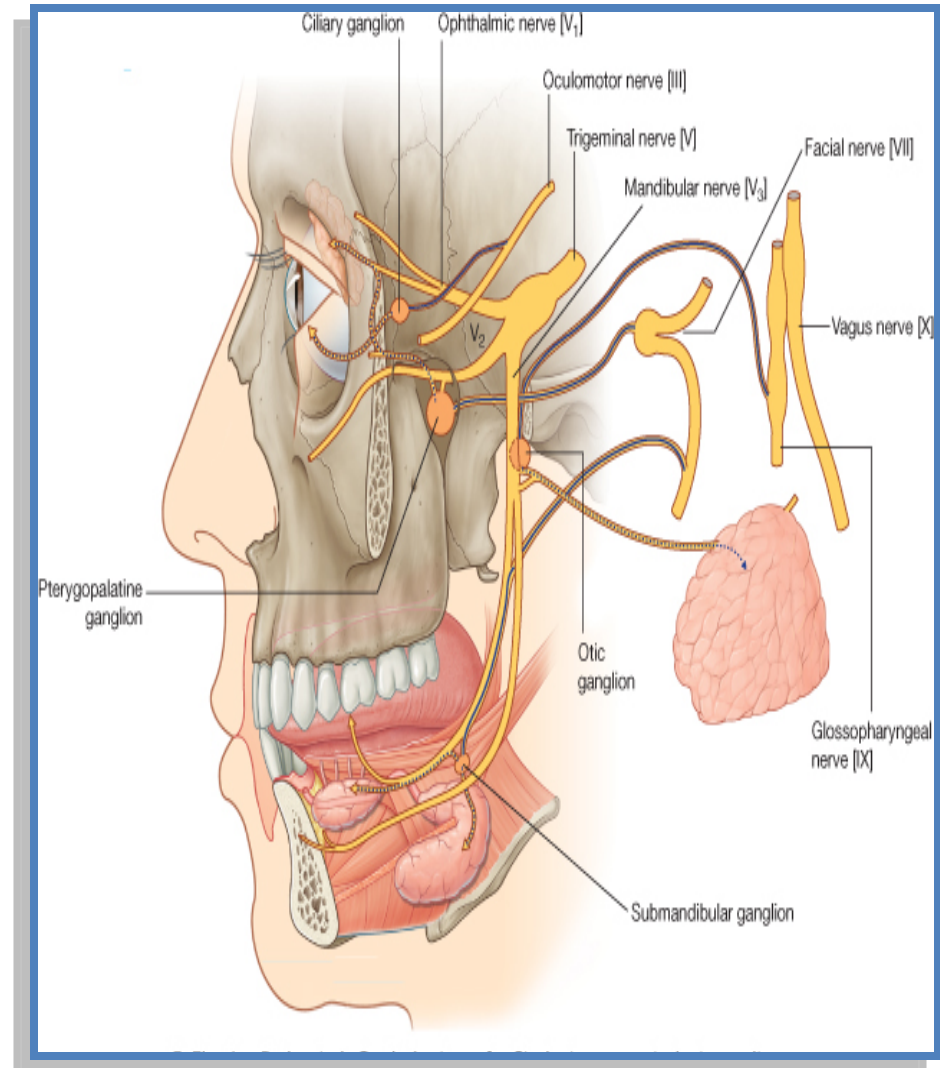


NERVE SUPPLY OF FACE

5TH & 7TH CRANIAL NERVES

By :
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OBJECTIVES

By the end of the lecture, students should be able to:

- List the nuclei of the deep origin of the trigeminal and facial nerves in the brain stem.
- Describe the type and site of each nucleus.
- Describe the superficial attachment of trigeminal and facial nerves to the brain stem.
- Describe the main course and distribution of trigeminal and facial nerves in the face.
- Describe the main motor & sensory manifestation in case of lesion of the trigeminal & facial nerves.

TRIGEMINAL NERVE

➤ Type:

Mixed

(sensory & motor).

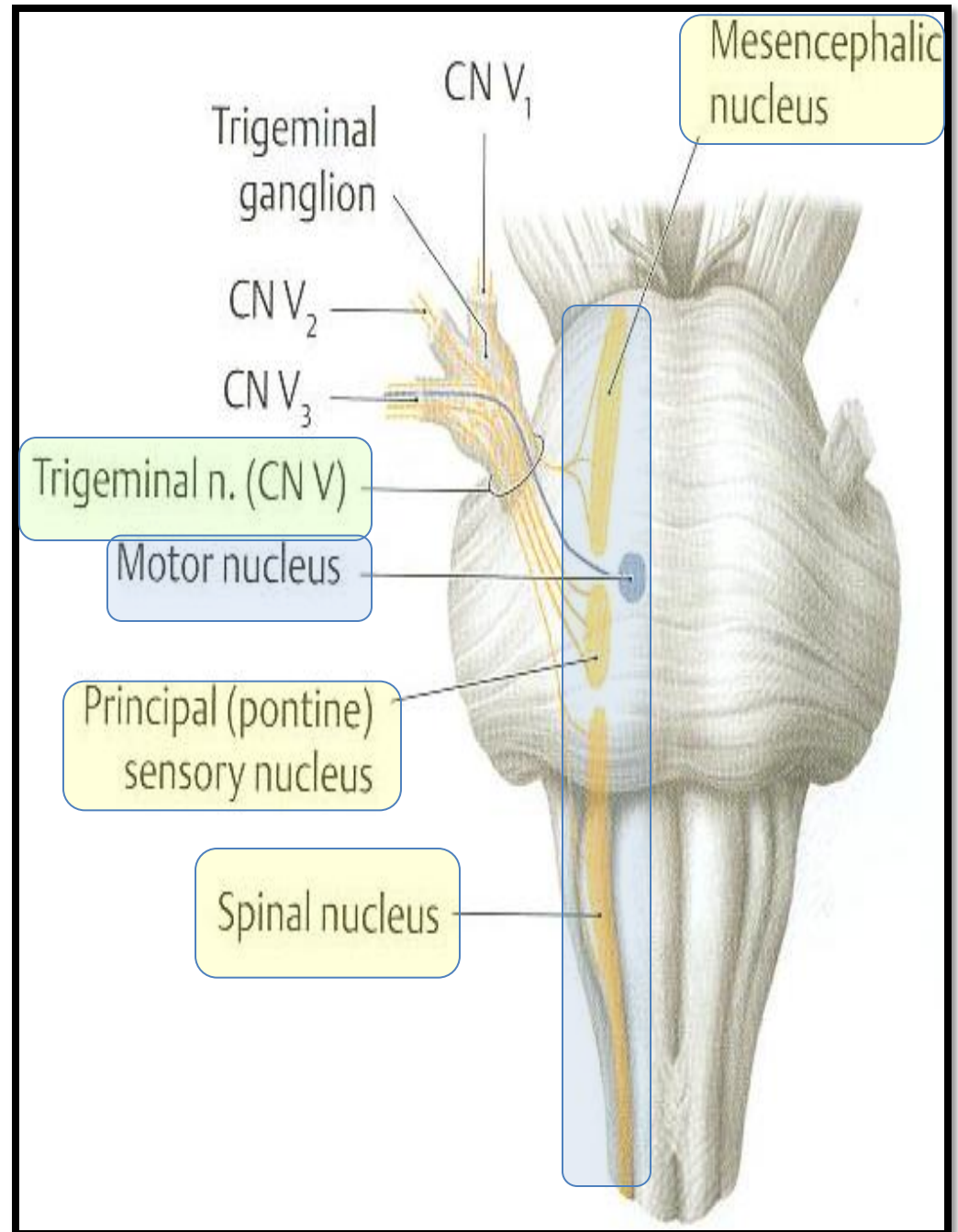
➤ Fibers:

1. General somatic afferent:

Carrying general sensations from face.

2. Special visceral efferent:

Supplying muscles developed from the 1st pharyngeal arch,
(8 muscles).



TRIGEMINAL NERVE NUCLEI

➤ **Four nuclei: (3 sensory + 1 Motor).**

➤ **General somatic afferent:**

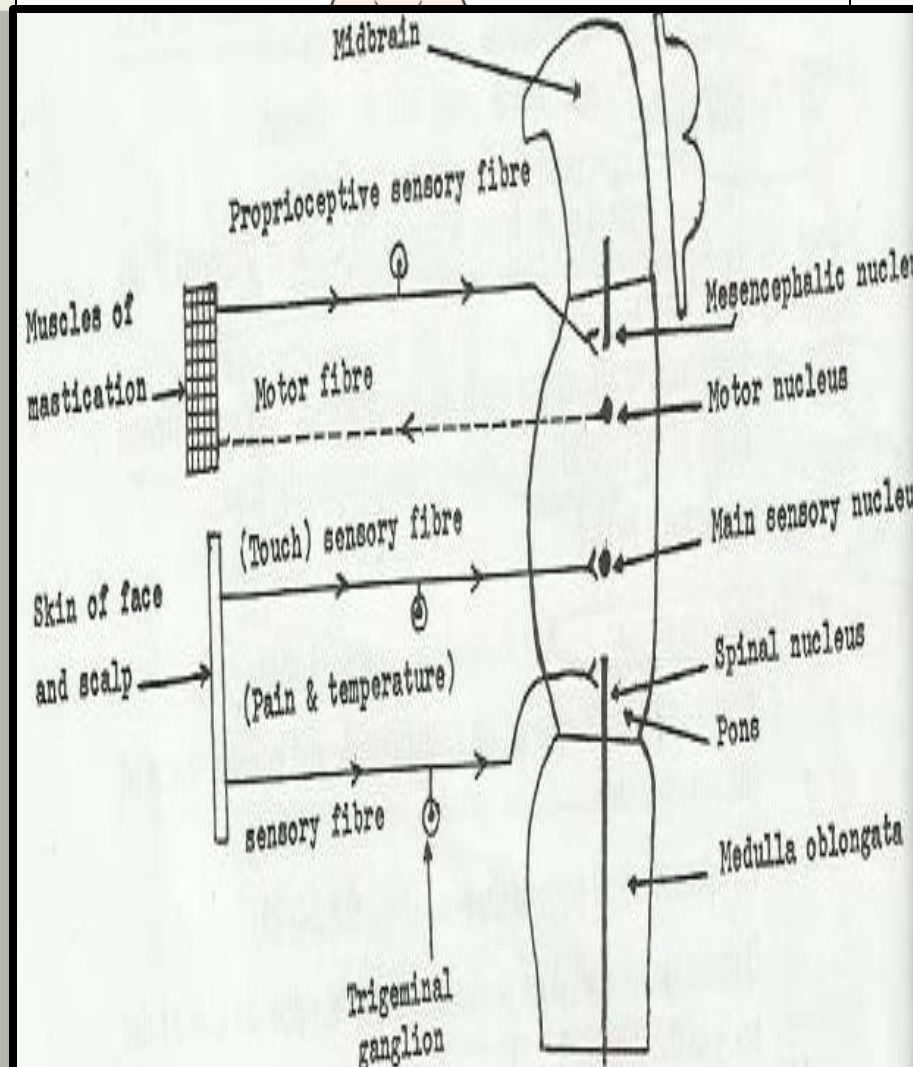
1. **Mesencephalic nucleus** (midbrain & pons): receives proprioceptive fibers from muscles of mastication.
2. **Principal (main) sensory nucleus** (pons): receives touch fibers from face & scalp
3. **Spinal nucleus** (pons, medulla & upper 2-3 cervical segments of spinal cord): receives pain & temperature sensations from face & scalp.

