PERIPHERAL NERVOUS SYSTEM

MANDIBULAR NERVE (V3)

Dr. Aiman Qais Afar

Surgical Anatomist

College of Medicine / University of Mutah

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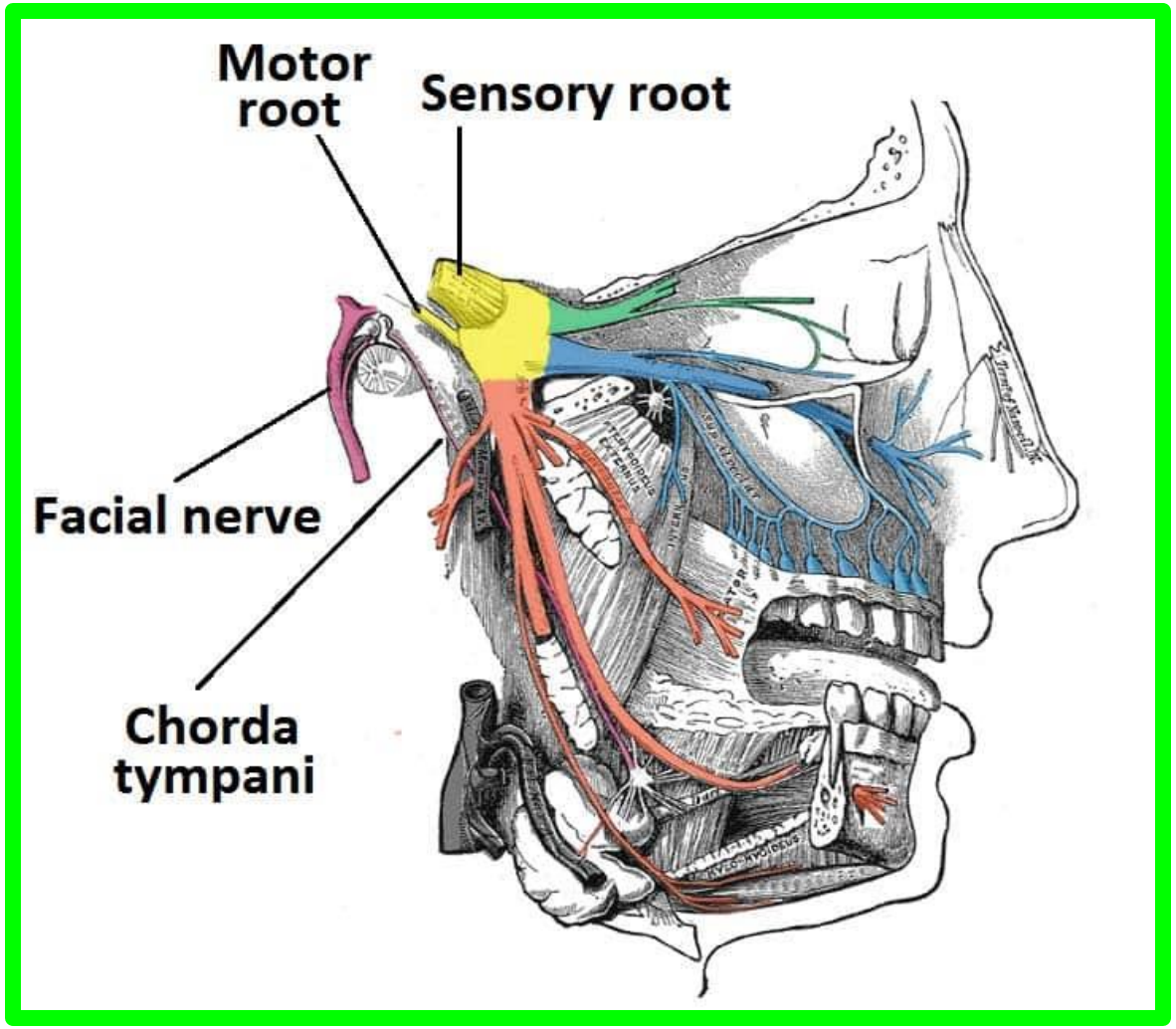
Monday 24 February 2025

Mandibular Nerve (V3)

- It is the 3rd division of trigeminal nerve.
- Is both motor and sensory
- It is formed of 2 roots:

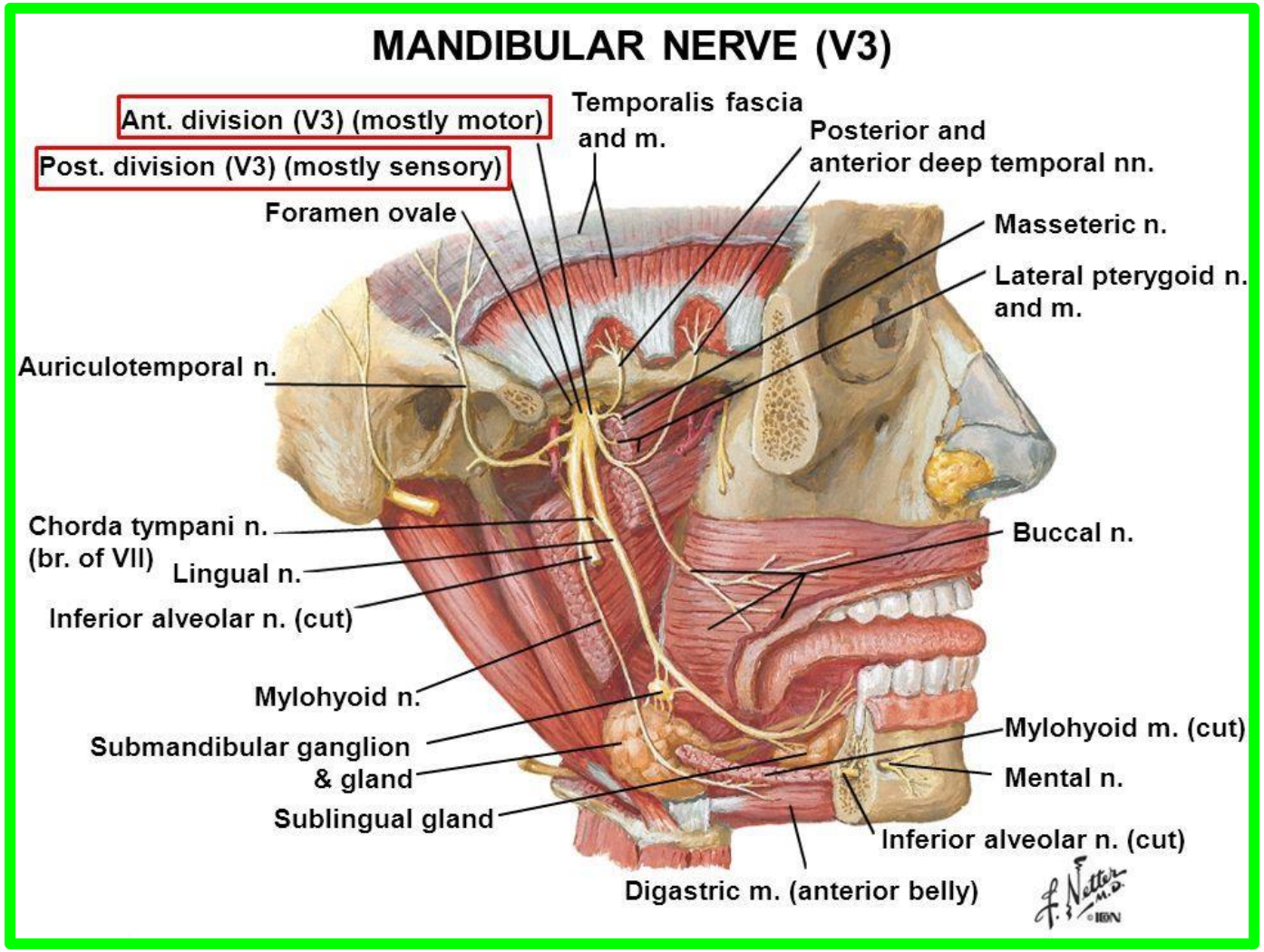


- ✓ **Sensory root:** arises from the trigeminal ganglion and runs forwards and laterally towards the foramen ovale.
- ✓ **Motor root:** a smaller root which arises from the motor nucleus of the trigeminal nerve in the pons and join the sensory root in the foramen ovale.

Mandibular Nerve (V3)

✓ The main trunk descends through the foramen ovale to reach the infratemporal fossa where it is related:

- ❖ Laterally to lateral pterygoid muscle.
- ❖ Medially to otic ganglion, medial pterygoid and tensor palate muscles.
- ❖ Posteriorly to middle meningeal artery.



Branches of the Mandibular Nerve (V3)

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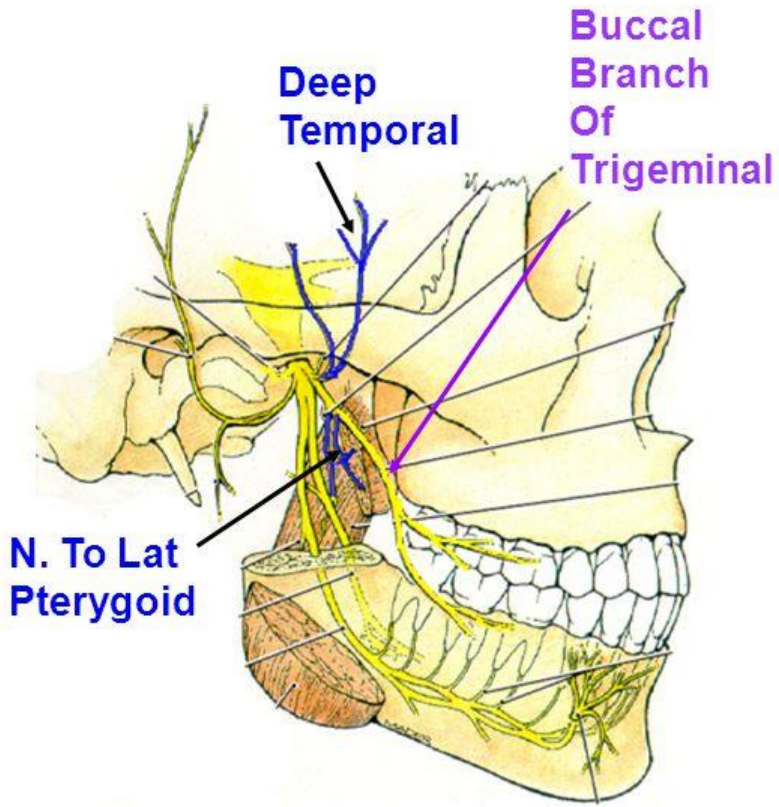
Branches from the Main Trunk of the Mandibular Nerve

(1)Nervus spinosus (sensory):
it enters the cranial cavity through the foramen spinosum (with middle meningeal artery) to the meninges.

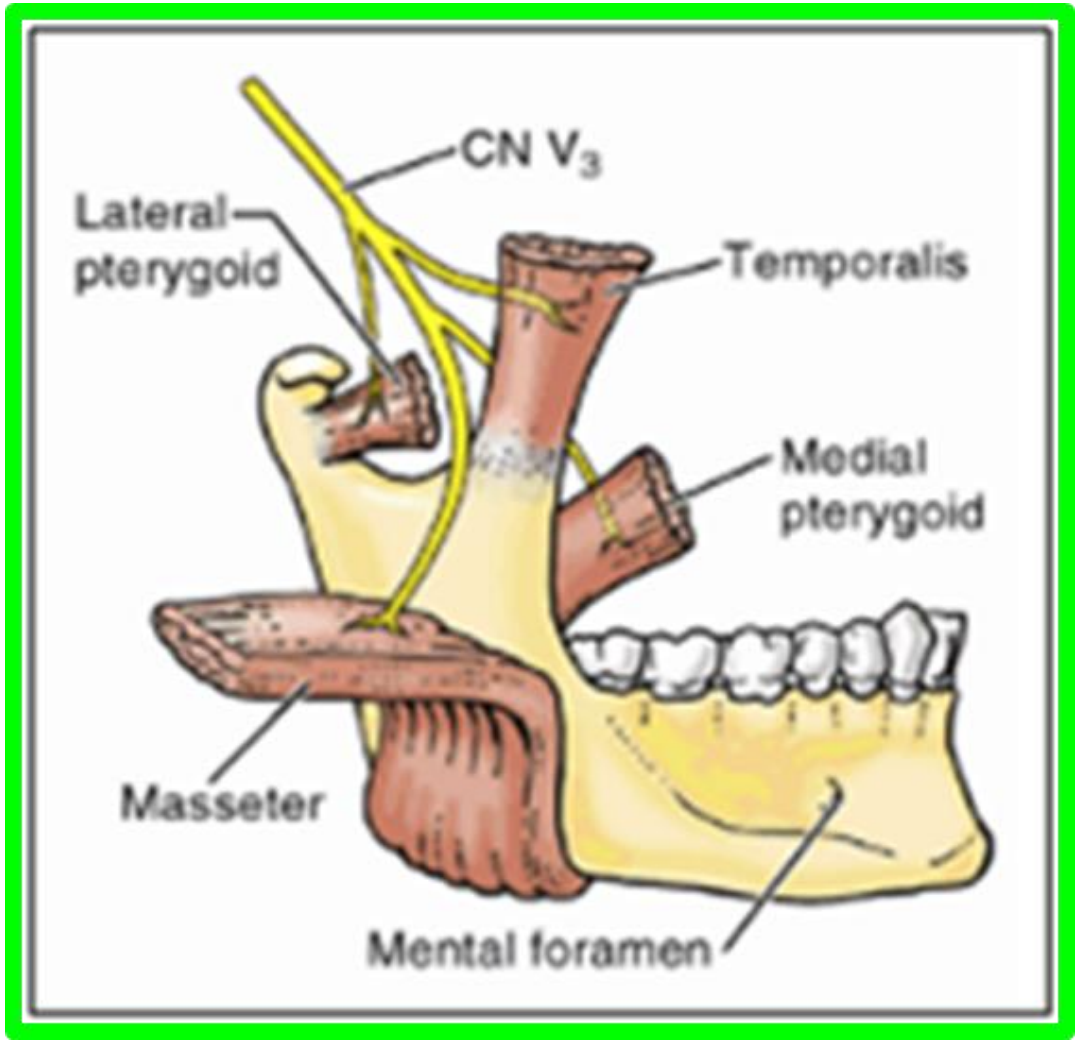


Branches of the Mandibular Nerve (V3)

Branches from the Main Trunk of the Mandibular Nerve

(2) Nerve to medial pterygoid (motor) supplies the muscle.

It also gives a branch which traverses the otic ganglion without relay to supply the tensor veli palatini and tensor tympani muscles.

