

# Skull. Sphenoid and Ethmoid bones



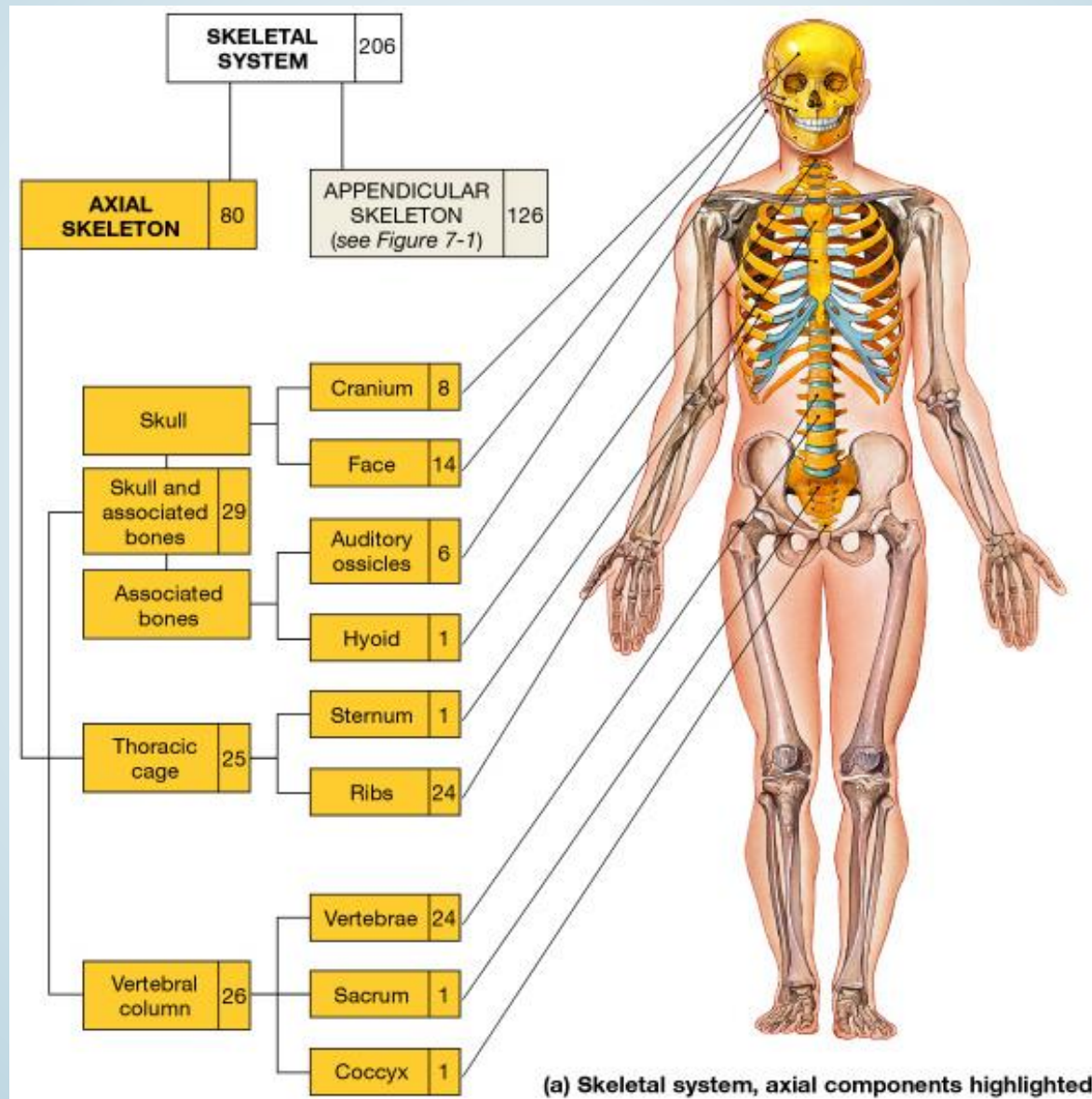
PhD., Dr. David Lendvai

Department of Anatomy, Histology and Embriology

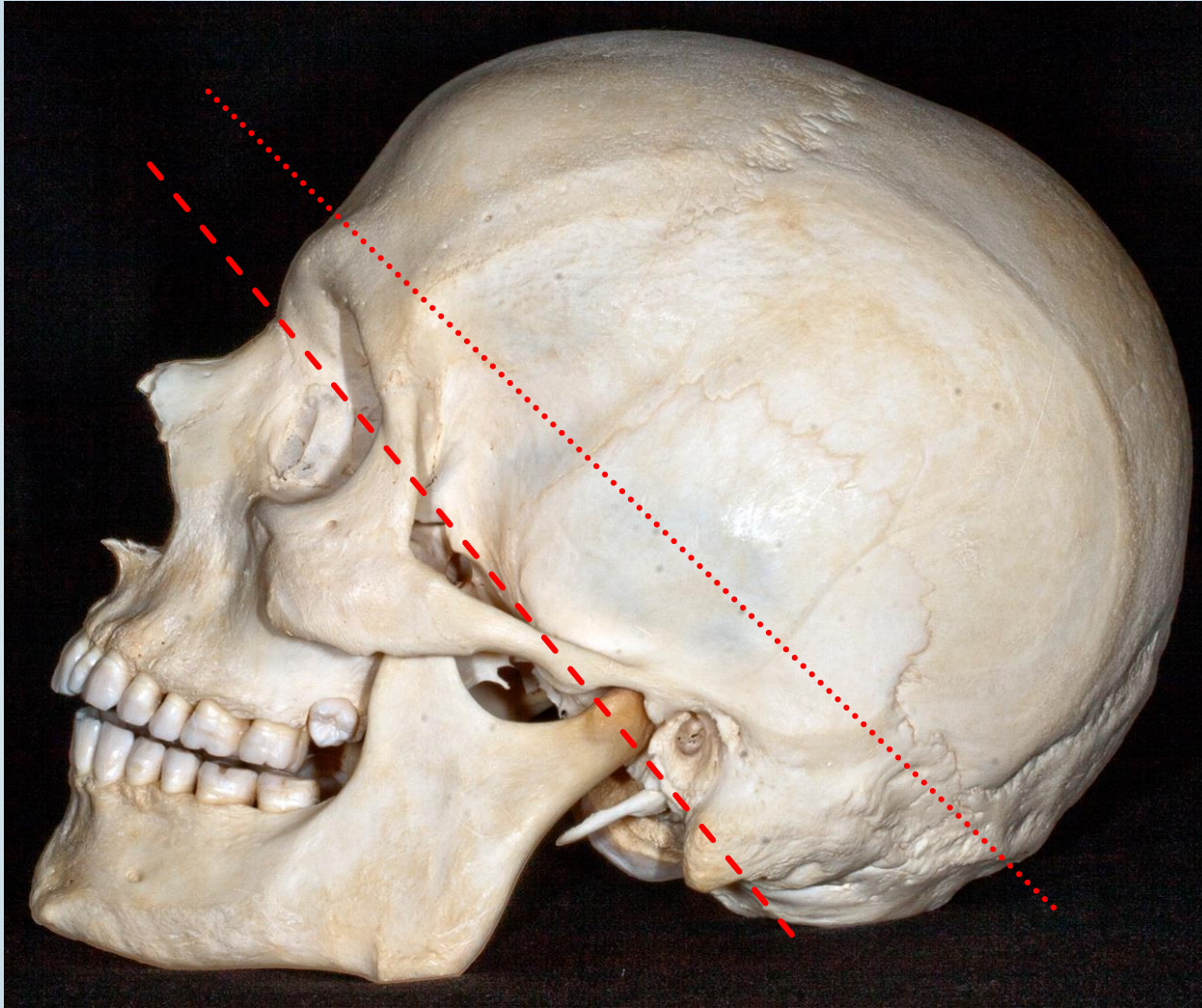
Semmelweis University, Faculty of Medicine

2018.

# Skeletal system



# Structure of the skull



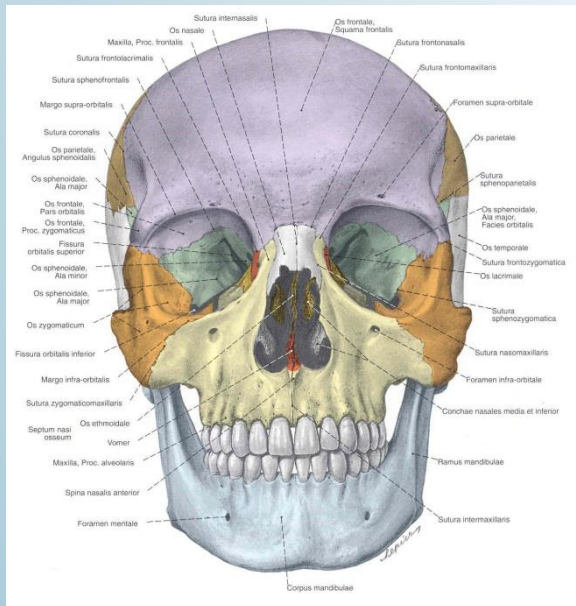
- - - - Border between viscerocranium and neurocranium

..... Calvaria

# Main parts of the skull

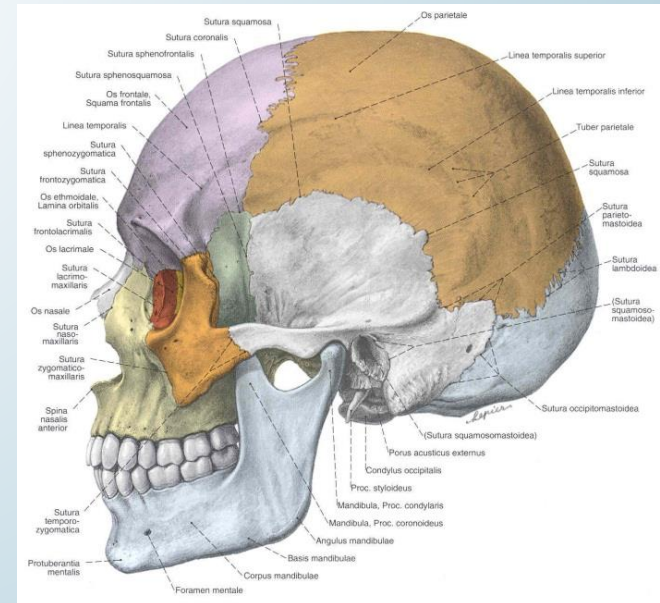
- Constitute by 22 bones:
- neurocranium* (8) – **UNPAIRED**: frontal, occipital, sphenoid, ethmoid bones  
**PAIRED**: temporal, parietal bones
- viscerocranium* (14) -**UNPAIRED**: mandibule, vomer.  
**PAIRED**: nasal, maxilla, zygomatic, lacrimal, palatine, inferior nasal concha

Their role – formation of cavities, protect viscera, voice formation, initial portions of the gastrointestinal and respiratory systems, insertion of muscles (mastication, head movements)



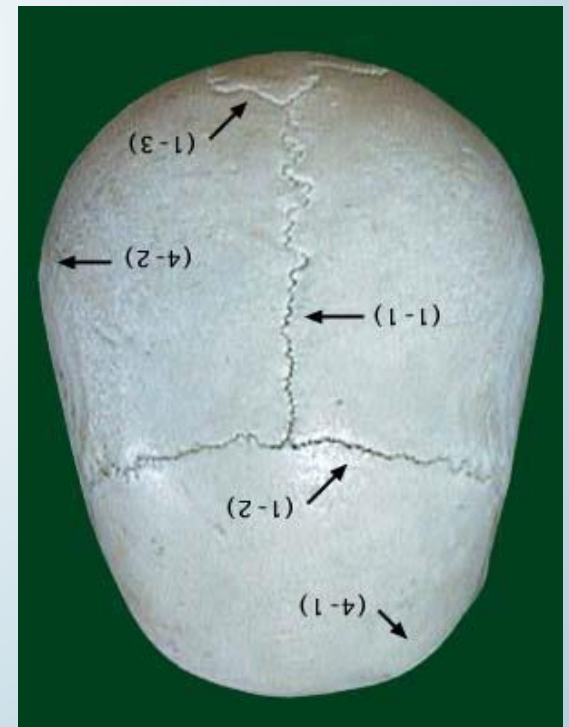
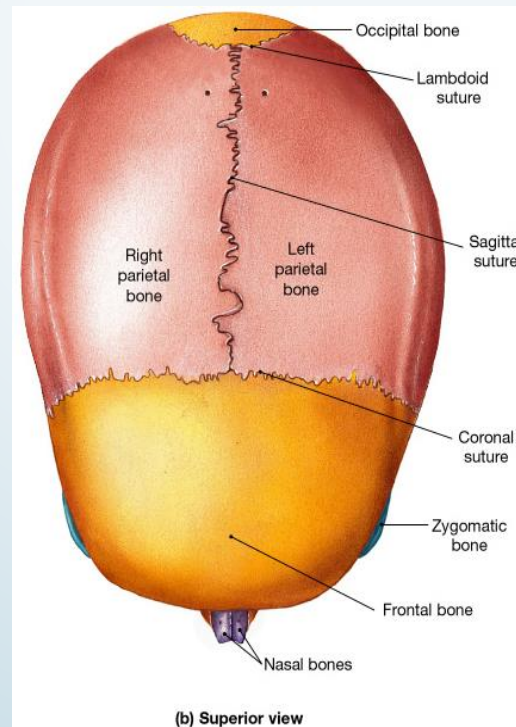
## Cavities:

- *Cranial cavity,*
- *Nasal cavity,*
- *Paranasal sinuses*
- *Oral cavity,*
- *Orbit,*
- *(Tympanic cavity,*
- *Inner ear)*

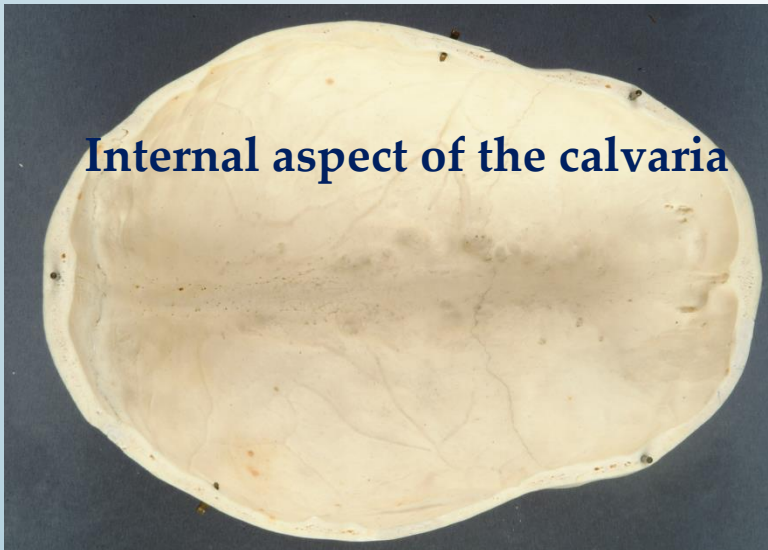
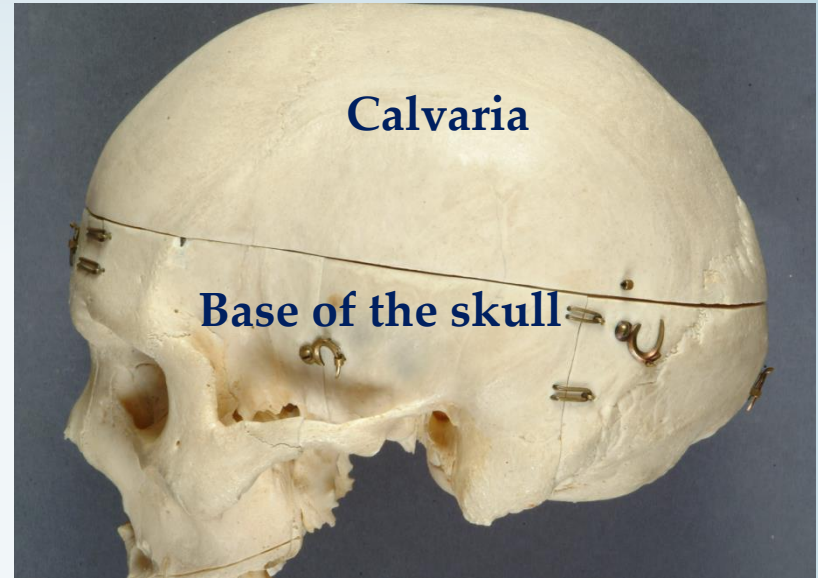
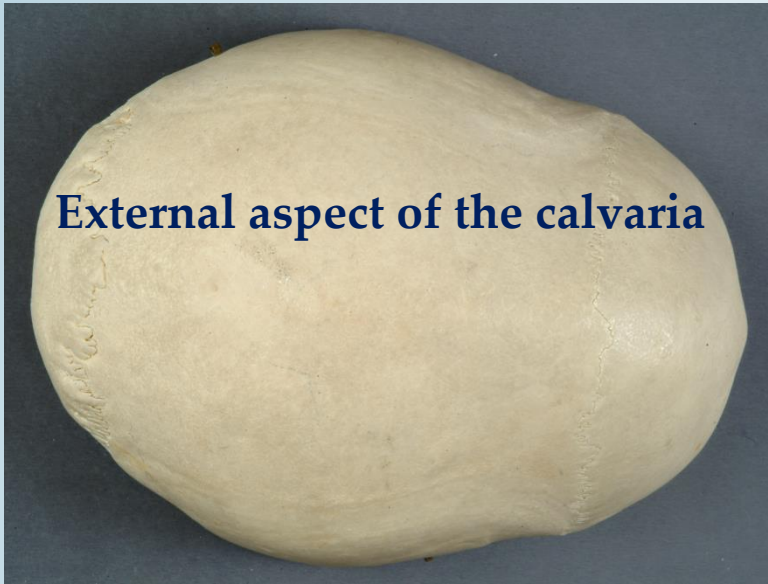