➤ **Special visceral efferent:**

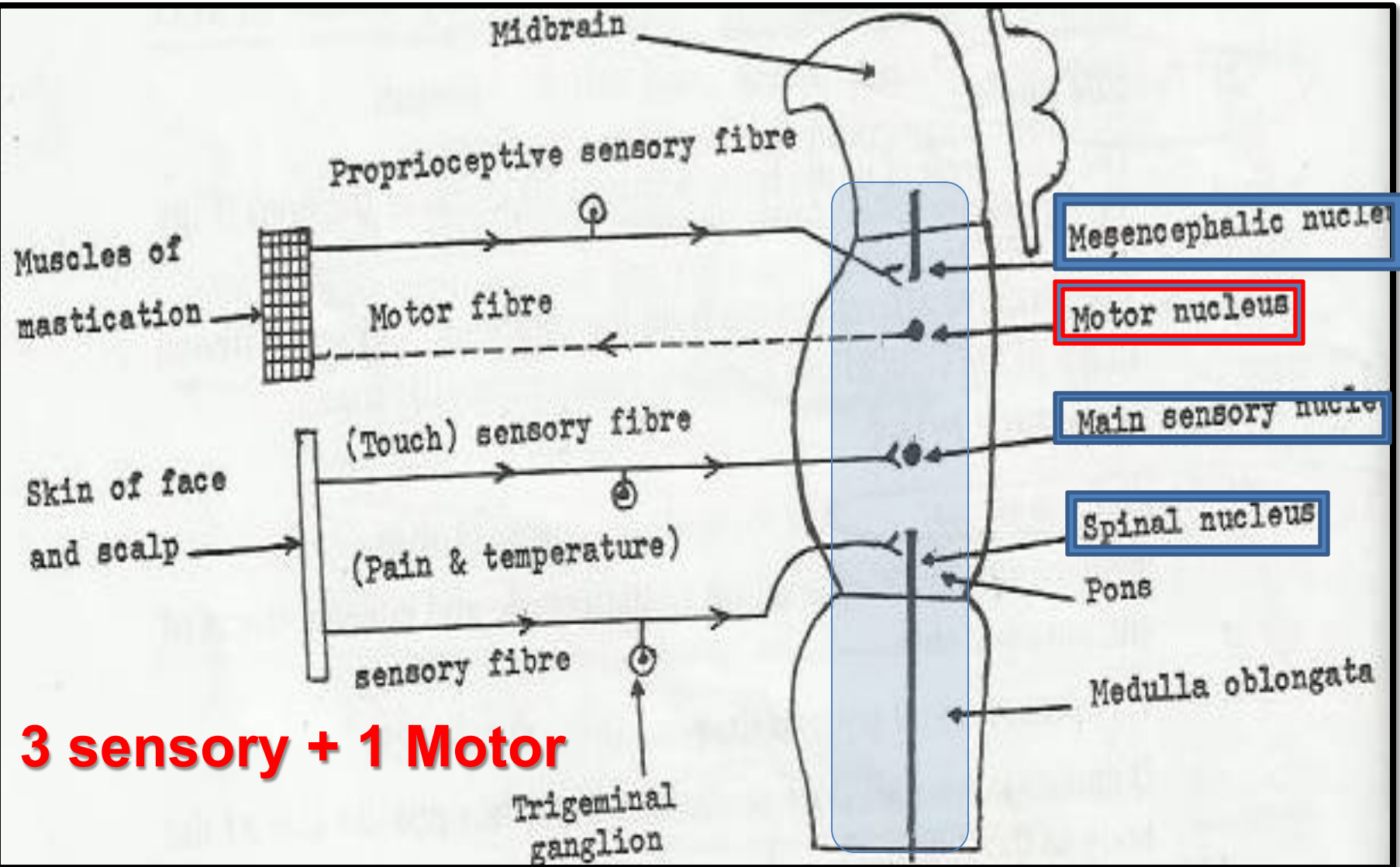
4. **Motor nucleus** (pons): supplies:

✓ **Four Muscles of mastication** (temporalis, masseter, medial & lateral pterygoid).

✓ **Other four muscles** (Anterior belly of digastric, mylohyoid, tensor palati & tensor tympani).

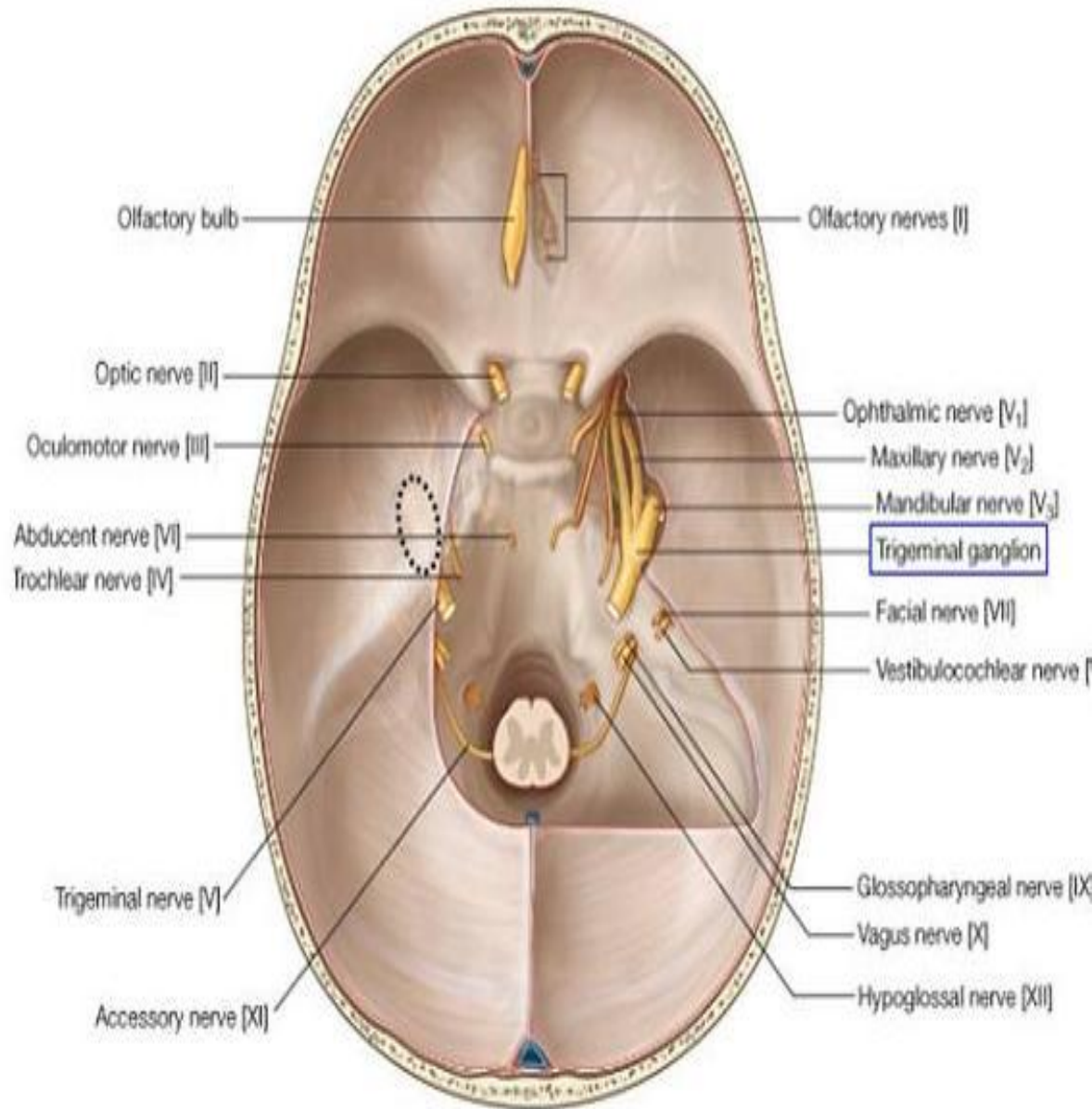


TRIGEMINAL NERVE NUCLEI (Deep origin)



TRIGEMINAL GANGLION

- **Site:**
- **Occupies a depression in the middle cranial fossa (temporal bone) known as **Trigeminal cave**.**
- **Importance:** Contains cell bodies :
 1. Whose **dendrites** carry sensations from the face.
 2. Whose **axons** form the sensory roots of trigeminal nerve.



TRIGEMINAL NERVE

➤ **Emerges** from the **middle** of the **ventral surface of the pons** by 2 roots (Large Lateral sensory root & small medial motor root).