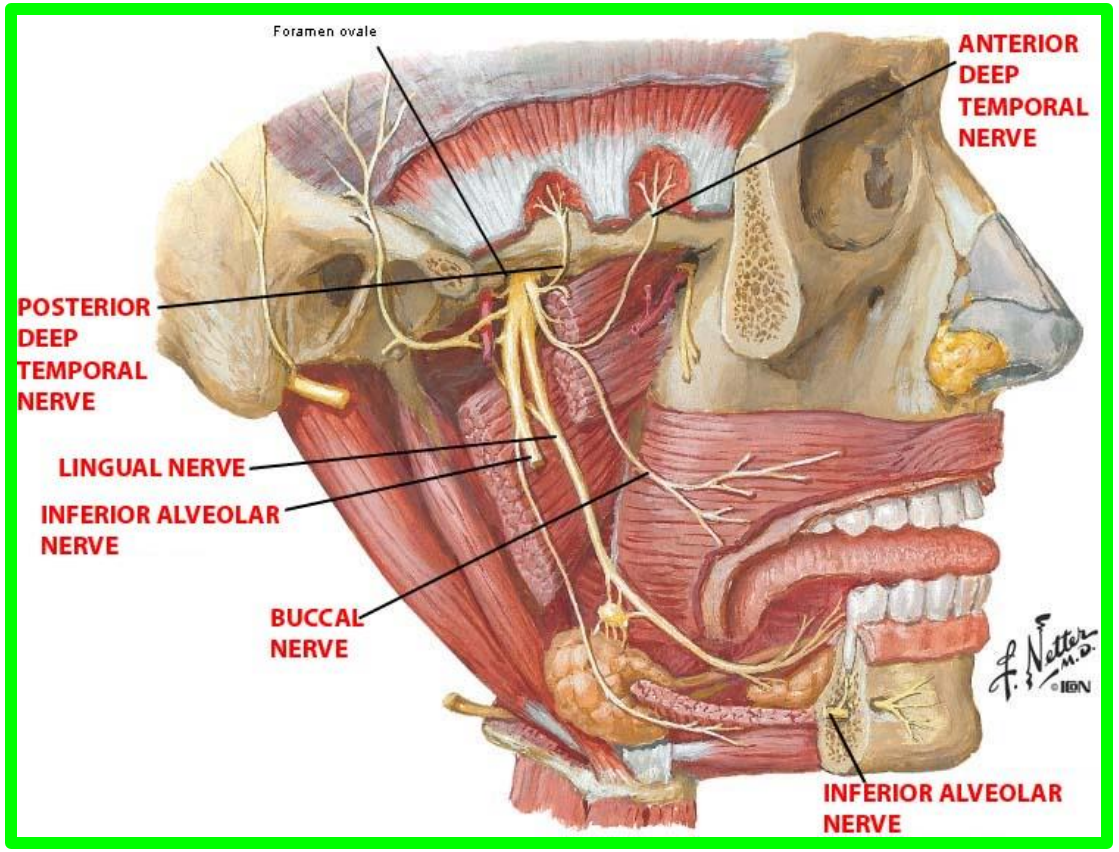


Branches of the Mandibular Nerve (V3)

Branches from the Anterior Division of the Mandibular Nerve

- Masseteric nerve to the masseter muscle
- Deep temporal nerves to the temporalis muscle
- Nerve to the lateral pterygoid muscle
- Buccal nerve to the skin and the mucous membrane of the cheek

The buccal nerve does not supply the buccinator muscle (which is supplied by the facial nerve), and it is the only sensory branch of the anterior division of the mandibular nerve

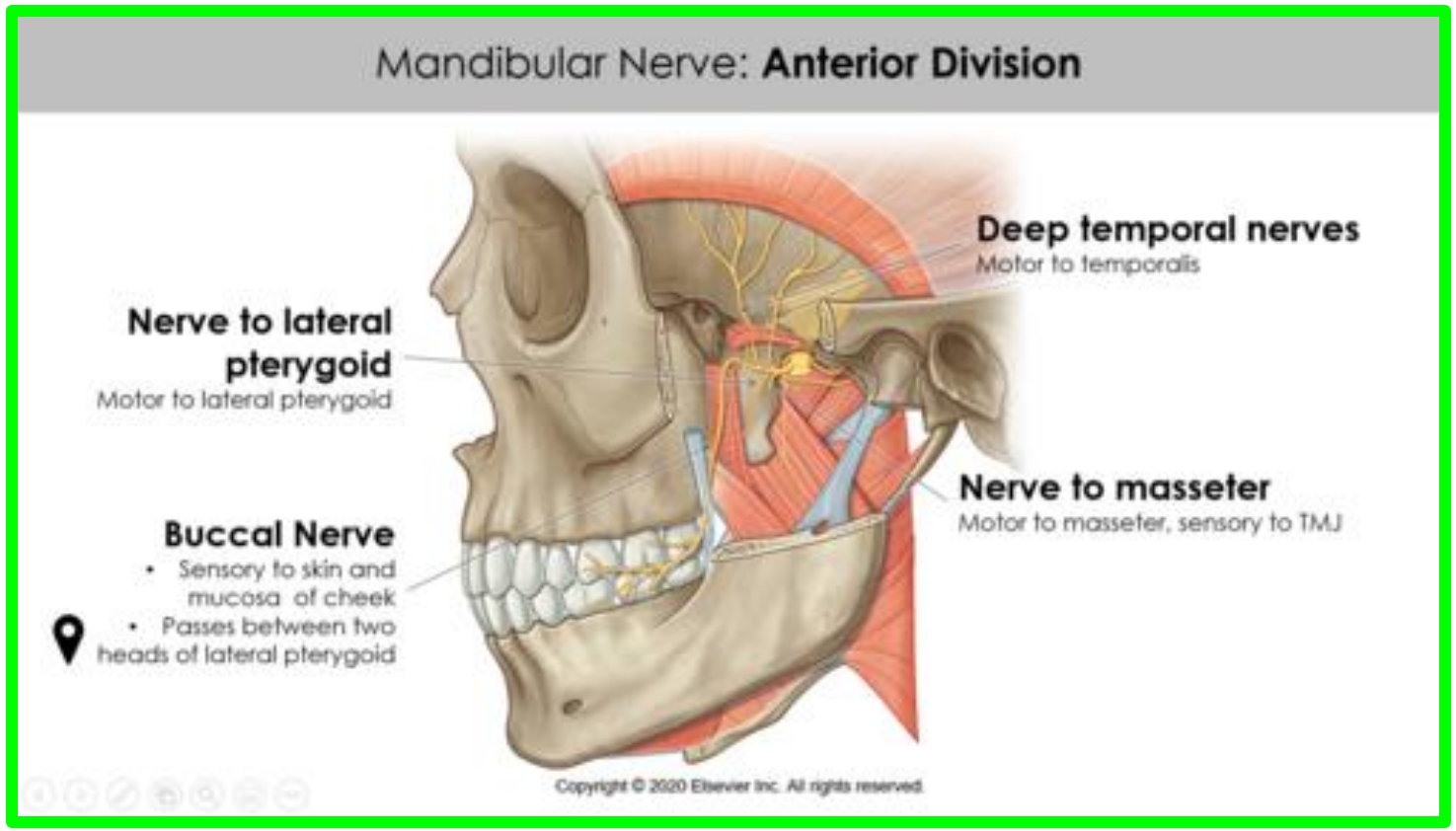


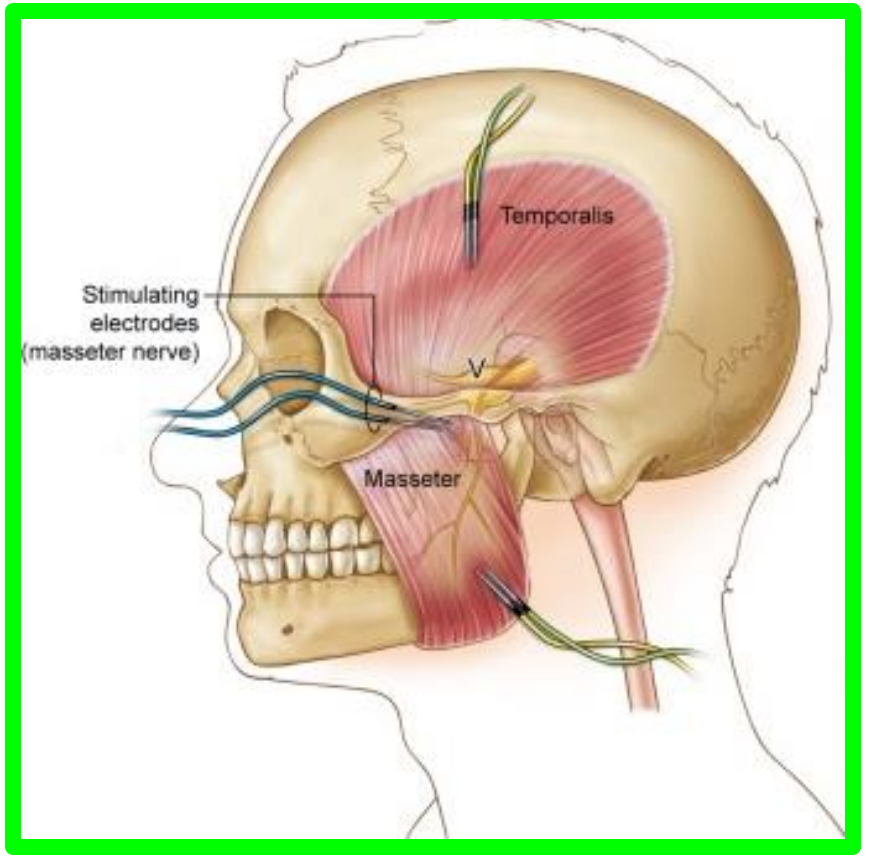
Branches from the Anterior Division of the Mandibular Nerve

(1)**Masseteric nerve:** passes above the upper border of lateral pterygoid muscle to the deep surface of the masseter muscle.

(2)**Nerve to lateral pterygoid:** enter the deep surface of the muscle.

(3)**2 deep temporal nerves:** pass above the upper border of lateral pterygoid to the deep surface of the temporalis muscle.

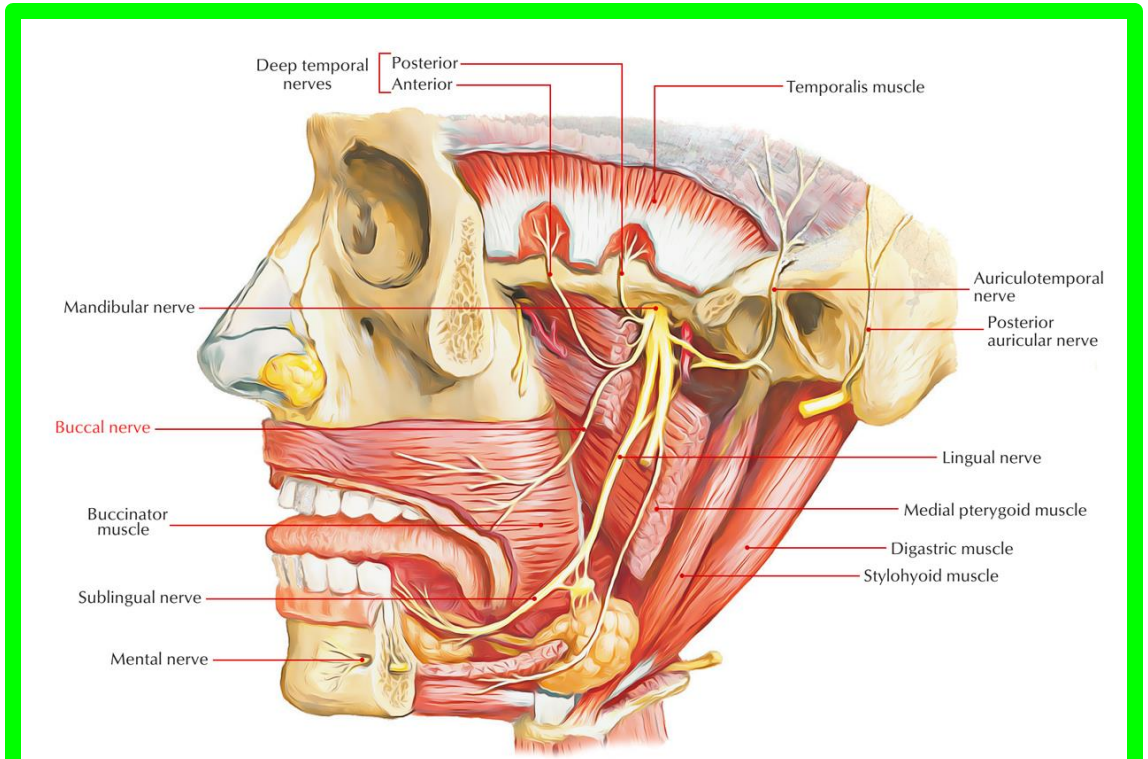


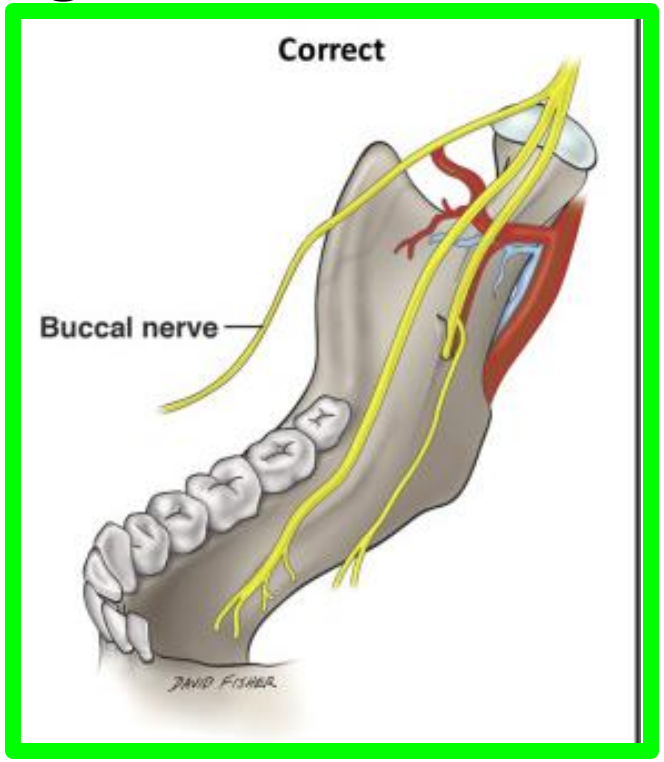


Branches from the Anterior Division of the Mandibular Nerve

(4) Buccal nerve (sensory)

- Passes between the 2 heads of the lateral pterygoid muscle.
- Then it passes forward deep to the ramus of mandible till the anterior border of the masseter muscle.
- It supplies : A. the skin covering the buccinator .
  B. The mucous membrane of the cheek and gums