# Connections between cranial bones

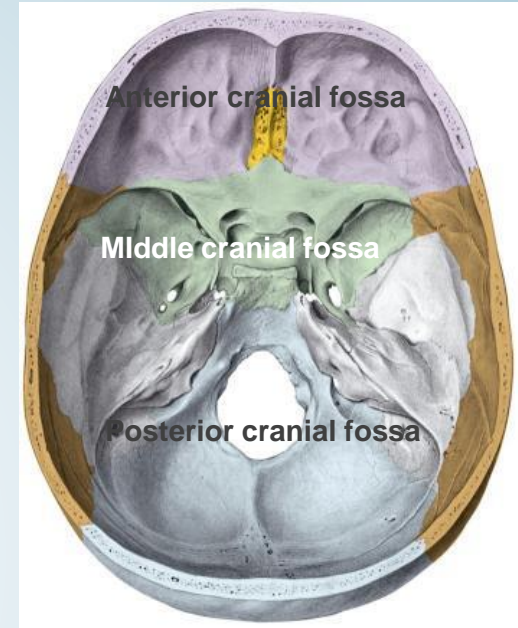
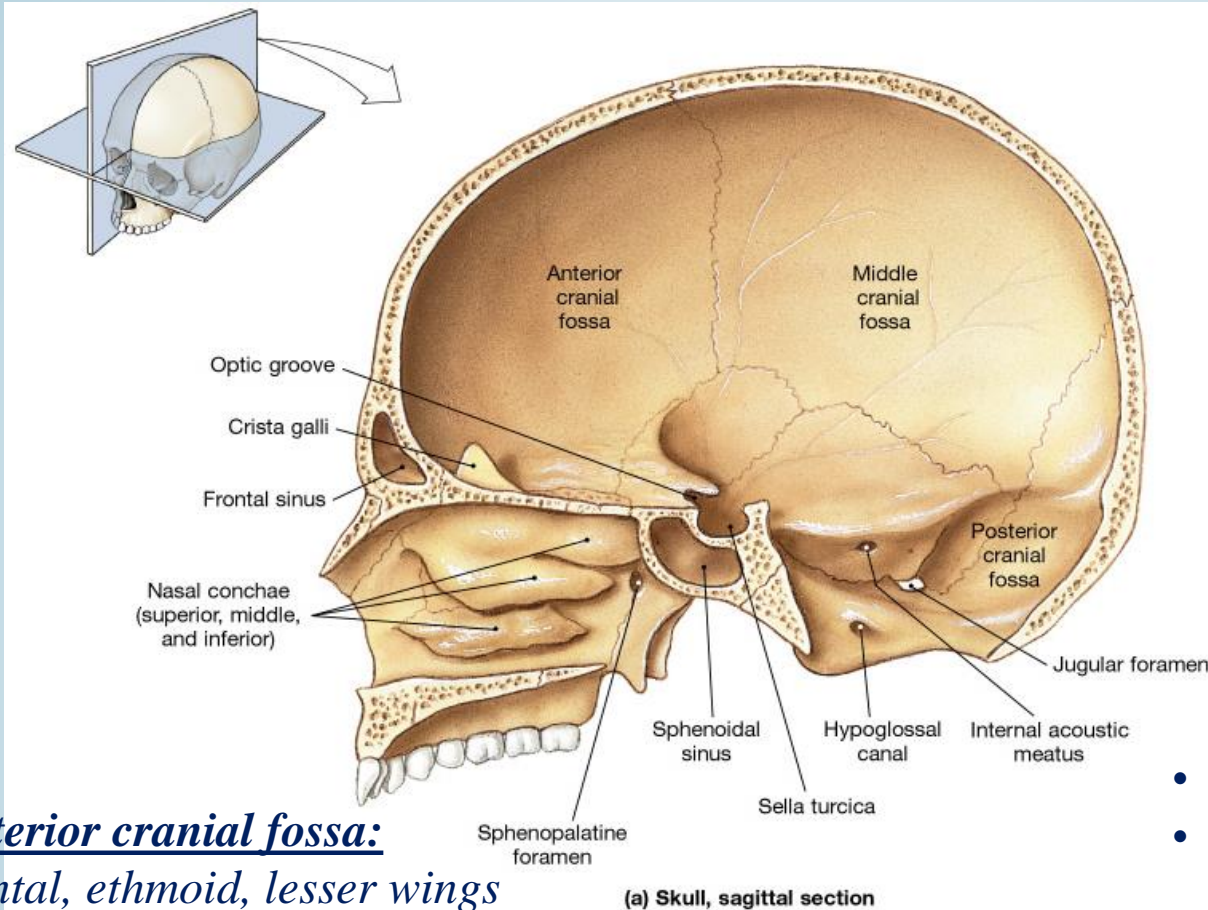
- *Synchondrosis, synostosis*  
(cartilagineal and bony connections)
- *Sutures*
  - *Coronal*
  - *Sagittal*
  - *Lambdoid*



# Calvaria and the base of the skull



# Fossae cranii

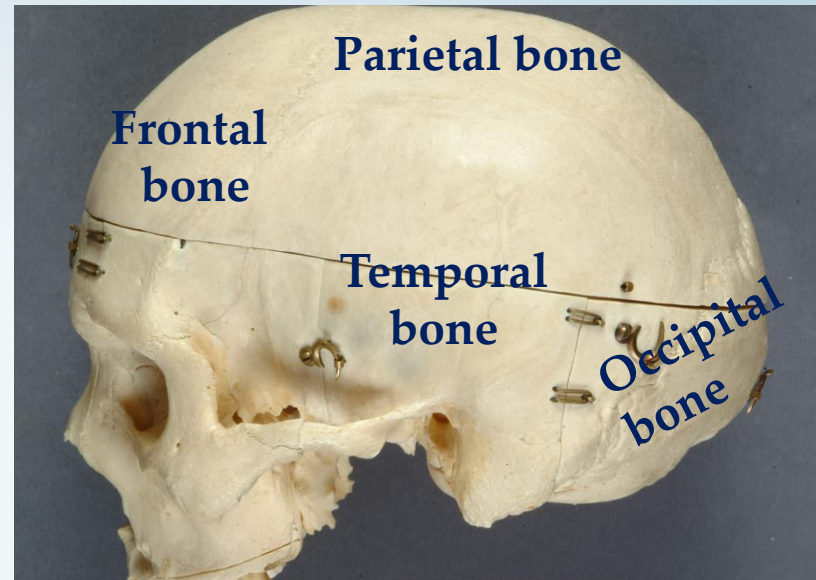
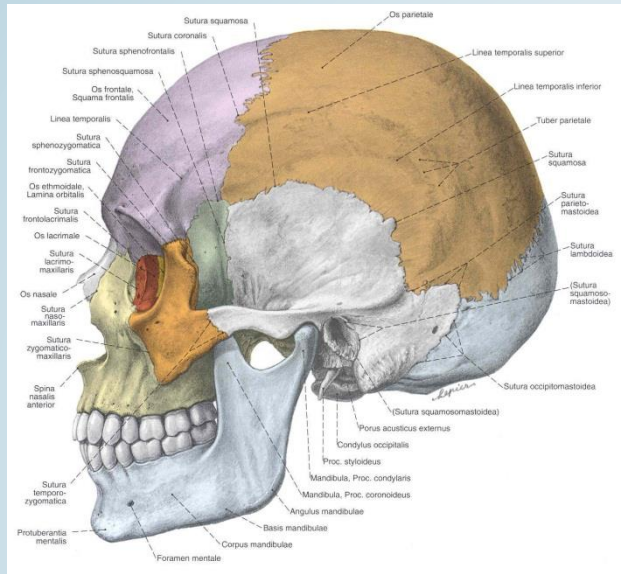


- **Posterior cranial fossa:**
- Occipital, temporal bones, parietal bones

- **Middle cranial fossa:**  
sphenoid, temporal bones, parietal bones

- **Anterior cranial fossa:**  
*frontal, ethmoid, lesser wings of sphenoid*

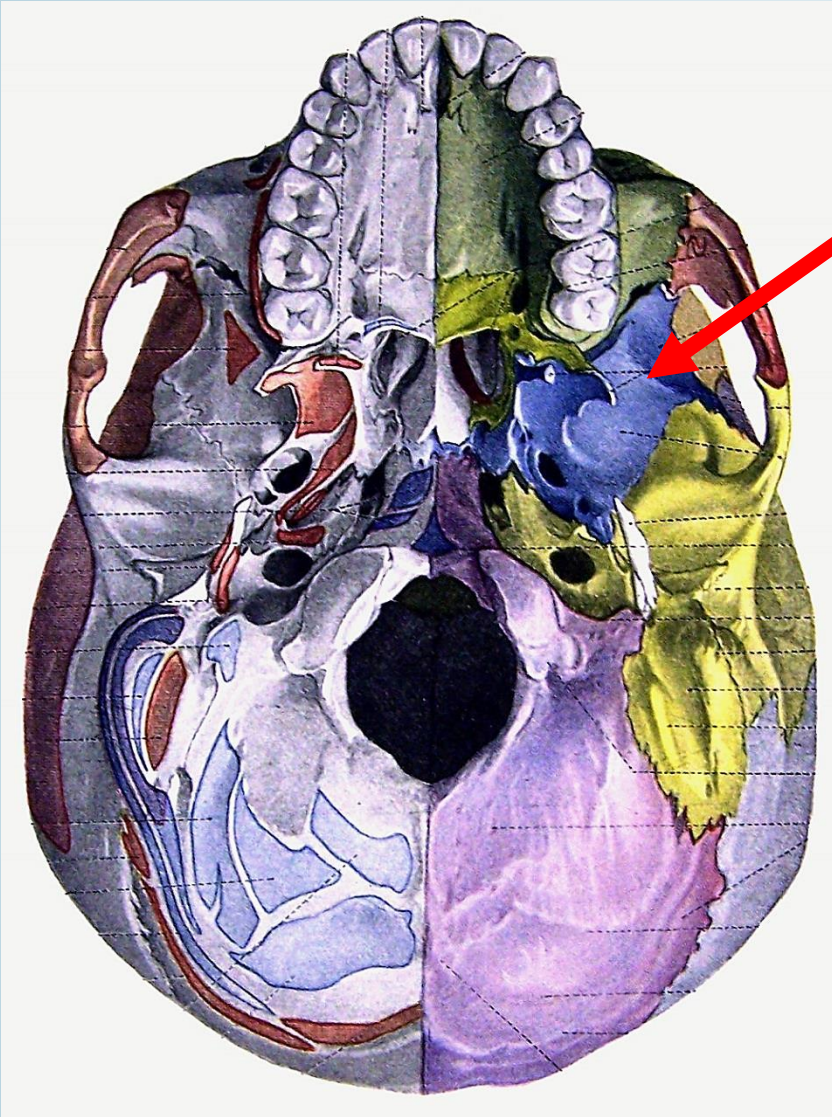
# Bones of the neurocranium





# Sphenoid bone

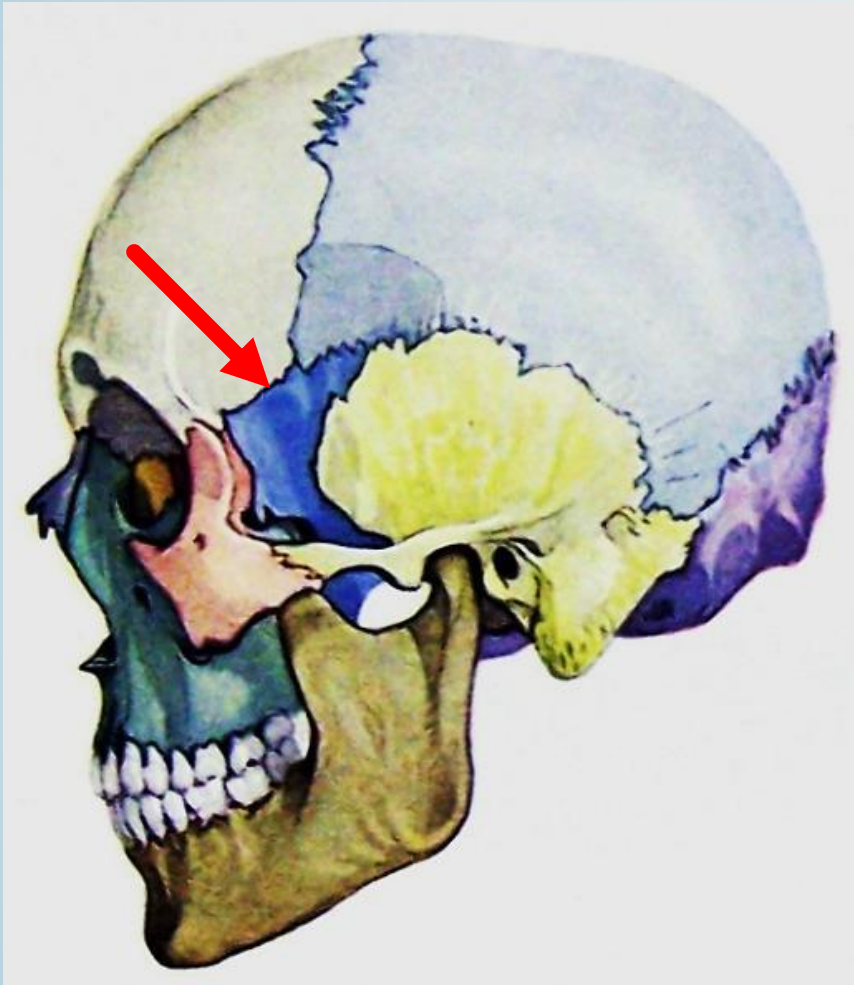
Braus



Part of the external skull base (- body (Corpus), pterygoid process, greater wing (Ala major)

# Sphenoid bone

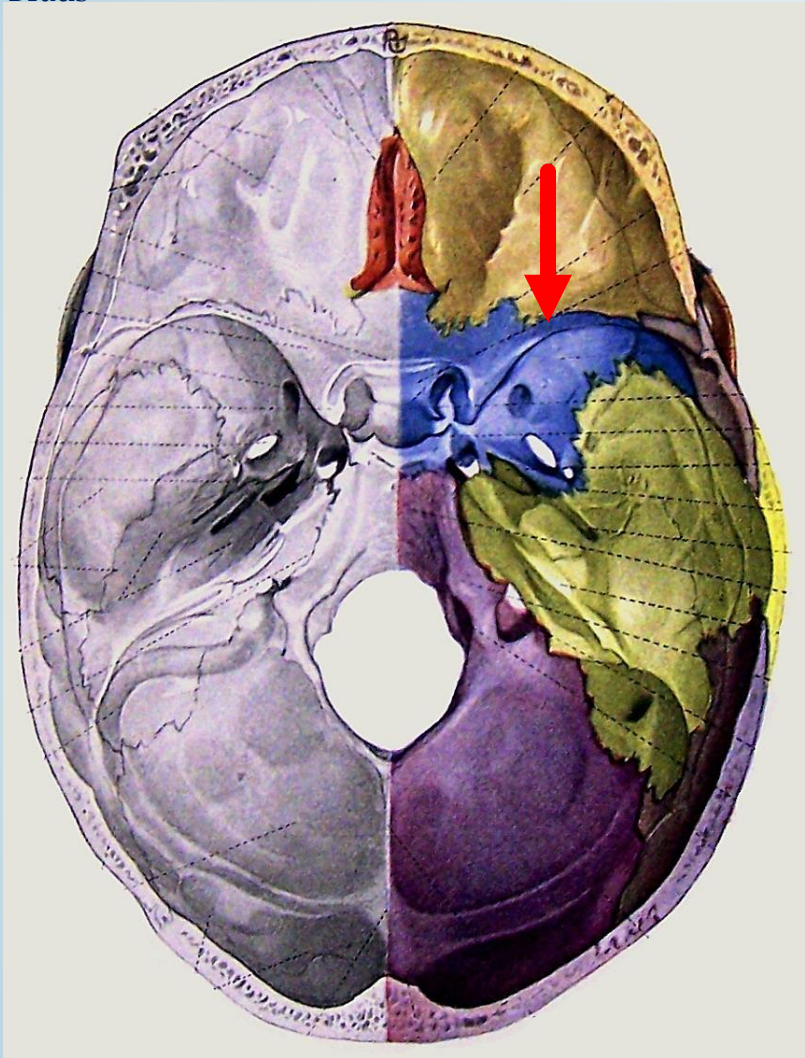
Braus



Part of the temporal fossa, greater wing (Ala major)

