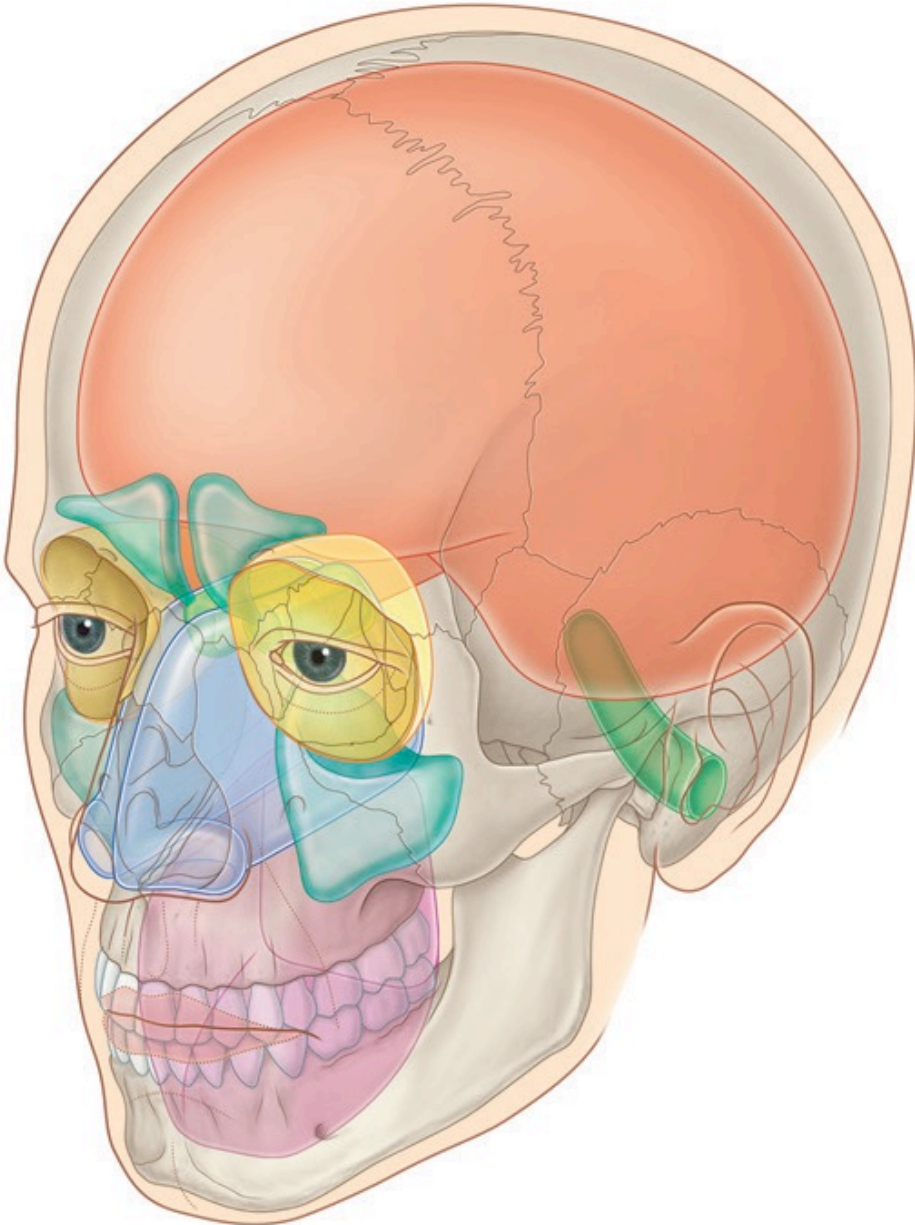


head and neck1

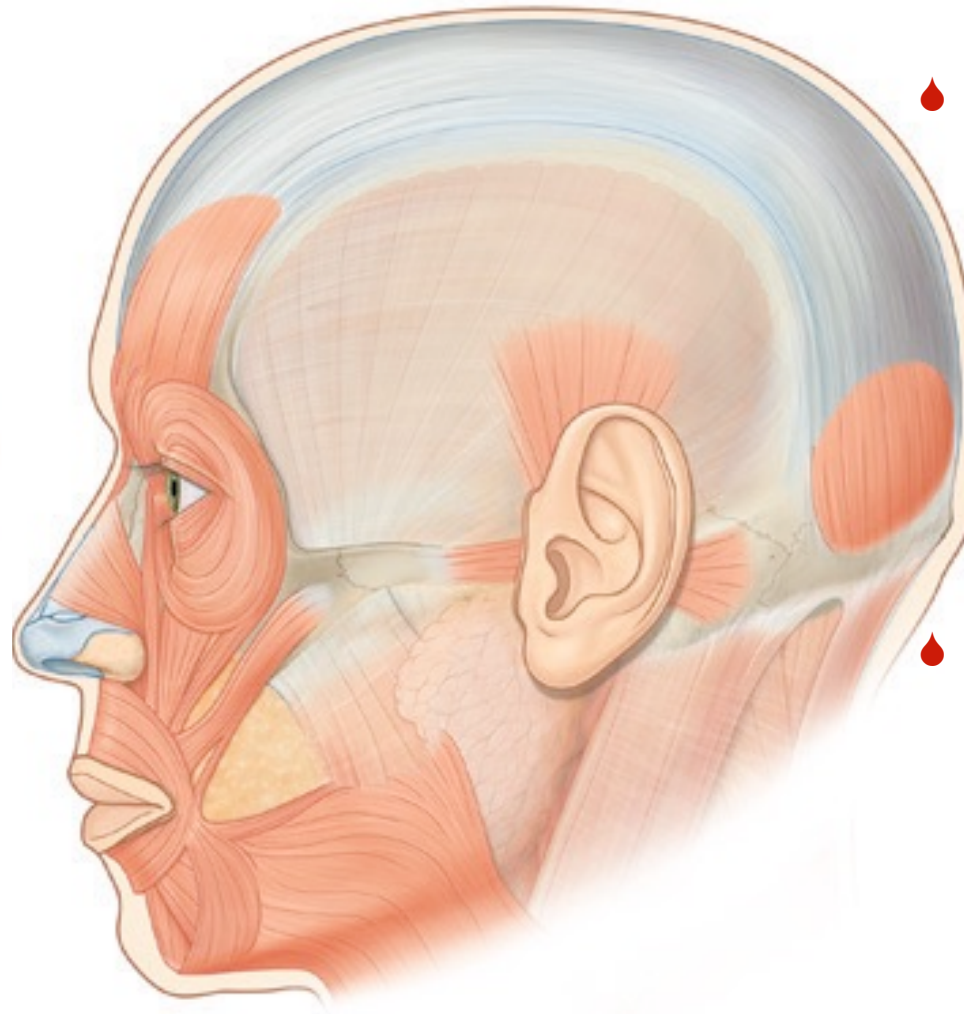
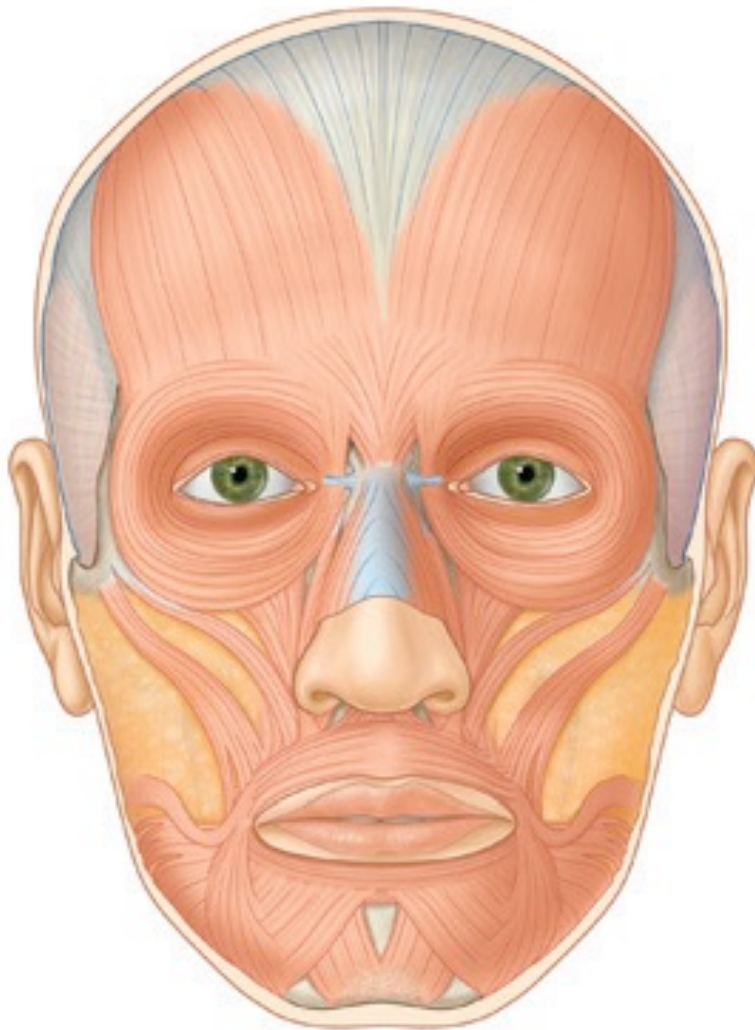
Prof. MUDr. Jiří Ferda, Ph.D.

Head and neck



- ♦ Skull
- ♦ Cranial cavity
- ♦ Ears
- ♦ Orbits
- ♦ Nasal cavity - nares - choanae
- ♦ Paranasal sinuses
- ♦ Oral cavity
- ♦ Face
- ♦ Skalp
- ♦ Fossa pterygopalatina
- ♦ Fossa infratemporalis

Face and scalp



- ♦ **face**

- ♦ *Muscular groups*

- ♦ *Moving the skin*

- ♦ *opening*

- ♦ Oral rim

- ♦ nares

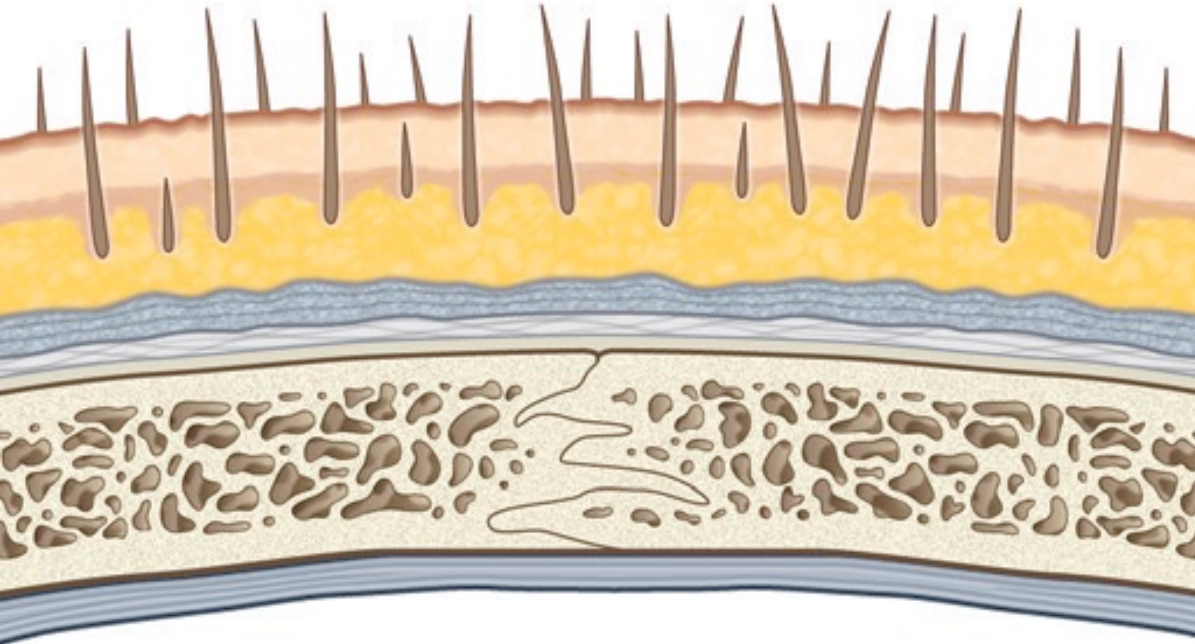
- ♦ Eye rim

- ♦ **Scalp – coverage of skull**

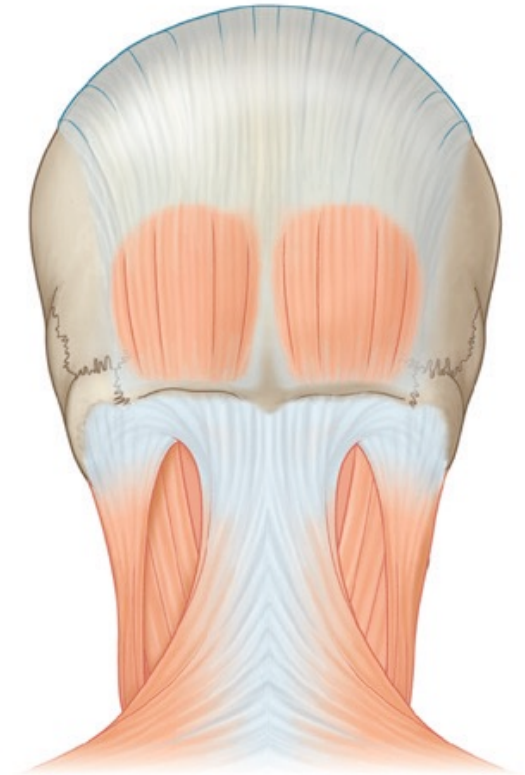
- ♦ Superior

- ♦ Dorsal

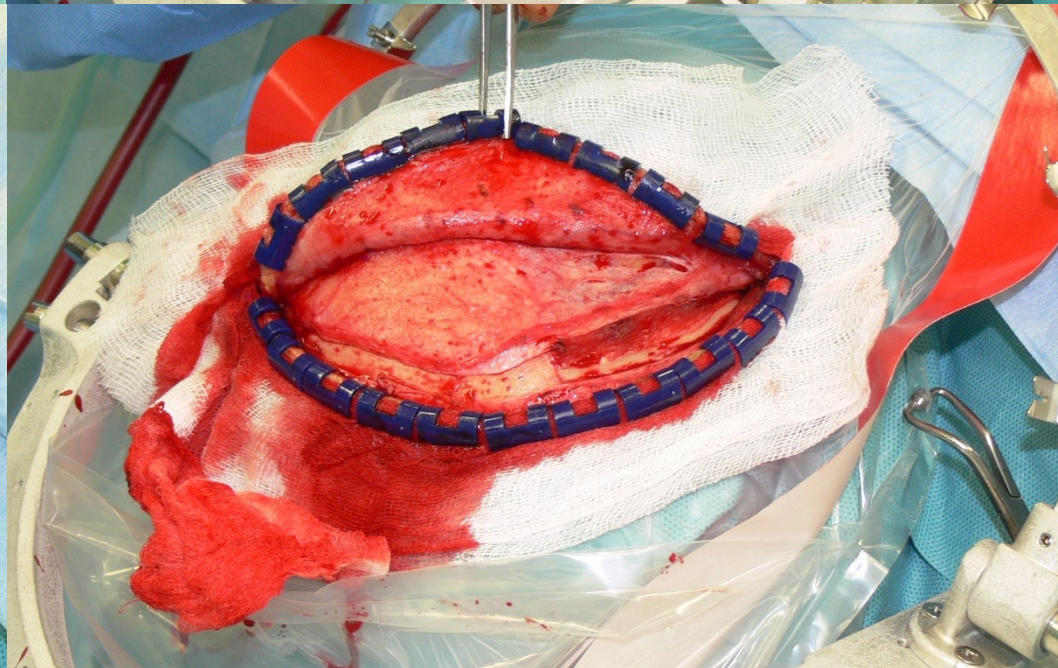
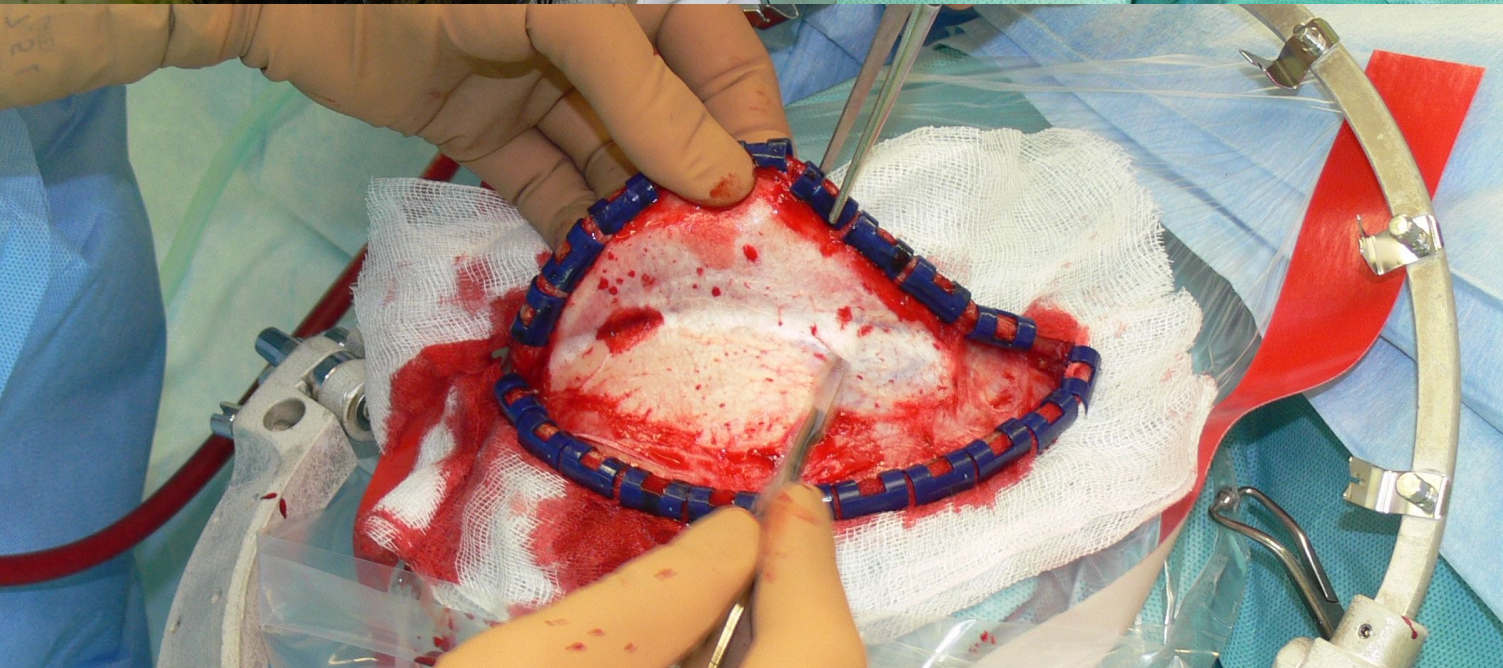
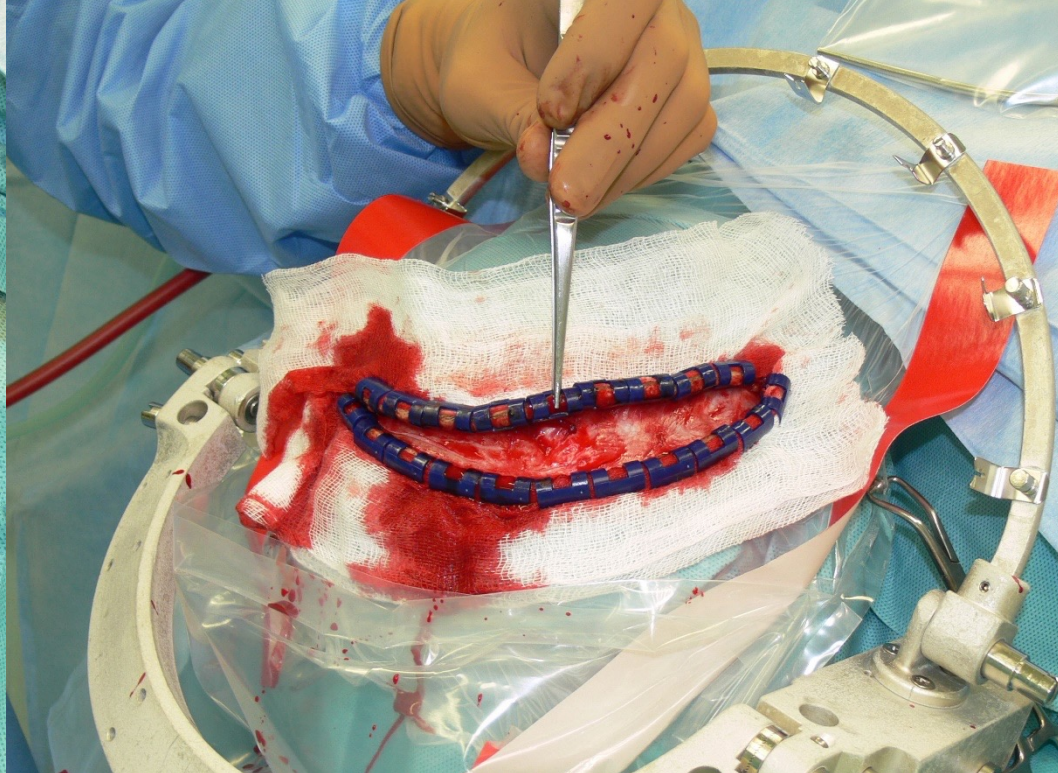
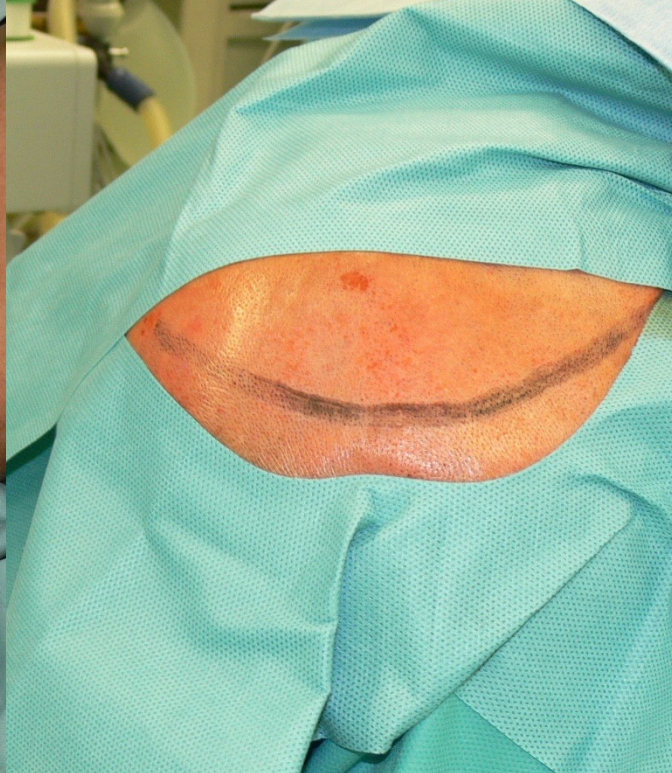
- ♦ Lateral

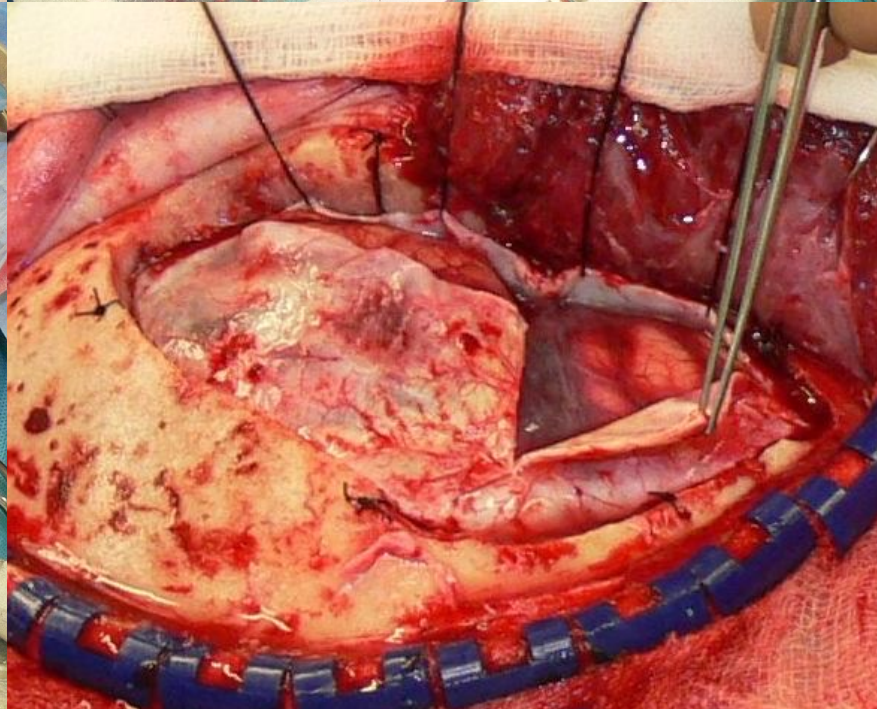
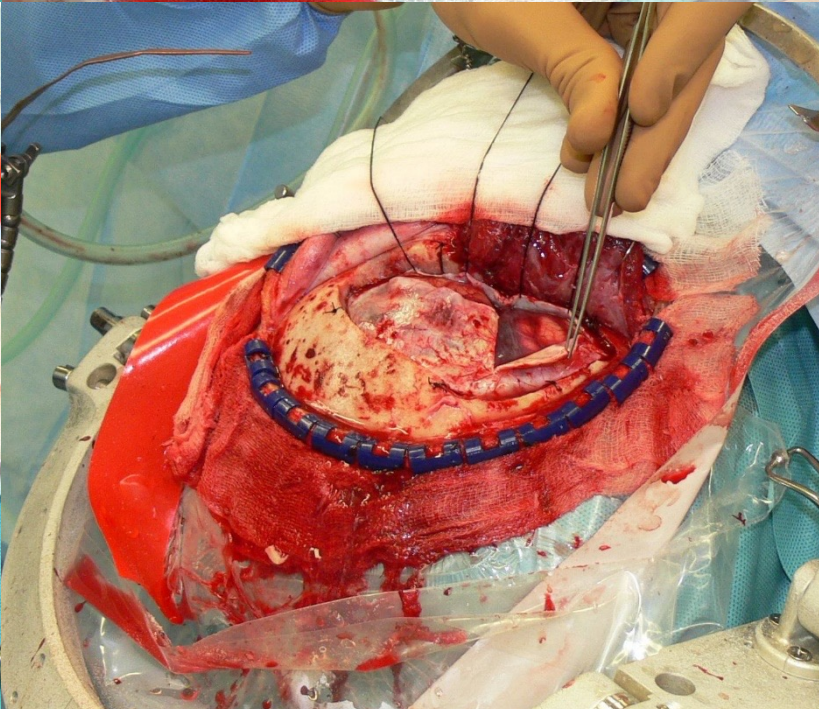
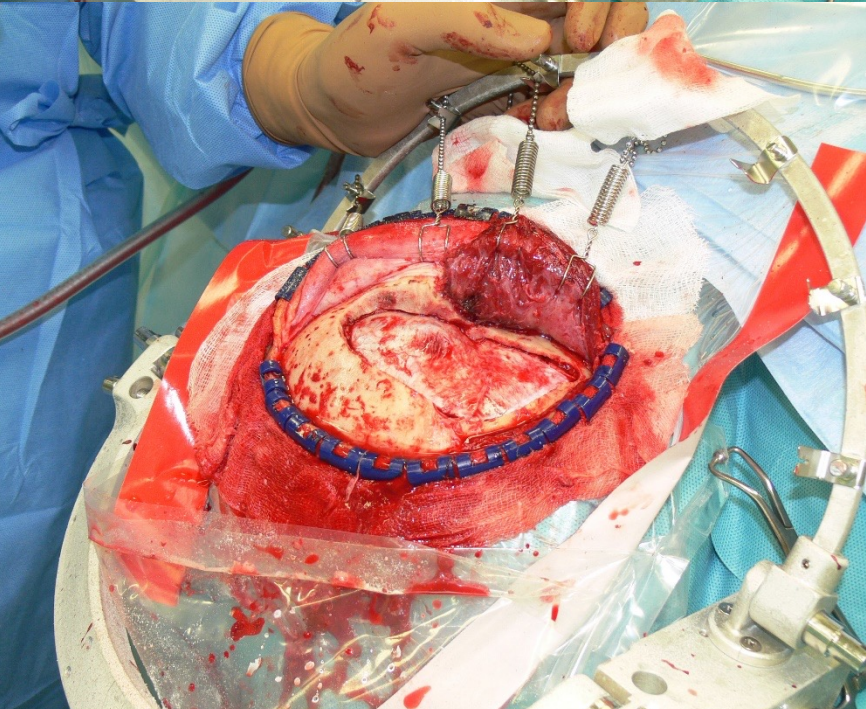
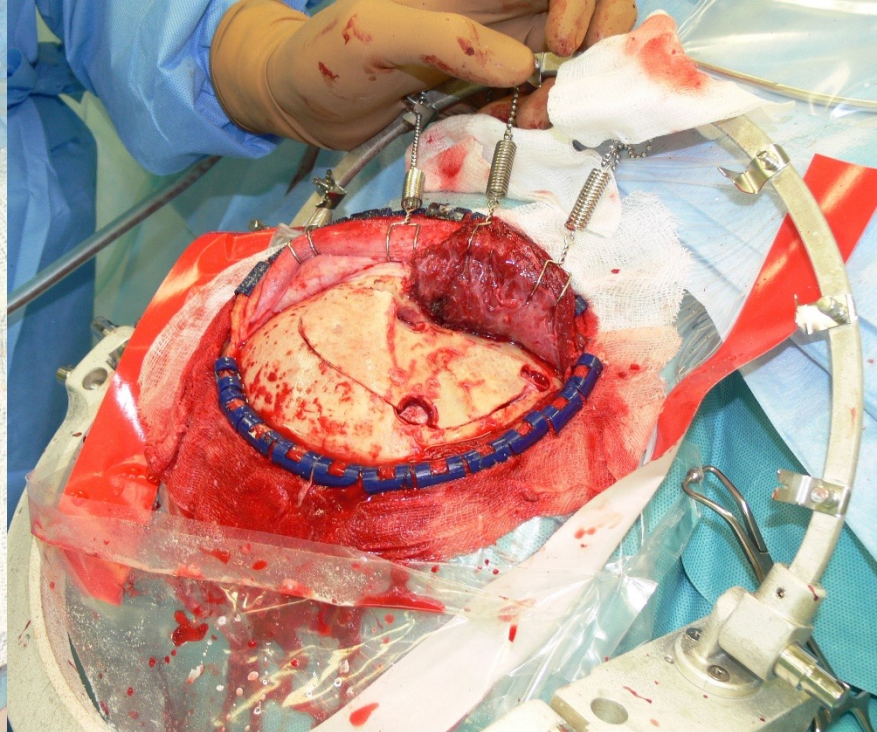
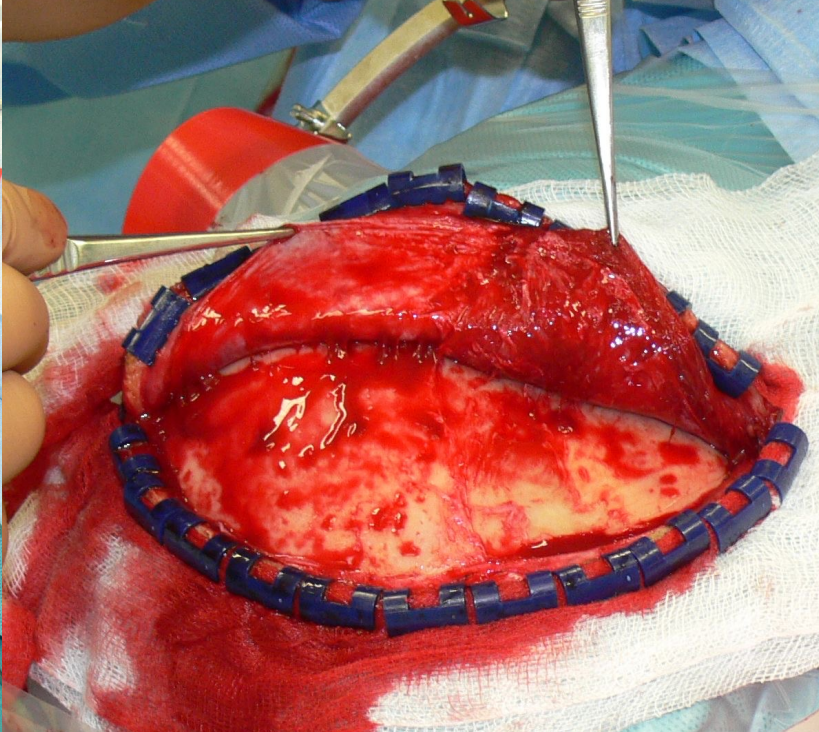
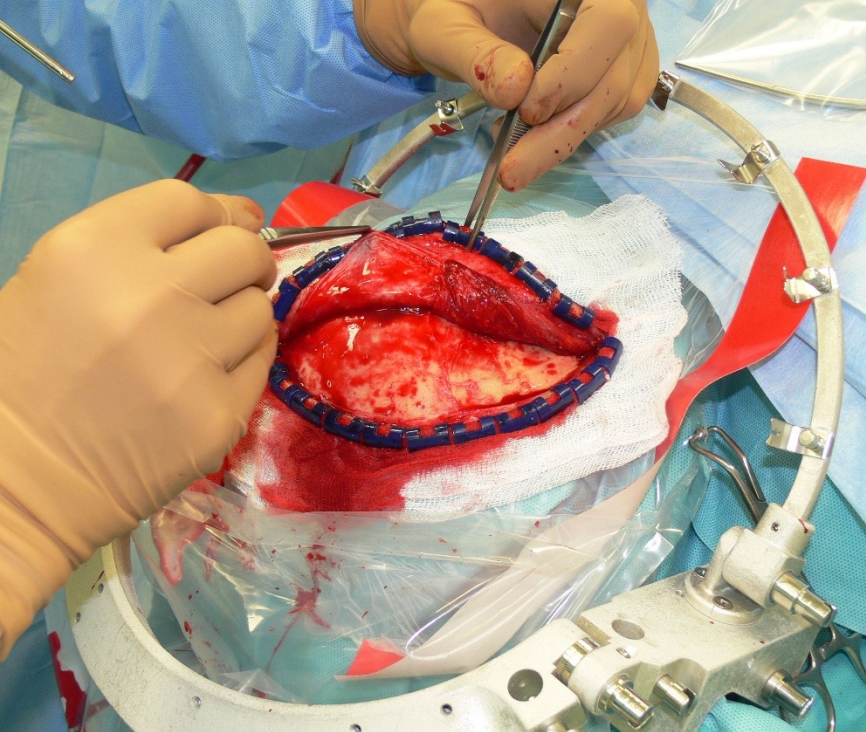


