

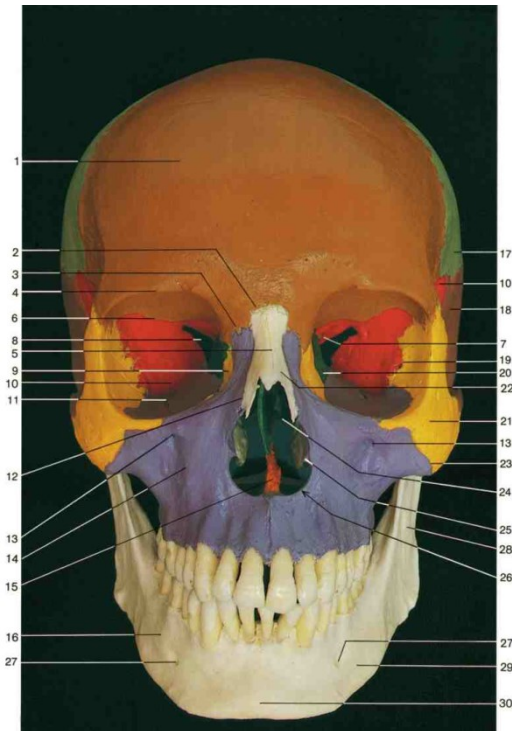
Neurocranium.
Calvary.
Internal and external skull bases.

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DIVISIONS OF THE SKULL

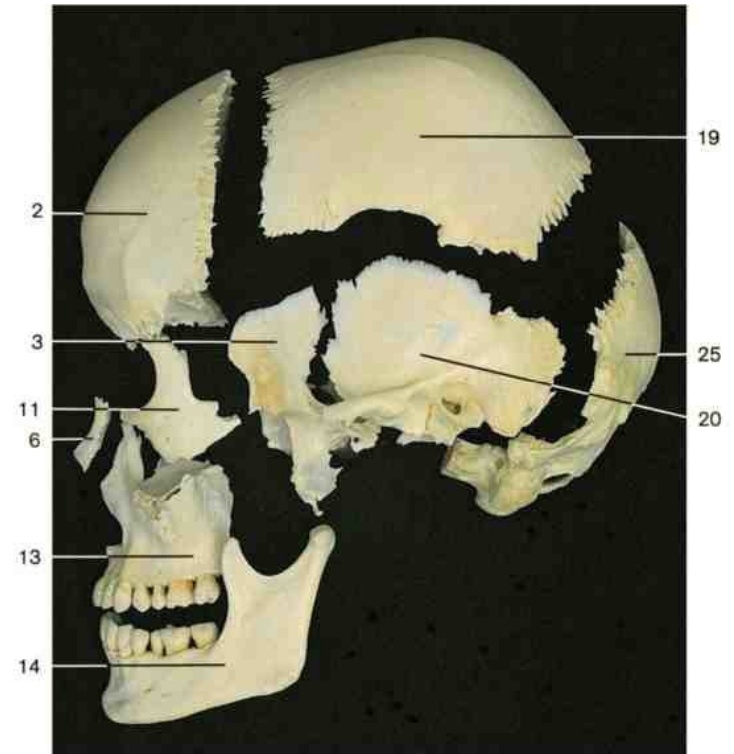
- **NEUROCRANIUM** (8) – *UNPAIRED*: frontal, occipital, sphenoid, ethmoid
PAIRED: temporal, parietal (*and the hearing ossicles – mobile*)
- **VISCEROCRANIUM** (14) – *UNPAIRED*: mandible (*mobile*), vomer.
PAIRED: nasal, maxilla, zygomatic, lacrimal, palatine, inferior nasal concha

ROLE – limit cavities, protect internal organs, vocalization,
hold the respiratory/gastrointestinal tract and anchor muscles



CRANIAL CAVITIES

cavitas cranii
cavum nasi
cavum oris
orbita
sinus paranasalis

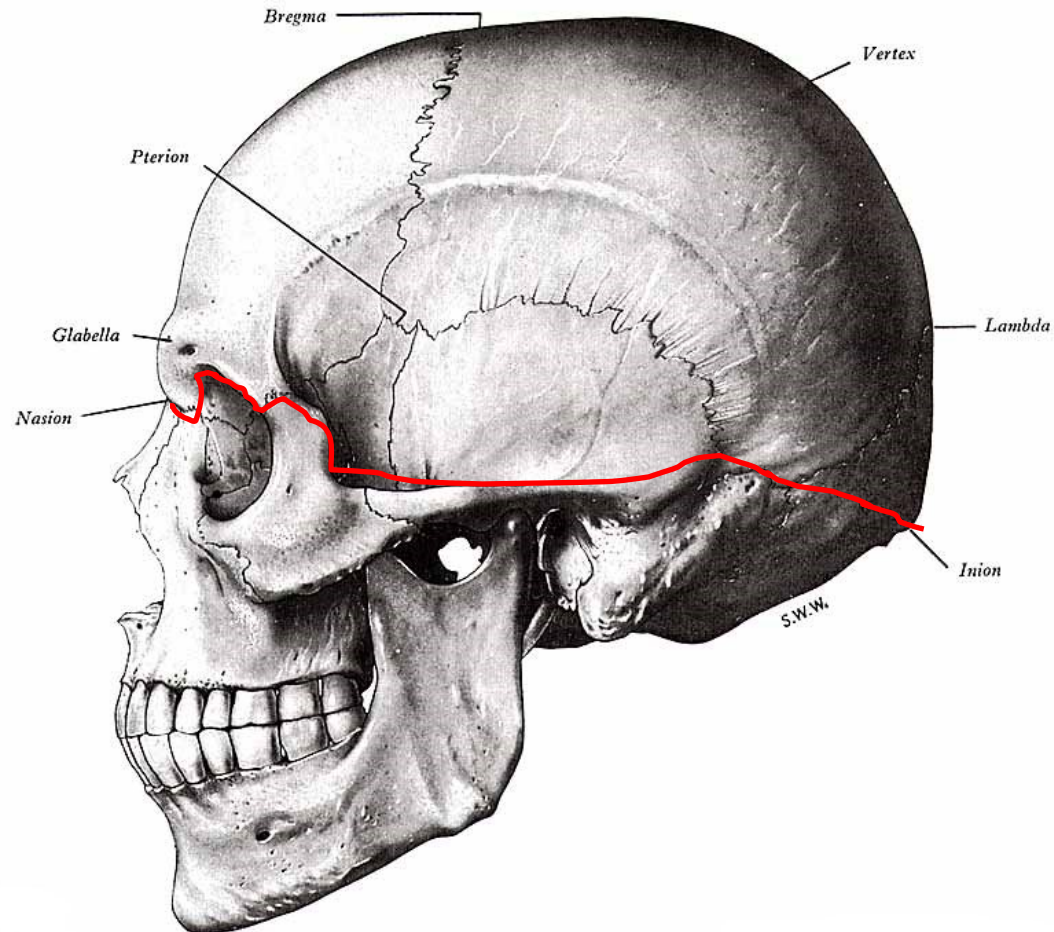


DIVISIONS OF THE NEUROCRANIUM

1. ARCH (calvary)
2. SKULL BASE (basis cranii)

SEPARATING LINE

- external occipital protuberance
- sup. nuchal line
- temp. line (*beginning*)
- zygomatic arch (*base*)
- infratemp. crest
- greater wing
- frontal proc. of zygomatic
- supraorbital margin
- nasofrontal suture



