

Trigeminal nerve trigeminal neuralgia

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EM II

Trigeminal nerve

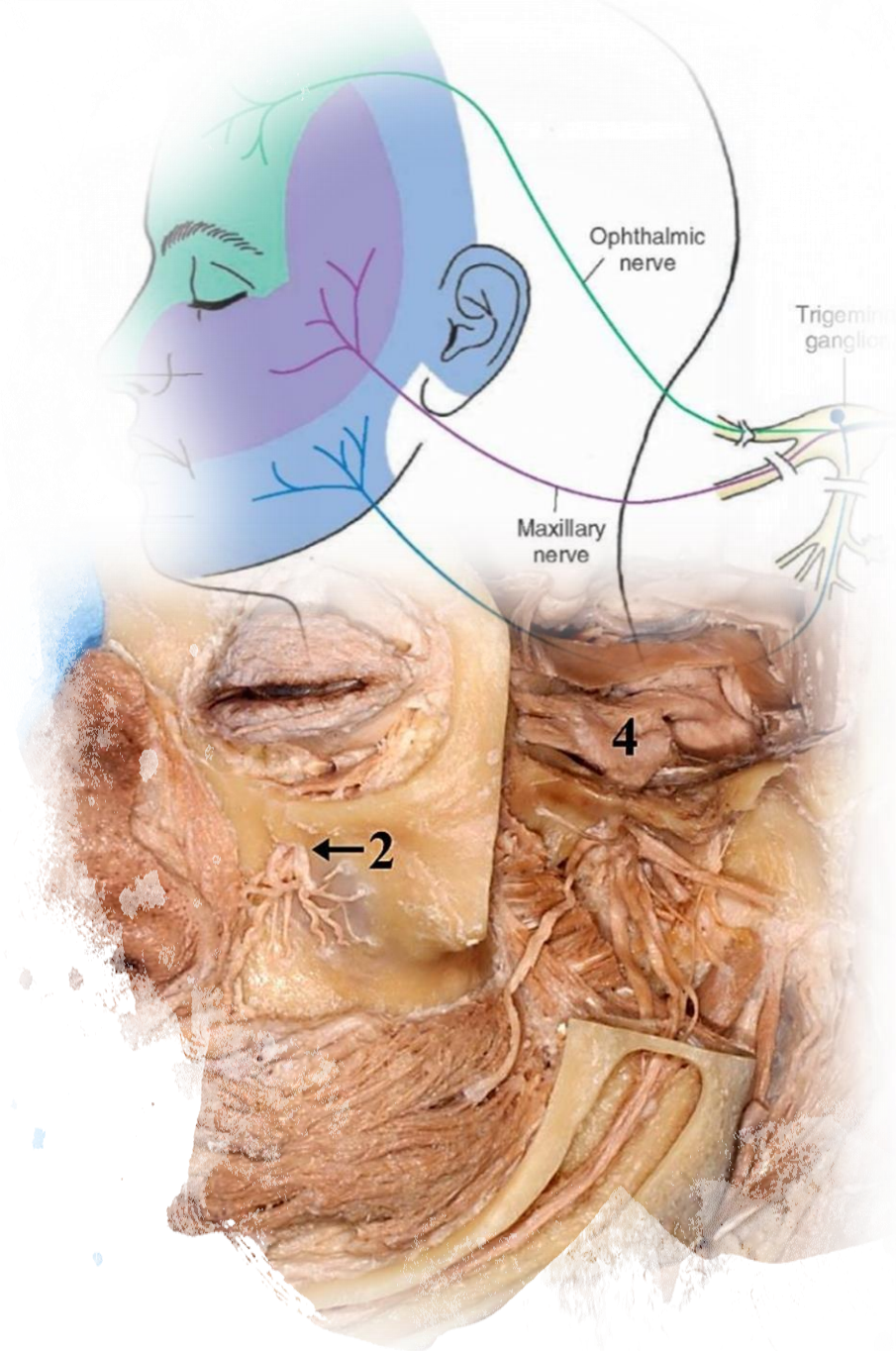
Largest cranial nerve

Sensory innervation:

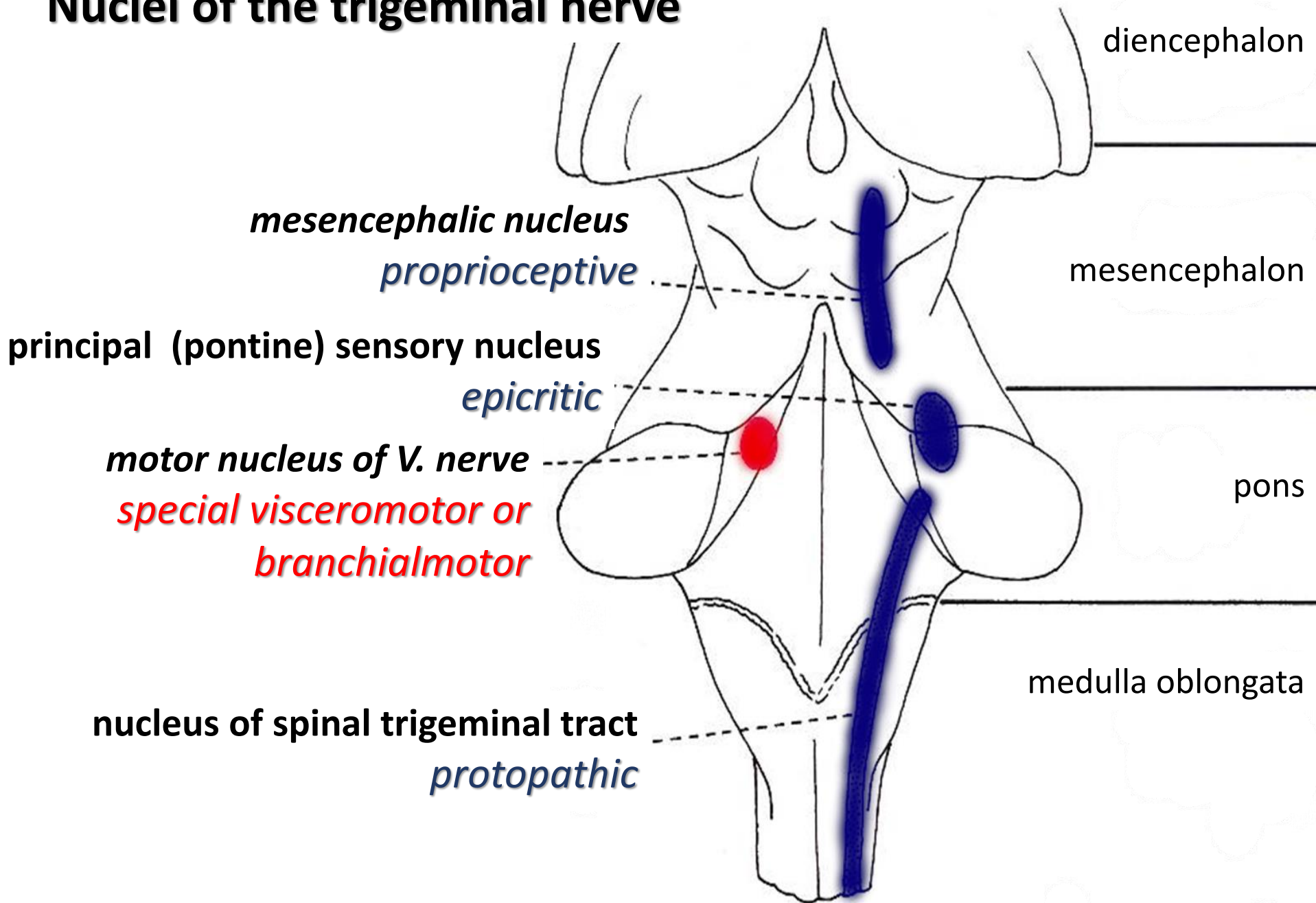
face, oral and nasal cavity, paranasal sinuses, orbit, dura mater, TMJ

Motor innervation:

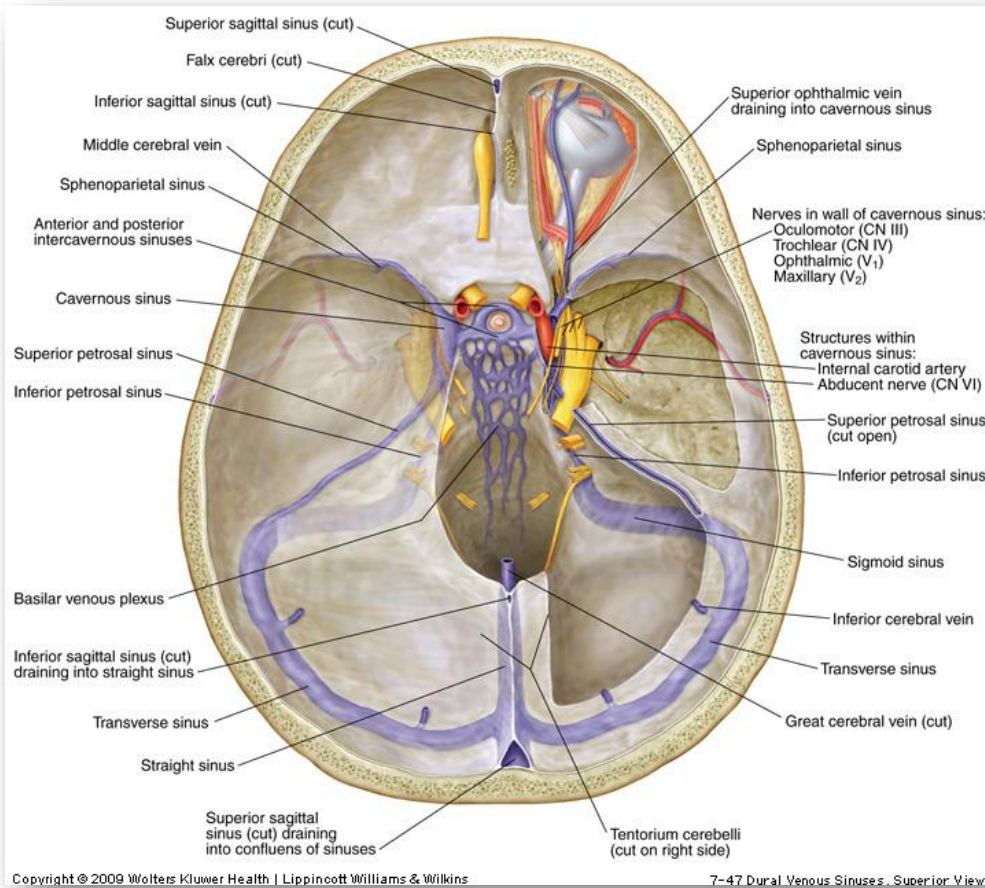
muscles of first pharyngeal arch



Nuclei of the trigeminal nerve



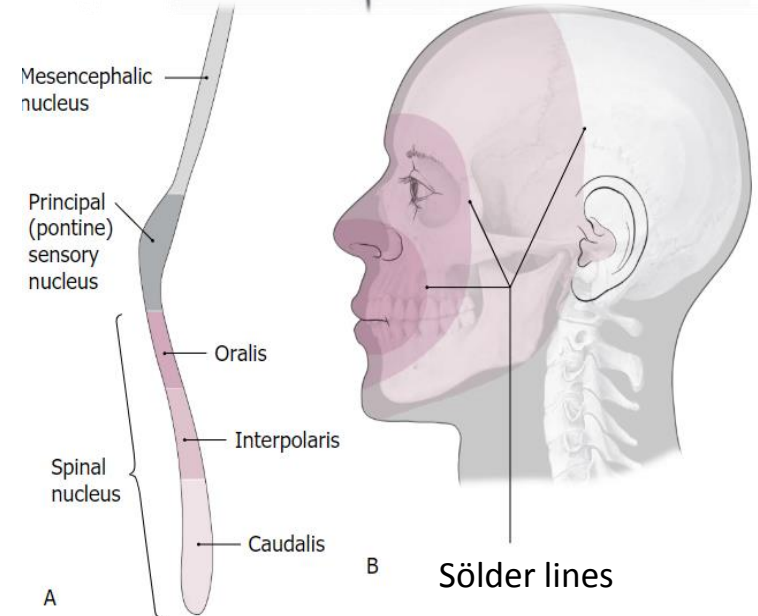
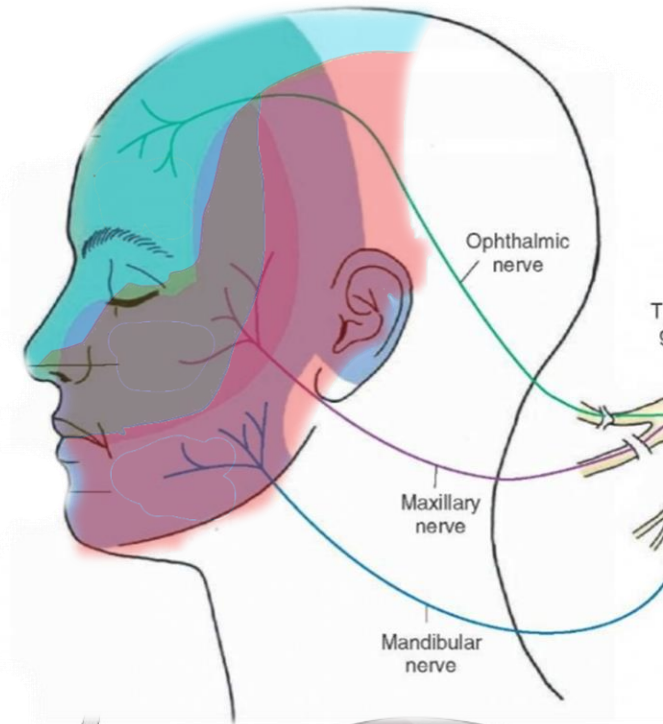
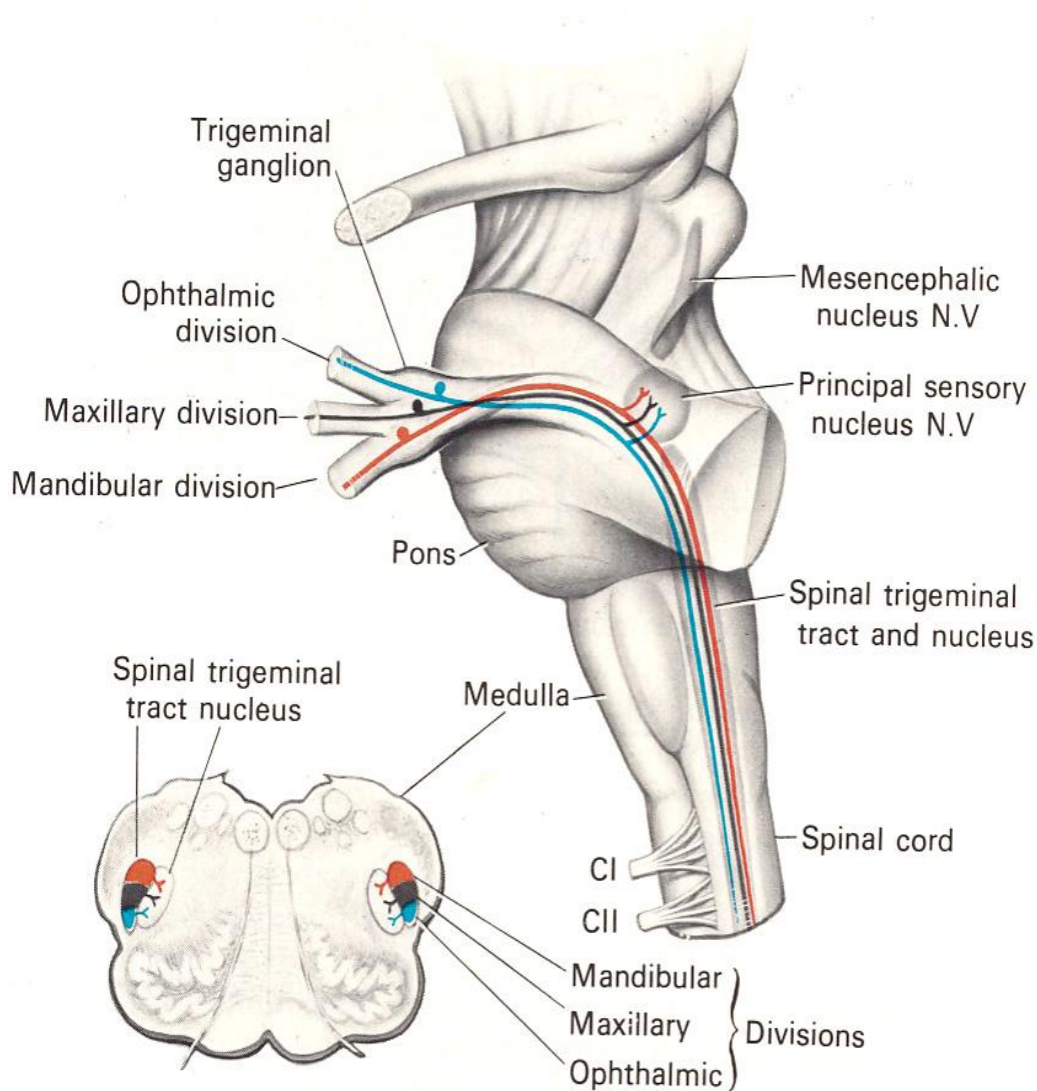
Segments of trigeminal nerve