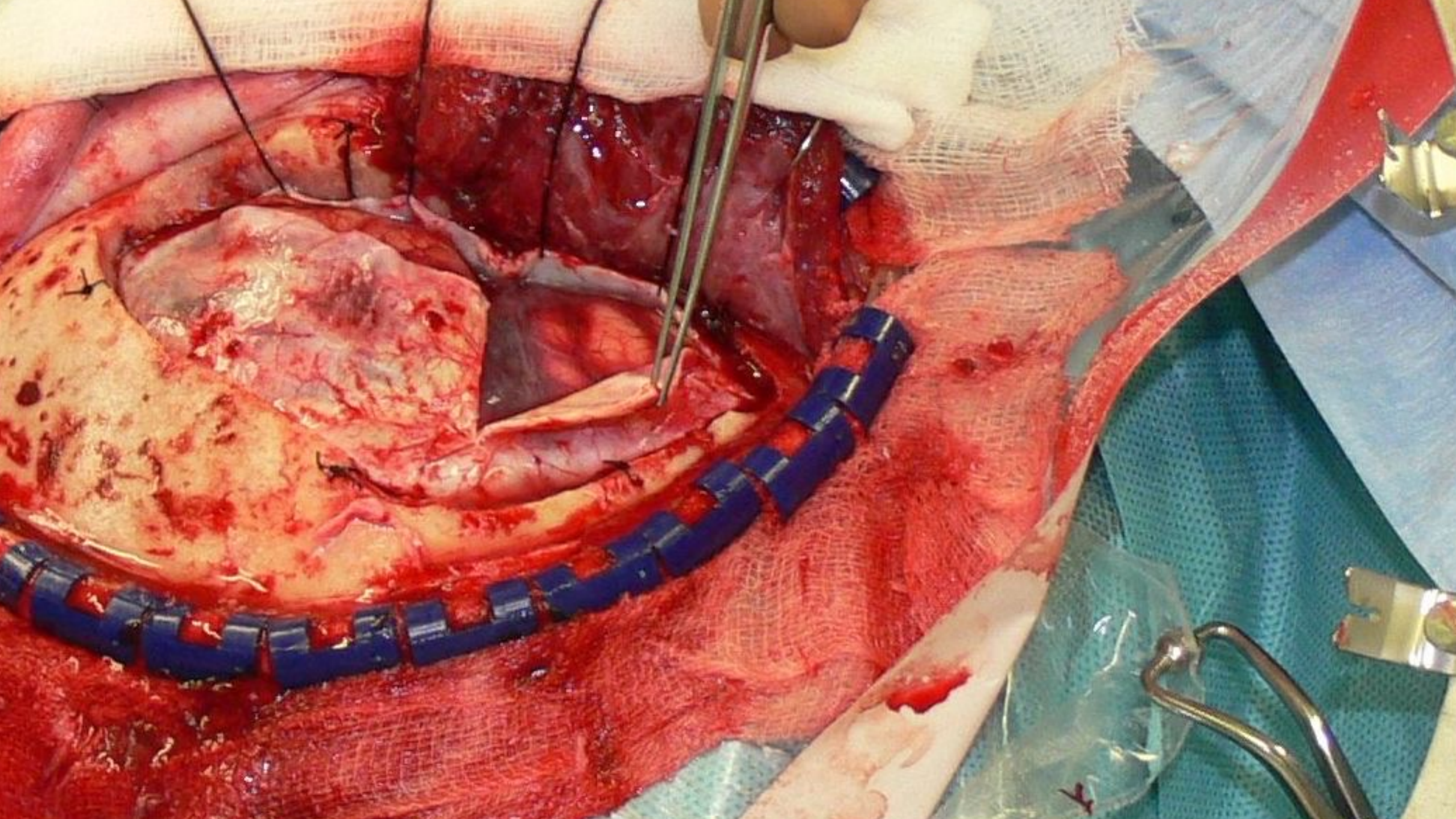
- skin
- Dense subcutaneous connective t.
- Galea aponeurotica
 - Tendon m. occipitofrontalis
- Loose connective tissue
- Pericranium
- Tabula externa
- Diploë
- Tabula interna
- Dura mater
 - Outer - periosteal
 - Inner – the own meninx

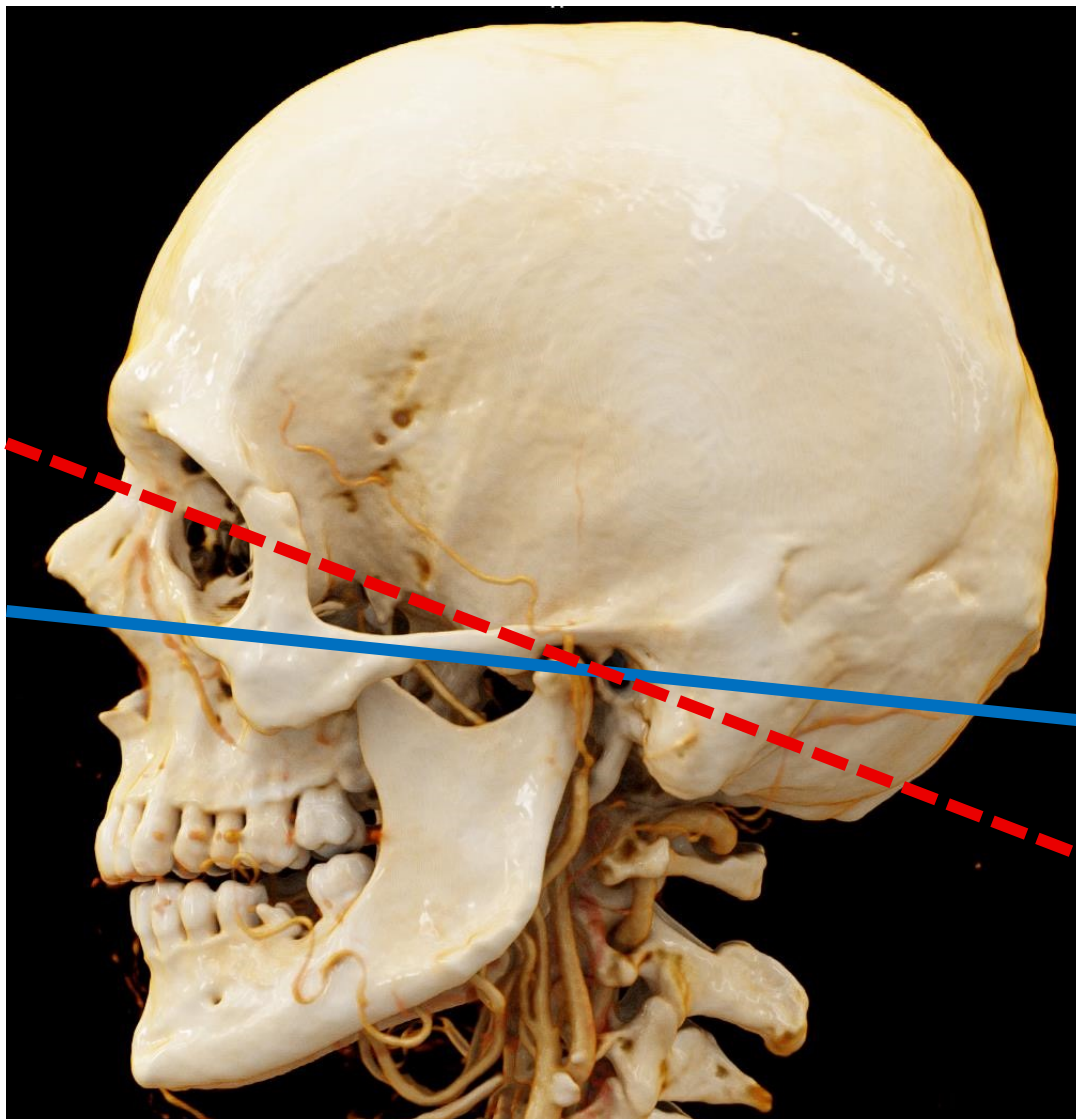


Scalp layers









-
- Horizontal Frankfurt line
- *Linea horizontalis auricoorbitalis*
- *Cave - linea orbitomeatalis*
 - *Inclination of CT a MRI*

cranium



♦ frankfurt horizontale

♦ *Linea horizontalis auricoorbitalis*

♦ views

♦ *Norma verticalis*

♦ *Norma basalis*

♦ *Norma lateralis*

♦ *Norma facialis*

♦ *Norma occipitalis*

♦ ***kefalometr***

Cranium as a unite

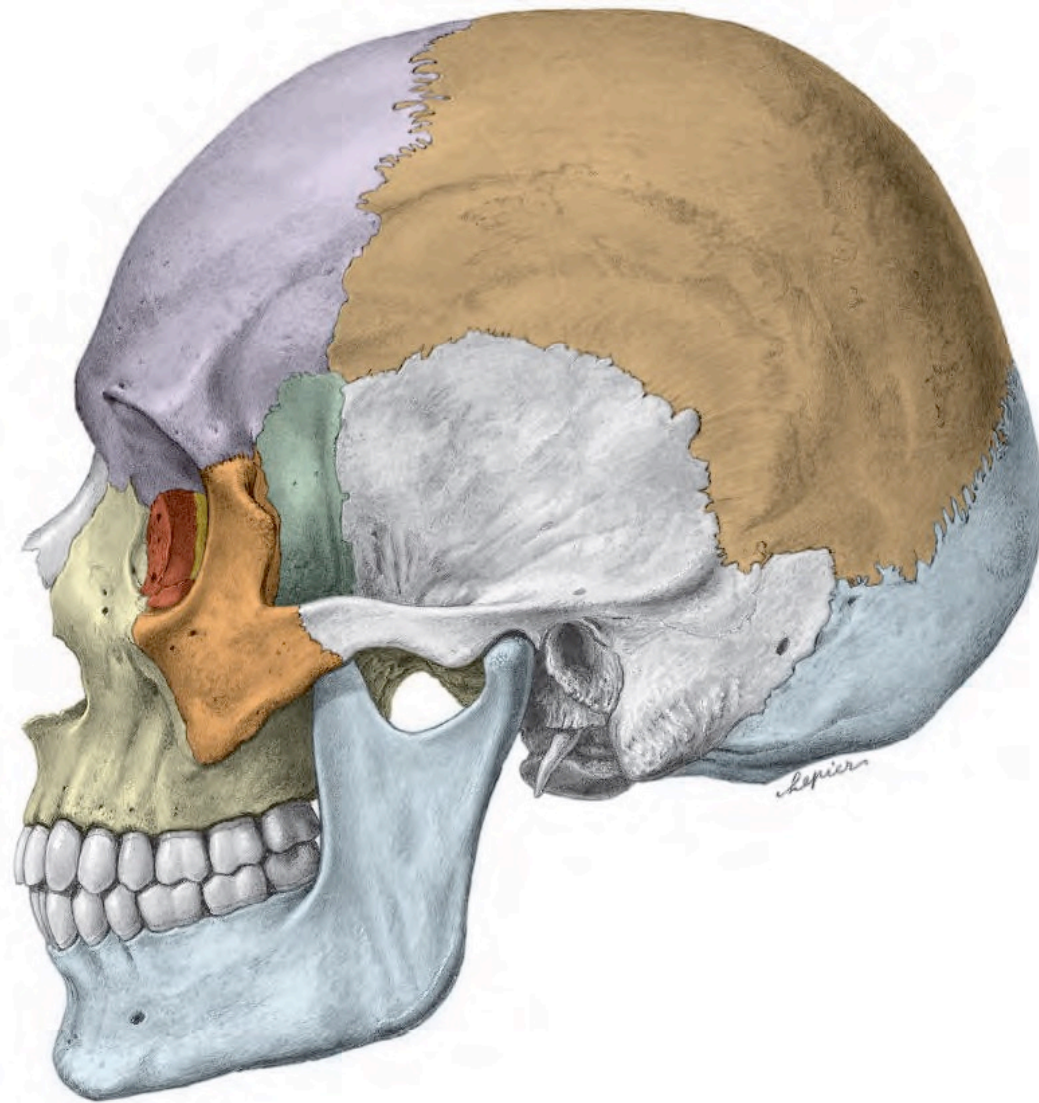


♦ Long-width index of skull - $w/l \cdot 100$

- ♦ *Less than 75 – dolichokrania*
- ♦ *75-80 – mesokrania*
- ♦ *More - brachykrania*

- ♦ Bregma
- ♦ Basion
 - ♦ height – B-B
- ♦ Nasion
- ♦ Glabella
- ♦ Opisthokranion
 - ♦ length – G-O
- ♦ Eurion
 - ♦ width – E-E
- ♦ Pterion
- ♦ Zygion
- ♦ Gnathion

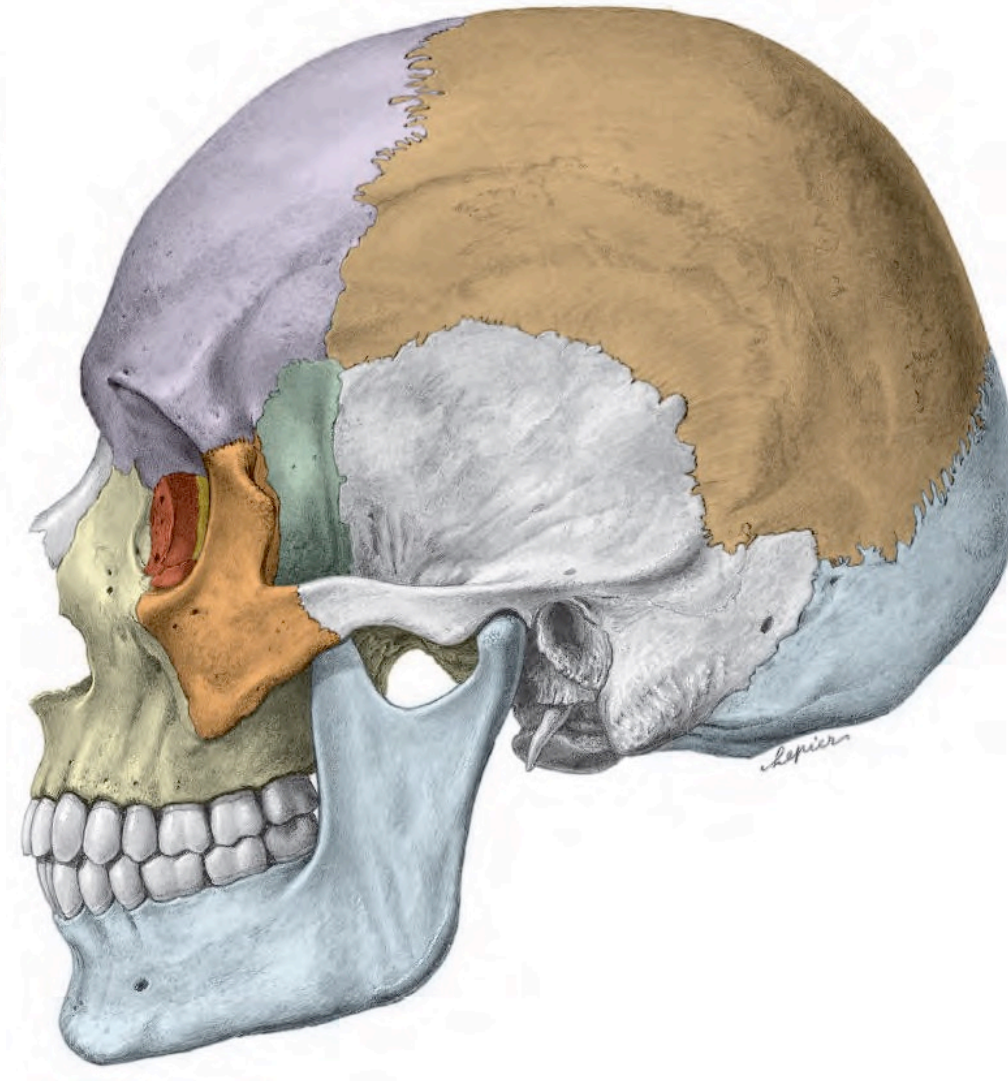
kefalometrie



- ♦ Os frontale
- ♦ Os ethmoidale
- ♦ Os sphenoidale
- ♦ Ossa parietalia
- ♦ Os occipitale
- ♦ Osa temporalia



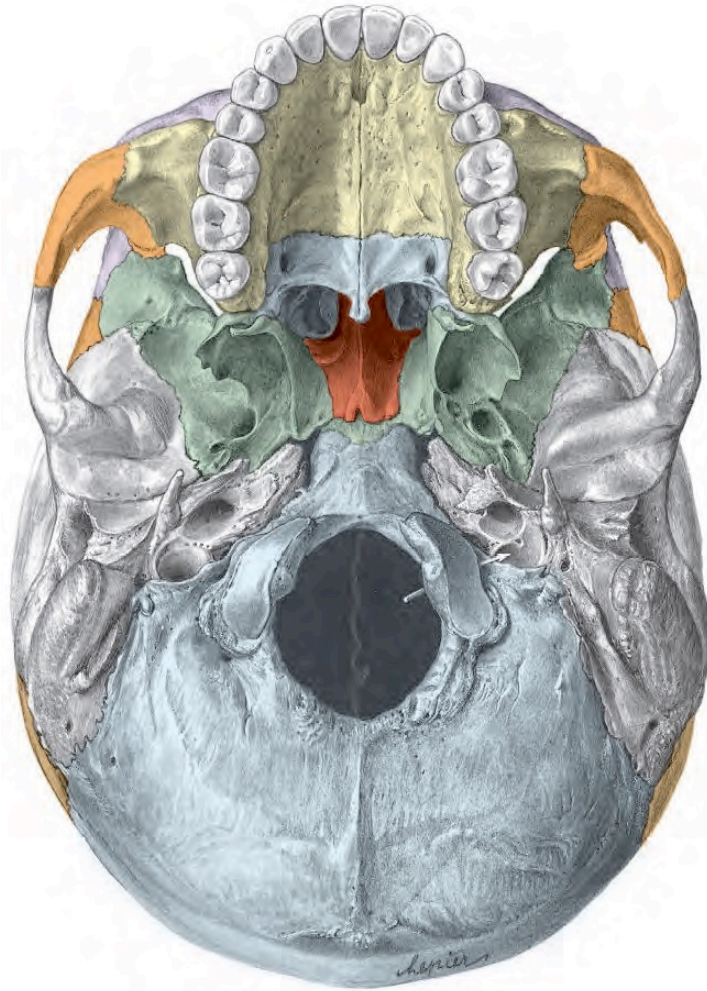
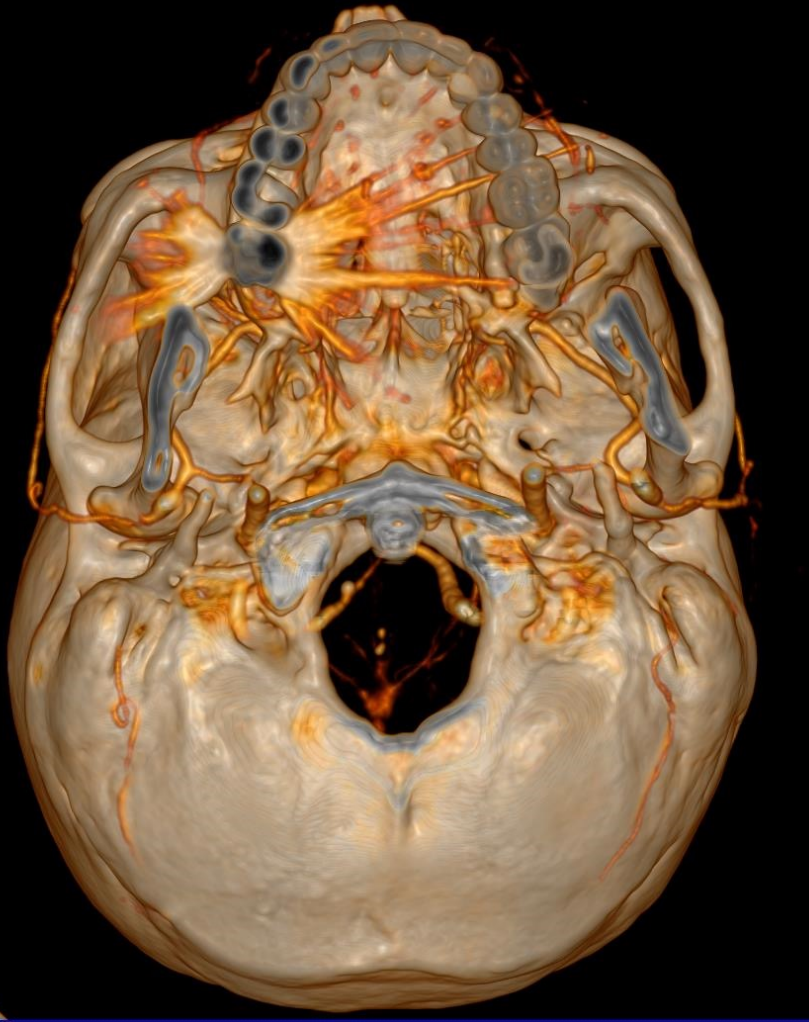
neurocranium



- ♦ **Coronaria**
- ♦ **Sagittalis**
 - ♦ Metopica
- ♦ **Lambdoidea**
 - ♦ Occipitalis transversa
- ♦ **Squamosa**
- ♦ **Sphenofrontalis**
- ♦ **Sphenoparietalis**
- ♦ **Sphenotemporalis**
- ♦ **Frontonasalis**
- ♦ **Frontozygomatica**