SKULL DEVELOPMENT

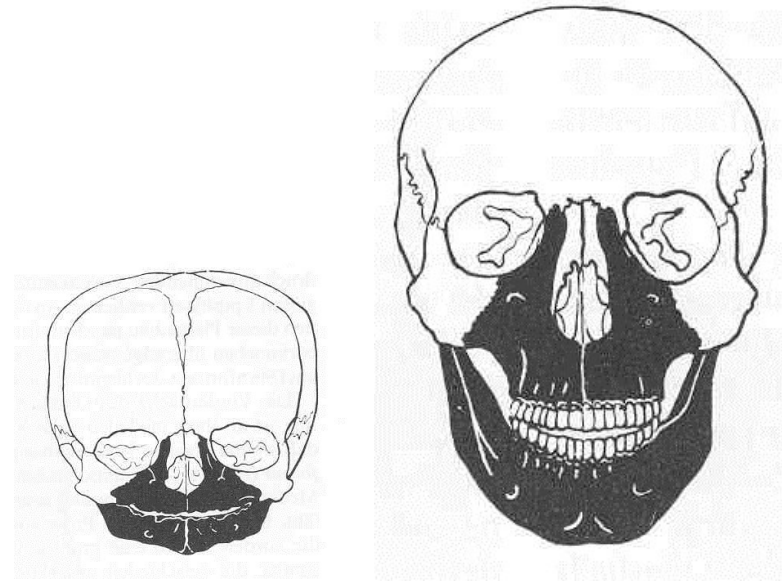
EXTERNAL PARTS (squamous parts and mandible)

INTRAMEMBRANOUS OSSIFICATION –

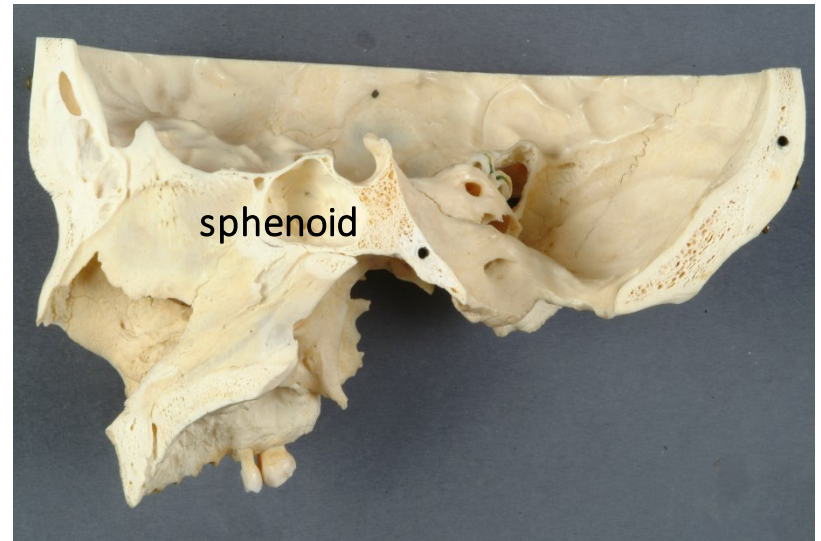
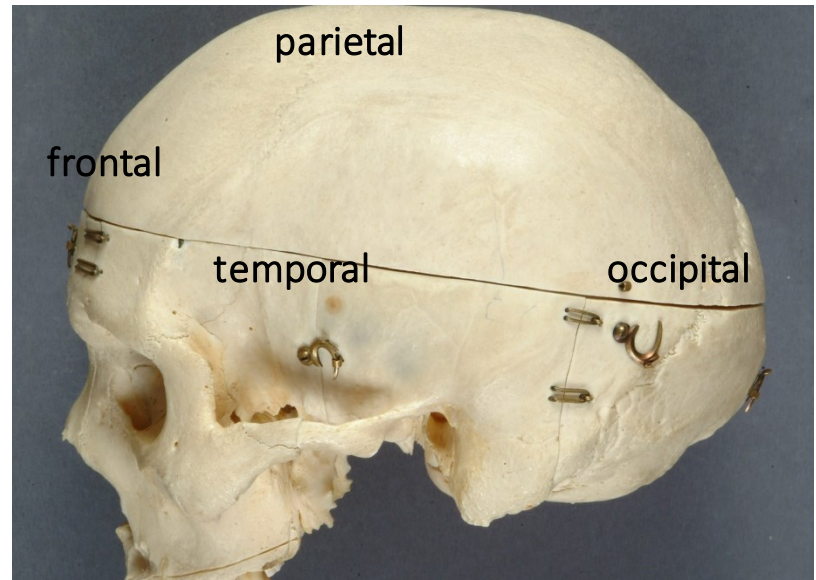
Starts from primary ossification centres in connective tissue
(NO CARTILAGE)

INTERNAL PARTS

ENDOCHONDRAL OSSIFICATION – hyaline cartilage
ossifies gradually



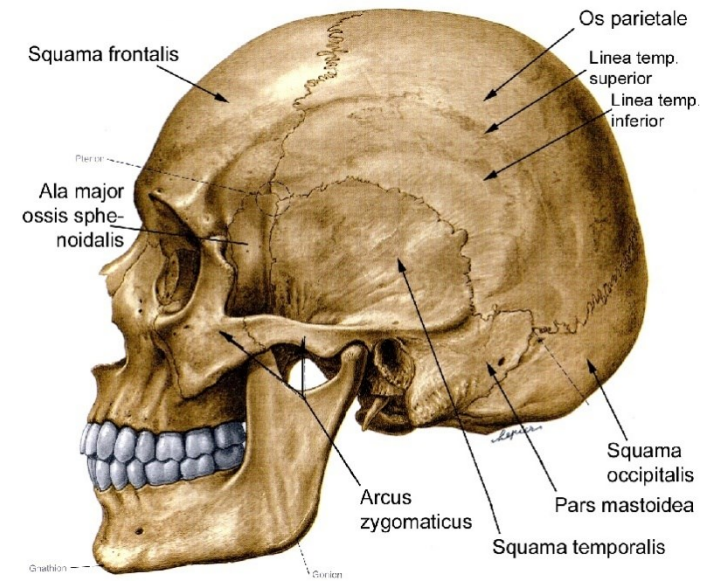
BONES OF THE NEUROCRANIUM



CALVARY

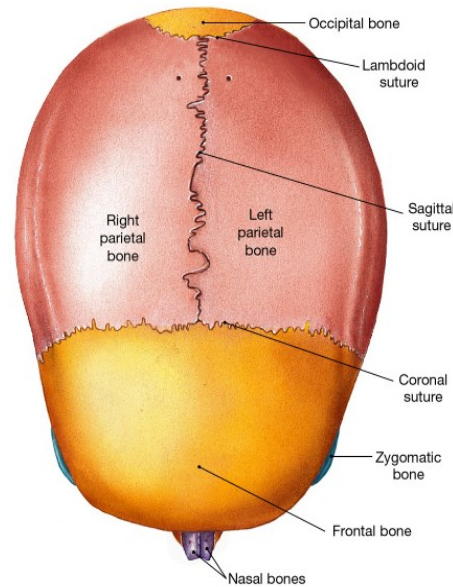
PARTS

- Squama frontalis
- Greater wing of sphenoid above the infratemp. crest
- Squama temporalis
- Parietal bones
- Squama occipitalis