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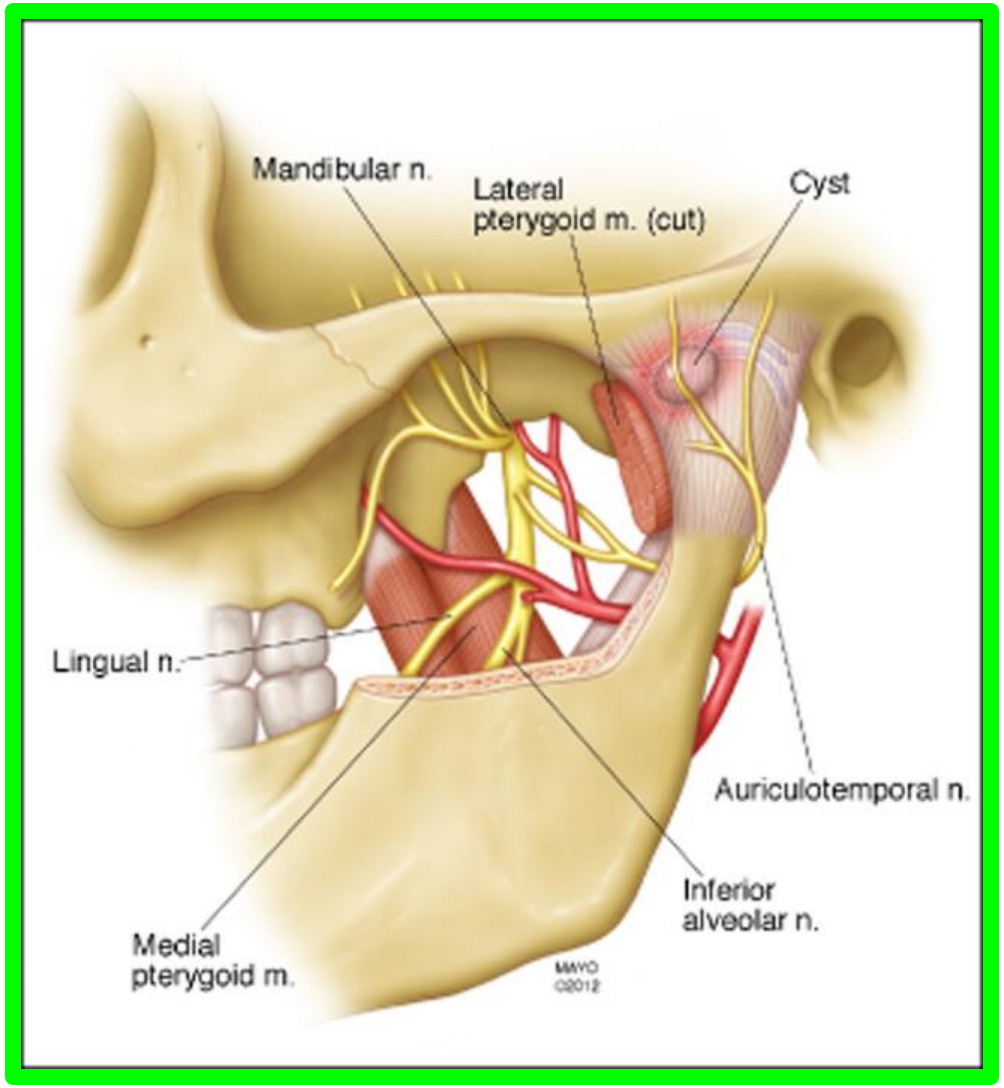
Branches of the Mandibular Nerve (V3)

Branches from the Posterior Division of the Mandibular Nerve

■ Auriculotemporal nerve

- ✓ It arises by 2 roots which surround the middle meningeal artery.
- ✓ It passes backwards deep to the neck of the mandible, then enters the parotid gland.
- ✓ It appears at its upper pole behind the superficial temporal vessels (VAN).
- ✓ It ascends in front of the auricle to terminate in the temporal fossa.

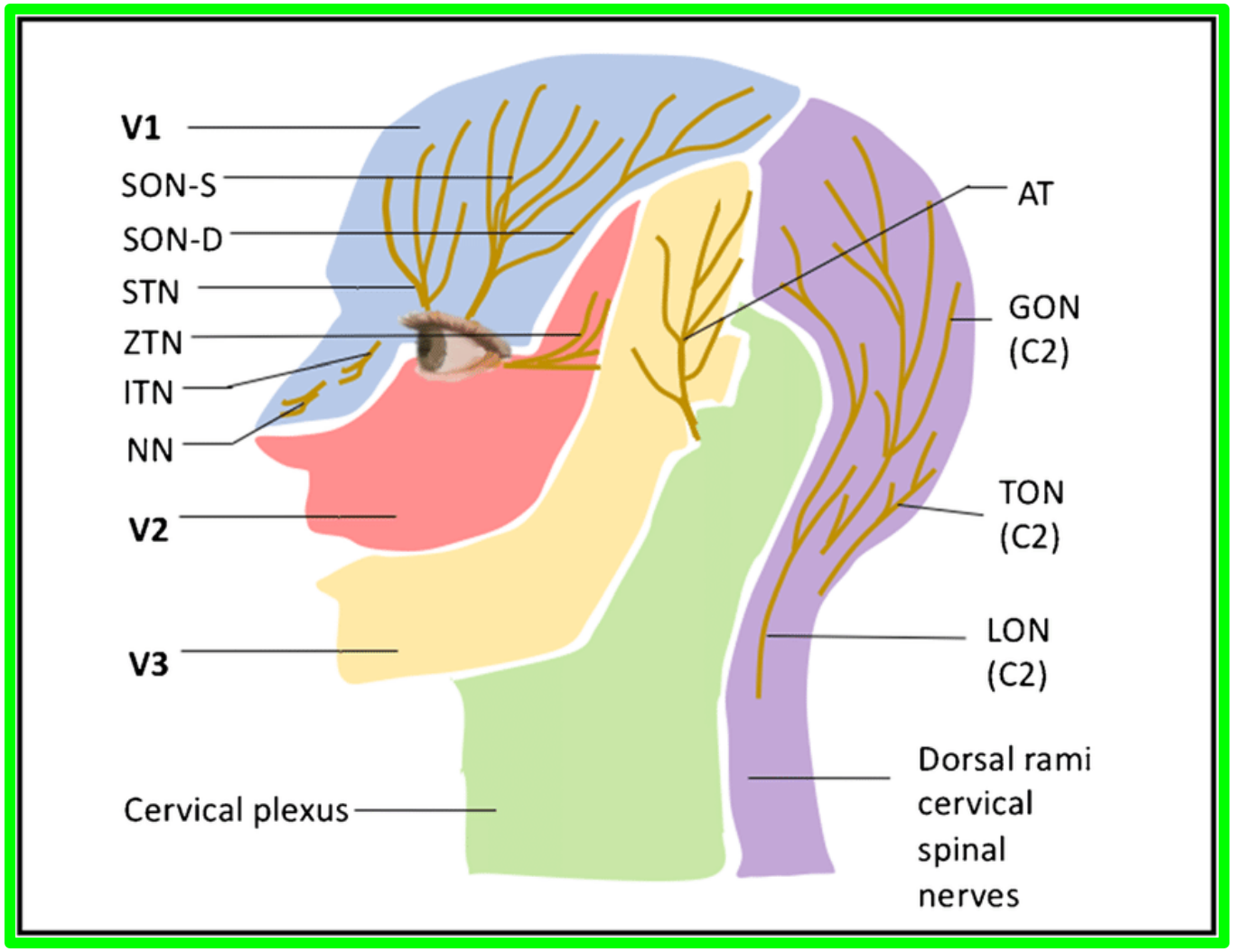


Branches from the Posterior Division of the Mandibular Nerve

■ Auriculotemporal nerve

**** Branches, It supplies;**

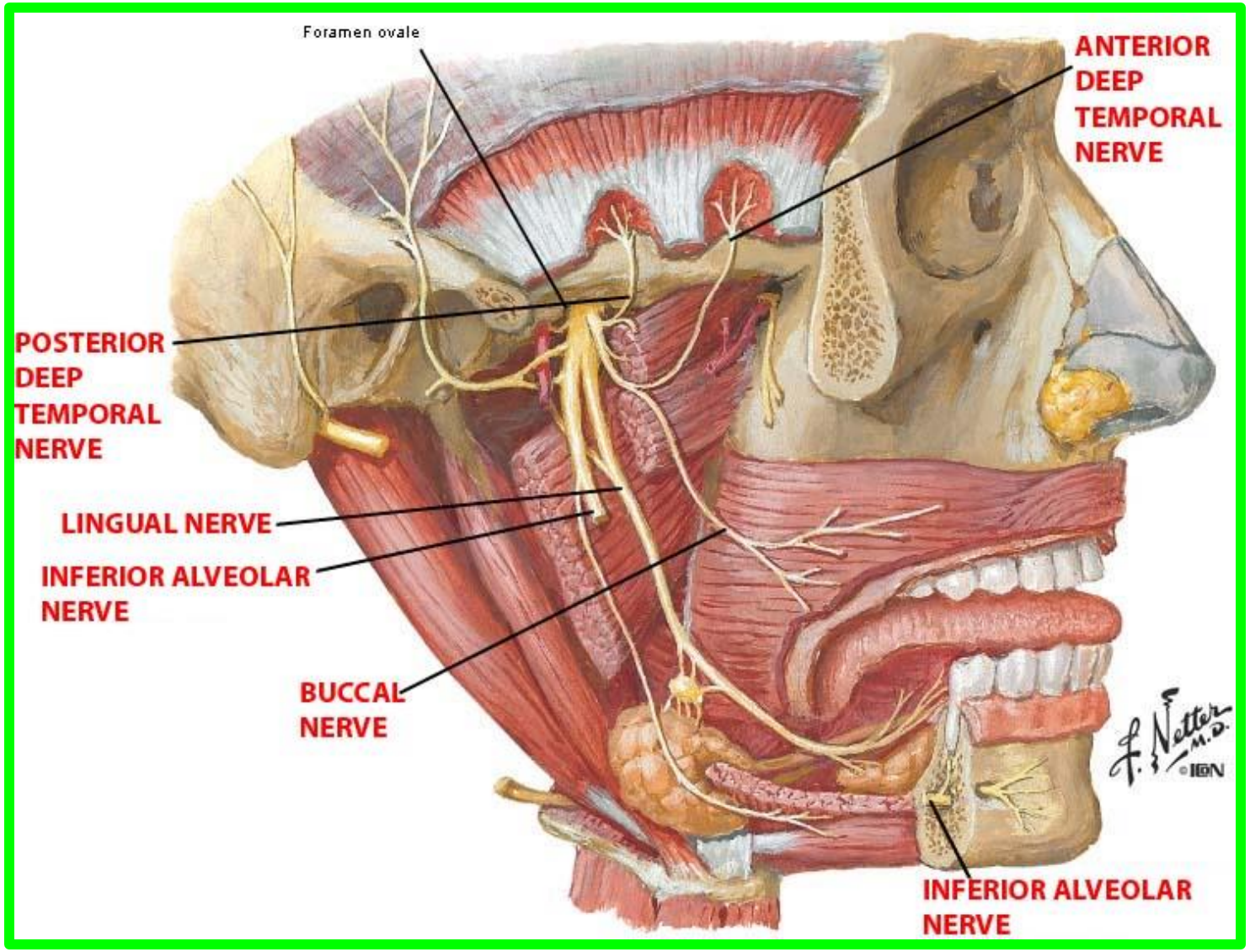
1) Posterior part of the temporal region (temple).
2) Upper 1/2 of the outer surface of the auricle.
3) Skin of the external auditory meatus and ear drum.
4) Temporo-mandibular joint.
5) Sensory and parasympathetic fibers to the Parotid gland.



Branches from the Posterior Division of the Mandibular Nerve

■■ Lingual nerve

- ✓ it lies deep to the lateral pterygoid muscle.
- ✓ Here it is joined by the chorda tympani nerve (branch of facial nerve carrying taste sensation and parasympathetic fibers).



Branches from the Posterior Division of the Mandibular Nerve

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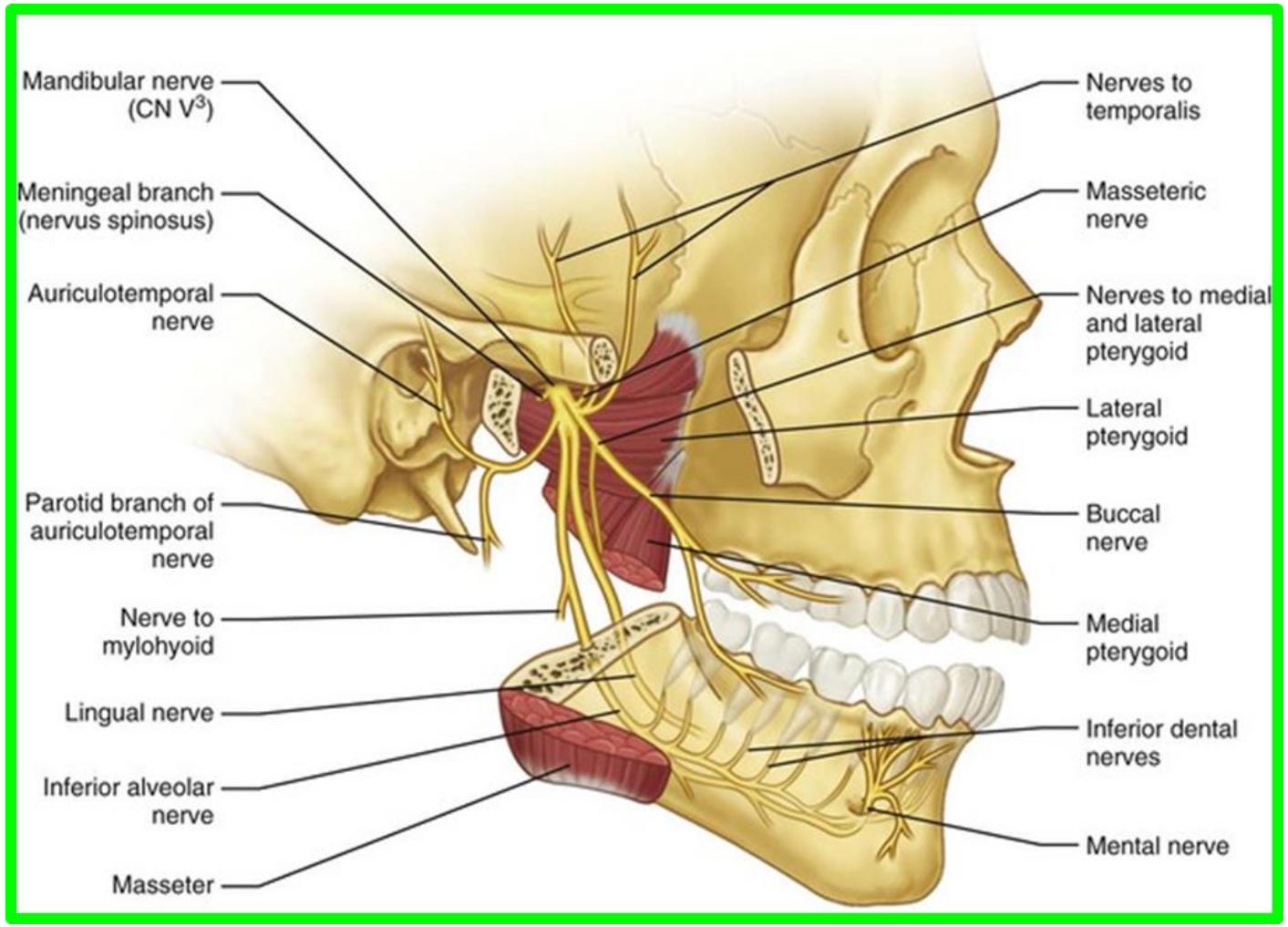
■■ Lingual nerve