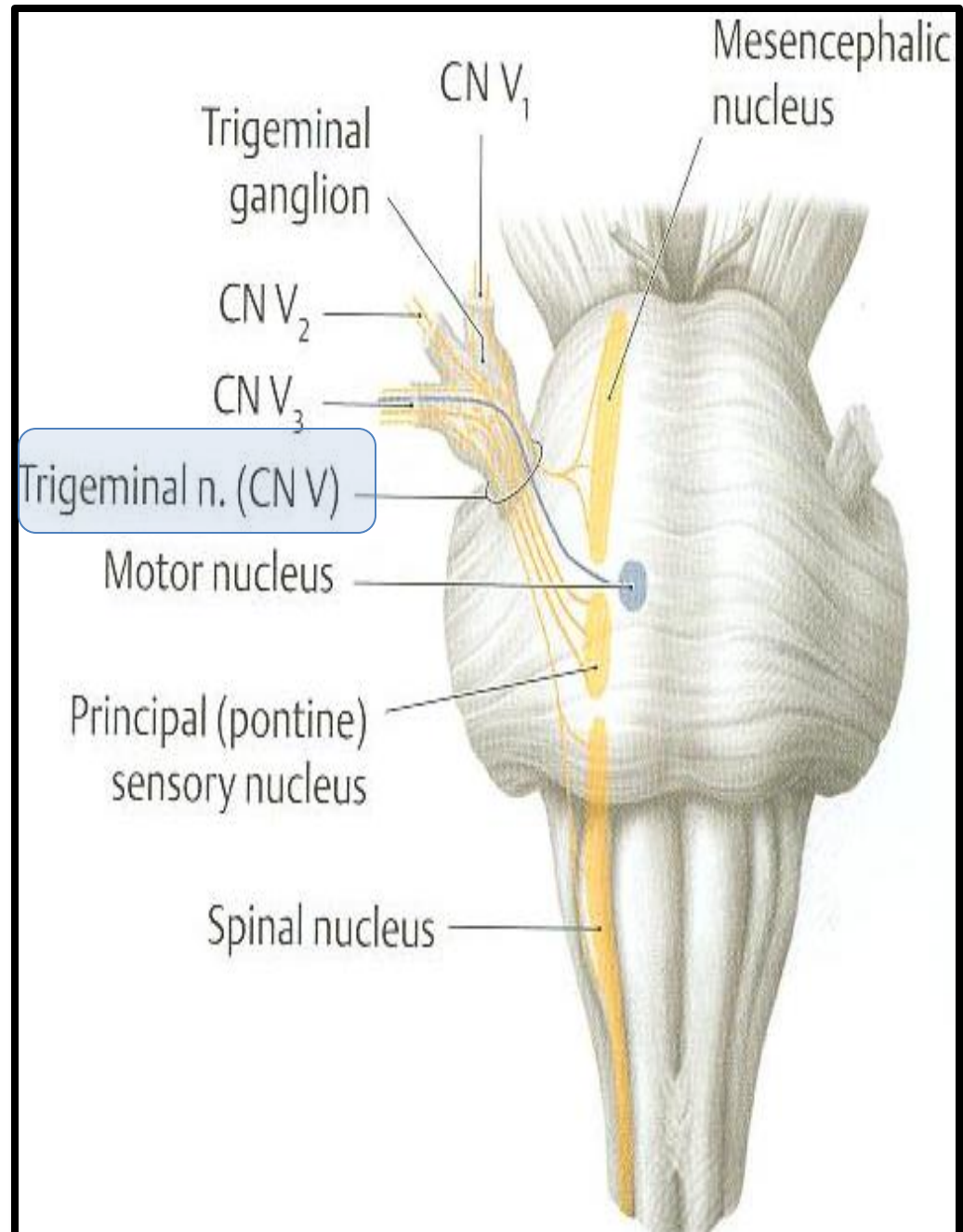
➤ **Divides into 3 divisions :** (dendrites of trigeminal ganglion):

1. **Ophthalmic.**

2. **Maxillary.**

3. **Mandibular.**

➤ Axons of cells of motor nucleus join **only** the mandibular division.



For you :

- Ophthalmic n.....passes through superior orbital fissure.
- Maxillary n.....passes through foramen rotundum.
- Mandibular n....passes through foramen ovale.

Trigeminal
nerve (V)

Ophthalmic nerve (V₁)

Maxillary nerve (V₂)

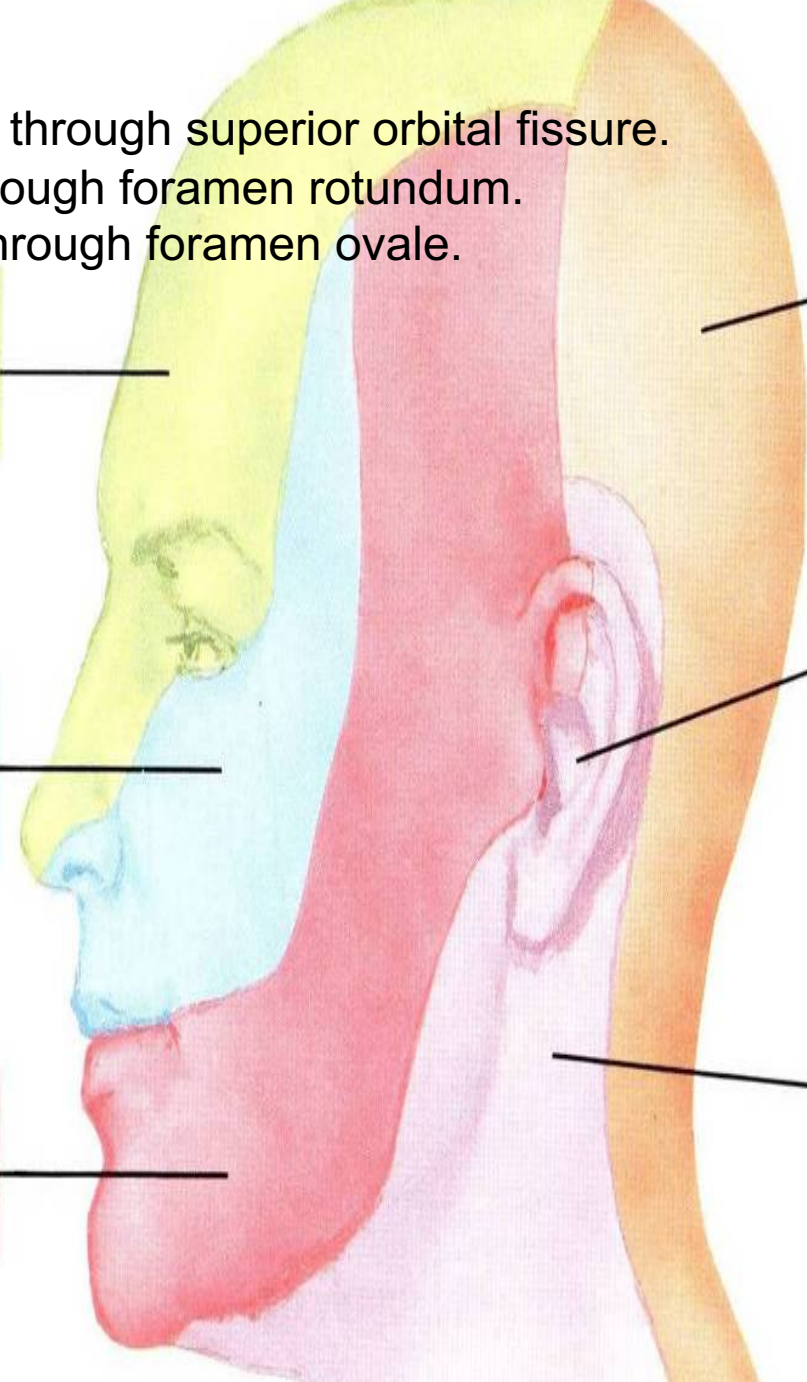
Mandibular nerve (V₃)

Dorsal rami of
cervical spinal
nerves

Auricular branch of
vagus to external
meatus and small
area on posteromedial
surface of auricle

Branches from
cervical plexus

*F. J. Netter
M.D.*

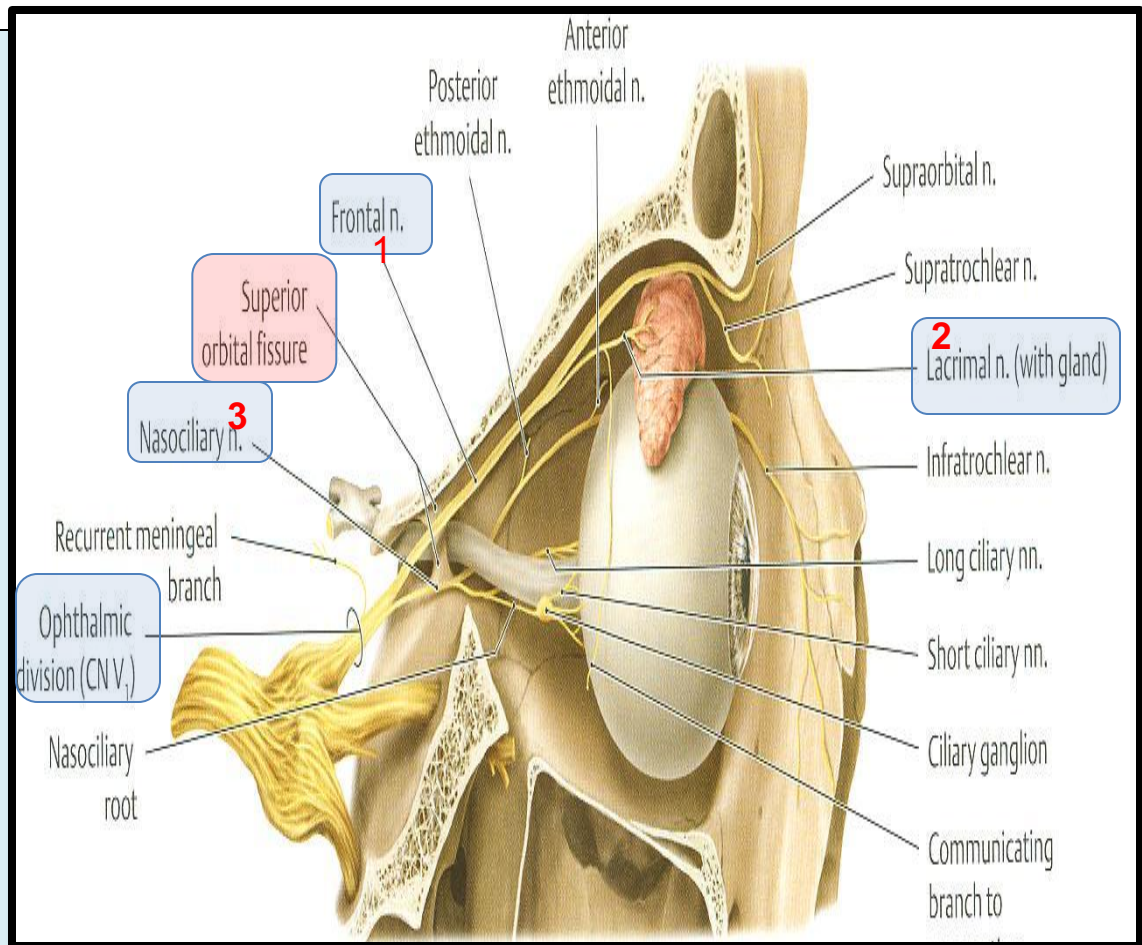


OPHTHALMIC (PURE SENSORY)

