

Neurocranium, splanchnocranium, basis cranii

Prof. MUDr. Jiří Ferda, Ph.D.

Images: Thieme: Atlas of Anatomy, Elsevier: Gray's Anatomy for Students, Galén: CT angiografie, KZM FN Plzeň

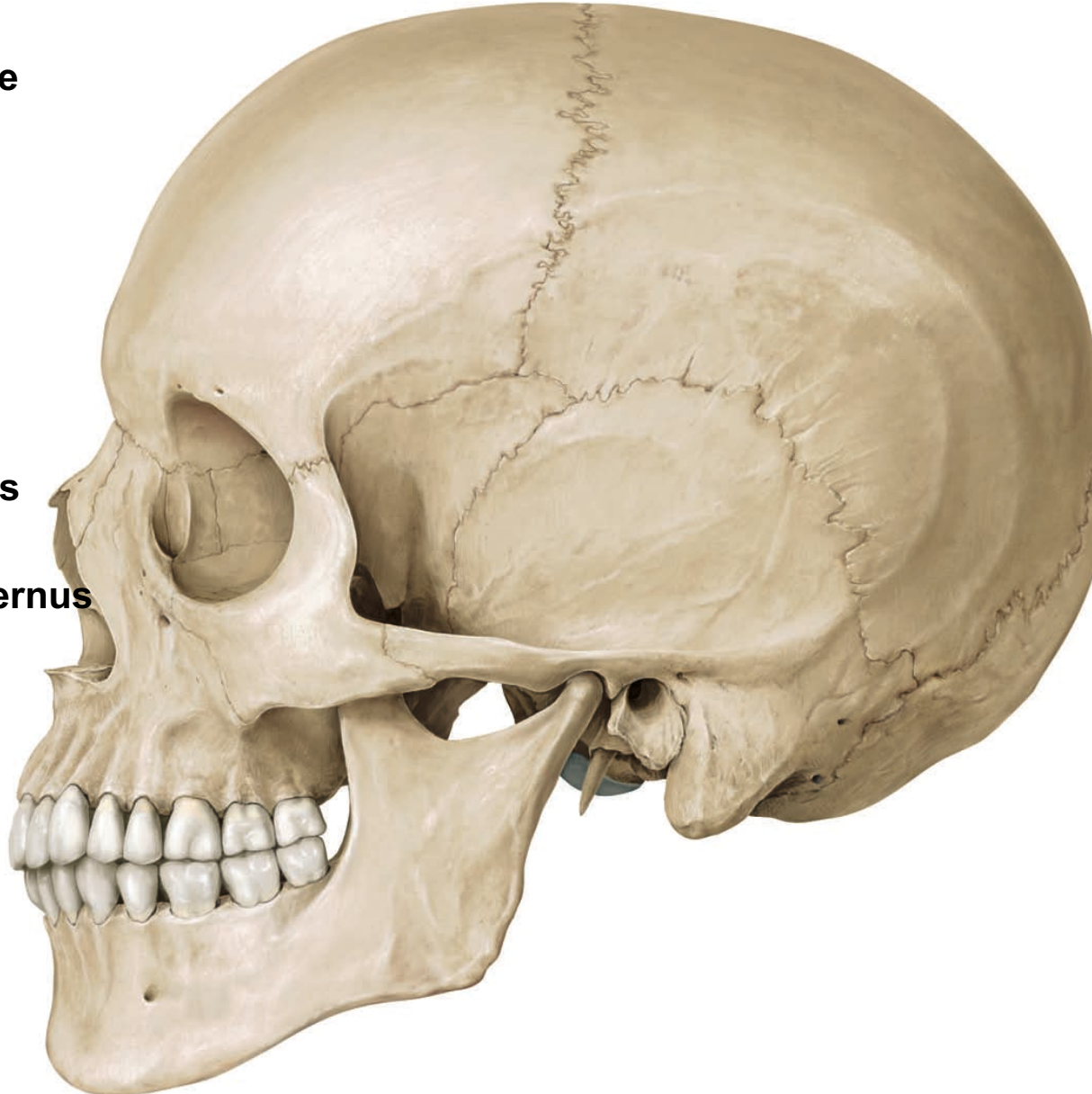
cranium

- ♦ **Splanchnocranium**
- ♦ *Obličejový skelet*
- ♦ *Facial skeleton*
- ♦ **Neurocranium**



Cranium

- ♦ **Os frontale**
 - ♦ Foramen supraorbitale
- ♦ **Os sphenoidale**
- ♦ **Os parietale**
- ♦ **Os occipitale**
- ♦ **Os temporale**
 - ♦ Squama
 - ♦ Processus mastoideus
 - ♦ Processus styloideus
 - ♦ Meatus acusticus externus
- ♦ **Os zygomaticum**
- ♦ **Mandibula**
 - ♦ Foramen mentale
- ♦ **Maxilla**
 - ♦ Foramen infraorbitale



- ♦ **Os frontale**
 - ♦ Foramen supraorbitale
- ♦ **Os sphenoidale**
- ♦ **Os parietale**
- ♦ **Os occipitale**
- ♦ **Os temporale**
- ♦ **Os zygomaticum**
- ♦ **Mandibula**
- ♦ **Maxilla**
- ♦ **Os zygomaticum**
 - ♦ Arcus zygomaticus
- ♦ **Os ethmoidale**
- ♦ **Os lacrimale**
 - ♦ Sulcus lacrimalis
- ♦ **Os nasale**

Cranium

- ♦ **Os frontale**
 - ♦ Foramen supraorbitale
- ♦ **Os parietale**
- ♦ **Os sphenoidale**
 - ♦ Ala minor
 - ♦ Ala major
- ♦ **Os ethmoidale**
 - ♦ Lamina perpendicularis
 - ♦ Concha media
- ♦ **Os zygomaticum**
- ♦ **Os temporale**
 - ♦ Processus mastoideus
- ♦ **Vomer**
- ♦ **Concha inferior**



- ♦ **Maxilla**
 - ♦ Foramen infraorbitale
- ♦ **Mandibula**
 - ♦ Foramen mentale
- ♦ **Orbita**
 - ♦ Margo supraorbitalis
 - ♦ Incissura frontalis
 - ♦ Margo infraorbitalis
 - ♦ Fisura orbitalis superior
 - ♦ Canalis opticus
- ♦ **Apertura piriformis**
 - ♦ Spina nasalis anterior
 - ♦ Septum nasi

Cranium

- ♦ **Os parietale**
 - ♦ Sutura sagittalis
 - ♦ Sutura lambdaidea
- ♦ **Os occipitale**
 - ♦ Protuberantia occipitalis externa
 - ♦ Linea nuchae suprema
 - ♦ Linea nuchae superior
 - ♦ Linea nuchae inferior
 - ♦ Condylus occipitalis
- ♦ **Os temporale**
 - ♦ Processus mastoideus
 - ♦ Foramen mastoideum
- ♦ **Os sphenoidale**
- ♦ **Os palatinum**
- ♦ **Maxilla**
 - ♦ Foramen incisivum
- ♦ **Mandibula**
 - ♦ Foramen mandibulare



Cranium - calva

- ♦ **Os frontale**
- ♦ **Sutura coronaria**
- ♦ **Os parietale**
 - ♦ **Foramina parietalia**
- ♦ **Sutura sagittalis**
- ♦ **Sutura lamdoidea**
- ♦ **Os occipitale**



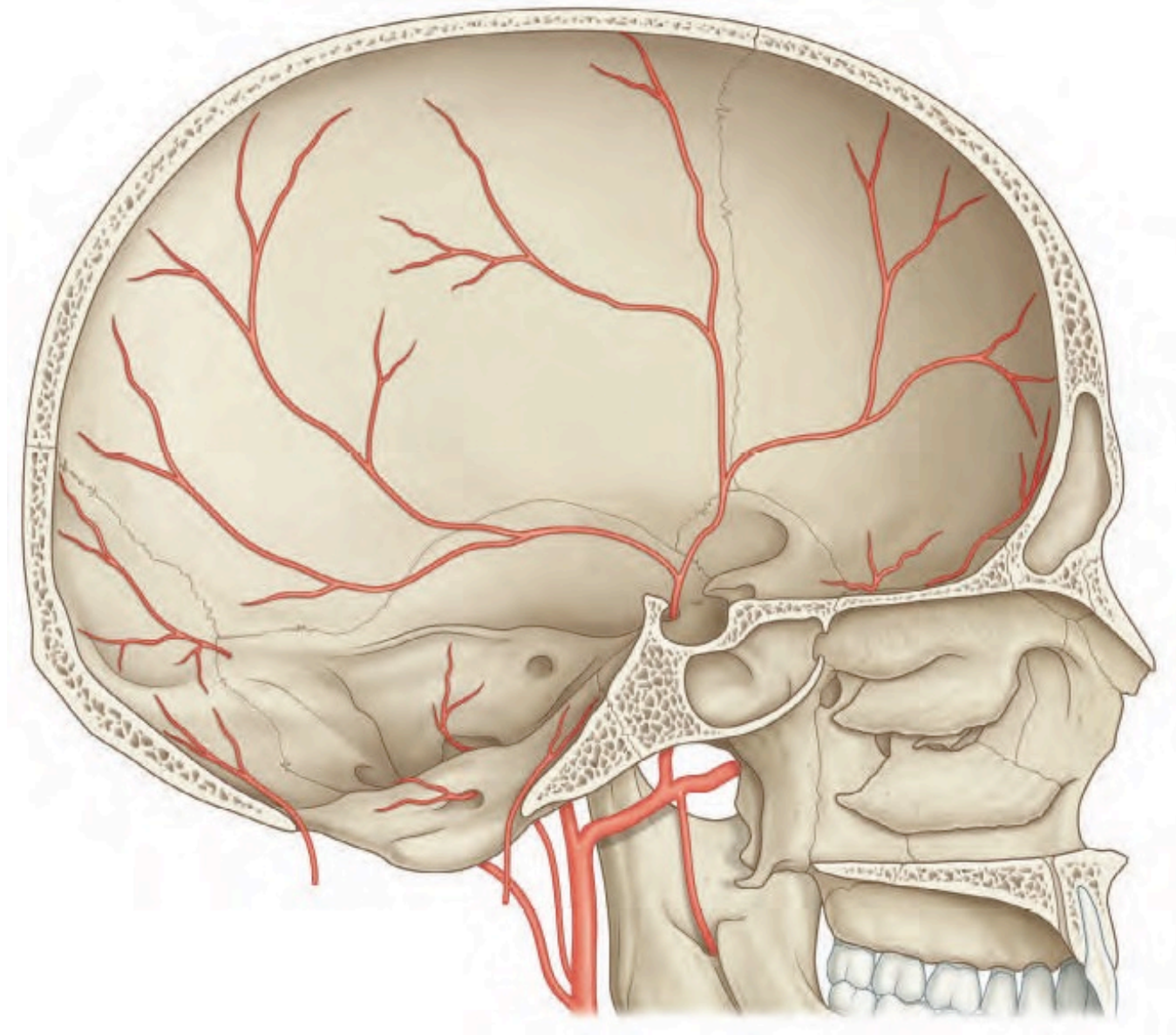
Calva

- ♦ **Os frontale**
- ♦ **Sinus frontalis**
- ♦ **Crista frontalis**
- ♦ **Sulcus sinus sagittalis**
- ♦ **Sulci arteriarum**
- ♦ **Foveolae granulares**
- ♦ **Foramina parietalia**
- ♦ **Ossa parietalia**

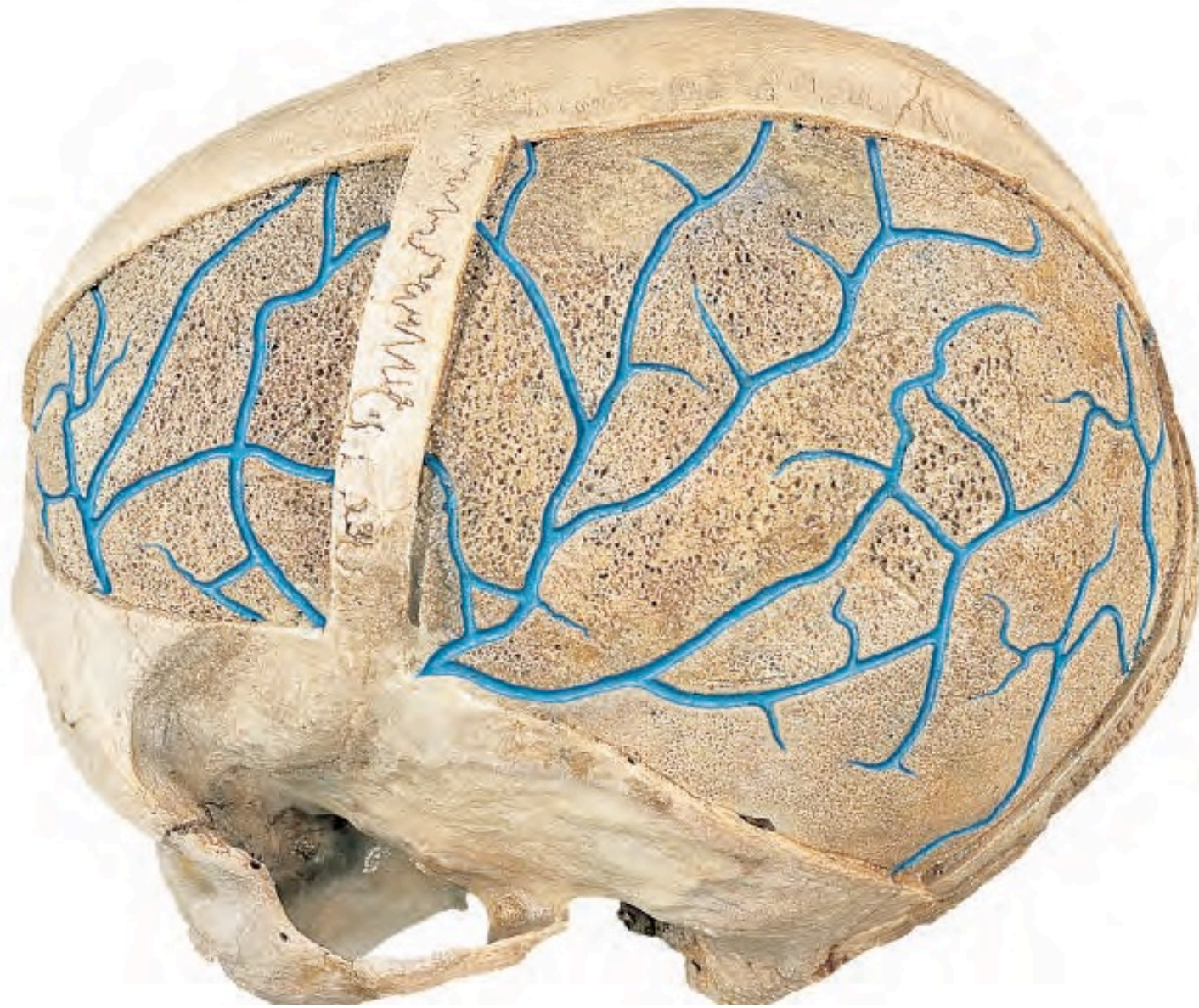


- ♦ A. meningica media
- ♦ A. meningica posterior
 - ♦ a. pharyngica ascendens
- ♦ Rr. mennigeales
 - ♦ a. ethmoidalis
 - ♦ a. pharyngica ascendens
 - ♦ a. occipitalis

Endosteální lamina durae matris
impressiones calvae



Arteriae meningeales



- ♦ Venae diploicae
- ♦ Frontales
- ♦ **Sutura coronaria**
- ♦ Temporales anteriores
- ♦ Temporales psoteriores
- ♦ Occipitales

Venae diploicae

Basis cranii externa

♦ Maxilla

- ♦ Foramen incisivum
- ♦ Sutura palatina mediana

♦ Os palatinum

- ♦ Foramen palatinum majus
- ♦ Foramen palatinum minus

♦ Choanae

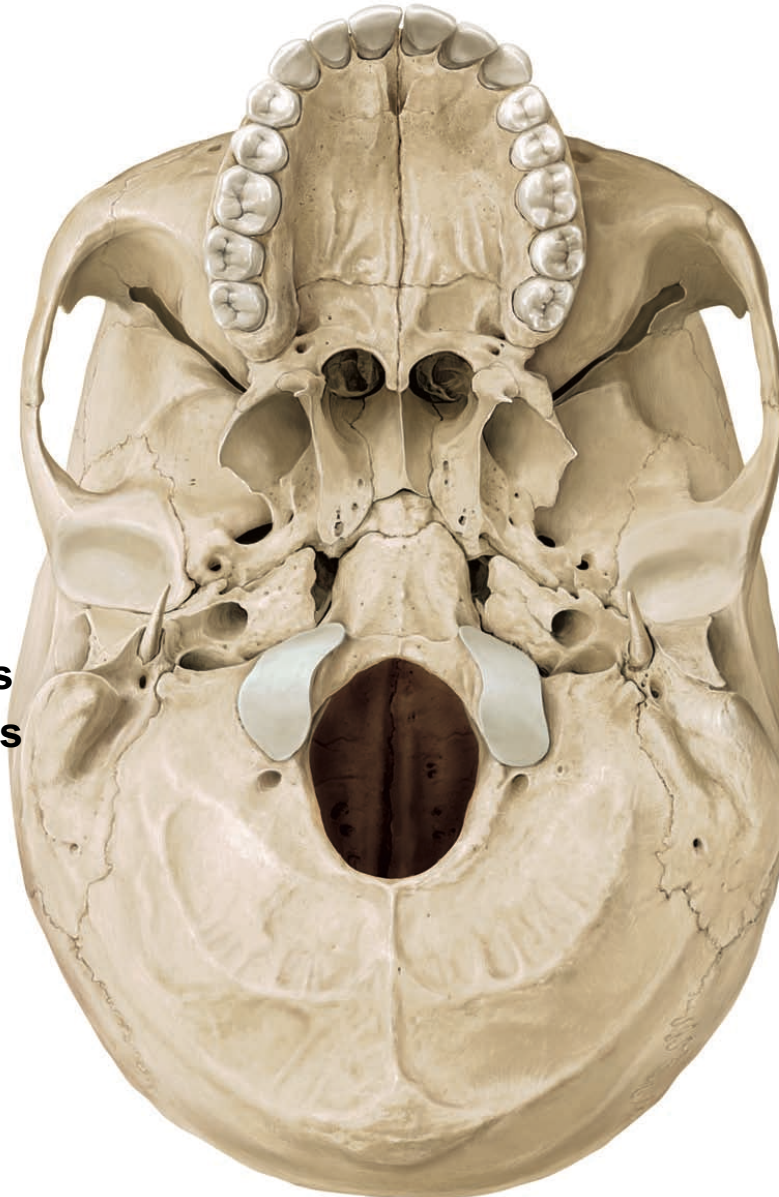
♦ Vomer

♦ Os sphenoidale

- ♦ Processus pterygoideus lateralis
- ♦ Processus pterygoideus medialis
- ♦ Foramen rotundum
- ♦ Foramen spinosum
- ♦ Fissura orbitalis inferior