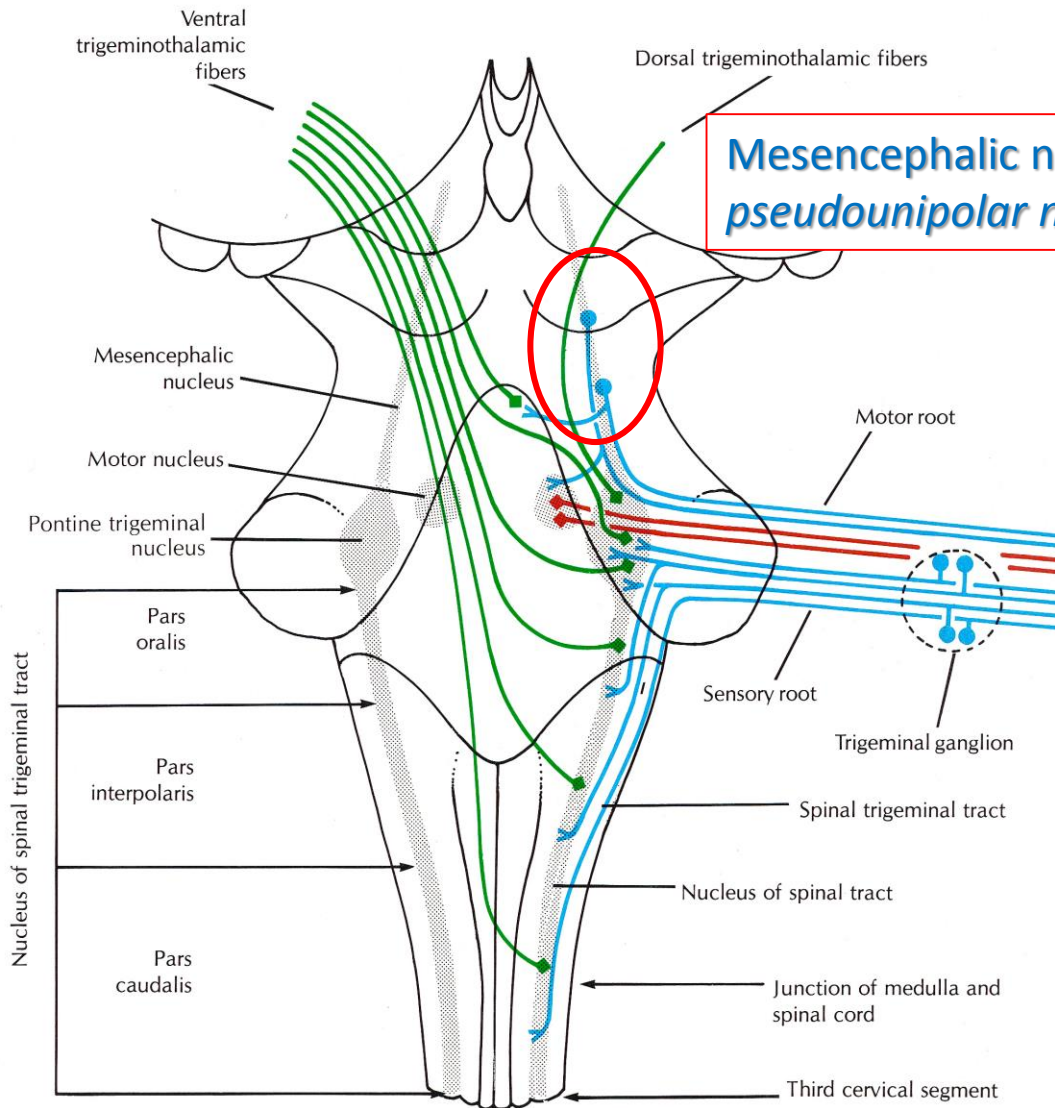
brainstem,
 cisternal (pontocerebellar),
 Meckel's cave,
 (Gasserian or semilunar ganglion)
 cavernous sinus,
 skull base
 peripheral branches



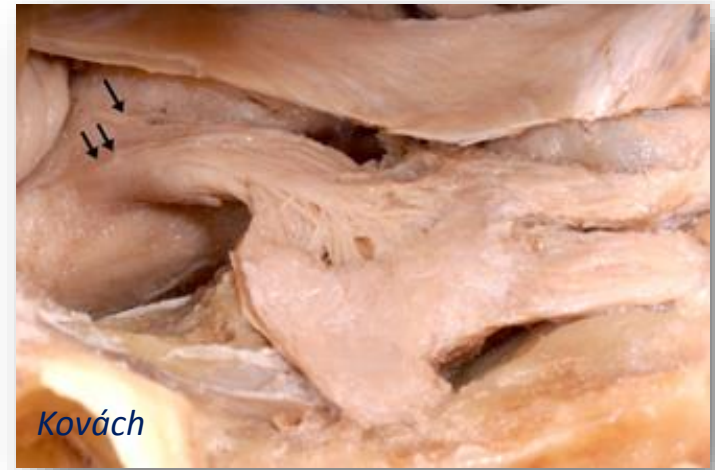
Somatotopic organisation



Trigeminal ganglion

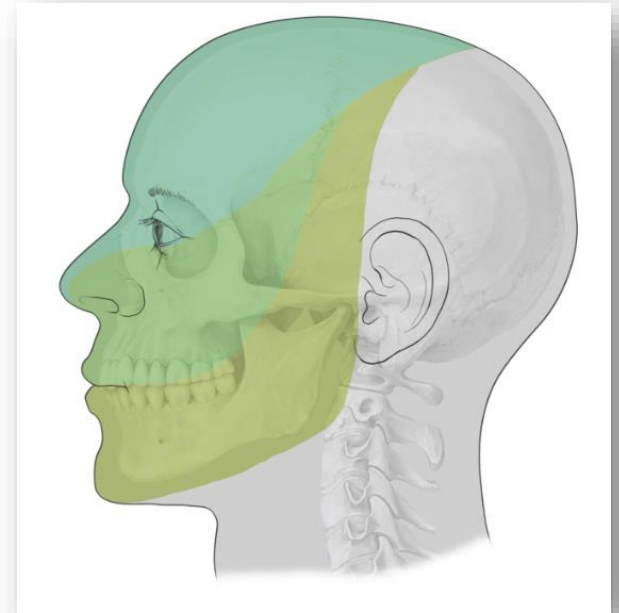
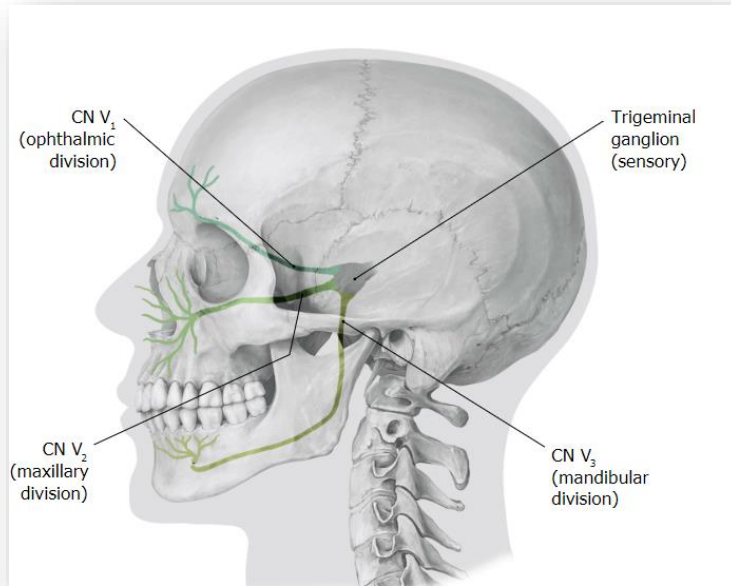


Mesencephalic nucleus:
pseudounipolar neurons



Motor root (Radix motoria) ↓
Sensory root (Radix sensoria) ↓↓

Ophthalmic nerve (V/1)



General **sensory** innervation:

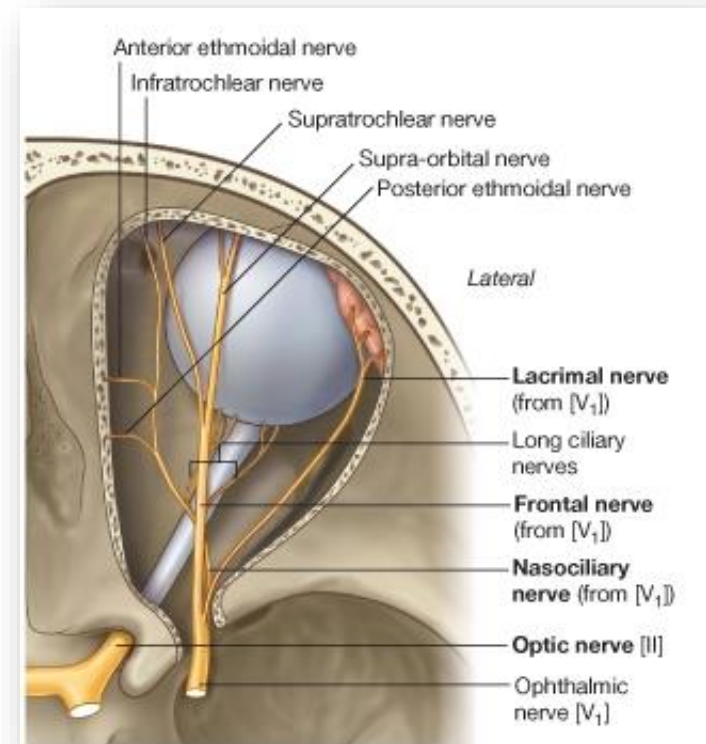
skin of the scalp and frontal region,
part of nasal cavity, and paranasal sinuses,
eye,
dura mater (anterior and tentorial region)
lacrimal gland