➤ Divides into 3 branches:

➤ **Frontal, Lacrimal & Nasociliary** which pass through superior orbital fissure to the orbit

1. **Frontal:** supplies **skin of face & scalp.**
2. **Lacrimal:** supplies **skin of face & lacrimal gland.**
3. **Nasociliary:** supplies **skin of face, nasal cavity & eyeball.**



MAXILLARY (PURE SENSORY)

➤ Supplies:

1. Upper teeth, gums & maxillary air sinus

(posterior, middle & anterior superior alveolar nerves).

1. Face: (zygomaticofacial & infraorbital nerves).

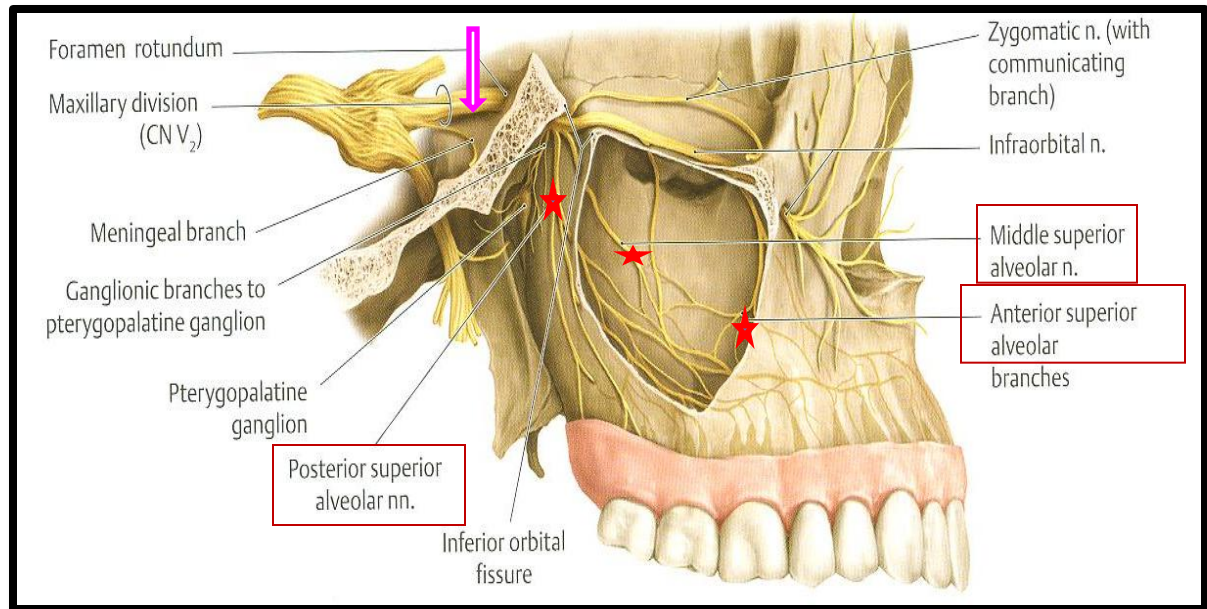
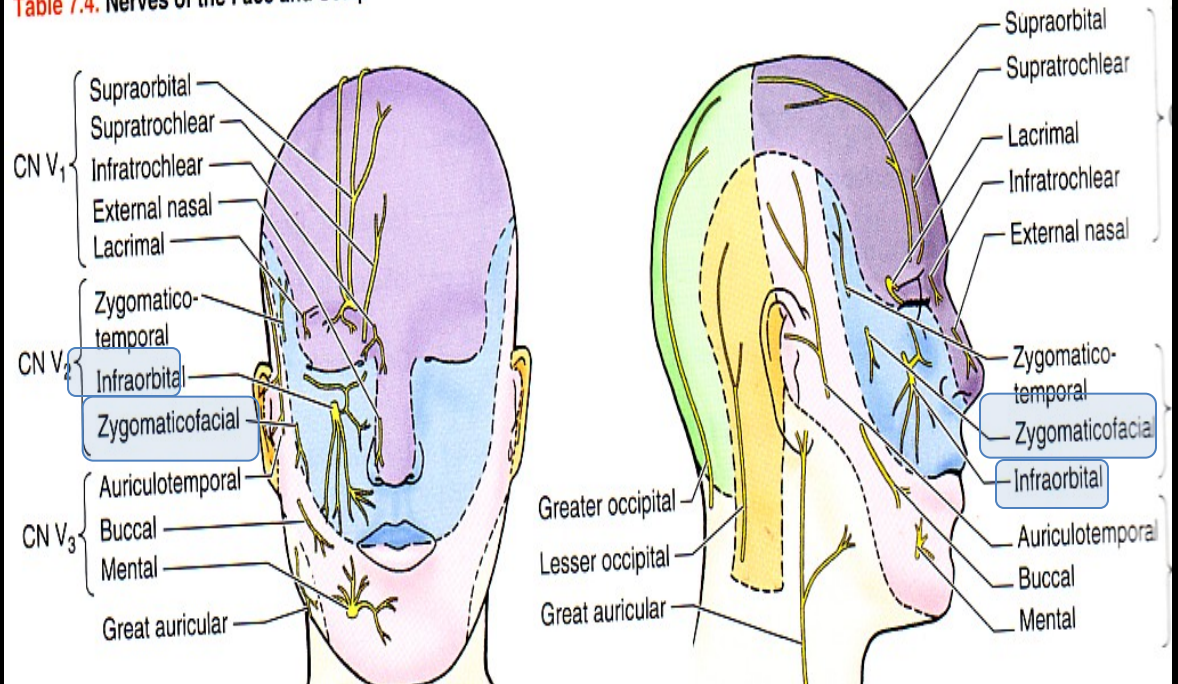
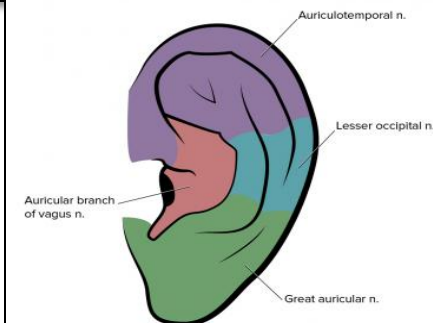
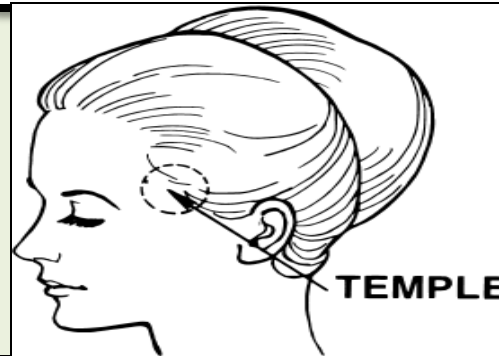
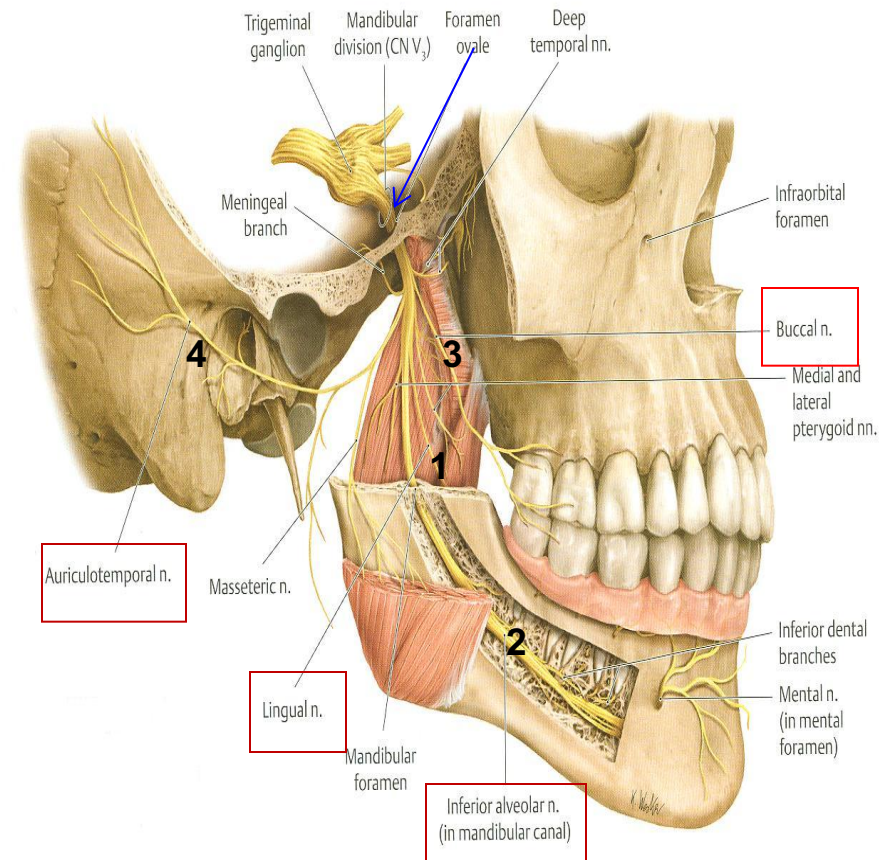