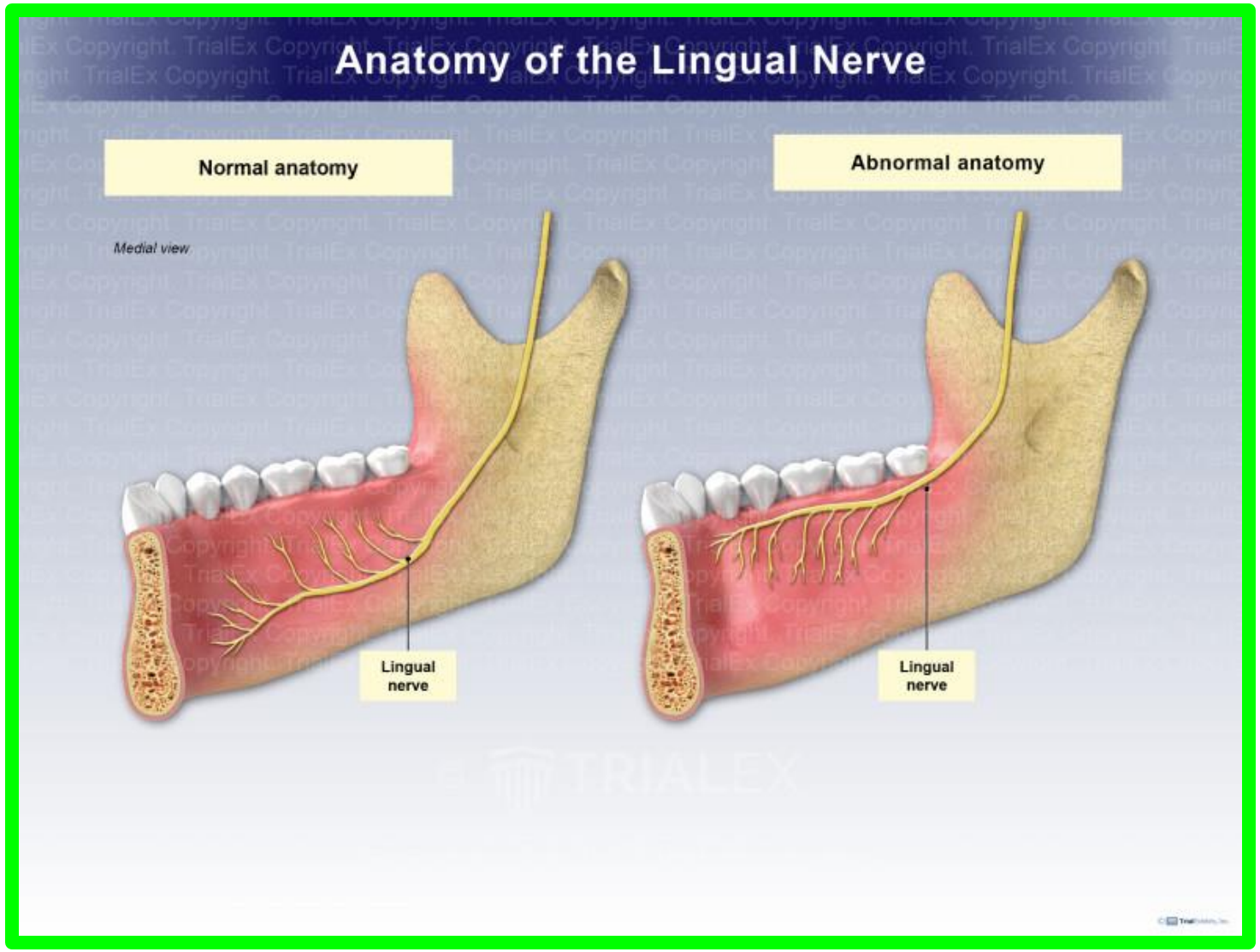
- ✓ It emerges from the lower border of lateral pterygoid muscle in front of the inferior alveolar nerve.
- ✓ Then, it descends between the ramus of the mandible (laterally) and the medial pterygoid muscle (medially).



Branches from the Posterior Division of the Mandibular Nerve

■■ Lingual nerve

- ✓ it passes along a groove on the inner surface of the socket of the last molar tooth just undercover of the mucosa of the gum (dangerous position during tooth extraction)



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Branches from the Posterior Division of the Mandibular Nerve

■■ Lingual nerve

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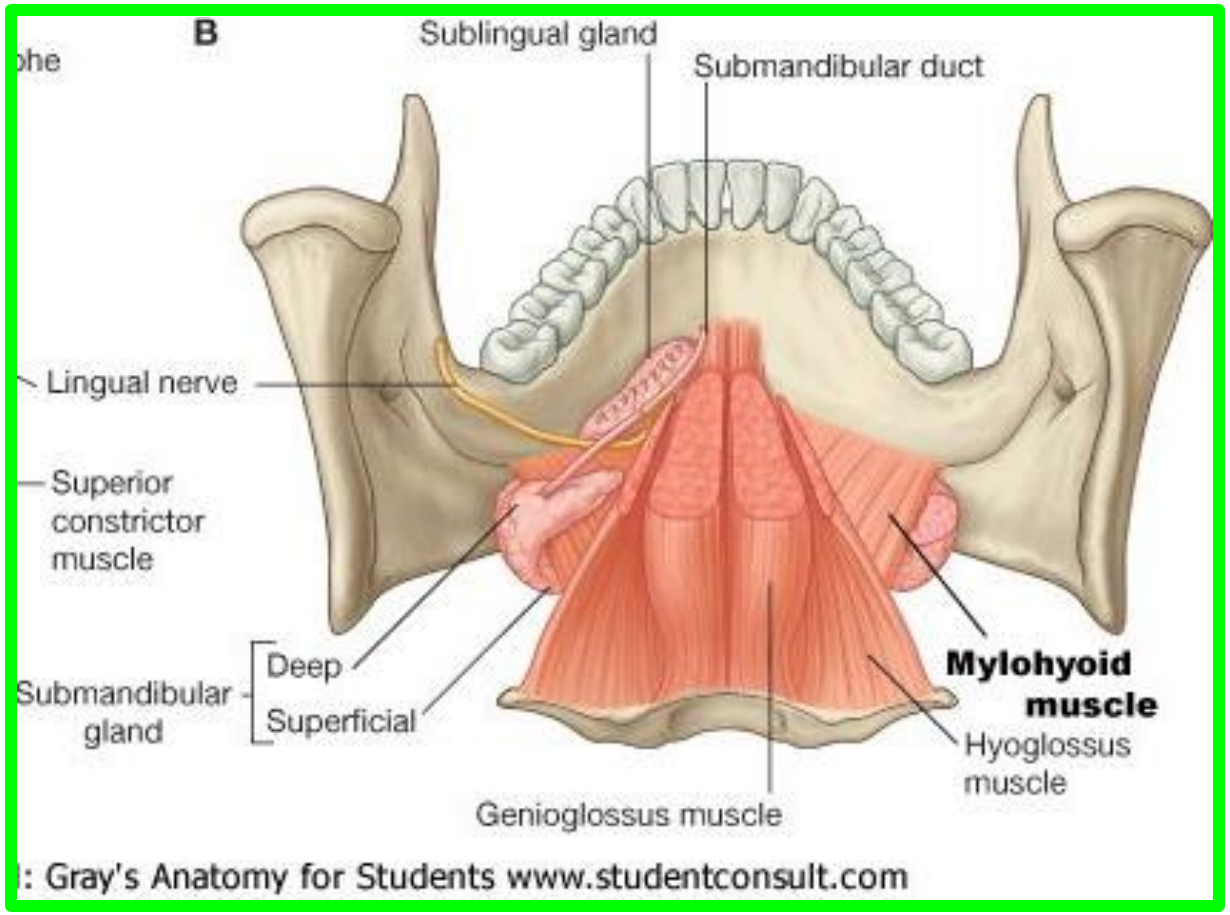
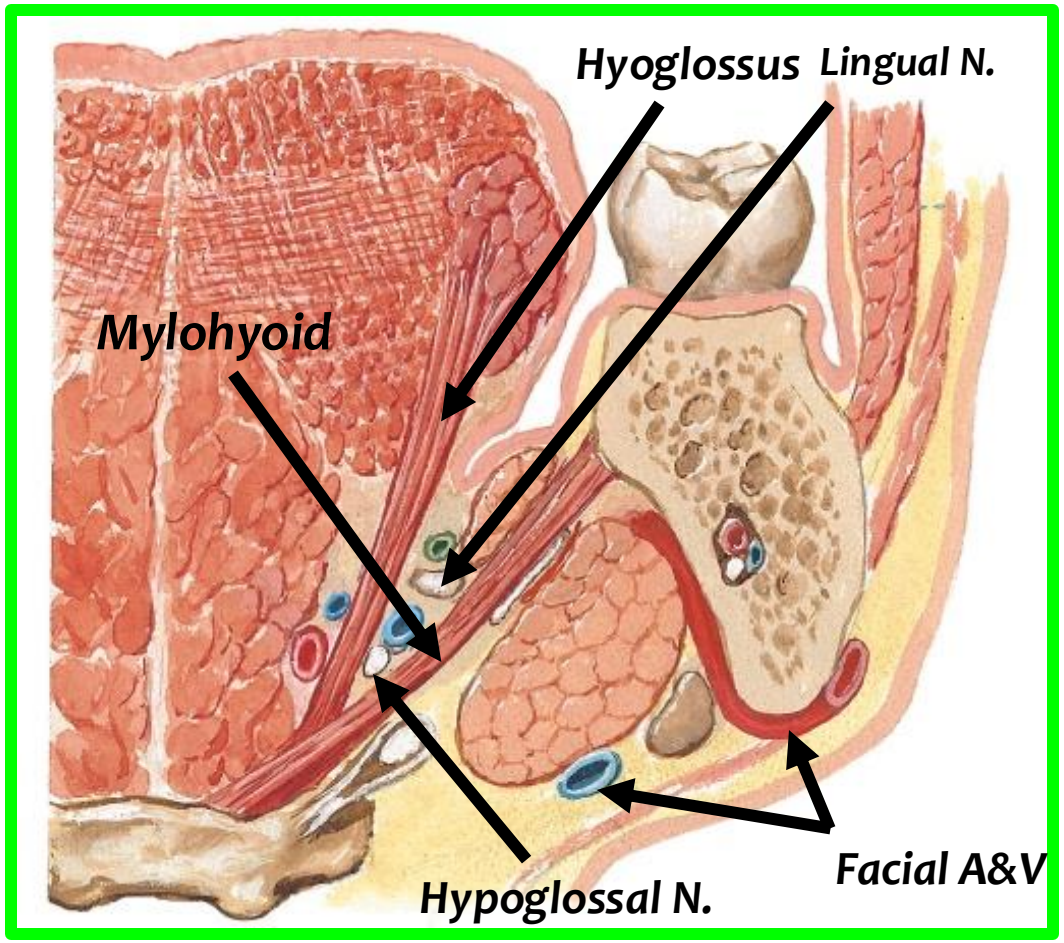
- ✓ Then, it crosses **superficial to** the hyoglossus muscle and **deep to** the superficial part of the submandibular salivary gland.
- ✓ Here, The submandibular Ganglion hangs from it.





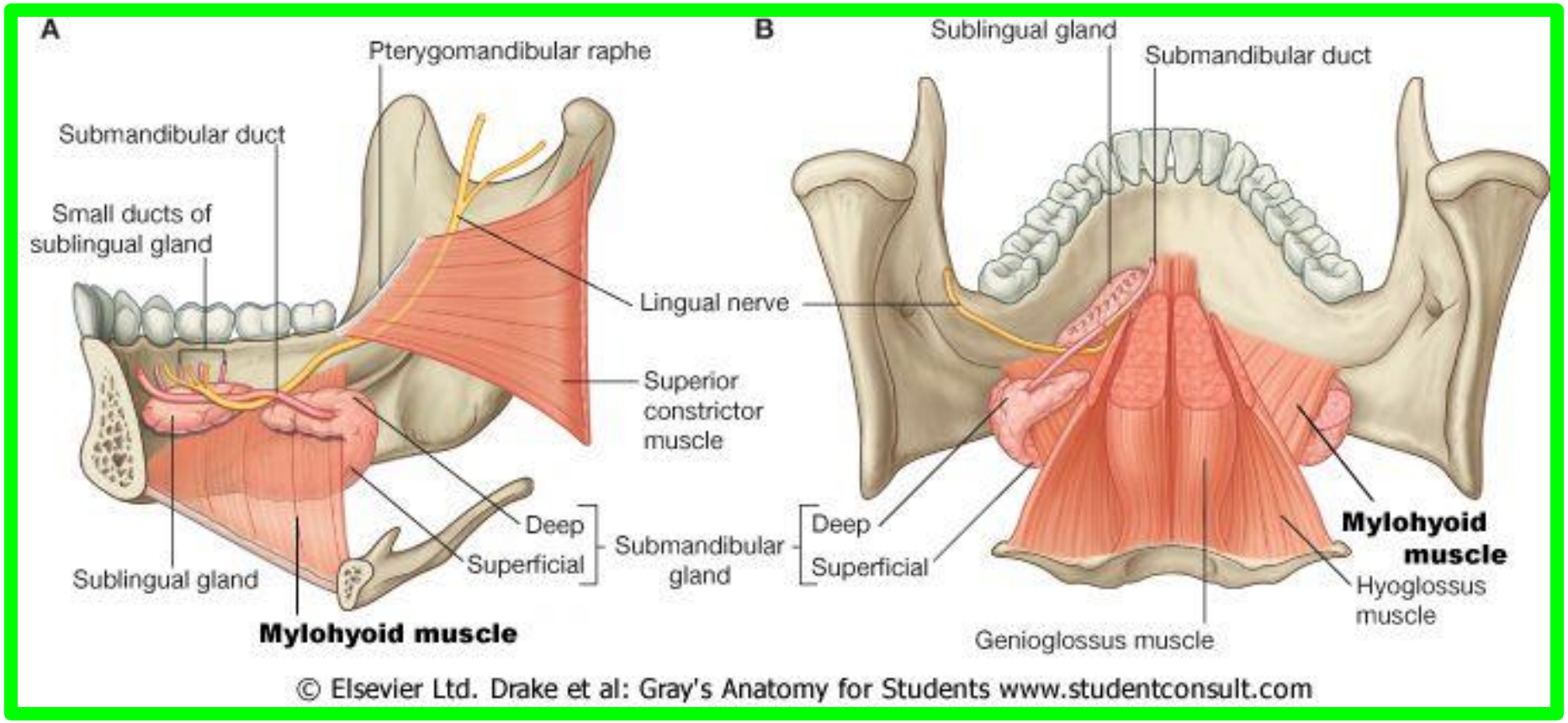
■■ Lingual nerve

- ✓ Finally, it passes deep to the mylohyoid muscle.
- ✓ Here, it has a triple relation with the submandibular duct:

A. first it passes lateral to the duct

B. Then it curves below to the duct

C. Finally it ascends medial to the duct



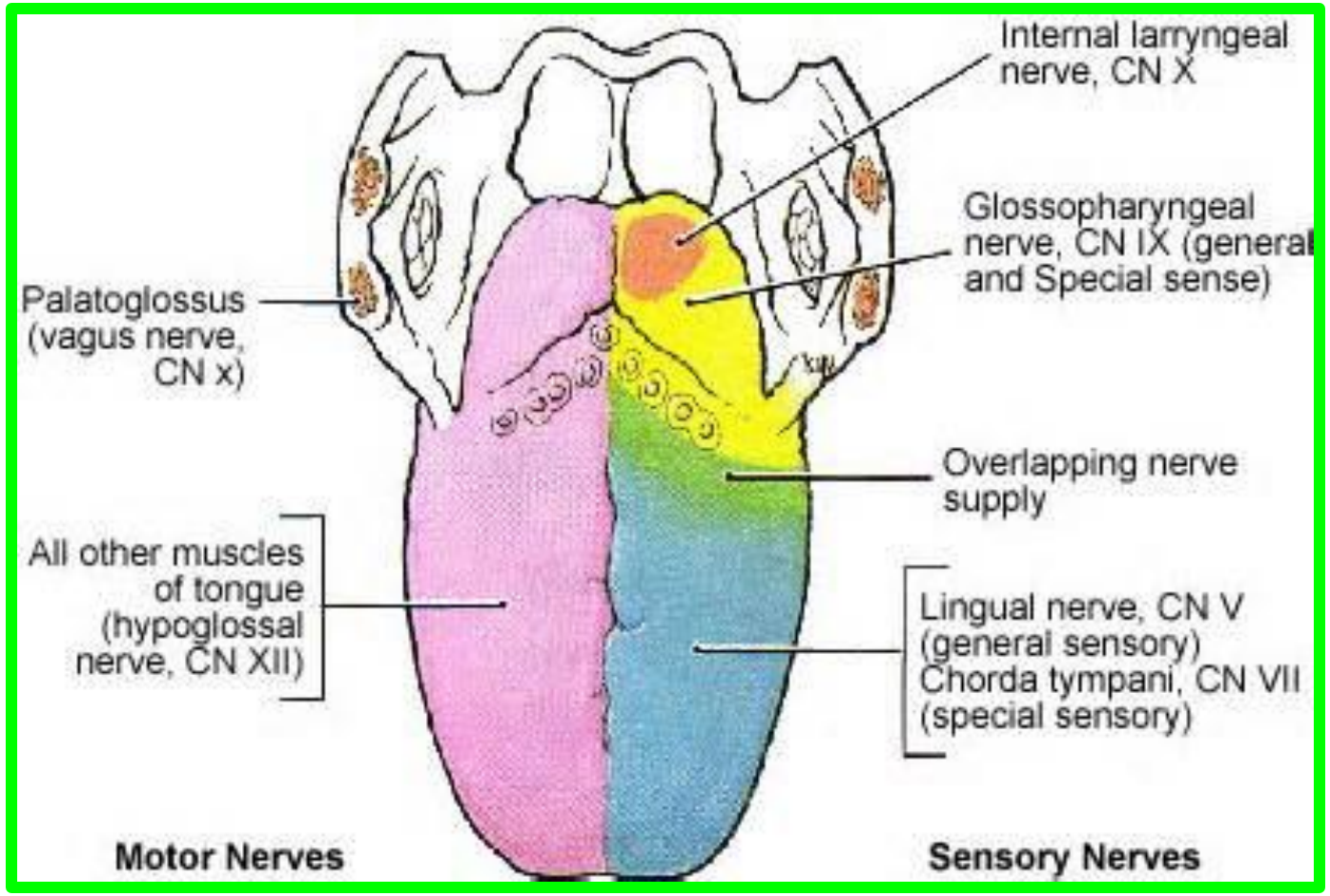
■■ Lingual nerve

✓ **Types of fibers:**

- ❑ **It carries general sensations from anterior 2/3 of the tongue and floor of the mouth. The fibers relay in the trigeminal ganglia (1st order neuron).**

- ❑ **It carries taste sensations from anterior 2/3 of the tongue.**

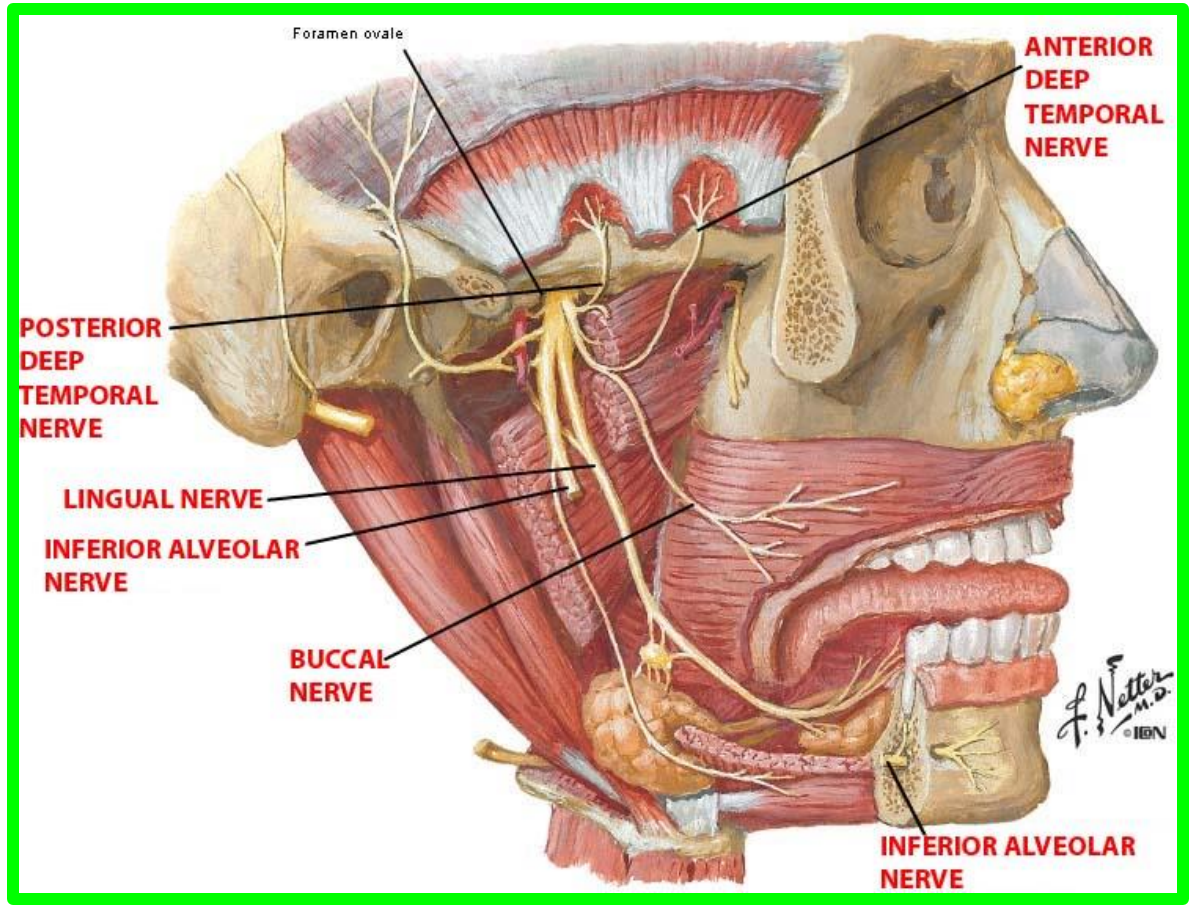
N.B; The taste sensation ends in the solitary nucleus through chorda tympani nerve.

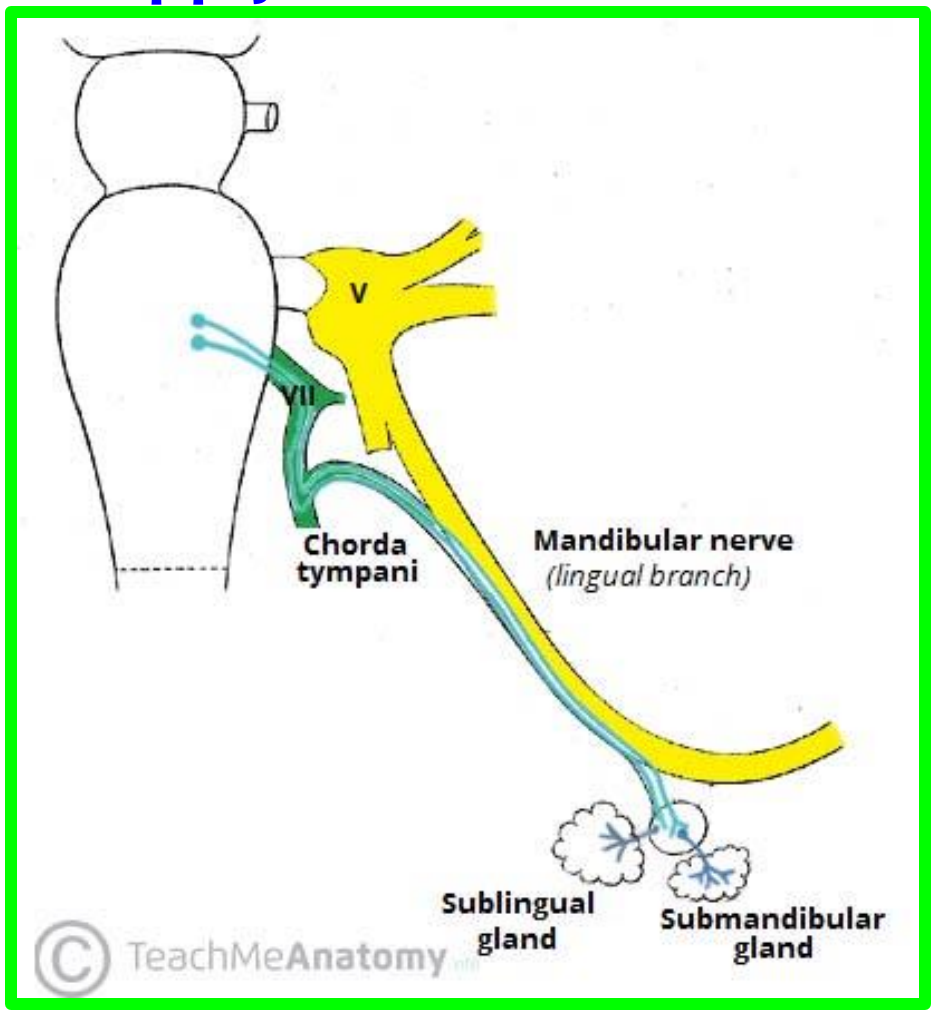


■■ Lingual nerve

✓ **Types of fibers:**

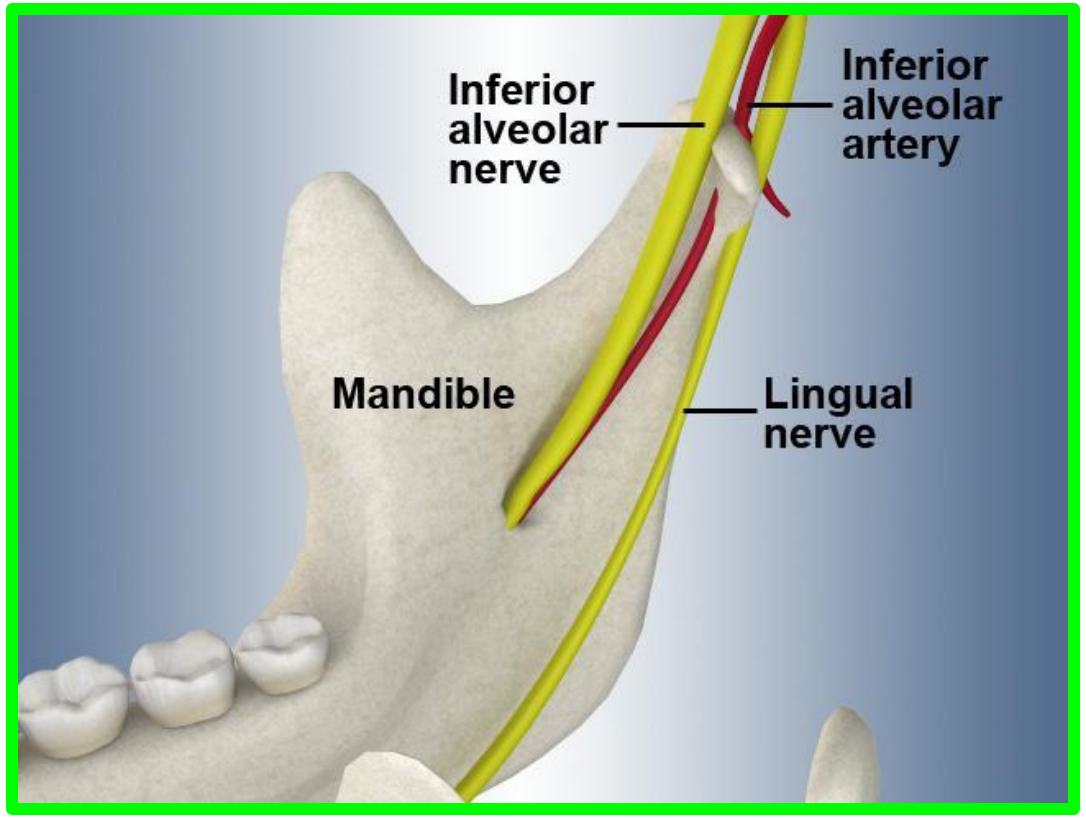
- Parasympathetic fibers from the superior salivary nucleus→ the facial nerve → chorda tympani (join the lingual nerve) to relay in the submandibular ganglion → postganglionic fibers supply the submandibular and sublingual glands.