# Sphenoid bone

Braus



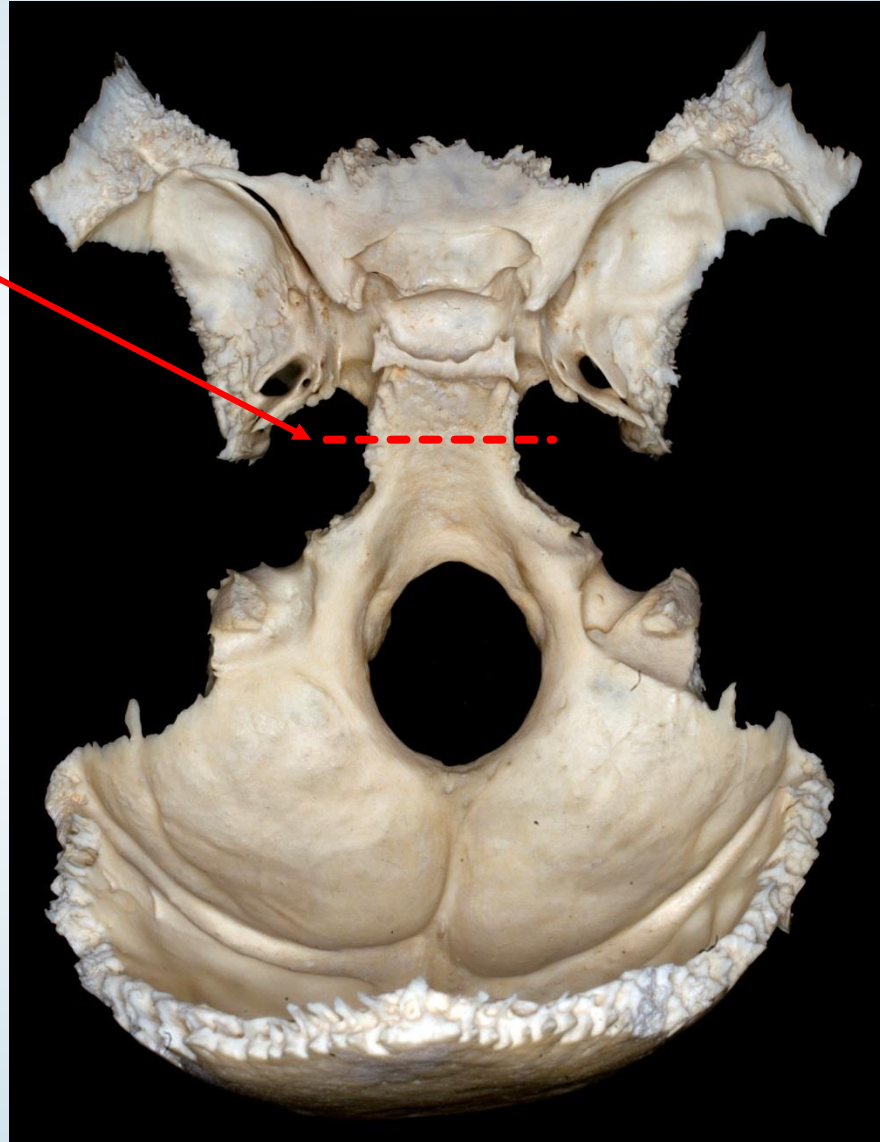
Part of the internal skull base (Corpus, Ala minor, Ala major)

# Sphenoid bone

**sphenooccipital synchondrosis:**  
ossified in the beginning  
of adulthood

About the age of 18  
can be the occipital bone and the  
sphenoid bone no longer  
separated from each other  
(synostosis)

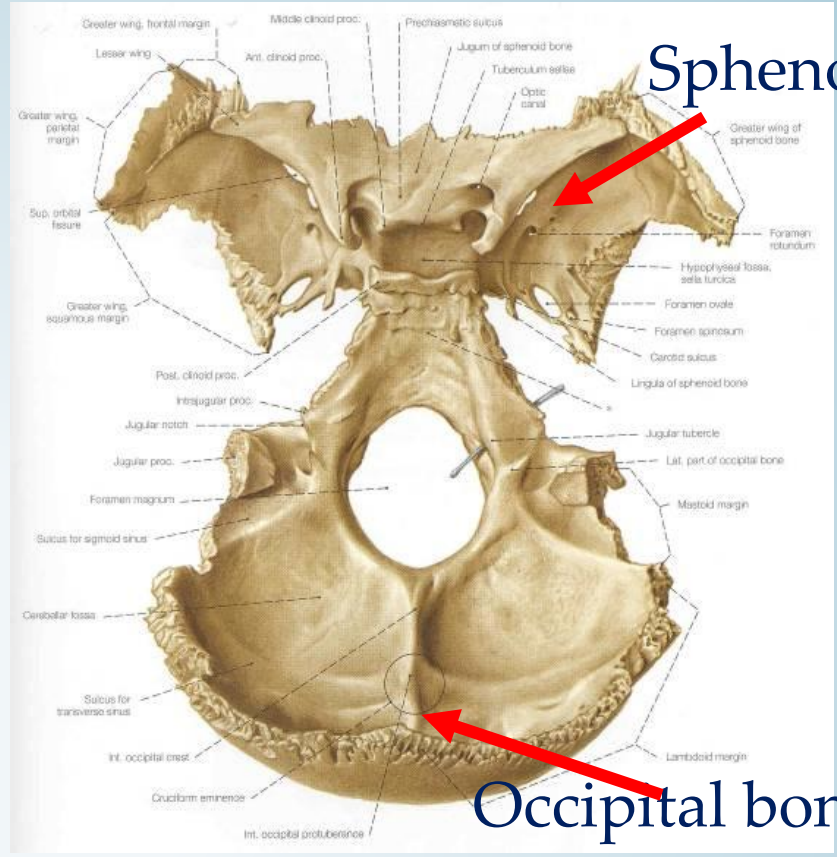
Connections to the others bones  
by sutures, with the passage of  
time also often ossified



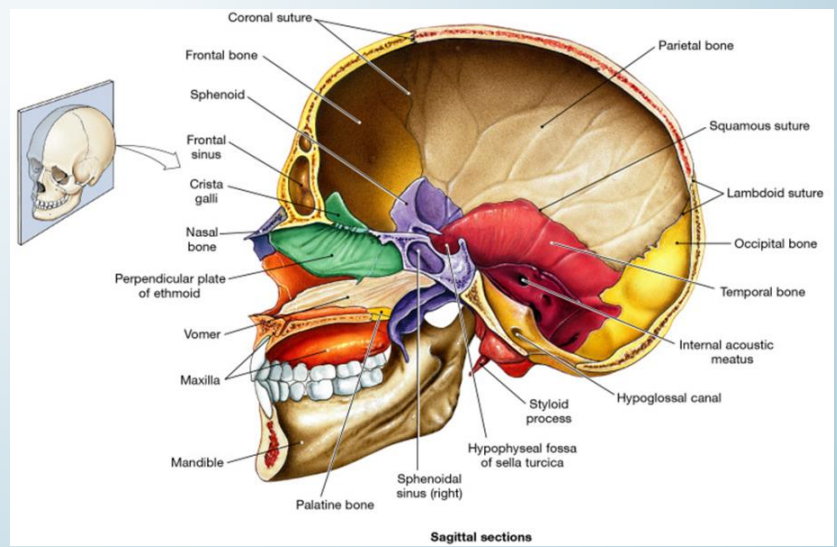
# Sphenoid

## Body of sphenoid:

- (cuboid shape)
- **Posterior surface** - connected to the basiliary part of the occipital bone
- **Inferior surface** - connected to vomer
- **Superior surface** - sella turcica, *tuberculum sellae*, *dorsum sellae*, (*anterior/middle/posterior clinoid process*)
- **Anterior surface** – facing to the nasal cavity (aperture of sphenoidal sinus)
- **Lateral surfaces** – origin of greater wings and the position of carotic grooves



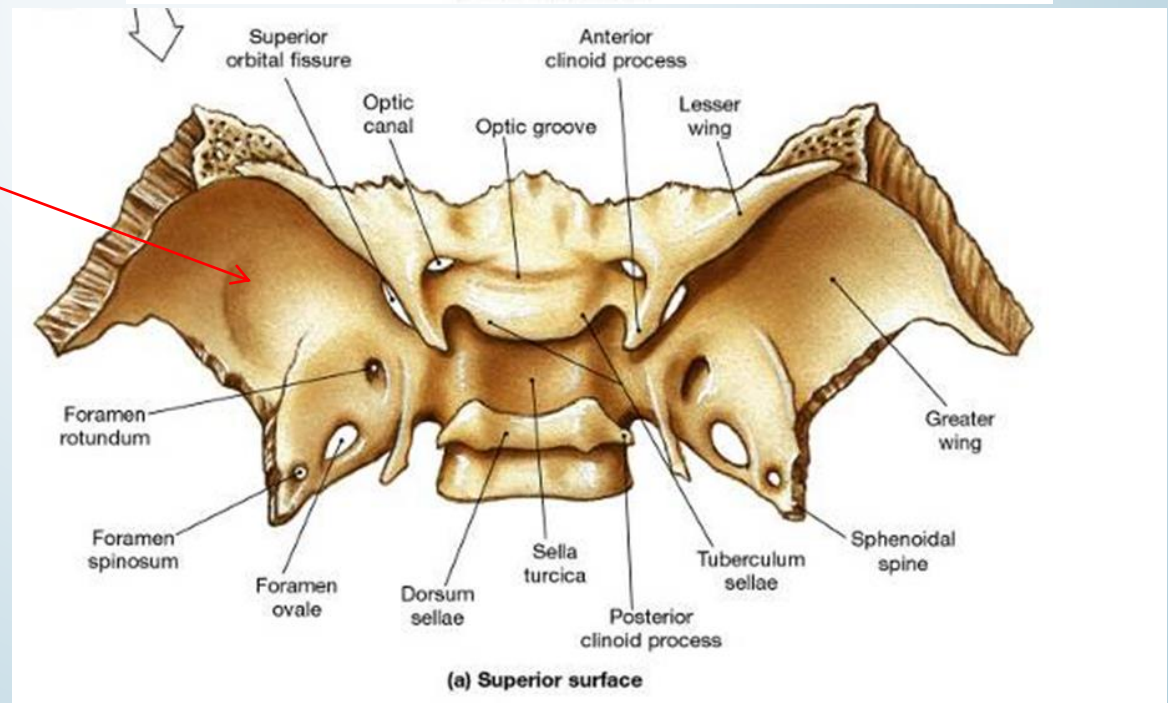
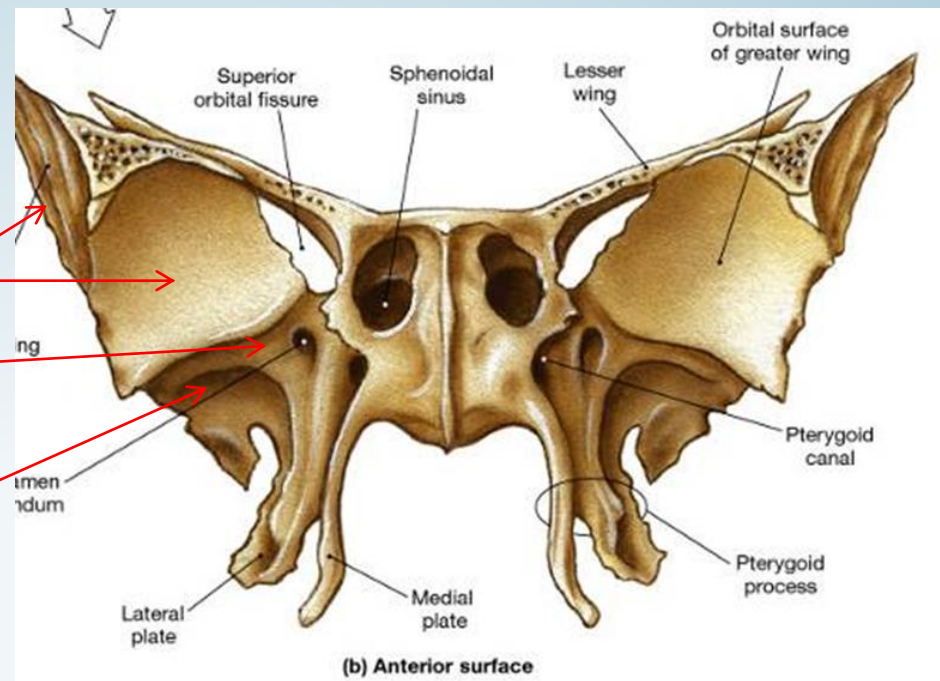
# Occipital bone