suturae

AFL

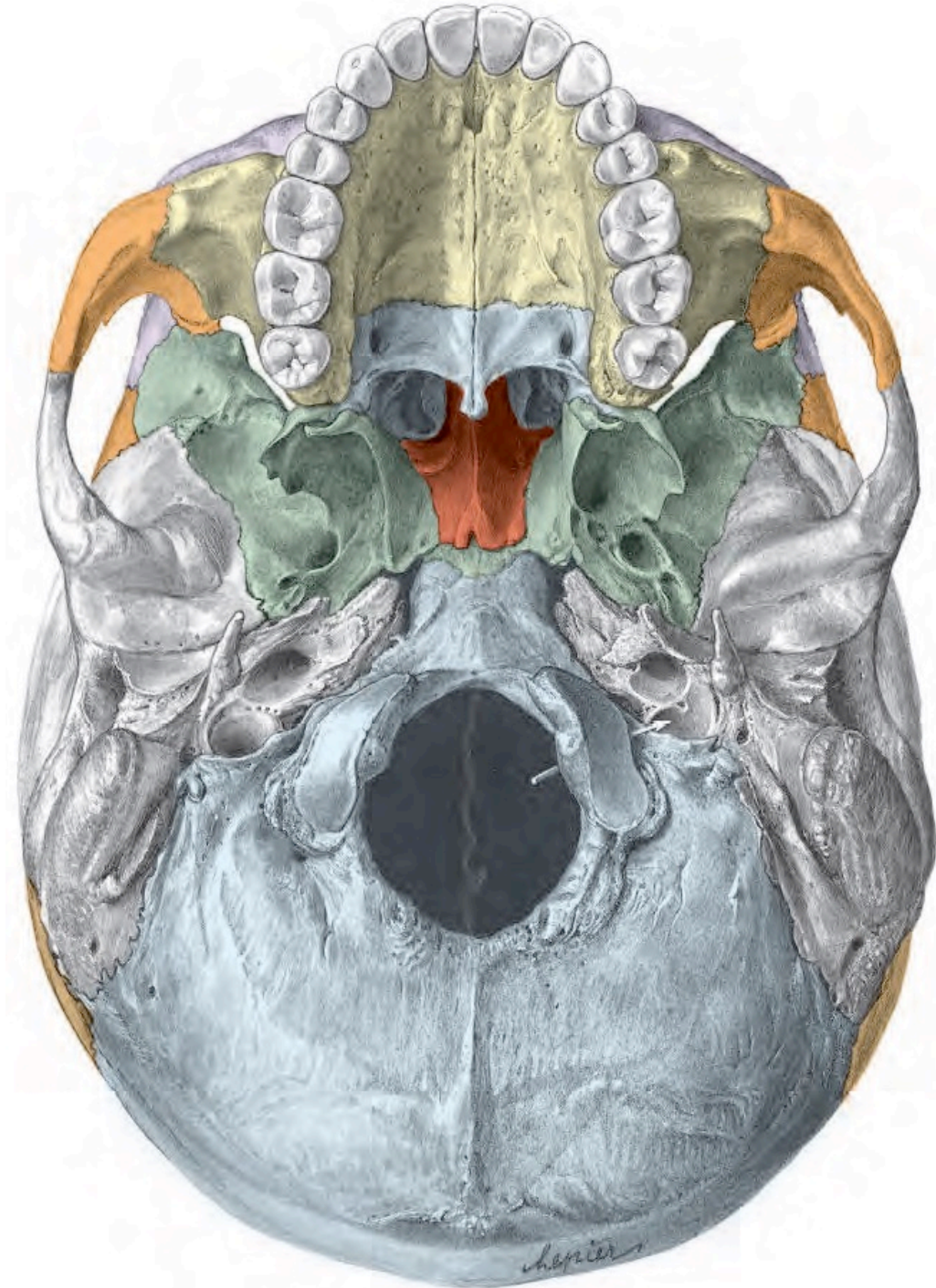


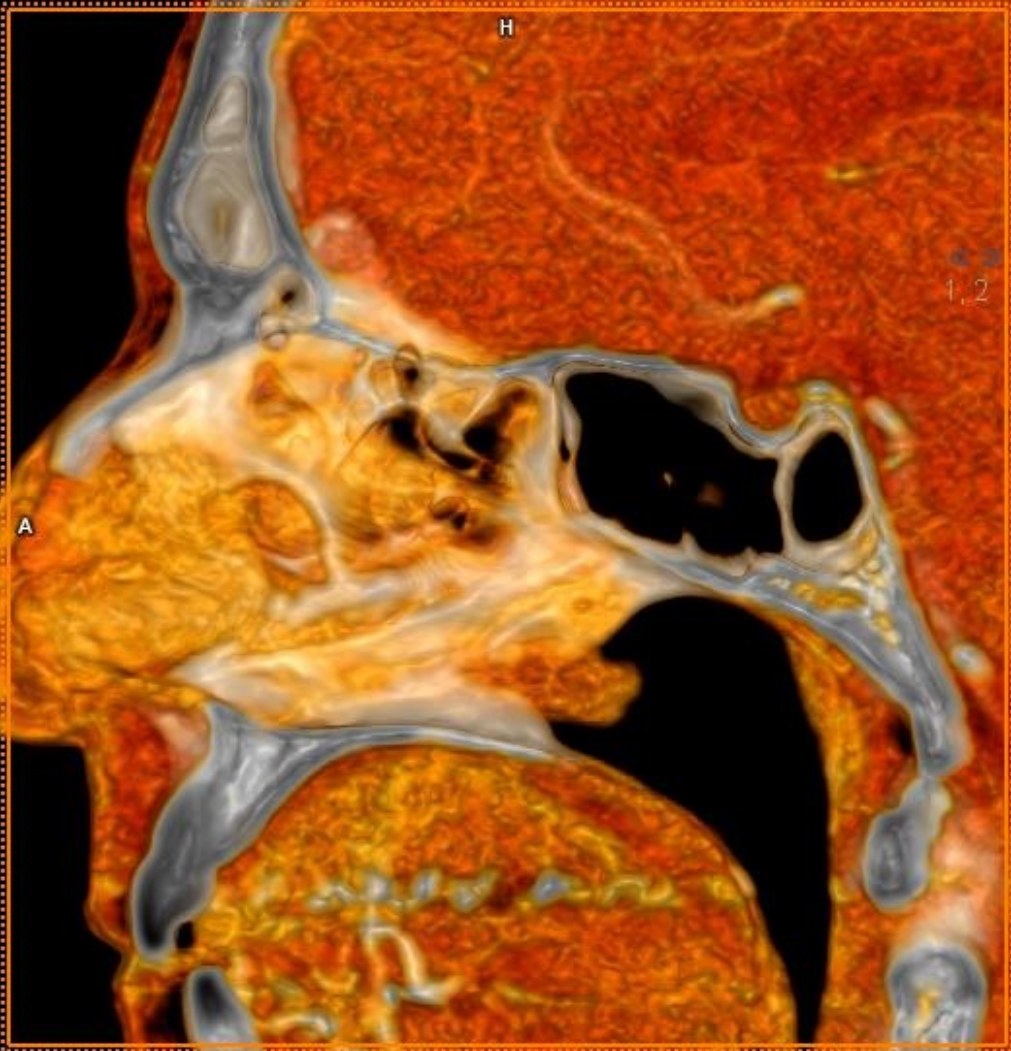
AHL



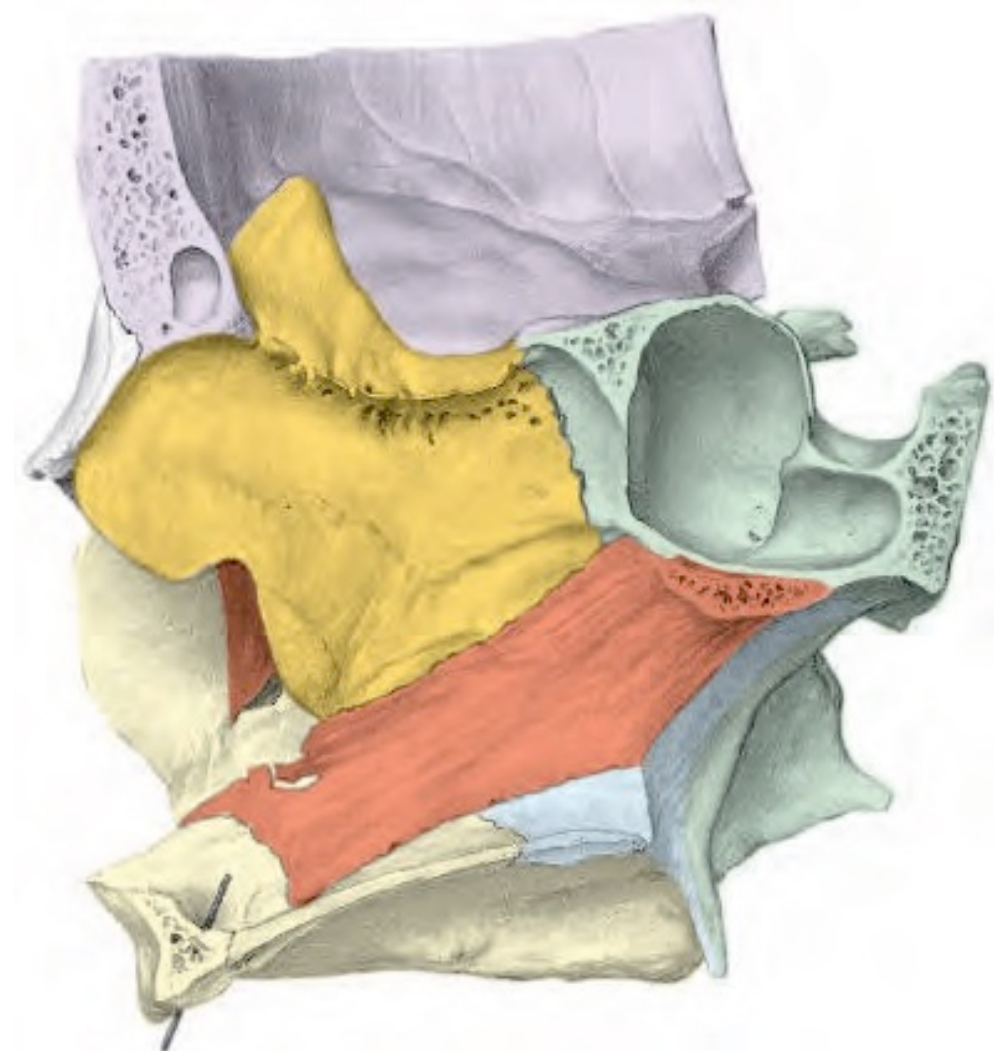
♦ os frontale, os ethmoideum, os sphenoidale, os temporale, os occipitale

basis cranii





- ♦ Os frontale
- ♦ Os ethmoidale
 - ♦ Crista galli
 - ♦ Lamina cribrosa
- ♦ Os sphenoidale
 - ♦ Sella turcica
- ♦ Vomer
- ♦ Maxilla
- ♦ Os palatinum

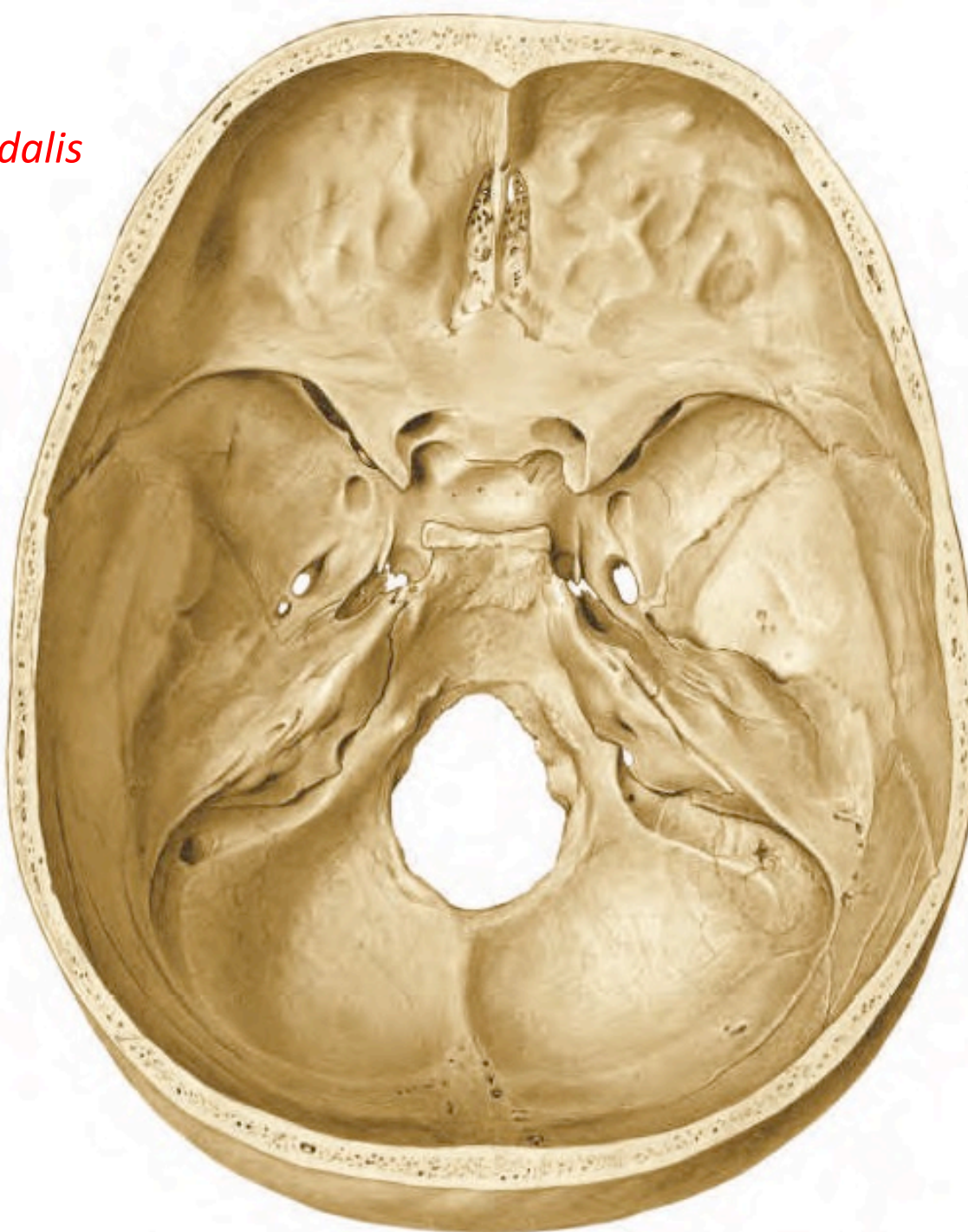


Fossae cranii

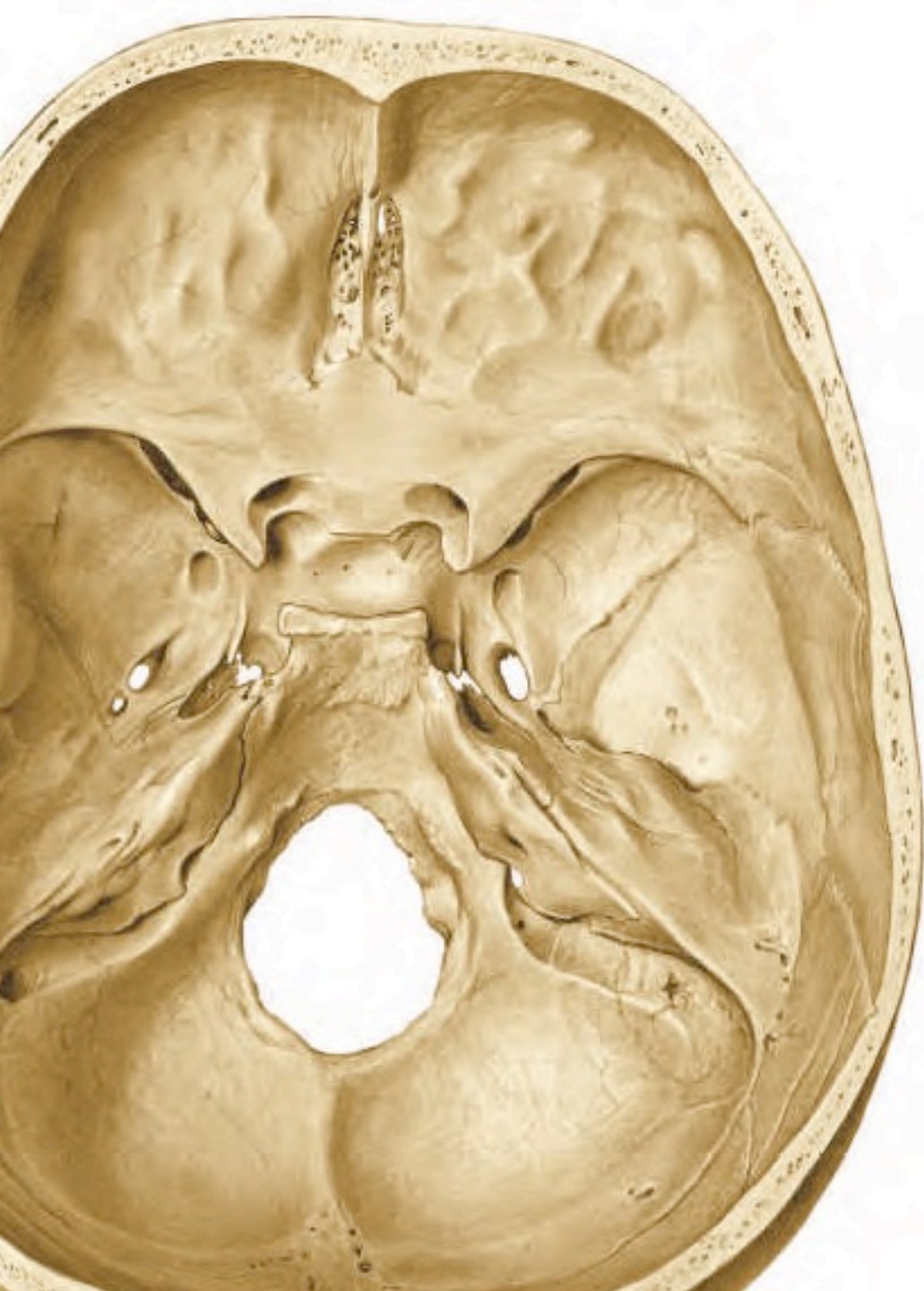
- ♦ **Fossa cranii anterior**
- ♦ *Ala minor ossis sphenoidalis*

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

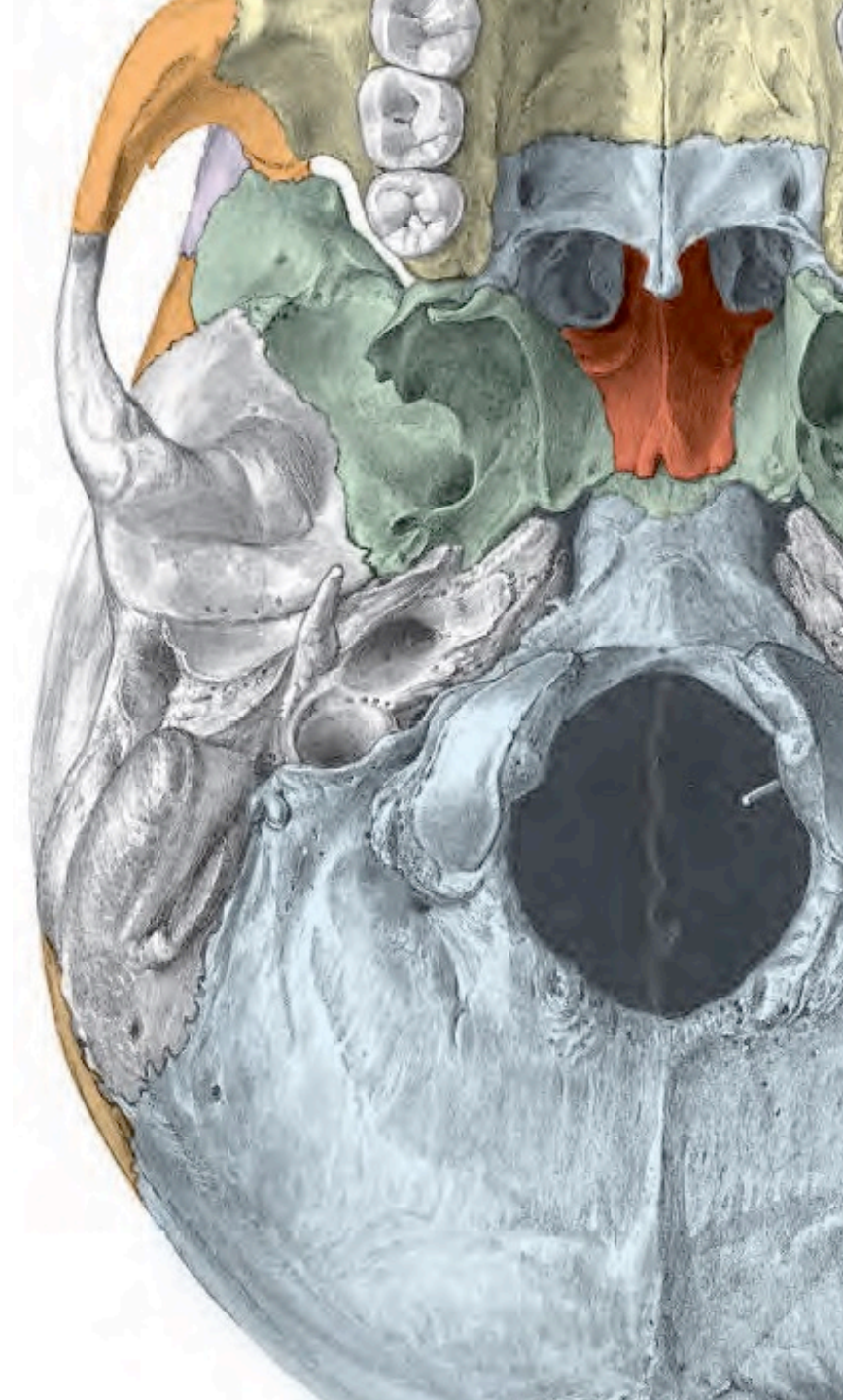
- ♦ **Fossa cranii posterior**



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

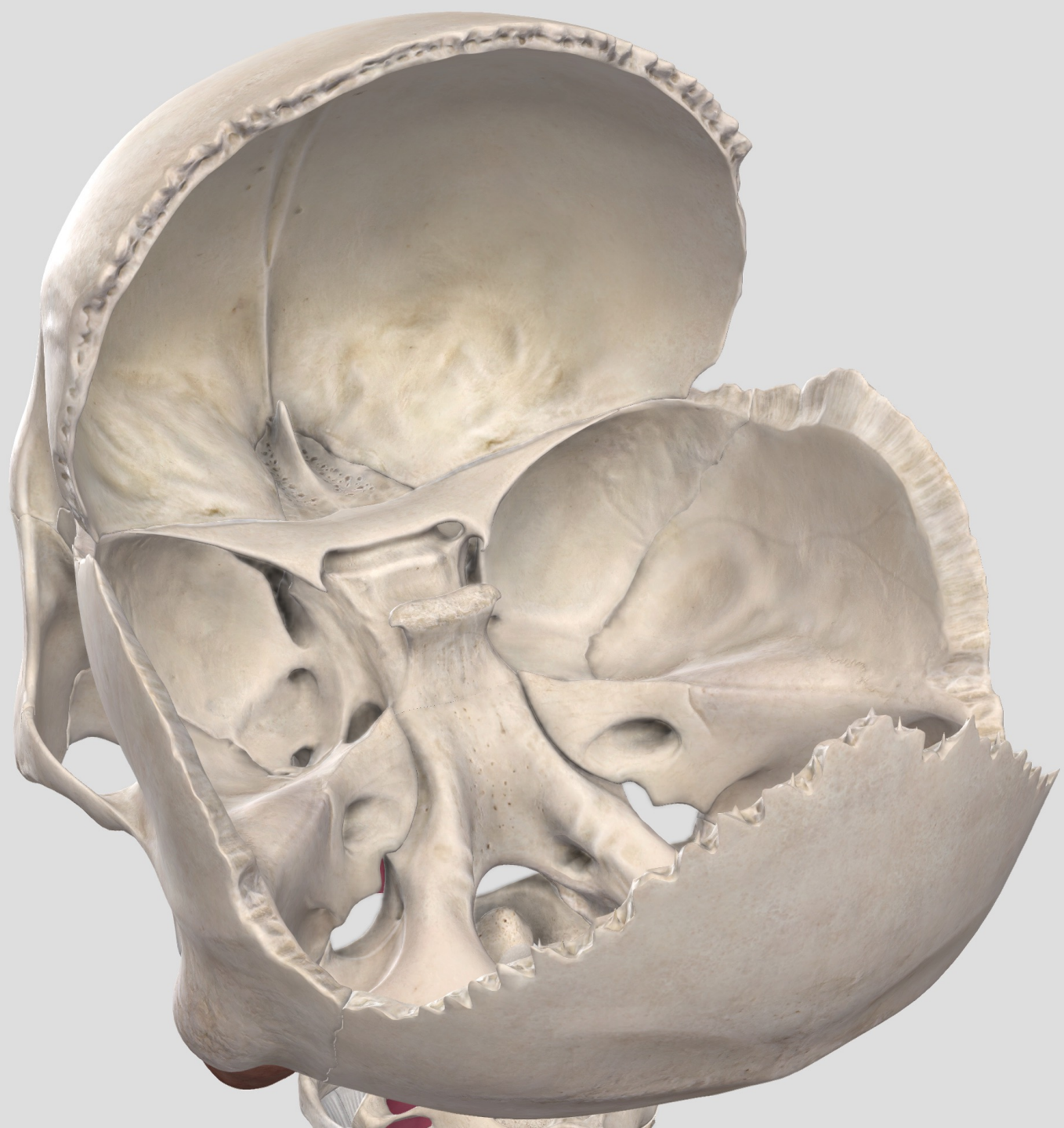


- ♦ **Lamina cribriformis**
- ♦ **Canalis opticus**
- ♦ **Fissura orbitalis superior**
- ♦ **Foramen rotundum**
- ♦ **Foramen ovale**
- ♦ **Foramen spinosum**
- ♦ **Canalis caroticus**
- ♦ **Meatus acusticus internus**
- ♦ **Foramen jugulare**
- ♦ **Canalis n. hypoglossii**
- ♦ **Foramen occipitale magnum**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

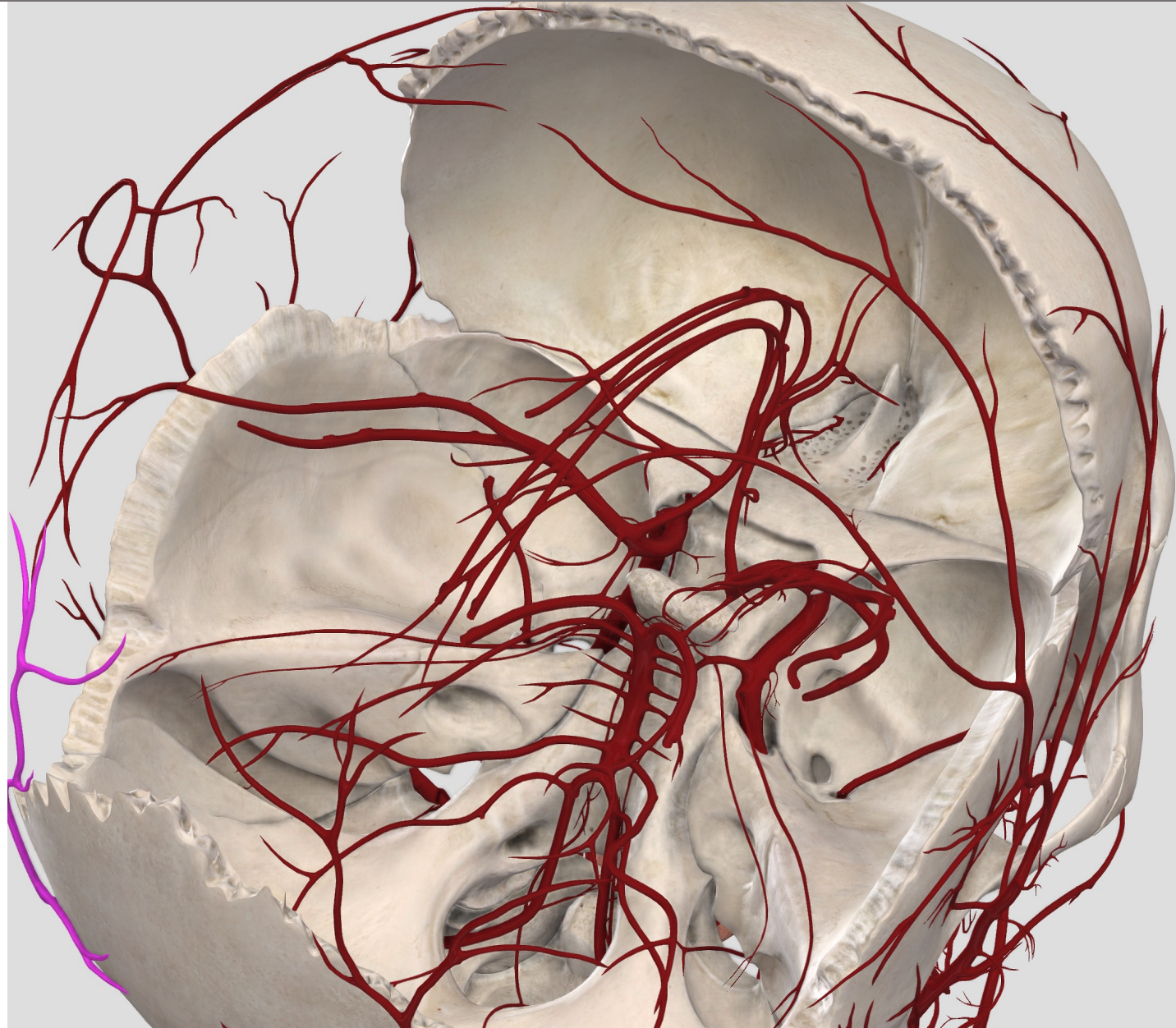


- ♦ **Lamina cribriformis**
- ♦ **Canalis opticus**
- ♦ **Fissura orbitalis superior**
- ♦ **Foramen rotundum**
- ♦ **Foramen ovale**
- ♦ **Foramen spinosum**
- ♦ **Canalis caroticus**
- ♦ **Meatus acusticus internus**
- ♦ **Foramen jugulare**
- ♦ **Canalis n. hypoglossii**
- ♦ **Foramen occipitale magnum**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

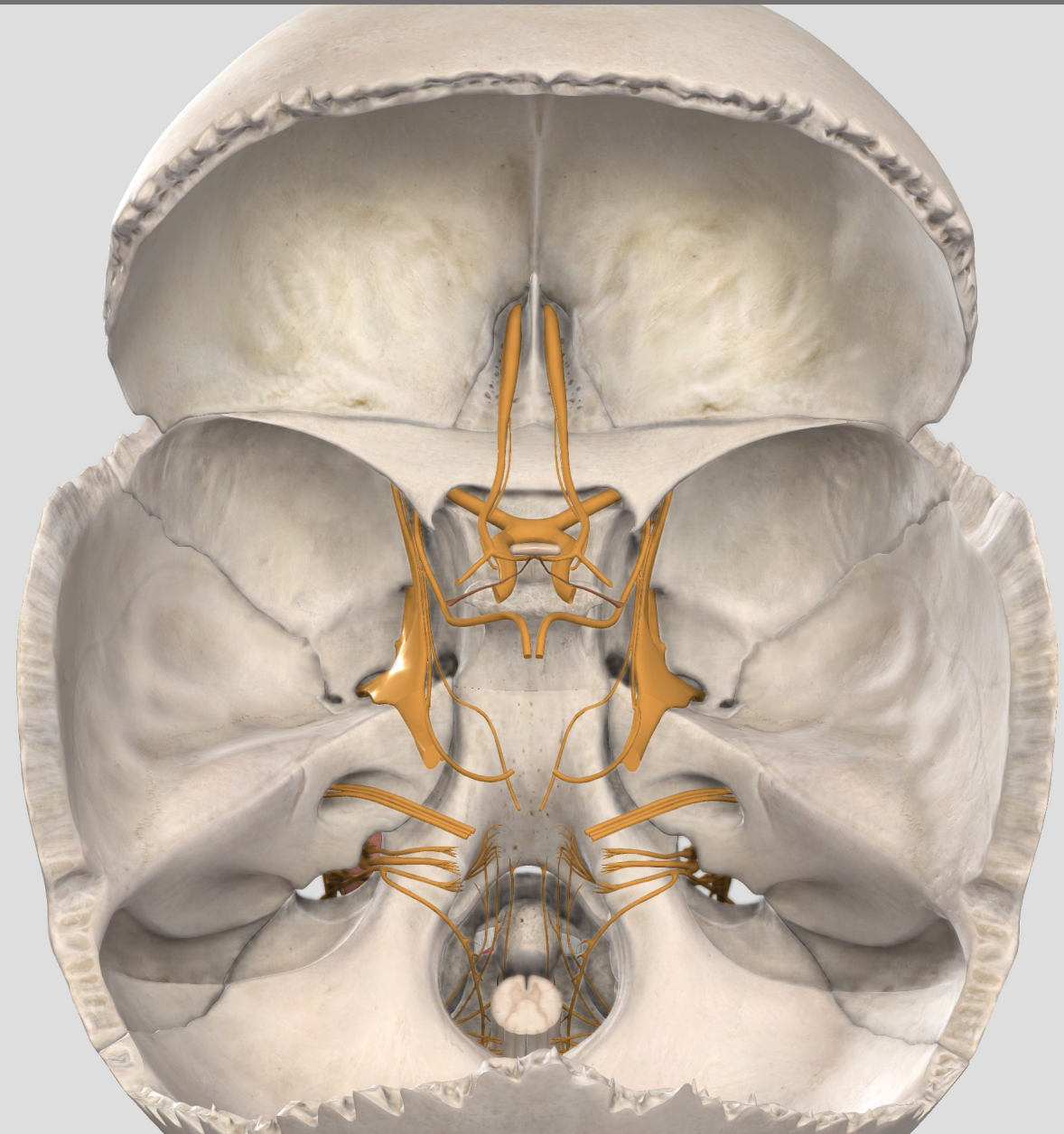
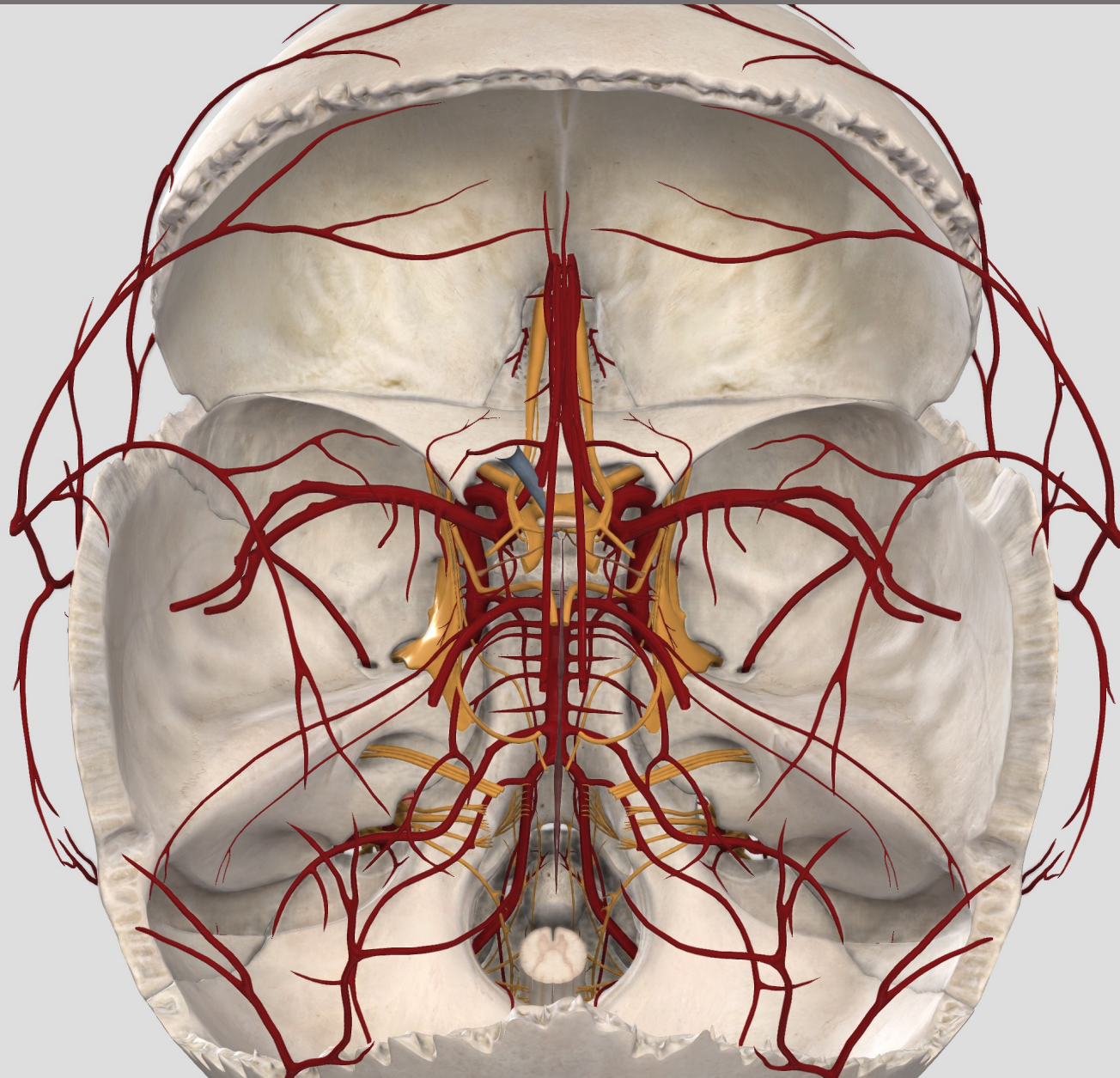
- ♦ **Foramen lacerum**