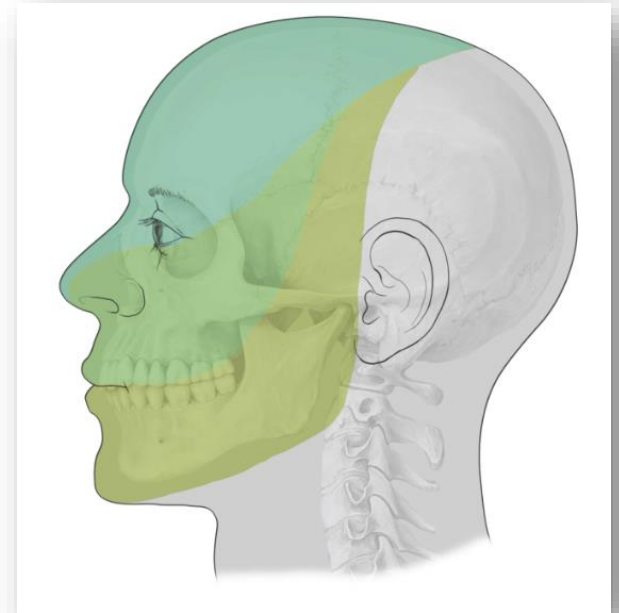
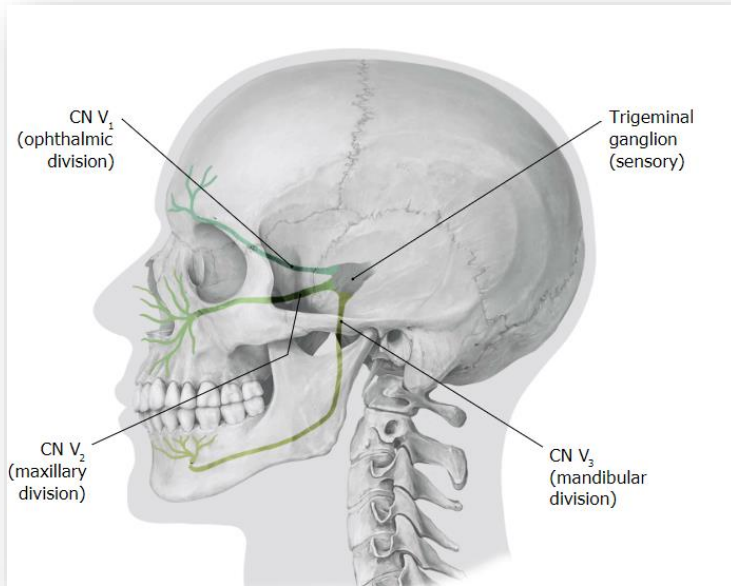
Branches of ophthalmic nerve (V/1)

tentorial branch

- **frontal nerve** (superior orbital fissure outside the tendinous ring)
 - supraorbital nerve (supraorbital notch)
 - supratrochlear nerve (supratrochlear notch)
- **lacrimal nerve** (superior orbital fissure outside the tendinous ring)
 - Communicating branch to zygomatic nerve
- **nasociliary nerve** (superior orbital fissure through the tendinous ring)
 - anterior ethmoidal nerve (anterior ethmoidal foramen then the cribriform plate)
(ant. meningeal, ant. nasal, ext. nasal)
 - posterior ethmoidal nerve (posterior ethmoidal foramen)
 - infratrochlear nerve
 - long ciliary nerves
 - small communicating branch to the *ciliary ganglion* (n.III), short ciliary nerves



Maxillary nerve (V/2)

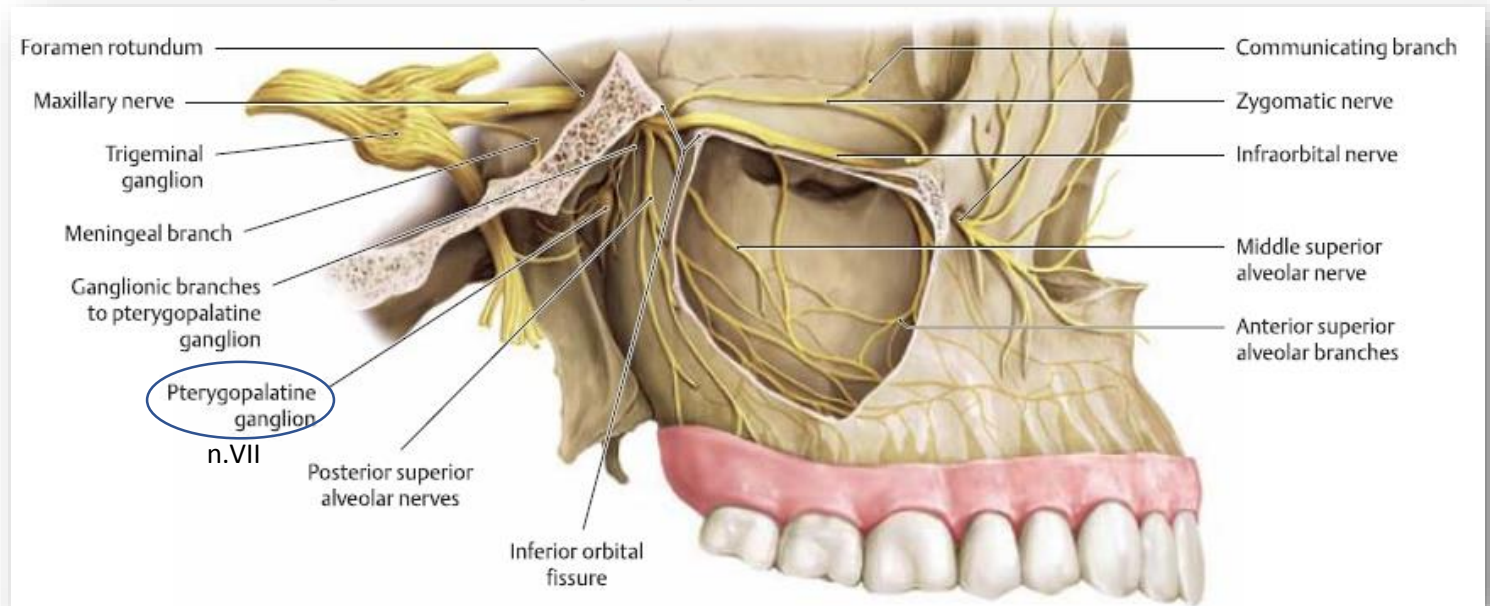


General **sensory** innervation:

face, scalp,
nose, palate, teeth,
maxillary sinuses
dura mater,
salivary glands and lacrimal gland

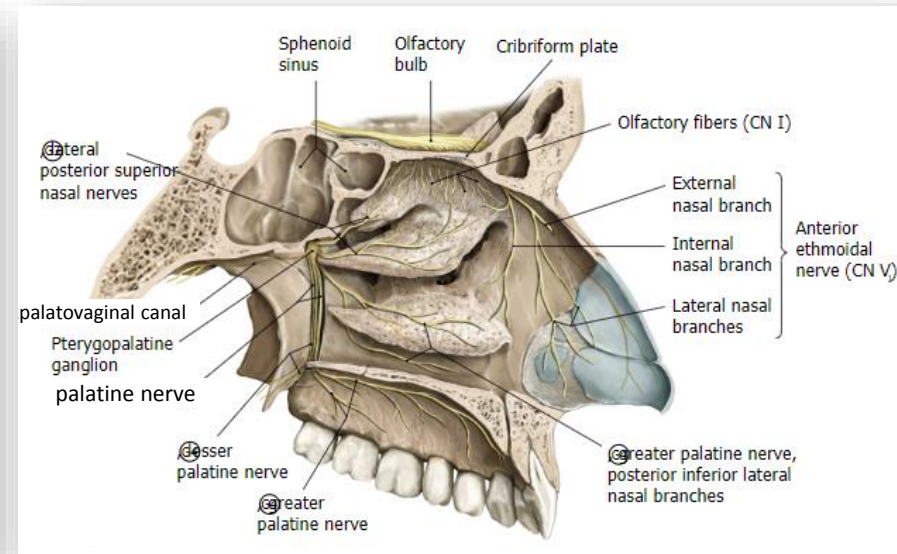
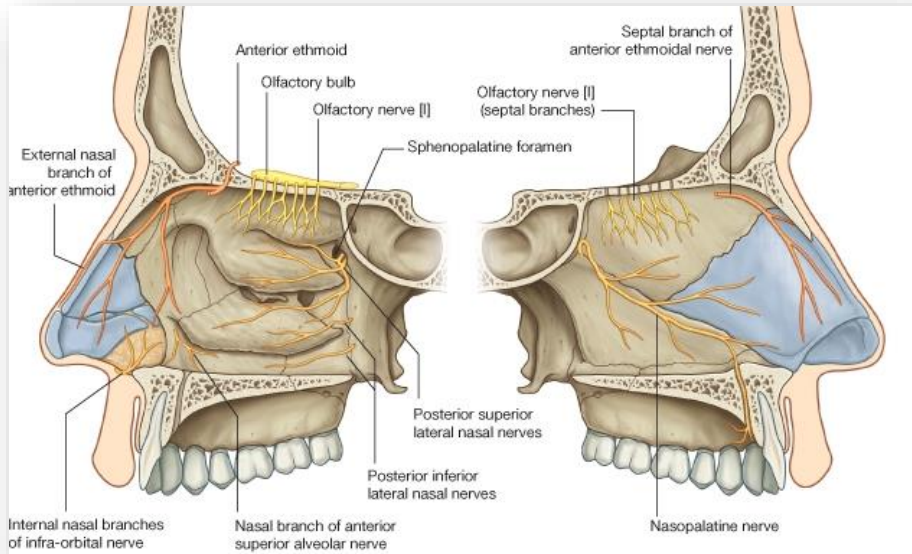


Branches of maxillary nerve (V/2)