♦ Os zygomaticum

♦ Arcus zygomaticus



♦ Foramen lacerum

♦ Os temporale

- ♦ Canalis caroticus
- ♦ Foramen jugulare
- ♦ Fossa mandibularis
- ♦ Processus styloideus
- ♦ Foramen stylomastoideum
- ♦ Processus mastoideus
- ♦ Incissura mastoidea
- ♦ Foramen mastoideum

♦ Os occipitale

- ♦ Foramen magnum
- ♦ Canalis nervi hypoglossi
- ♦ Tuberculum pharyngeum
- ♦ Condylus occipitalis
- ♦ Canalis condylaris

Basis cranii interna

♦ Os frontale

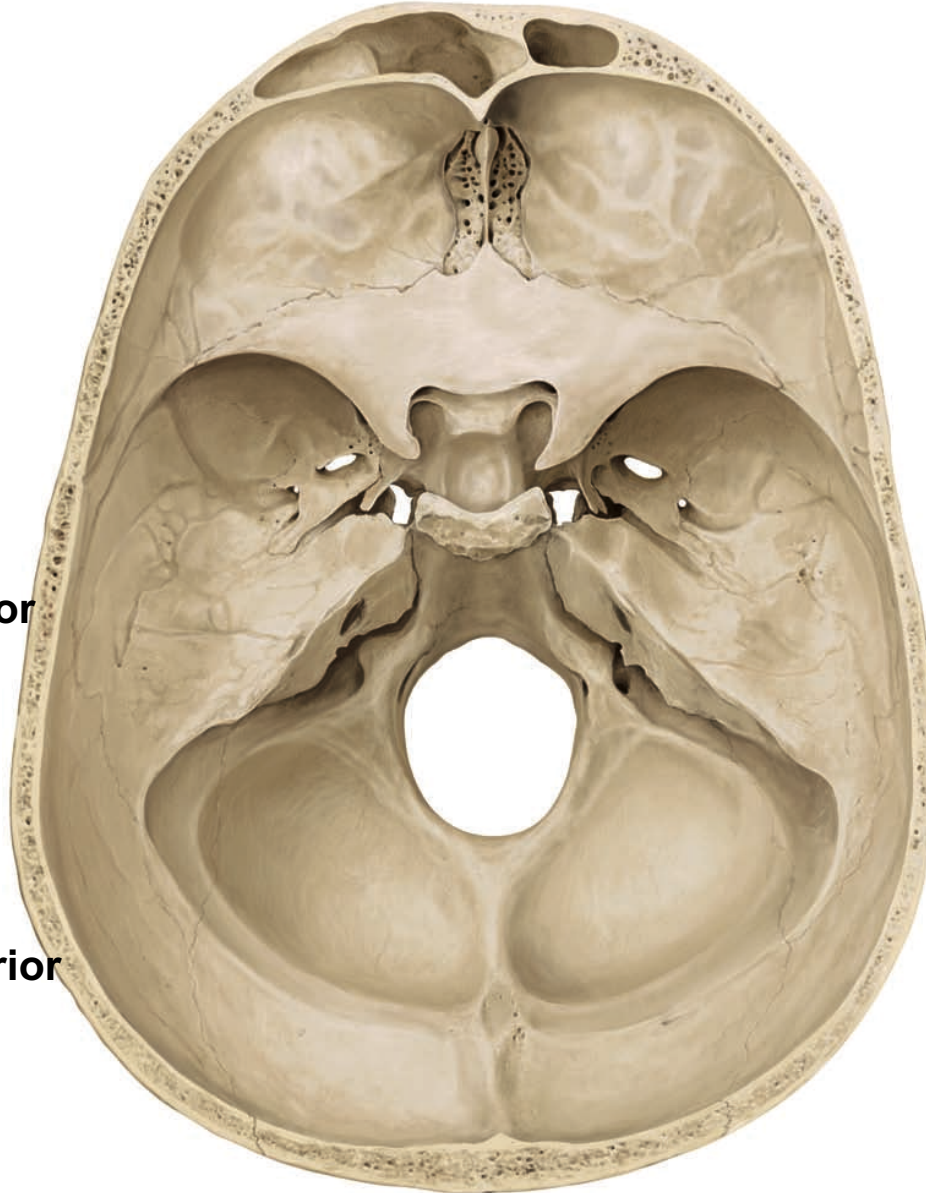
- ♦ Sinus frontalis
- ♦ Crista frontalis

♦ Os ethmoidale

- ♦ Lamina cribrosa
- ♦ Crista galli

♦ Os sphenoidale

- ♦ Ala minor
- ♦ Planum sphenoidale
- ♦ Processus clinoideus anterior
- ♦ Canalis opticus
- ♦ Ala major
- ♦ Foramen ovale
- ♦ Foramen spinosum
- ♦ Fossa hypophysealis
- ♦ Processus clinoideus posterior
- ♦ Clivus



♦ Os temporale

- ♦ Pars petrosa
- ♦ Meatus acusticus internus
- ♦ Foramen jugulare

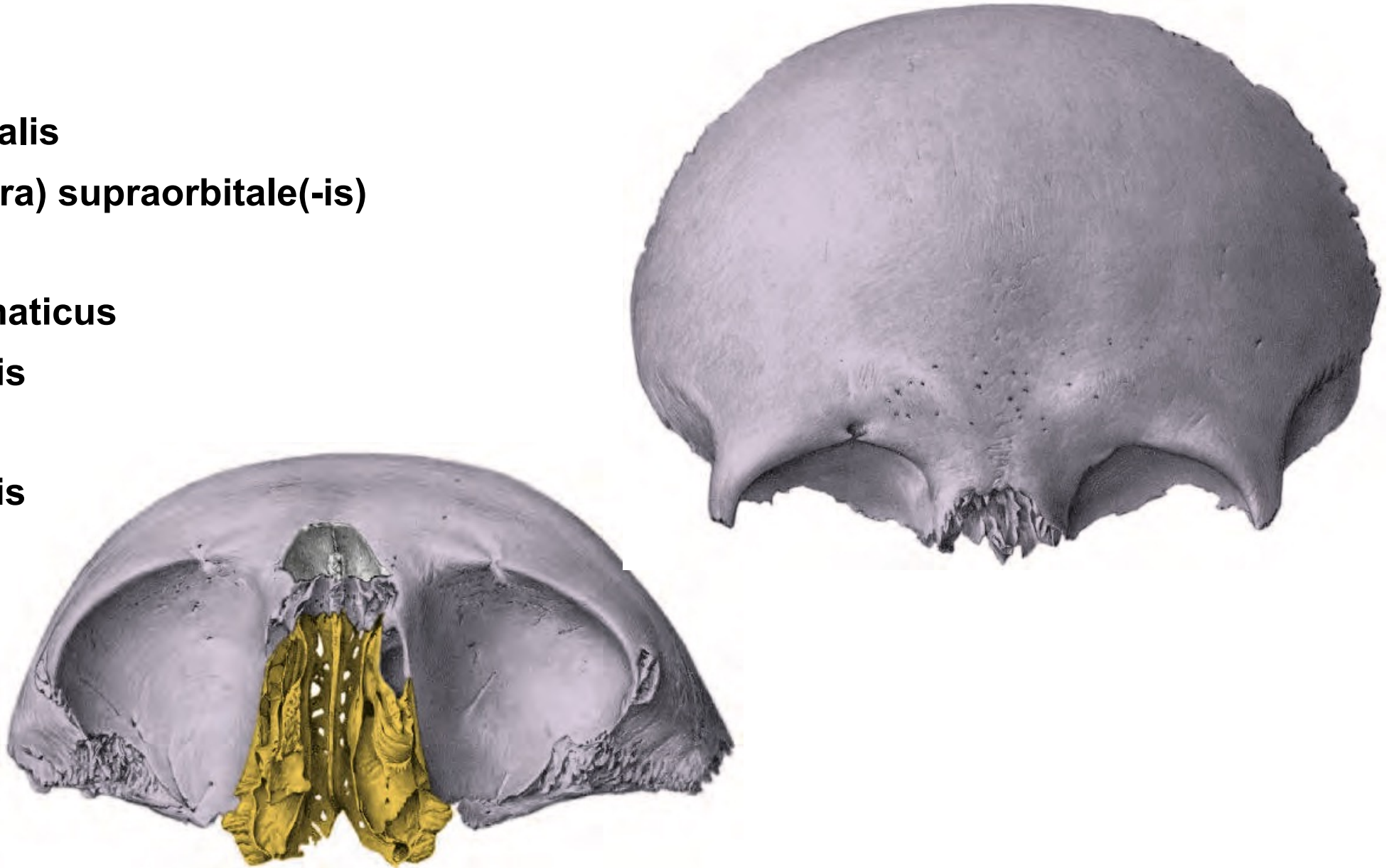
♦ Os occipitale

- ♦ Clivus
- ♦ Canalis nervi hypoglossi
- ♦ Foramen magnum
- ♦ Fossa cerebellaris
- ♦ Sulcus sinus transversus
- ♦ Sulcus sinus sigmoidei
- ♦ Confluens sinuum



Os frontale

- ♦ **Pars nasalis**
- ♦ **Spina nasalis**
- ♦ **Margo supraorbitalis**
- ♦ **Foramen (incissura) supraorbitale(-is)**
- ♦ **Pars orbitalis**
- ♦ **Processus zygomaticus**
- ♦ **Arcus supraciliaris**
- ♦ **Glabella**
- ♦ **Eminentia frontalis**
- ♦ **Pars squamosa**



Os parietale

♦ Anguli

- ♦ Angulus anterior superior (frontalis)
- ♦ Angulus anterior inferior (sphenoideus)
- ♦ Angulus posterior inferior (mastoideus)
- ♦ Angulus posterior superior (occipitalis)

♦ Marga

- ♦ Frontalis
- ♦ Squamosus
- ♦ Occipitalis
- ♦ Sagittalis

♦ Tuberositas parietalis

♦ Linea temporalis superior

♦ Linea temporalis inferior

♦ Sulci a. meningeae

♦ Sulcus sinus sigmoidei

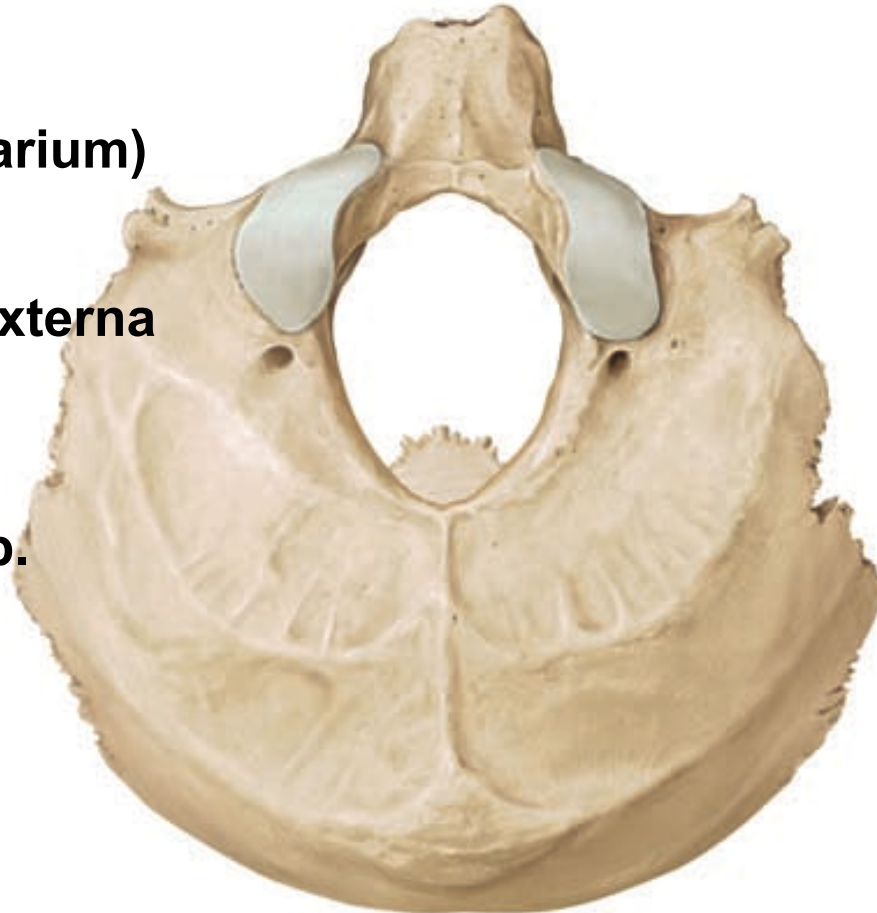
♦ Sulcus sinus sagittalis

♦ Foramen parietale



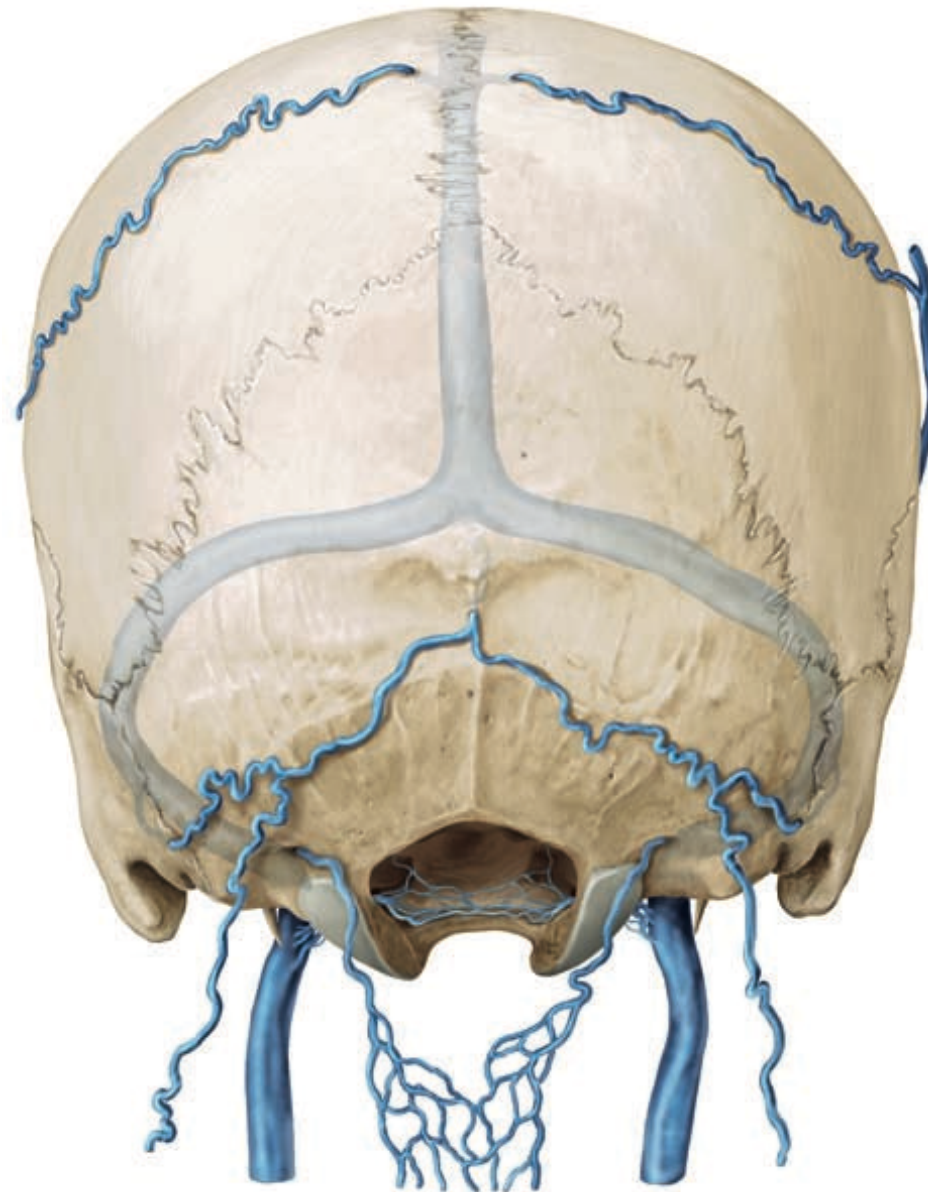
Os occipitale

- ♦ Squama
- ♦ Foramen magnum
- ♦ Pars basilaris
- ♦ Processus nuchalis
- ♦ Canalis hypoglossus
- ♦ Canalis condylaris (emissarium)
- ♦ Crista occipitalis externa
- ♦ Protuberantia occipitalis externa
- ♦ Linea nuchae
 - ♦ suprema, superior, inferior
- ♦ Sulcus sinus sagittalis sup.
- ♦ Sulcus sinus transversi
- ♦ Eminentia cruciformis