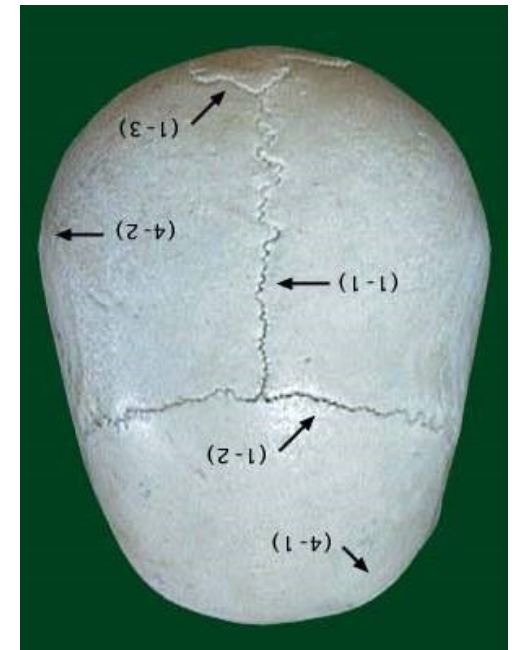


SUTURES (syndesmosis):

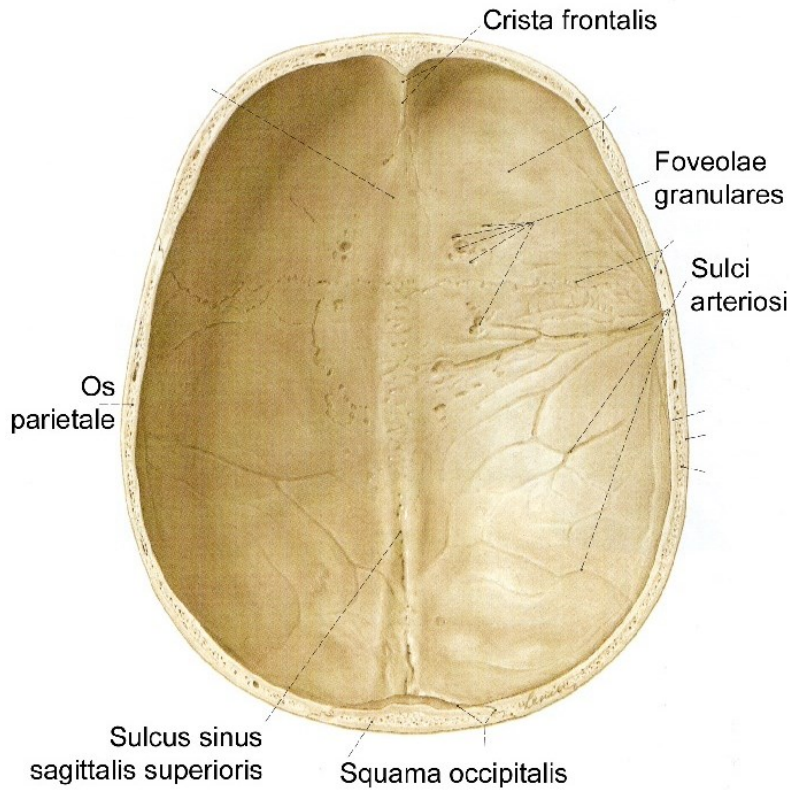
- coronal
- sagittal
- squamous
- lambdoid



(b) Superior view



CALVARY (internal surface)



Groove for the sup. sagittal sinus

Int. occipital protuberance

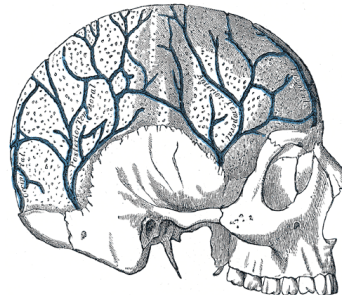
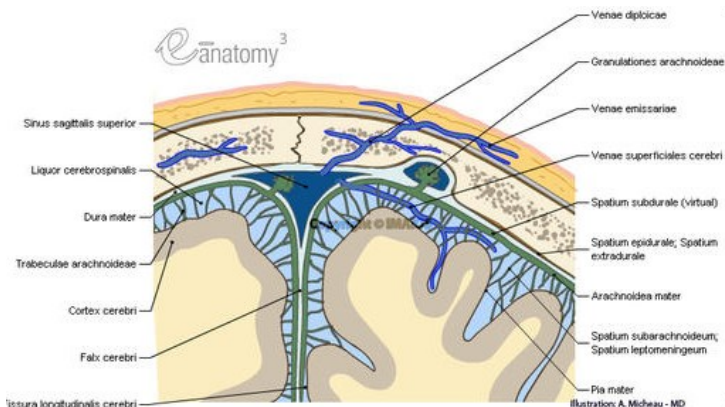
Groove for the transverse sinus

Foveolae granulares

Sulci arteriosi

cca 5 mm thick

2 compact layers (lamina ext., int.), + spongiosa (diploë, containing red bone marrow)

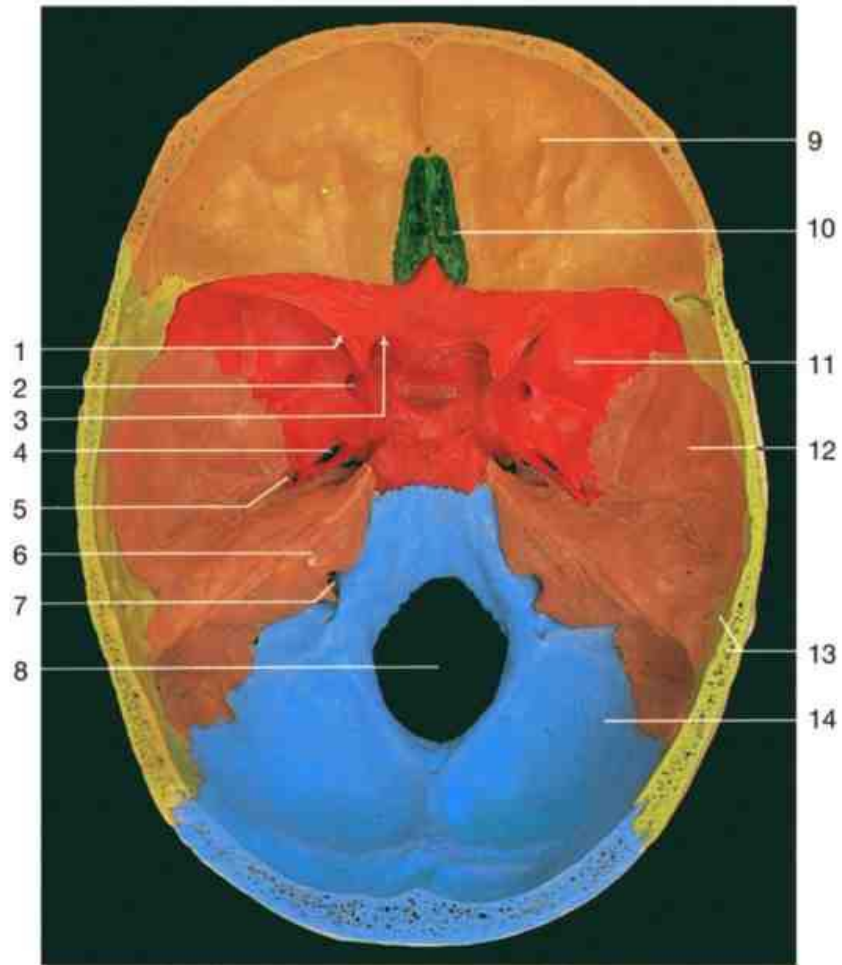


Venous emissaries:

Parietal, mastoid, occipital foramina

Diploic veins connect the internal and external venous systems

BONY COMPONENTS OF THE SKULL BASE



BASIS CRANII INTERNA ET EXTERNA



CRANIAL FOSSAE

anterior cranial fossa

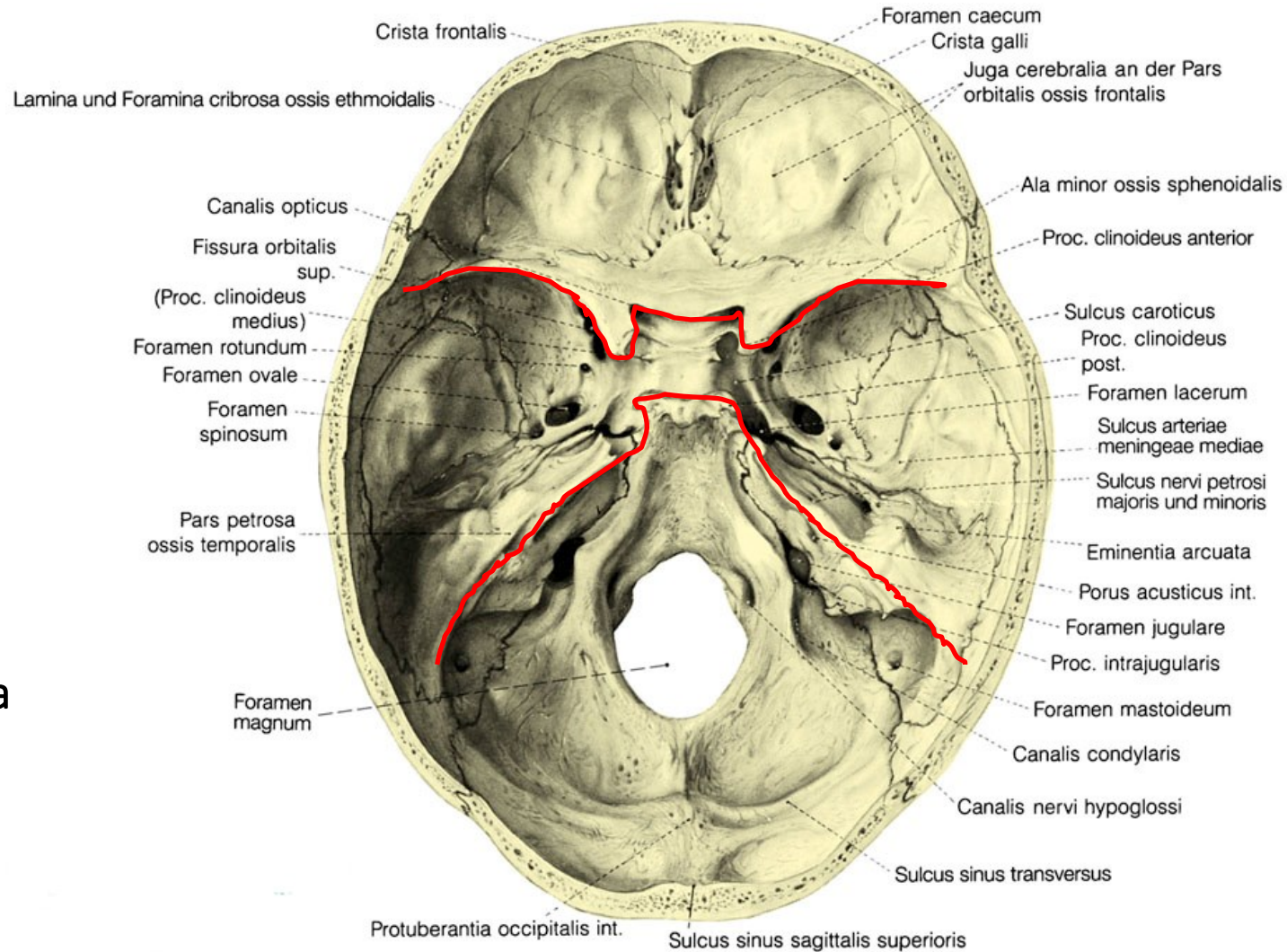
- frontal
- ethmoid
- lesser wing of sphenoid

middle cranial fossa

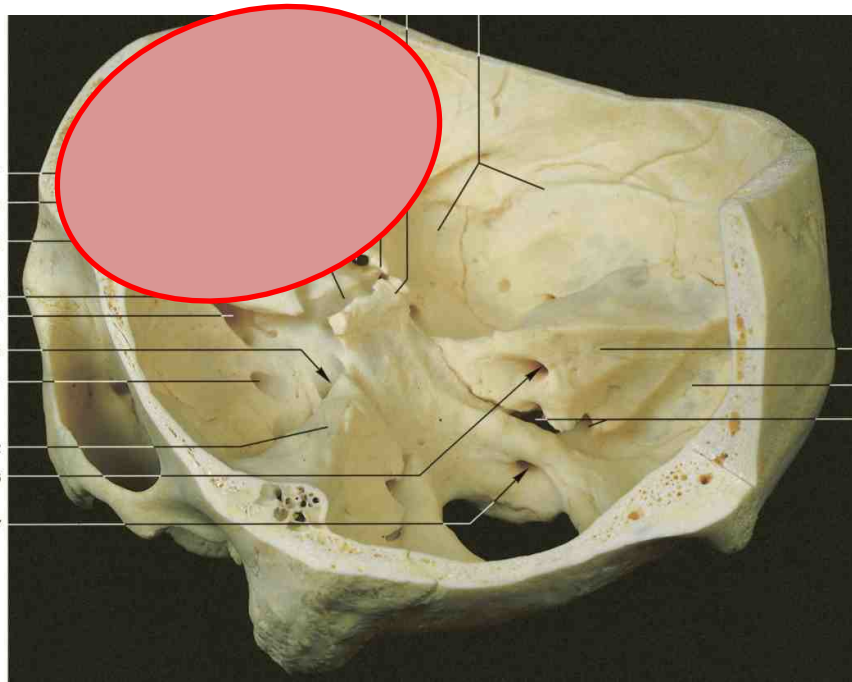
- sphenoid
- temporal
- parietal

posterior cranial fossa

- occipital
- temporal



ANTERIOR CRANIAL FOSSA



COMPONENTS

- Cribriform lamina of the ethmoid
- Orbital part of the frontal bone
- Lesser wing of the sphenoid
- Together with the *anterior clinoid process*

