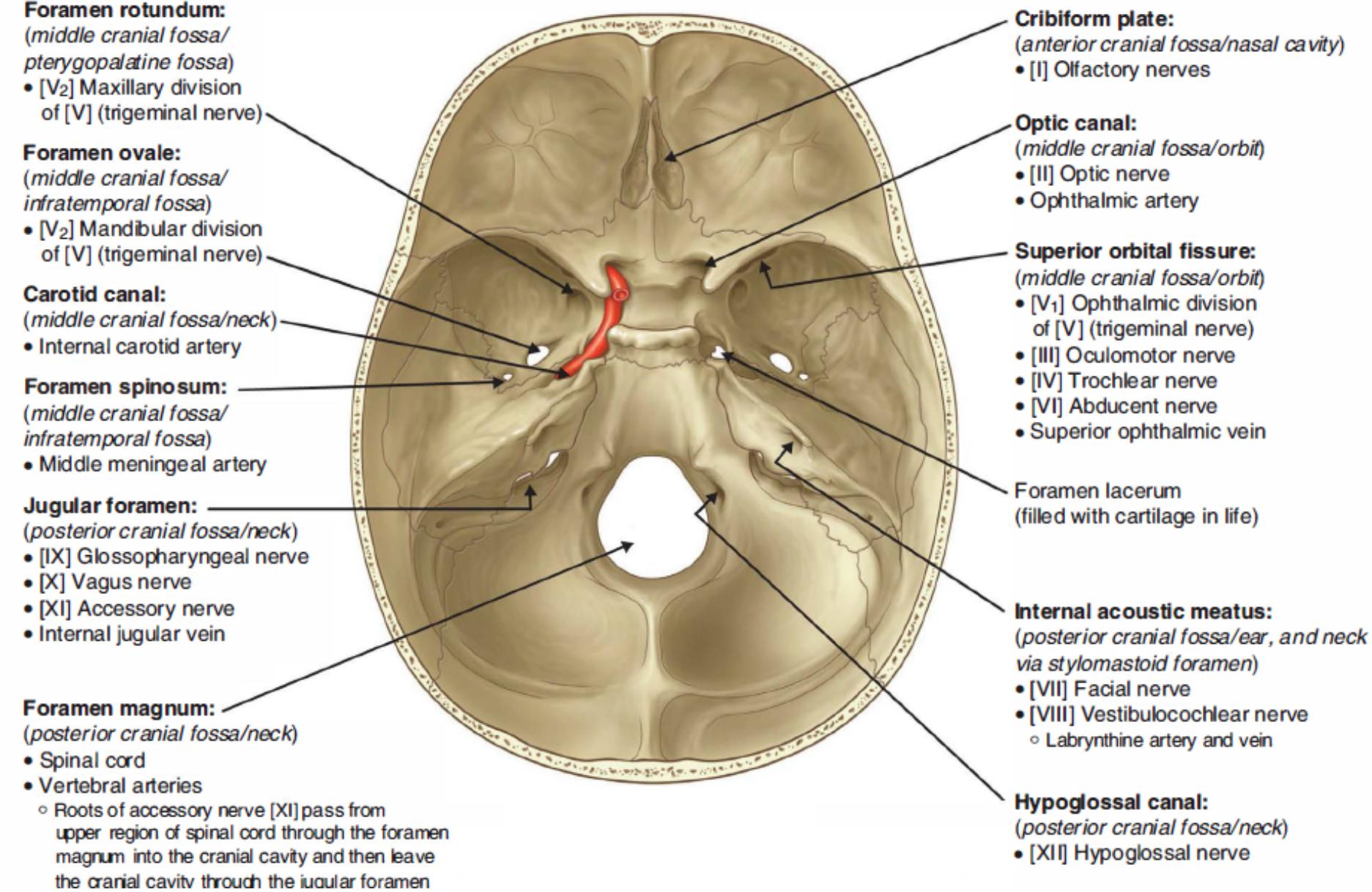


Table 8.2 Internal foramina of the skull

Foramen	Structures passing through foramen
ANTERIOR CRANIAL FOSSA	
Foramen cecum	Emissary veins to nasal cavity
Olfactory foramen in cribriform plate	Olfactory nerves [I]
MIDDLE CRANIAL FOSSA	
Optic canal	Optic nerve [II]; ophthalmic artery
Superior orbital fissure	Oculomotor nerve [III]; trochlear nerve [IV]; ophthalmic division of the trigeminal nerve [V ₁]; abducent nerve [VI]; ophthalmic veins
Foramen rotundum	Maxillary division of the trigeminal nerve [V ₂]
Foramen ovale	Mandibular division of the trigeminal nerve [V ₃]; lesser petrosal nerve
Foramen spinosum	Middle meningeal artery
Hiatus for the greater petrosal nerve	Greater petrosal nerve
Hiatus for the lesser petrosal nerve	Lesser petrosal nerve
POSTERIOR CRANIAL FOSSA	
Foramen magnum	End of brainstem/beginning of spinal cord; vertebral arteries; spinal roots of the accessory nerve; meninges
Internal acoustic meatus	Facial nerve [VII]; vestibulocochlear nerve [VIII]; labyrinthine artery
Jugular foramen	Glossopharyngeal nerve [IX]; vagus nerve [X]; accessory nerve [XI]; inferior petrosal sinus, sigmoid sinus (forming internal jugular vein)
Hypoglossal canal	Hypoglossal nerve [XII]; meningeal branch of the ascending pharyngeal artery
Condylar canal	Emissary vein



Base of skull:

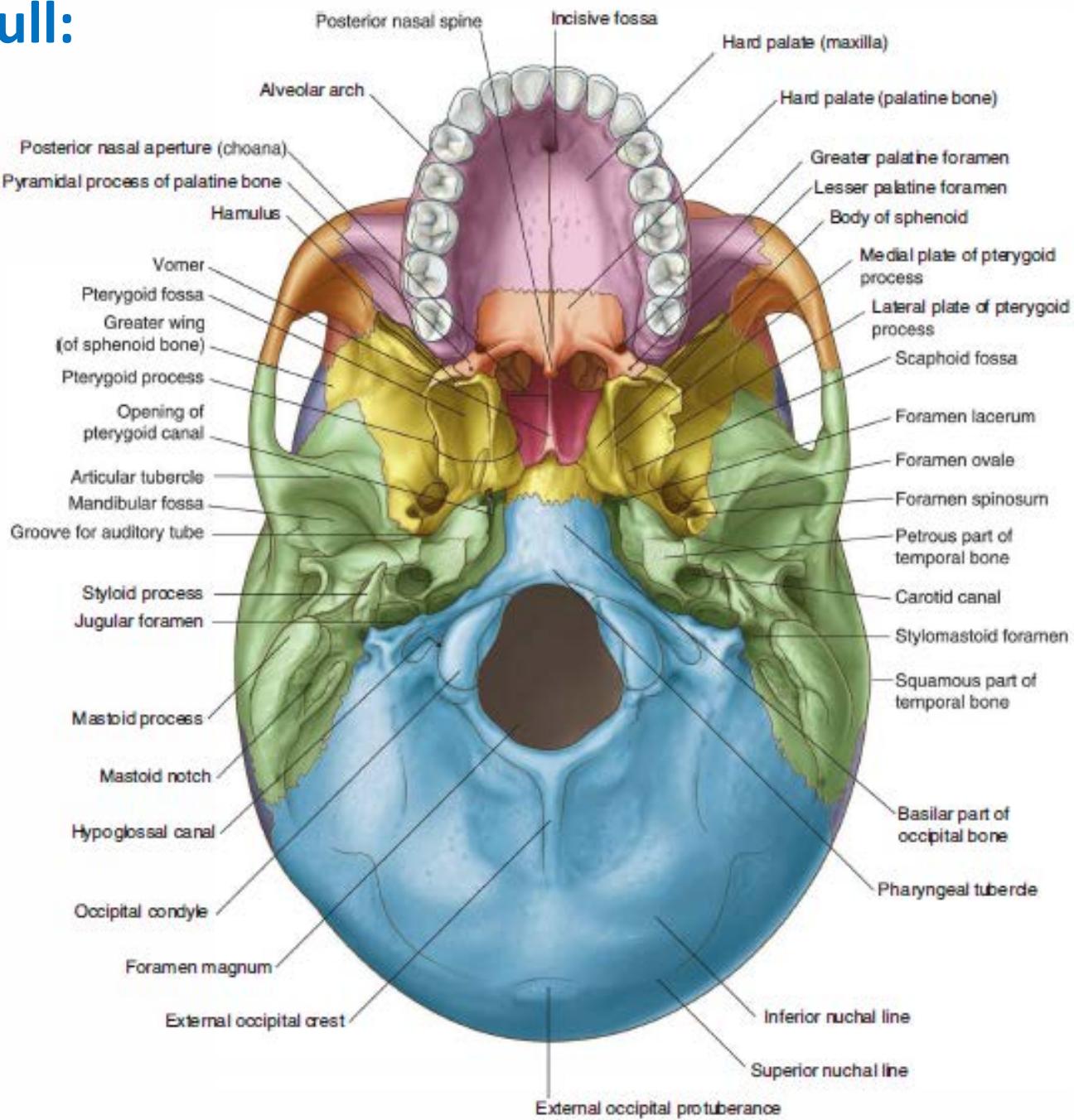
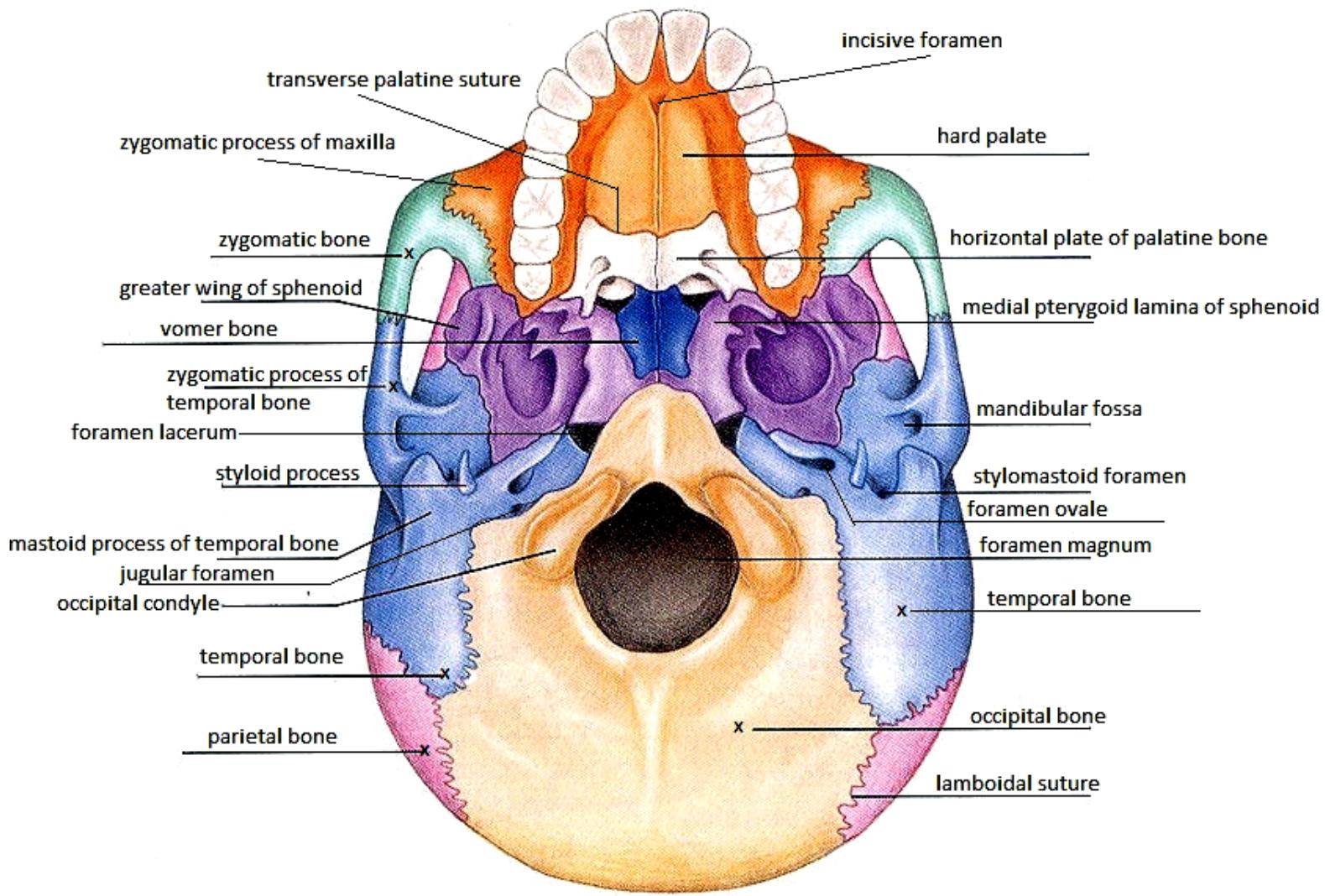


Fig. 8.23 Inferior view of the skull.