Emissaria

- ♦ Emissarium parietale
- ♦ Emissarium mastoideum
- ♦ Emissarium condylare
- ♦ Emissarium occipitale



Os temporale – temporal bone – spánková kost

- ♦ Pars squamosa
- ♦ Pars tympanica
- ♦ Pars petrosa



Os temporale

- ♦ **Squama**
- ♦ **Processus zygomaticus**
- ♦ **Tuberculum articulare**
- ♦ **Fossa mandibularis**
- ♦ **Fissura petrotympanica**
- ♦ **Processus styloideus**
- ♦ **Meatus acusticus externus**
- ♦ **Processus mastoideus**
- ♦ **Fissura tympanomastoidea**
- ♦ **Foramen mastoideum**



Os temporale

- ♦ Foramen mastoideum
- ♦ Sulcus sinus sigmoidei
- ♦ Processus styloideus
- ♦ Foramen stylomastoideum
- ♦ Canalis caroticus
- ♦ Apex ossis petrosi
- ♦ Processus zygomaticus
- ♦ Fossa jugularis
- ♦ Fossa mandibularis
- ♦ Meatus acusticus externus
- ♦ Meatus acusticus internus



Os sphenoidale

- ♦ Central bone of skull
- ♦ Centrální kost lebky



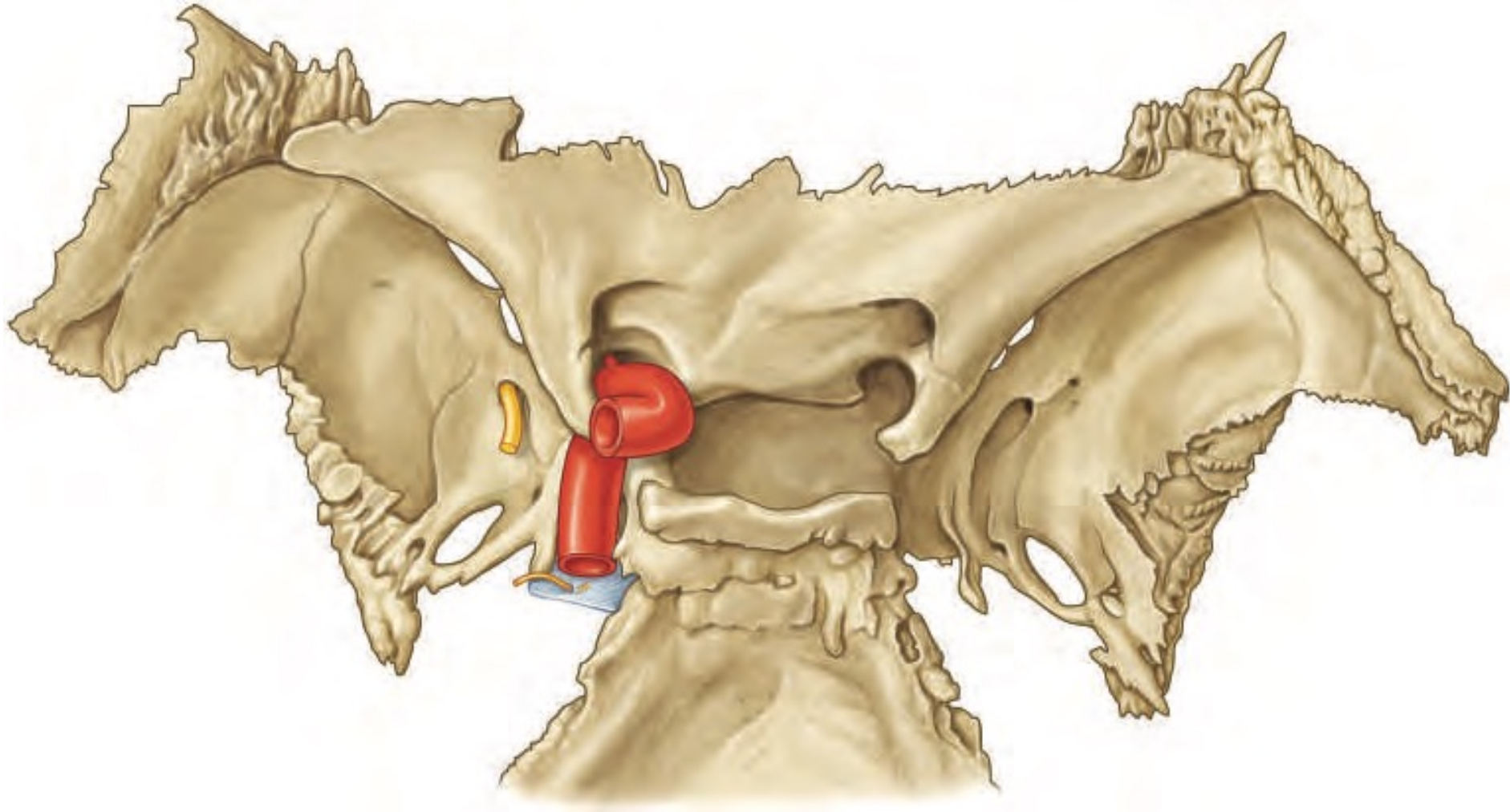


- ♦ **Corpus**
- ♦ *Ala minor*
- ♦ *Planum sphenoidale*
- ♦ *Limbus sphenoidalis*
- ♦ *Processus clinoidei ant.*
- ♦ *Sulcus prechiasmaticus*
- ♦ *Canalis opticus*
- ♦ **Sella turcica**
- ♦ **Ala major**
- ♦ *Foramen rotundum*
- ♦ *Foramen ovale*
- ♦ *Foramen spinosum*

Os sphenoidale

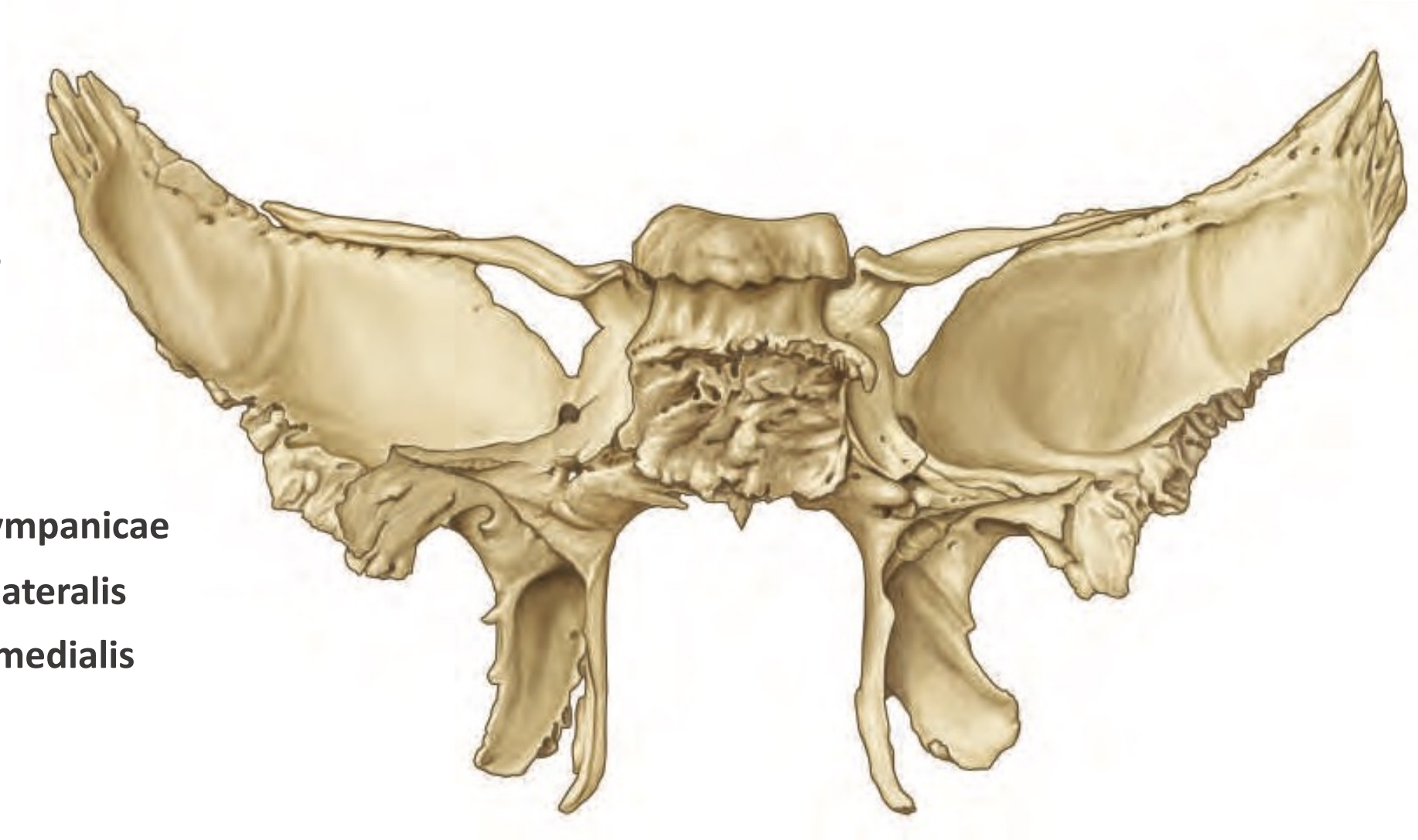
Os sphenoidale

- ♦ **Corpus**
- ♦ *Ala minor*
- ♦ *Jugum sphenoidale*
- ♦ *Limbus sphenoidalis*
- ♦ *Processus clinoidei ant.*
- ♦ *Processus clinoidei med.*
- ♦ *Sulcus prechiasmaticus*
- ♦ *Canalis opticus*
- ♦ *Sulcus caroticus*
- ♦ **Sella turcica**
- ♦ **Tuberculum**
- ♦ **Dorsum sellae**
- ♦ **Ala major**
- ♦ *Foramen rotundum*
- ♦ *Foramen ovale*
- ♦ *Foramen spinosum*



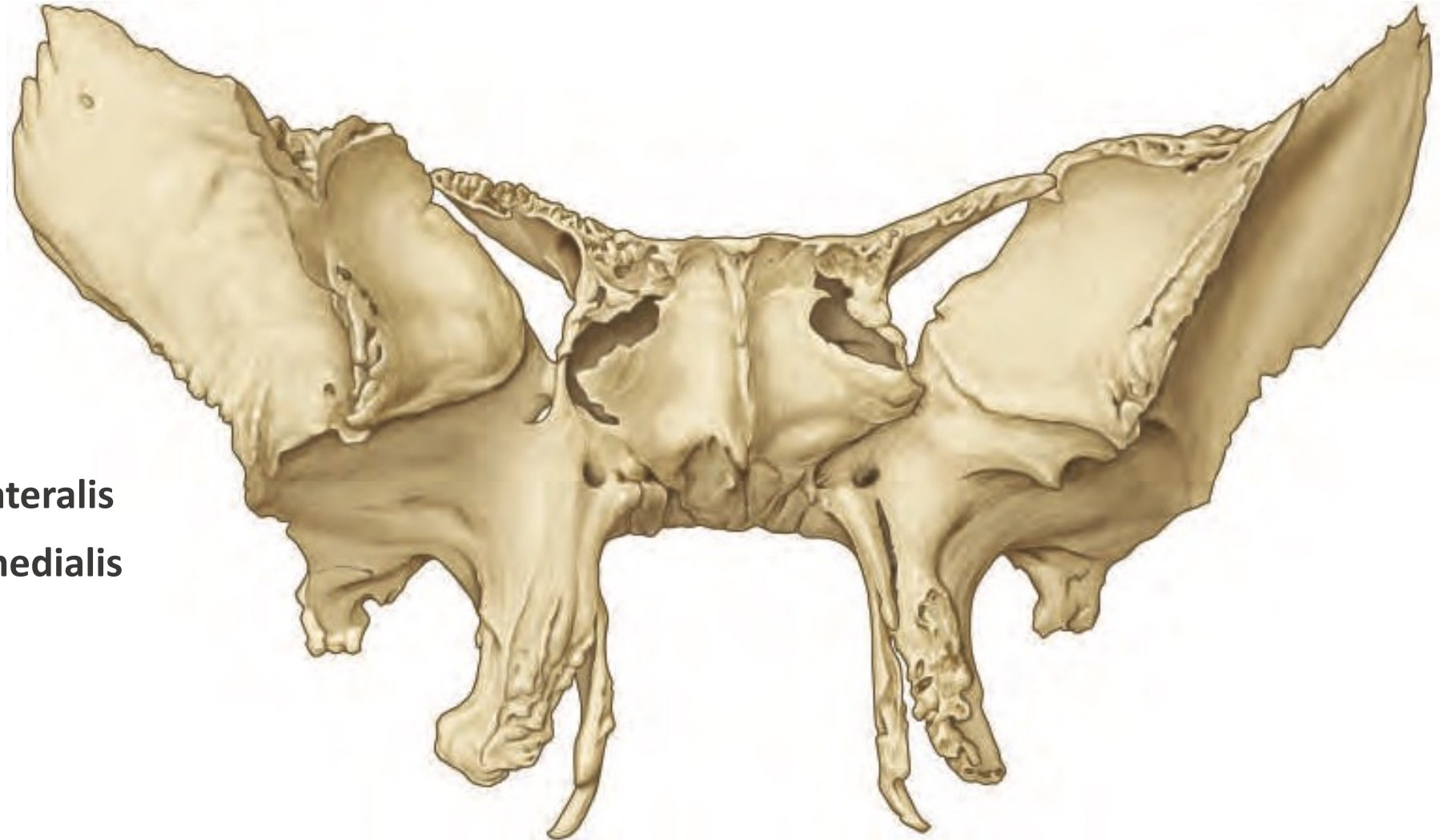
Os sphenoidale

- ♦ **Corpus**
- ♦ **Rostrum**
- ♦ **Dorsum sellae**
- ♦ **Ala minor**
- ♦ **Fissura orbitalis superior**
- ♦ **Ala major**
- ♦ *Canalis pterygoideus*
- ♦ *Foramen rotundum*
- ♦ **Sulcus tubae pharyngotympanicae**
- ♦ **Processus pterygoideus lateralis**
- ♦ **Processus pterygoideus medialis**
- ♦ **Hamulus pterygoideus**



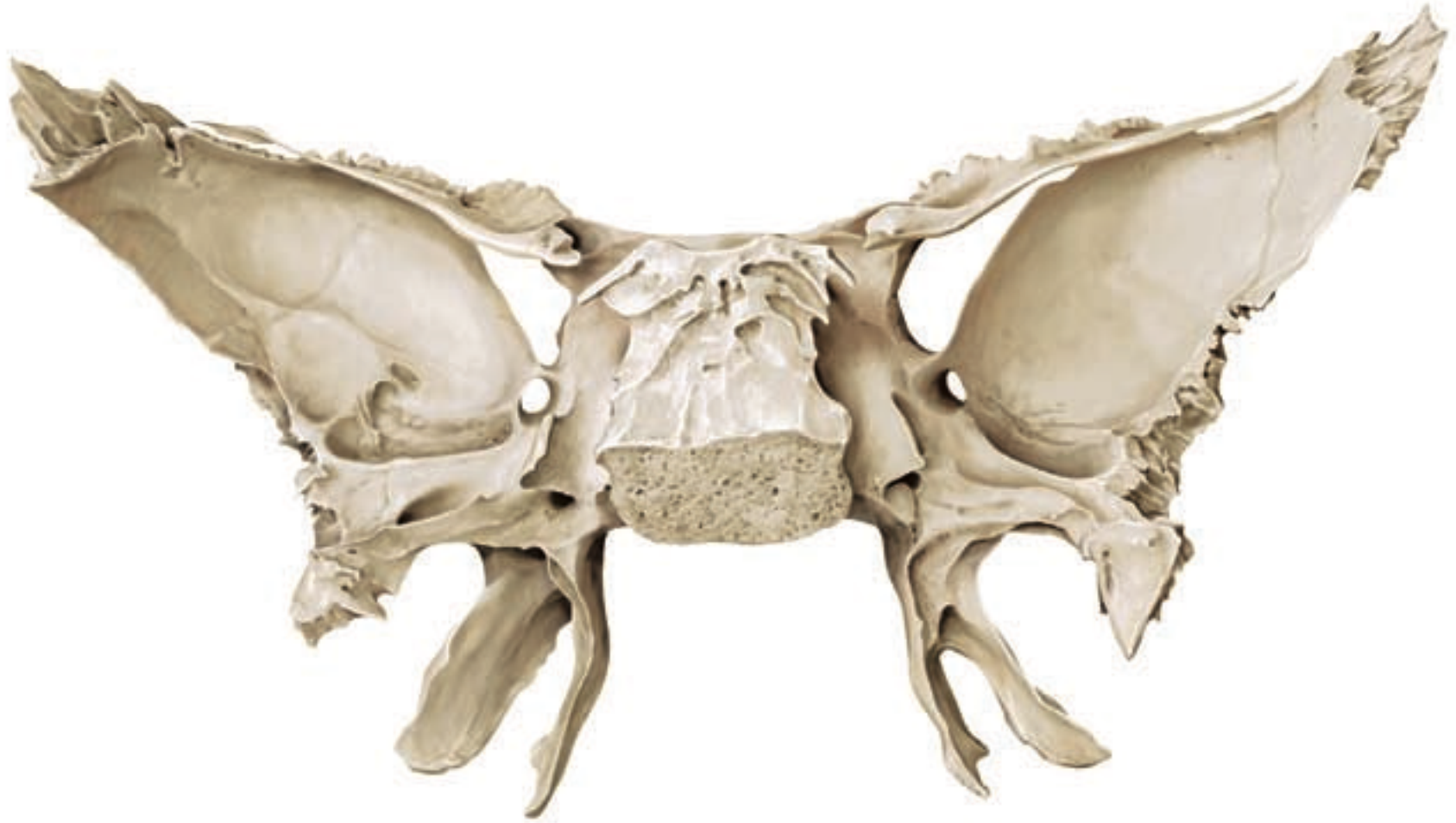
Os sphenoidale

- ♦ **Corpus**
- ♦ *Ala minor*
- ♦ *Crista sphenoidalis*
- ♦ *Sinus sphenoidalis*
- ♦ **Sella turcica**
- ♦ **Ala major**
- ♦ *Foramen rotundum*
- ♦ *Canalis pterygoideus*
- ♦ **Processus pterygoideus lateralis**
- ♦ **Processus pterygoideus medialis**
- ♦ **Hamulus pterygoideus**