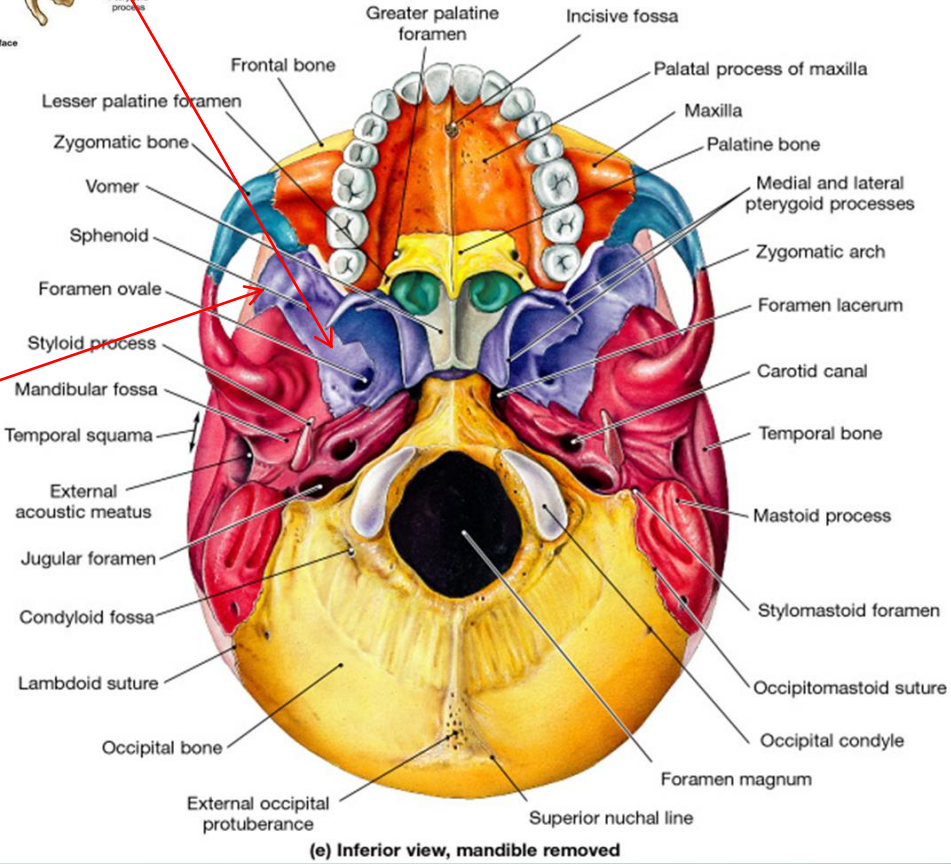
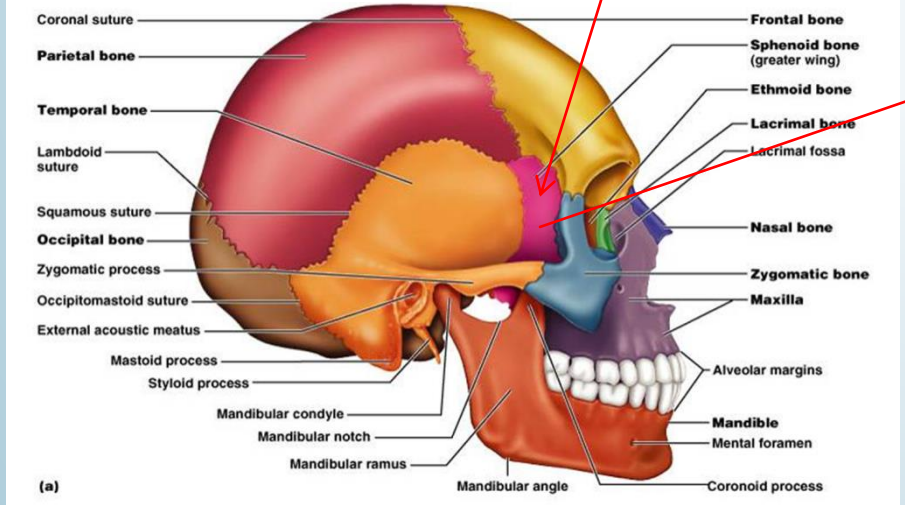
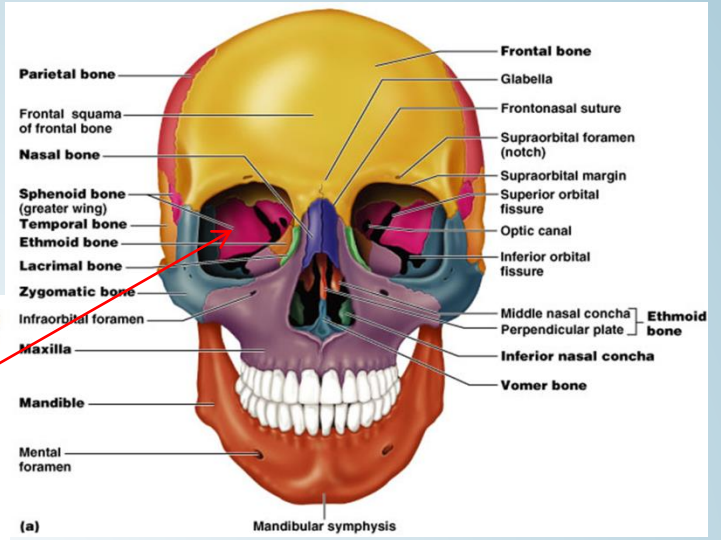
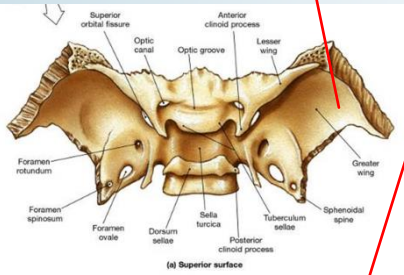
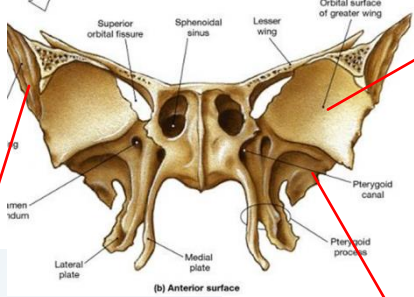
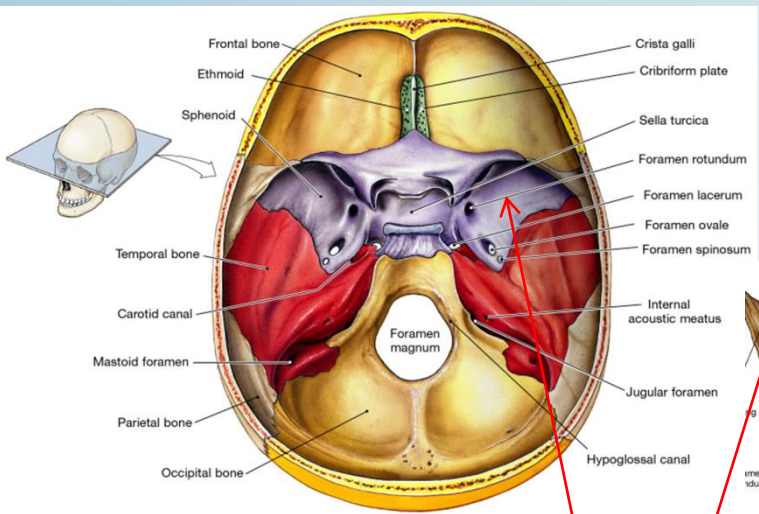


# Sphenoid

## Surfaces of the greater wing:

- orbital surface
- maxillary surface  
(around foramen rotundum)
- temporal surface
- infratemporal surface
- cerebral surface





# Sphenoid bone

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Os sphecoideum ~ Wasp ~ Os vespiforme

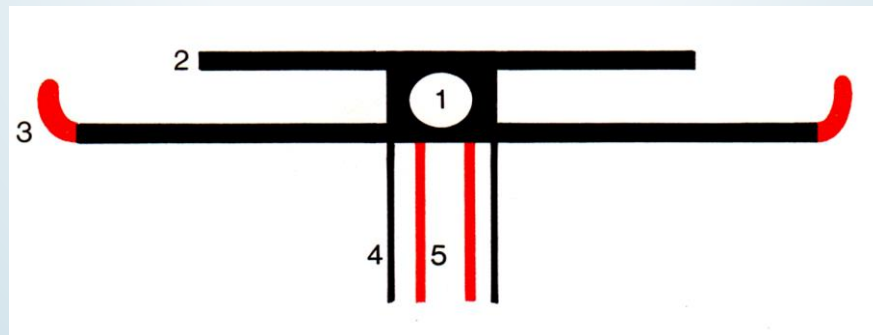
Os sphenoidale = cuneiform

Os cuneiforme, alatum, pterygoideum, polymorphon, carinae, colatorii, paxillare





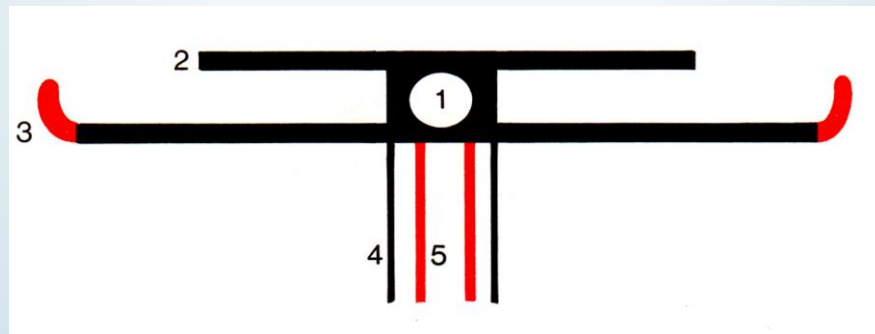
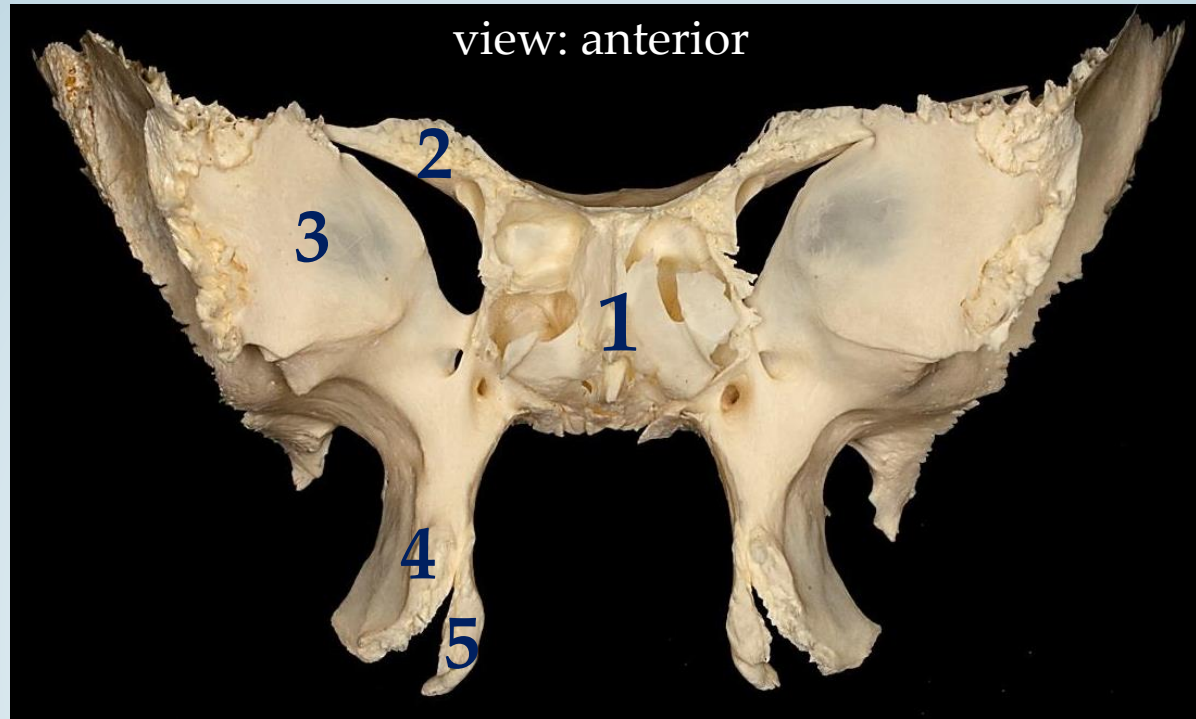
fotó: Semmelweis Egyetem ©



Faller

- 1. sphenoidal sinus
- 2. lesser wing of sphenoid bone
- 3. greater wing of sphenoid bone

- 4. lateral pterygoid plate
- 5. medial pterygoid plate

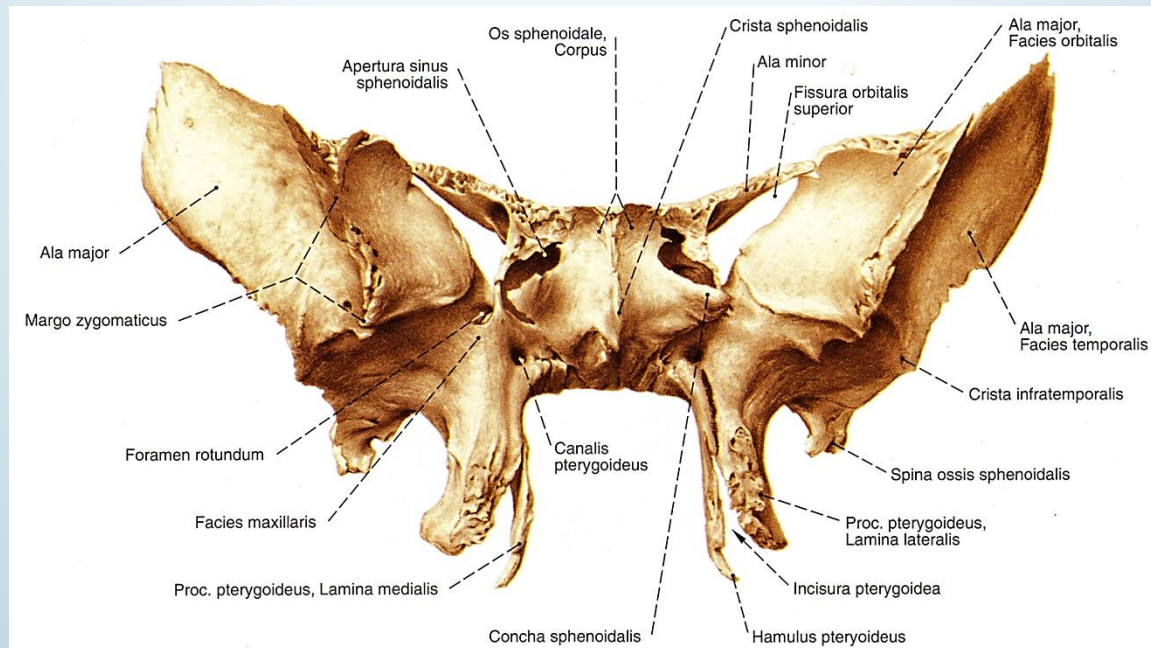
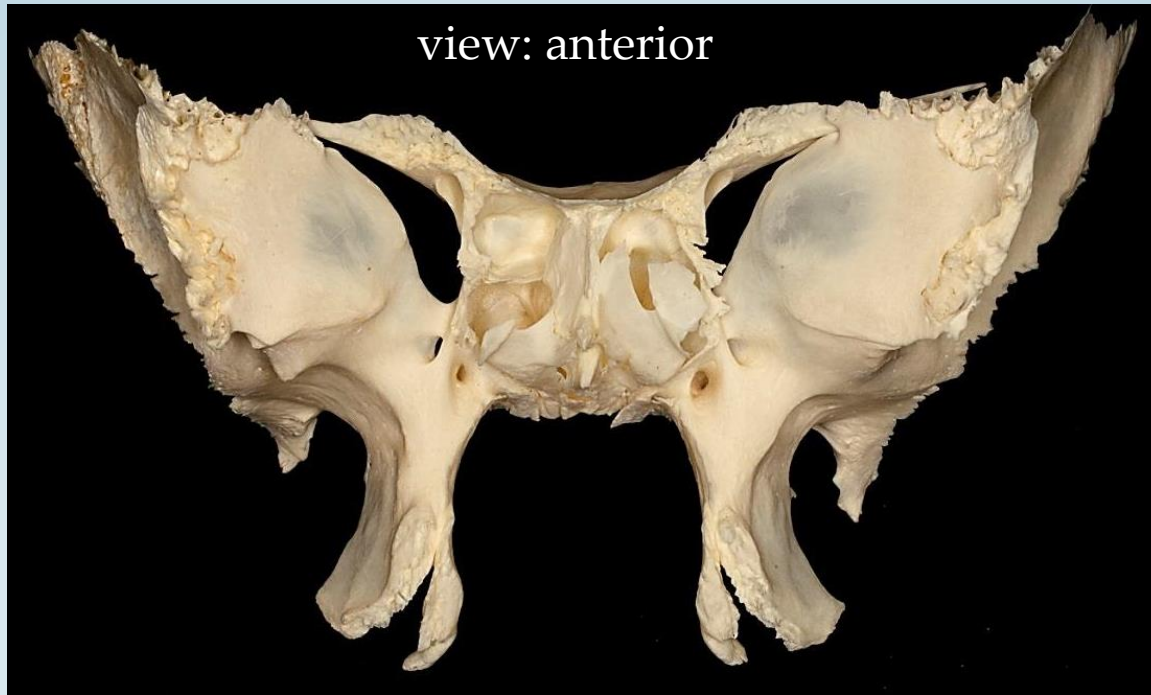