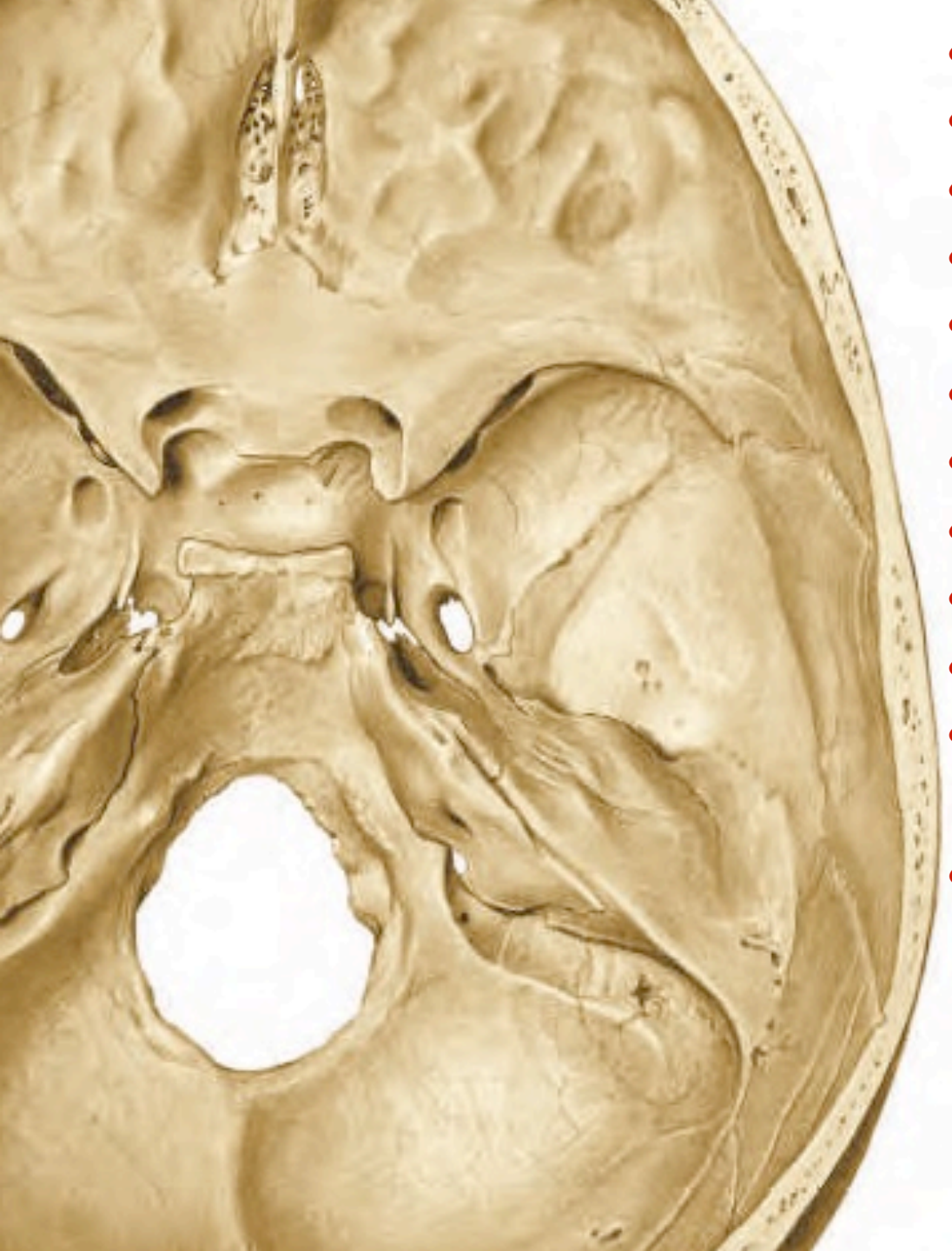


foramina



foramina

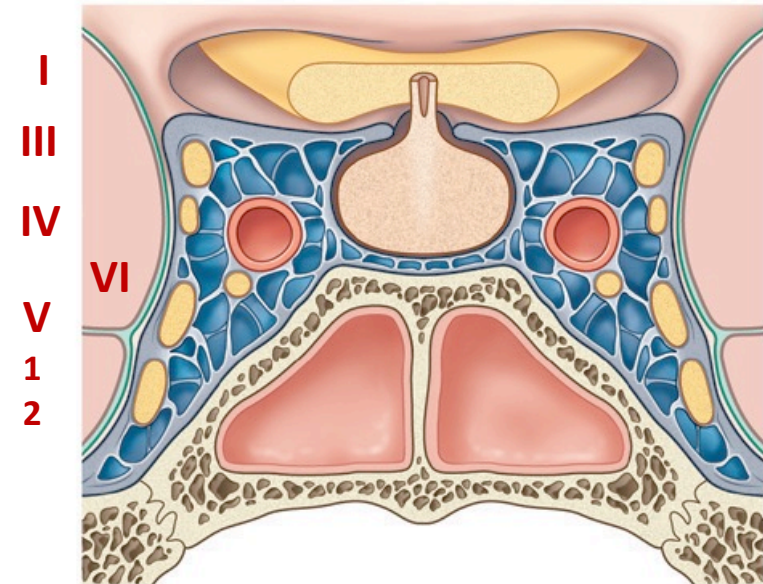




- ♦ **Lamina cribriformis** - *nn. olfactorii n.I*
- ♦ **Canalis opticus** - *n. opticus n.II , a. ophtlamica*
- ♦ **Fissura orbitalis superior** - *n. ophtalmicus n. V₁, nn. III, IV, VI v opht. sup.*
- ♦ **Foramen rotundum** - *n. maxillaris n. V₂*
- ♦ **Foramen ovale** - *n. mandibularis - n. V₃*
- ♦ **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*



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



Sella turcica



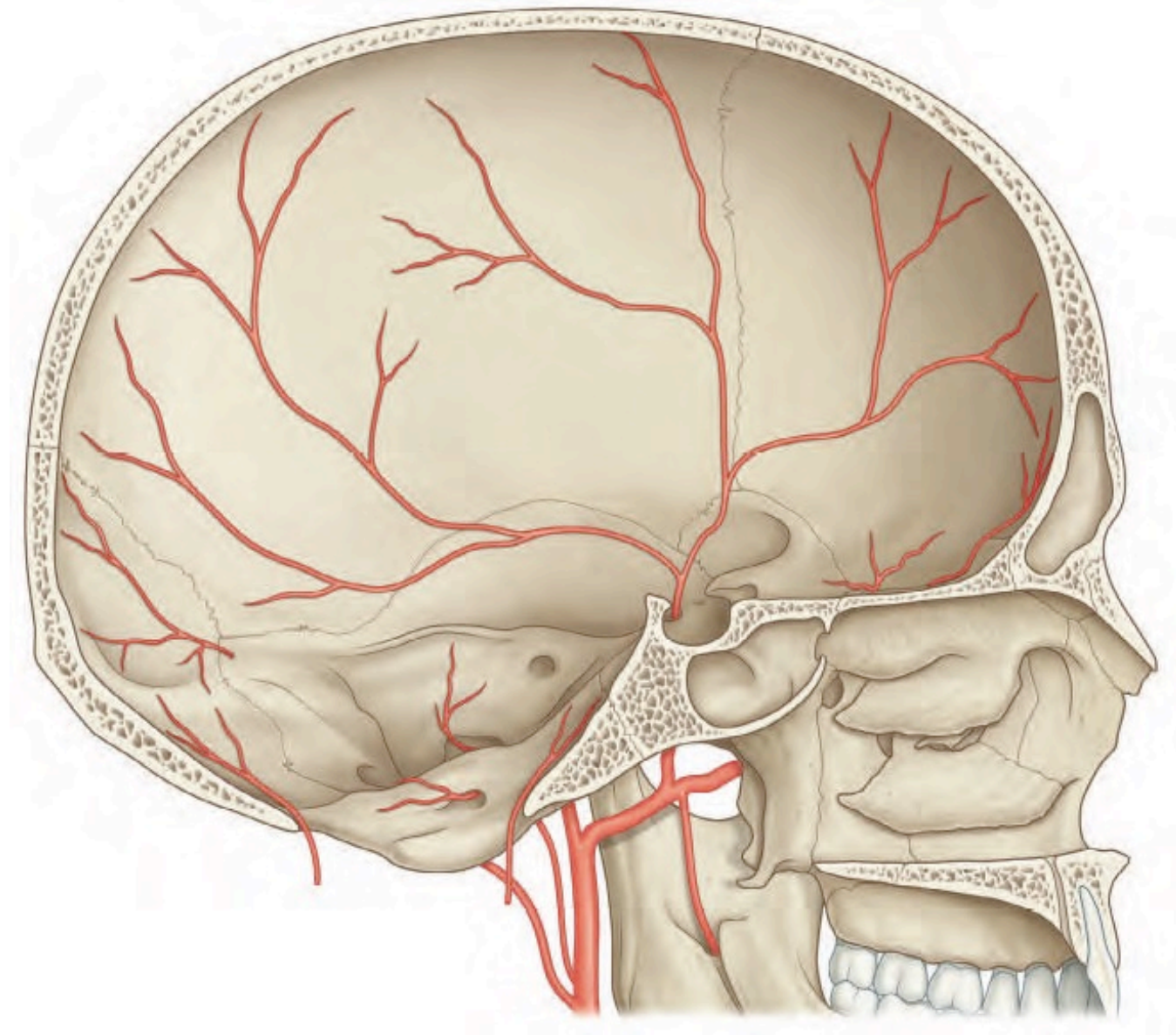
- ♦ **Corpus**
- ♦ *Ala minor*
- ♦ *Planum sphenoidale*
- ♦ *Limbus sphenoidalis*
- ♦ *Processus clinoidei ant.*
- ♦ *Sulcus prechiasmaticus*
- ♦ *Canalis opticus*
- ♦ **Sella turcica**
- ♦ **Ala major**
- ♦ *Foramen rotundum*
- ♦ *Foramen ovale*
- ♦ *Foramen spinosum*

Os sphenoidale

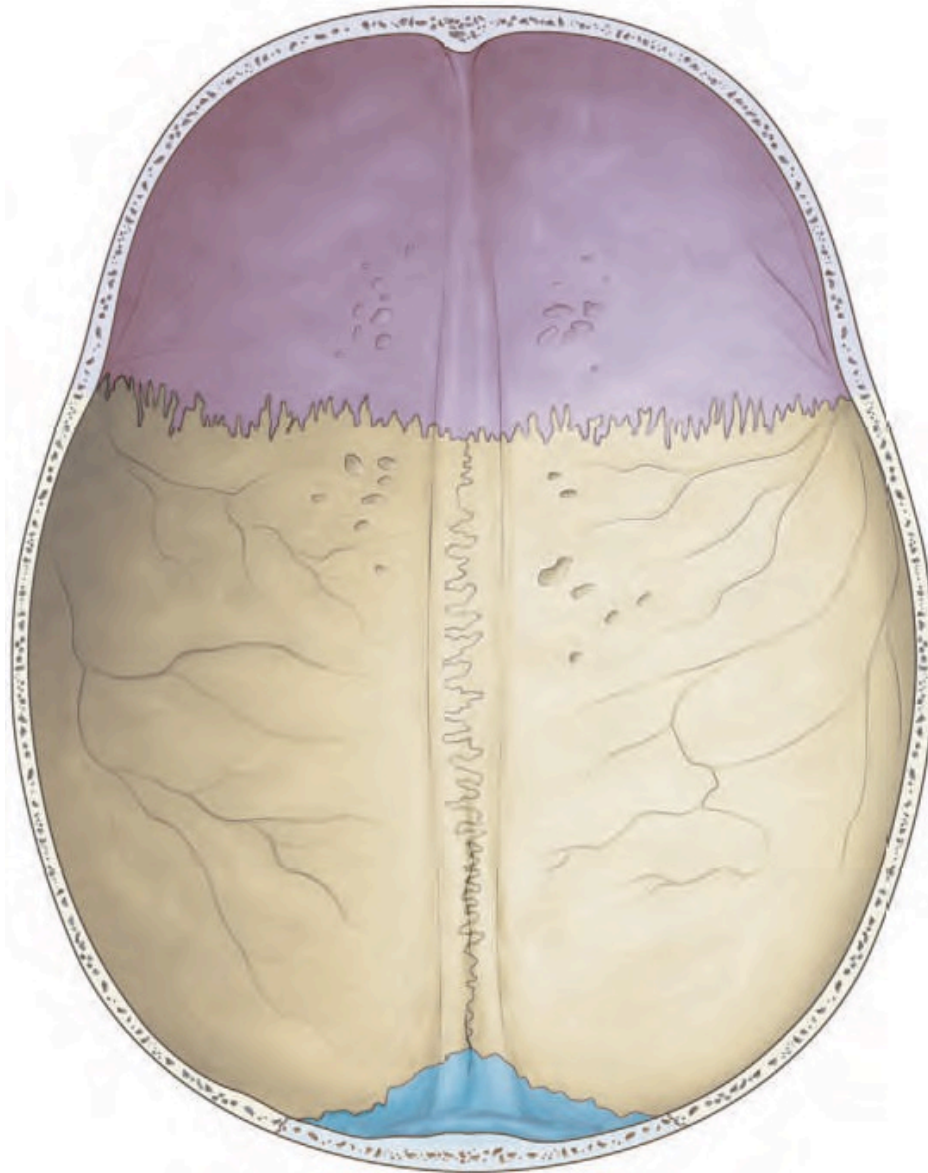
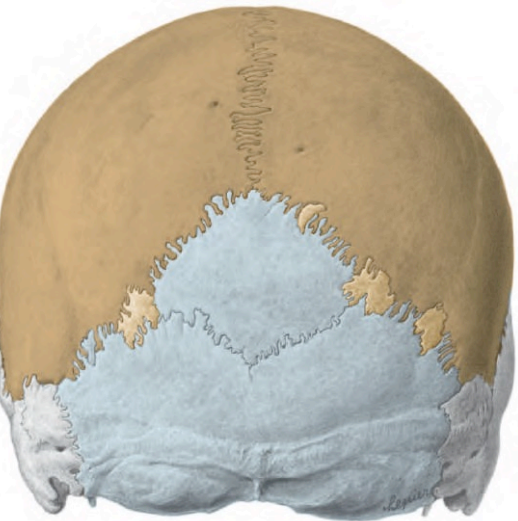
- ♦ A. meningica media
- ♦ A. meningica posterior
 - ♦ a. pharyngica ascendens
- ♦ Rr. mennigeales
 - ♦ a. ethmoidalis
 - ♦ a. pharyngica ascendens
 - ♦ a. occipitalis

Endosteal lamina durae matris

impressiones calvae

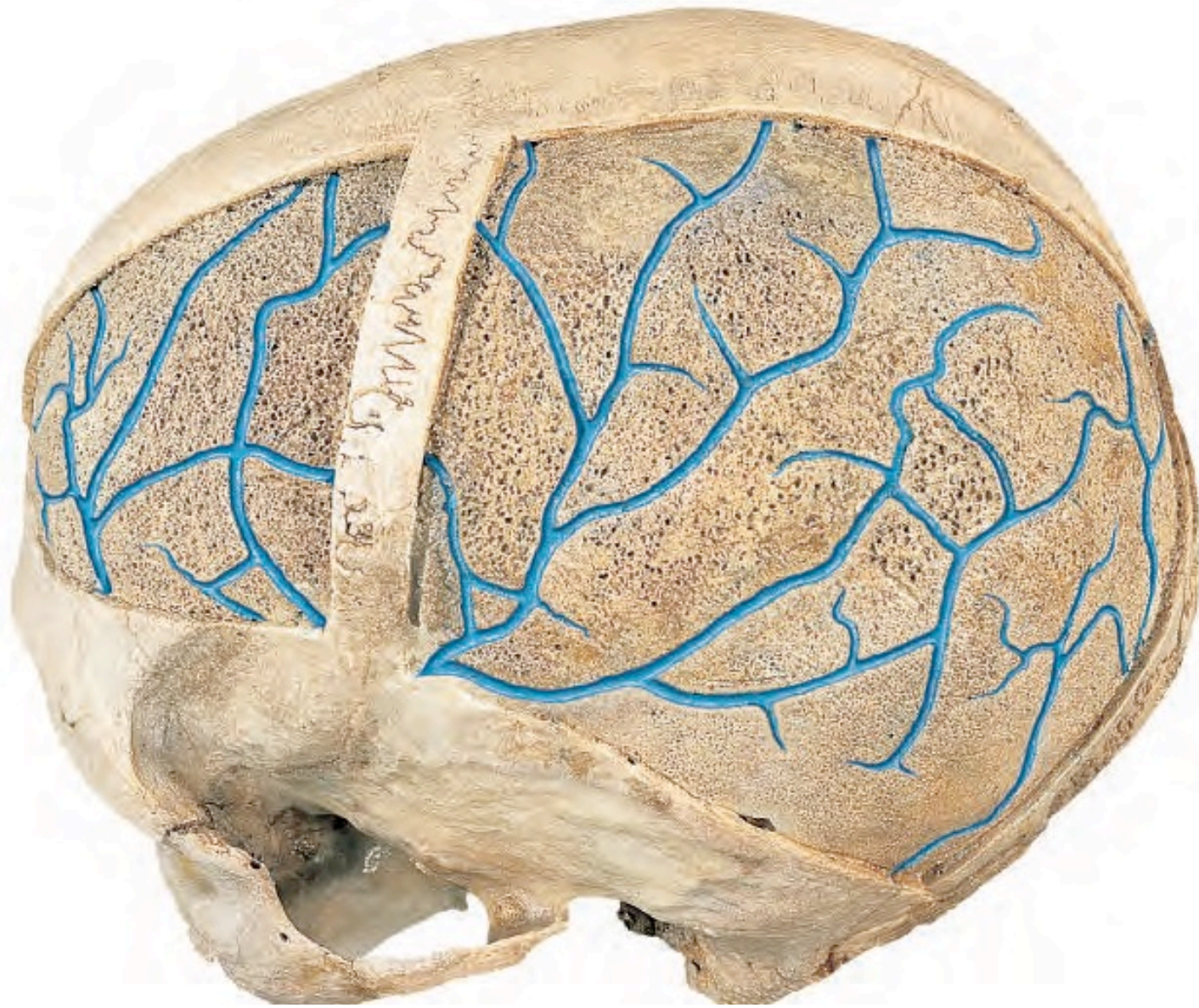


Arteriae meningeales



- ♦ **Suturae**
- ♦ **Lamina externa**
- ♦ **Lamina interna**
- ♦ **Diploë**
- ♦ **Impresiones arteriarum**
- ♦ **Impresiones gyrorum**
- ♦ **Juga cerebralia**
- ♦ **Granulationes arachnoideales**

calvaria

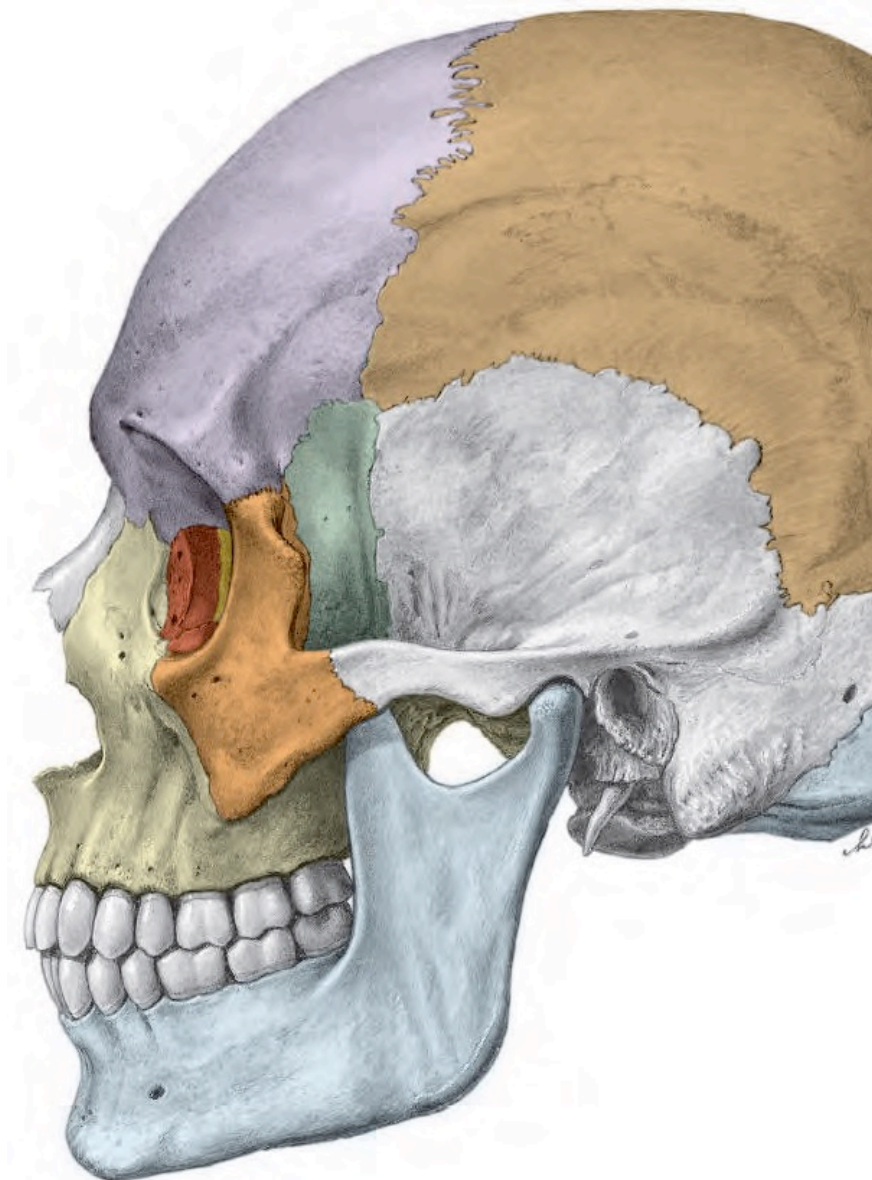


- ♦ Venae diploicae
- ♦ Frontales
- ♦ **Sutura coronaria**
- ♦ Temporales anteriores
- ♦ Temporales psoteriores
- ♦ Occipitales

Venae diploicae



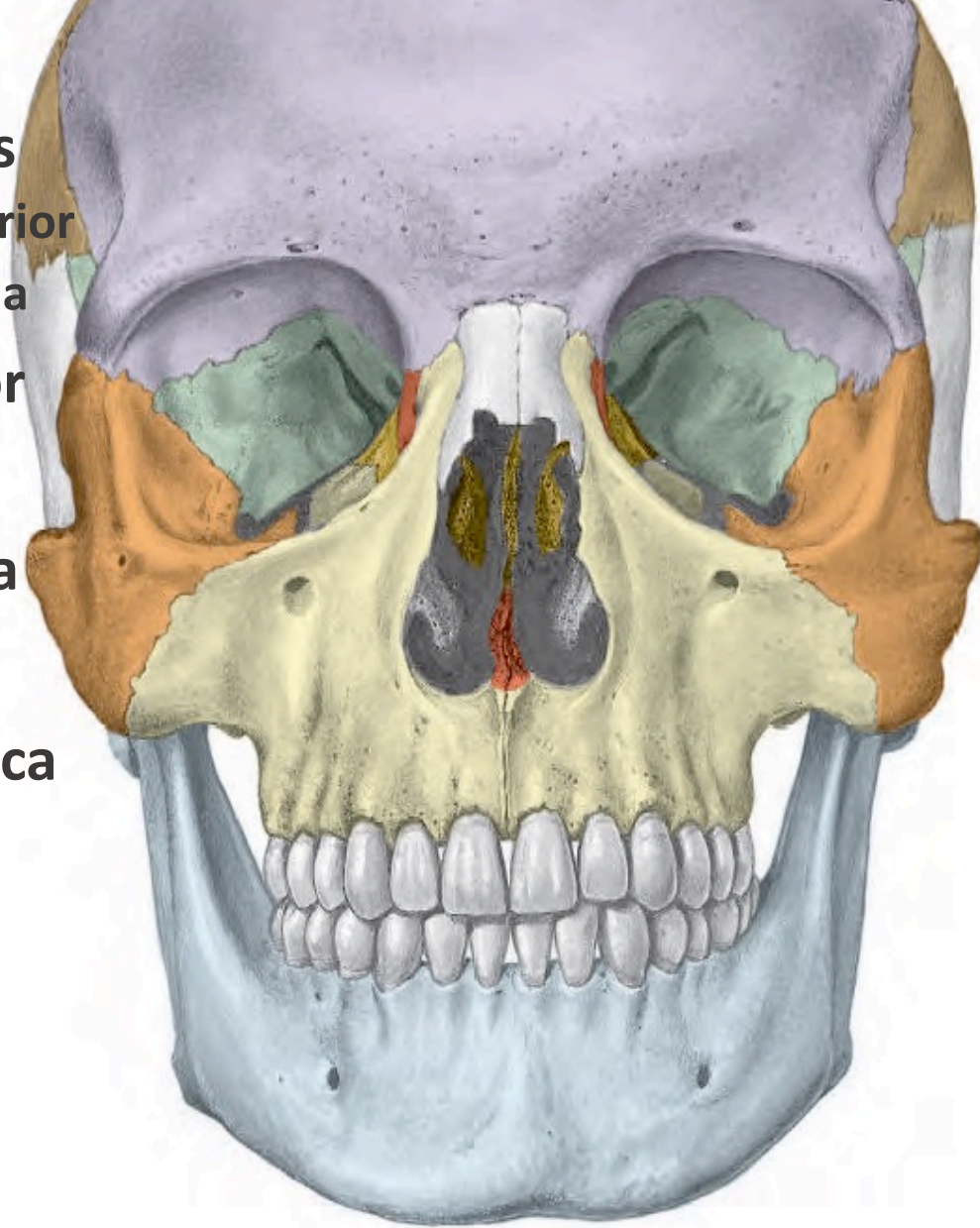
- ♦ **Ossa nasalia**
- ♦ **Os ethmoidalis**
 - ♦ Concha superior
 - ♦ Concha media
- ♦ **Concha inferior**
- ♦ **Vomer**
- ♦ **Ossa lacrimalia**
- ♦ **Os palatinum**
- ♦ **Ossa zygomatica**
- ♦ **Maxilla**
- ♦ **Mandibula**



splanchnocranium



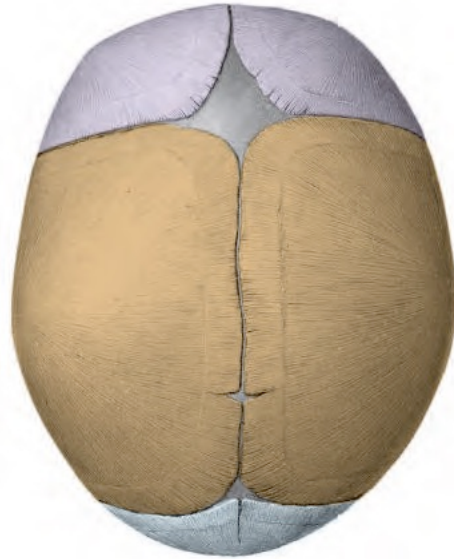
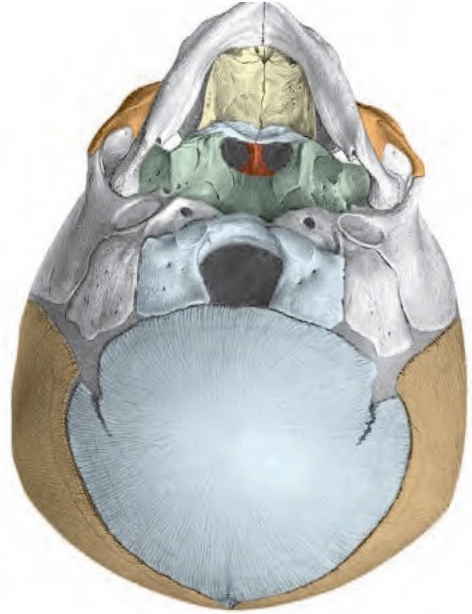
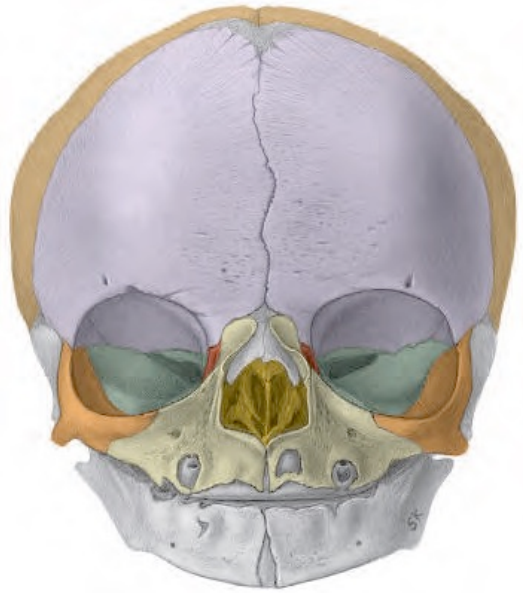
- ♦ **Ossa nasalia**
- ♦ **Os ethmoidalis**
 - ♦ Concha superior
 - ♦ Concha media
- ♦ **Concha inferior**
- ♦ **Vomer**
- ♦ **Ossa lacrimalia**
- ♦ **Os palatinum**
- ♦ **Ossa zygomatica**
- ♦ **Maxilla**
- ♦ **Mandibula**



splanchnocranium

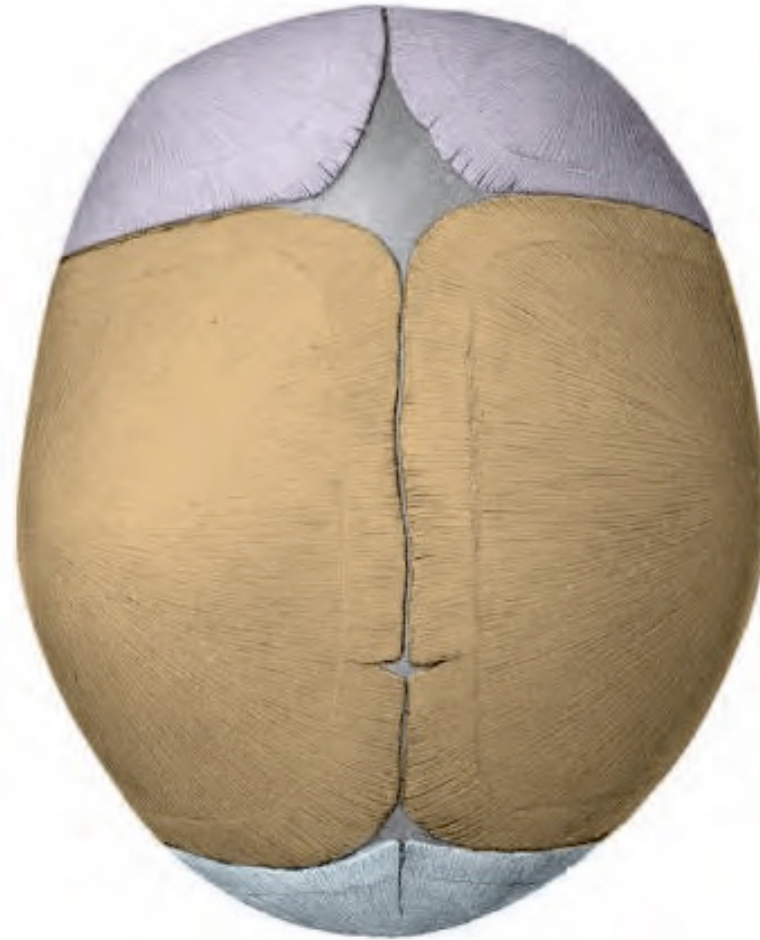


splanchnocranium



- ♦ **Sutura metopica**
 - ♦ *ossis frontalis*
- ♦ **Tubera frontalia**
- ♦ **Tubera parietalia**
- ♦ **Os tympanicum**
 - ♦ *Ring in newborn – adult conus*
- ♦ **Os incisivum (praemaxilla)**
- ♦ **Sutura mandibulae – ossalia mentalia**
- ♦ **Fonticuli (fontanelles)**
- ♦ **Os bregmaticum – fonticulus major**
- ♦ **Os epiptericum – fonticulus sphenoidalis**
- ♦ **Ossa suturarum wormiana**
 - ♦ *Sutura lambdoidea*