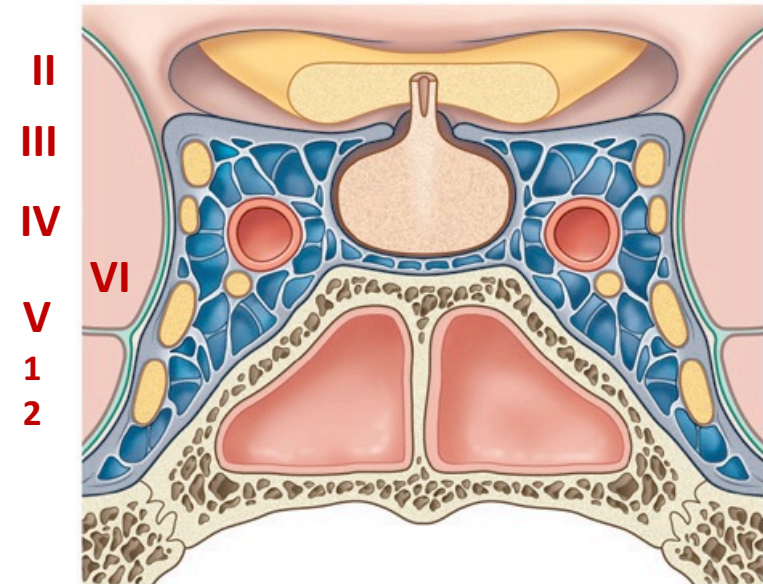
Os sphenoidale

- ♦ **Corpus**
- ♦ *Ala minor*
- ♦ *Planum sphenoidale*
- ♦ *Limbus sphenoidalis*
- ♦ *Processus clinoidei ant.*
- ♦ *Sulcus prechiasmaticus*
- ♦ *Canalis opticus*
- ♦ **Sella turcica**
- ♦ **Ala major**
- ♦ *Foramen rotundum*
- ♦ *Foramen ovale*
- ♦ *Foramen spinosum*





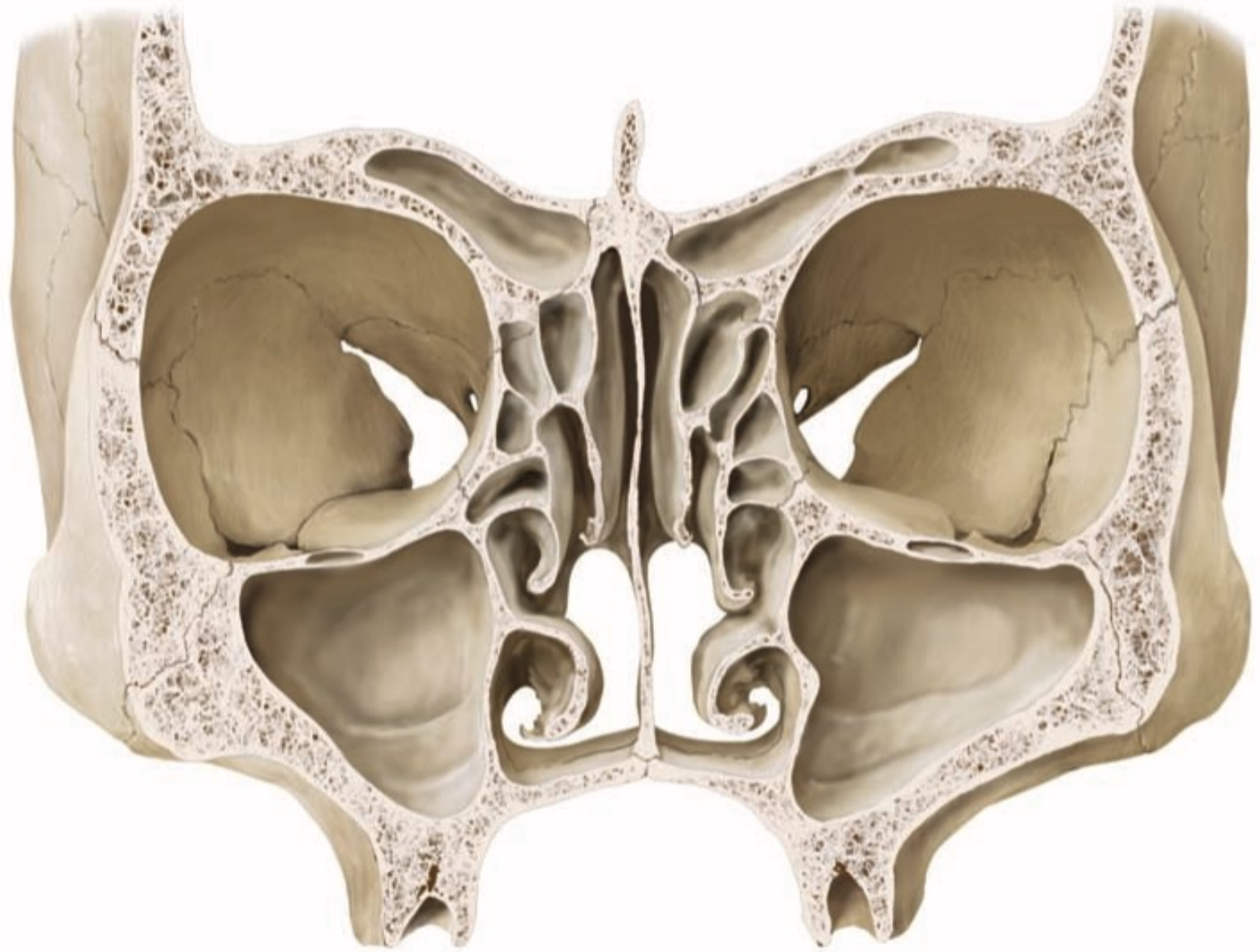
- ♦ **Sella turcica**
- ♦ *Tuberculum sellae*
- ♦ *Processus clinoidei medii*
- ♦ *Fossa hypophysealis*
- ♦ *Dorsum sellae*
- ♦ *Processus clinoidei posteriores*



Sella turcica

Splanchnocranium

- ♦ **Cavitas cranii**
- ♦ **Orbita**
- ♦ **Cavitas nasi**
- ♦ **Sinus maxillaris**
- ♦ **Sinus frontalis**
- ♦ **Cellulae ethmoideae**
- ♦ **Cavitas oris**



Orbita

- ♦ Foramen supraorbitale
- ♦ Incissura frontalis
- ♦ Foramen ethmoidale ant.
- ♦ Foramen ethmoidale post
- ♦ Canalis opticus
- ♦ Fissura orbitalis superior
- ♦ Fissura orbitalis inferior
- ♦ Sulcus infraorbitalis
- ♦ Foramen infraorbitale
- ♦ Foramen zygomaticoorbitale



- ♦ Os frontale
- ♦ Os sphenoidale
- ♦ Os palatinum
- ♦ Os ethmoidale
- ♦ Os lacrimale
- ♦ Maxilla
- ♦ Os zygomaticum

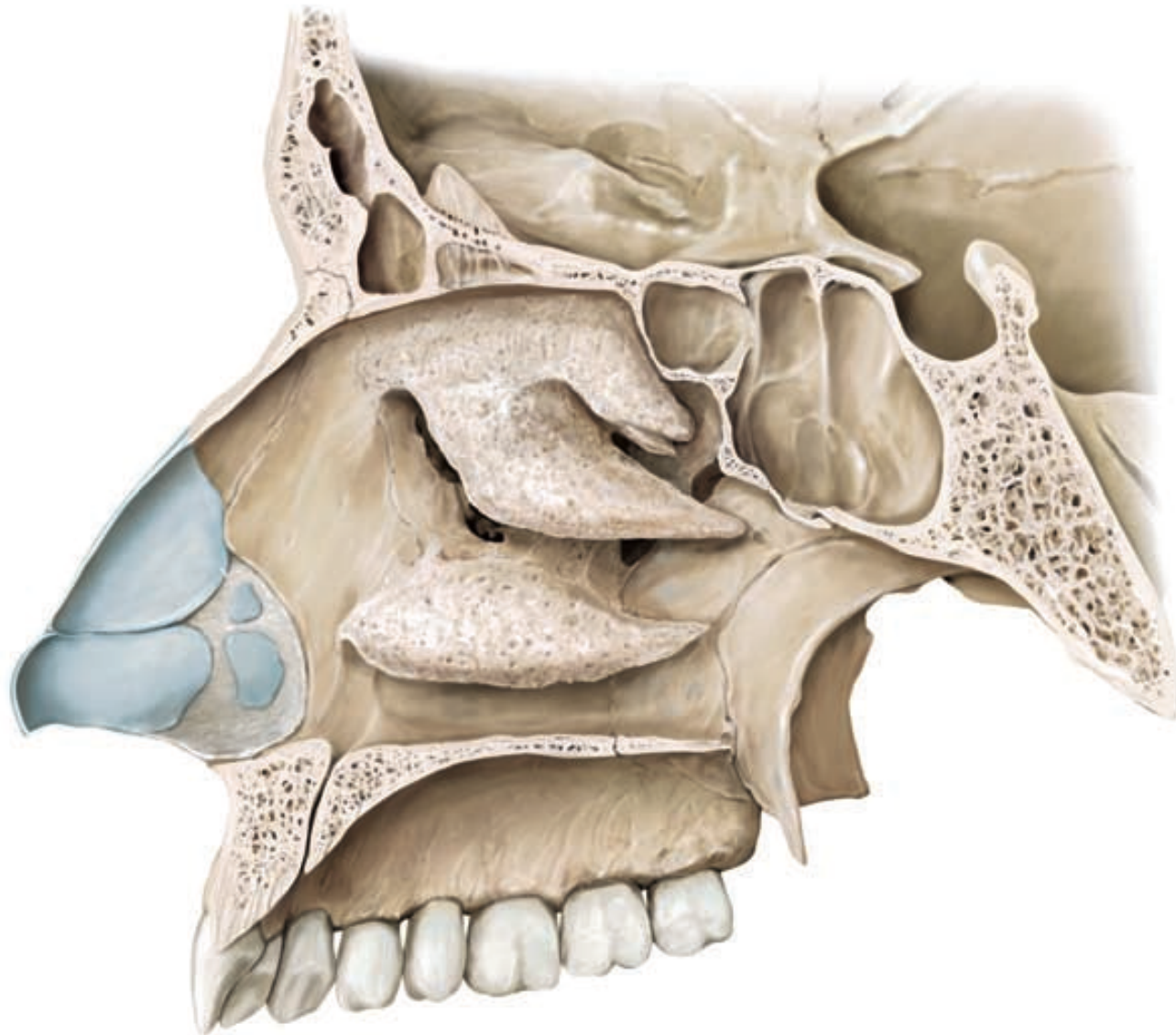
Orbita

- ♦ **Canalis opticus**
- ♦ **Fissura orbitalis superior**
- ♦ **Fissura orbitalis inferior**
- ♦ **Fossa pterygopalatina**
- ♦ **Fossa saccus lacrimalis**
- ♦ **Sinus maxillaris**



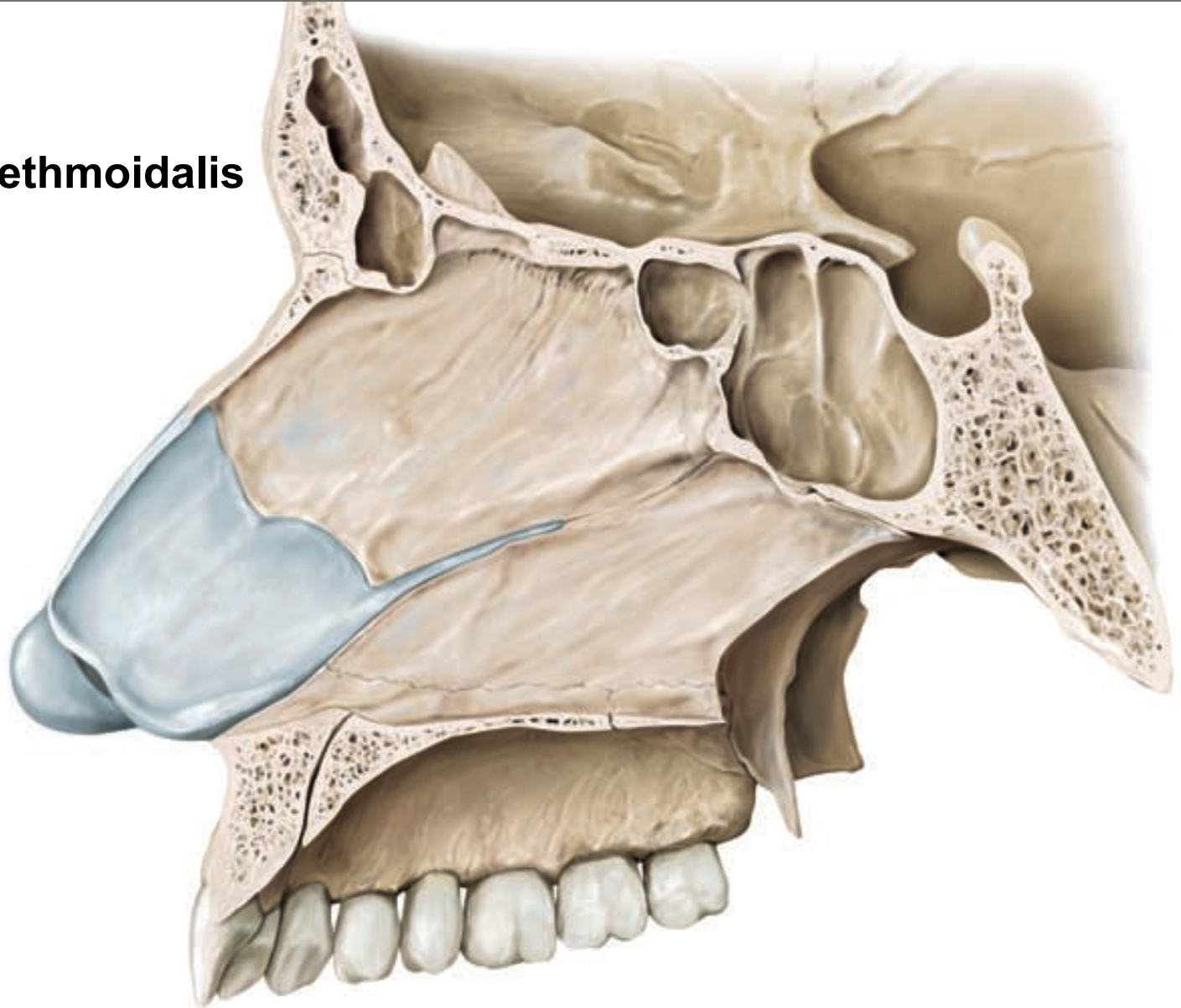
Cavitas nasi et conchae

- ♦ **Os ethmoidale**
 - ♦ Lamina cribrosa
- ♦ **Concha superior**
 - ♦ *Meatus nasi superior*
- ♦ **Concha media**
 - ♦ *Meatus nasi medius*
- ♦ **Concha inferior**
 - ♦ *Meatus nasi inferior*
- ♦ **Processus frontalis maxillae**
- ♦ **Processus palatinus maxillae**
- ♦ **Os sphenoidale**
 - ♦ **Processus pterygoideus lateralis**
 - ♦ **Processu pterygoideus medialis**
 - ♦ **Sinus sphenoidalis**
 - ♦ **Fossa hypophysealis**