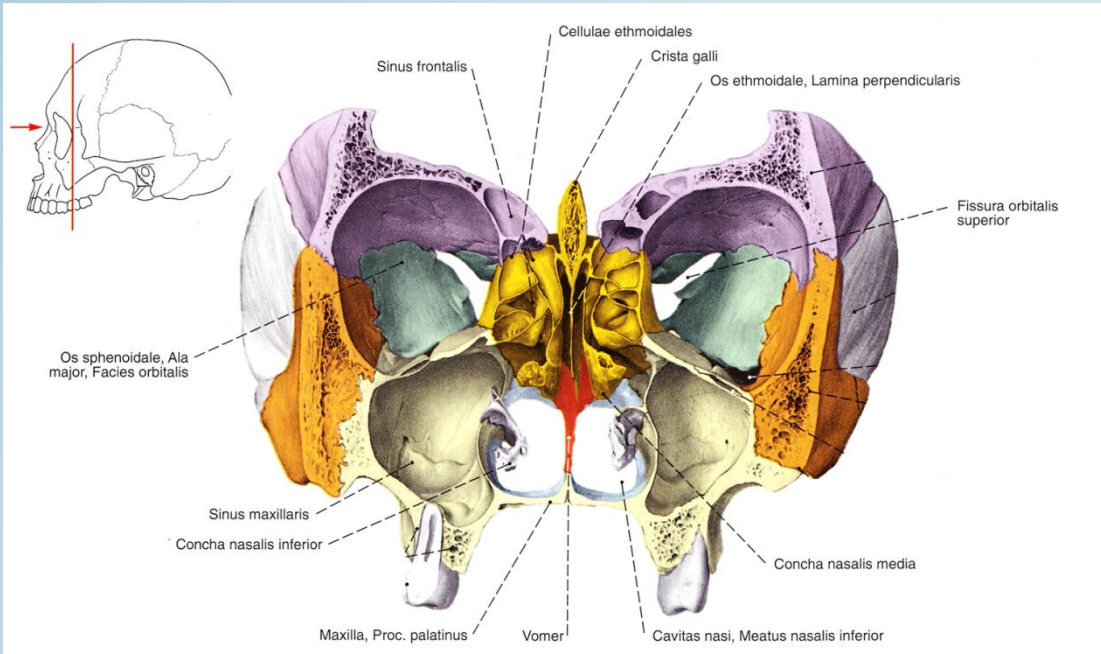
Faller

1. sphenoidal sinus
2. lesser wing of sphenoid bone
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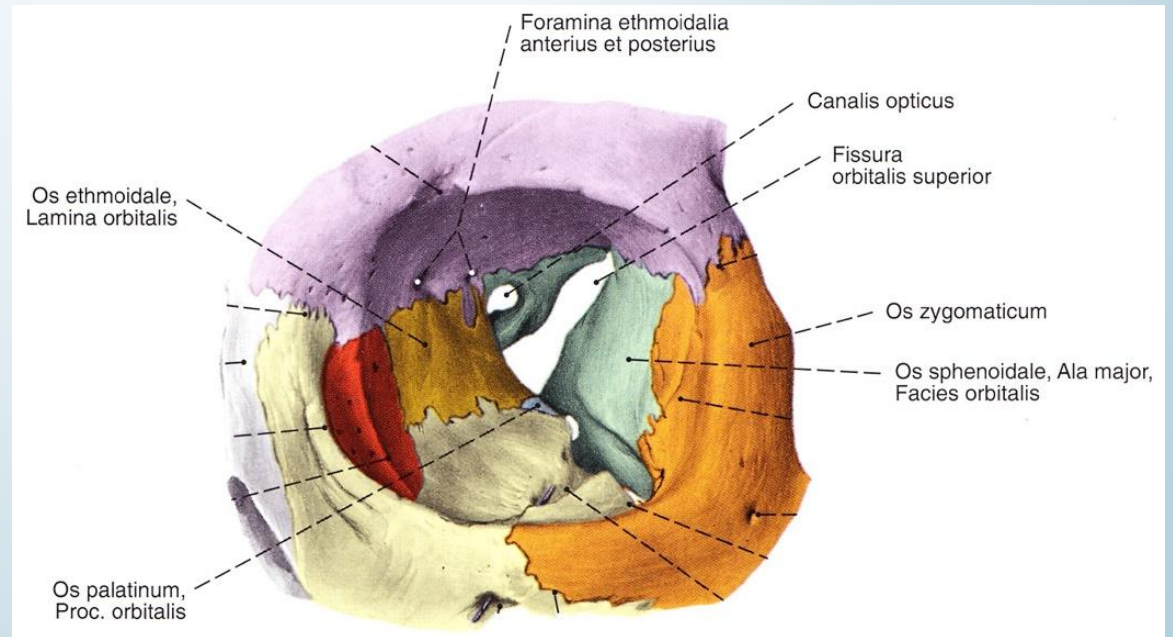
4. lateral pterygoid plate
5. medial pterygoid plate

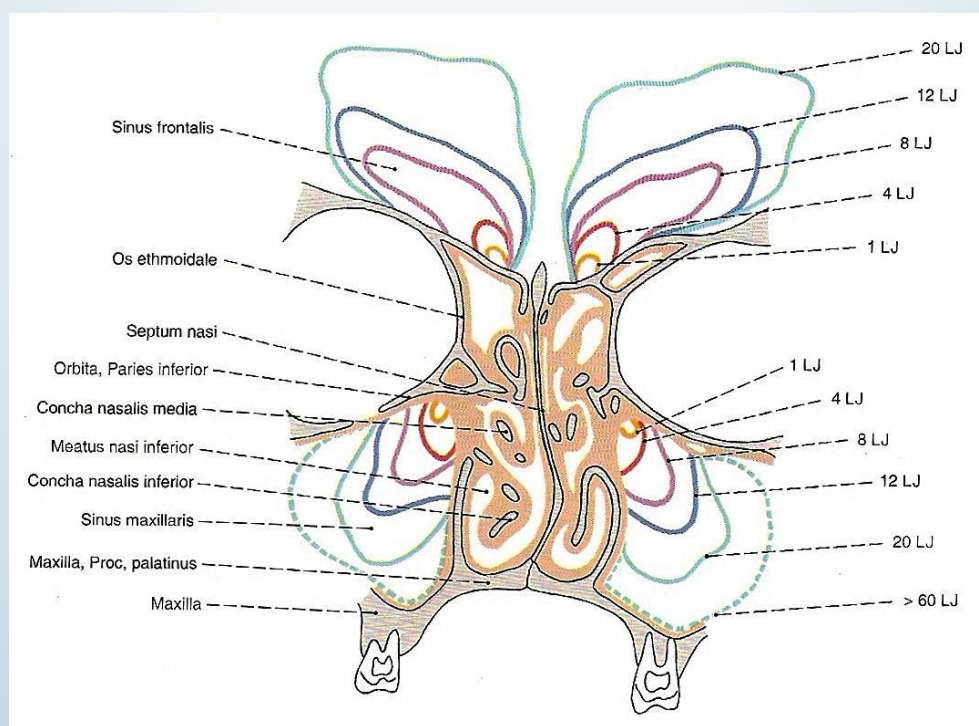
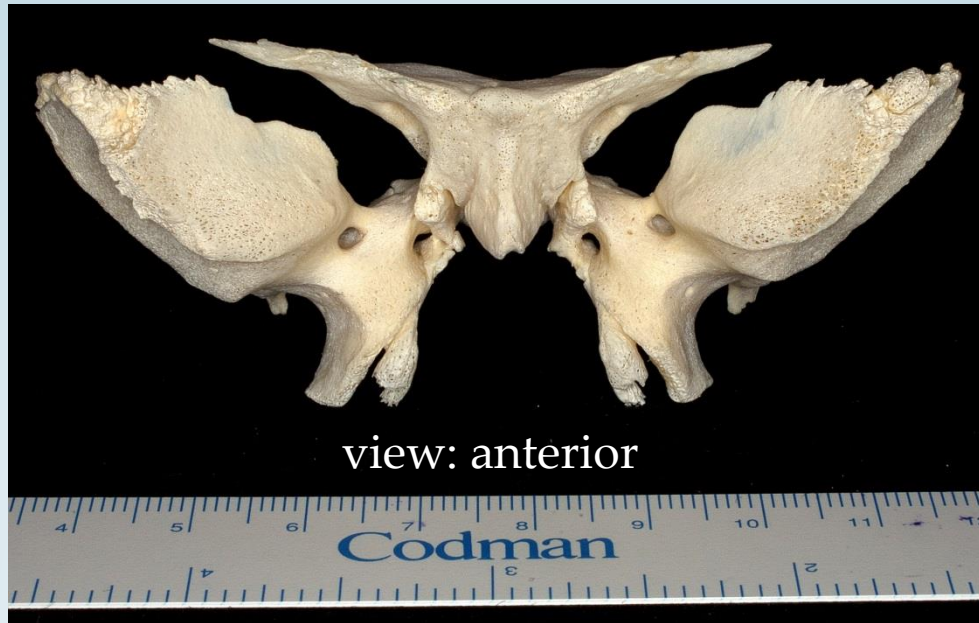
view: anterior



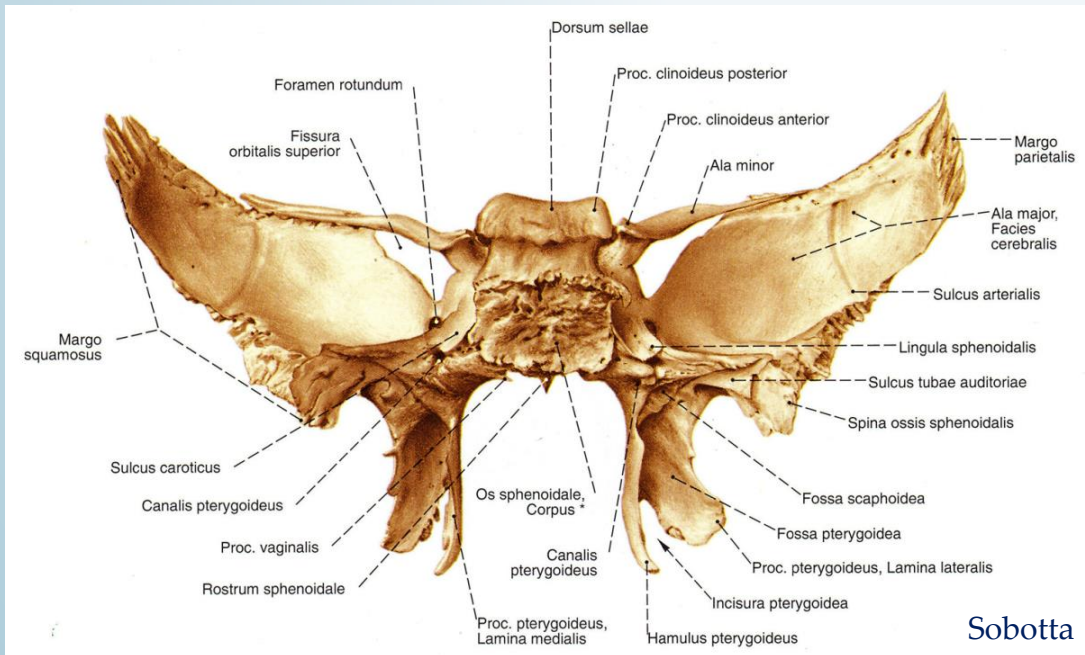
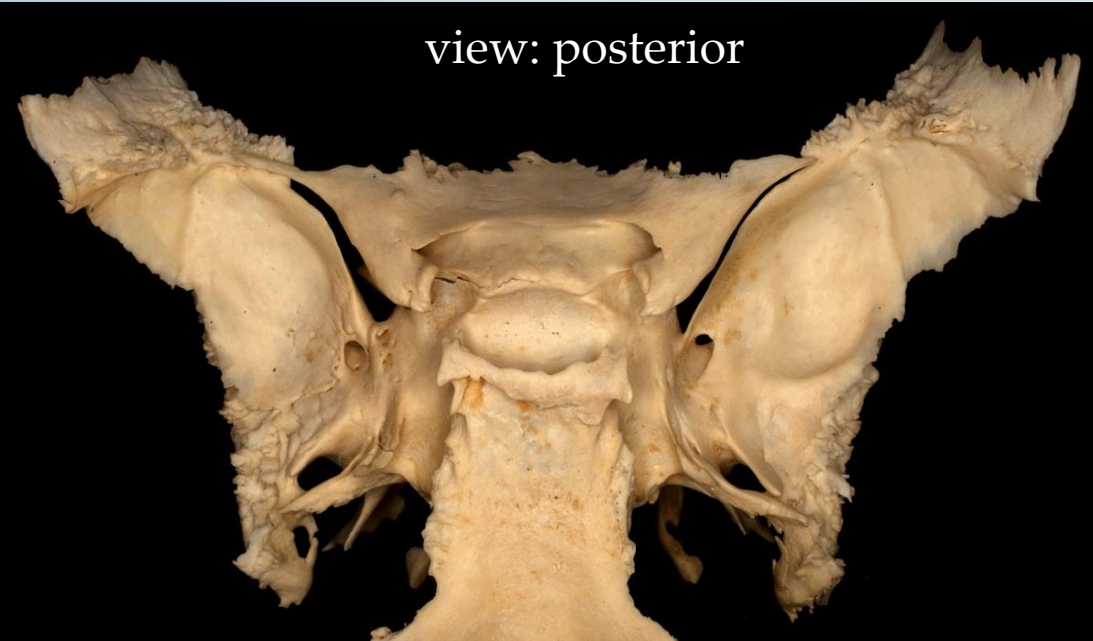


## Formation of the posterior and lateral wall of the orbit





view: posterior



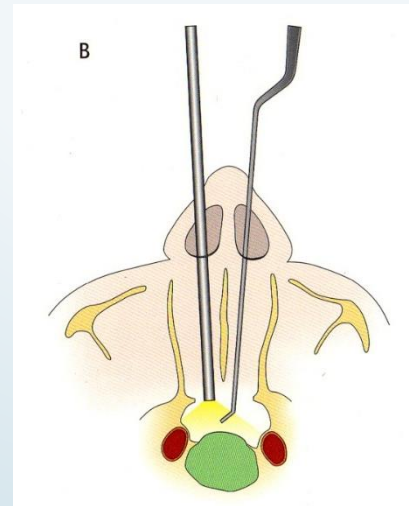
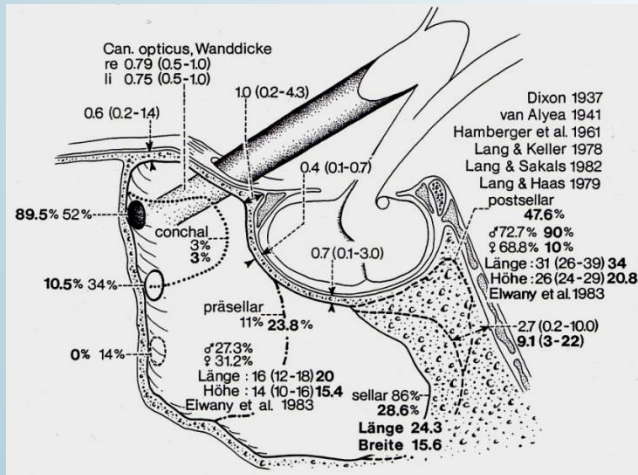
# Sphenoid sinus - sinus sphenoidalis; Turkish Saddle - Sella turcica

Eördögh



Aesculap – B Braun

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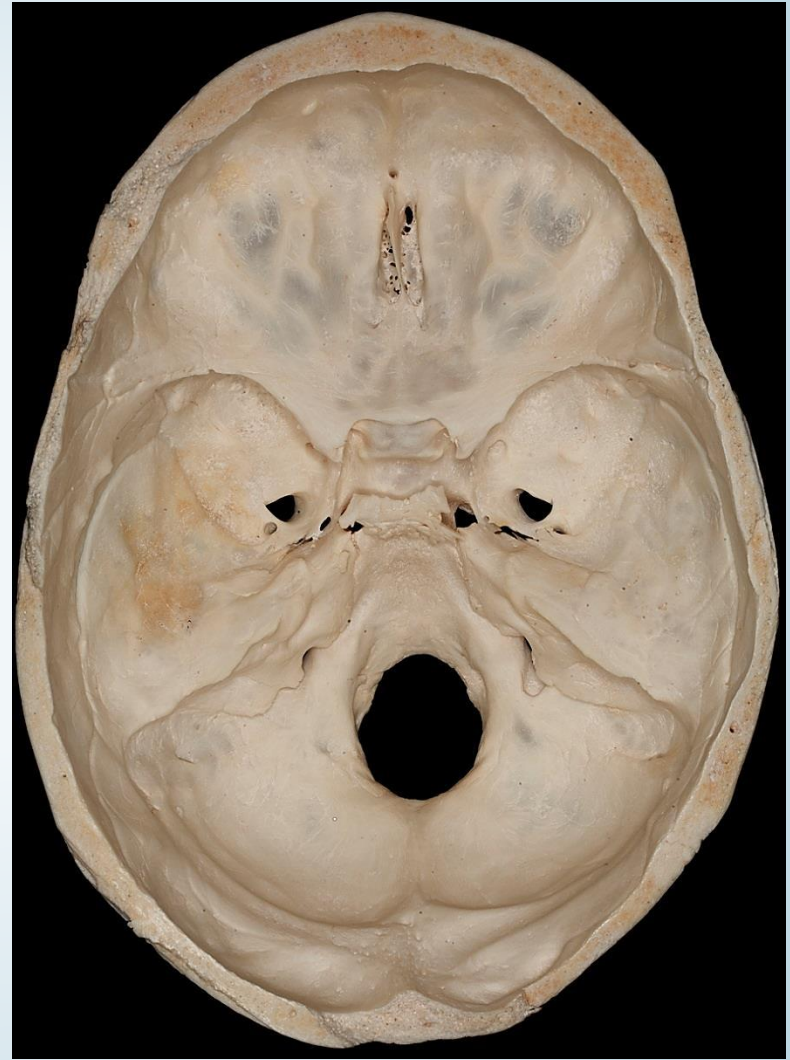
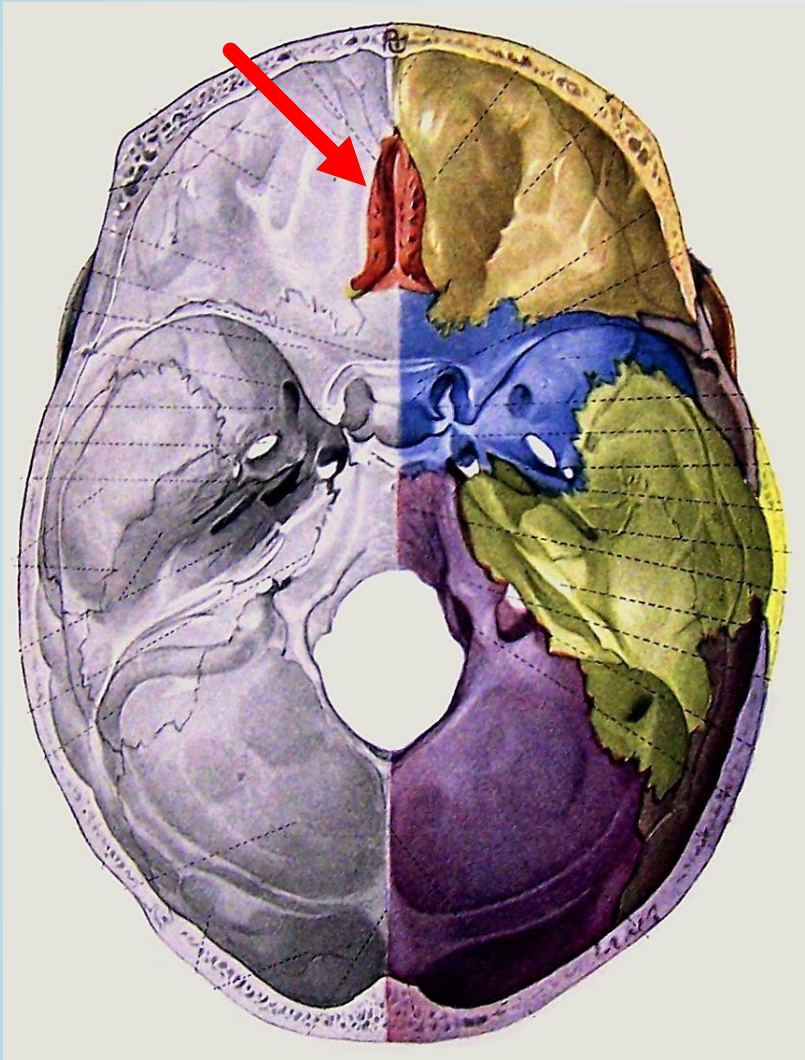