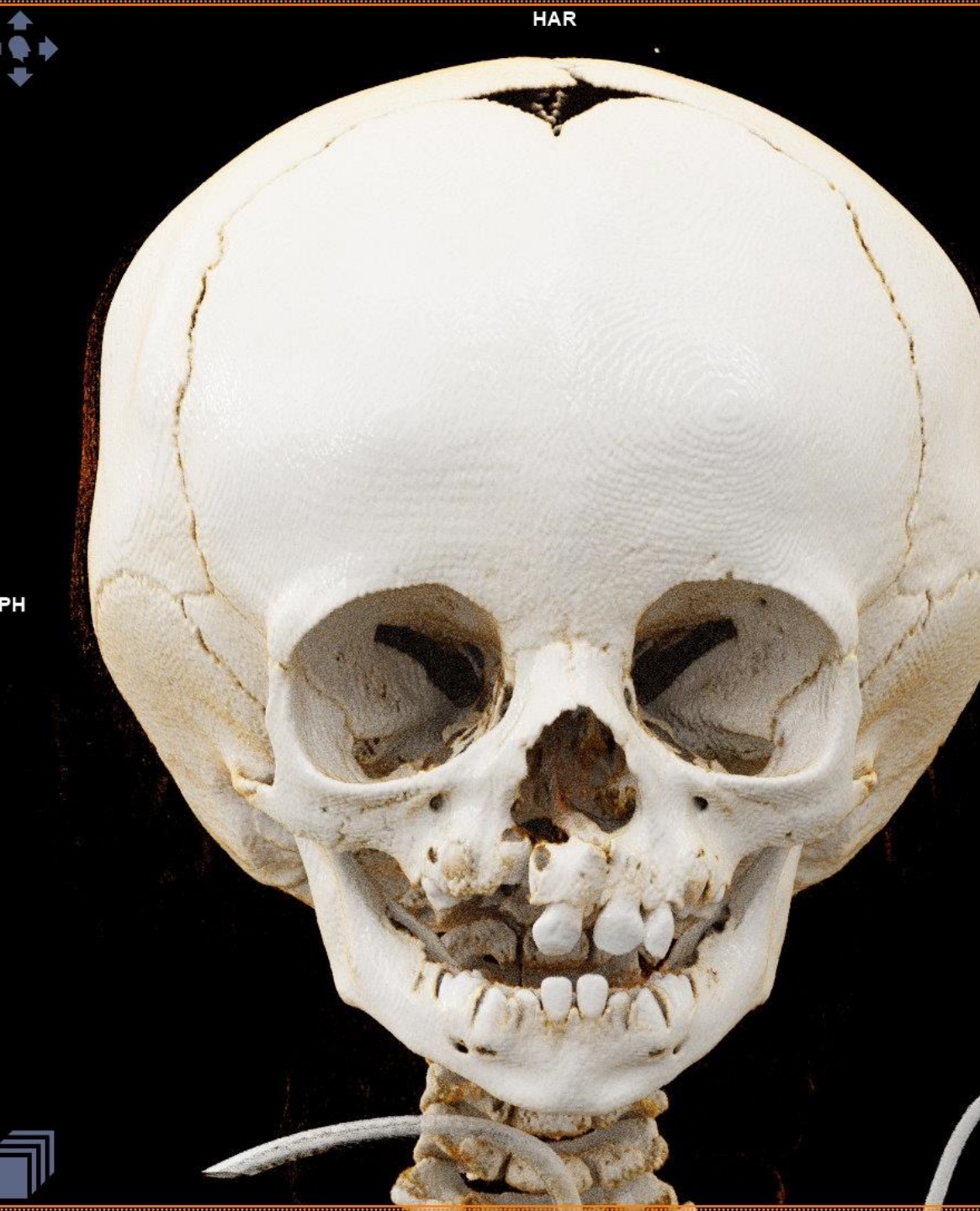
Cranium neonati



- ♦ Fibrous membrane
- ♦ Fonticulus major
 - ♦ Larger fontanelle
 - ♦ *Closed in two years*
 - ♦ *Clinical examination*
- ♦ Fonticulus minor
 - ♦ *Smaller fontanelle*
 - ♦ *Closing in 6 months*
- ♦ Fonticulus sphenoidalis
- ♦ Fonticulus mastoideus

- ♦ *Changes in intracranial pressure*
- ♦ *Acoustic window for ultrasound*

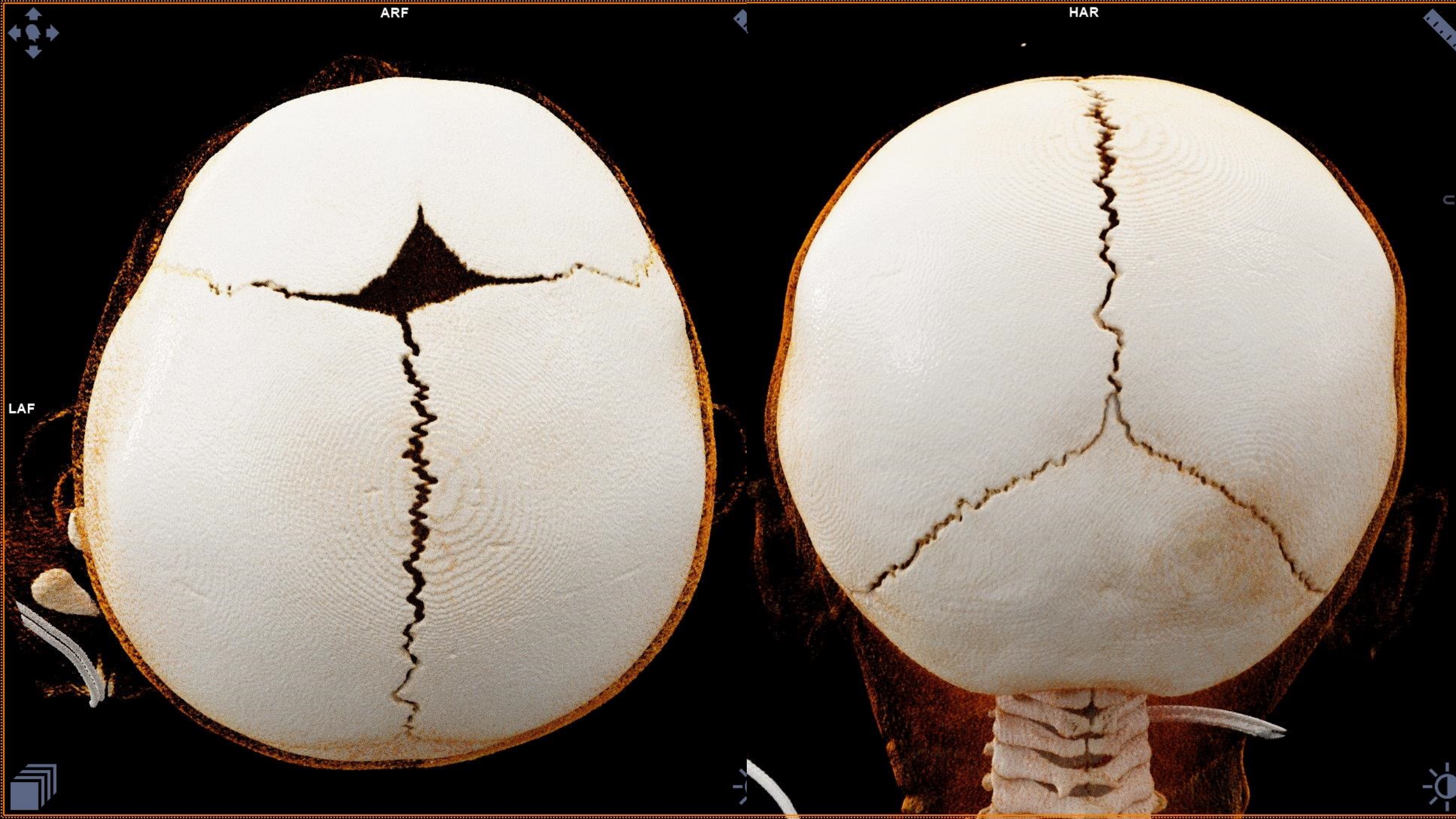
fonticuli

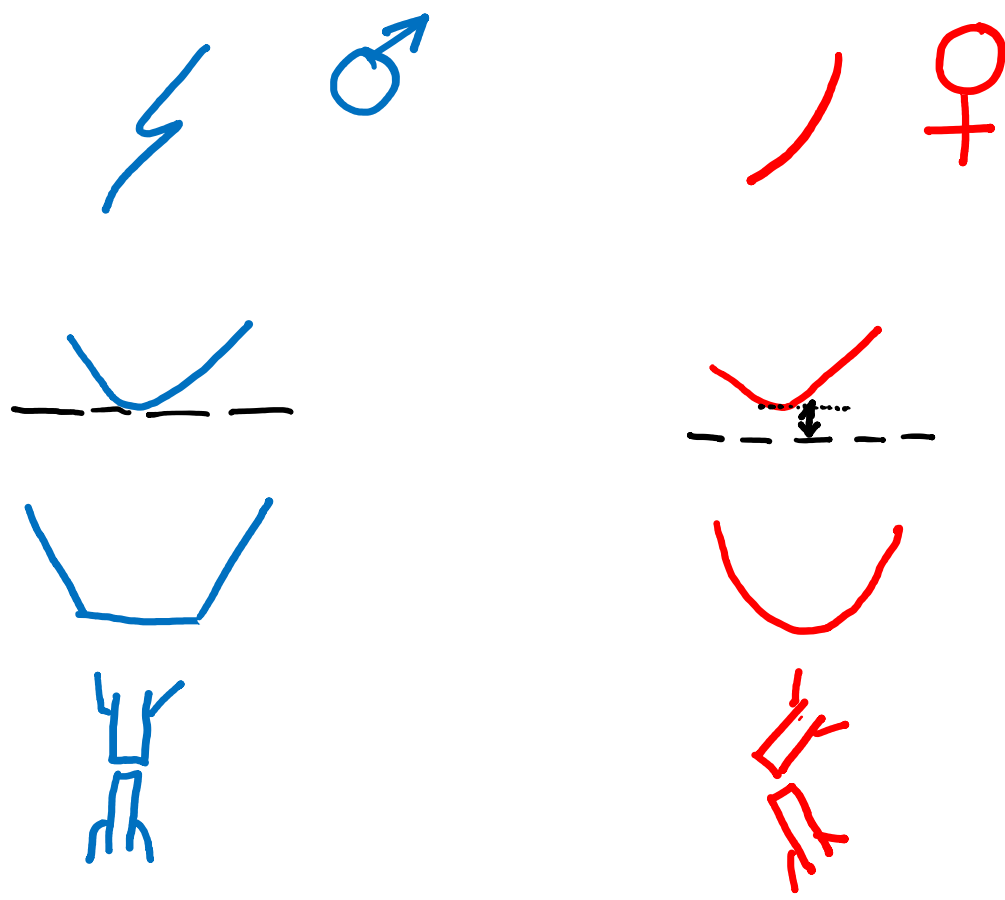


ARF

HAR

LAF





- Sutura nasofrontalis
- Arcus superciliaris M+ F-
- Tubera frontalia M- F+
- Protuberantia occipitalis externa M+ F-
- Processus mastoideus
- Protuberantia mentalis
- Processus alveolares
 - M: ortognathie
 - F: prognathie dentes incisivi

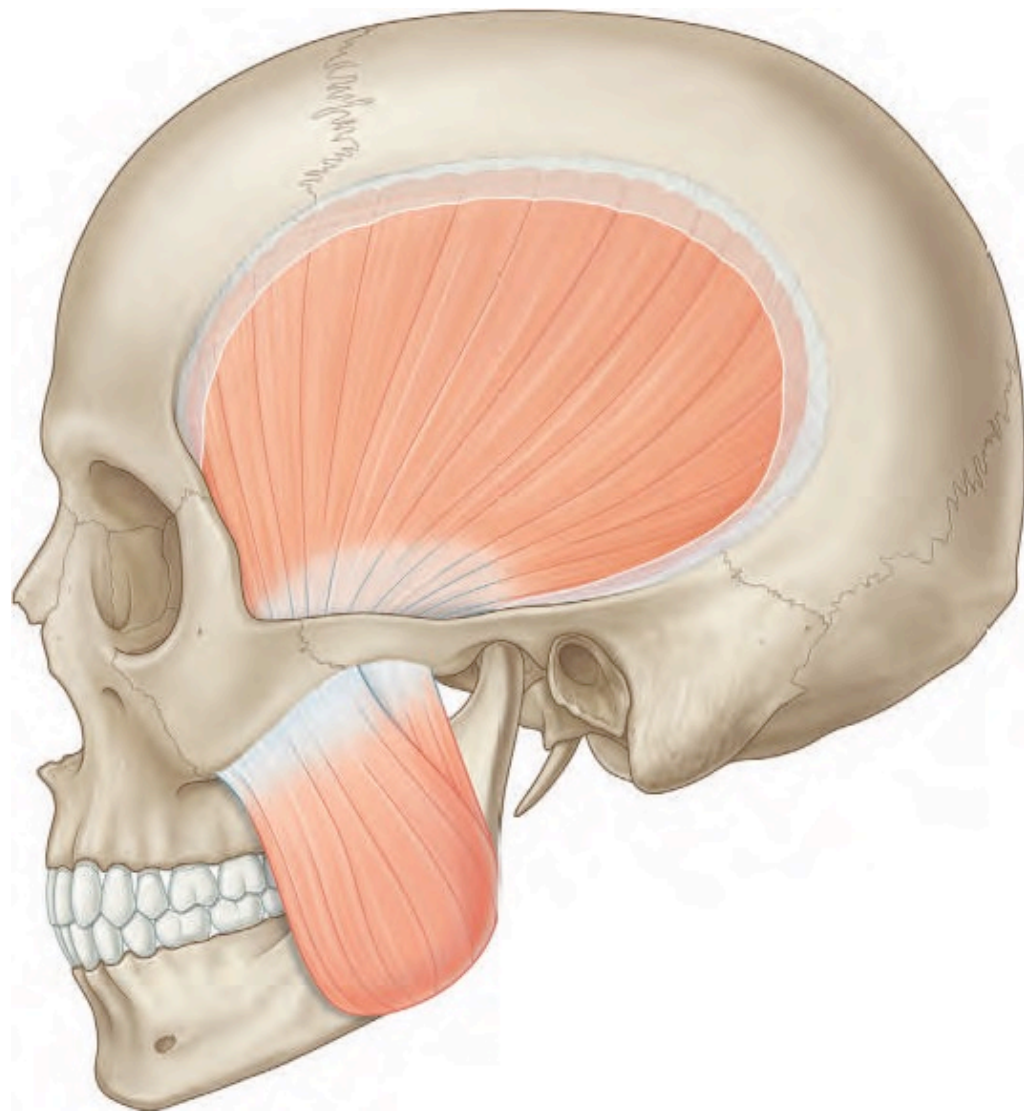
Gender differences

- 💧 **Mastication mm.**
- 💧 **Innervated by n. trigeminus V3**
- 💧 **First branchial arch**
- 💧 **Motor nucleus**
- 💧 *Muscles of mastication*
- 💧 *M. temporalis*
- 💧 *M. masseter*
- 💧 *M. pterygoideus lateralis*
- 💧 *M. pterygoideus medialis*

- 💧 **Skin muscles – hyoid branchial arch**
- 💧 **n. facialis VII**
- 💧 **No fascias**



musculi capitis



♦ **M. temporalis**

- ♦ Linea temporalis superior et inferior
- ♦ Processus coronoideus mandibulae

♦ **M. masseter**

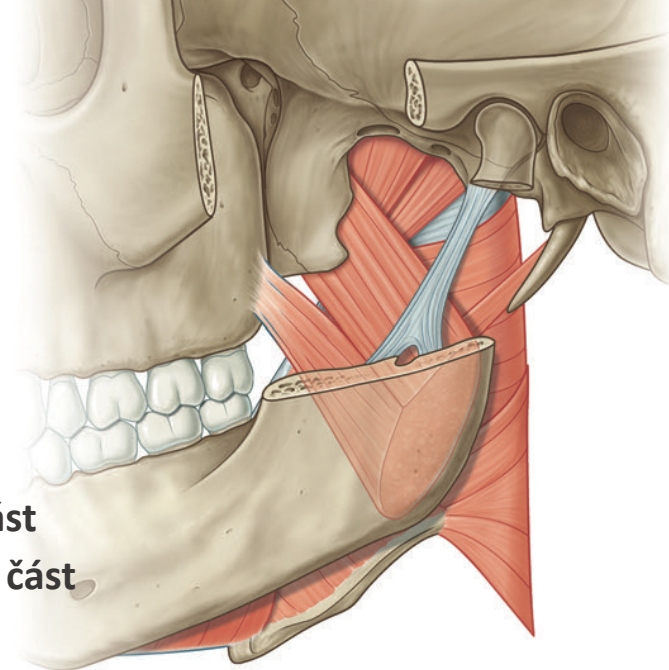
- ♦ Proc. maxillaris ossis zyg. – povrchní část
- ♦ Proc. zygomaticus os. temp. – hluboká část
- ♦ Angulus mandibulae

♦ **M. pterygoideus medialis**

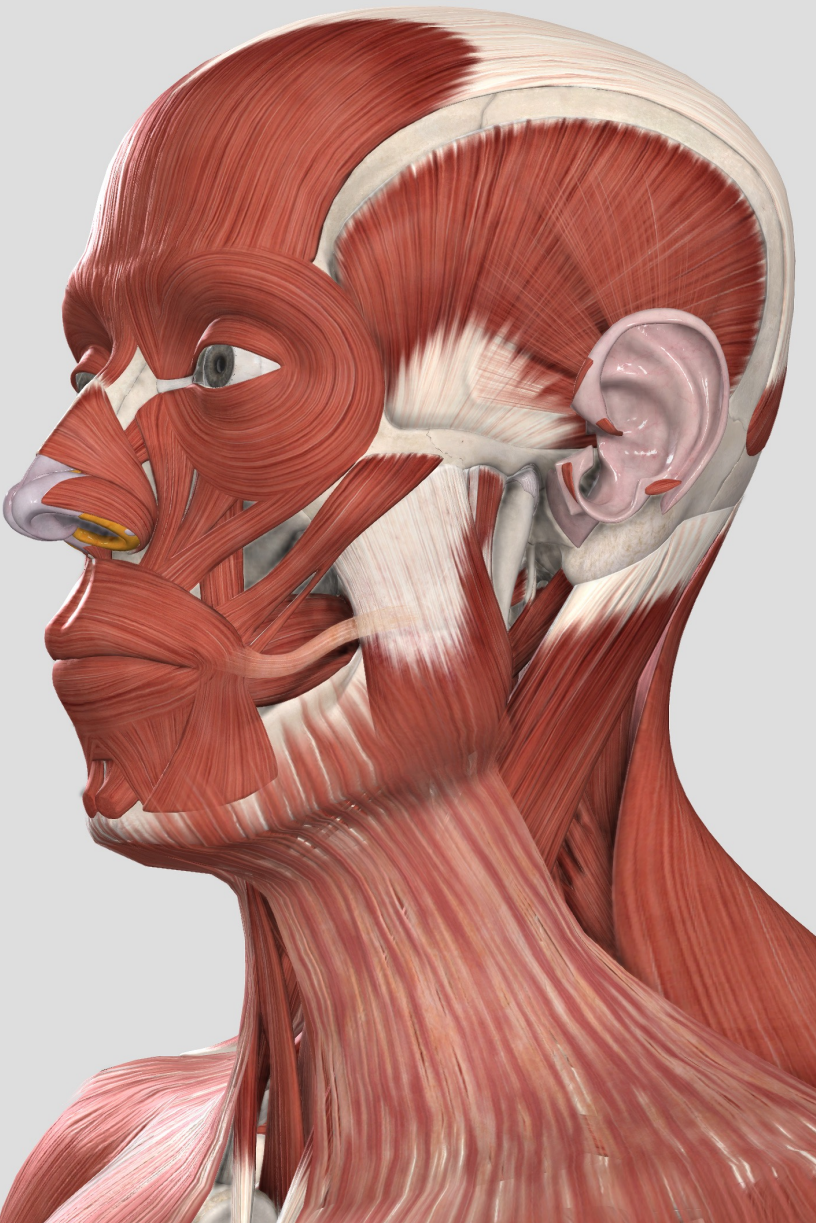
- ♦ Caput superf. – tuberositas maxillae – mandib.
- ♦ Caput prof. – lamela lateralis proc. pterygoidei – mandibula

♦ **M. pterygoideus lateralis**

- ♦ Caput superior – ala major ossis sph. – pouzdro
- ♦ Caput inferior – lamela later. Proc. pterygoidei - capsula



musculi masticatorii



♦ Superior group

- ♦ *M. occipitalis*
- ♦ *M. temporotemporalis*
- ♦ *M. procerus*

♦ Ocular group

- ♦ *M. orbicularis oculi*
- ♦ *M. corrugator supercilii*
- ♦ *M. depressor supercilii*