Table 7.4. Nerves of the Face and Scalp



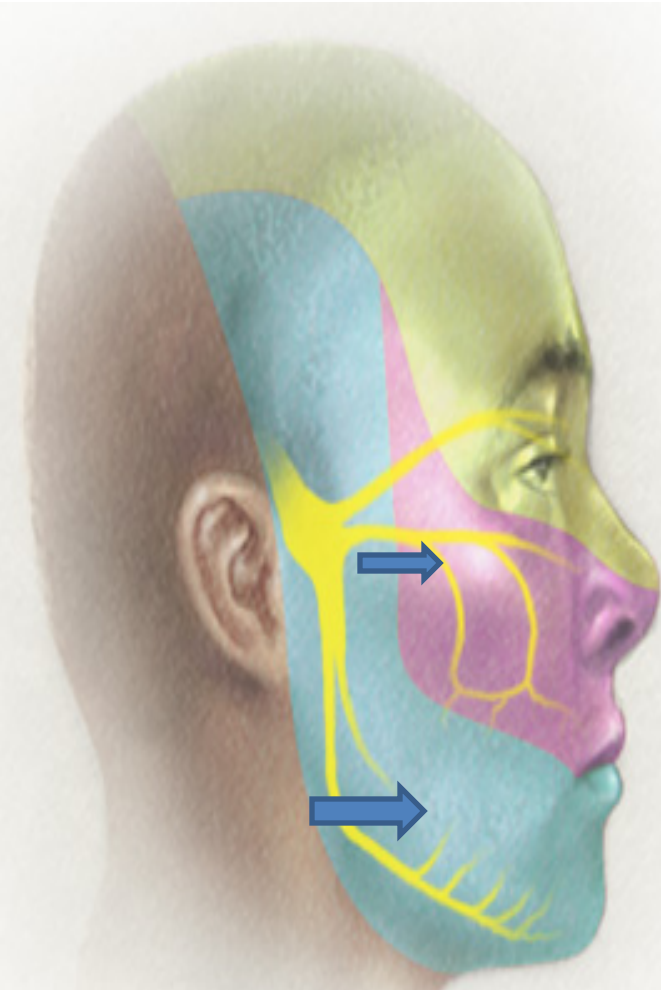
MANDIBULAR (MIXED)

- **Mandibular itself:** receives proprioceptive fibers from muscles of mastication.
- **SENSORY BRANCHES:** supplies various regions on the side of head.
 1. **Lingual:** receives General sensations from anterior 2/3 the of tongue.
 2. **Inferior alveolar:** supplies Lower teeth, gums & face (over mandible).
 3. **Buccal:** supplies Face (cheek on upper jaw)
 4. **Auriculotemporal:** supplies auricle, temple, parotid gland & TMJ.
- **MOTOR BRANCHES:** to **8 muscles** (4 muscles of mastication & other 4 muscles).



Trigeminal Neuralgia

- **Compression, degeneration or inflammation** of the **5th cranial nerve** may result in a condition called **trigeminal neuralgia** or **tic douloureux** (convulsions in the face).
- This condition is characterized by **recurring episodes (recurrent attacks) of intense stabbing pain (excruciating pain)** radiating **from** the angle of the jaw **along** a branches of the trigeminal nerve.
- **Usually involves maxillary & mandibular branches**, rarely in the ophthalmic division.



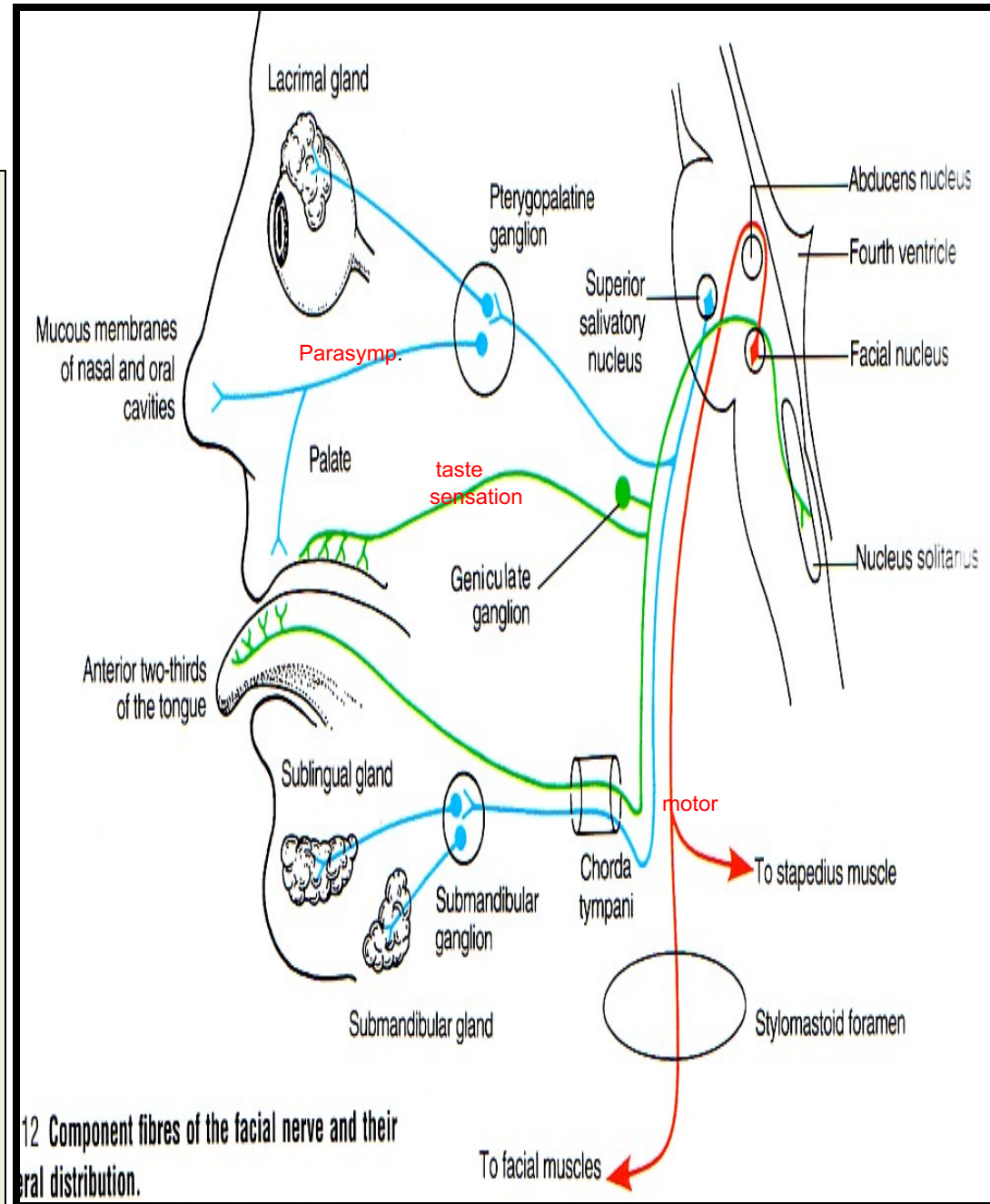
FACIAL NERVE

FACIAL NERVE

- **Type: Mixed** (special sensory, Motor, parasympathetic).