BORDERS

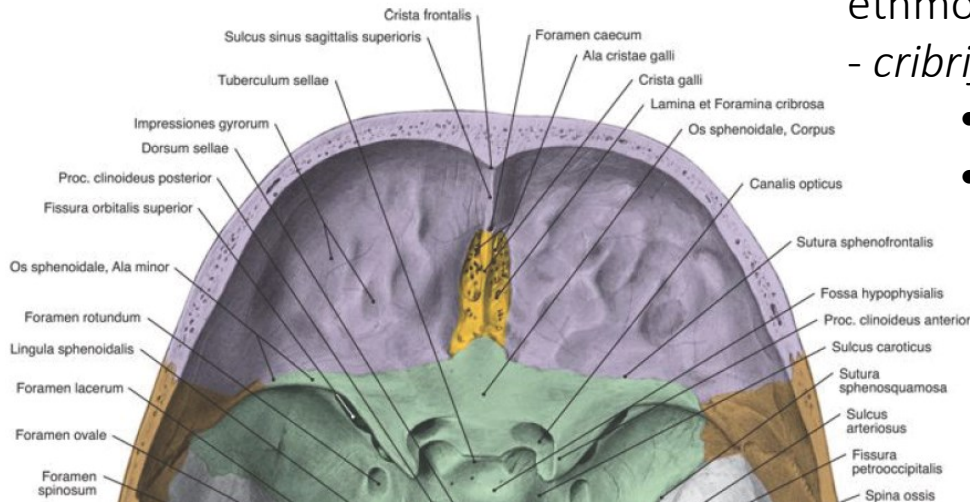
- ANT & LAT frontal bone
- MIDDLE sulcus chiasmatis
- POST – lesser wing

STRUCTURES

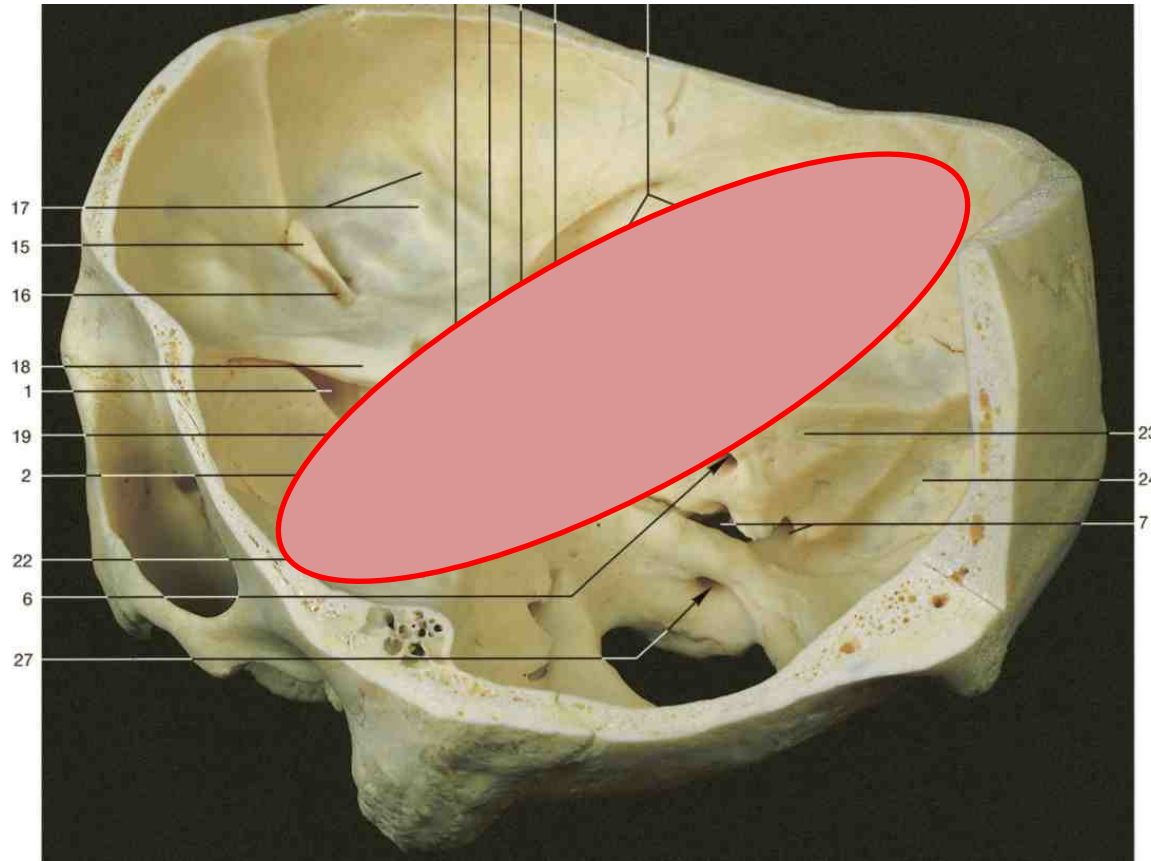
- *crista galli* (lamina perpendicularis ossis ethmoidalis)

- *cribriform lamina*

- fila olfactoria → *nasal cavity*
- anterior ethmoidal a. and n. → *nasal cavity*



MIDDLE CRANIAL FOSSA

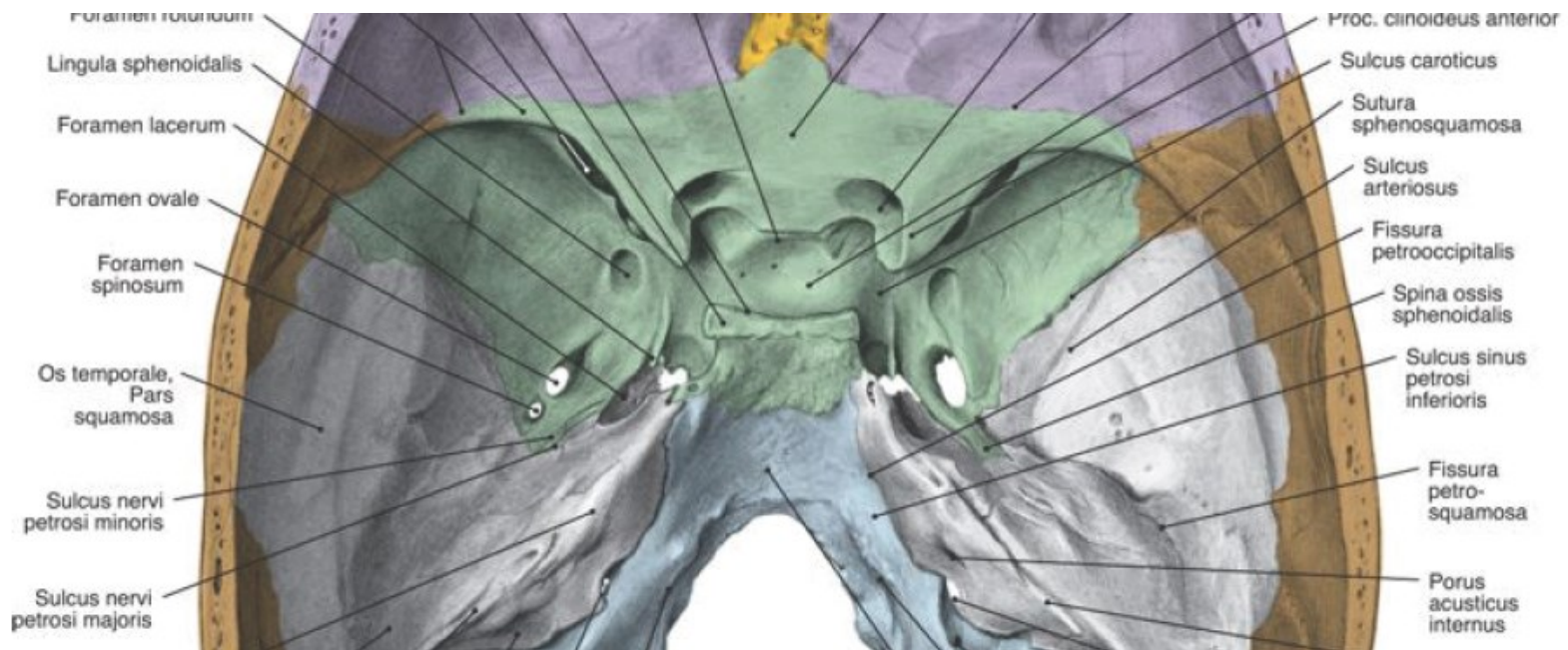


COMPONENTS

- body of sphenoid and greater wings
- anterior surface of the petrous part/temporal squama temporalis, inferior part