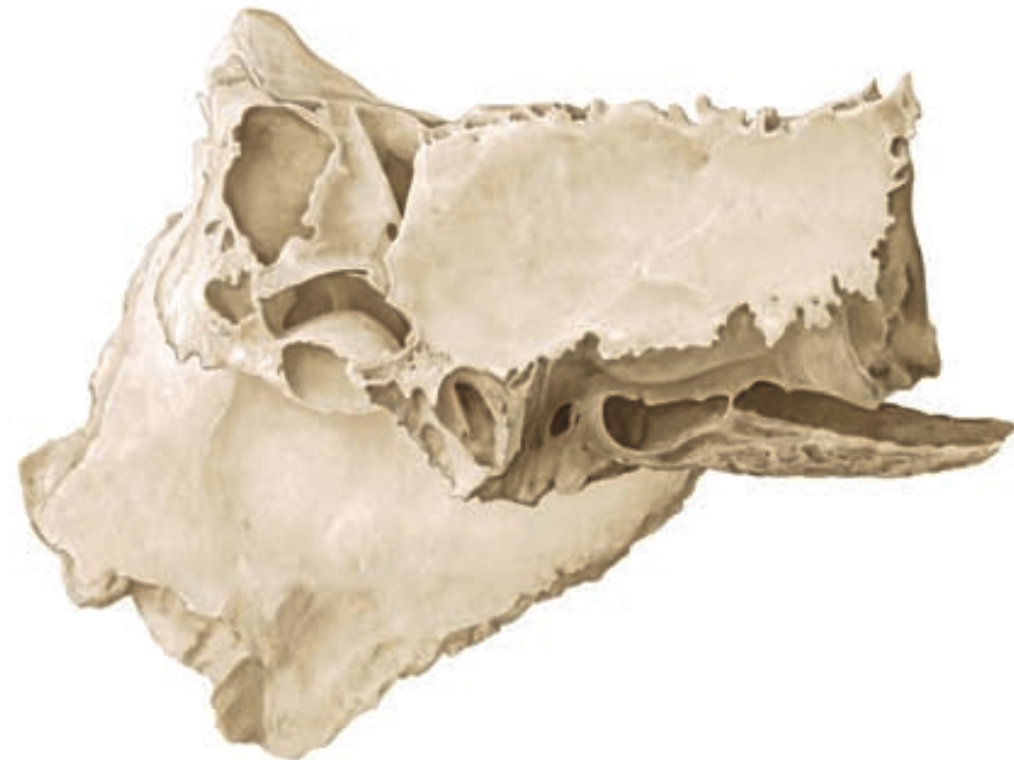
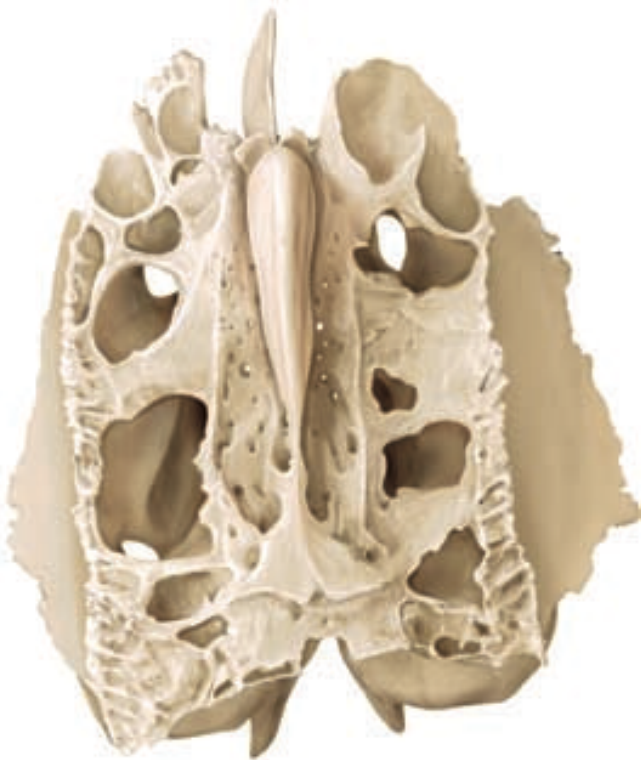
Cavitas nasi – septum

- ♦ **Crista nasalis maxillae**
- ♦ **Vomer**
- ♦ **Lamina perpendicularis ossis ethmoidalis**

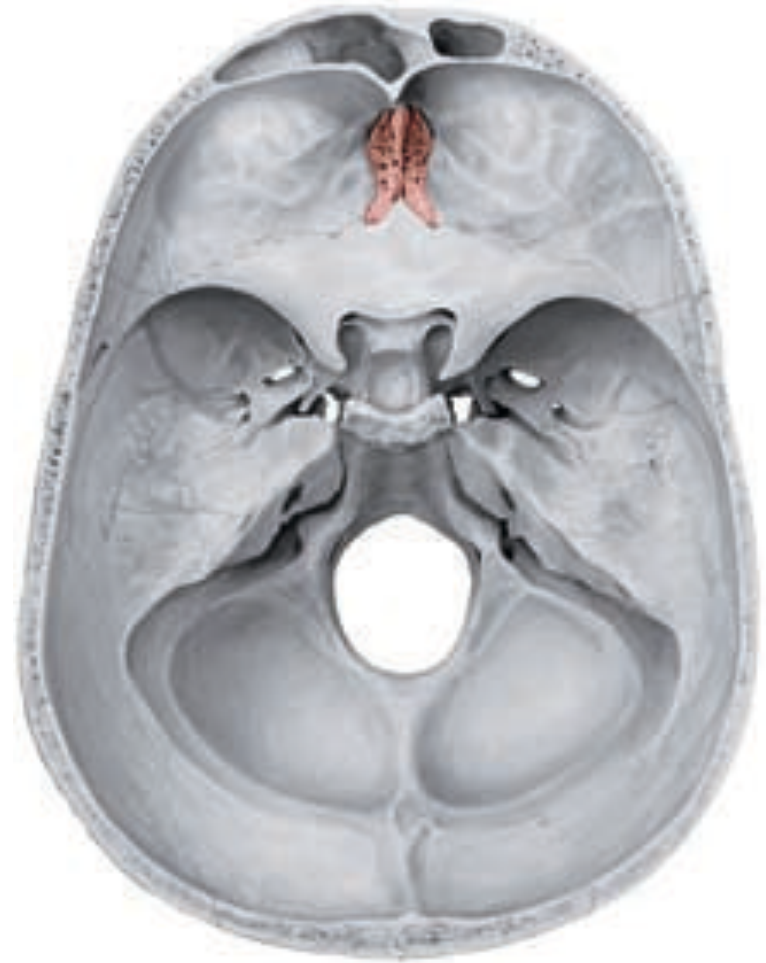
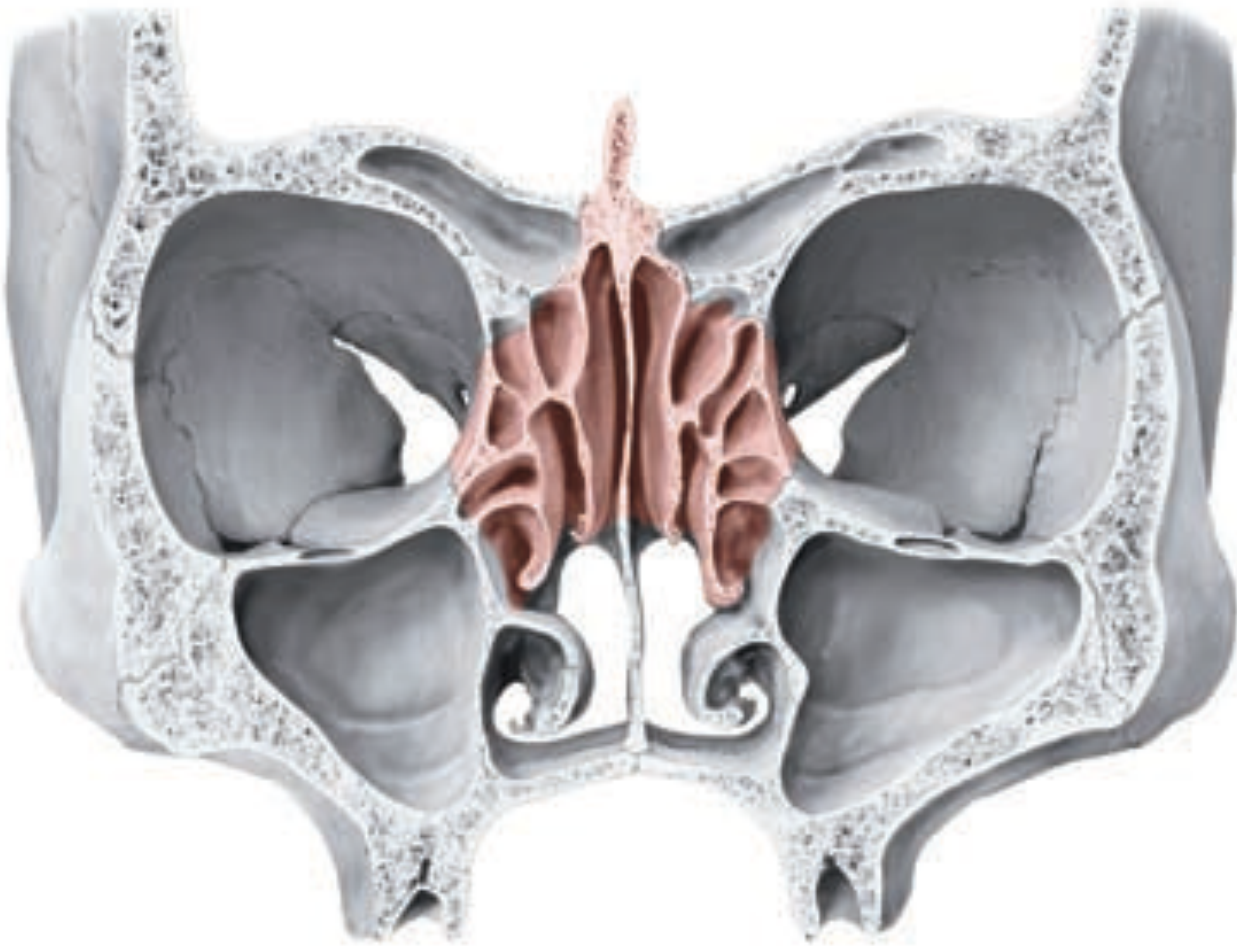


Os ethmoidale

- ♦ **Crista galli**
- ♦ **Lamina cribrosa**
- ♦ **Lamina perpendicularis**
- ♦ **Lamina orbitalis**



Os ethmoidale



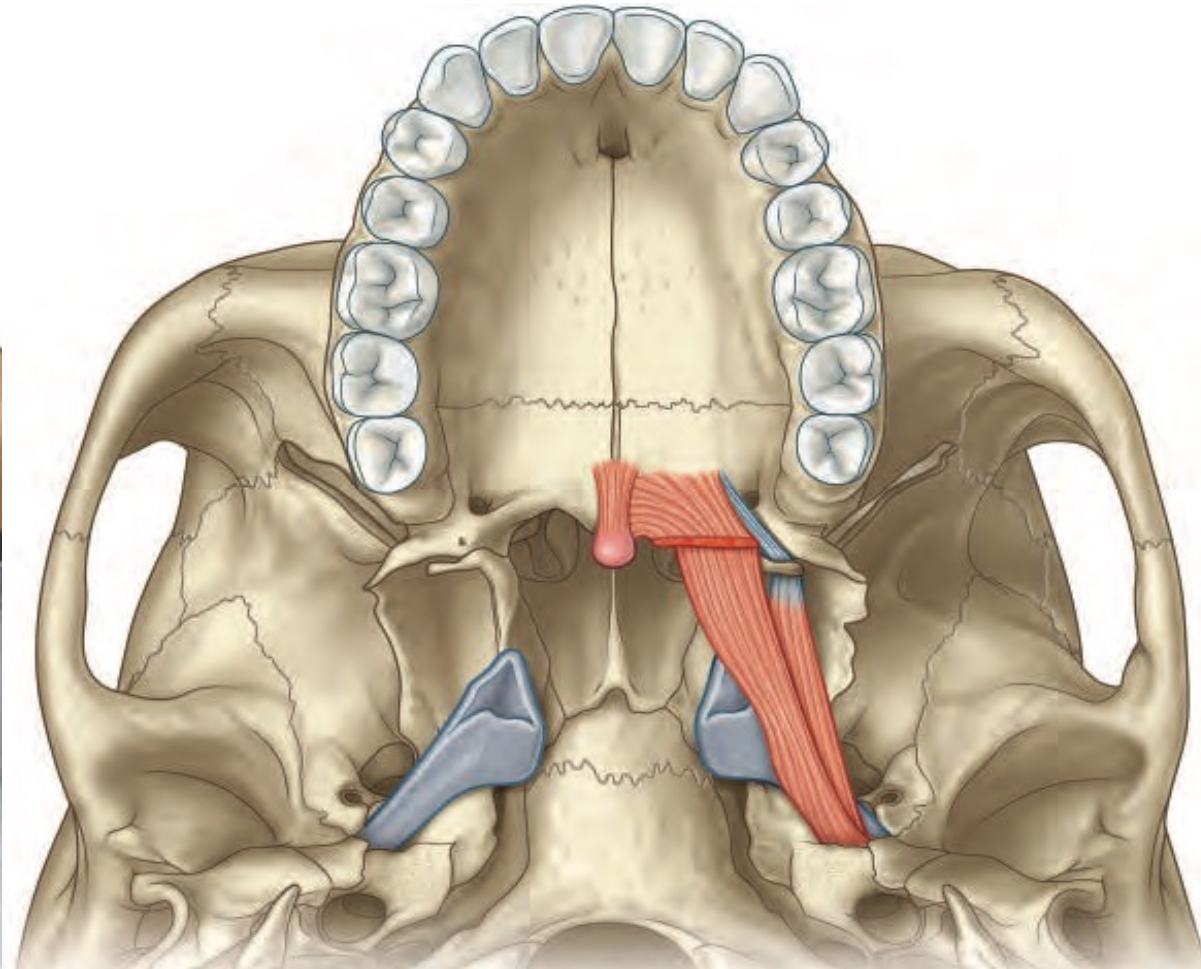
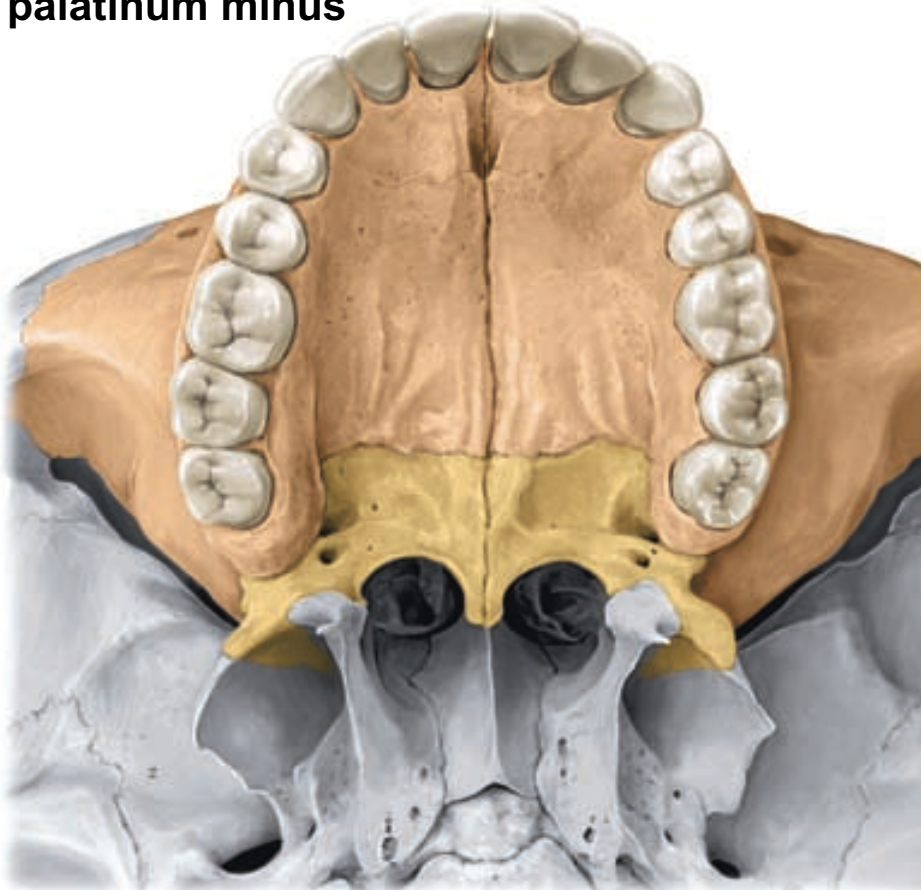
Palatum durum