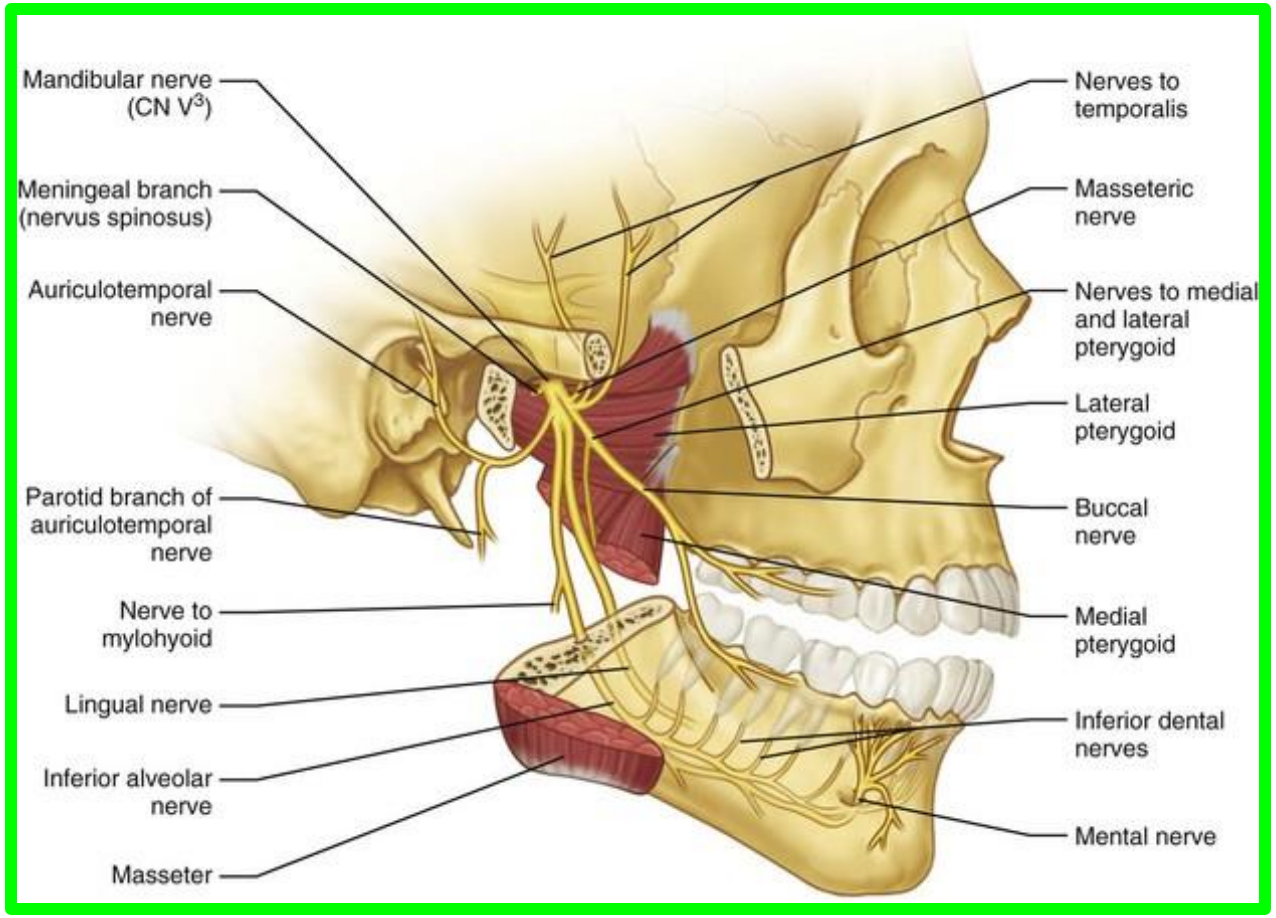




■■Inferior alveolar nerve (Mixed nerve, motor and sensory)

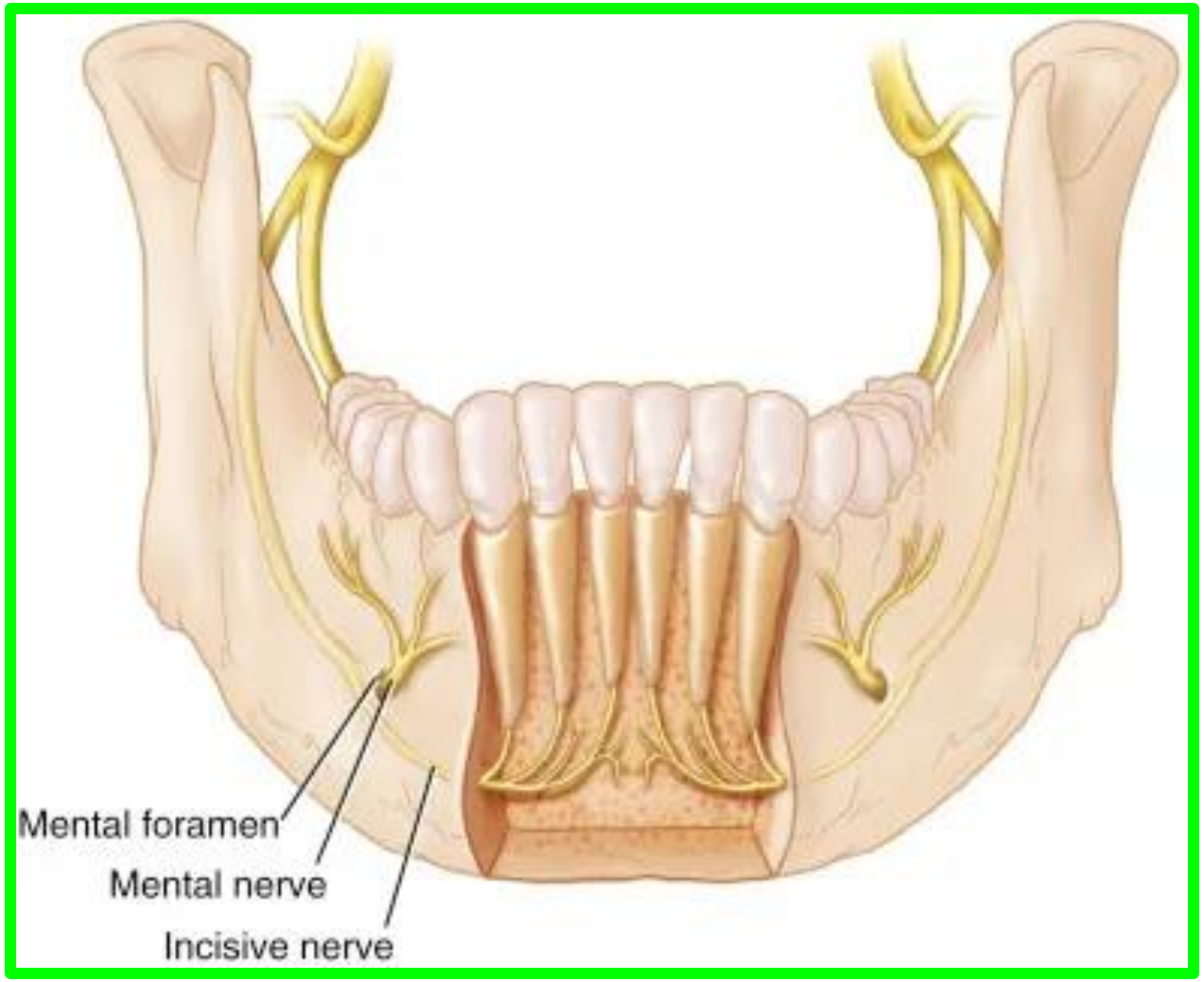
- ✓ It is the largest branch of the posterior division of mandibular nerve.
- ✓ It begins deep to the lateral pterygoid muscle then emerges from its lower border.
- ✓ It descends between the ramus of the mandible (laterally) and medial pterygoid muscle (medially).





■■Inferior alveolar nerve (Mixed nerve, motor and sensory)

- ✓ It enters the mandibular foramen and runs in the mandibular canal.
- ✓ Termination; It ends in the mandibular canal by dividing into 2 branches (mental and incisive nerves).

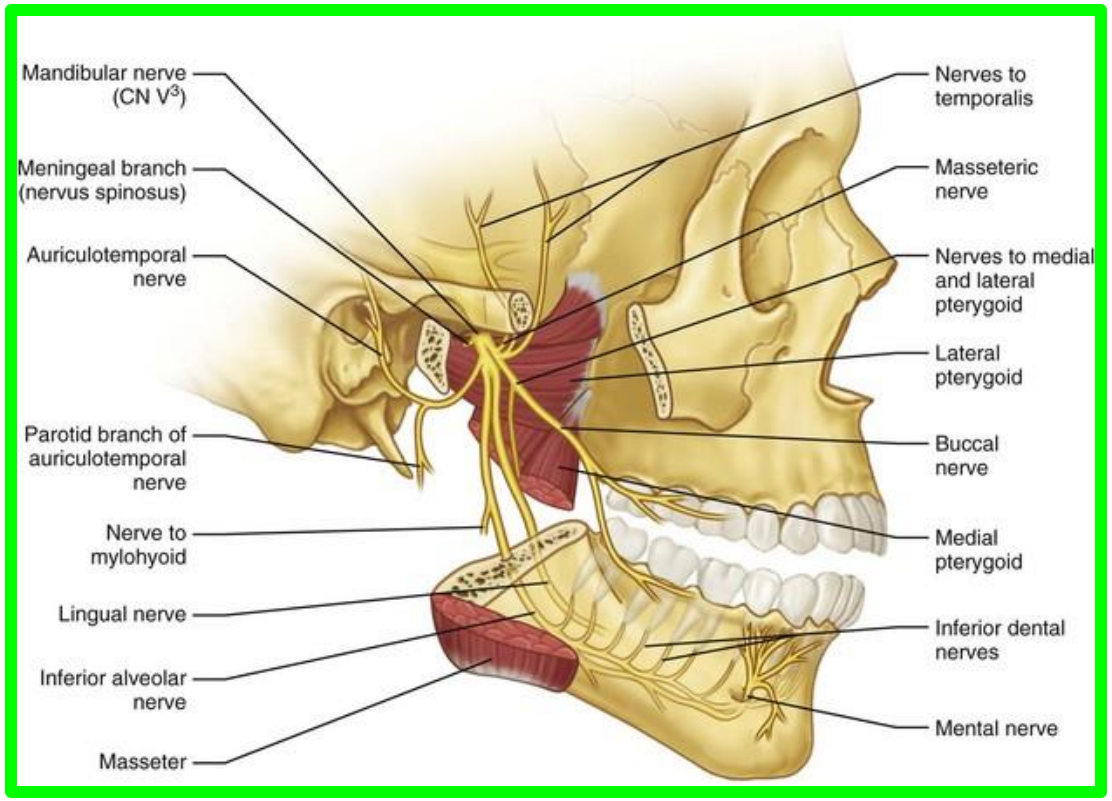


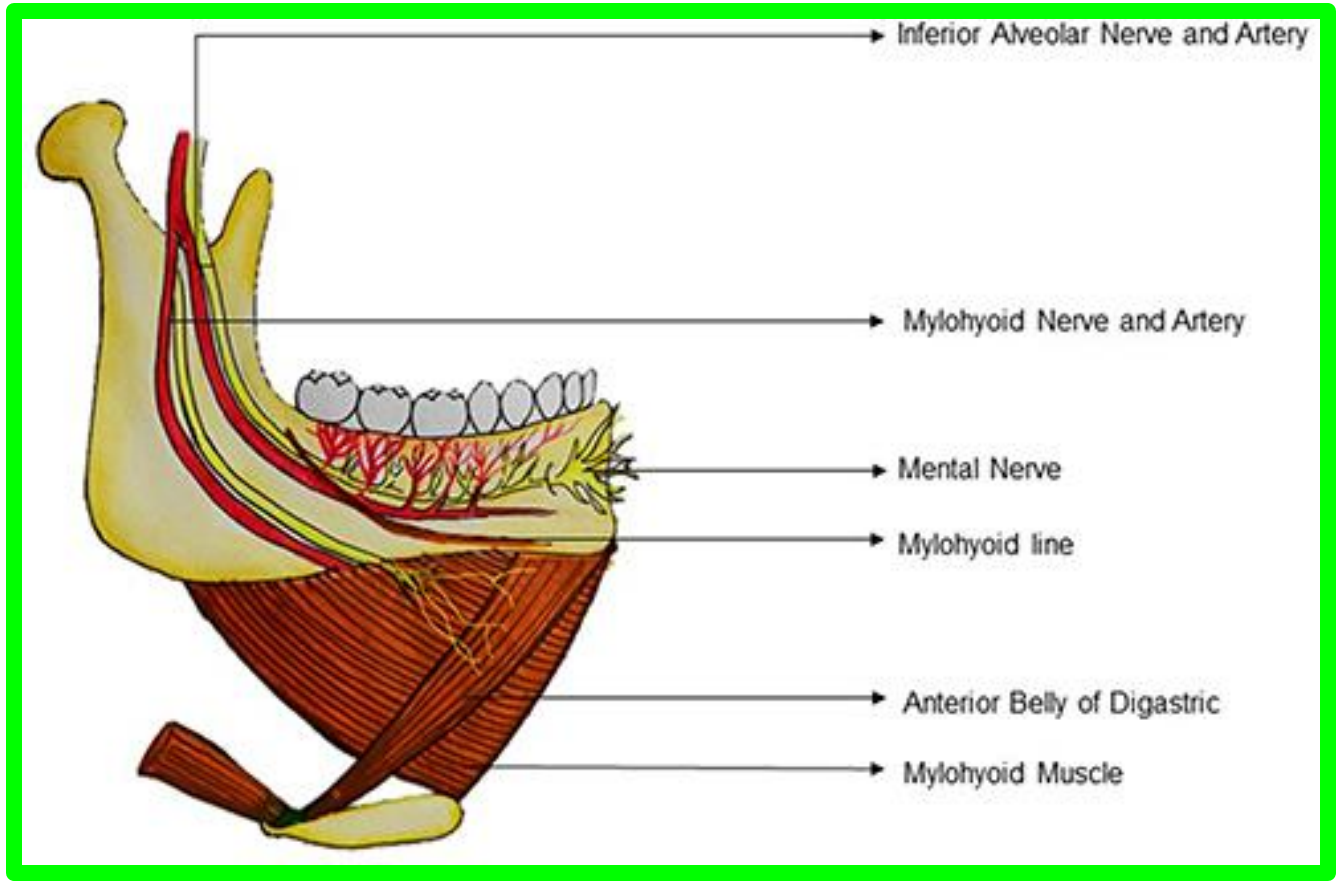
■■Inferior alveolar nerve (Mixed nerve, motor and sensory)

- **Branches;**

1- Nerve to mylohyoid (motor):

- ✓ It arises before it enters the mandibular foramen.
- ✓ It runs in the mylohyoid groove to supply Mylohyoid and anterior belly of digastric muscles.





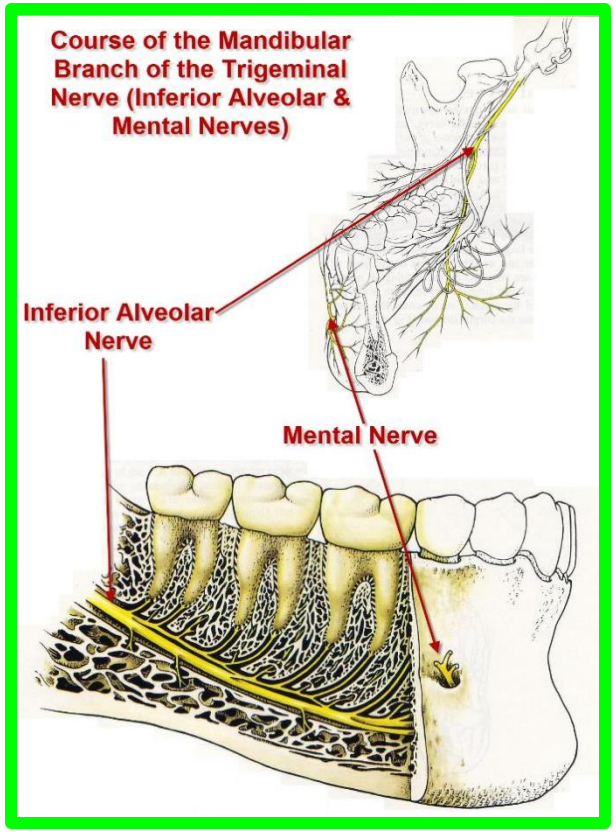
■■Inferior alveolar nerve (Mixed nerve, motor and sensory)

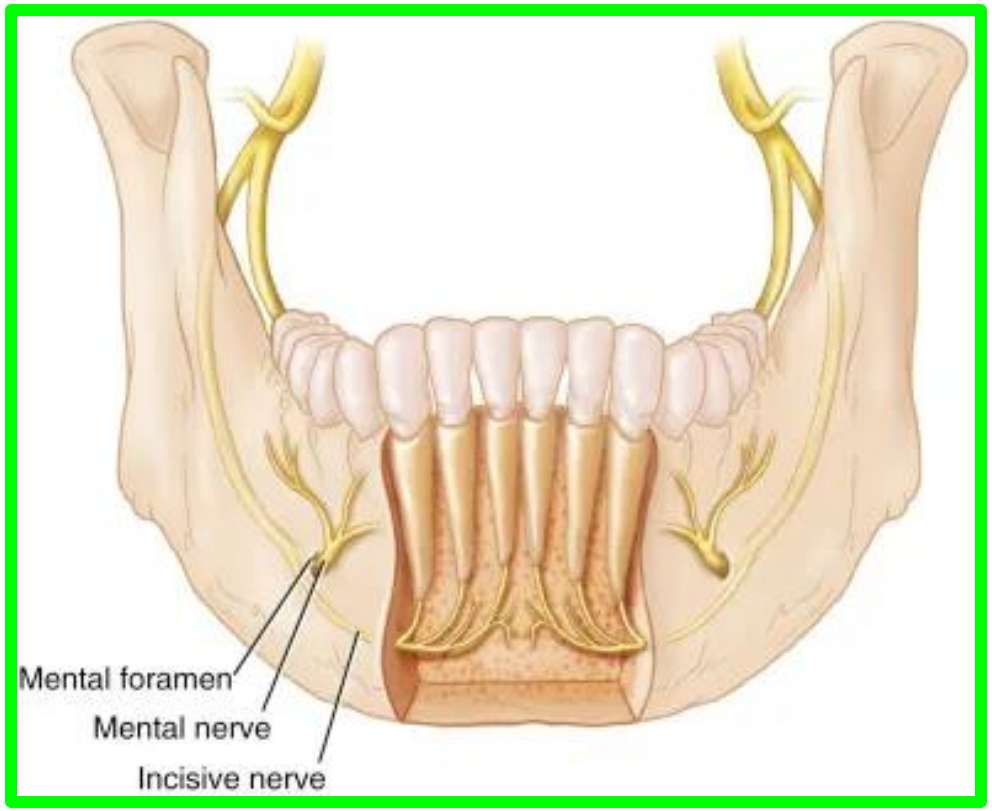
- **Branches;**

2- Branches to the lower molar and premolar teeth.