BORDERS

- ANT: lesser wing, optic canal, sulcus chiasmatis
- LAT: squama temporalis
- POST: dorsum sellae, groove for the sup. petrosal sinus



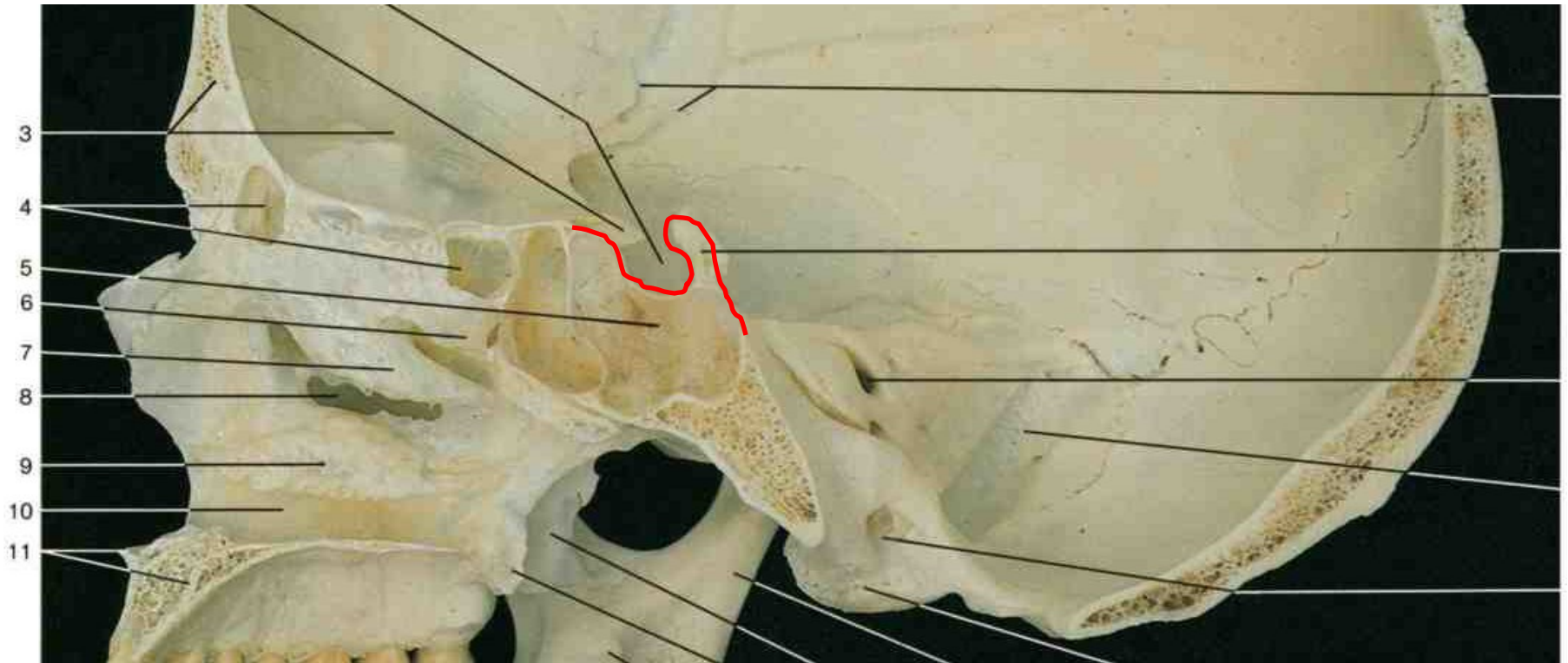
STRUCTURES

- optic canal - *orbit*
- tuberculum sellae (processus clinoideus medius)
- pituitary fossa
- dorsum sellae (processus clinoideus posterior),
- carotid groove
- sup. orbital fissure - *orbit*
- foramen rotundum - *pterygopalatine fossa*
- foramen ovale - *external base of skull*
- foramen spinosum - *external base of skull*
- foramen lacerum - *external base of skull*
- sphenopetrosal fissure (synchondrosis)
- groove for the sup. petrosal sinus

STRUCTURES ON THE ANTERIOR SURFACE OF THE PYRAMIDAL BONE

- trigeminal impression (ganglion trigemini)
- groove/canal for the greater and lesser petrosal nerves
- arcuate eminence
- tegmen tympani

SELLA TURCICA = *turkish saddle*



BORDERS, COMPONENTS AND STRUCTURES

ANT *sulcus chiasmatis*

- *anterior clinoid process* (tips of the lesser wing of sphenoid)