[www.mozaweb.hu](http://www.mozaweb.hu)

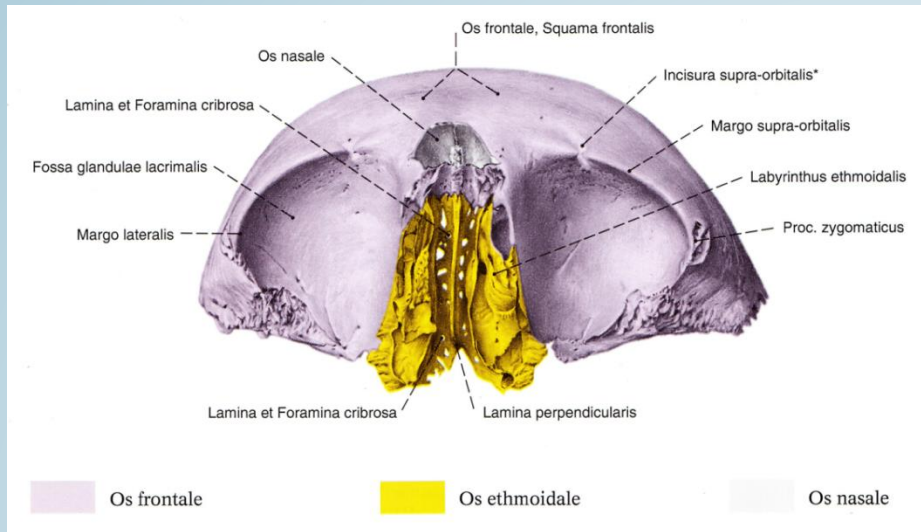
Lang



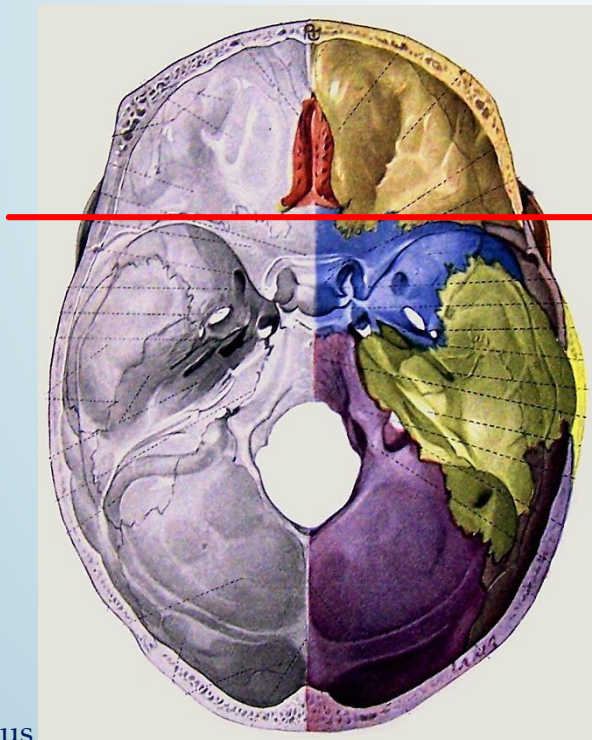
# Ethmoidal bone - Os ethmoidale



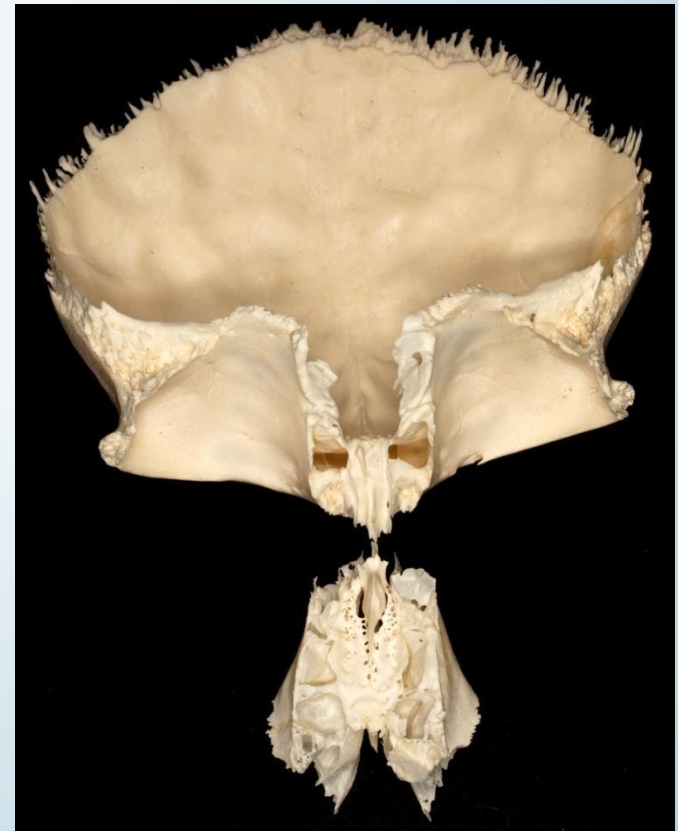
Braus



Sobotta



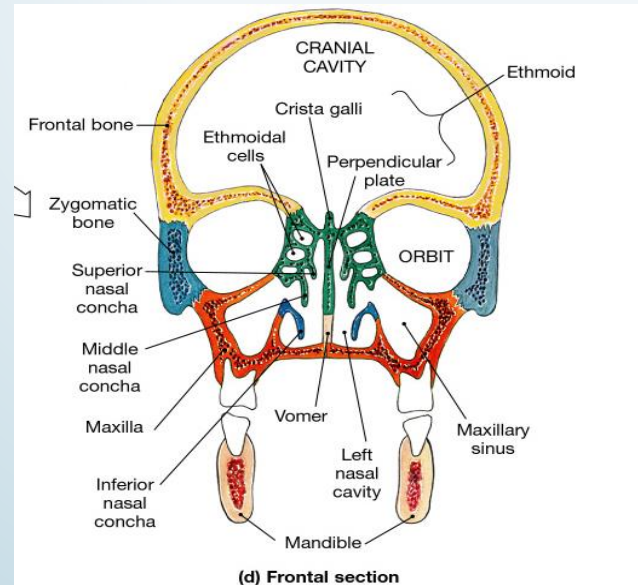
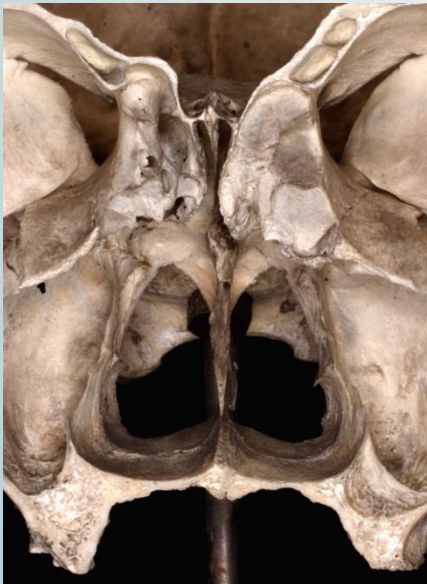
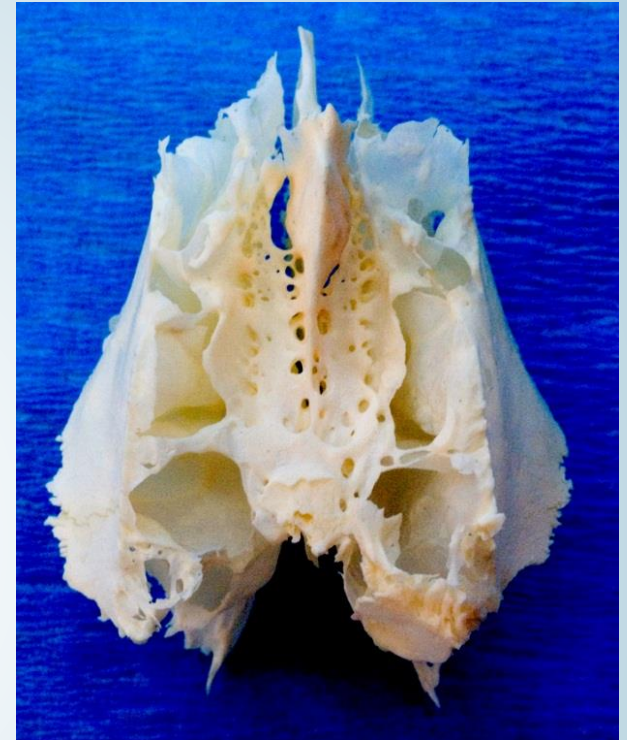
Braus



# Ethmoid bone

SUPERIOR ASPECT

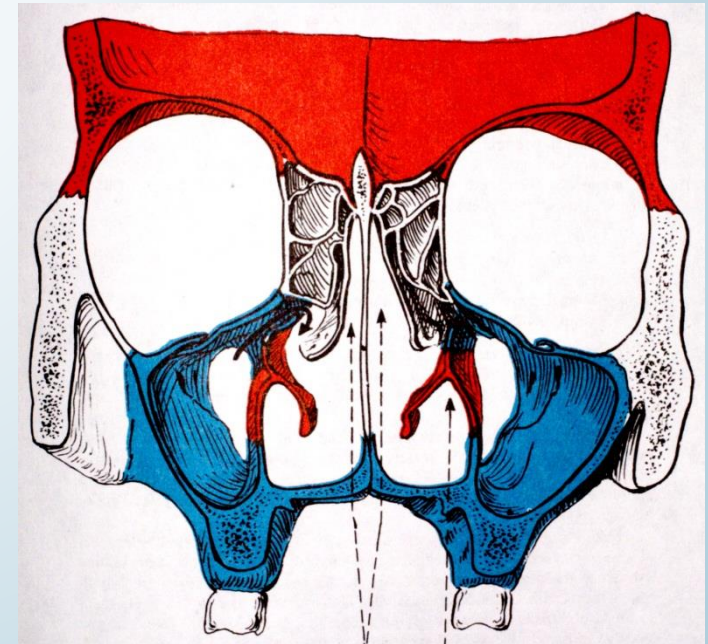
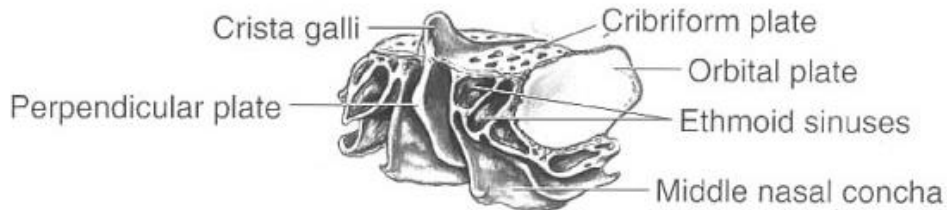
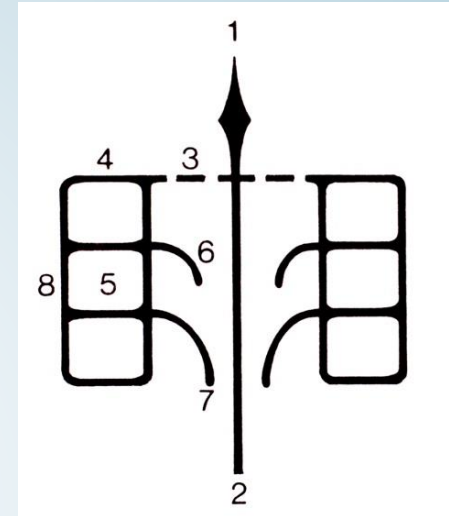
ANTERIOR ASPECT



LATERAL ASPECT

# Ethmoid bone

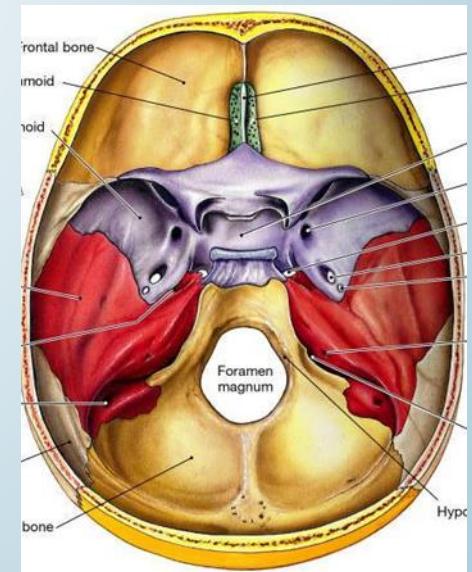
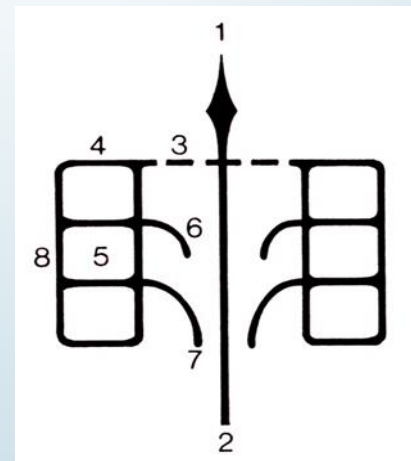
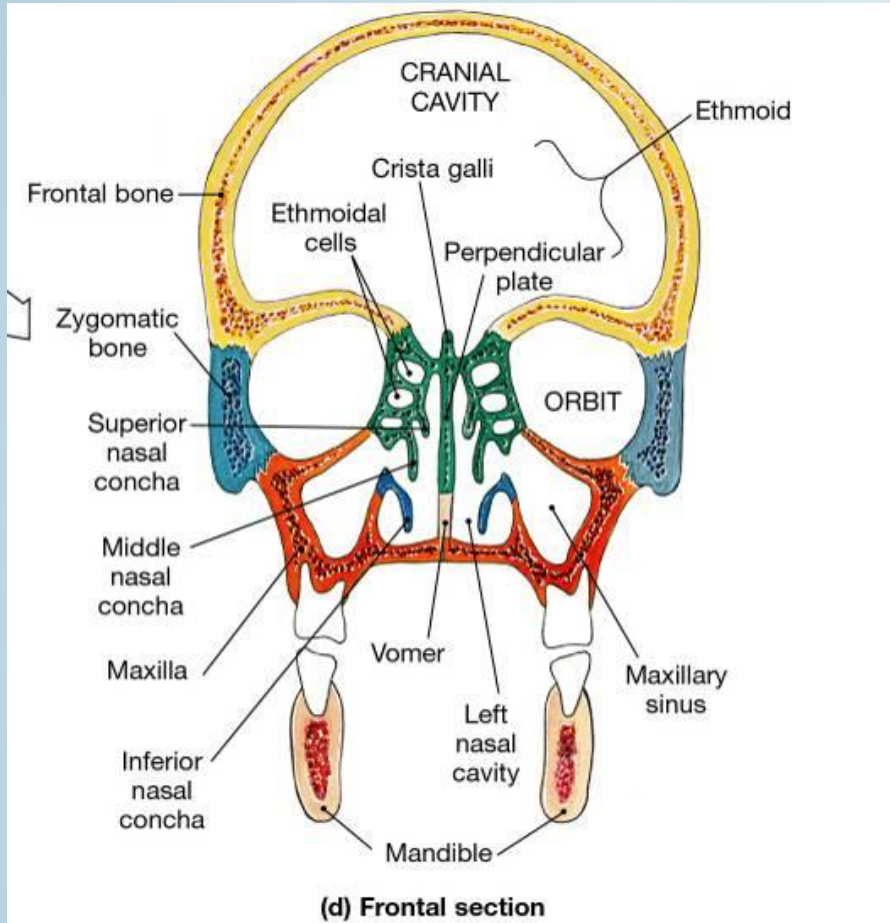
- Irregular bone
- Forms the wall of *orbit and nasal cavity*
- Connects to the *frontal, sphenoid, lacrimal bones and the maxilla*
- The lateral massive parts contain the - **labyrinth**  
- inside cavities (*ethmoidal cells*)
- It forms together with the vomer the bony nasal septum