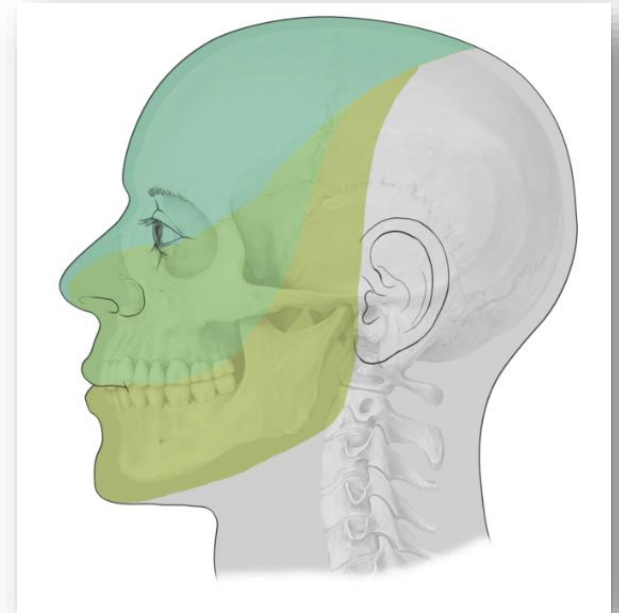
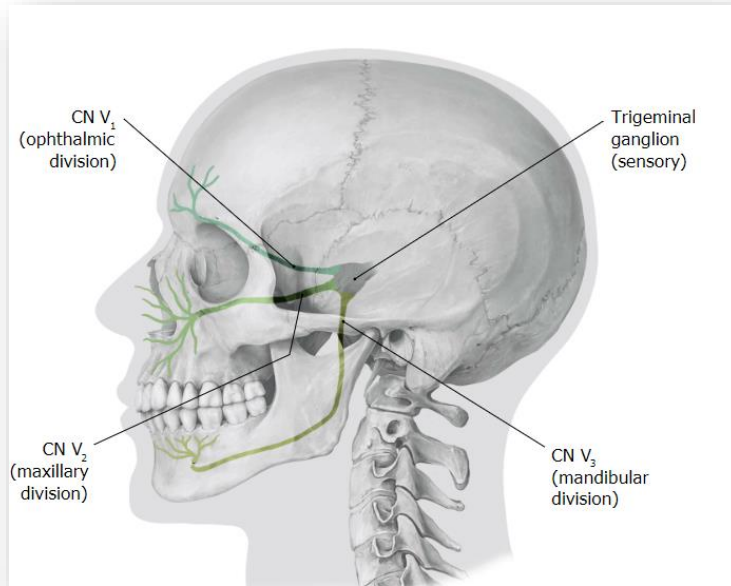
- **meningeal**
 - **zygomatic nerve** (inferior orbital fissure)
 - zygomaticotemporal nerve (zygomaticotemporal foramen)
 - zygomaticofacial nerve (zygomaticofacial foramen)
 - **infraorbital nerve** (inferior orbital fissure then infraorbital foramen)
 - posterior superior alveolar nerve (pterygomaxillary fissure)
 - middle superior alveolar nerve
 - anterior superior alveolar nerve
- inferior palpebral branch
external nasal branch
superior labial branch

Branches of maxillary nerve (V/2)



- **nasopalatine nerve** (sphenopalatine foramen)
- **posterior superior nasal nerves** (sphenopalatine foramen)
- **greater palatine nerve** (greater palatine foramen)
 - lateral posterior inferior nasal nerve
- **lesser palatine nerve** (lesser palatine foramen)
- **pharyngeal nerve** (palatovaginal canal)

Mandibular nerve (V/3)



General **sensory** innervation:

face, scalp
tongue (2/3), teeth,
dura mater,
salivary glands

motor innervation:

muscles of mastication, tensor tympani, tensor veli palatini, mylohyoid, ant. belly of digastric



Branches of mandibular nerve (V/3)

- **trunk**

- meningeal
- medial pterygoid nerve

- **anterior division**

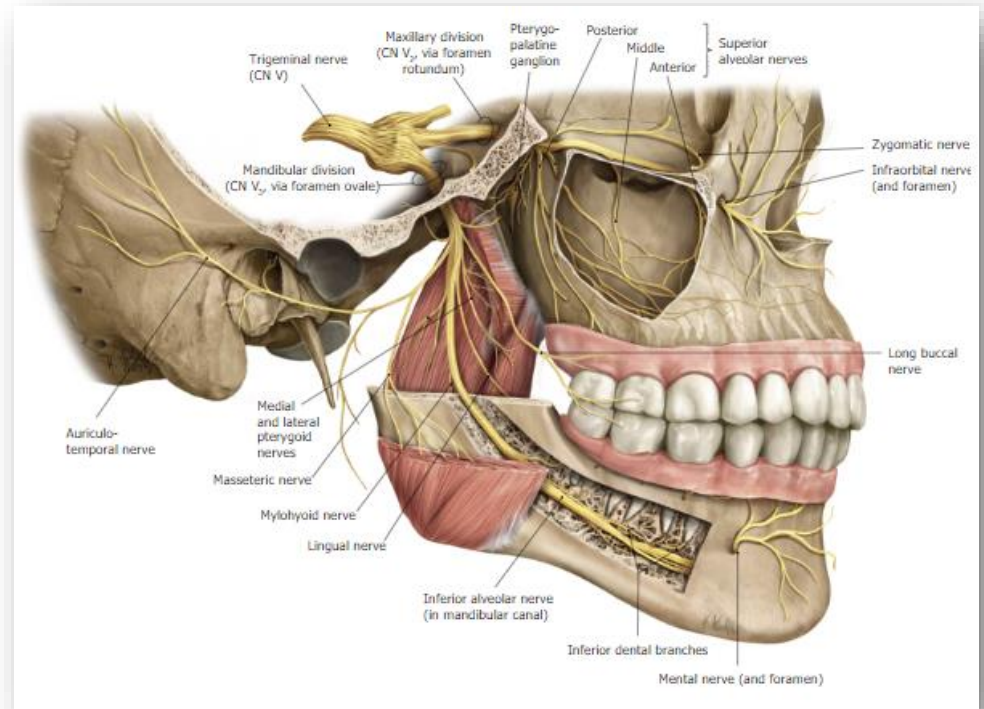
(4 branches, all **motor** except one)

- deep temporal nerves
- lateral pterygoid nerves
- masseteric nerve
- **buccal nerve**

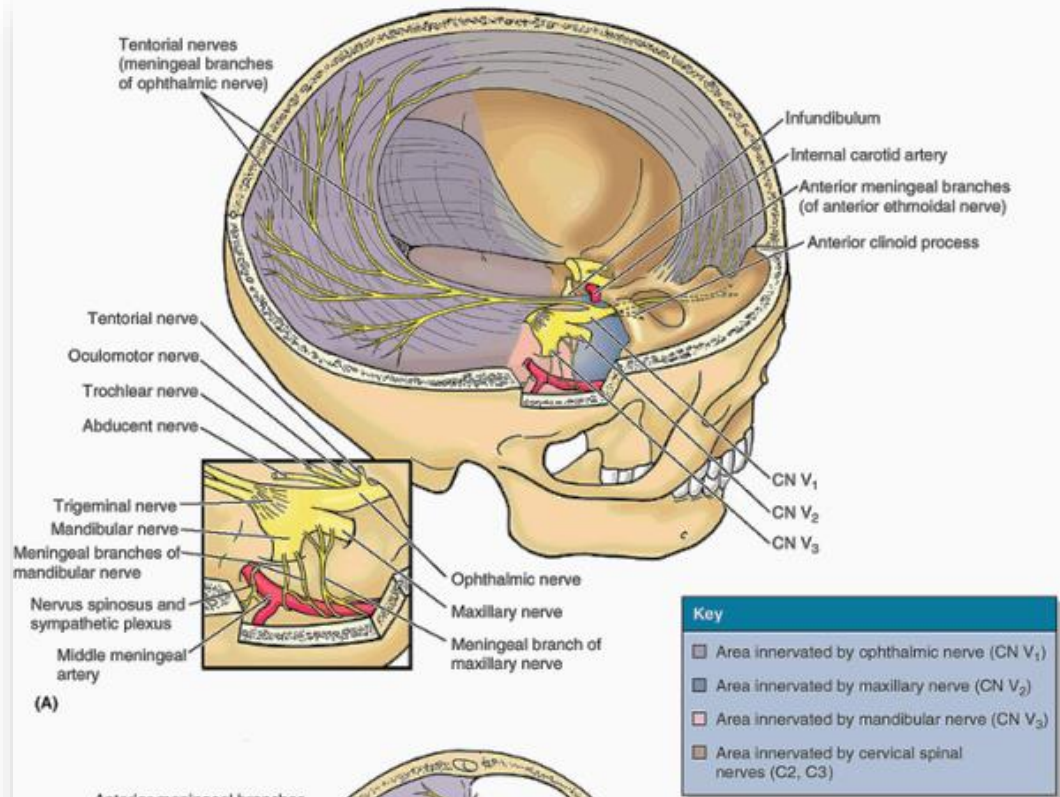
- **posterior division**

(3 branches, all **sensory** except one)