3- Incisive nerve: to the lower canine and incisor teeth.

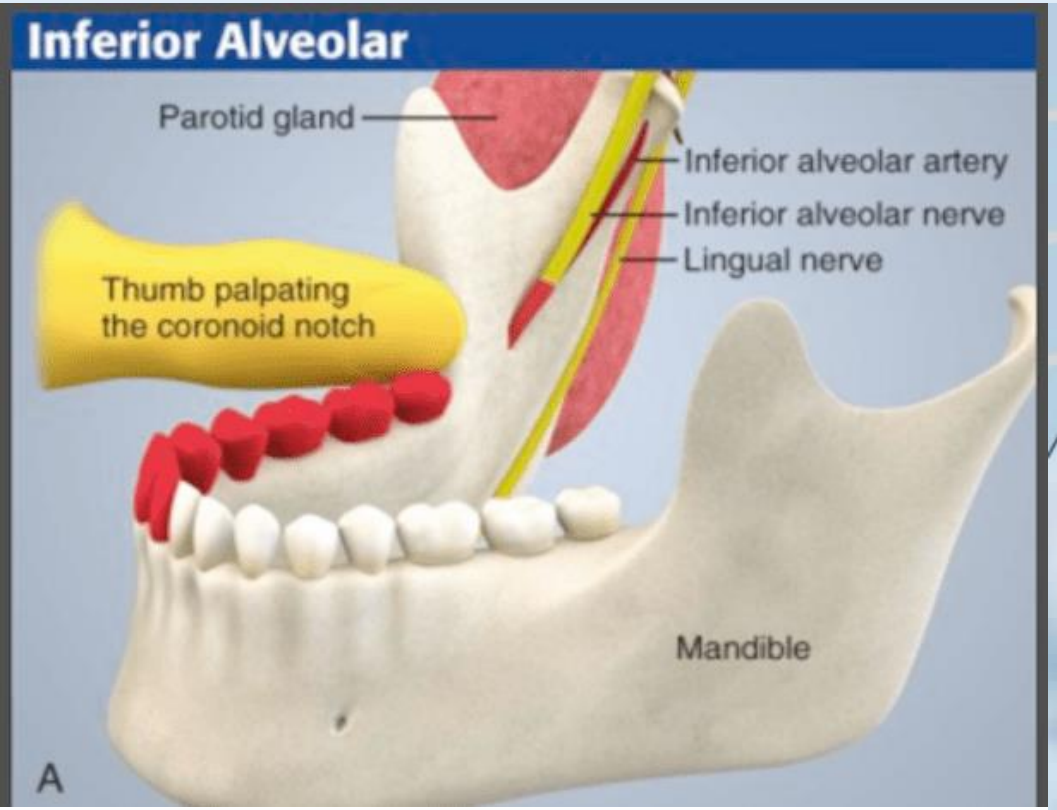
4- Mental nerve: exits from the mental foramen and supplies the skin of the chin.

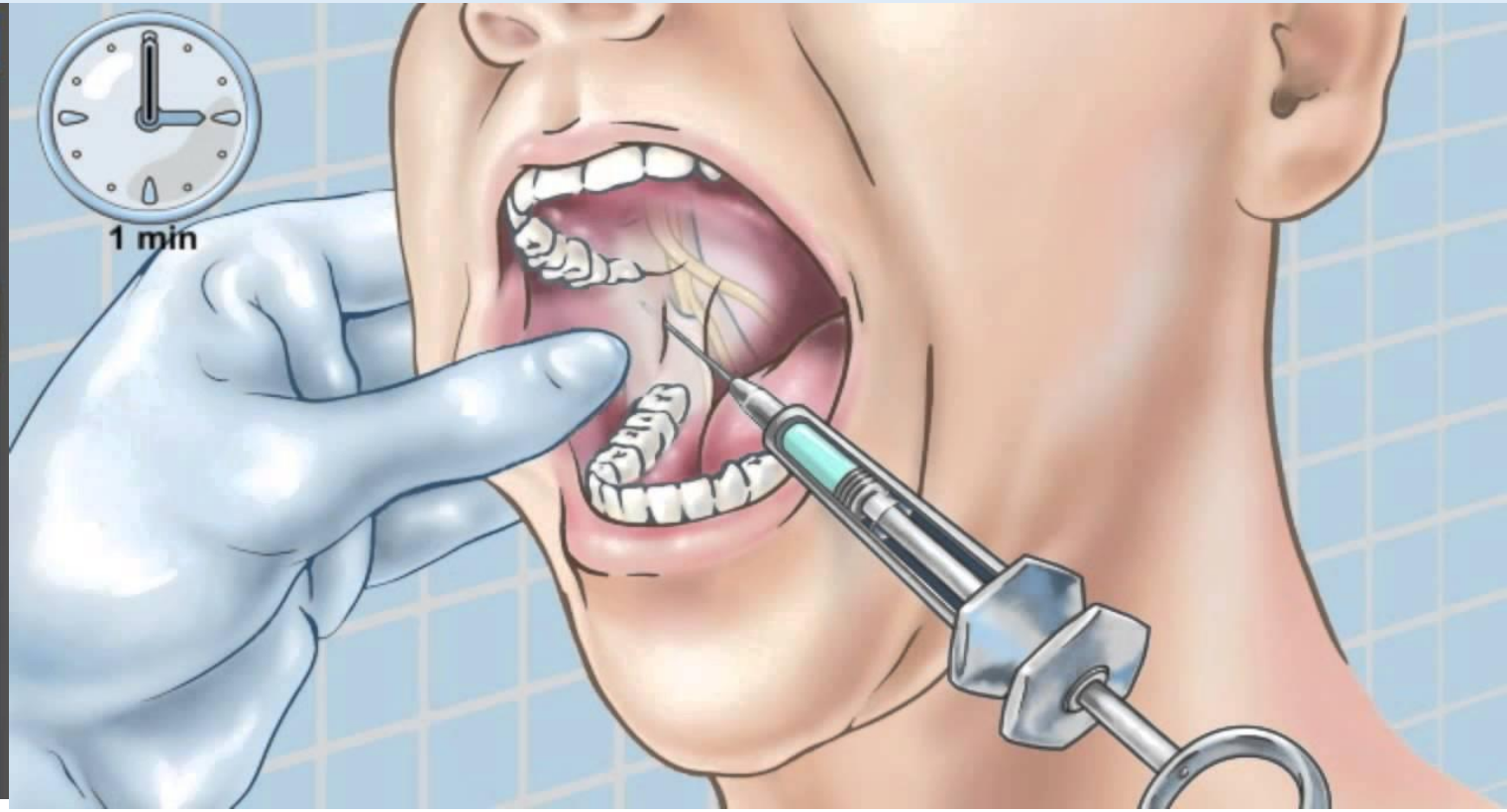




Inferior Alveolar Nerve Block

An alveolar nerve block—commonly used by dentists when repairing mandibular teeth—anesthetizes the inferior alveolar nerve, a branch of CN V3. The anesthetic agent is injected around the mandibular foramen, the opening into the mandibular canal on the medial aspect of the ramus of the mandible.

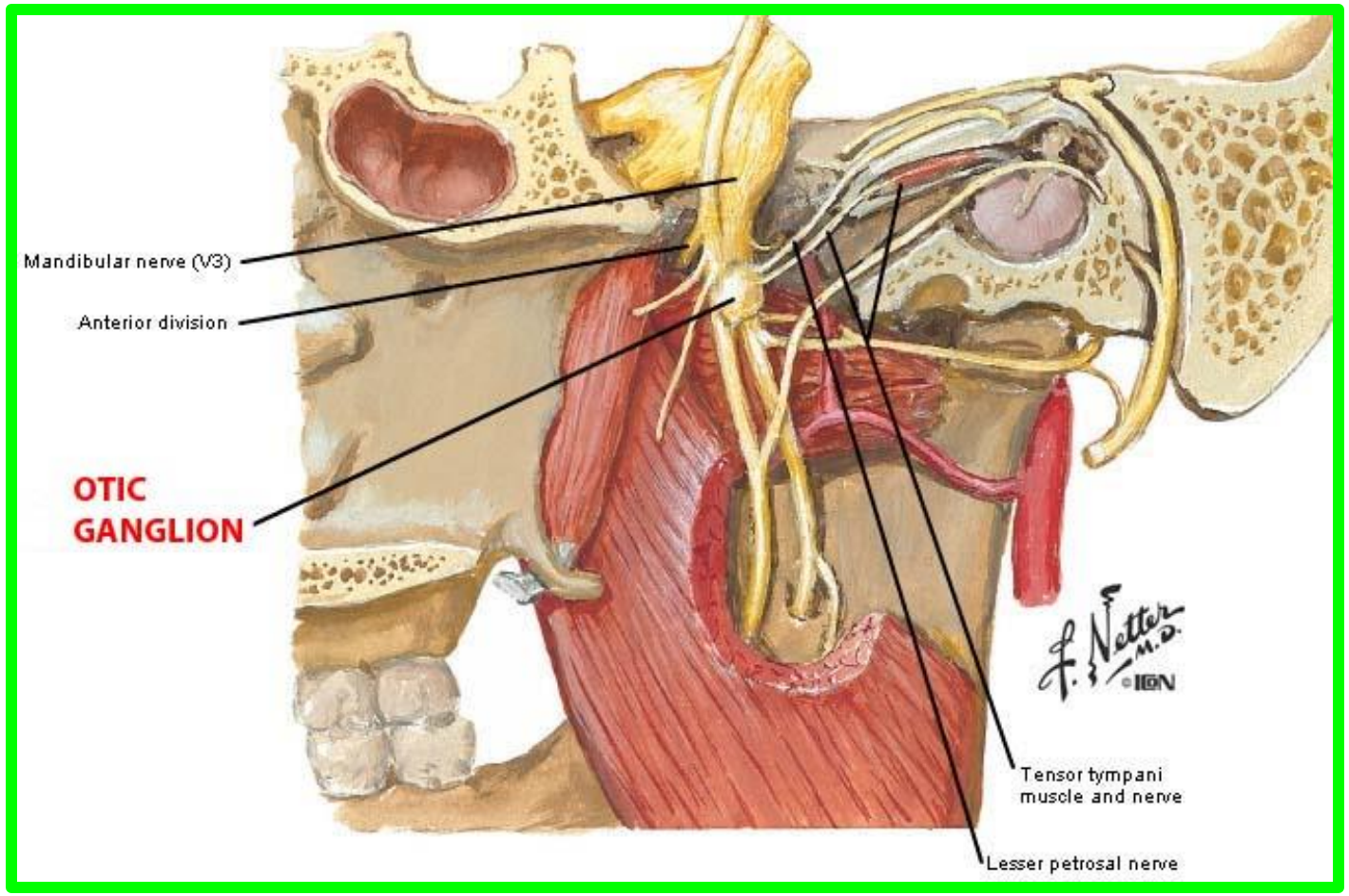




The otic ganglion

- **Type:** it is a small parasympathetic ganglion.
- **Site:** in the infratemporal fossa below foramen ovale.
- **Size:** it is about 2 – 3 mm.
- **Relations:**

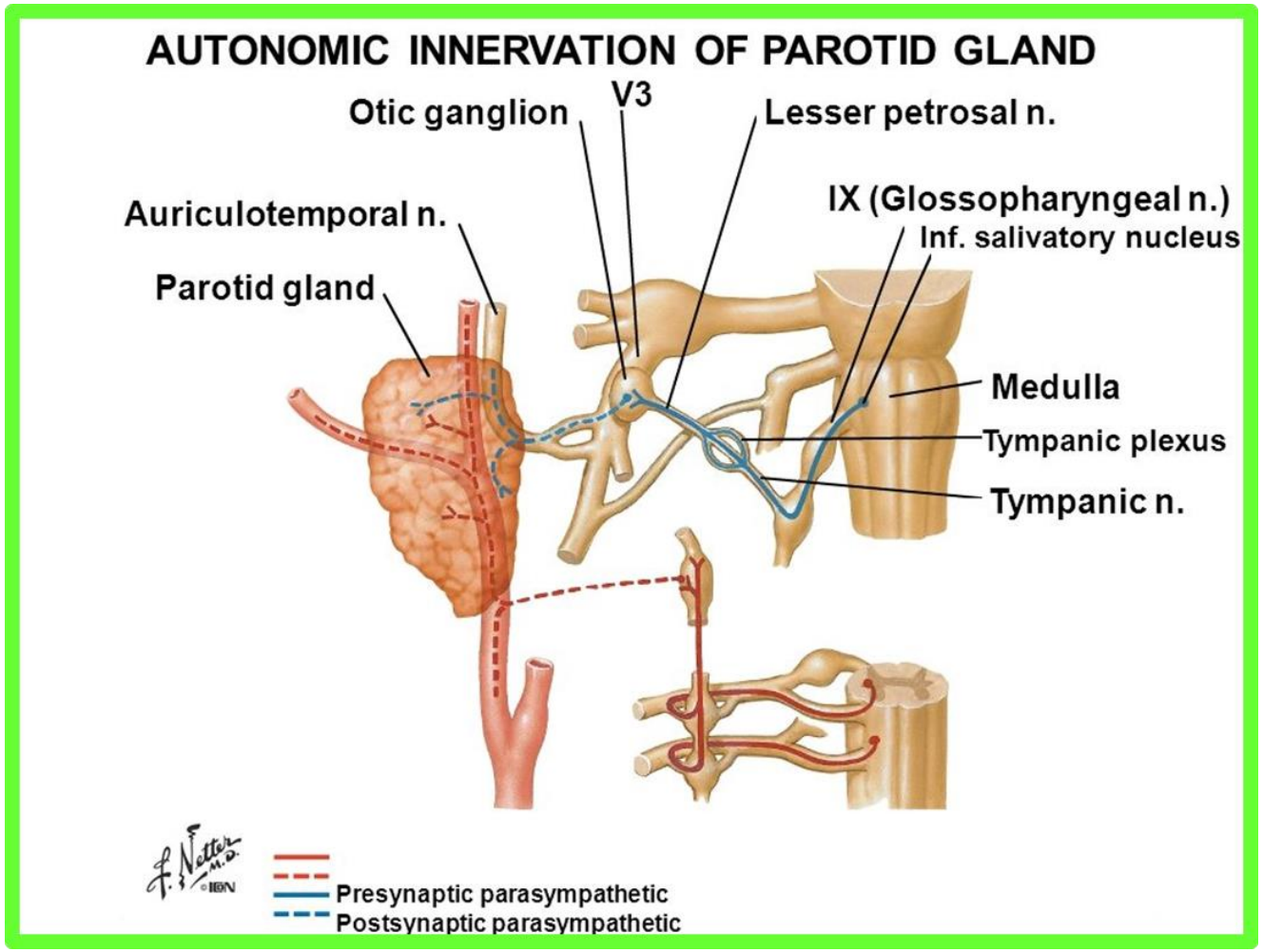
✓ Laterally: main trunk of mandibular nerve.
✓ Medially: tensor palati muscle.
✓ Posteriorly: middle meningeal artery.