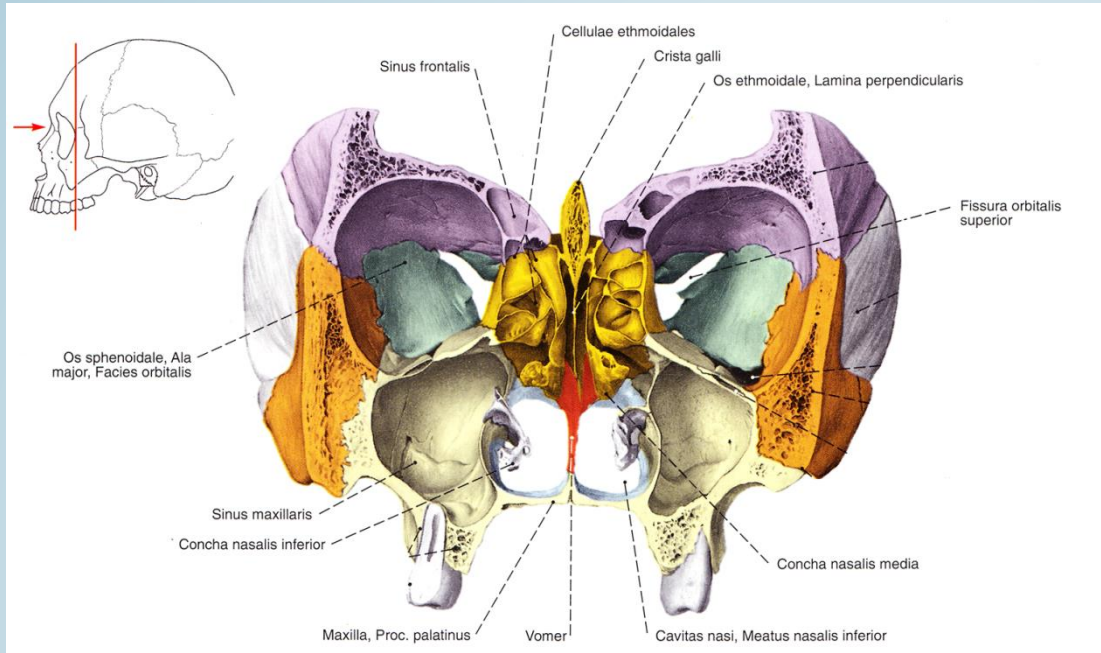


# Ethmoid bone

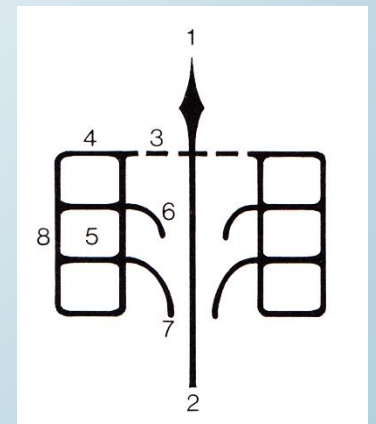
## Parts:

- cribriform plate and foramina
- perpendicular plate
- orbital plate
- ethmoidal labyrinth (cellulae)
- superior nasal concha
- middle nasal concha
- crista galli

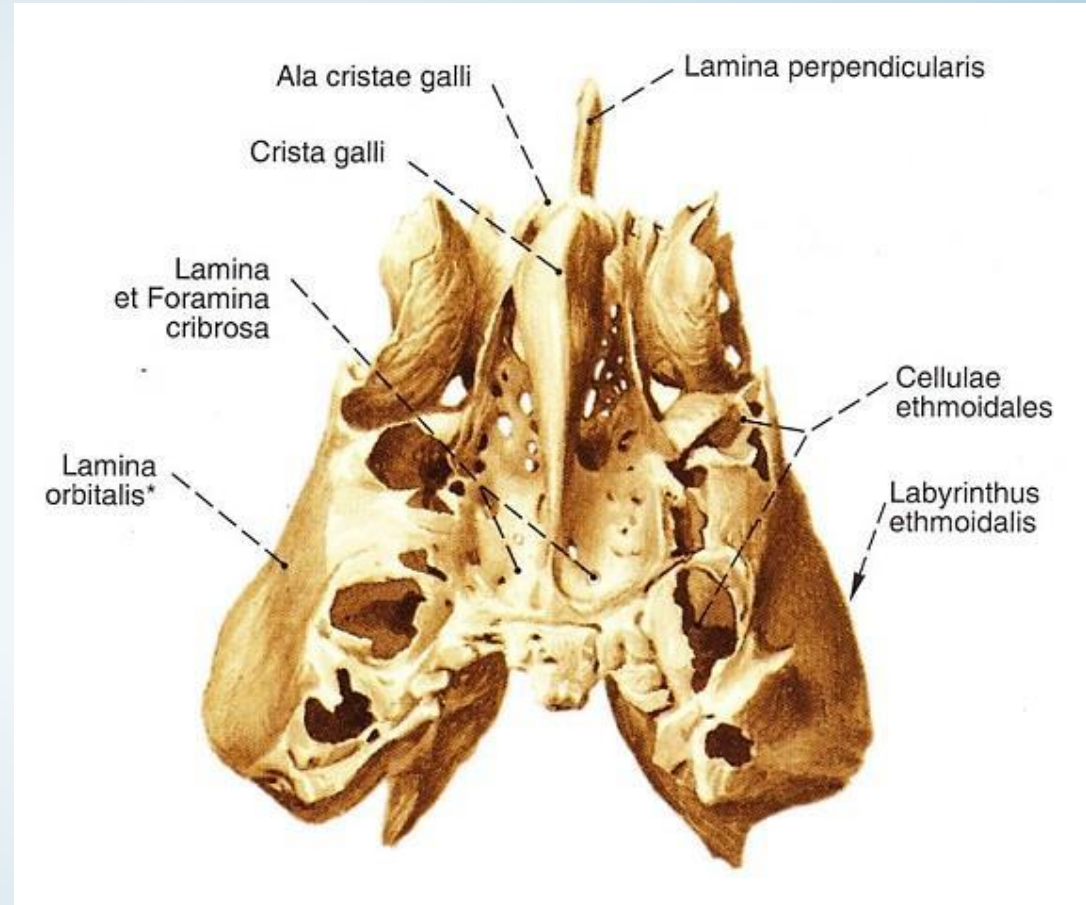


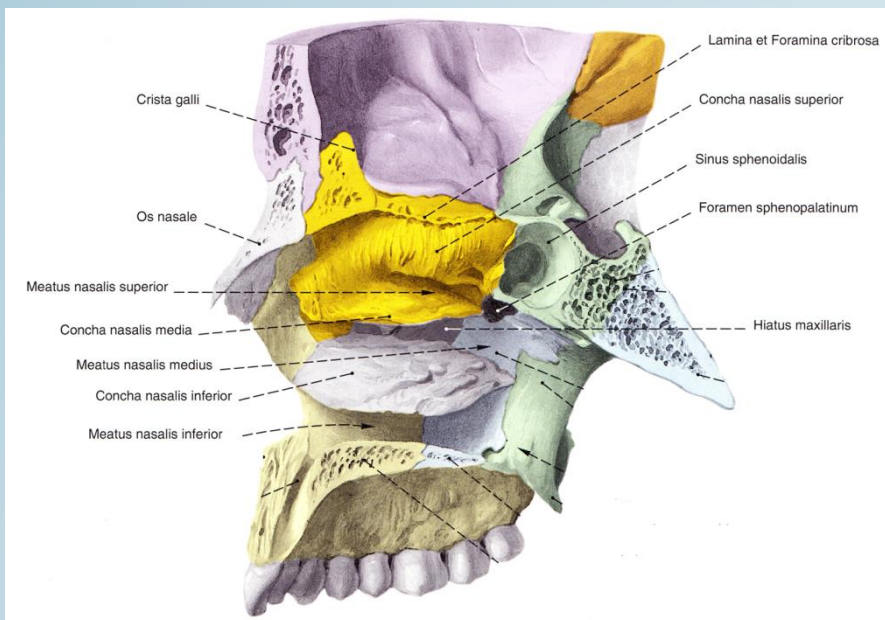


- 1 Crista galli
- 2 Perpendicularis plate
- 3 Cribriform plate
- 4 Ethmoidal labyrinth
- 5 Ethmoidal cells
- 6 Superior nasal concha
- 7 Medial nasalis cocha
- 8 Orbital lamina / papyracea

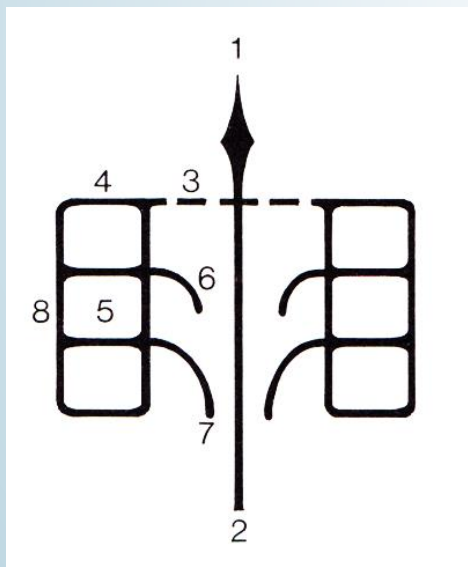


# Ethmoid bone





Sobotta



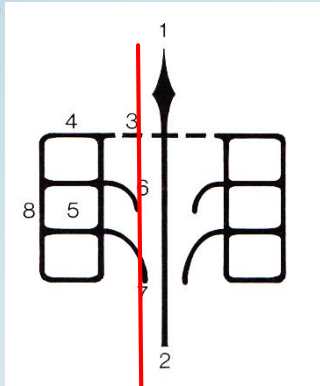
Faller



6 superior nasal concha  
7 medial nasal concha



Faller

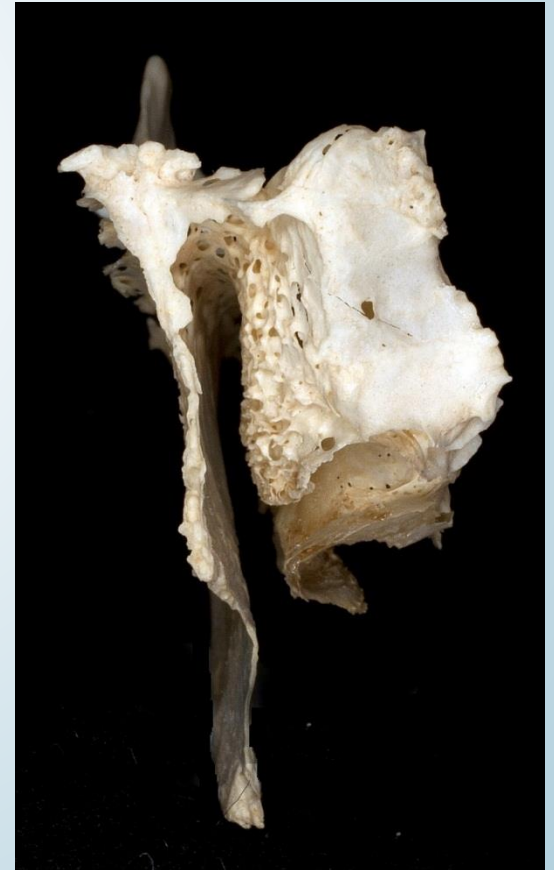
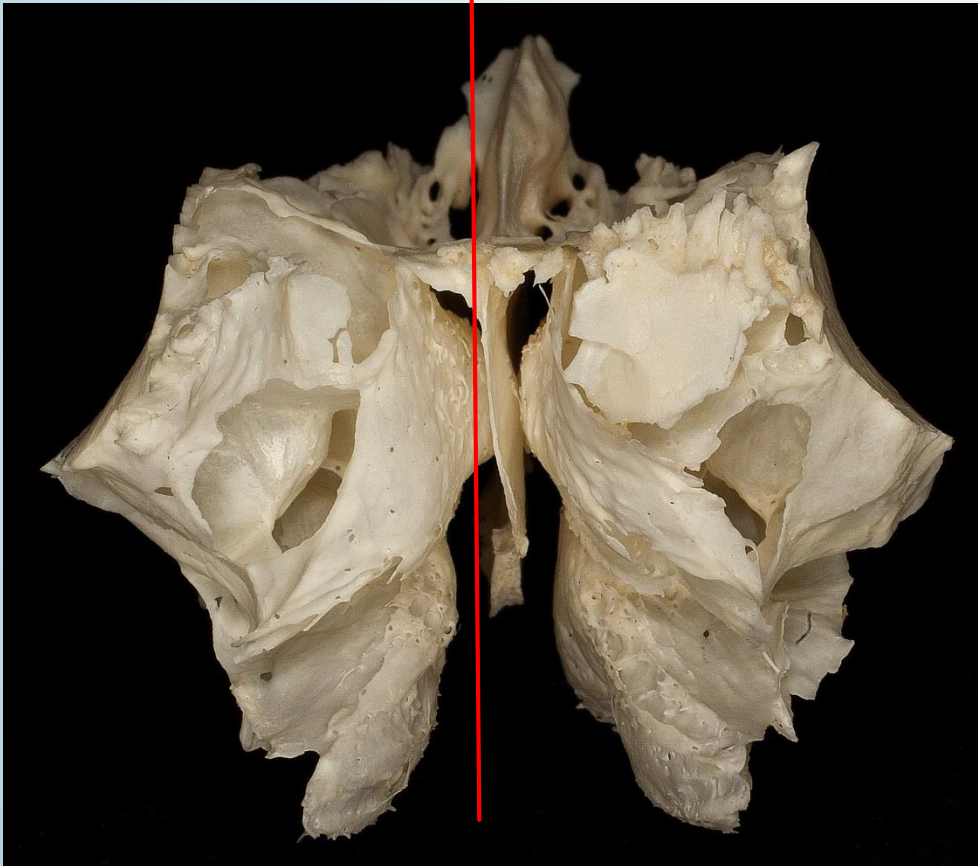