- ♦ **Maxilla**

- ♦ Crista nasalis
- ♦ Foramen incisivum

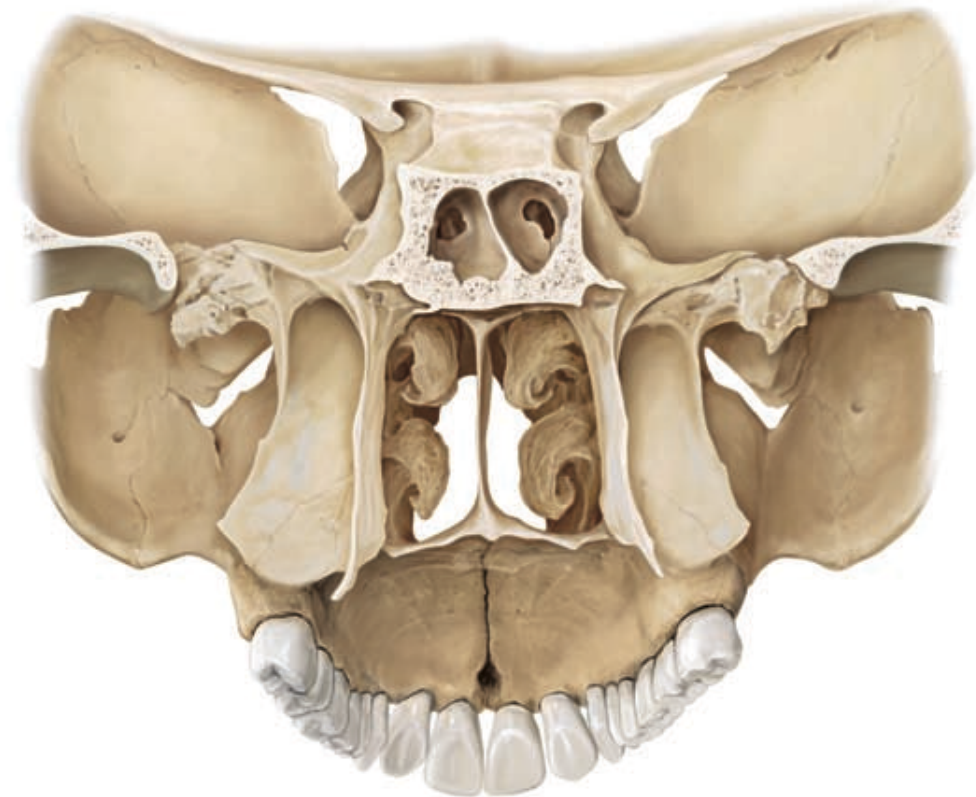
- ♦ **Os palatinum**

- ♦ Foramen palatinum majus
- ♦ Foramen palatinum minus



Maxilla

- ♦ **Crista nasalis**
- ♦ **Sinus maxillaris**
- ♦ **Foramen incisivum**
- ♦ **Sutura palatina mediana**
- ♦ **Sutura palatina transversa**



Maxilla

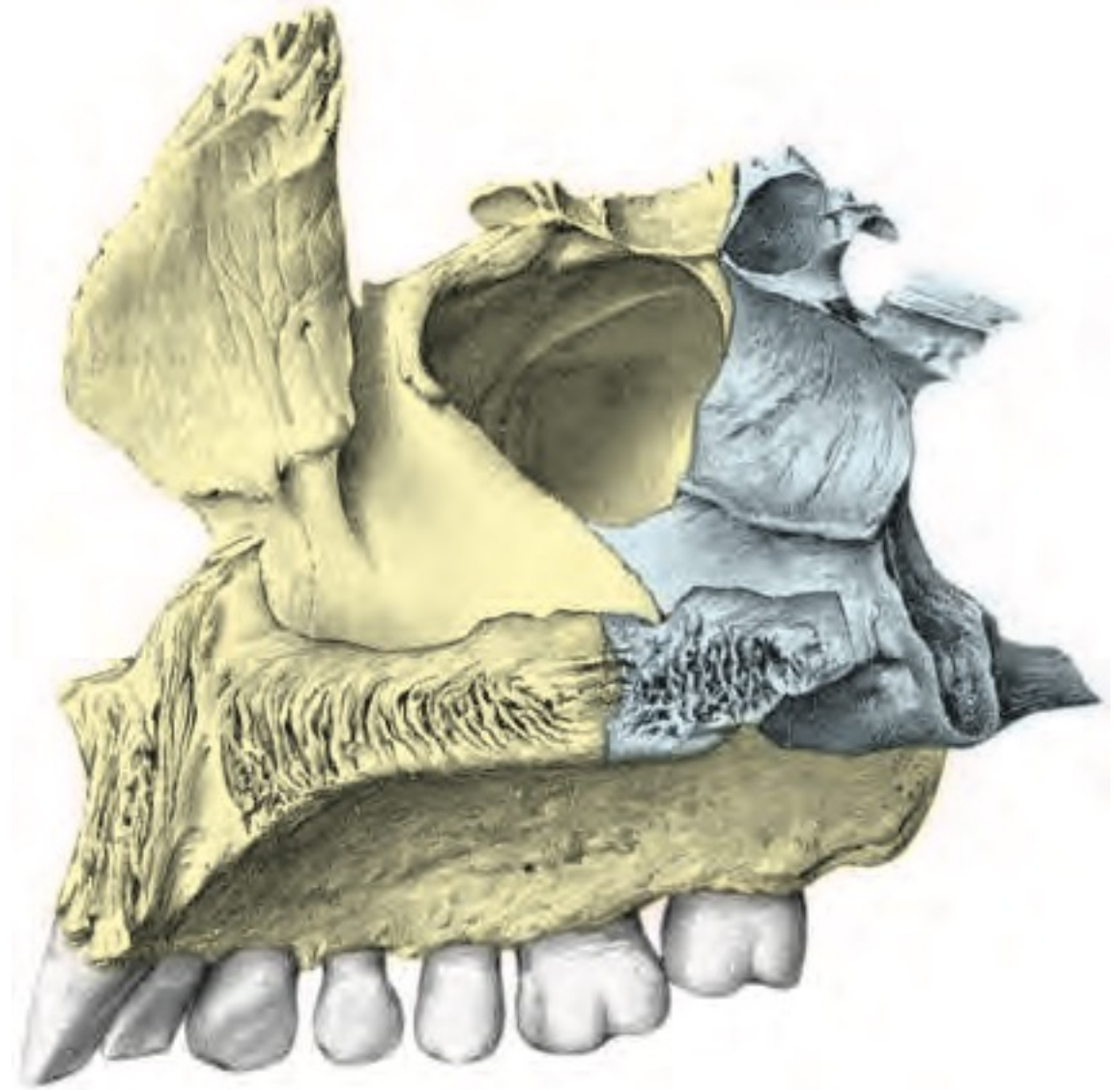
- ♦ **Processus frontalis**
- ♦ **Crista lacrimalis anterior**
- ♦ **Incissura nasalis**
- ♦ **Spina nasalis anterior**
- ♦ **Fossa canina**
- ♦ **Tuberositas maxillaris**
- ♦ **Processus zygomaticus**
- ♦ **Foramina alveolaria**
- ♦ **Pars orbitalis**
- ♦ **Margo infraorbitalis**
- ♦ **Sulcus infraorbitalis**
- ♦ **Foramen infraorbitale**



Maxilla et os palatinum

- ♦ **Processus frontalis**
- ♦ **Sulcus lacrimalis**
- ♦ **Facies nasalis**
- ♦ **Spina nasalis anterior**
- ♦ **Hiatus maxillaris**
- ♦ **Sinus maxillaris**
- ♦ **Processus palatinus**
- ♦ **Canalis incisivus**

- ♦ **Crista ethmoidalis**
- ♦ **Incissura sphenopalatina**
- ♦ **Lamina perpendicularis**
- ♦ **Lamina horizontalis**
- ♦ **Crista conchalis**



Mandibula

- ♦ **Caput**
- ♦ **Processus condylaris**
- ♦ **Fovea pterygoidea**
- ♦ **Processus coronoideus**
- ♦ **Incissura mandibulae**
- ♦ **Ramus mandibulae**
- ♦ **Linea obliqua**
- ♦ **Angulus**
- ♦ **Corpus**
- ♦ **Processus alveolaris**
- ♦ **Alveoli**
- ♦ **Dentes**
- ♦ **Protuberantia mentalis**
- ♦ **Foramen mentale**



Mandibula

- ♦ **Caput**
- ♦ **Processus condylaris**
- ♦ **Fovea pterygoidea**
- ♦ **Processus coronoideus**
- ♦ **Incissura mandibulae**
- ♦ **Ramus mandibulae**
- ♦ **Linea obliqua**
- ♦ **Angulus**
- ♦ **Corpus**
- ♦ **Processus alveolaris**
- ♦ **Alveoli**
- ♦ **Dentes**
- ♦ **Foramen mandibulare**
- ♦ **Linea mylohyoidea**



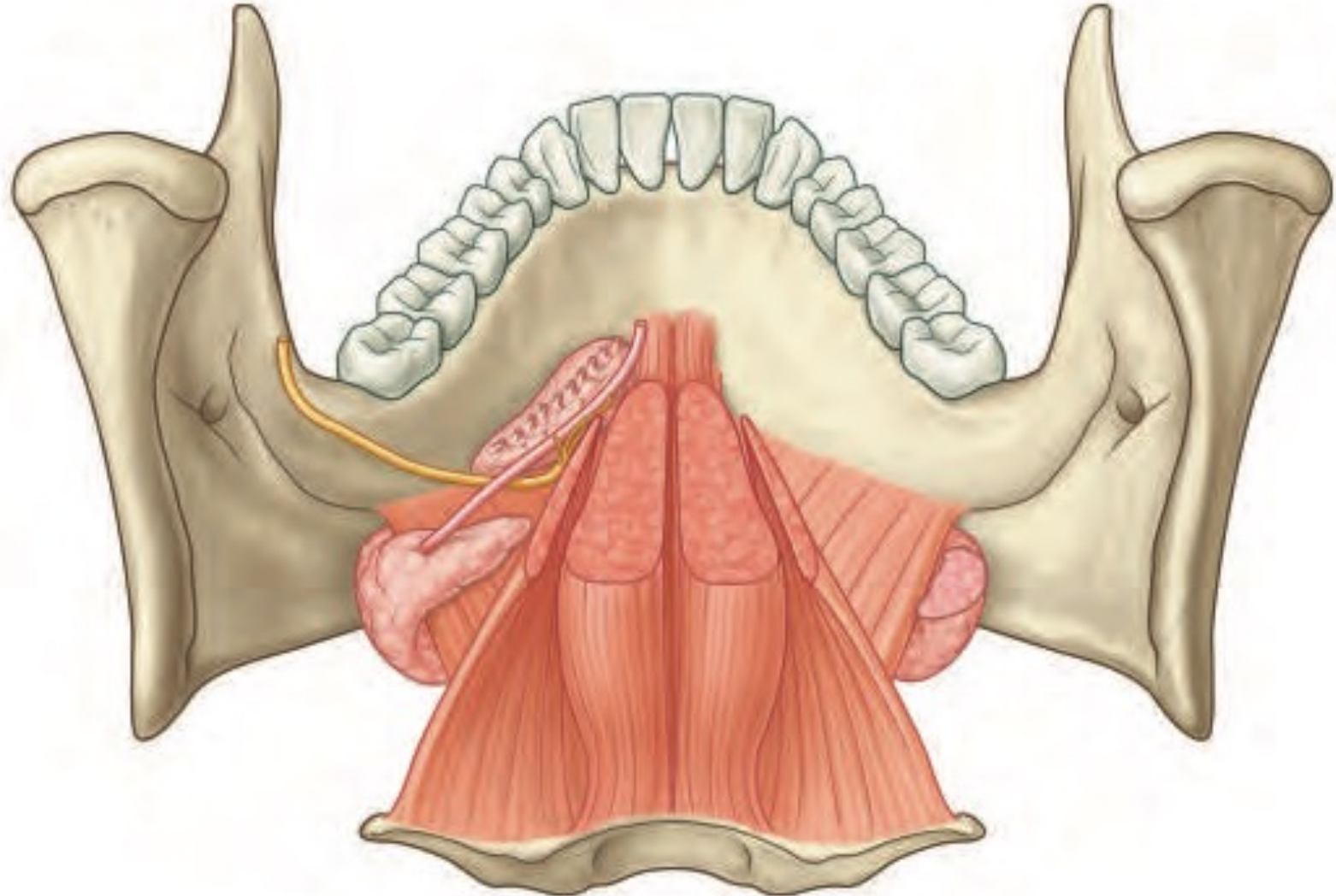
Mandibula

- ♦ **Caput**
- ♦ **Processus condylaris**
- ♦ **Fovea pterygoidea**
- ♦ **Processus coronoideus**
- ♦ **Incissura mandibulae**
- ♦ **Ramus mandibulae**
- ♦ **Linea obliqua**
- ♦ **Angulus**
- ♦ **Corpus**
- ♦ **Processus alveolaris**
- ♦ **Alveoli**
- ♦ **Dentes**
- ♦ **Foramen mandibulare**
- ♦ **Linea mylohyoidea**



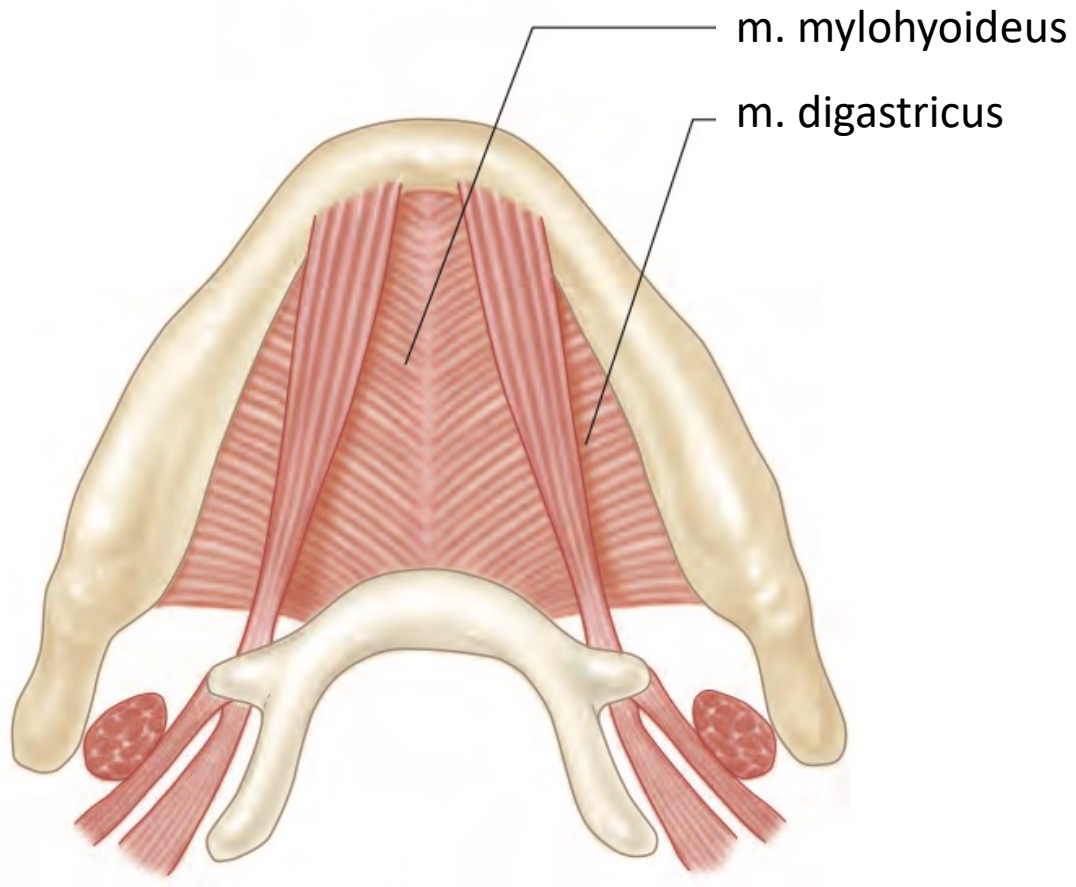
Mandibula et os hyoideum

- ♦ **M. mylohyoideus**
- ♦ **M. genioglossus**
- ♦ **M. hyoglossus**
- ♦ **Gl. submandibularis**
- ♦ **Gl. sublingualis**
- ♦ **N. lingualis**