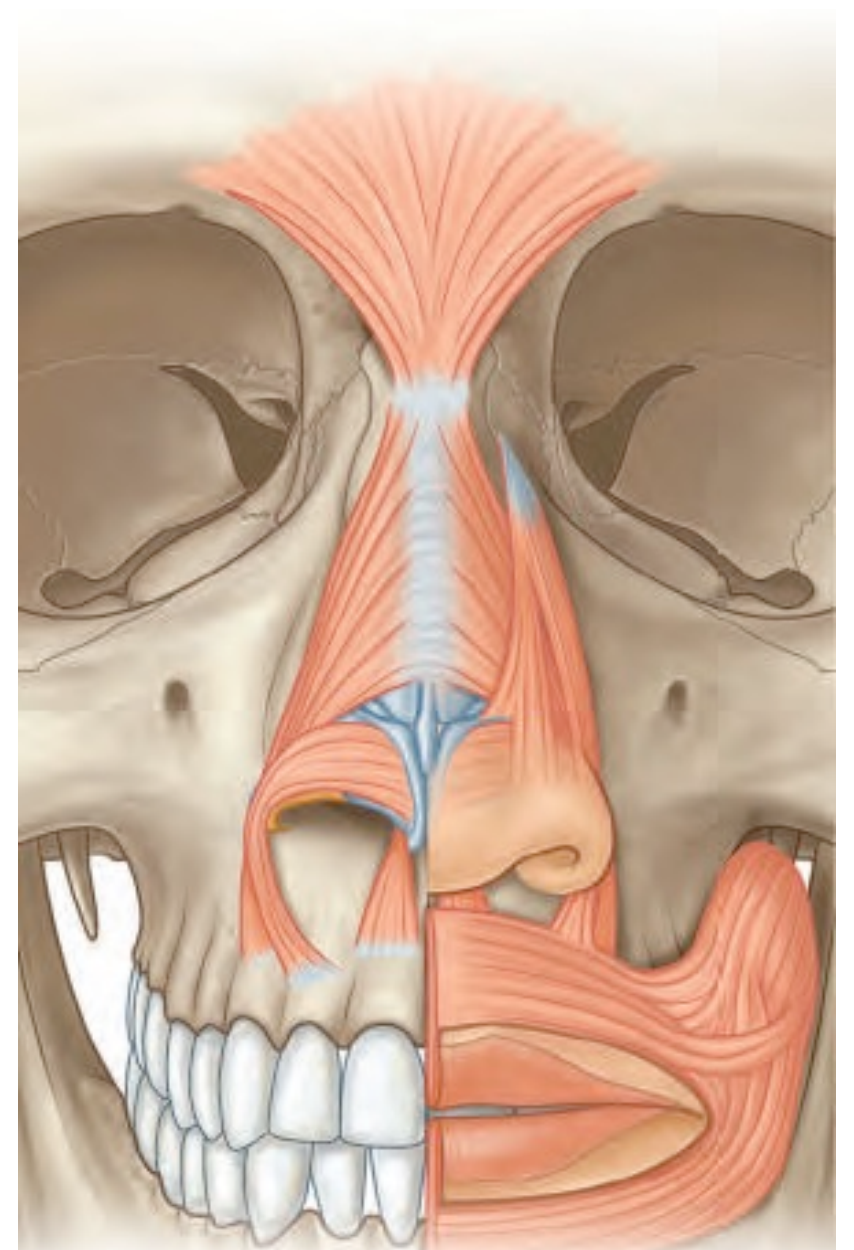
♦ Nasal group

- ♦ *M. nasalis*
- ♦ *M. depressor septi*

♦ Oral group

♦ Auricular group

- ♦ *M. platyzma*



Musculi capitis



• *M. levator labii superioris alaequae nasi*

• *M. levator labii superioris*

• *M. zygomaticus major*

• *M. zygomaticus minor*

• *M. levator anguli oris*

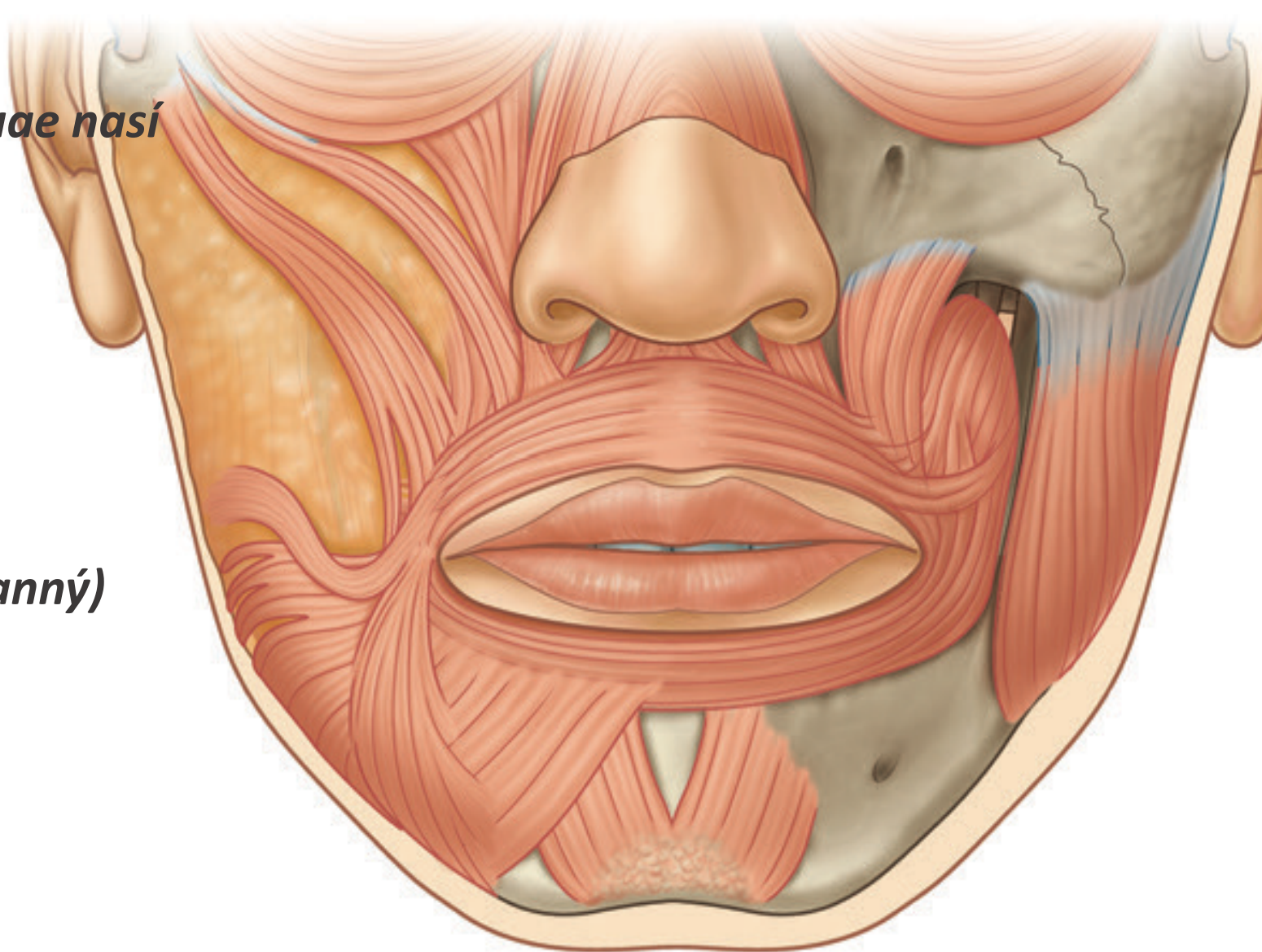
• *M. buccinator*

• *M. risorius (variabilně jednostranný)*

• *M. depressor anguli oris*

• *M. depressor labii inferioris*

• *M. mentalis*



musculi mimici

- ♦ **Auricular mm**

- ♦ *M. auricularis anterior*

- ♦ *M. auricularis superior*

- ♦ *M. auricularis posterior*

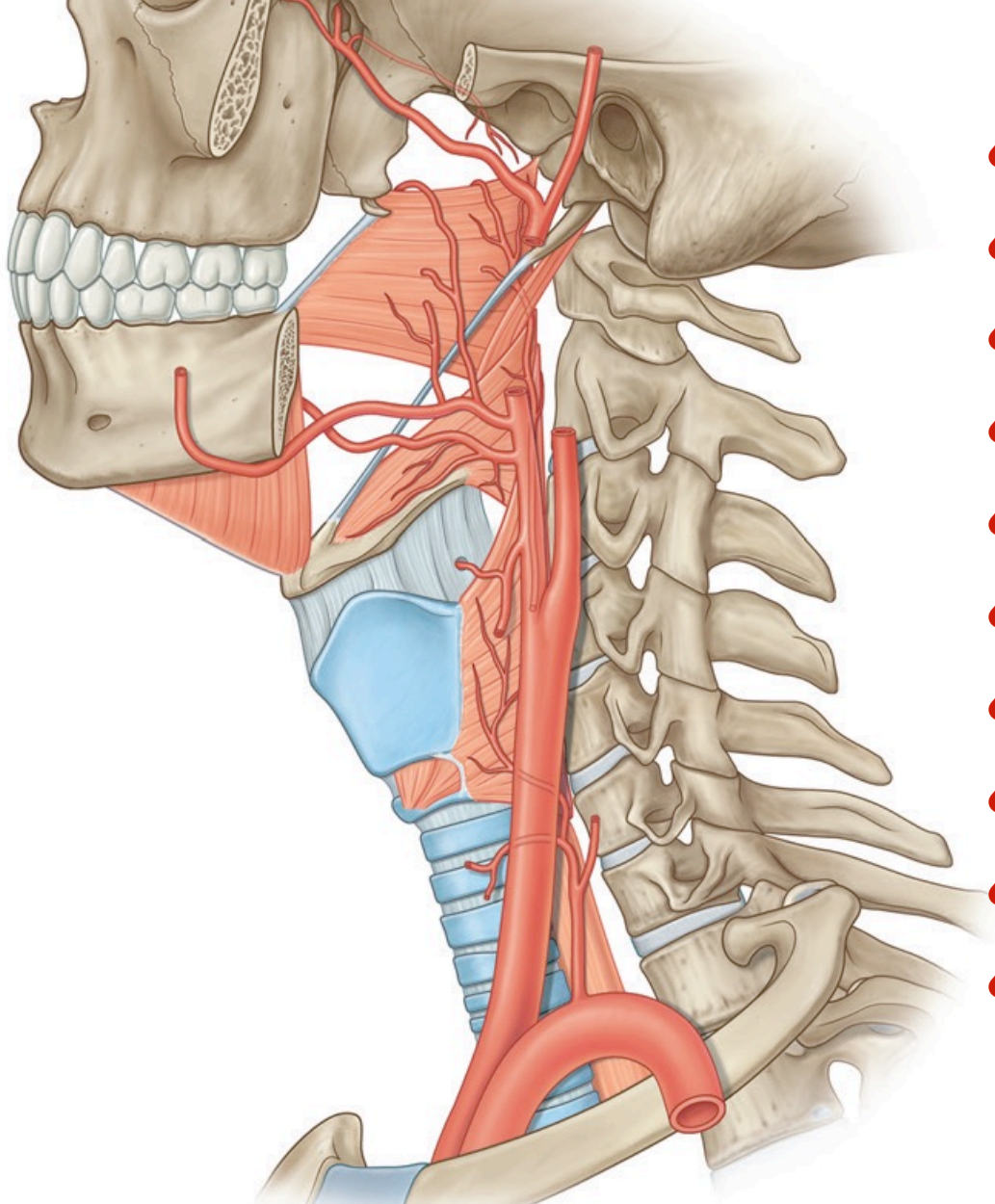
- ♦ **rudimentary**

- ♦ *M. helicis major, minor*

- ♦ *M. tragicus, m. antitragicus*

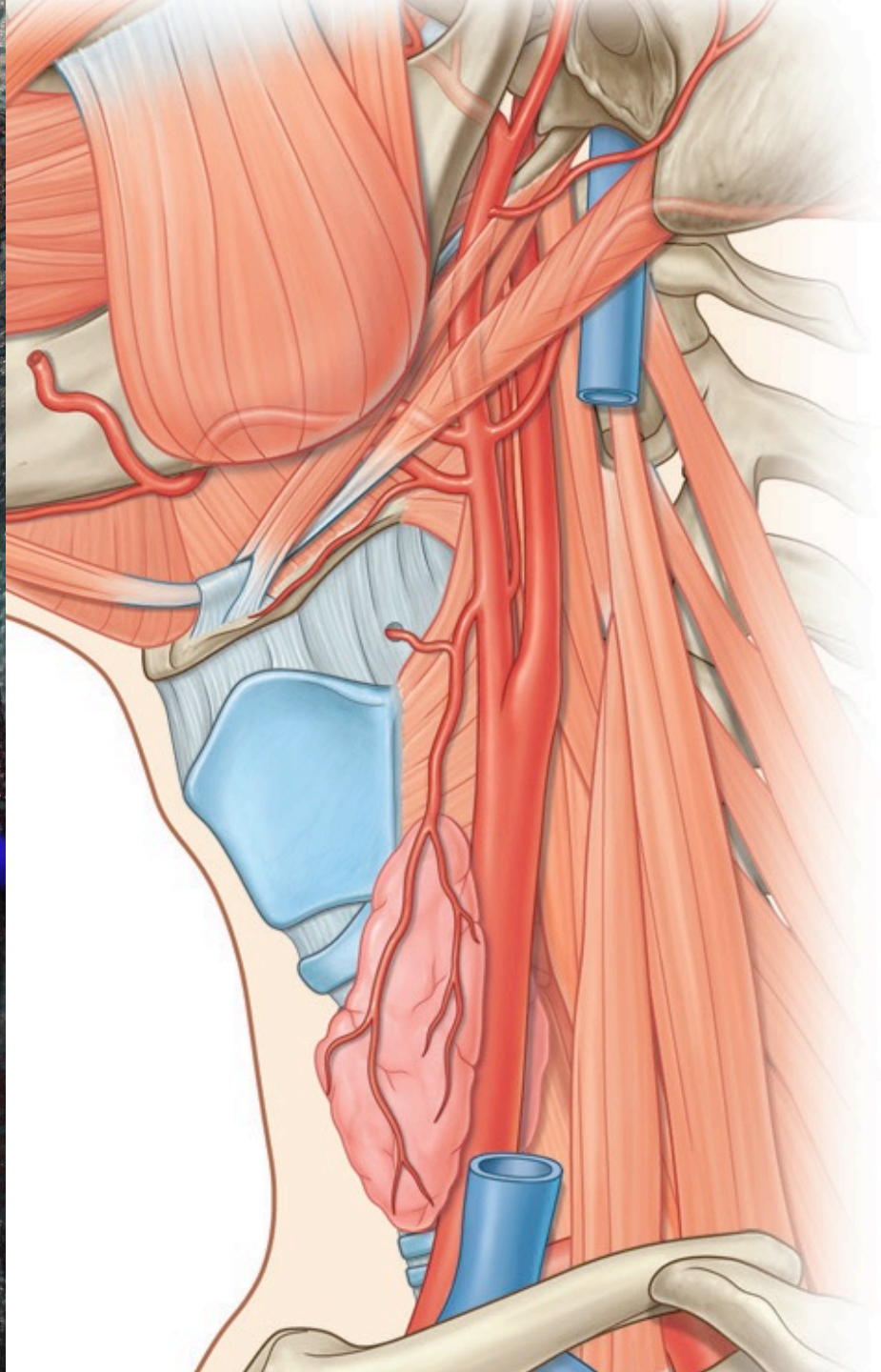
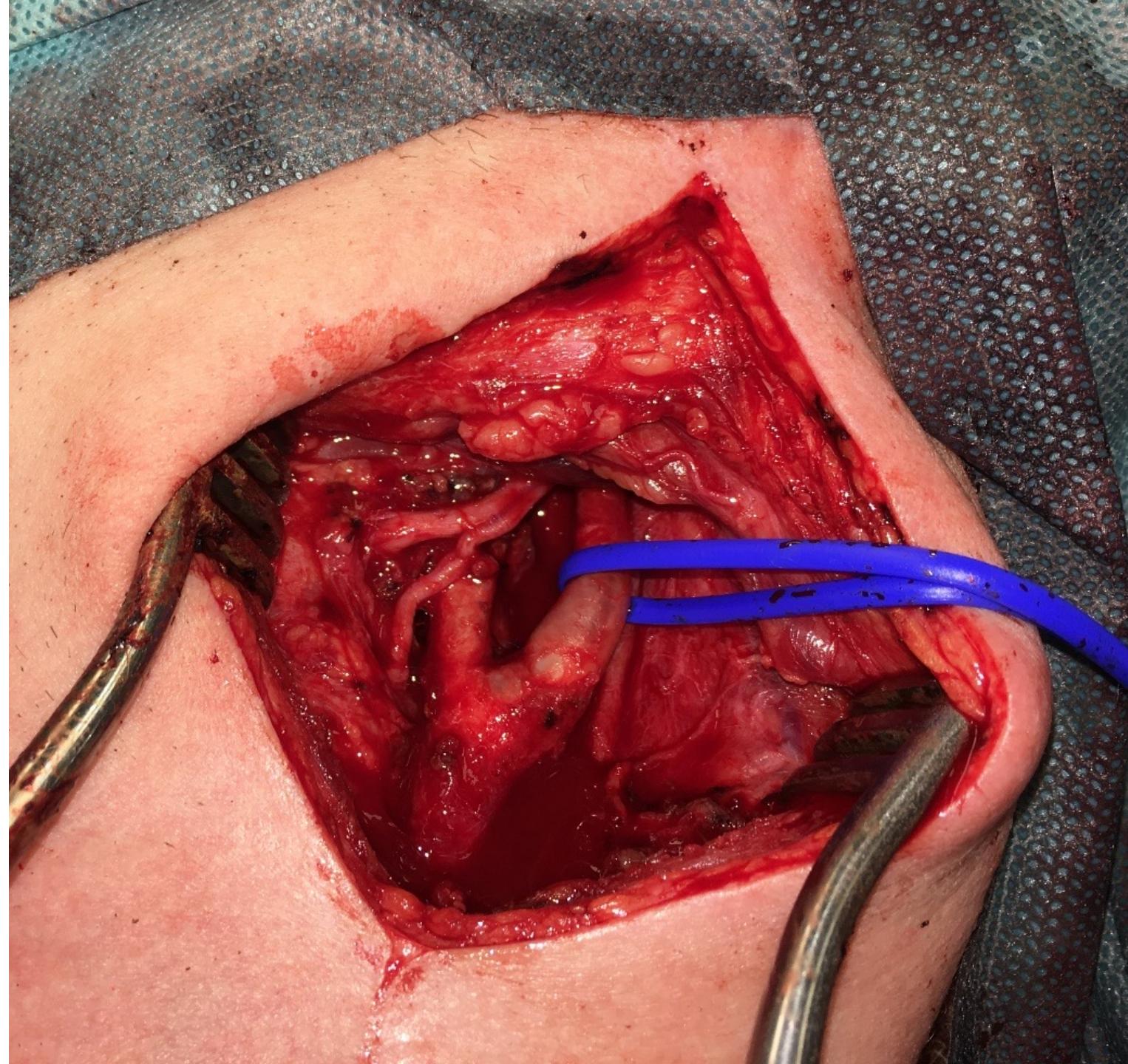


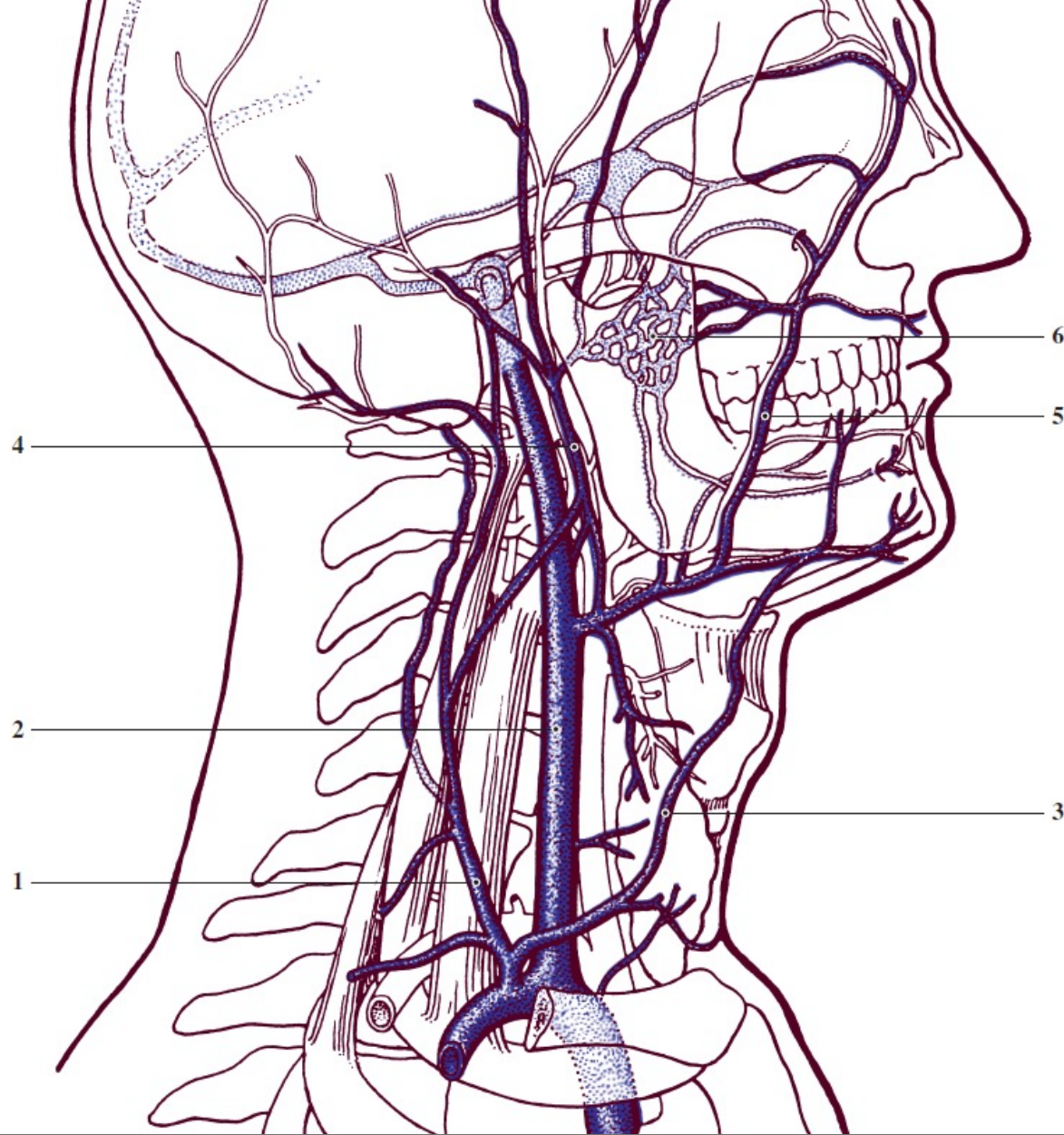
musculi auris



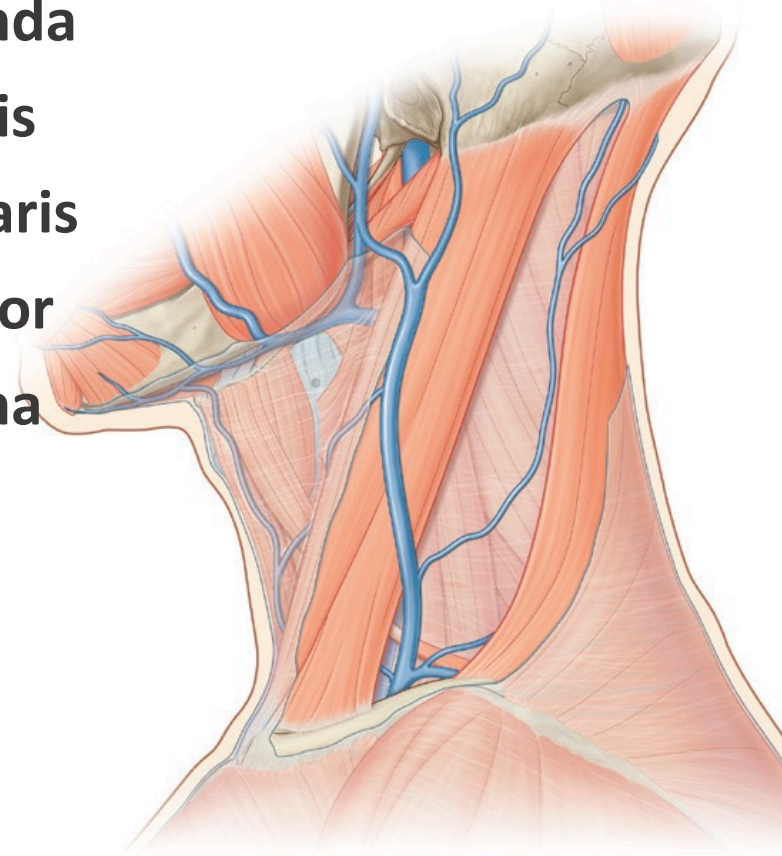
- ♦ a. carotis communis
- ♦ A. carotis interna
- ♦ A. carotis externa
- ♦ A. thyroidea superior
- ♦ A. lingualis
- ♦ A. facialis
- ♦ A. maxillaris
- ♦ A. temporalis superficialis
- ♦ A. pharyngica ascendens
- ♦ A. occipitalis

arteriae capitis

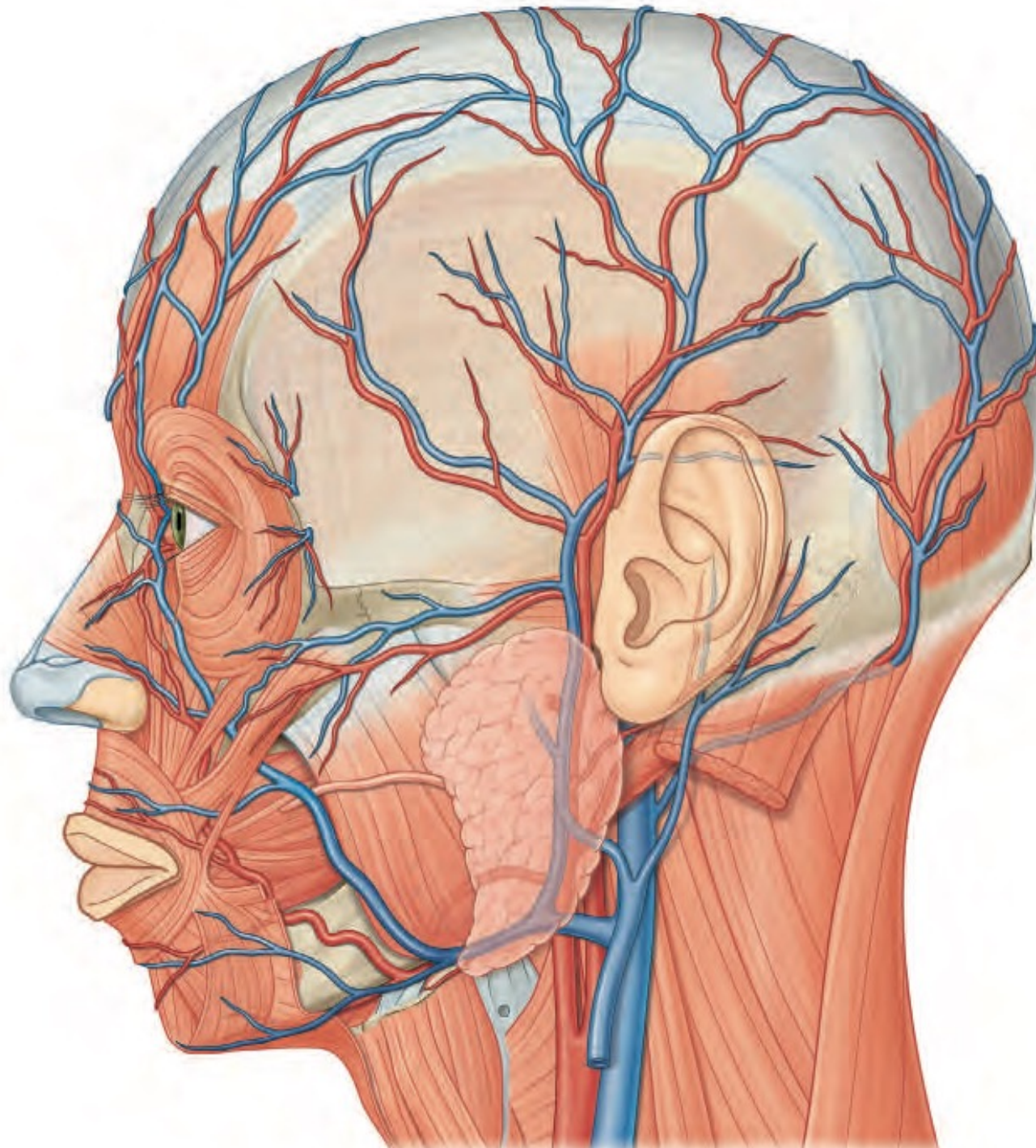




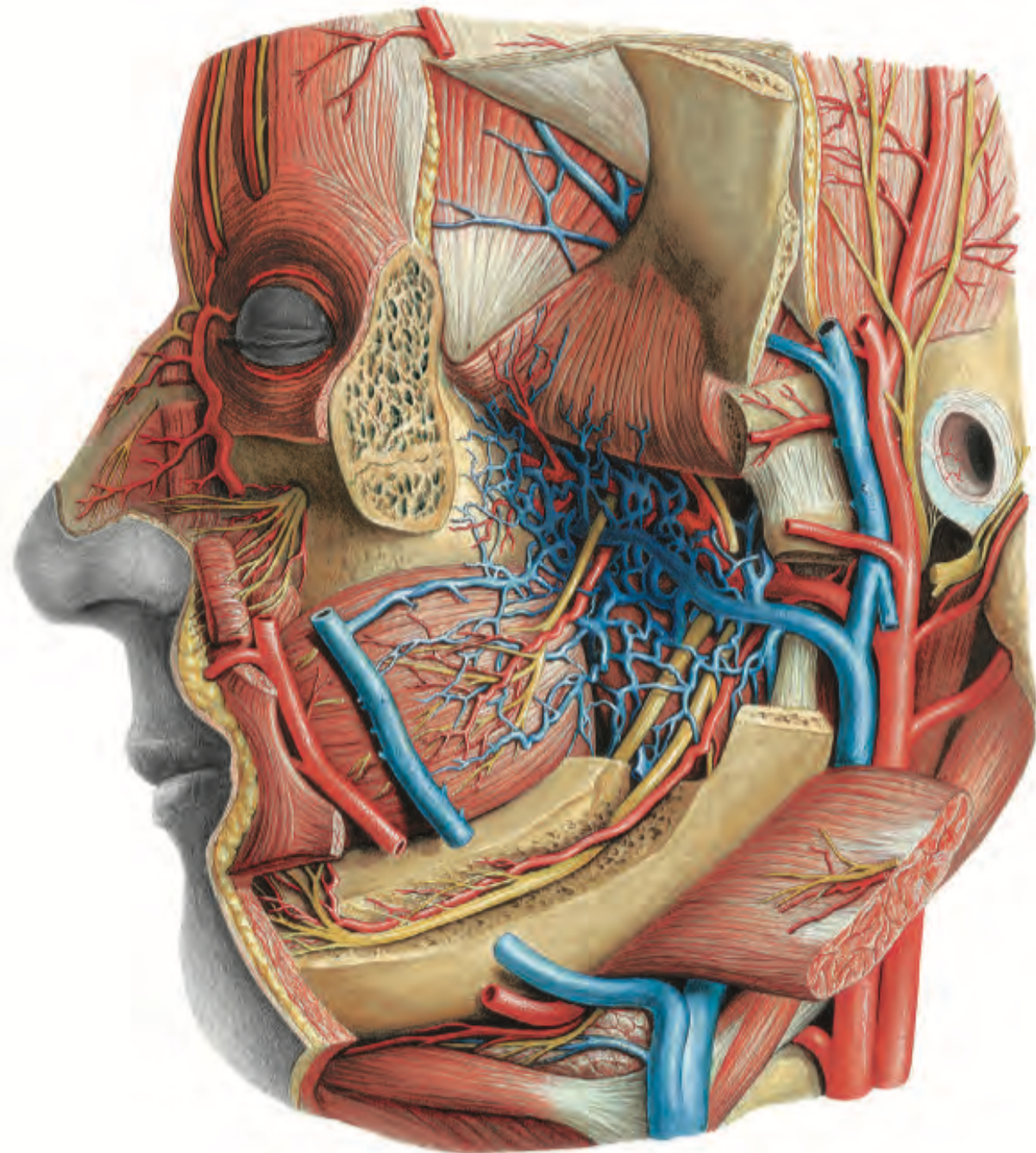
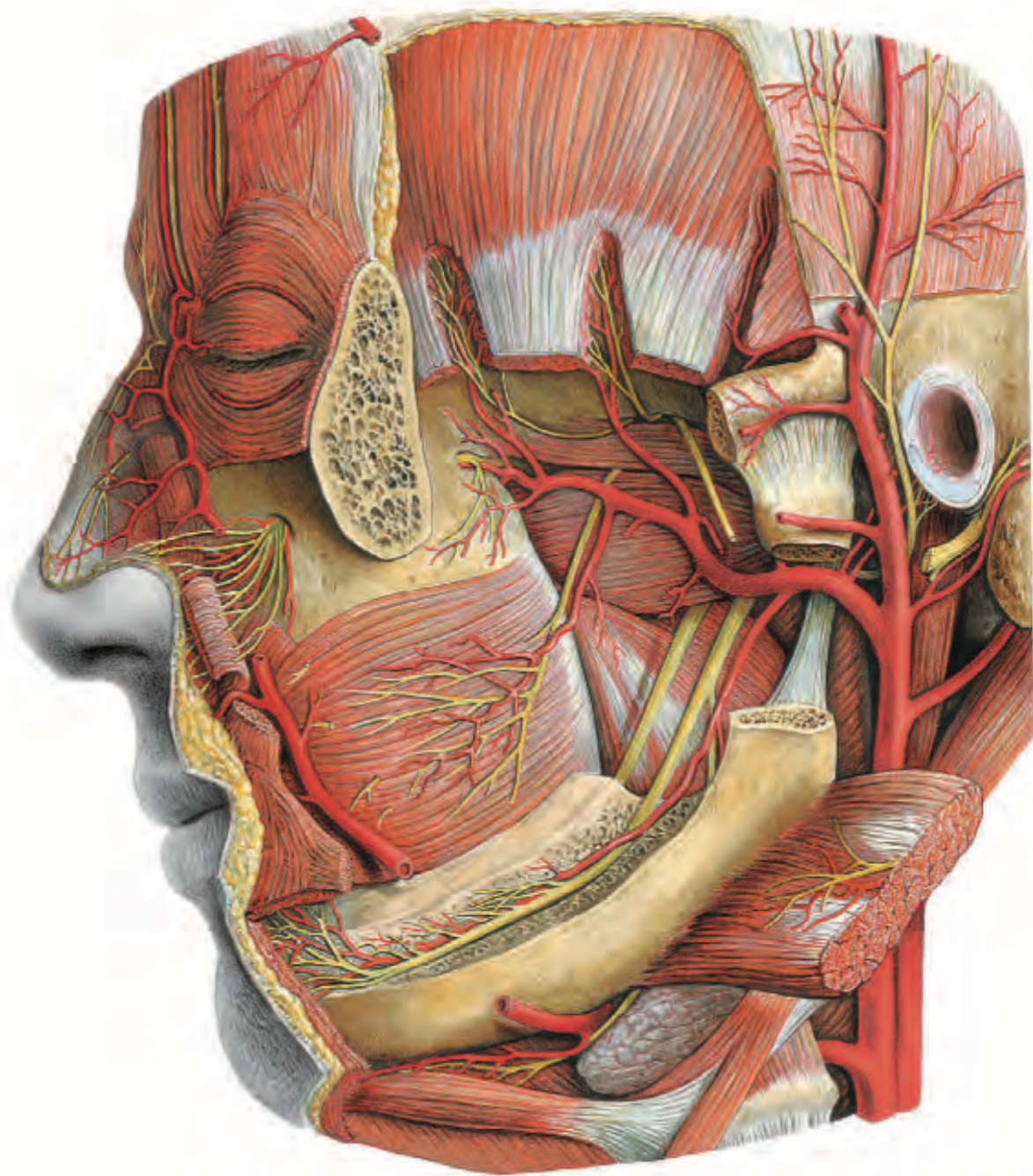
- V. jugularis interna
- V. angularis
- V. facialis
- V. lingualis profunda
- V. lingualis dorsalis
- V. retromandibularis
- V. jugularis anterior
- V. jugularis externa