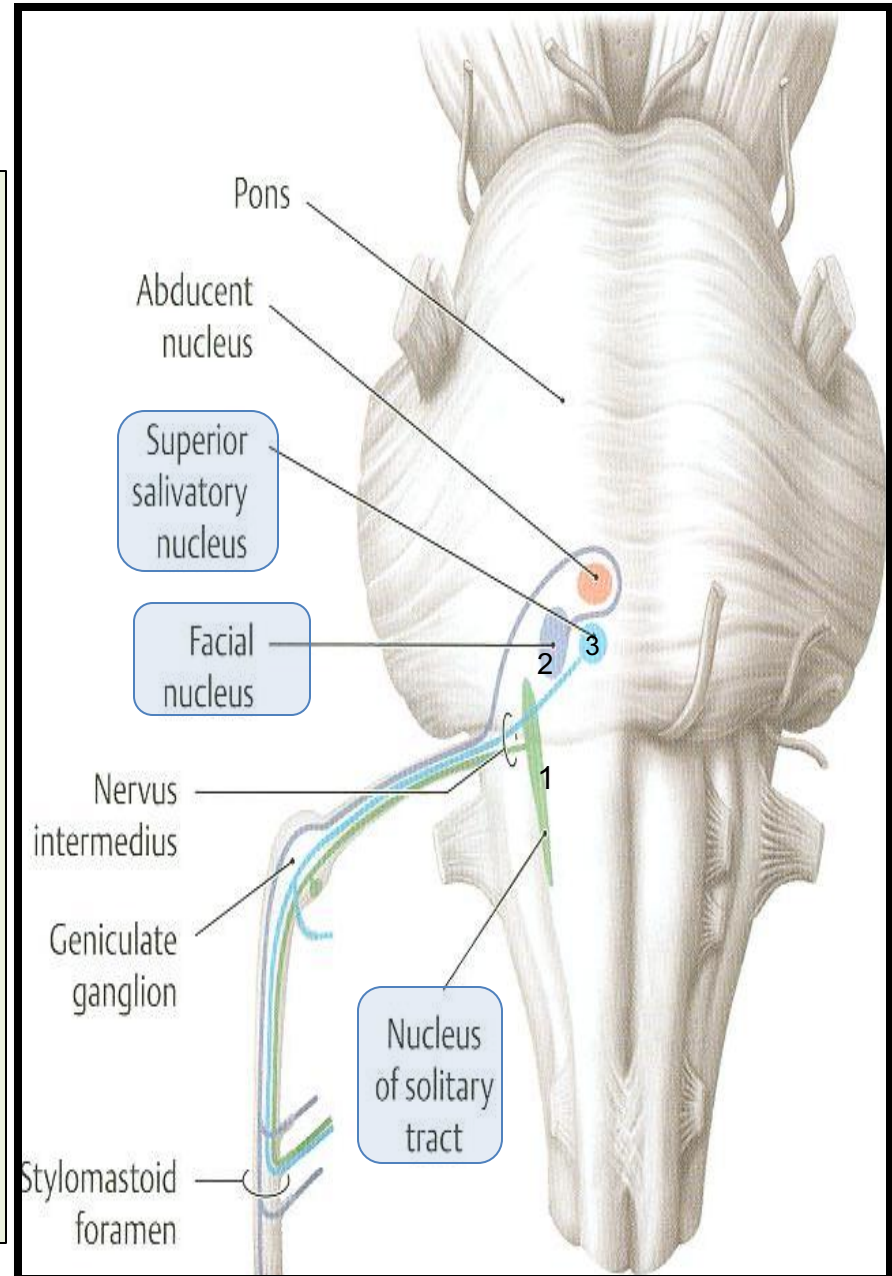
➤ **Fibers:**

1. **Special visceral afferent:** carrying taste sensation from anterior 2/3 of the tongue.
2. **Special visceral efferent:** supplying muscles developed from **the 2nd pharyngeal arch**.
3. **General visceral efferent:** supplying **parasympathetic secretory fibers** to submandibular, sublingual, lacrimal, nasal & palatine glands.



FACIAL NERVE NUCLEI

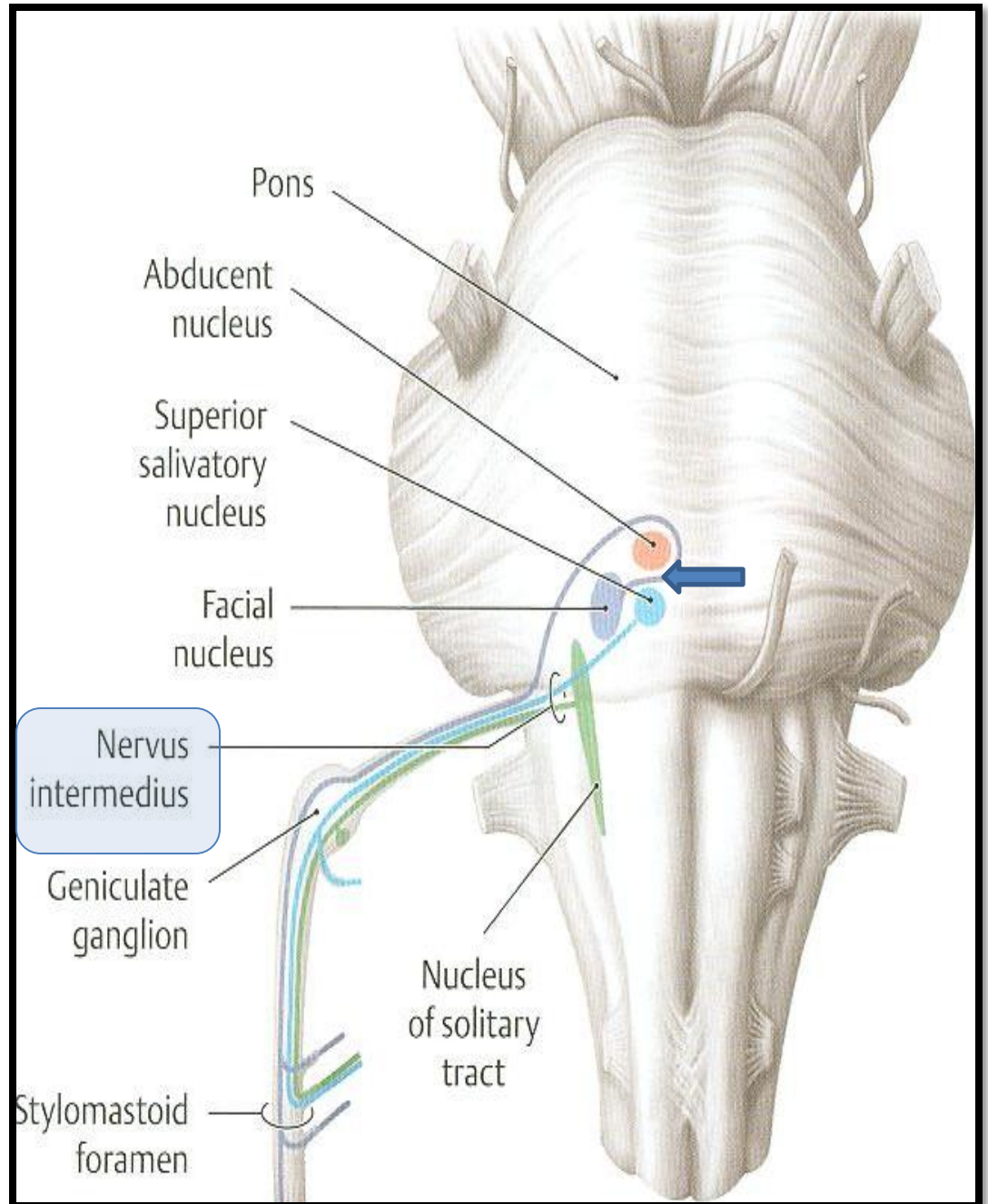
- 3 Nuclei :
- **Special visceral afferent: (nucleus solitarius):** receives taste from the anterior 2/3 of tongue.
- **Special visceral efferent: motor nucleus of facial nerve:** supplies: muscles of face, posterior belly of digastric, stylohyoid, platysma, stapedius, and occipitofrontalis.
- **General visceral efferent: superior salivatory nucleus:** sends preganglionic **parasympathetic secretory fibers** to sublingual, submandibular, lacrimal, nasal & palatine glands.



COURSE OF FACIAL NERVE

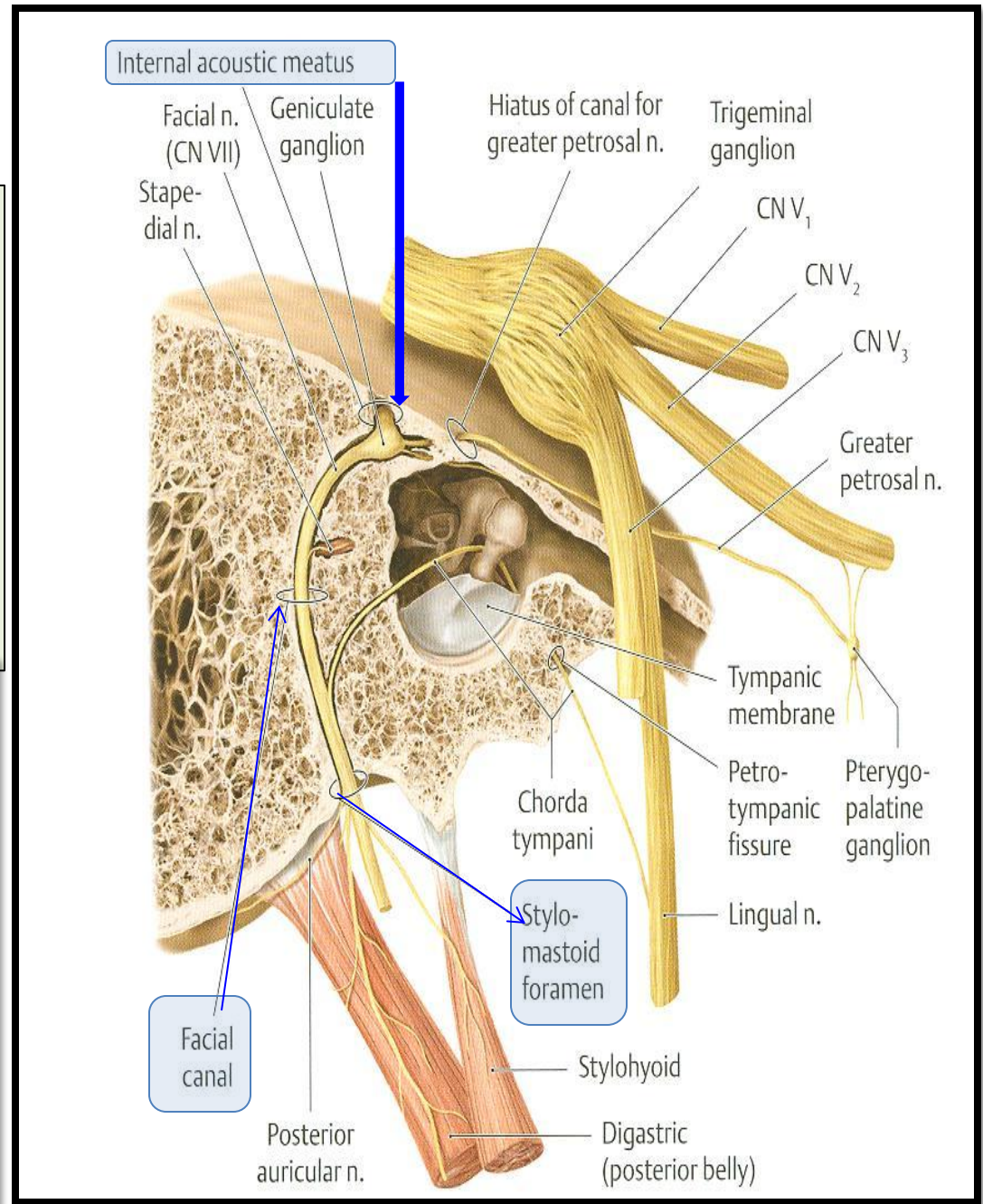
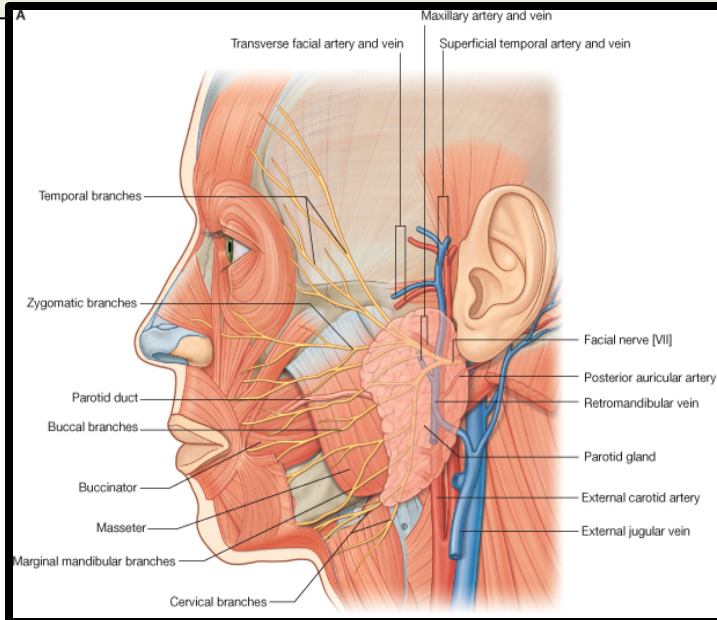
➤ Emerges from the cerebellopontine angle by 2 roots:

- 1. Medial motor root:** contains motor fibers.
- 2. Lateral root (nervus intermedius):** contains parasympathetic & taste fibers.