Os hyoideum

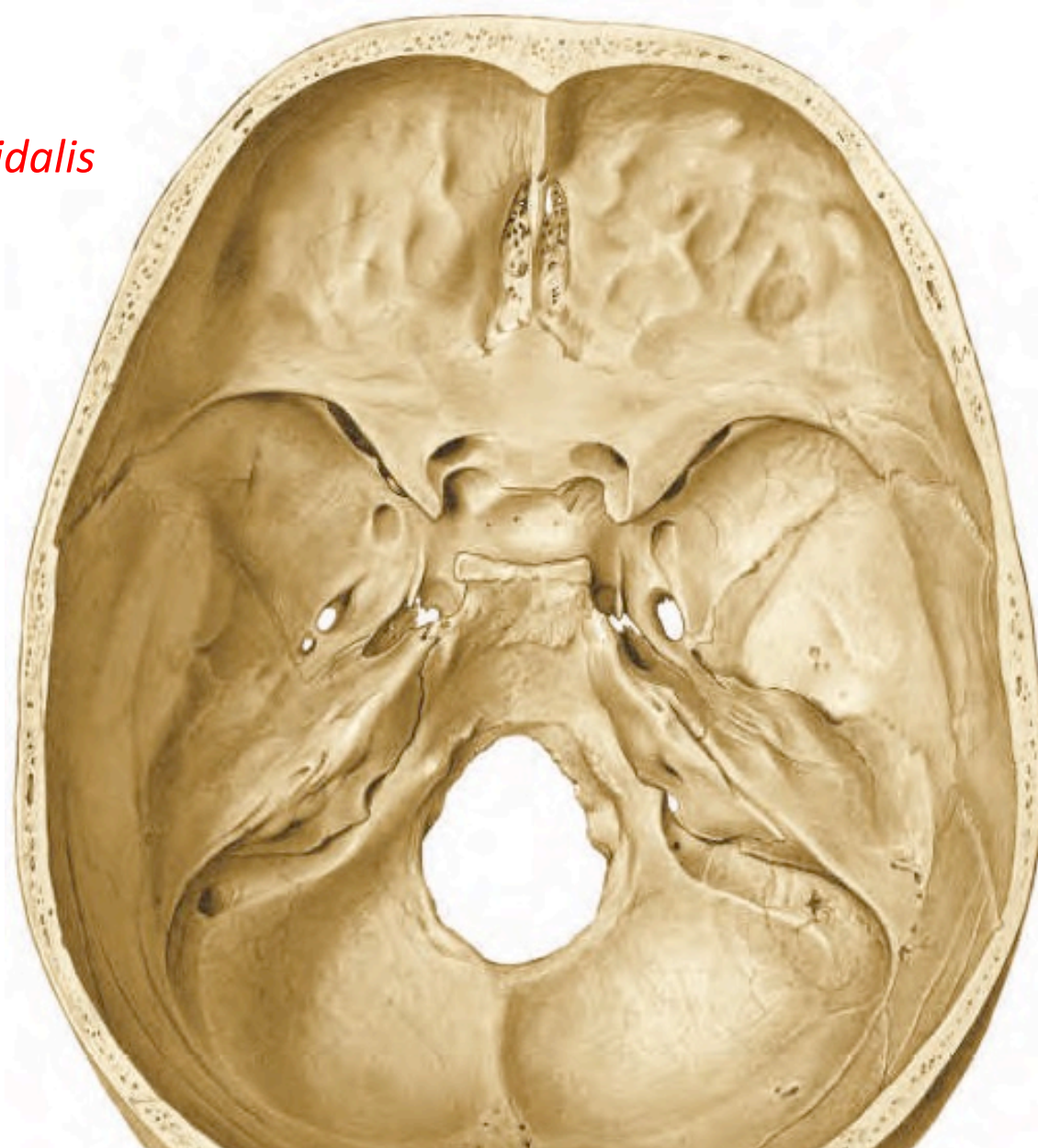
- ♦ **Cornu minor**
- ♦ **Cornu major**
- ♦ **Corpus**



- ♦ **Fossa cranii anterior**
- ♦ *Ala minor ossis sphenoidalis*

- ♦ **Fossa cranii media**
- ♦ *Dorsum sellae*
- ♦ *Os petrosum*
 - ♦ *Margo superior*

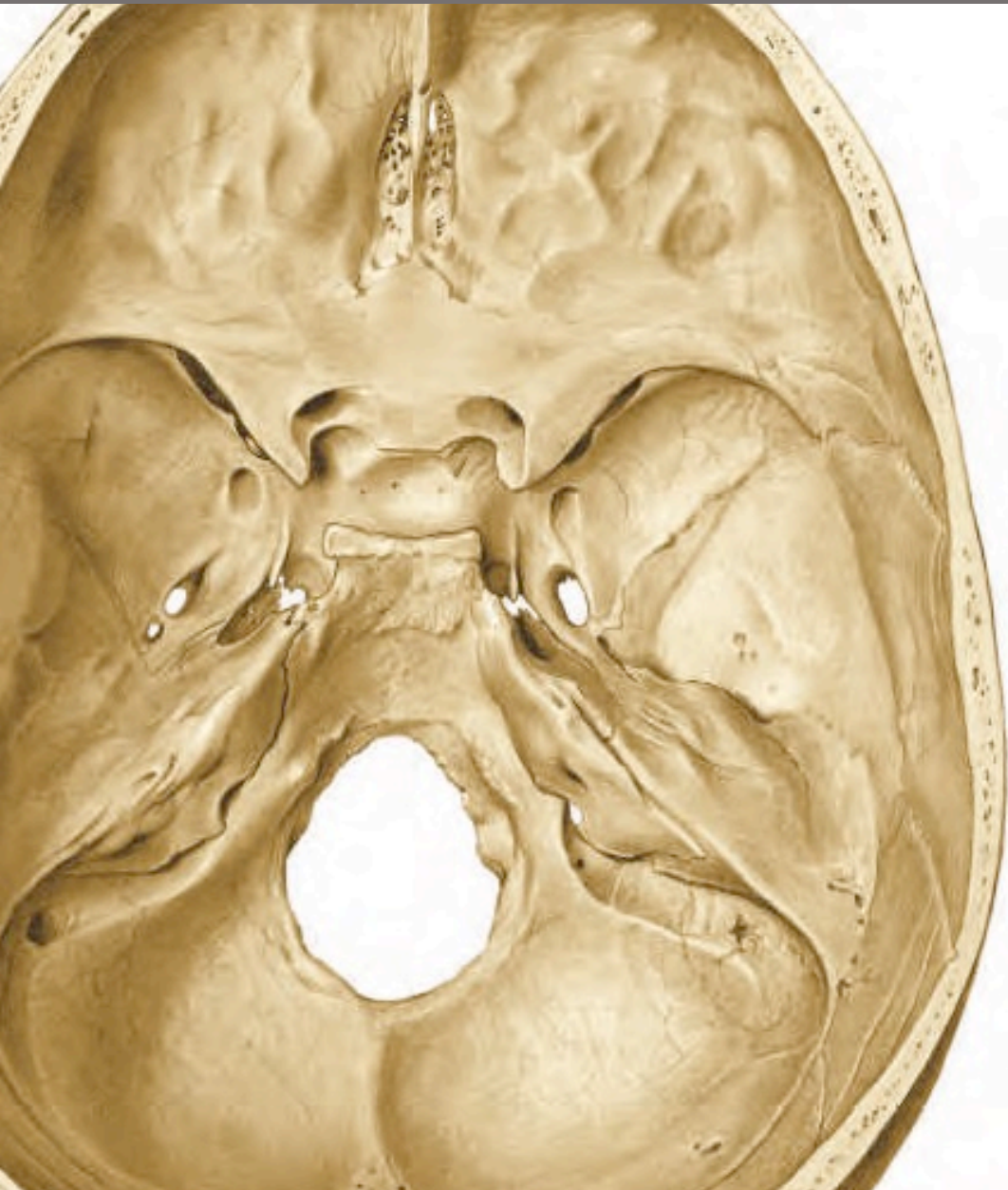
- ♦ **Fossa cranii posterior**



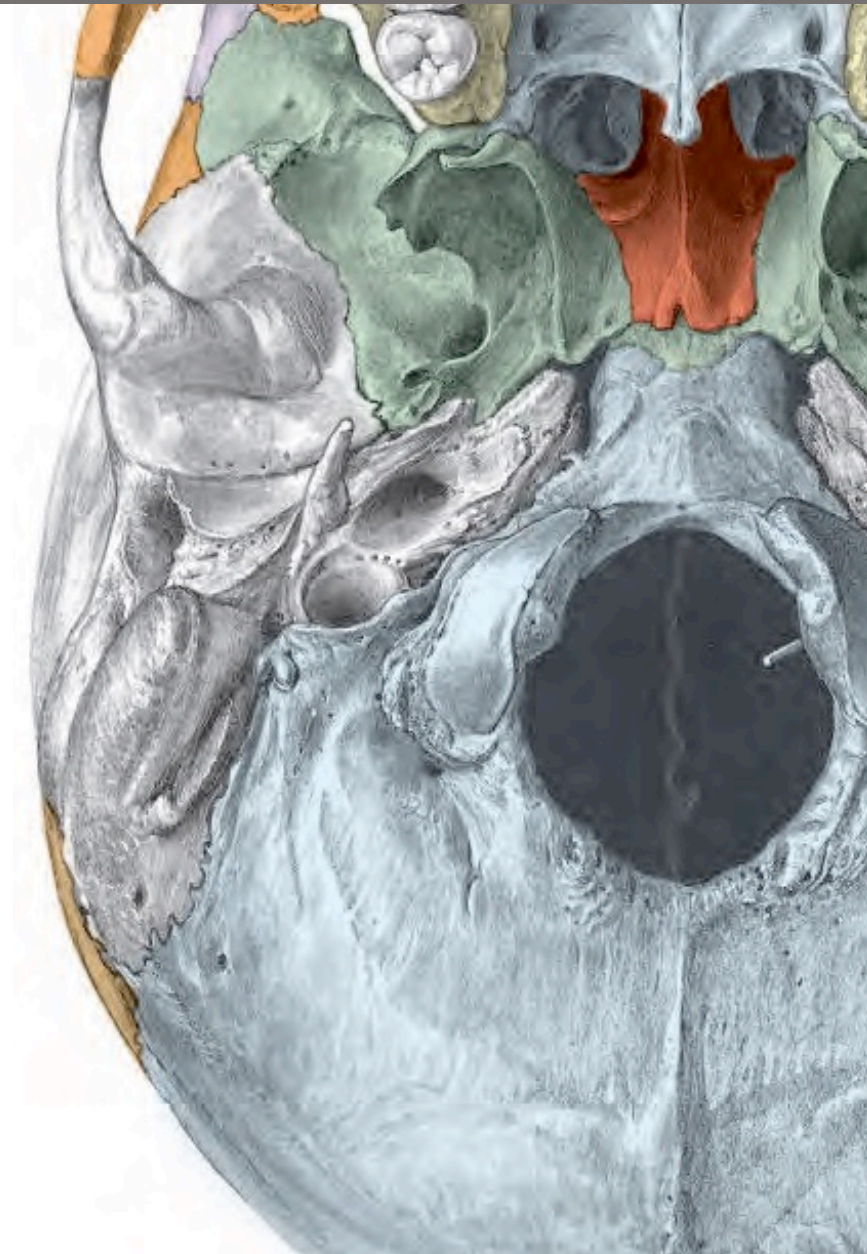
- ♦ **Crista frontalis**
- ♦ **Crista galli**
- ♦ **Ala minor ossis sphenoidalis**
- ♦ **Sella turcica**
- ♦ **Foramina, canales, fissures**
 - ♦ **Canalis opticus**
 - ♦ **Fissura orbitalis superior**
 - ♦ **Rotundum, ovale, spinosum**
 - ♦ **Canalis caroticus**
- ♦ **Impressio trigeminalis**
- ♦ **Foramen magnum**
- ♦ **Sulci sinuum transversi et sigmoides**
- ♦ **Canalis n. hypoglossii**
- ♦ **Foramen jugulare**
- ♦ **Meatus acusticus internus**

Fossae cranii

Foramina, canales, meati



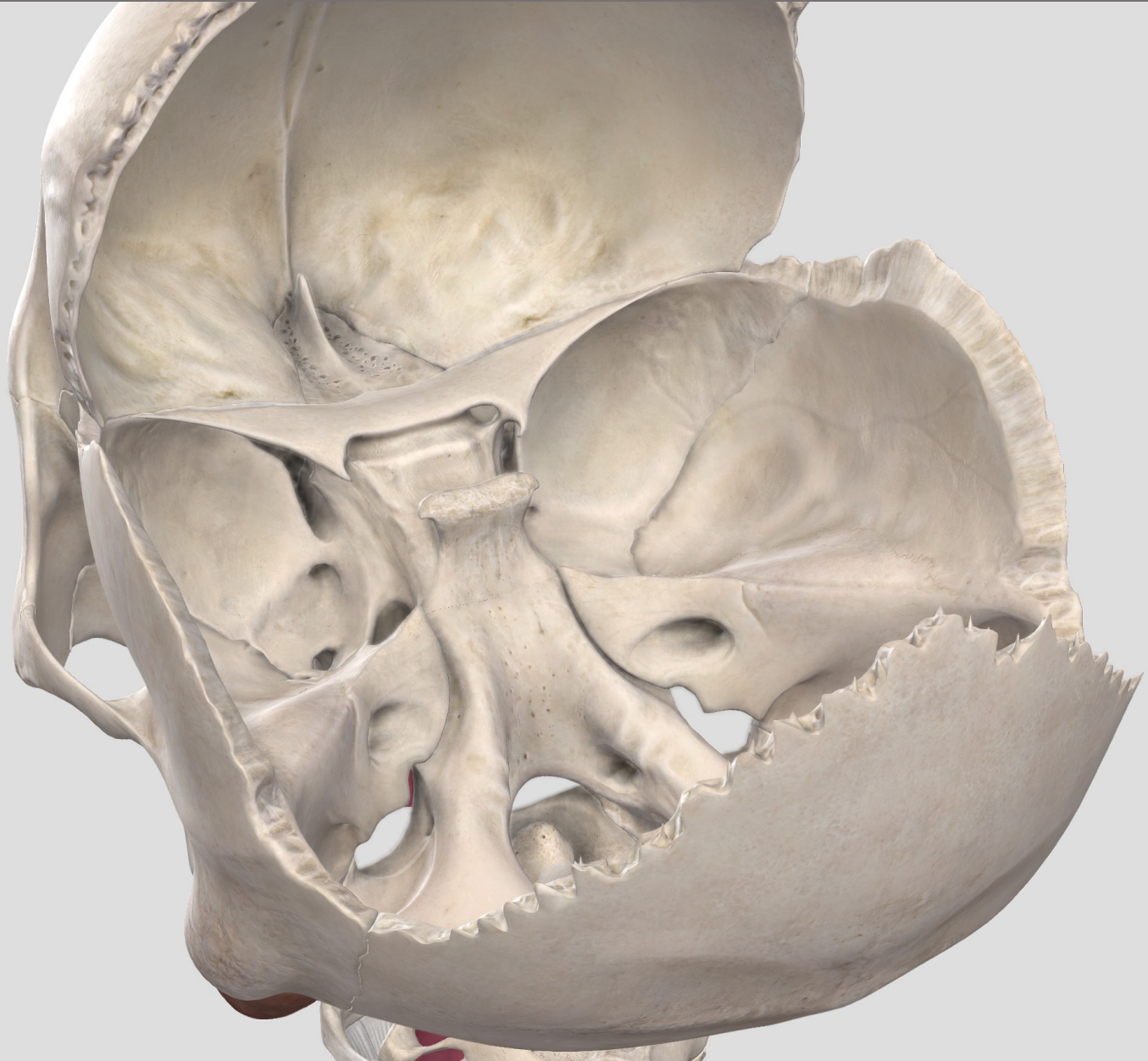
- ♦ **Lamina cribrosa**
- ♦ **Canalis opticus**
- ♦ **Fissura orbitalis superior**
- ♦ **Foramen rotundum**
- ♦ **Foramen ovale**
- ♦ **Foramen spinosum**
- ♦ **Canalis caroticus**
- ♦ **Meatus acusticus internus**
- ♦ **Foramen jugulare**
- ♦ **Canalis n. hypoglossii**
- ♦ **Foramen occipitale magnum**
- ♦ **Foramen stylomastoideum**
- ♦ **Foramen lacerum**