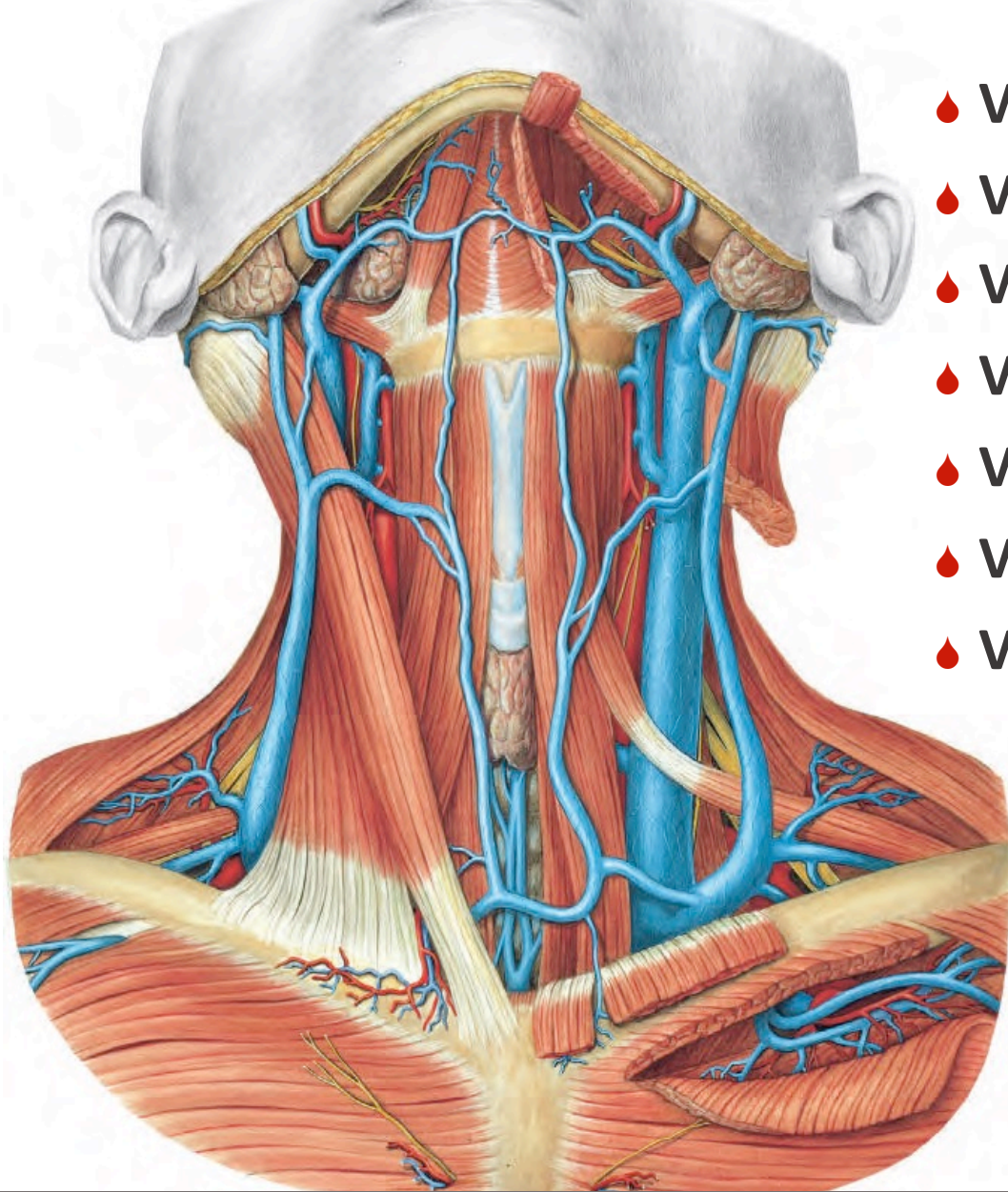


venae

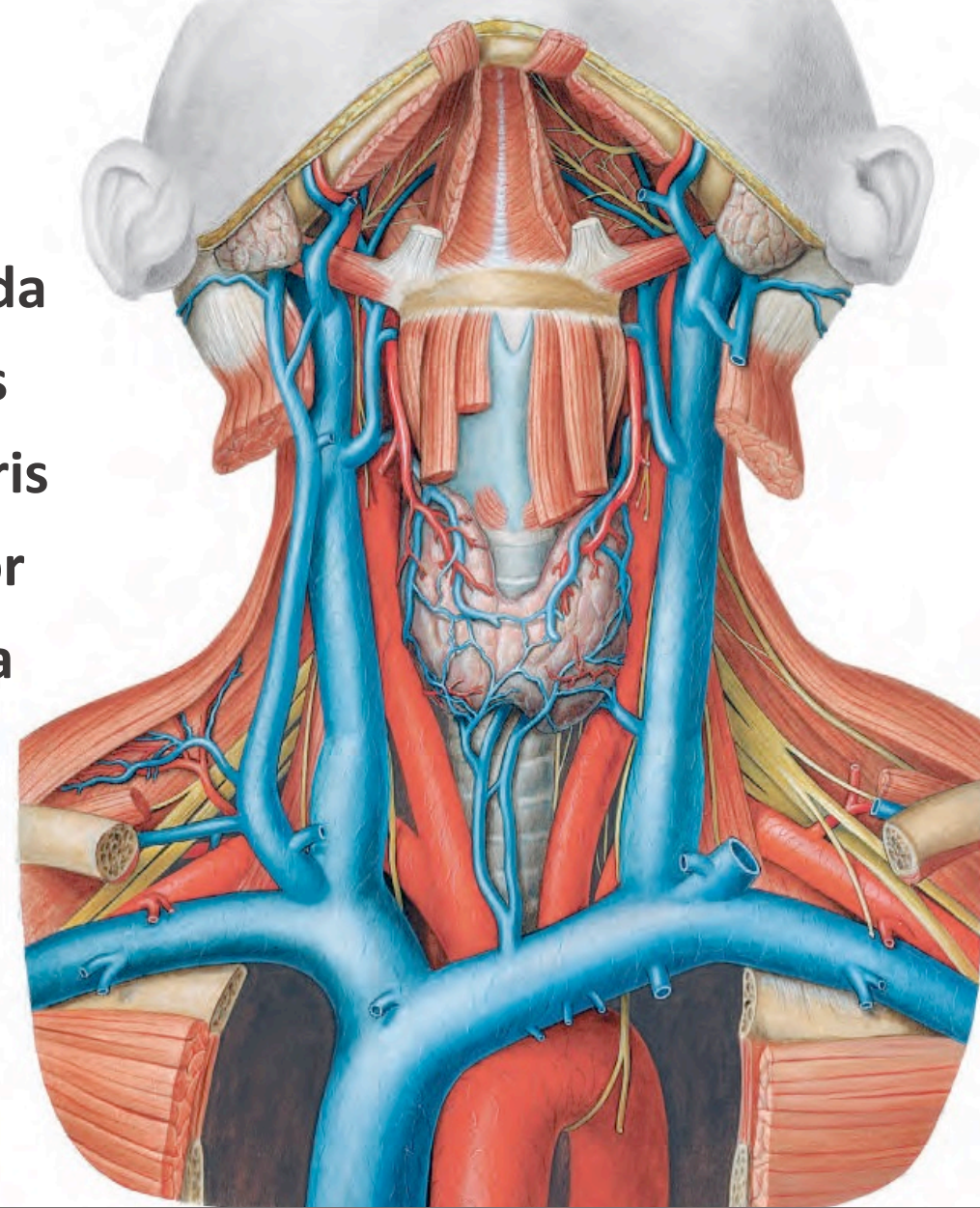


- ♦ **V. jugularis interna**
- ♦ **V. angularis**
- ♦ **V. facialis**
 - ♦ **A. facialis**
- ♦ **V. lingualis profunda**
- ♦ **V. lingualis dorsalis**
- ♦ **V. retromandibularis**
 - ♦ **A. maxillaris**
- ♦ **V. jugularis anterior**
- ♦ **V. jugularis externa**

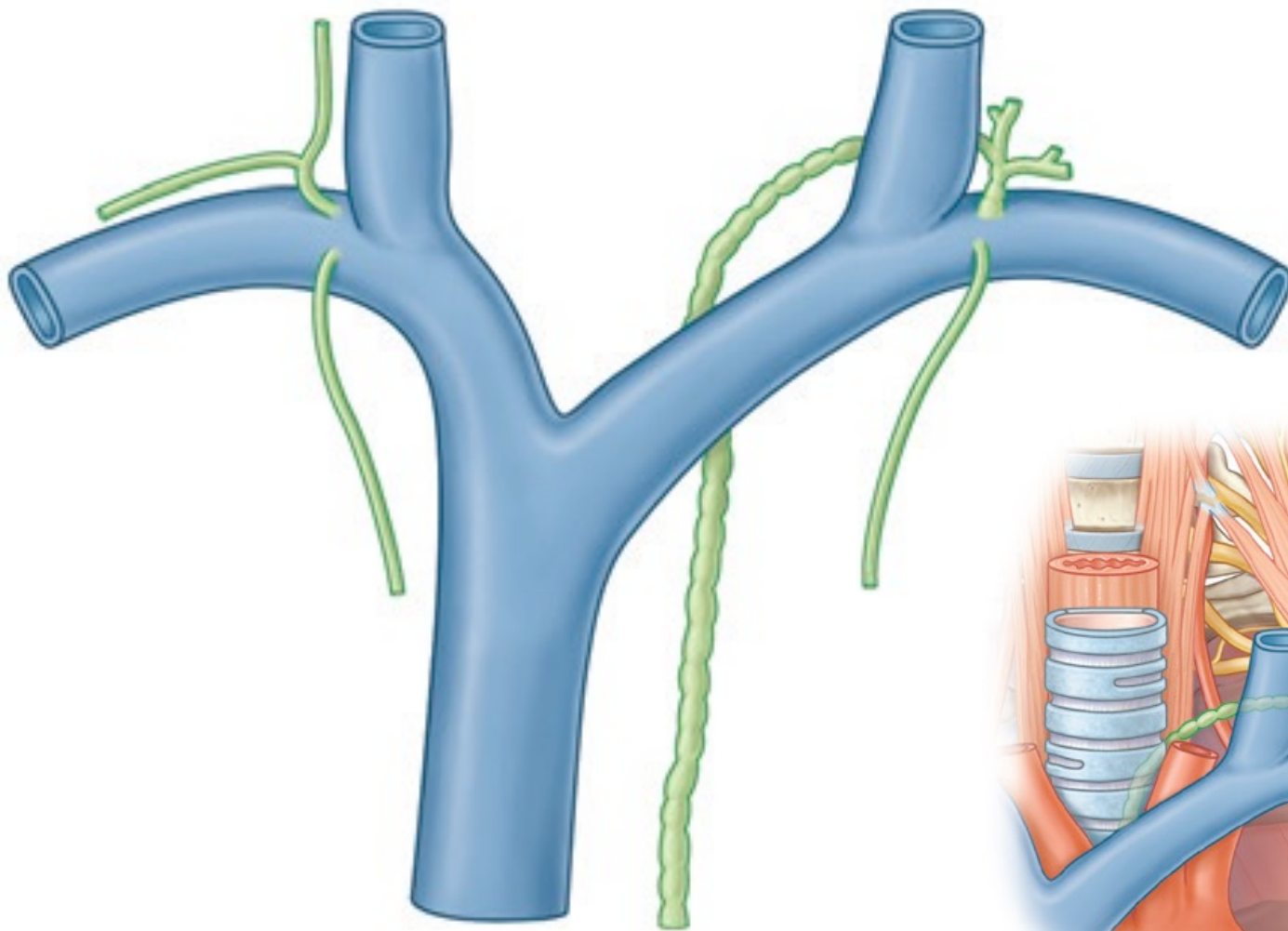




- ♦ V. jugularis interna
- ♦ V. facialis
- ♦ V. lingualis profunda
- ♦ V. lingualis dorsalis
- ♦ V. retromandibularis
- ♦ V. jugularis anterior
- ♦ V. jugularis externa



venae jugulares



♦ **Dx.**

♦ Tr. bronchomediastinalis dx.

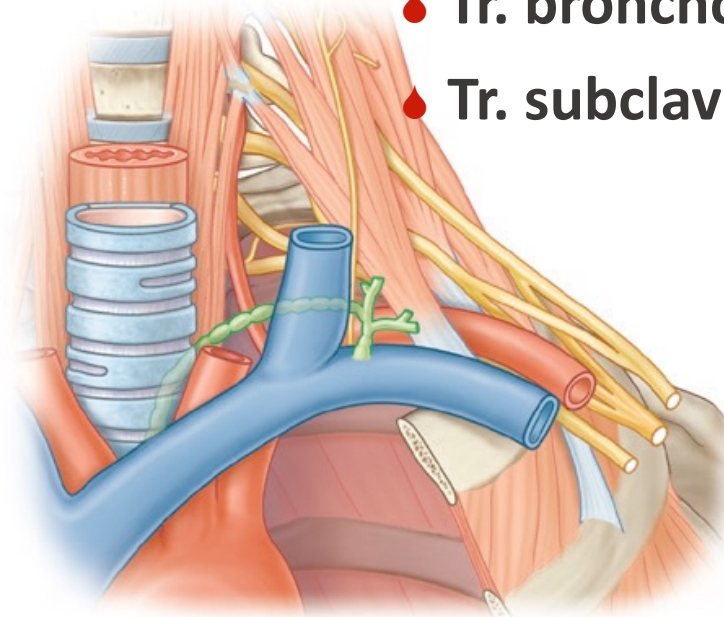
♦ Tr. subclavius dx. (tr. jugularis dx.)

♦ **Sin.**

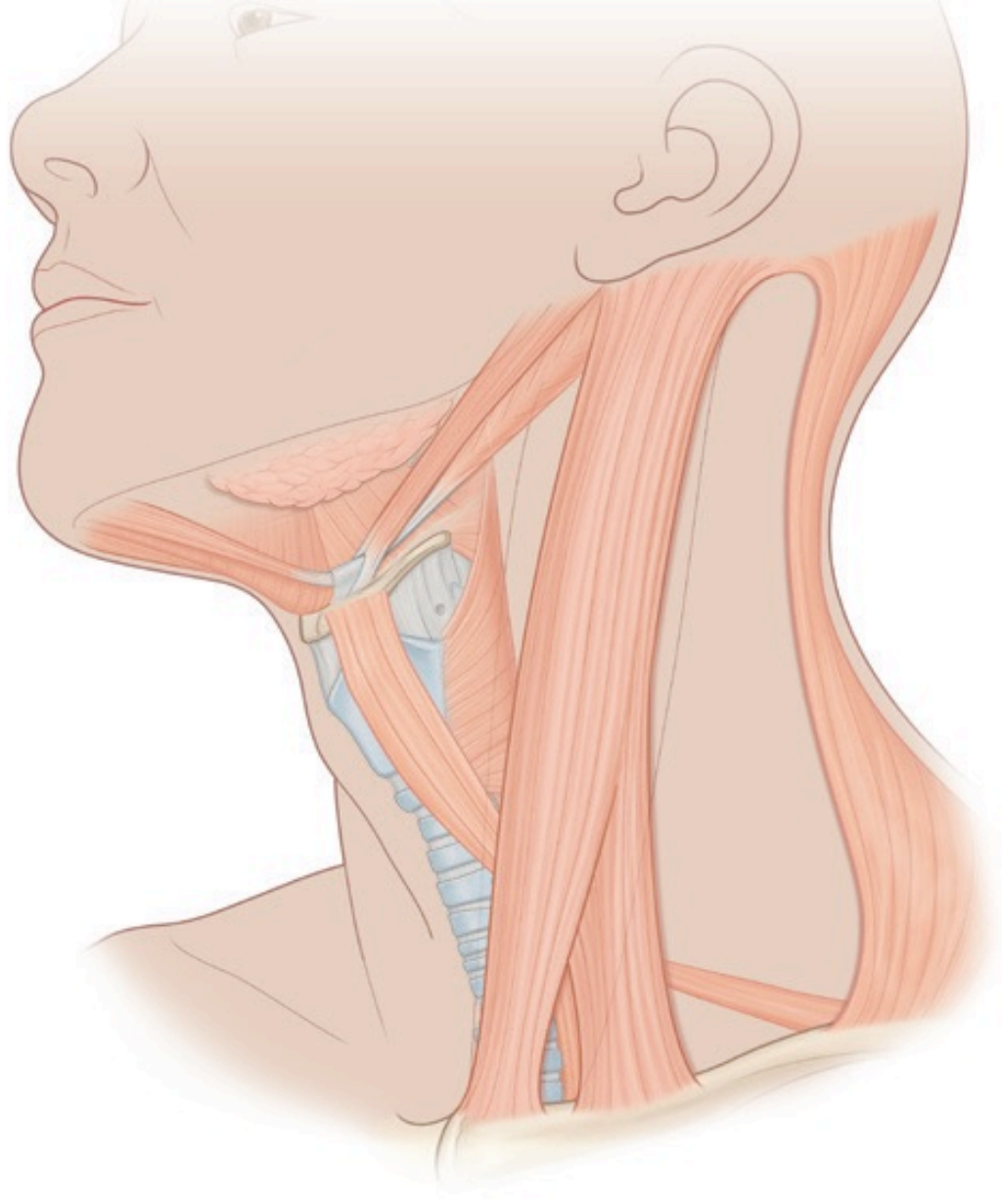
♦ Ductus thoracicus

♦ Tr. bronchomedialis sin.

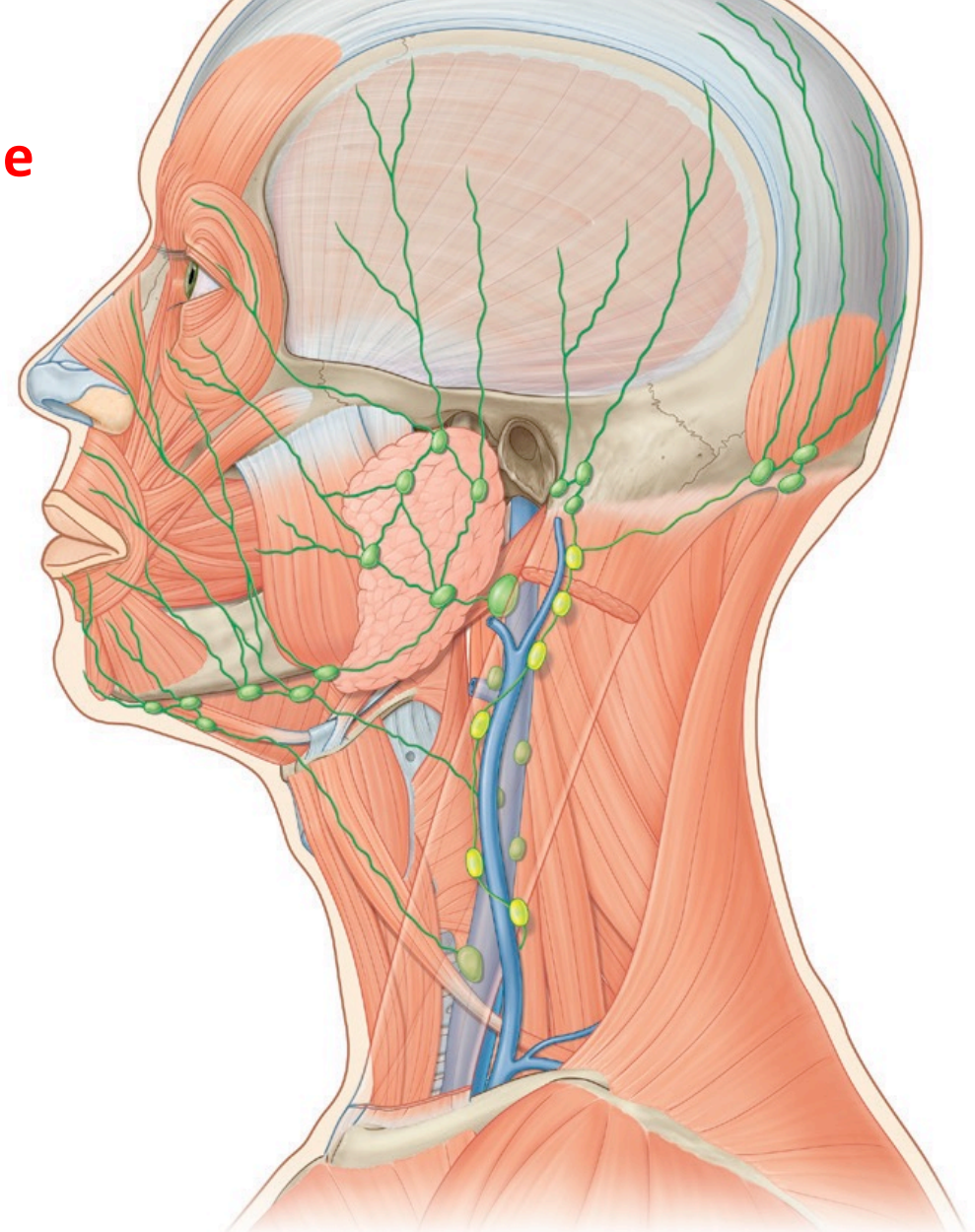
♦ Tr. subclavius sin (tr. jugularis sin.)



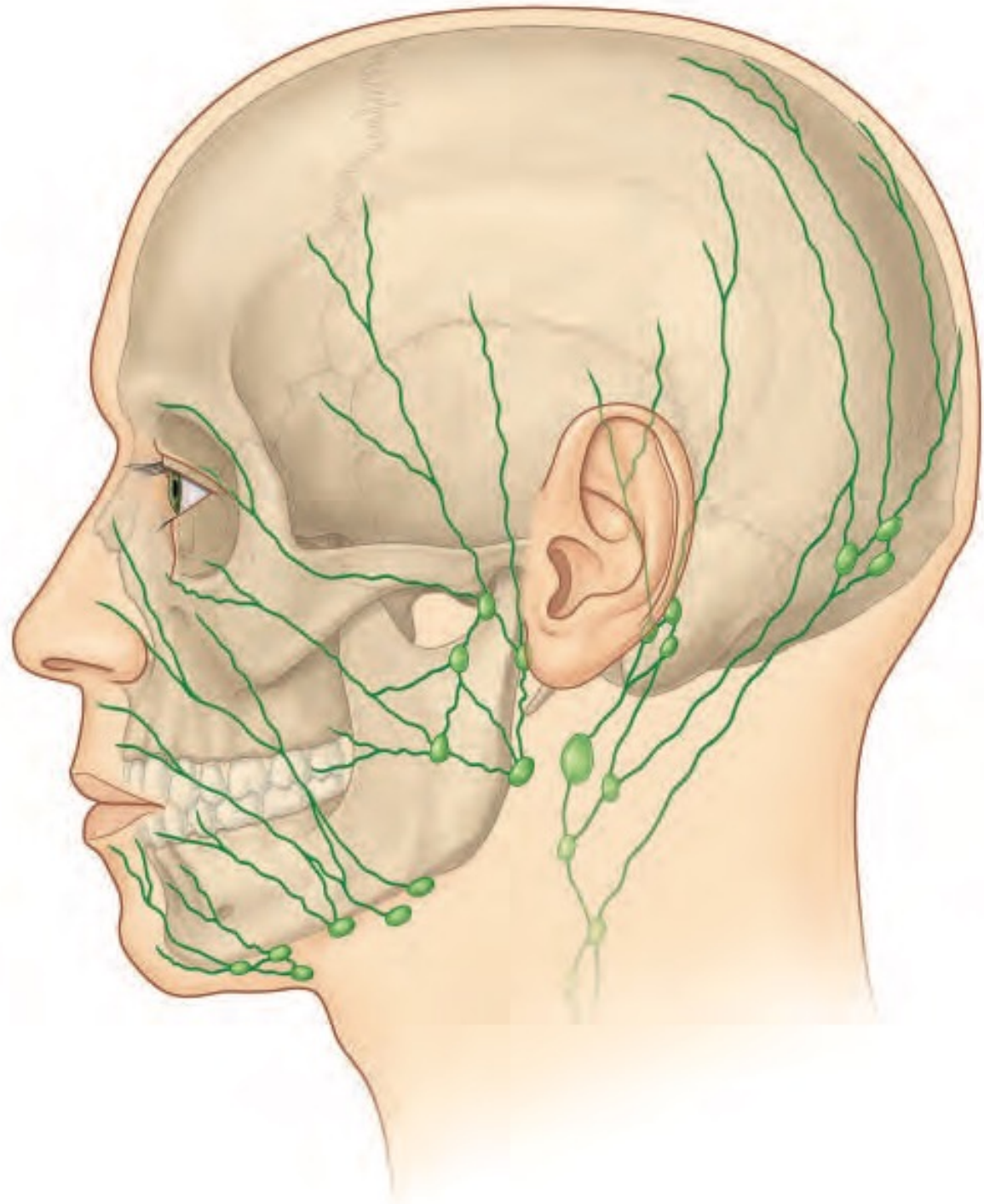
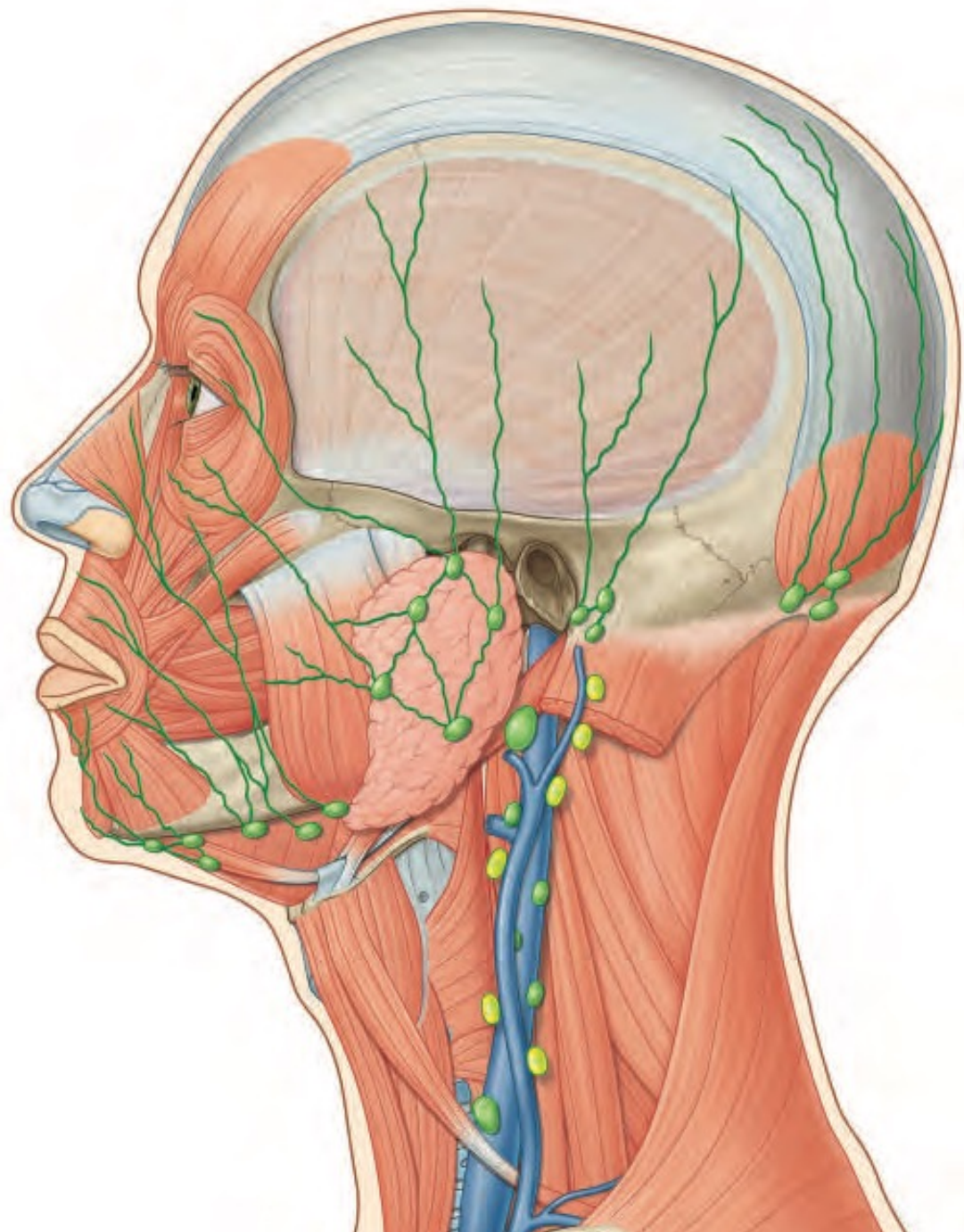
angulus venosus