COURSE OF FACIAL NERVE

- Passes through internal auditory meatus to **inner ear** where it runs in **facial canal**.
- Emerges from the stylomastoid foramen & **enters the parotid gland** where it ends.

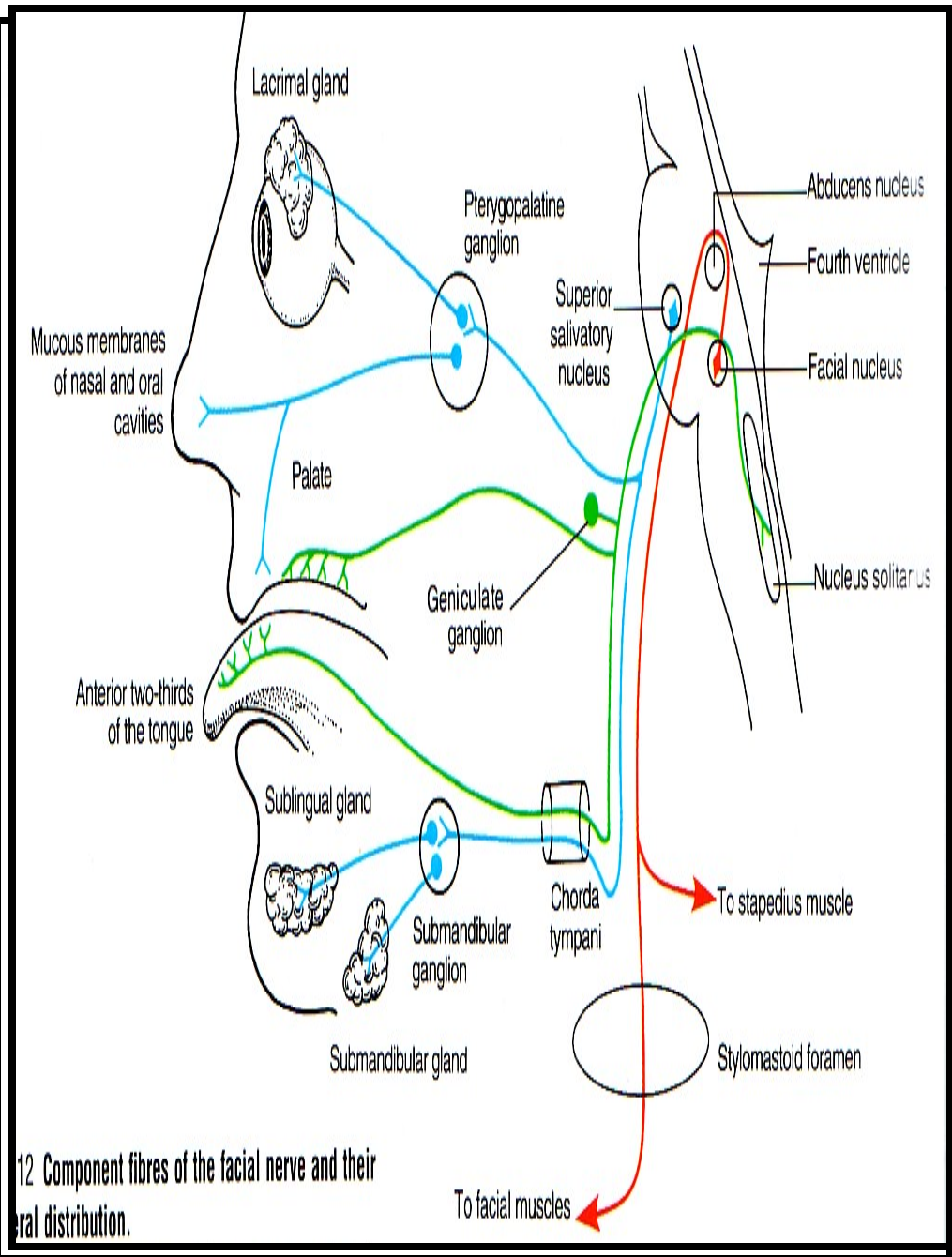


BRANCHES OF FACIAL NERVE

In facial canal:

- Greater petrosal nerve:** carries preganglionic parasympathetic fibers to lacrimal, nasal & palatine glands.
- Chorda tympani:** carries:
 - preganglionic parasympathetic fibers to submandibular & sublingual glands.
 - taste fibers from anterior 2/3 of tongue.
- Nerve to stapedius.** control the amplitude (range) of sound waves from the external environment to the inner ear.

N.B.: **Geniculate ganglion:** contains cell bodies of neurons of facial n. ; its fibres carrying taste sensations from anterior 2/3 of tongue; ending in solitary nucleus in M.O .
Lies in internal acoustic meatus.



12 Component fibres of the facial nerve and their oral distribution.

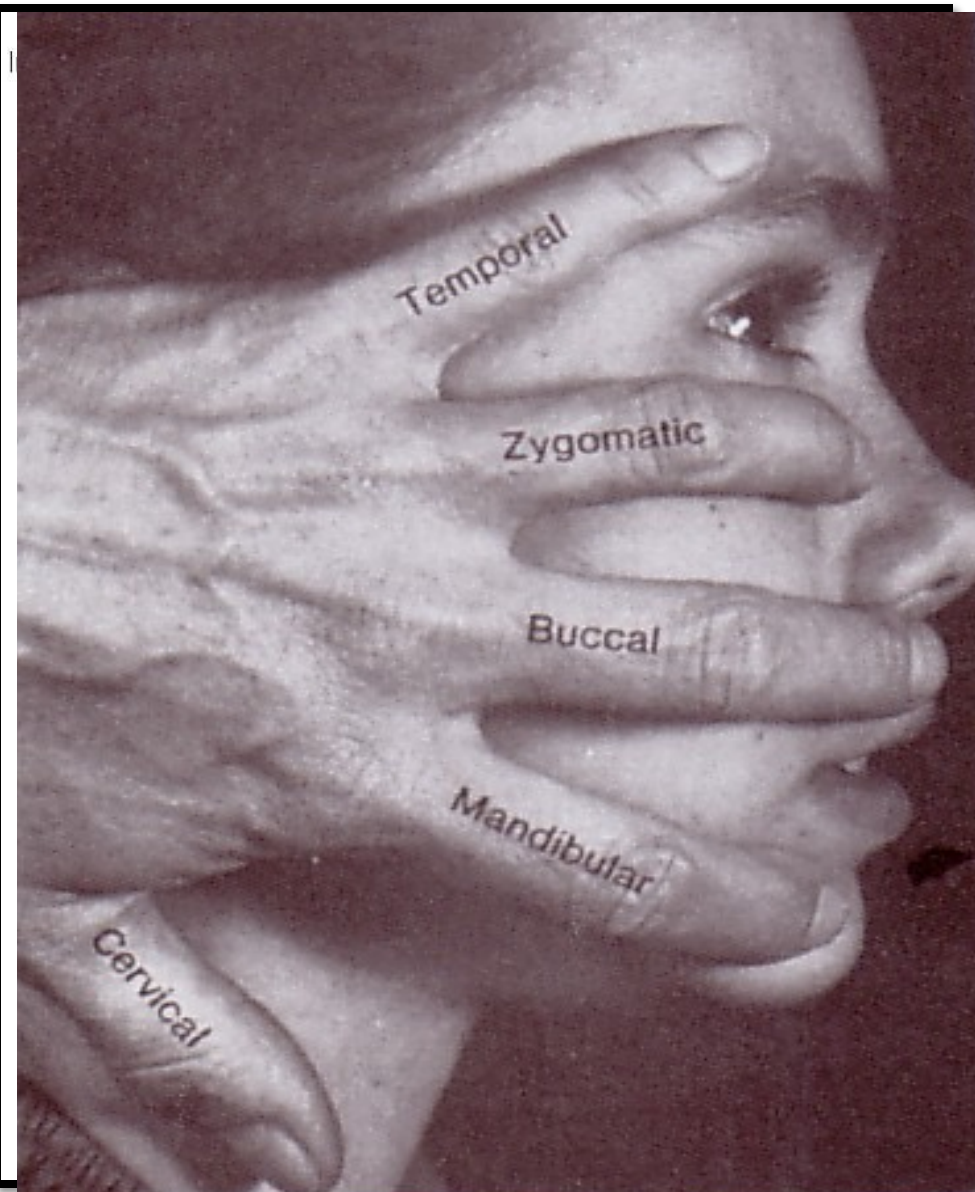
BRANCHES OF FACIAL NERVE

➤ Just as it emerges from the stylomastoid foramen it gives:

1. **Posterior auricular:** to **occipitofrontalis muscle.**
2. **Muscular** branches to **posterior belly of digastric & stylohyoid.**