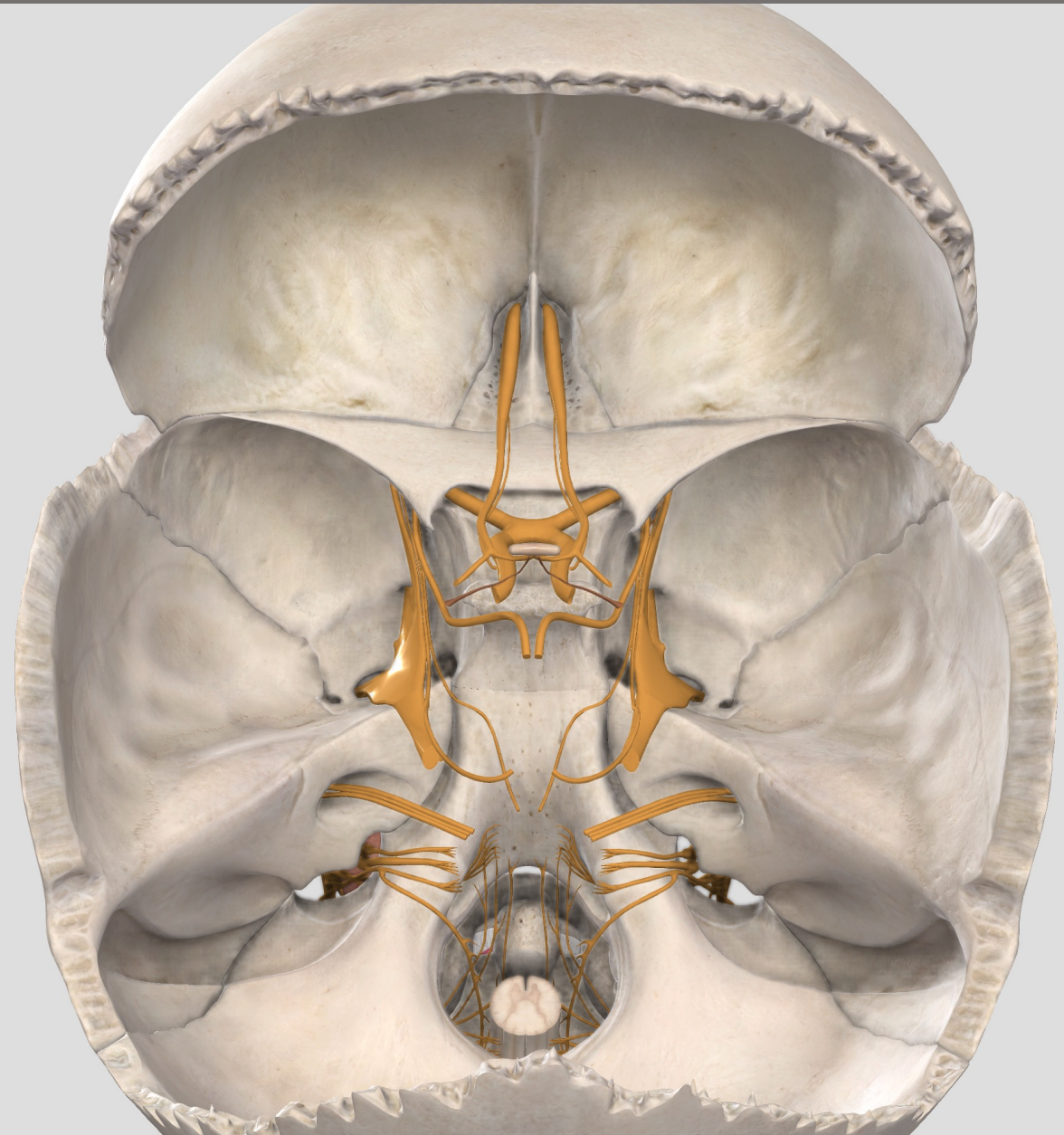
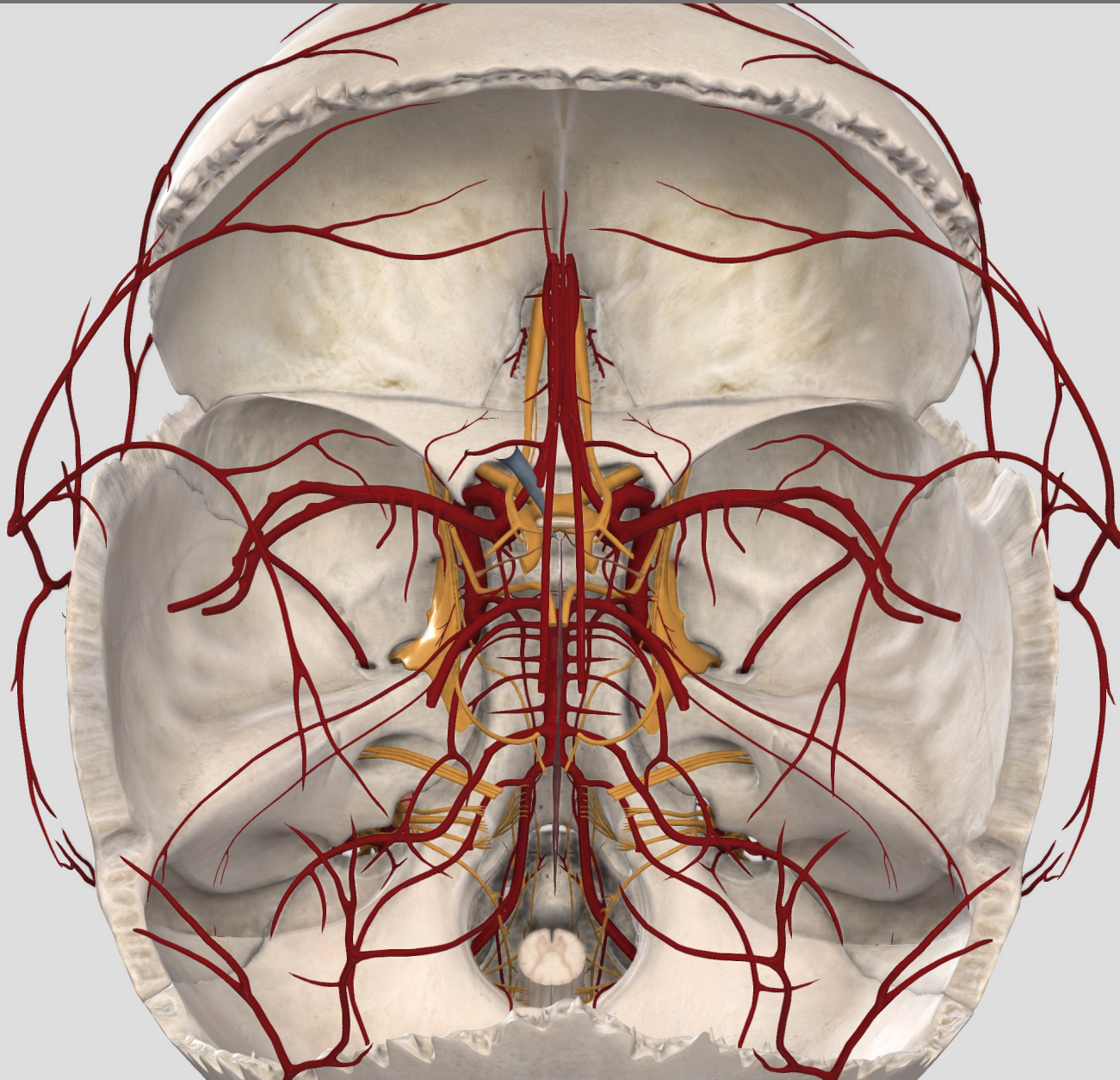
Foramina, canales, meati

- ♦ **Lamina cribiformis**
- ♦ **Canalis opticus**
- ♦ **Fissura orbitalis superior**
- ♦ **Foramen rotundum**
- ♦ **Foramen ovale**
- ♦ **Foramen spinosum**
- ♦ **Canalis caroticus**
- ♦ **Meatus acusticus internus**
- ♦ **Foramen jugulare**
- ♦ **Canalis n. hypoglossii**
- ♦ **Foramen occipitale magnum**
- ♦ **Foramen stylomastoideum**

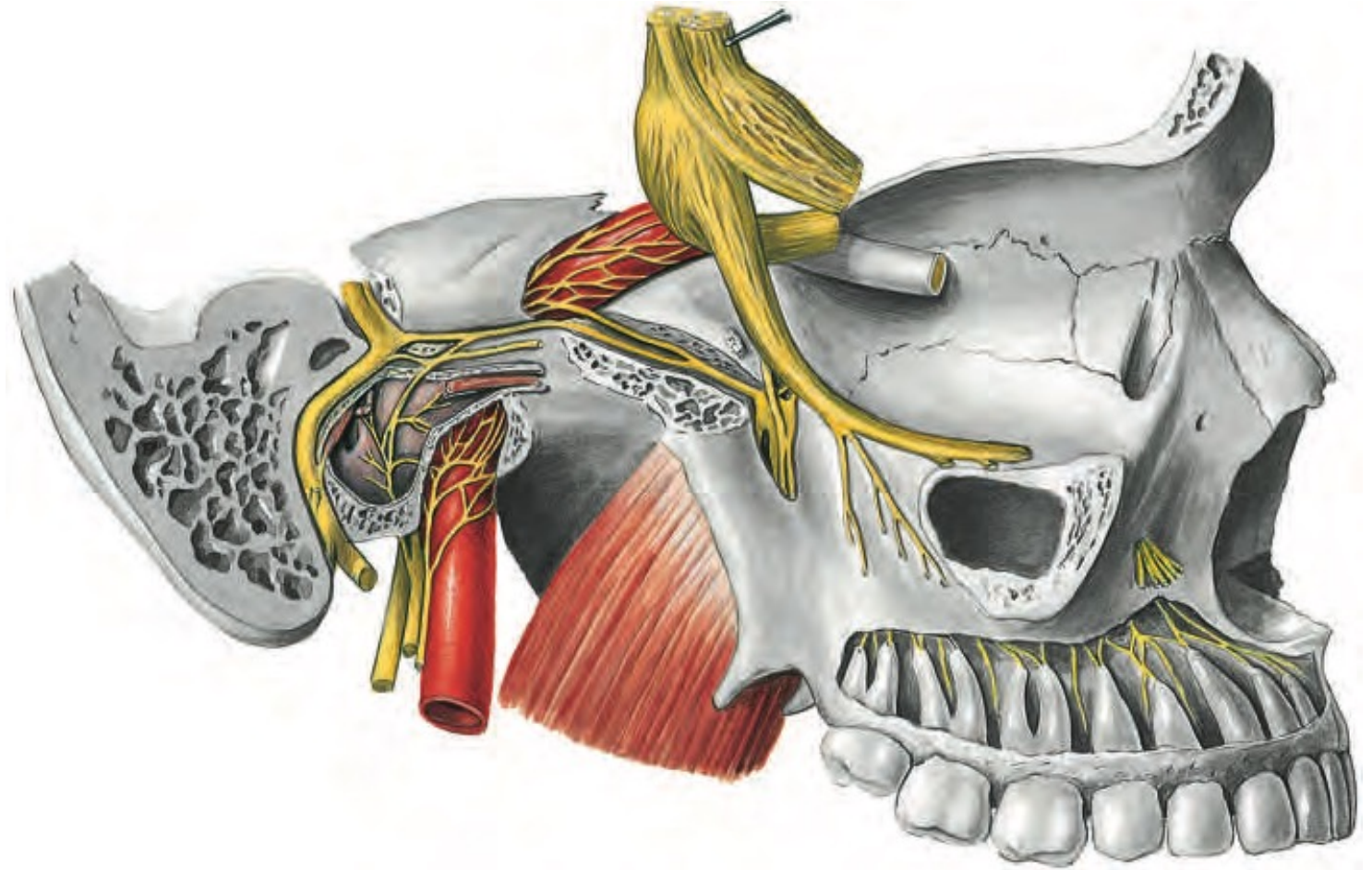
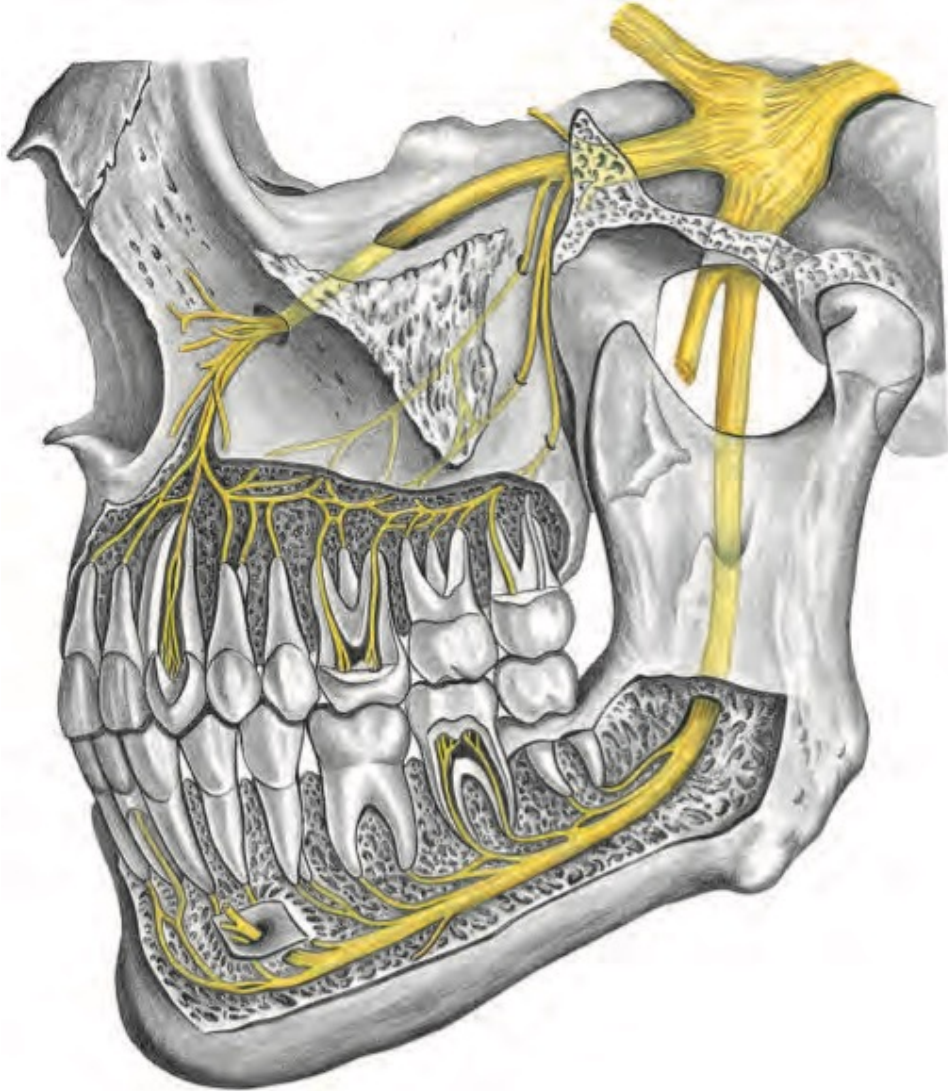
- ♦ **Foramen lacerum**



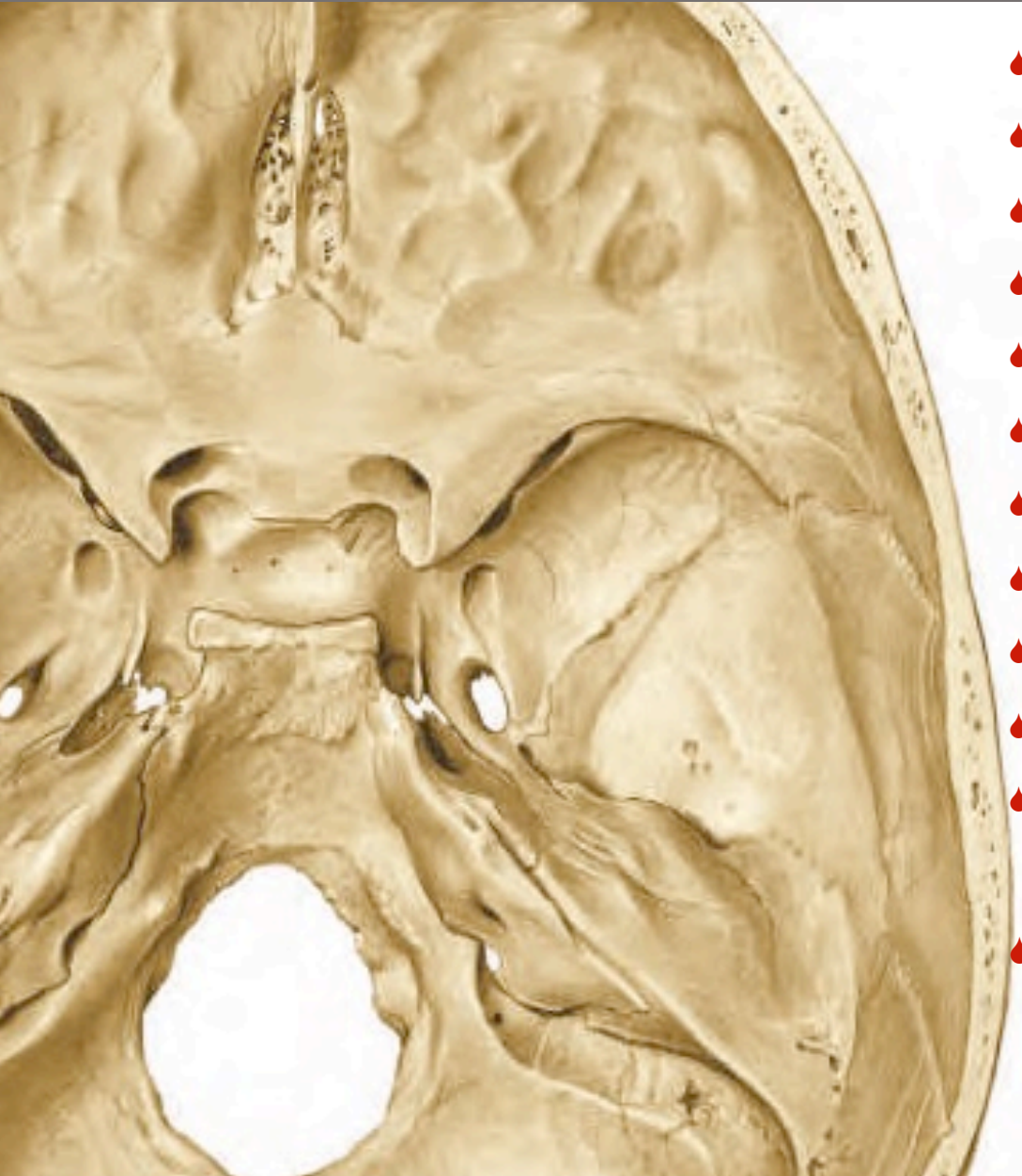
Foramina, canales, meati



Foramina, canales, meati



Foramina, canales, meati



- ♦ **Lamina cribiformis** - *nn. olfactorii n. I*
- ♦ **Canalis opticus** - *n. opticus n.II , a. ophtalmica*
- ♦ **Fissura orbitalis superior** - *n. ophtalmicus n. V₁, nn. III, IV, VI, v. opht. sup.*
- ♦ **Foramen rotundum** - *n. maxillaris n. V₂*
- ♦ **Foramen ovale** - *n. mandibularis - n. V₃*
- ♦ **Foramen spinosum** - *a. meningica media*
- ♦ **Canalis caroticus** - *a. carotis interna*
- ♦ **Meatus acusticus internus** - *n.VII (výstup. for. stylomastoideum), n. VIII*
- ♦ **Foramen jugulare** - *v. jugularis interna, n.X, n.IX, n. XI*
- ♦ **Canalis n. hypoglossii** - *n. XII*
- ♦ **Foramen occ. magnum** - *medulla spinalis, aa. verterbr., radices n. XI*
- ♦ **Foramen lacerum** - *chrupavka*

Neurocranium, splanchnocranium, basis cranii

Prof. MUDr. Jiří Ferda, Ph.D.

Images: Thieme: Atlas of Anatomy, Elsevier: Gray's Anatomy for Students, Galén: CT angiografie, KZM FN Plzeň