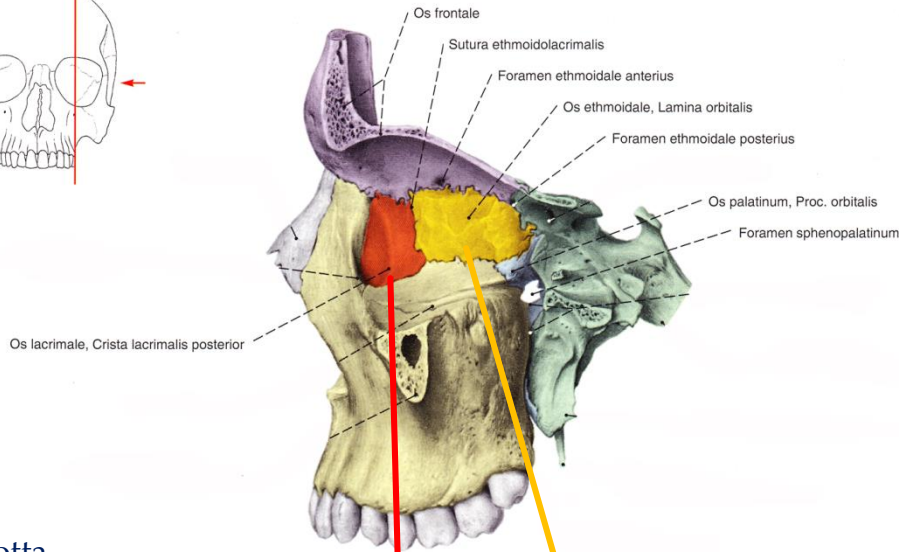
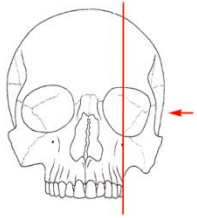
Ethmoidal cells: altogether approx. 30 (= Labyrinthus ethmoid)

one of the paranasal sinuses

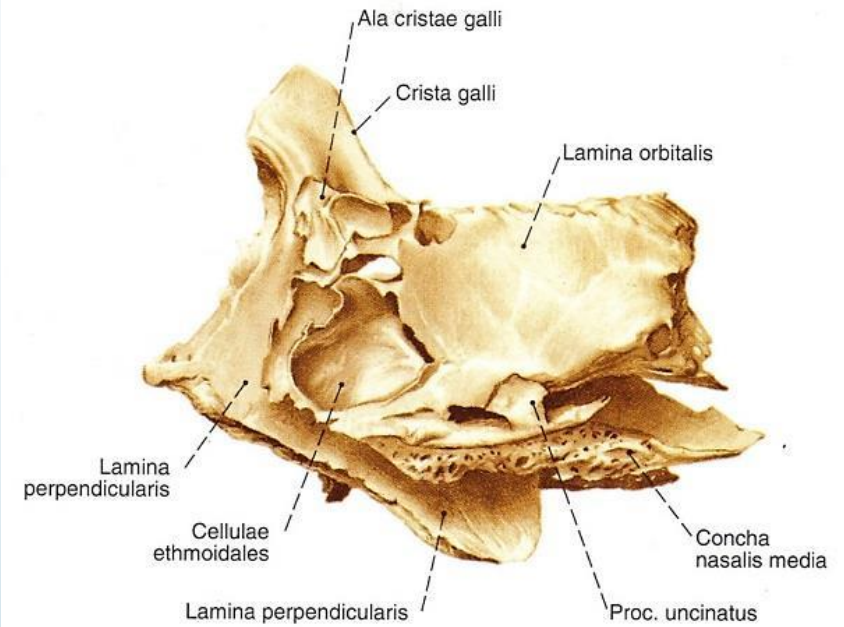
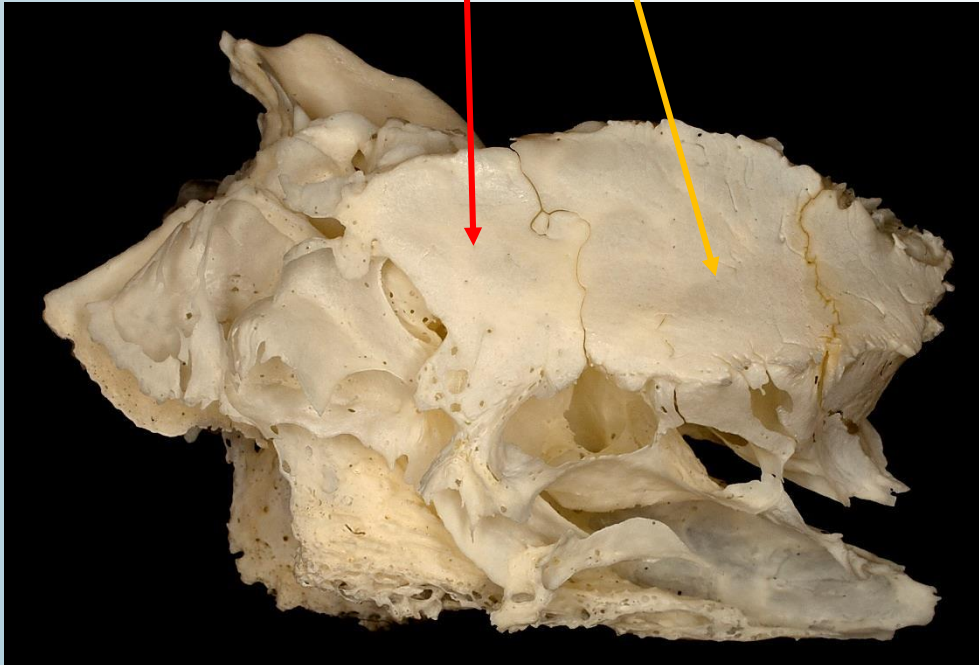
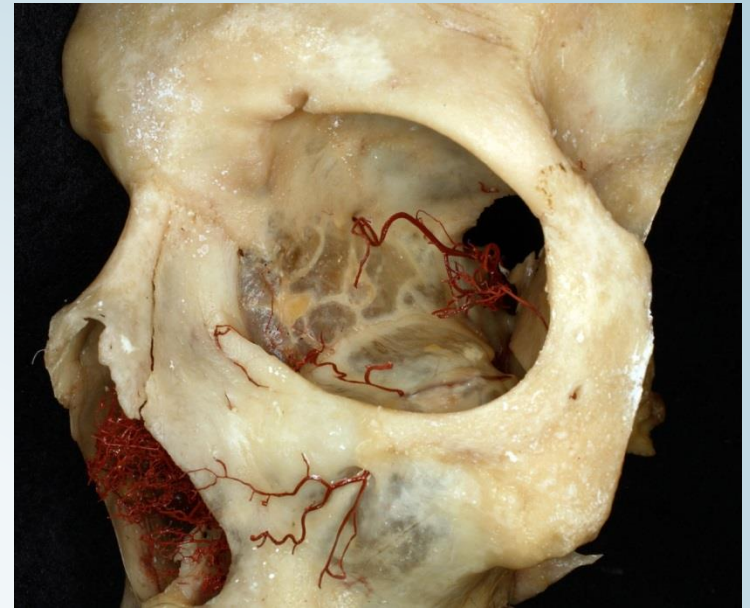
Border between the orbit and the nasal cavity

Inflammation: possible complications in the Orbit through the thin lamina papyracea



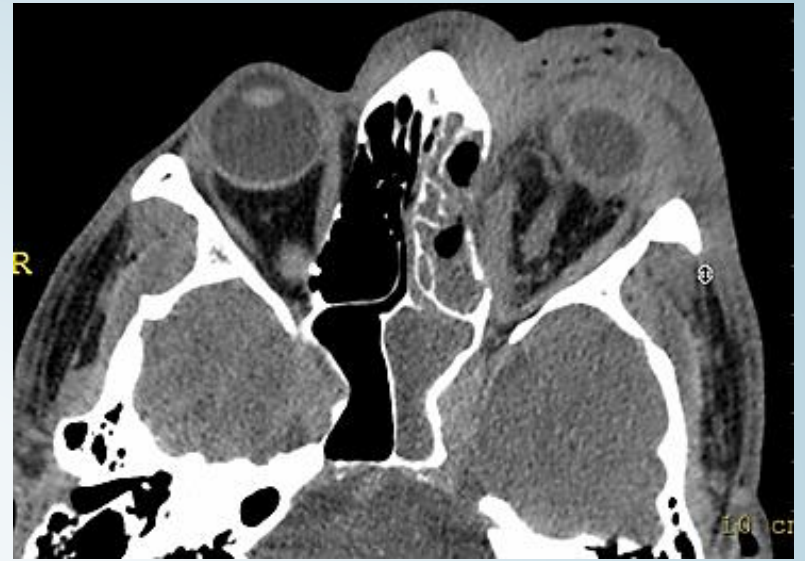
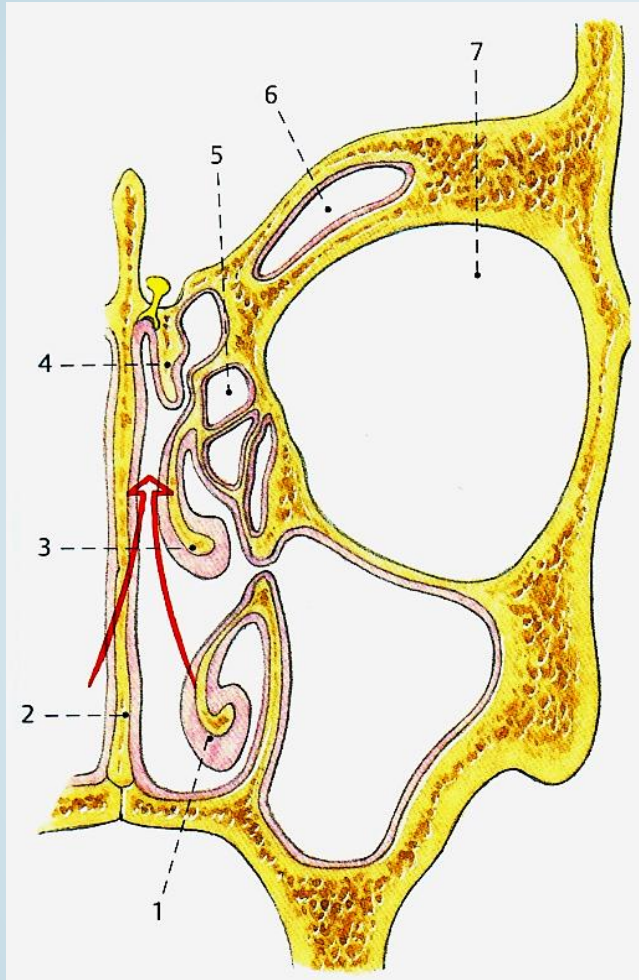


Sobotta



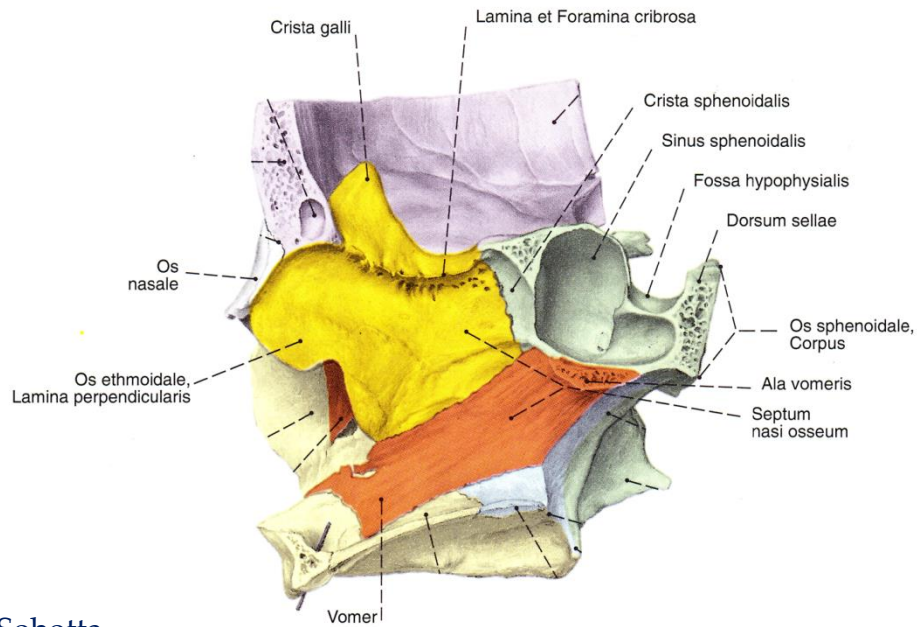
Sobotta

# Thumfart

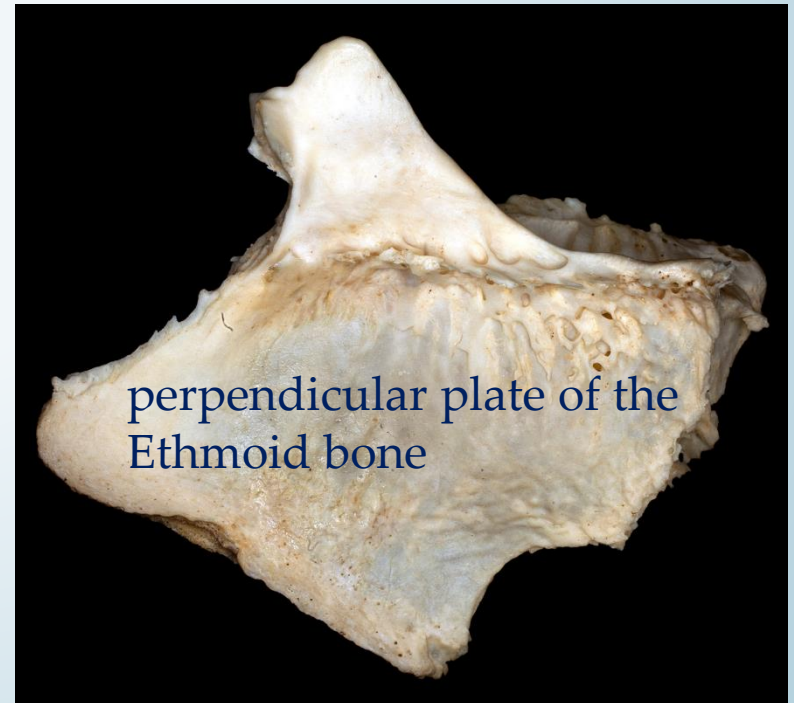
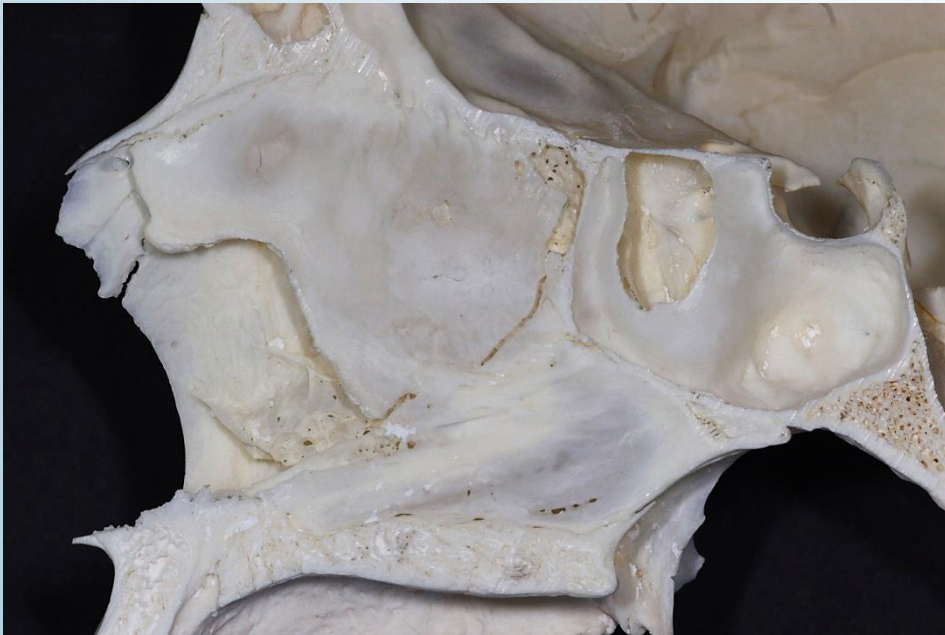
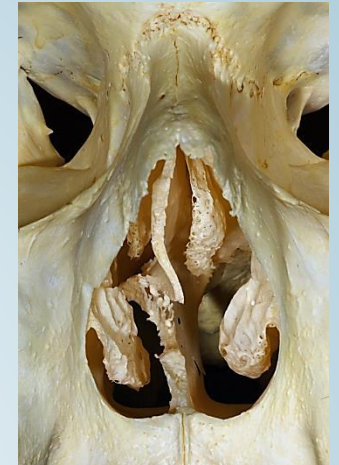


Dr. Magyar Péter





Sobotta



# Literature

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Faller: Anatomie in Stichworten: Ein Arbeitsbuch für Medizinstudenten und praktische Ärzte (Ferdinand Enke Verlag 1988.)

Sobotta: Az ember anatómiájának atlasza (Urban & Fischer 2000.)

Thumfart: Operative Zugangswege in der HNO-Heilkunde (Thieme 1998.)