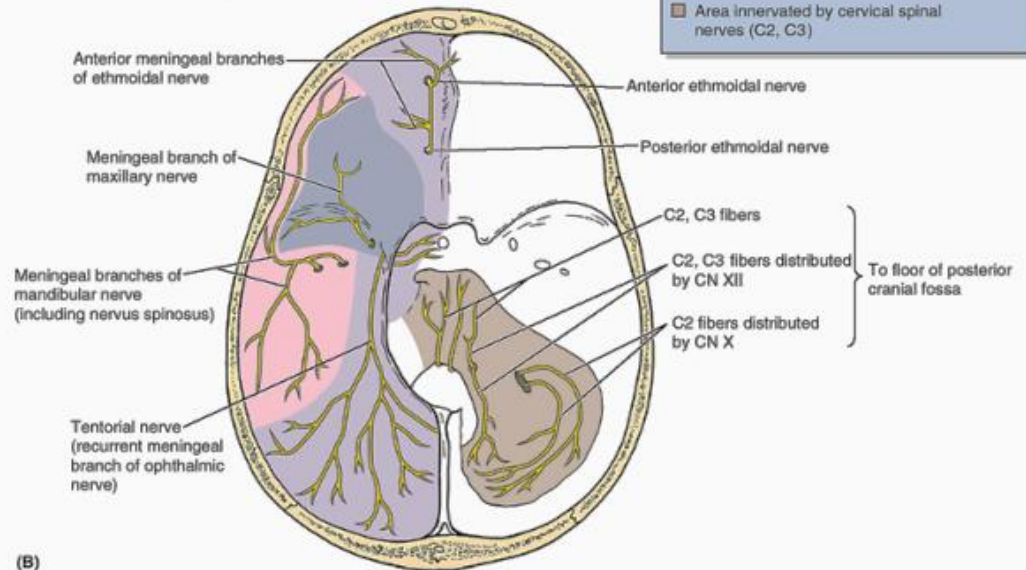
- auriculotemporal nerve (TMJ)
- lingual nerve
- inferior alveolar nerve
 - incisive nerve
 - mental nerve
 - **mylohyoid nerve**



Innervation of dura mater



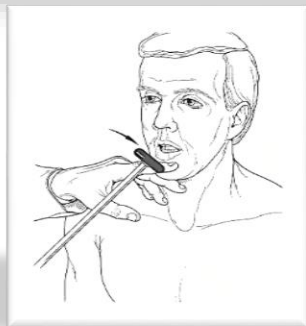
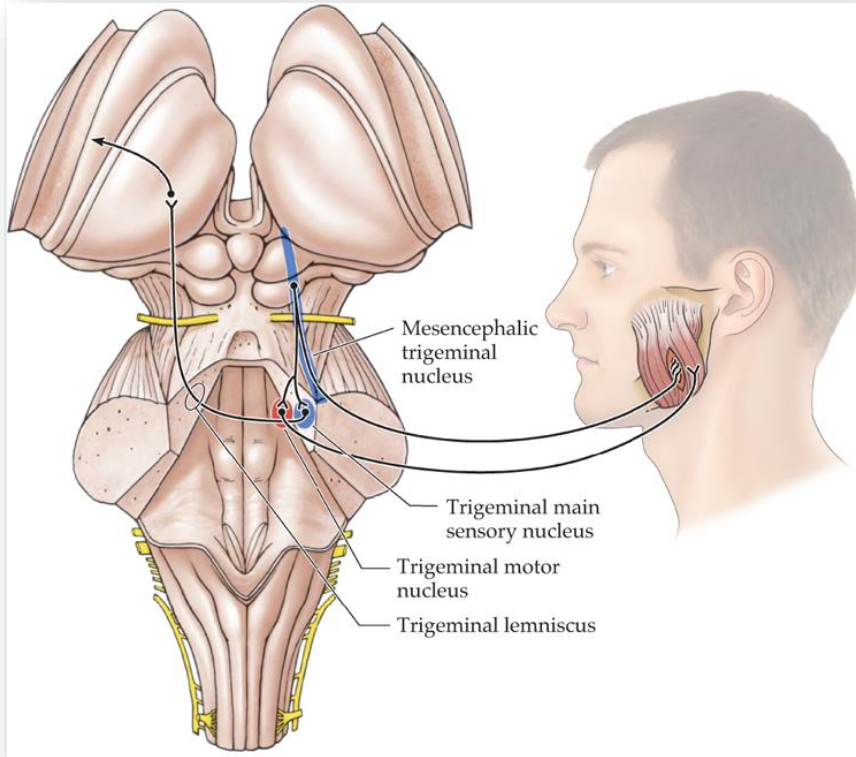
(A)



(B)

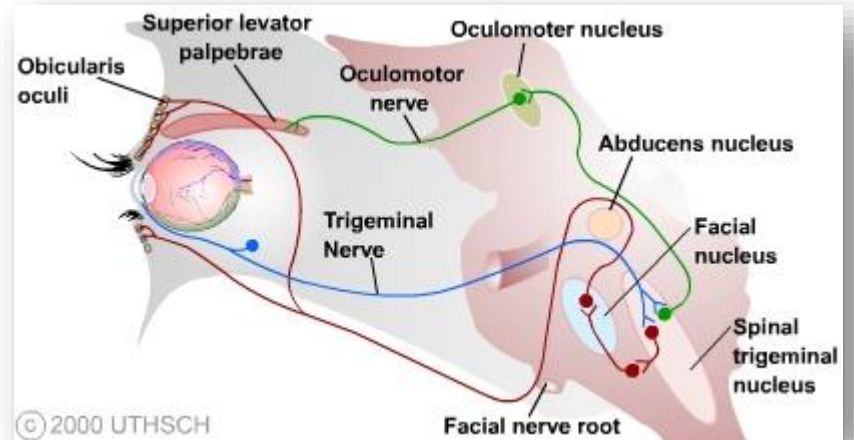
Masseter reflex

(jaw jerk, monosynaptic)



Corneal reflex

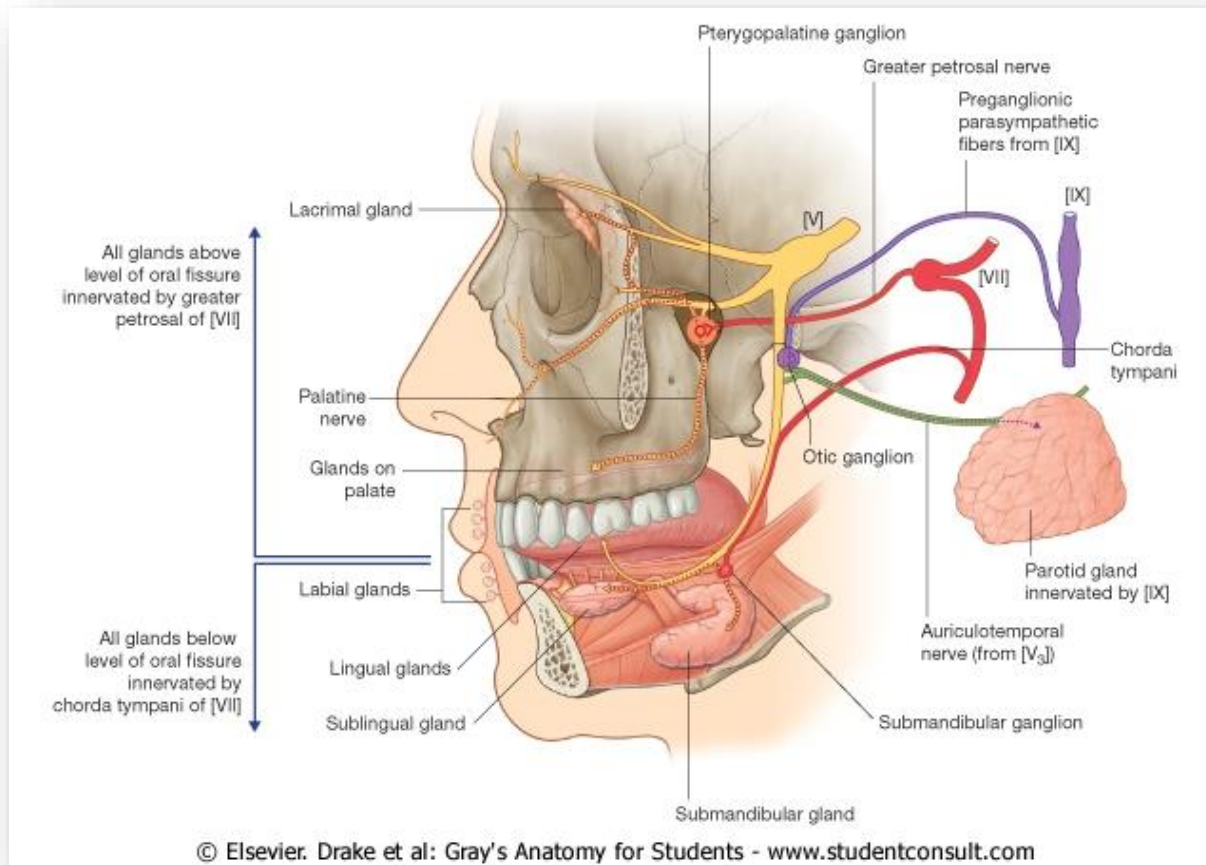
(polysynaptic)



Reflexes (*n.V. afferents*)

- tearing (n. VII)
- salivary (n. VII, n. IX)
- sneezing (n. X)
- vomiting (n.X)