- *tuberculum sellae* + 2 *middle clinoid process*

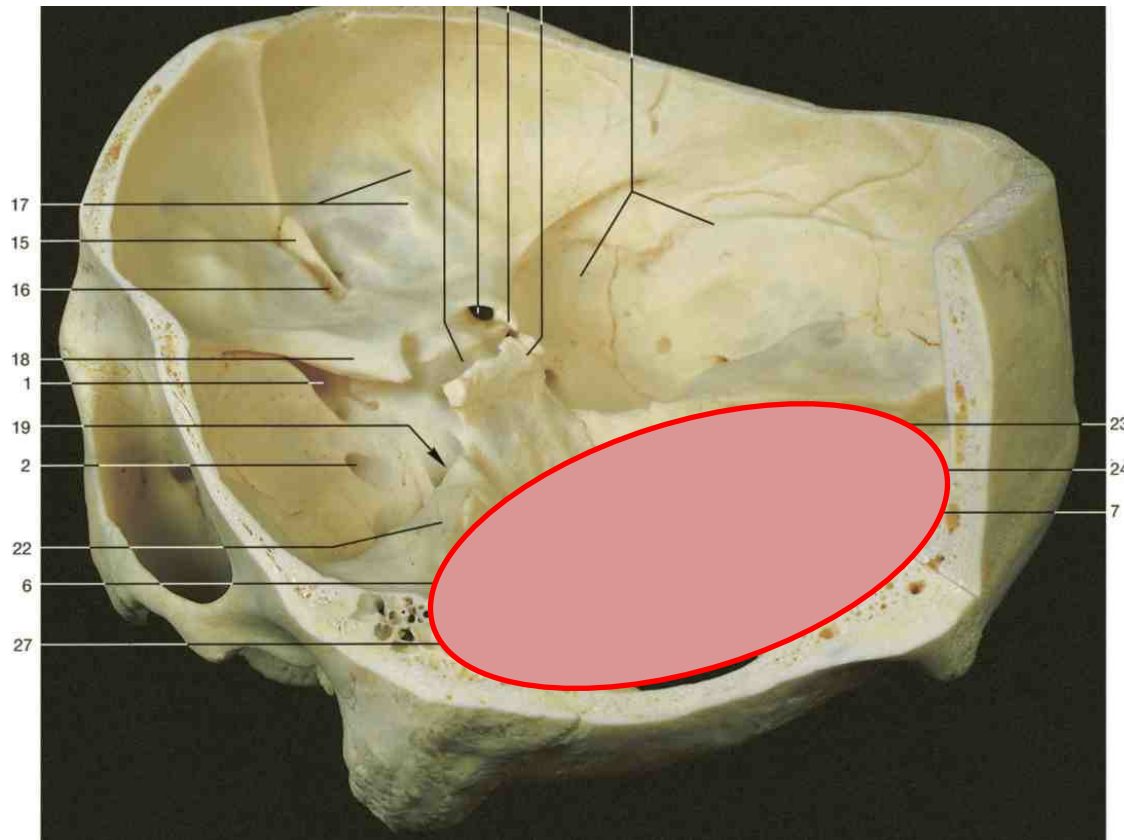
- *pituitary/hypophyseal fossa*

POST *dorsum sellae*, + 2 *post. clinoid process*

LAT groove for the cavernous sinus and the carotid sulcus

CONTENT: hypophysis

POSTERIOR CRANIAL FOSSA

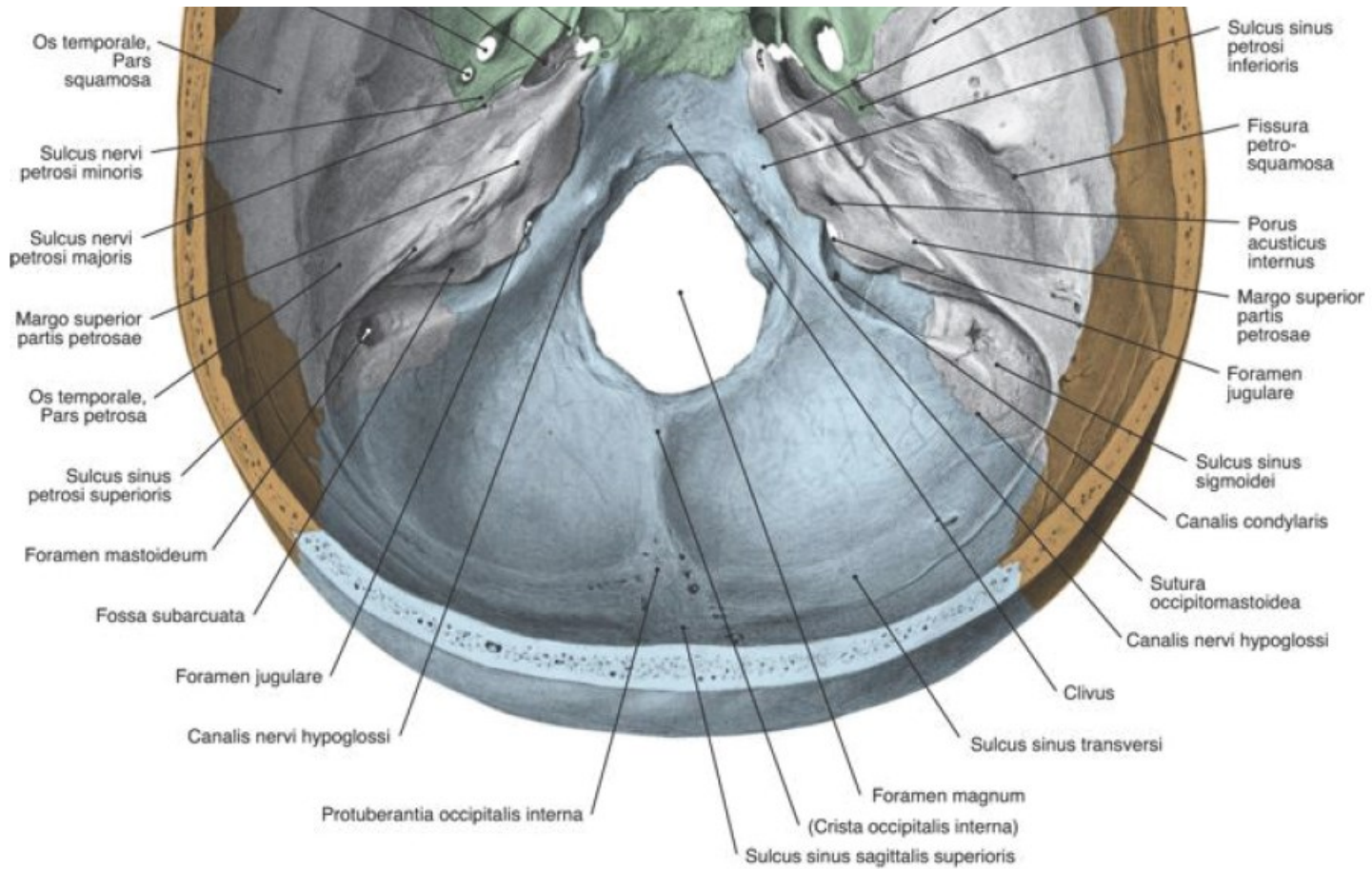


COMPONENTS

- posterior surface of pyramid
- occipital bone (basilar, lateral parts, squama)

BORDERS

- ANT: groove for the sup petrosal sinus
+ the dorsum sellae
- POST: internal occipital prot, groove for the transverse sinus