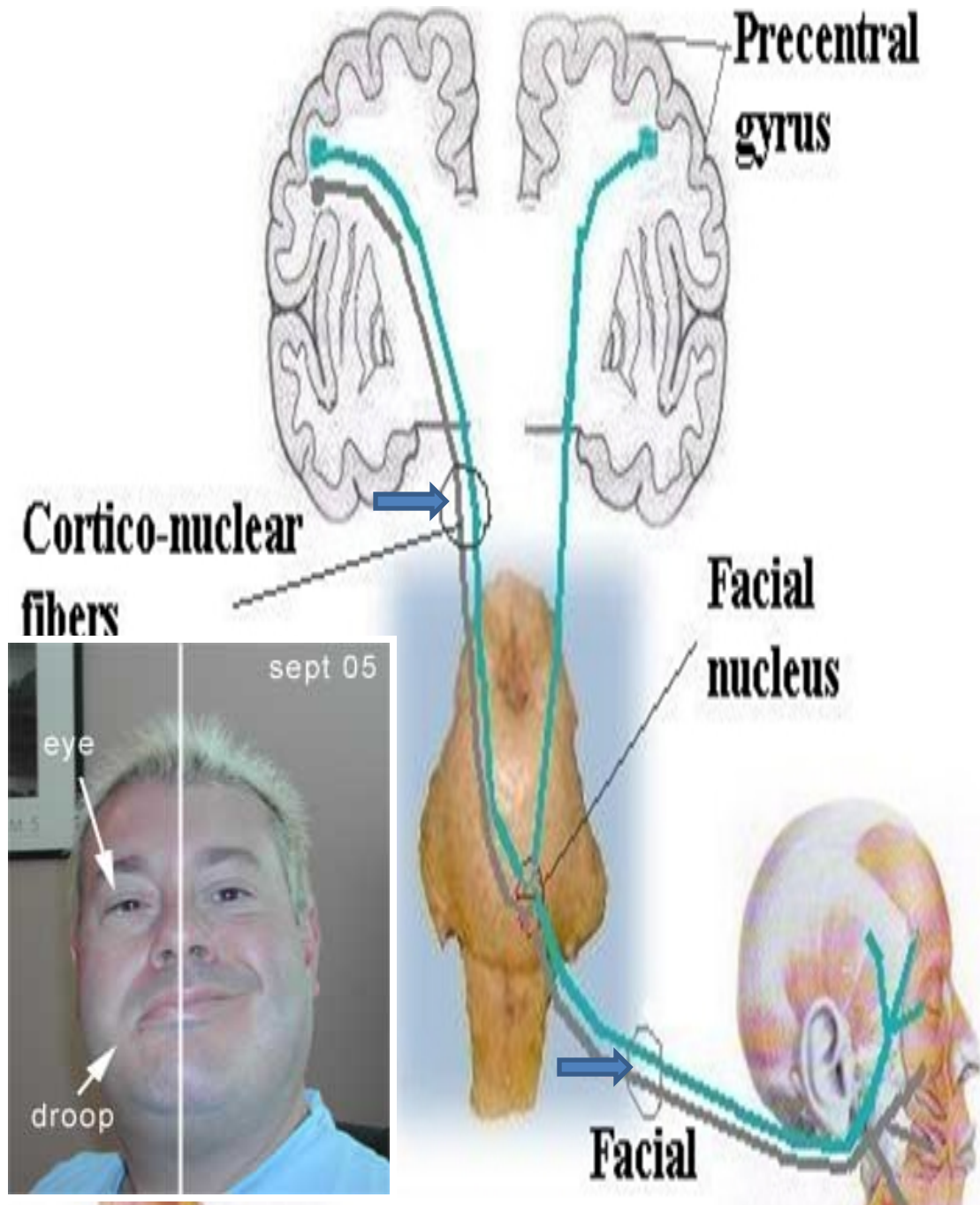
➤ **Inside parotid gland:** gives **5 terminal motor branches:**

- *Temporal,*
- *Zygomatic,*
- *Buccal,*
- *Mandibular &*
- *Cervical... (for platysma ms.)*
To the muscles of the face.



Bell's Palsy

- **Damage of the facial nerve results in paralysis of muscles of facial expressions** : Facial (Bell's) palsy; lower motor neuron lesion (whole face affected)
- NB. In upper motor neuron lesion (upper face is intact) .
- **Face is distorted:**
 - Drooping of lower eyelid,
 - Sagging of mouth angle,
 - Dribbling of saliva,
 - Loss of facial expressions,
 - Loss of chewing,
 - Loss of blowing,
 - Loss of sucking,
 - Unable to show teeth or close the eye **on that side.**



THANK YOU & BEST LUCK

SUMMARY

- Both trigeminal & facial nerves are **mixed**.
- Nuclei of trigeminal nerve are found in **midbrain, pons & medulla**. They are of the general somatic **afferent** & special visceral **efferent** types.
- The trigeminal nerve emerges from the **pons** and **divides into: ophthalmic, maxillary & mandibular divisions** that **receive sensory supply from the face** (with an exception of a small area over ramus of mandible by great auricular nerve C2,3).
- **All motor fibers** are included in the **mandibular division** & supply muscles of mastication.

SUMMARY

- Nuclei of facial nerve are found in **pons**. They are of the special visceral **afferent** & **efferent** types, as well as general visceral **efferent** type.
- The facial nerve emerges from the **cerebellopontine angle**, gives **motor fibers** to **muscles of facial expression**, **secretory fibers** to submandibular, sublingual, lacrimal, nasal & palatine glands & receives **taste fibers** from anterior 2/3 of tongue.

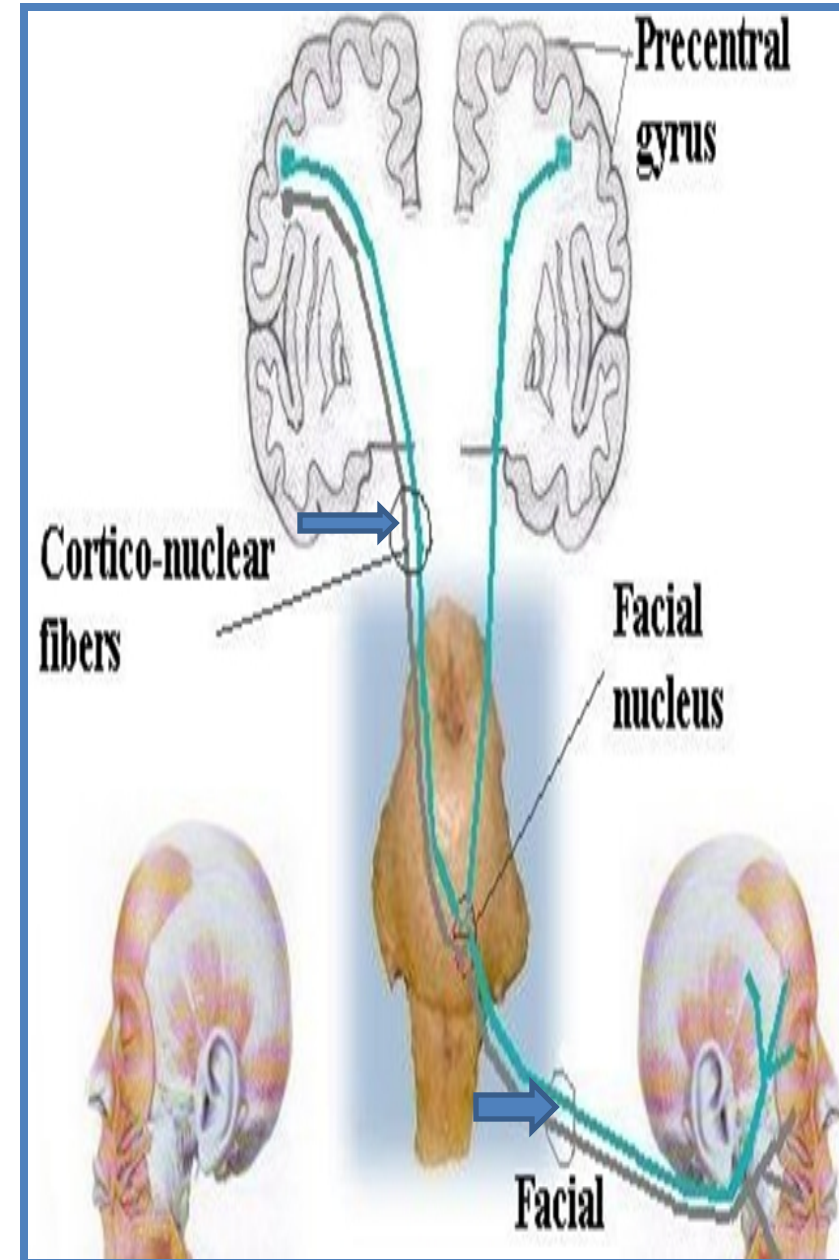
Lower Motor Neuron Lesion

- **Results from injury of facial nerve fibres below facial nucleus** as in internal acoustic meatus; in the middle ear; in the facial canal or in parotid gland.
- Manifested by **complete paralysis of facial muscles** on the same side of lesion.

Upper Motor Neuron Lesion

- This occurs after **injury to the pyramidal tract (corticospinal) above facial nucleus...**
- Leads to **paralysis of facial muscles of lower ½ of face** of opposite side but the upper ½ of the face intact because :
 - **Ms. of lower ½ of face** receive pyramidal fibres from opposite cerebral cortex only,
 - **While Ms. of upper ½ of face** receive pyramidal fibres from both cerebral hemispheres (Bilateral represented).

For the Students



TEST YOUR SELF !

➤ **Stimulation of which of the following nerves could lead to salivation and lacrimation?:**

- a) Facial.
- b) Glossopharyngeal.
- c) Trigeminal.
- d) Vagus.

➤ **Lesion of mandibular nerve may result in:**

- a) Loss of sensation of skin over the nose.
- b) Loss of lacrimation.
- c) Loss of sensory supply of upper teeth.
- d) Loss of general sensations of anterior 2/3 of tongue.