„Guest” fibers to trigeminal nerve



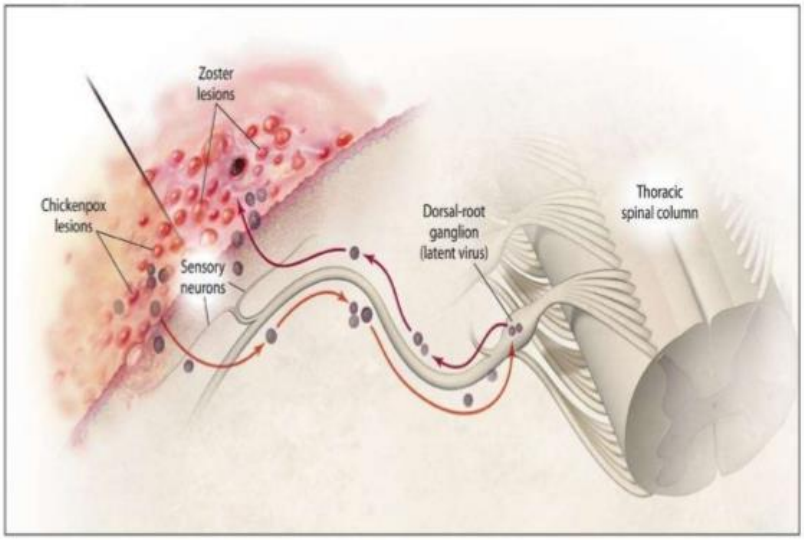
GVM

*(sup. and inf. salivary nucl.
n. VII and n IX)*

SVS

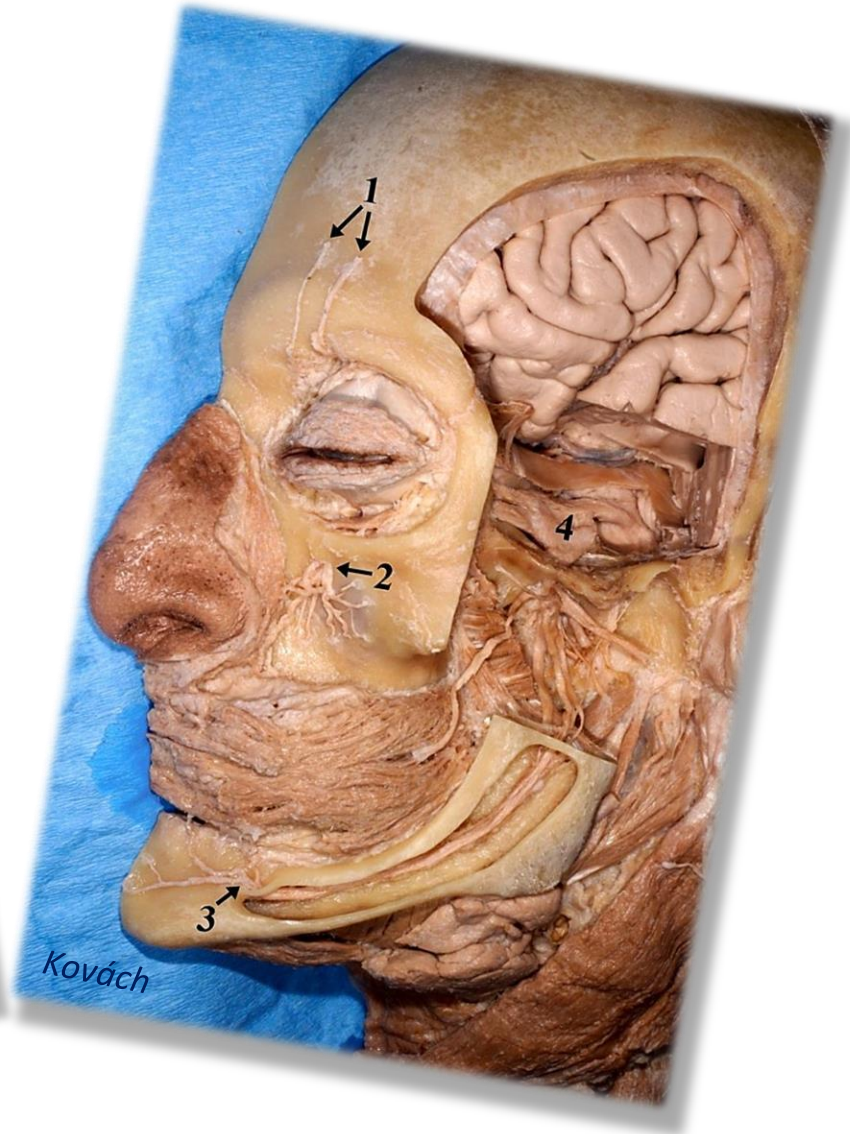
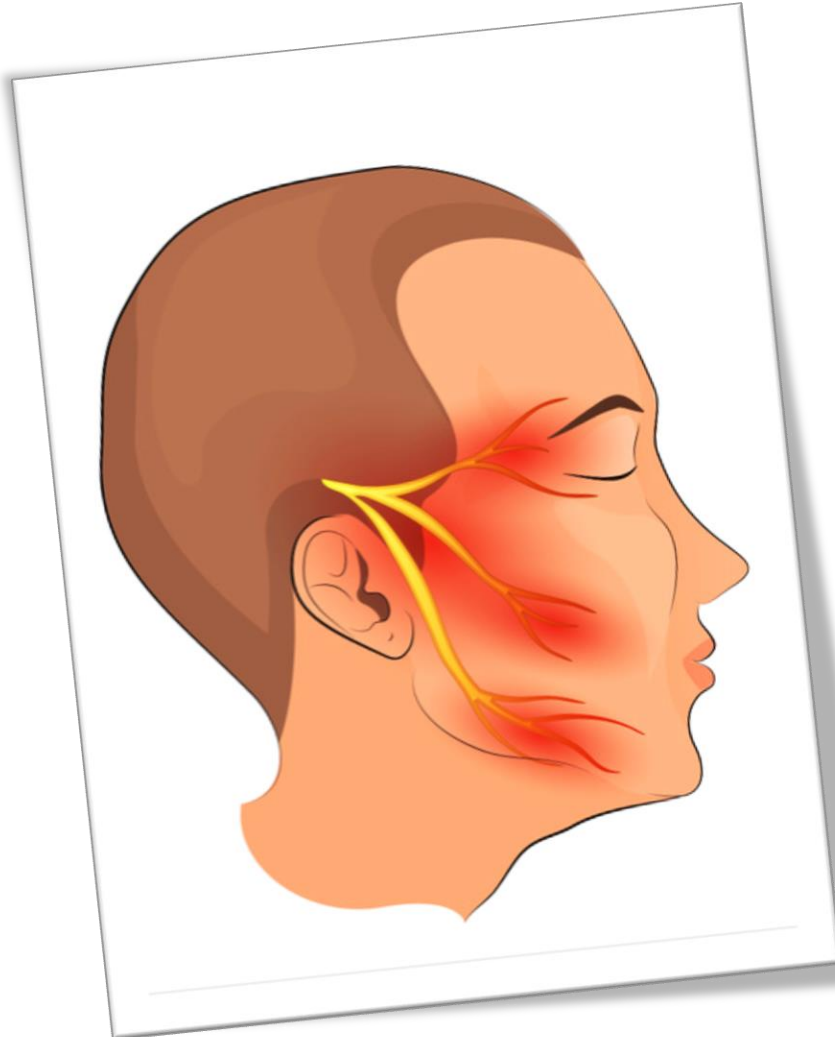
(solitari nucl. N. VII)

Herpes zoster

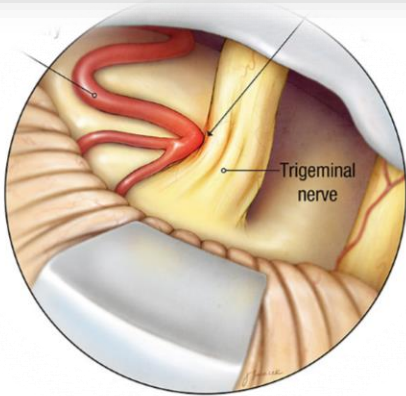
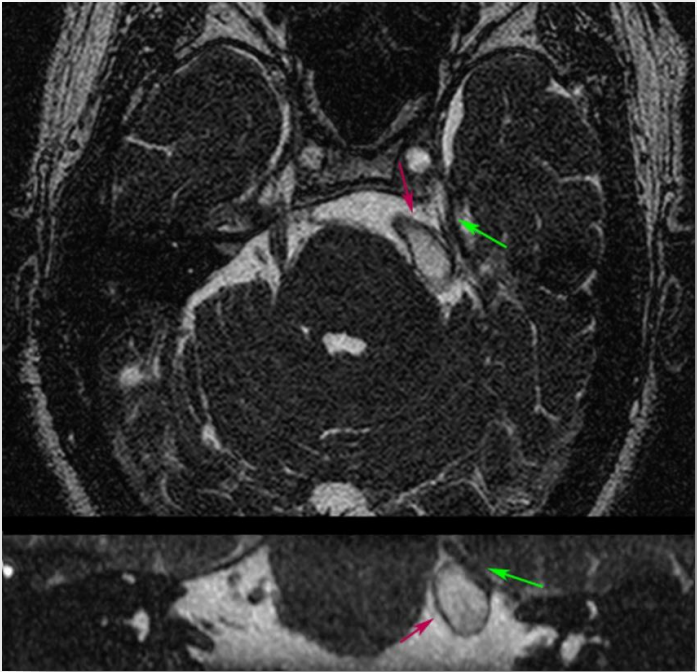