- ♦ **Vertical line**
- ♦ **Horizontal line**
- ♦ **Skupiny**
- ♦ **IA, IB**
- ♦ **IIA, IIB**
- ♦ **III**
- ♦ **IV**
- ♦ **V**
- ♦ **VI**
- ♦ **VII**



nodi lymphatici



nervi craniales – cranial nerves – hlavové nervy

0. nervus terminalis – terminal nerve – koncový nerv

I. nervus olfactorius – olfactory nerve – čichový nerv

II. nervus opticus – optic nerve – zrakový nerv

III. nervus oculomotorius – oculomotor nerve – okohybný nerv

IV. nervus trochlearis – trochlear nerve – kladkový nerv

V. nervus trigeminus – trigeminal nerve – trojklanný nerv

VI. nervus abducens – abducent nerve – odtahovací nerv

VII. nervus facialis – facial nerve – lícní nerv

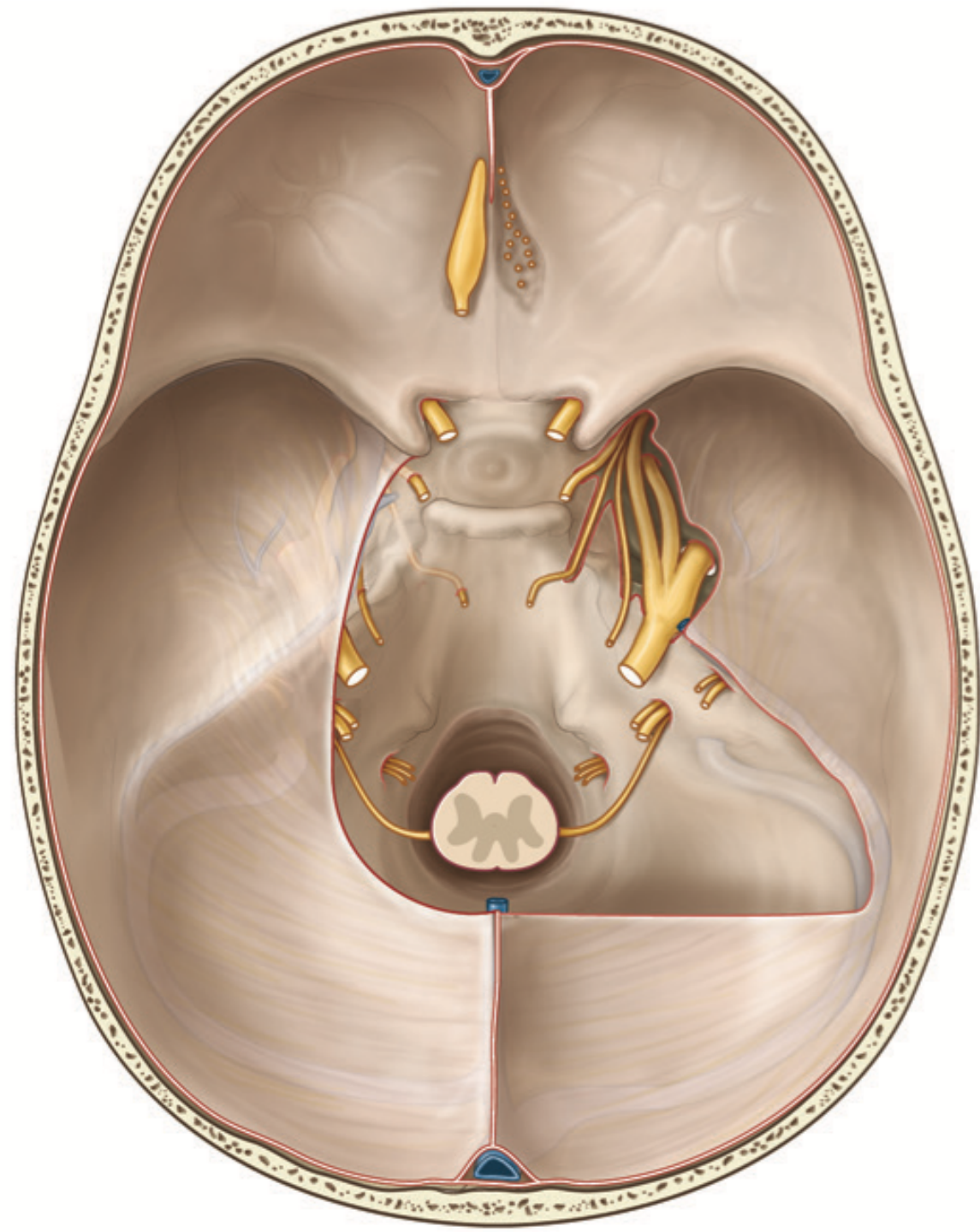
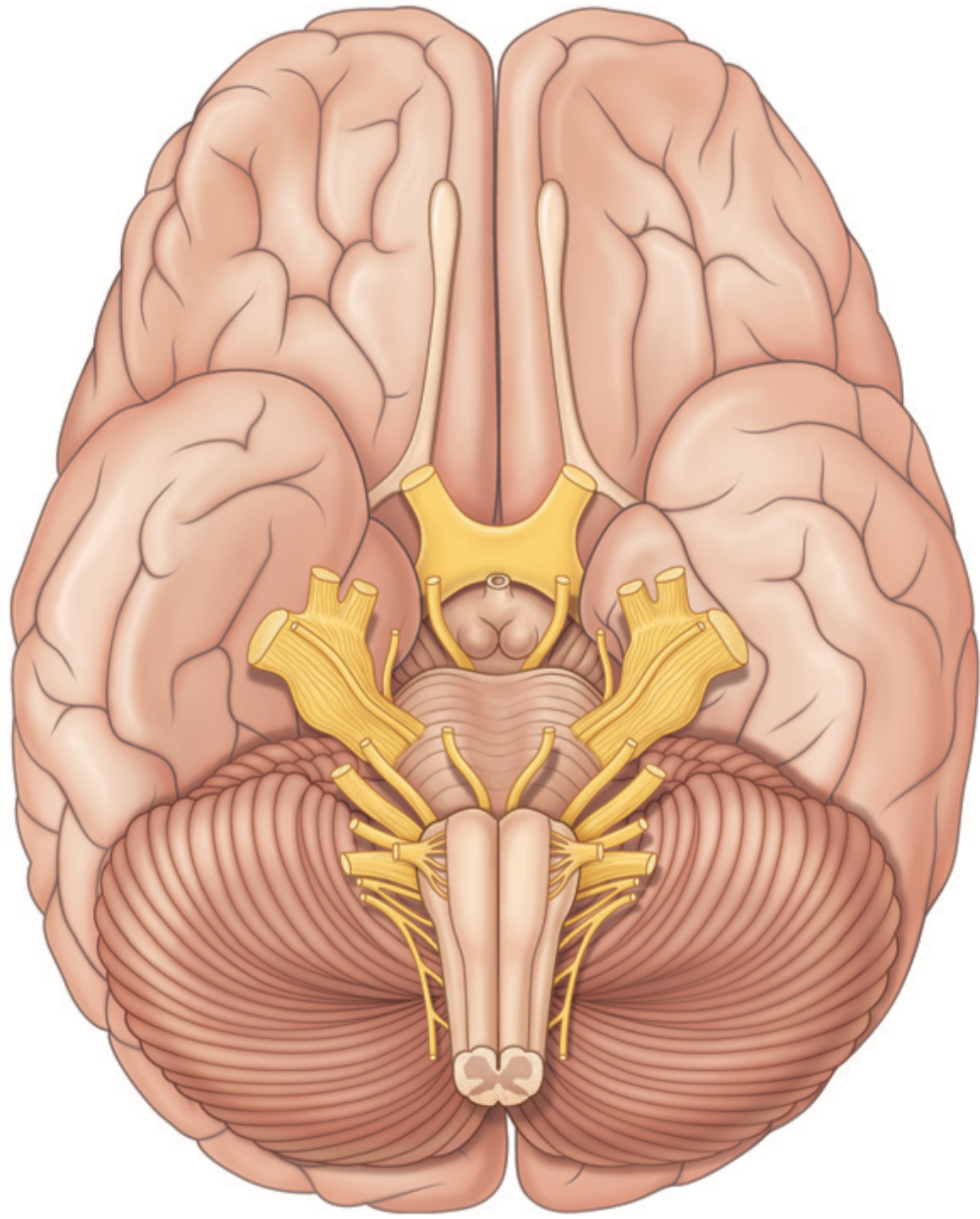
VIII. nervus vestibulocochlearis – vestibulocochlear nerve – rovnovážný a sluchový nerv

IX. nervus glossopharyngeus – glossopharyngeal nerve – jazykohltanový nerv

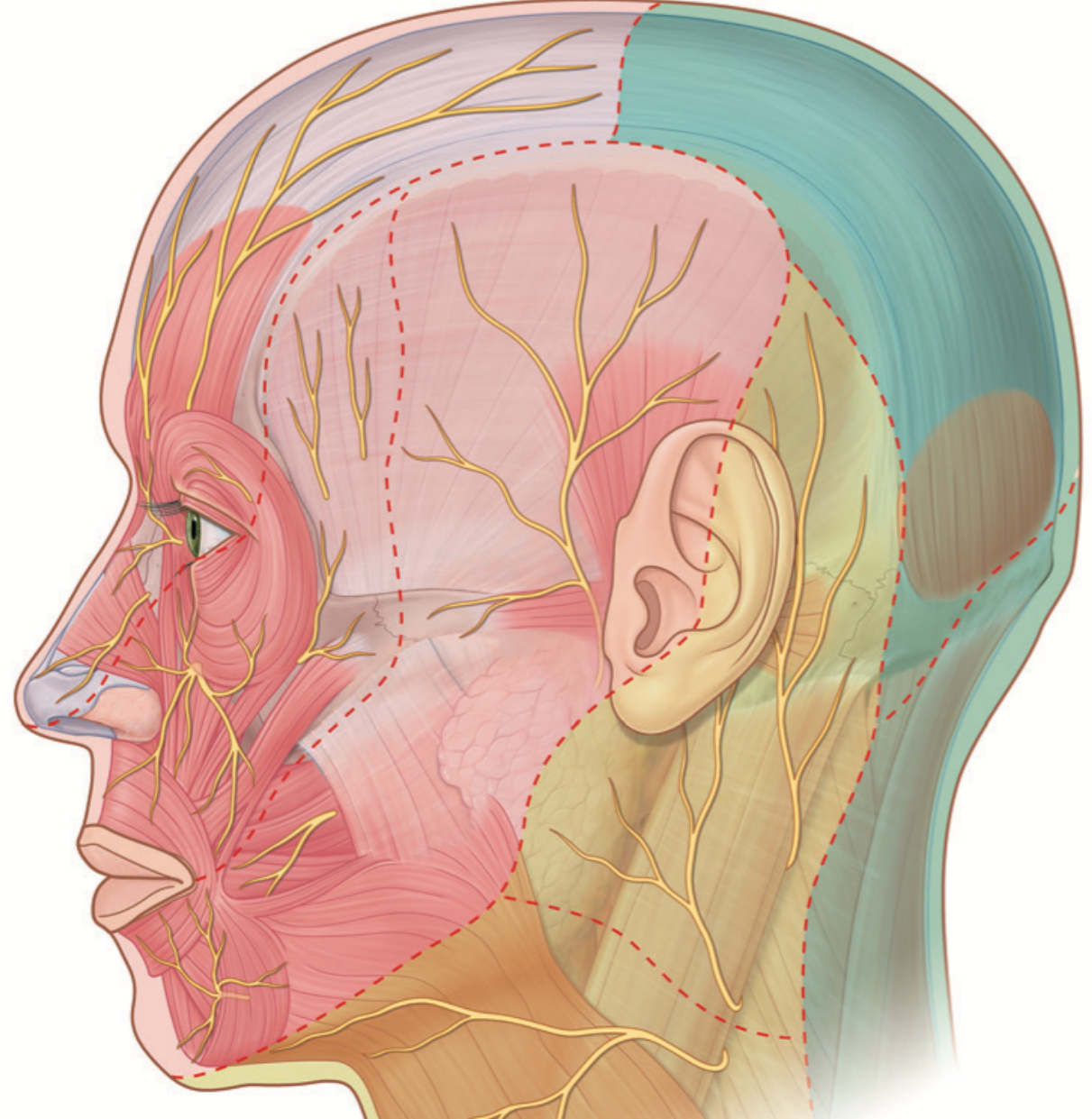
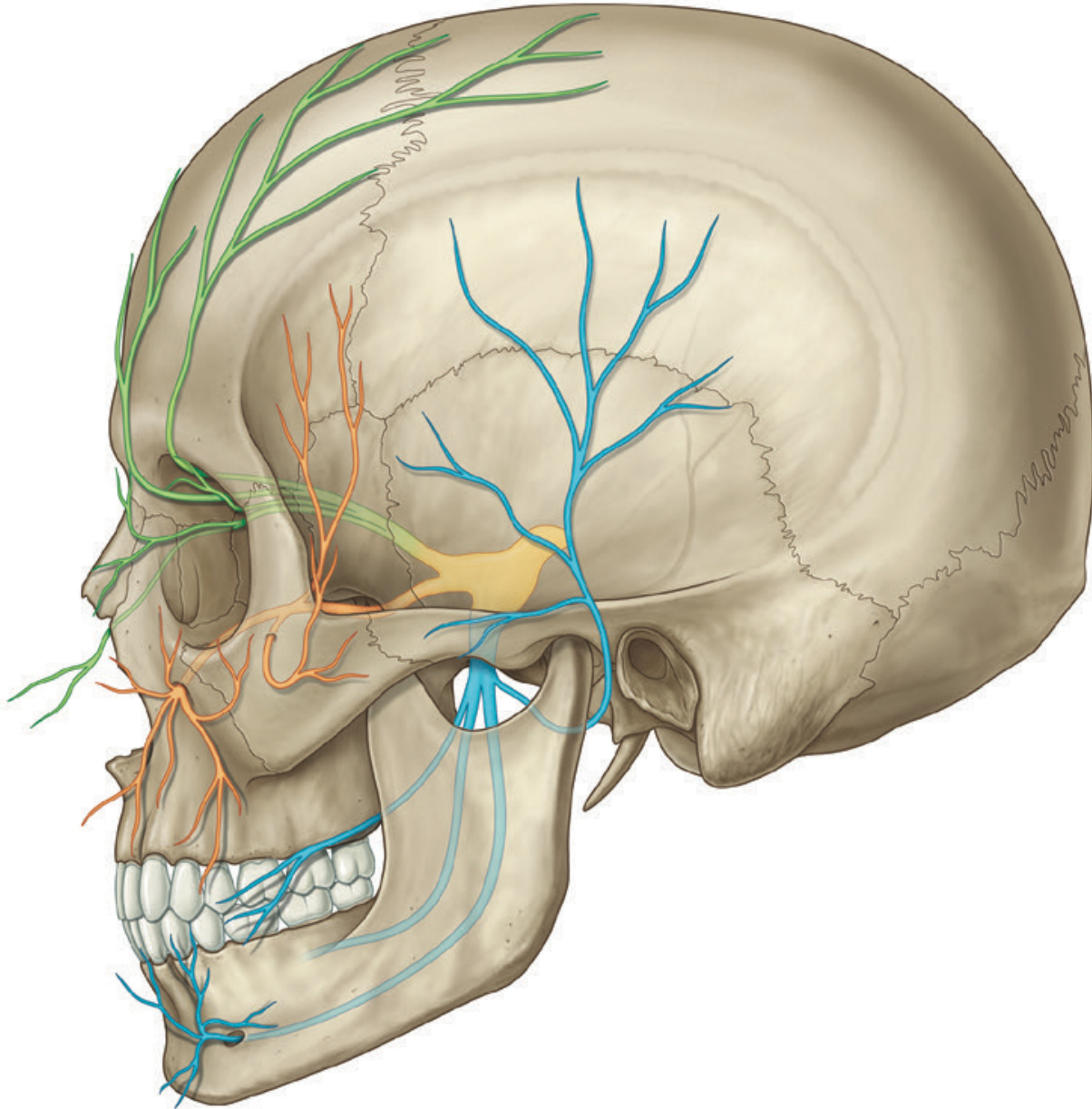
X. nervus vagus – vagal nerve – bloudivý nerv

XI. nervus accesorius – accesory nerve – přídatný nerv

XII. nervus hypoglossus – hypoglossal nerve – podjazykový nerv



V. nervus trigeminus



VII. nervus facialis

♦ Function

♦ Somatomotor

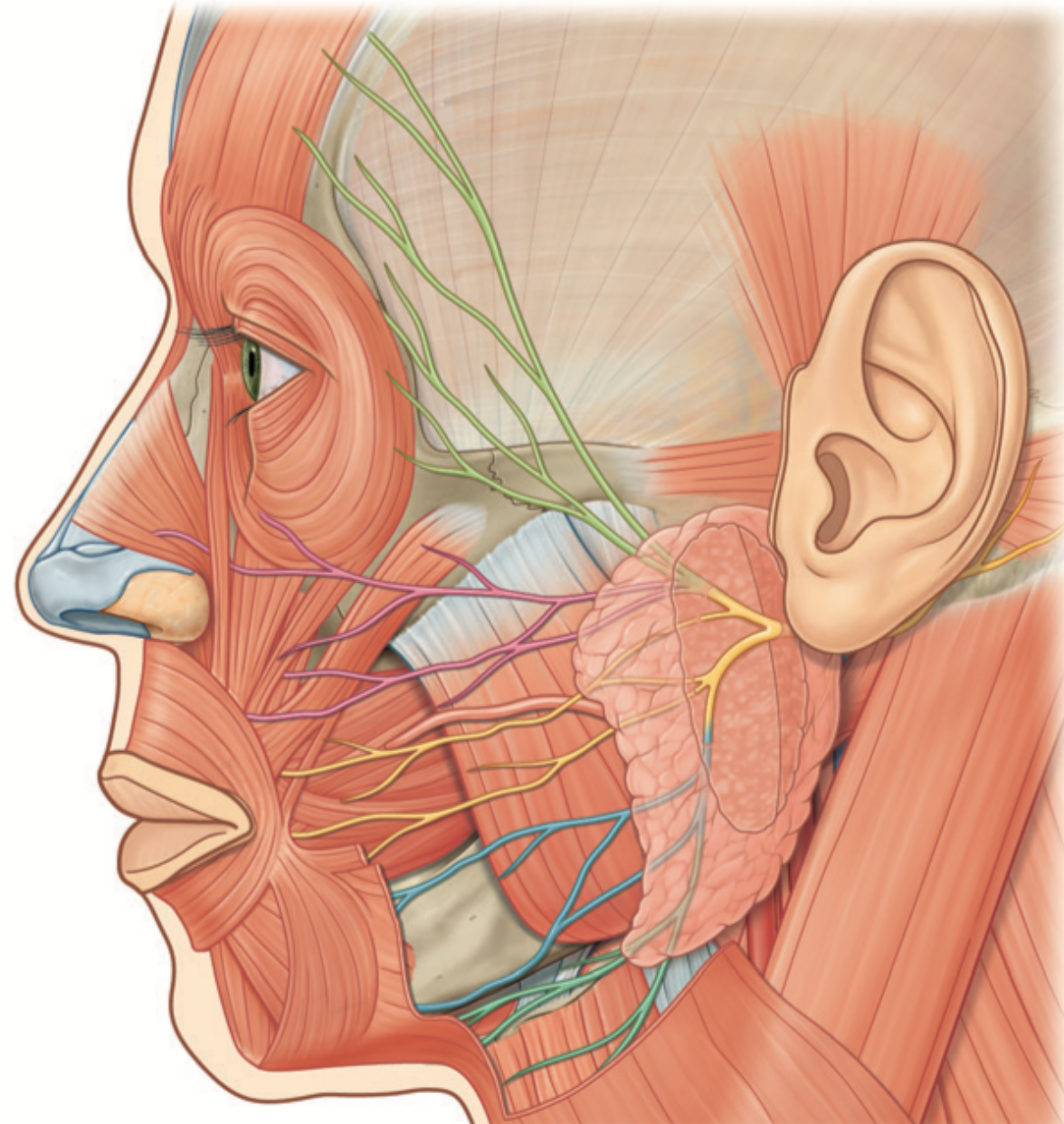
♦ nucleus nervi facialis

- ♦ Mimic muscles
- ♦ M. stapedius
- ♦ M. digastricus venter posterior
- ♦ M. styloideus
- ♦ Accessory to m. tensor tympani
- ♦ (chorda tympani through ganglion oticum)

♦ Visceromotor

♦ nucleus salivatorius superior

- ♦ N. intermedius – between n. facialis a n. VIII.
- ♦ Lacrimal gland
- ♦ Nasal, oral and paranasal gl.
- ♦ Gl. sublingualis
- ♦ Gl. submandibularis



Autonomous ganglia

♦ Ganglion ciliare

- ♦ *N. oculomotorius III*

♦ Ganglion pterygopalatinum

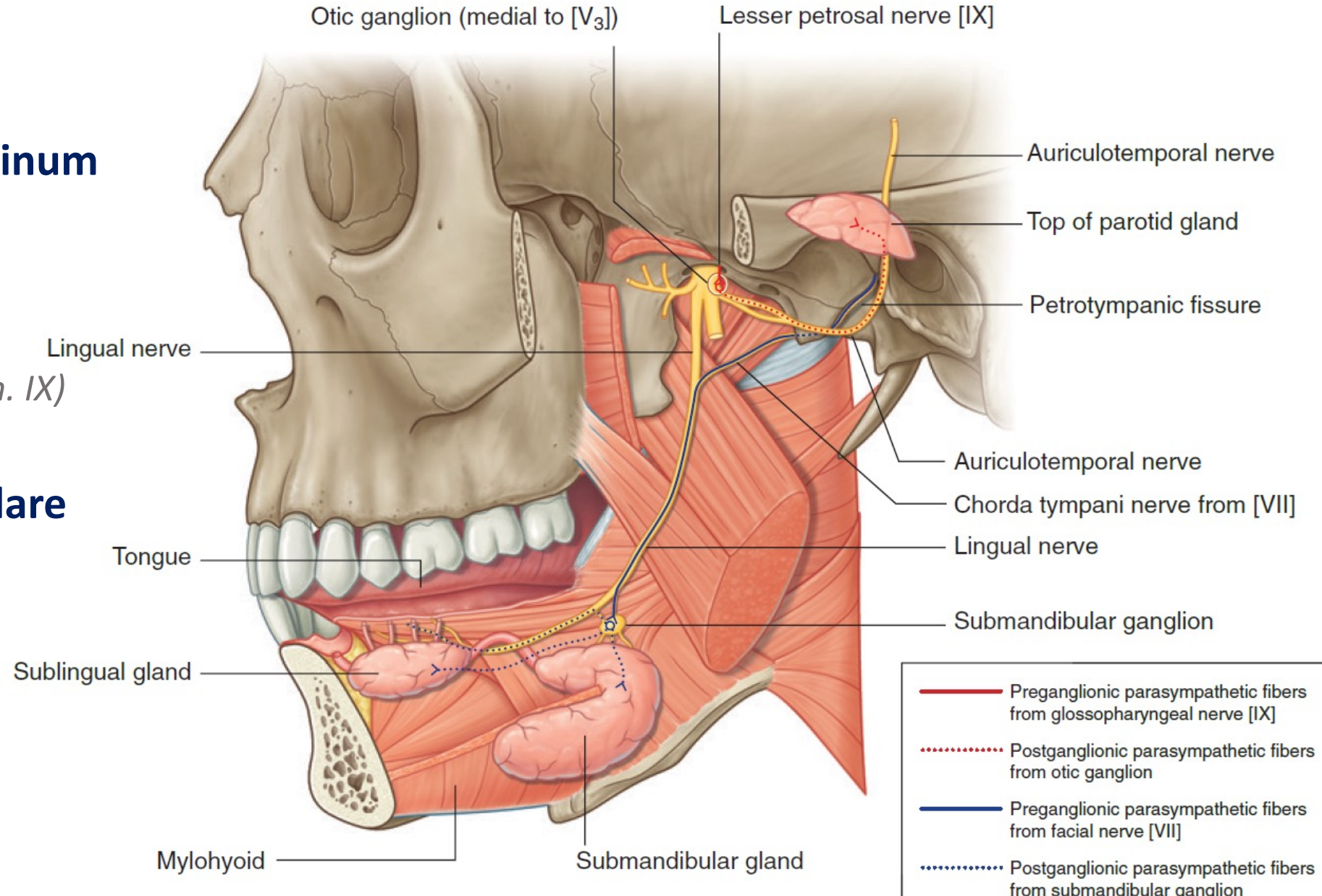
- ♦ *N. facialis (n. VII)*
- ♦ *N. petrosus major*

♦ Ganglion oticum

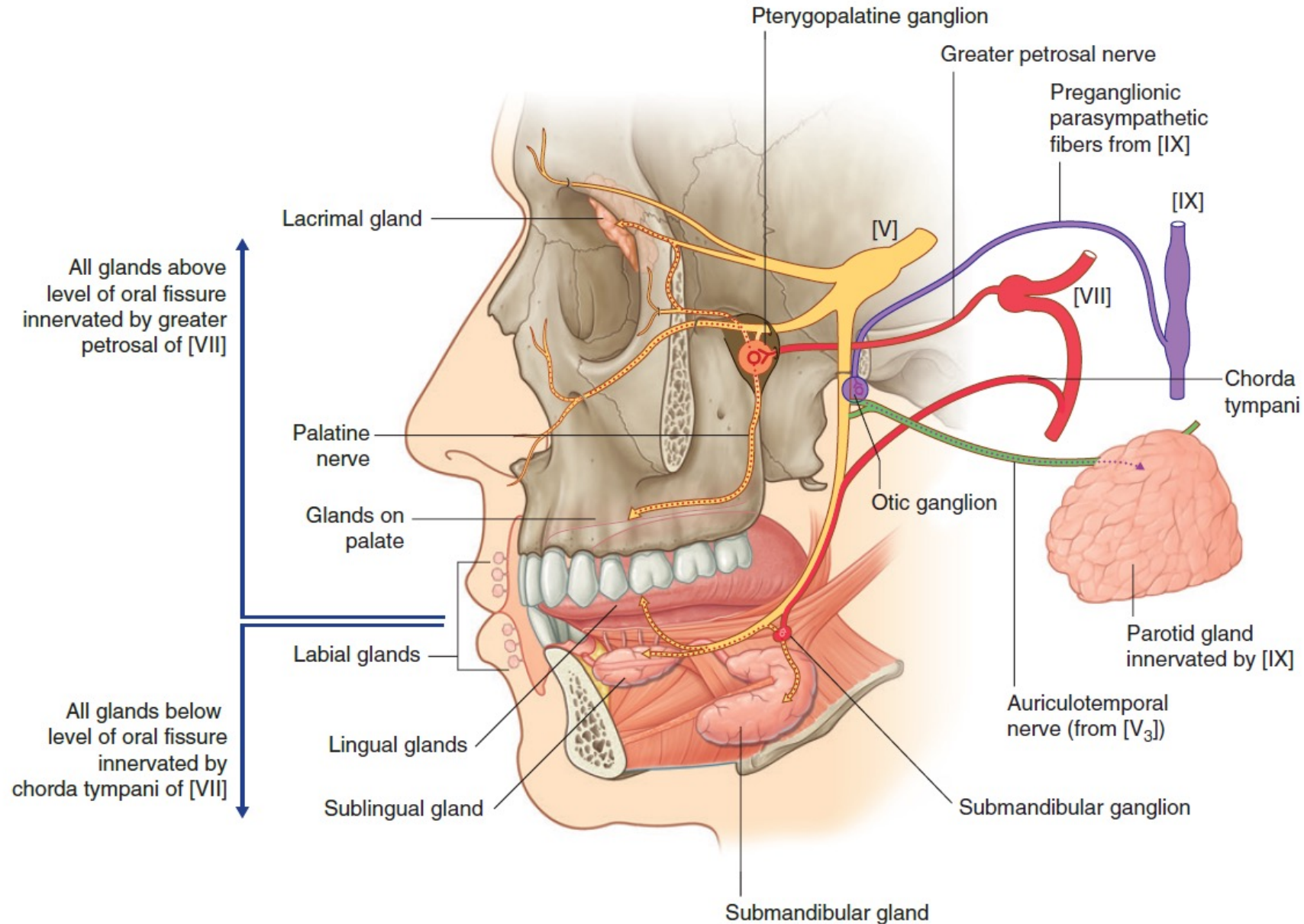
- ♦ *N. glossopharyngeus (n. IX)*
- ♦ *N. petrosus minor*

♦ Ganglion submandibulare

- ♦ *N. facialis (n. VII)*
- ♦ *Chorda tympani*
- ♦ *N. lingualis (n. V3)*



Parasympathetic



Sympatricus

♦ Sympatricus

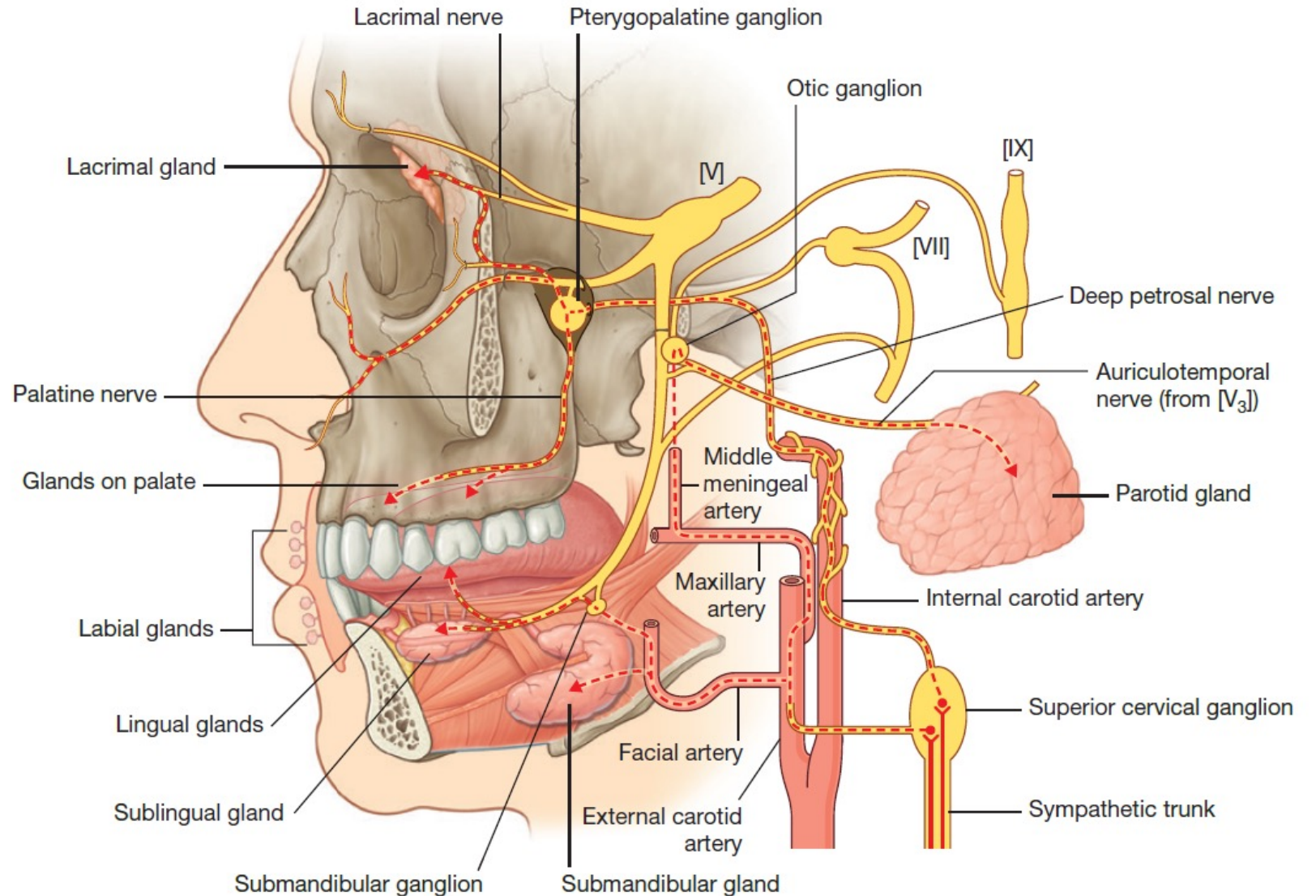
♦ **A. carotis interna**

♦ *Ggl. pterygopalatinum*

♦ **A. carotis externa**

♦ *Ggl. oticum*

♦ *Ggl. submandibulare*



ganglion ciliare

- ♦ **Ganglion ciliare**

- ♦ **Preganglionic fibers**

- ♦ Somata - nc. oculomotorius accesorius
- ♦ (Edinger-Westphal)

- ♦ *ramus inferior n. oculomotorii*

- ♦ **Postganglionic fibers**

- ♦ ad m. ciliaris a m. sphincter pupillae

- ♦ **No interconnection**

- ♦ **Sensoric n. trigeminus**

- ♦ *ramus communicans cum ganglio ciliaris*
- ♦ (*radix sensoria ganglii ciliaris*)

- ♦ **sympathetic**

- ♦ *radix sympathica ganglii ciliaris*
- ♦ *Plexus a. carotis interna – to m. dilatator pupillae*