Base of skull:



A**Carotid canal:**

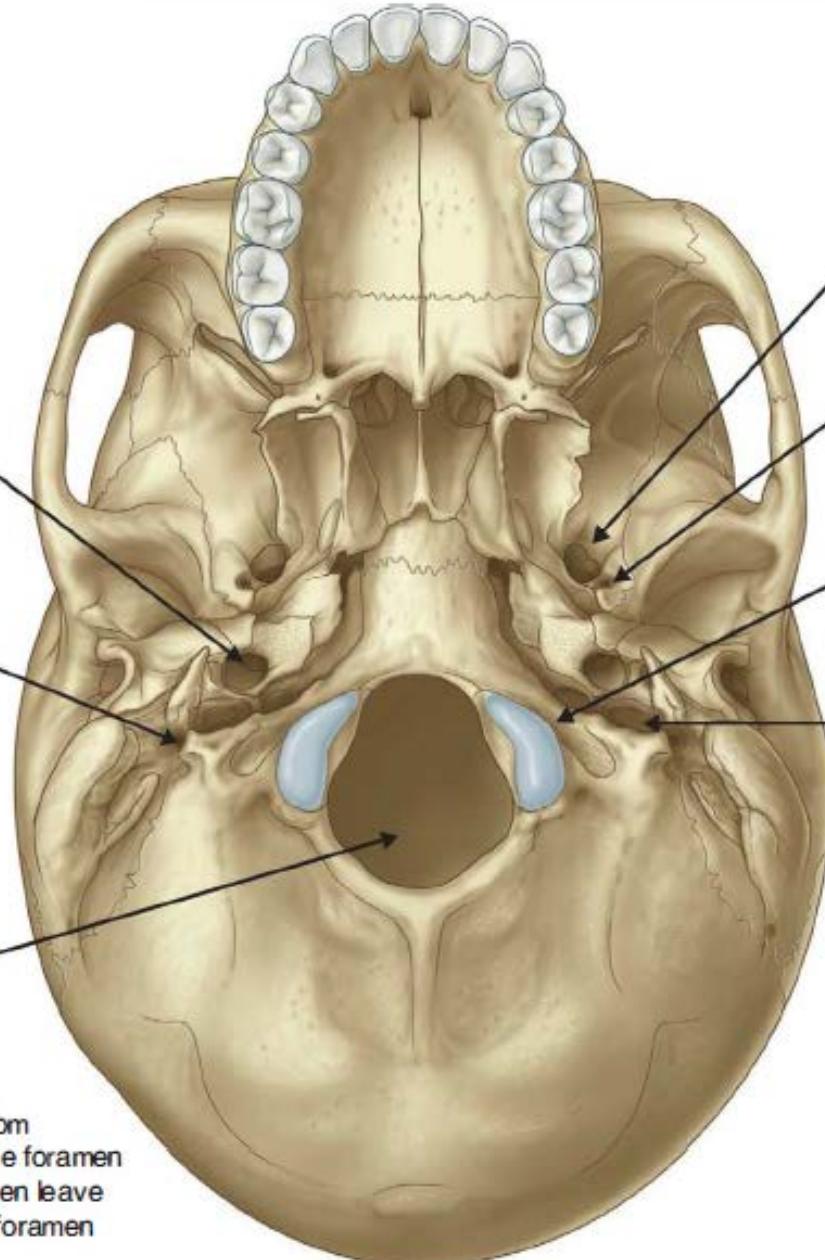
- Internal carotid artery

Stylo mastoid foramen:

- [VII] Facial nerve

Foramen magnum:

- Spinal cord
- Vertebral arteries
 - Roots of accessory nerve [XI] pass from upper region of spinal cord through the foramen magnum into the cranial cavity and then leave the cranial cavity through the jugular foramen

**Foramen ovale:**

- [V₂] Mandibular division of [V] (trigeminal nerve)

Foramen spinosum:

- Middle meningeal artery

Hypoglossal canal:

- [XII] Hypoglossal nerve

Jugular foramen:

- [IX] Glossopharyngeal nerve
- [X] Vagus nerve
- [XI] Accessory nerve
- Internal jugular vein

B

A scenic landscape featuring a frozen lake in the foreground, its surface covered in a layer of ice. Beyond the lake, snow-covered hills rise against a clear blue sky. Bare deciduous trees stand in the mid-ground, their intricate branches reaching towards the sky. A few evergreen trees are scattered among them. The overall atmosphere is serene and cold.

Have A Good Time