Trigeminal neuralgia:

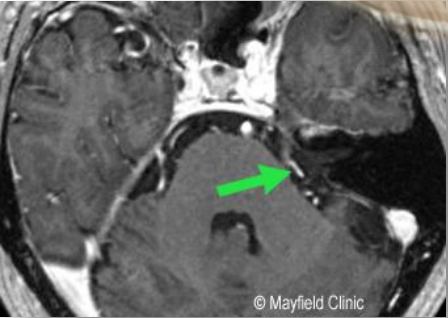
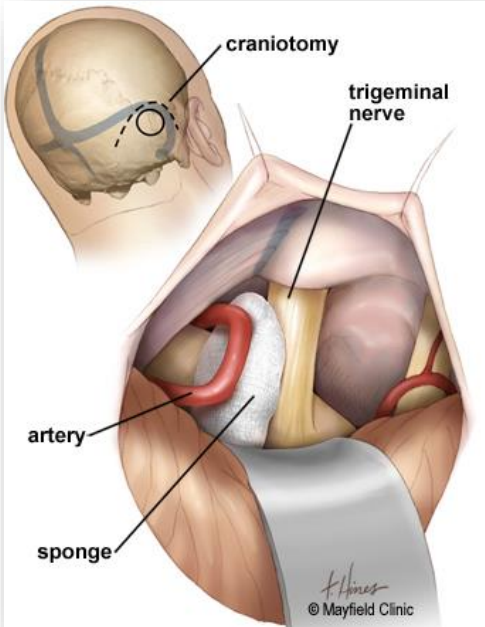
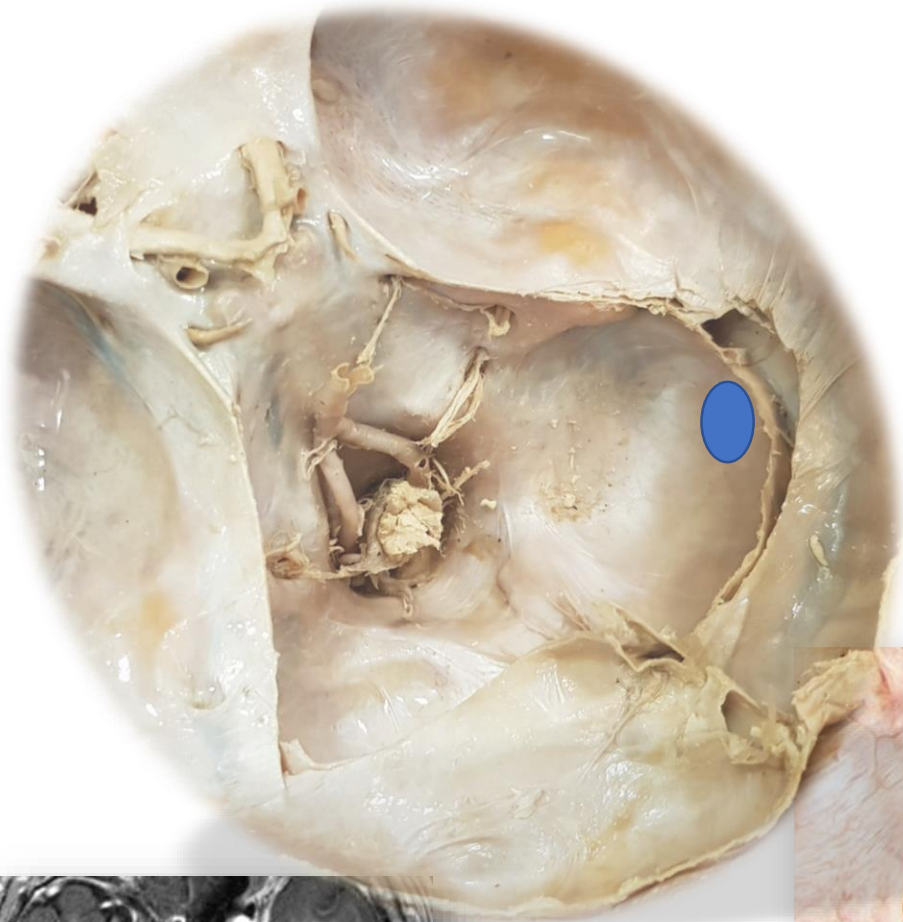
excruciating pain in the area of distribution of trigeminal nerve



Trigeminal neuralgia: nerve compression



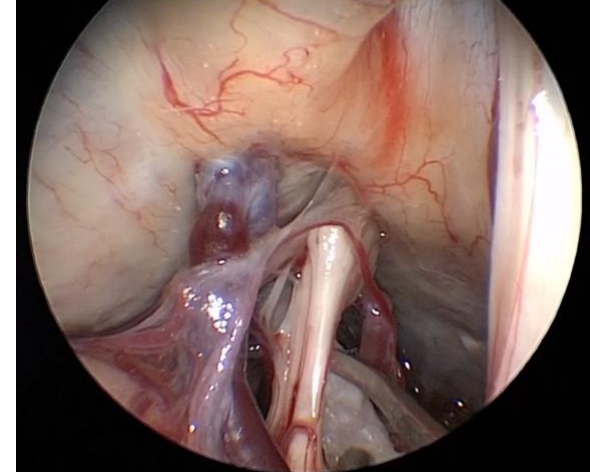
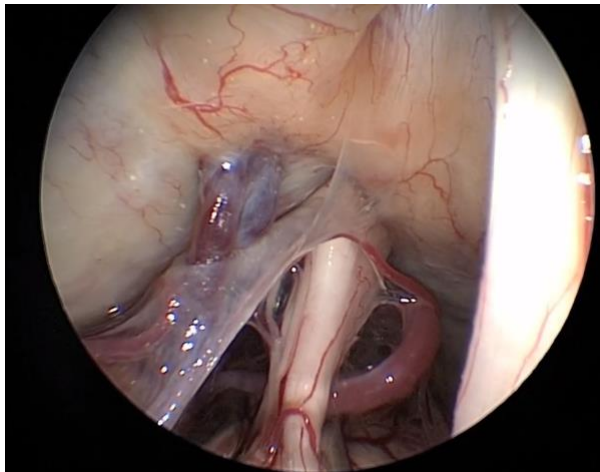
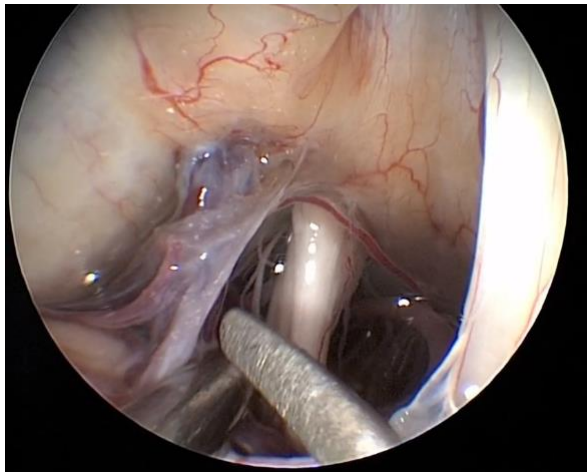
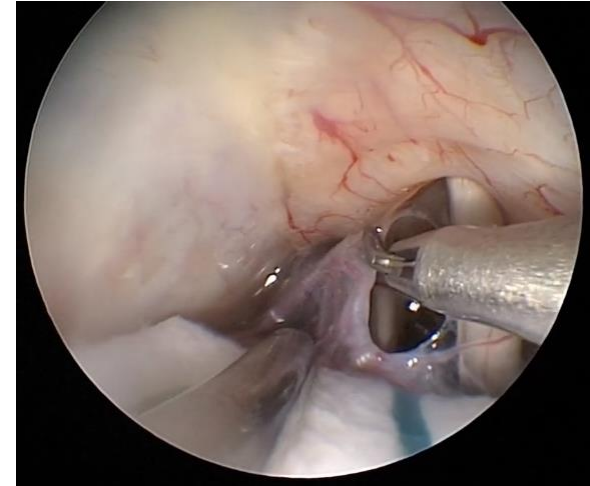
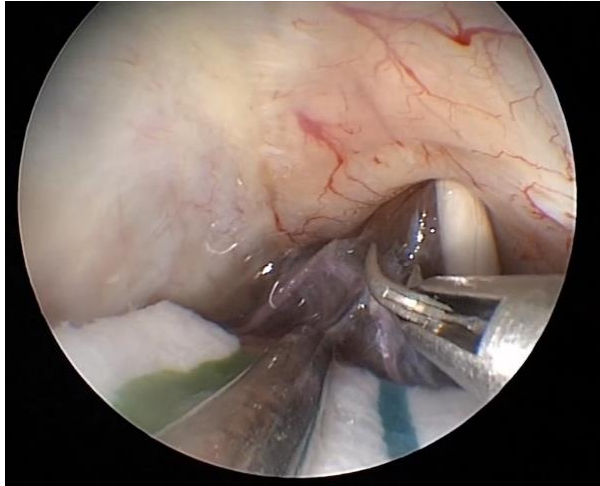
Trigeminal neuralgia: vascular compression



Microvascular decompression (MVD) surgery



This procedure was pioneered by Peter **Jannetta**, MD



John Y.K. Lee,



*Thank you for
your attention*

Dr. Gábor GERBER