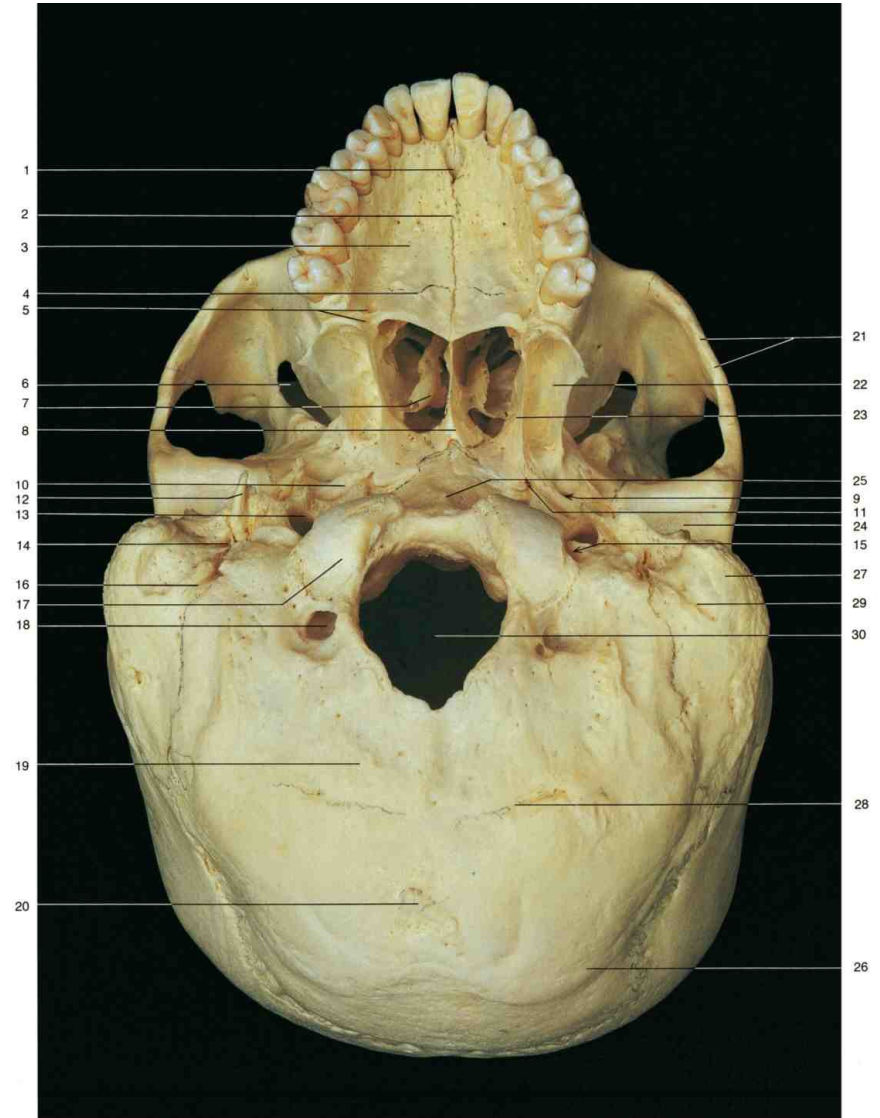
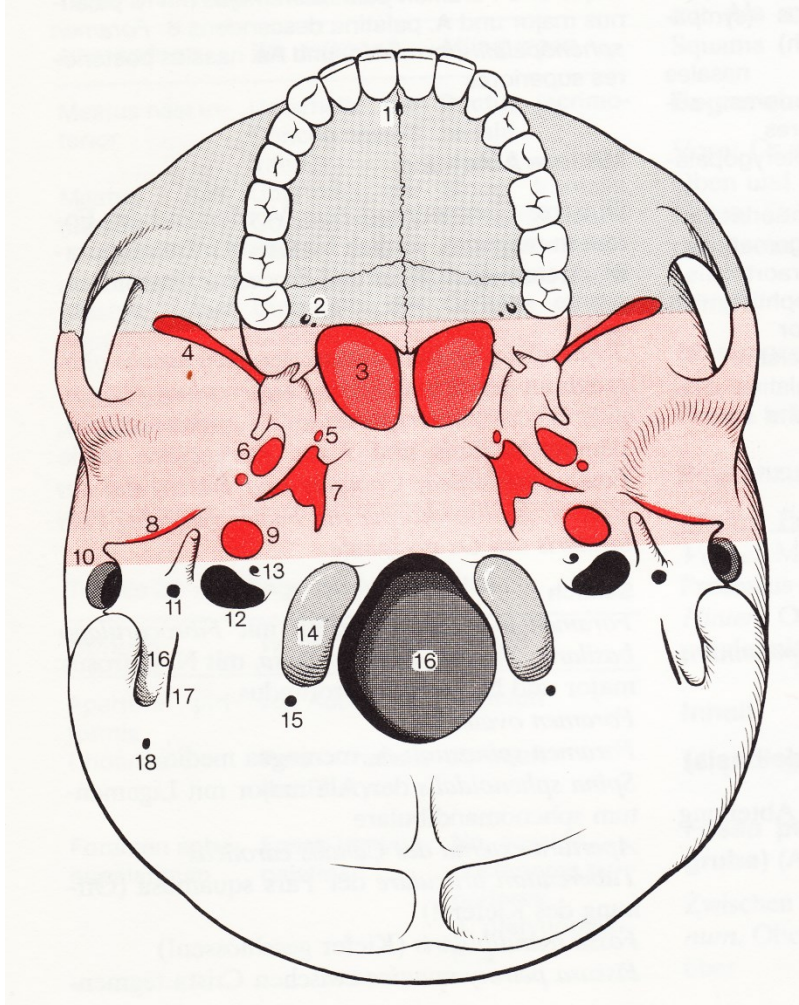


STRUCTURES

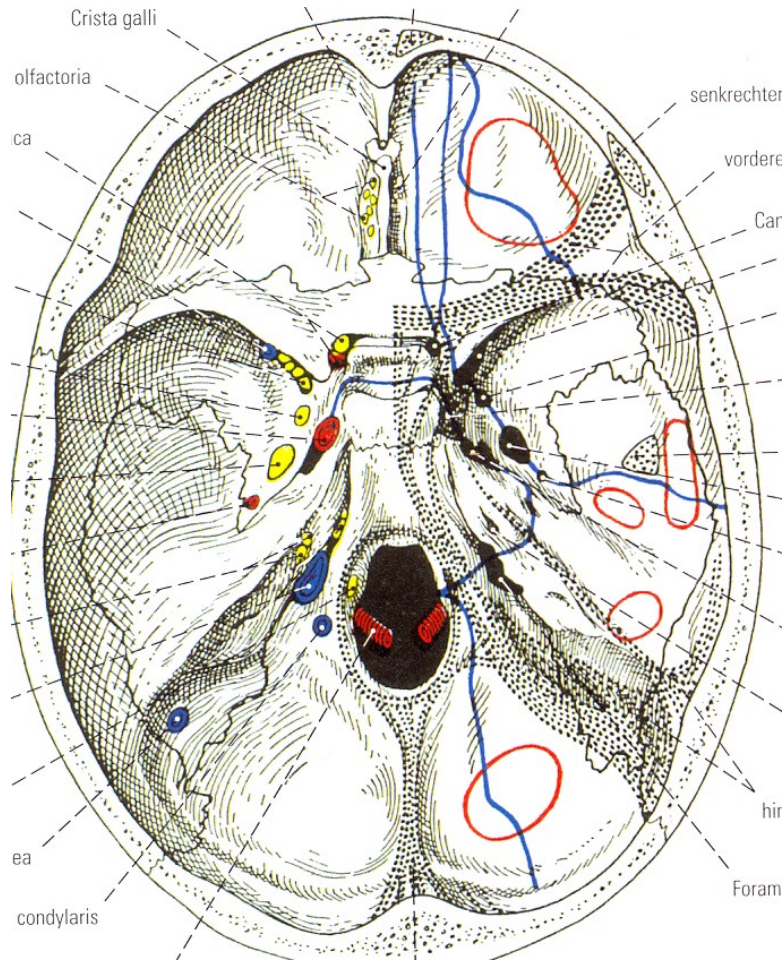
- petrooccipital fissure (synchondrosis)
- groove for the inferior petrosal sinus
- groove for the sigmoidal sinus
- groove for the transverse sinus
- jugular foramen (pars nervosa + pars venosa)
- porus + meatus acusticus internus
- vestibular aquaeduct
- mastoid foramen

- clivus (basilar part of the occipital + dorsum sellae)
- foramen magnum → *external skull base*
- condylar canal → *external skull base*
- canalis hypoglossi → *external skull base*
- internal occipital protuberance
- internal occipital crest
- groove for the superior sagittal sinus
- cerebellar fossa + cerebral fossa

BASIS CRANII EXTERNA



CLINICAL RELEVANCES



RED: weak areas

BLACK DOTTED: strengthened parts (along the trajectorial lines)

BLUE : typical fracture lines

FRACTURES OF THE SKULL BASE

ANTERIOR CRANIAL FOSSA

„Spectacle” hematoma

Nose bleeding, CSF drips from the nose

MIDDLE CRANIAL FOSSA

Bleeding from the ears

POSTERIOR CRANIAL FOSSA

Haematoma behind the mastoid proc.,
haemorrhage behind the posterior wall of
pharynx

Literature:

Andrea Székely: Koponya, os ethmoidale, os shenoidale

Faller: An atomie in Stichworten (Enke, 1980)

Rochen, Yokochi, Drecoll: Color atlas of anatomy (7th edition)