The otic ganglion

- **Roots:**

  (1) Parasympathetic root: Inferior salivary nucleus → glossopharyngeal nerve → tympanic branch → form the tympanic plexus in the middle ear → lesser superficial petrosal nerve → leaves the cranial cavity through the foramen ovale → relay in the otic ganglion→ postganalionic to parotid gland through the auriculotemporal nerve.

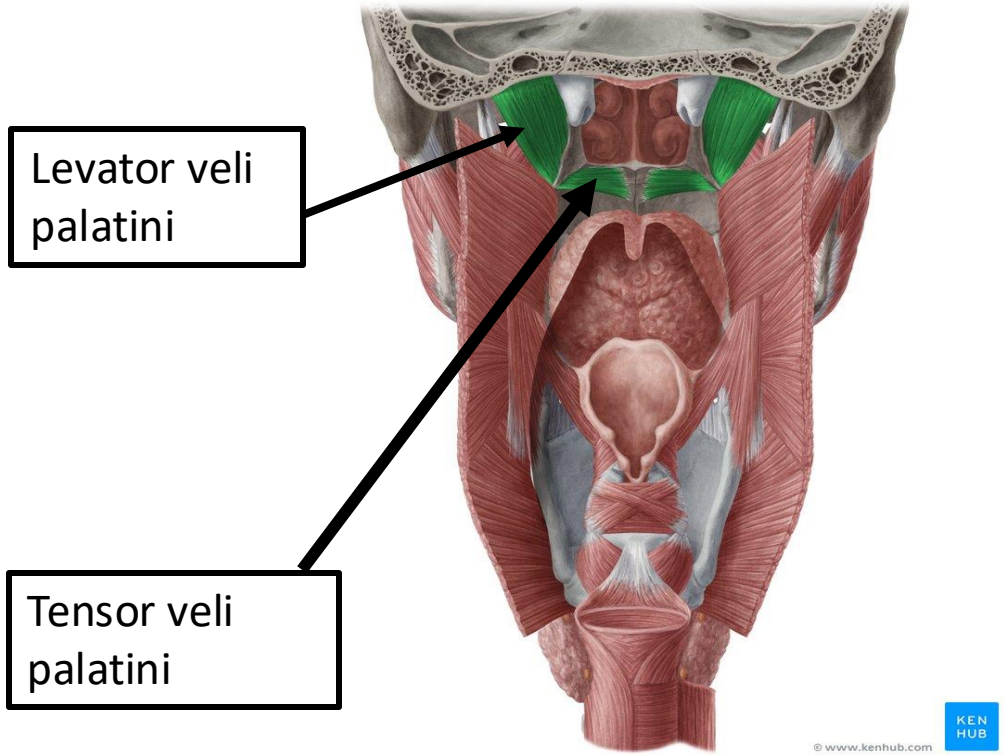


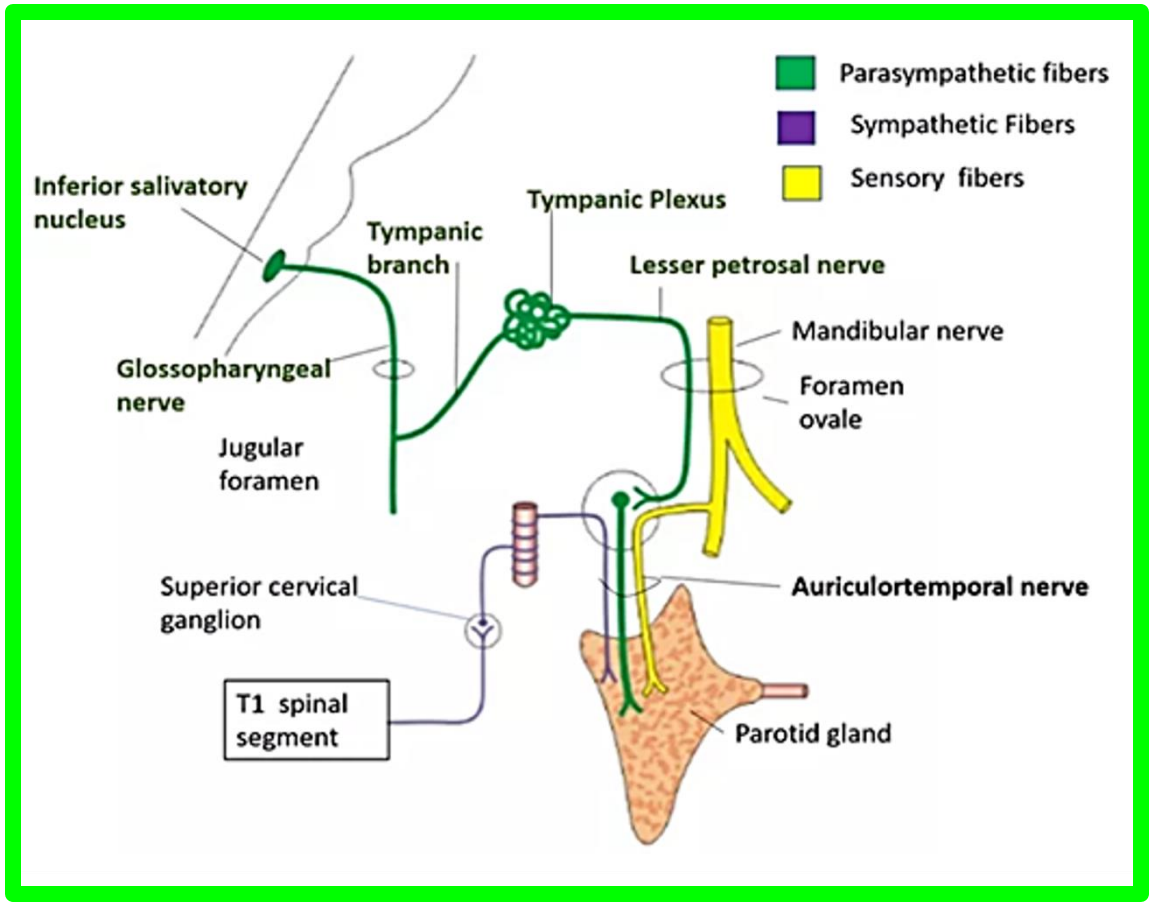
The otic ganglion

(2) Sympathetic root: from the plexus around middle meningeal artery.

(3) Sensory root: from mandibular nerve to the parotid gland.

(4) Motor root: arising from the nerve to medial pterygoid muscle (it passes without relay) to tensor palati and tensor tympani muscles.





The otic ganglion

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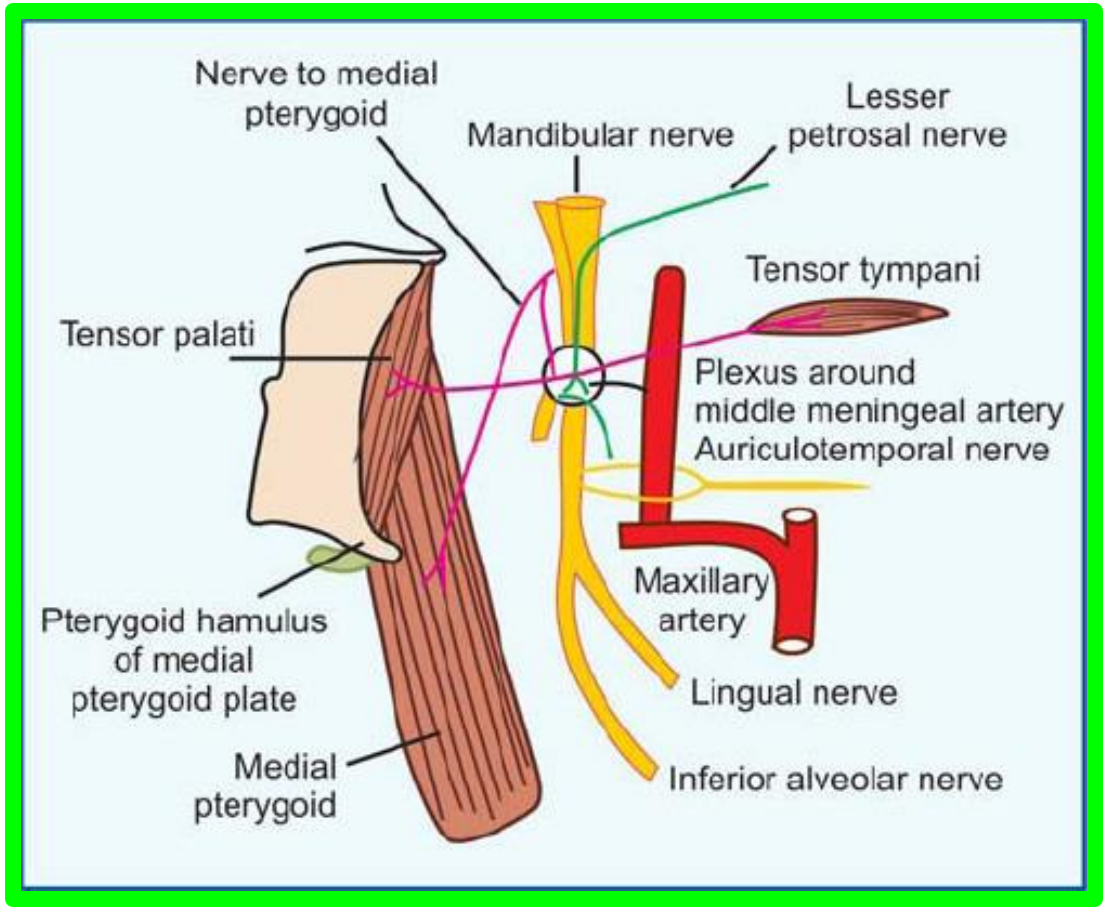
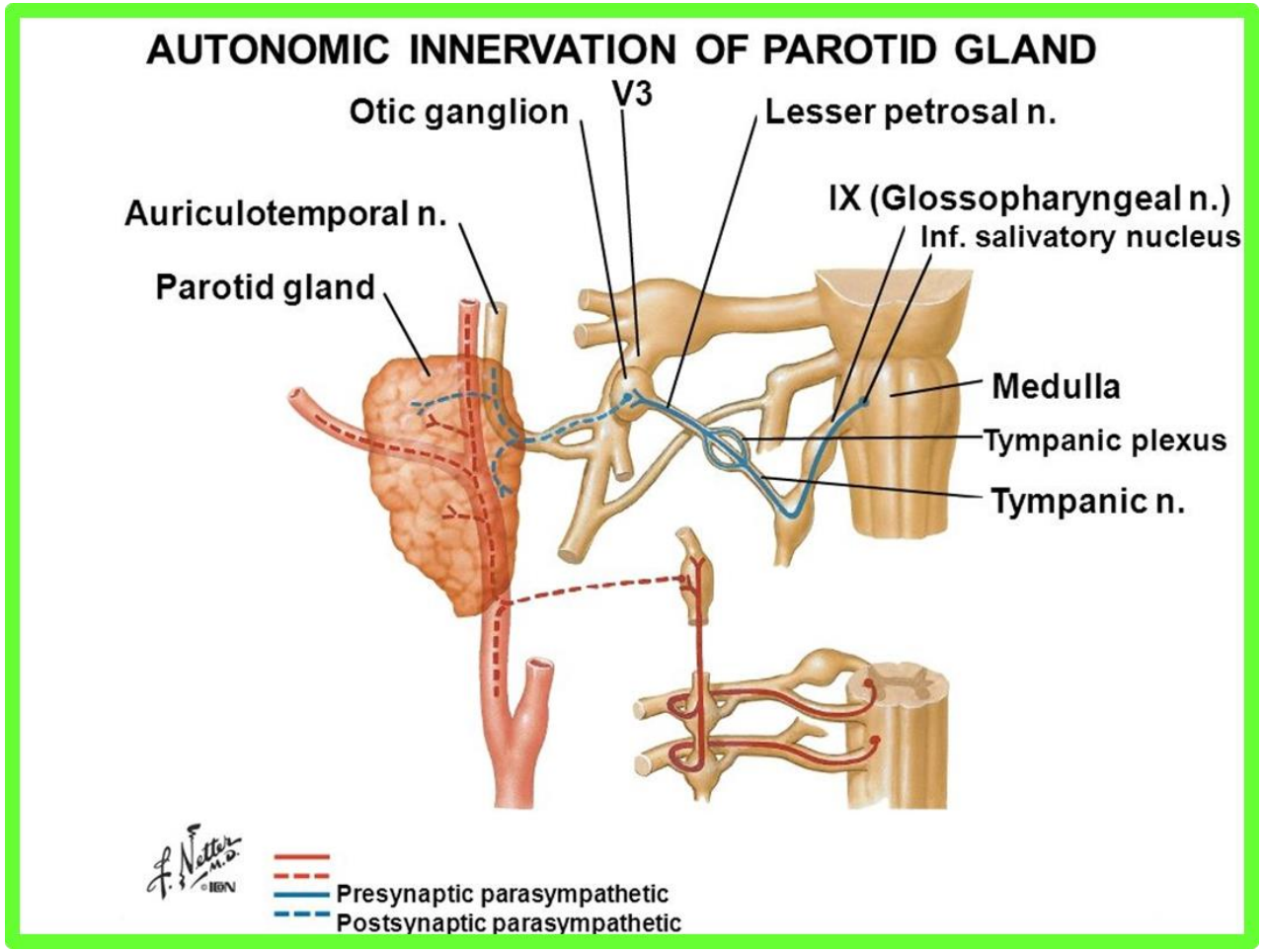
Monday 24 February 2025

- **Branches,**

1- Parasympathetic to the parotid gland through the auriculotemporal nerve.

2- To tensor palati and tensor tympani muscles from the nerve to medial pterygoid.

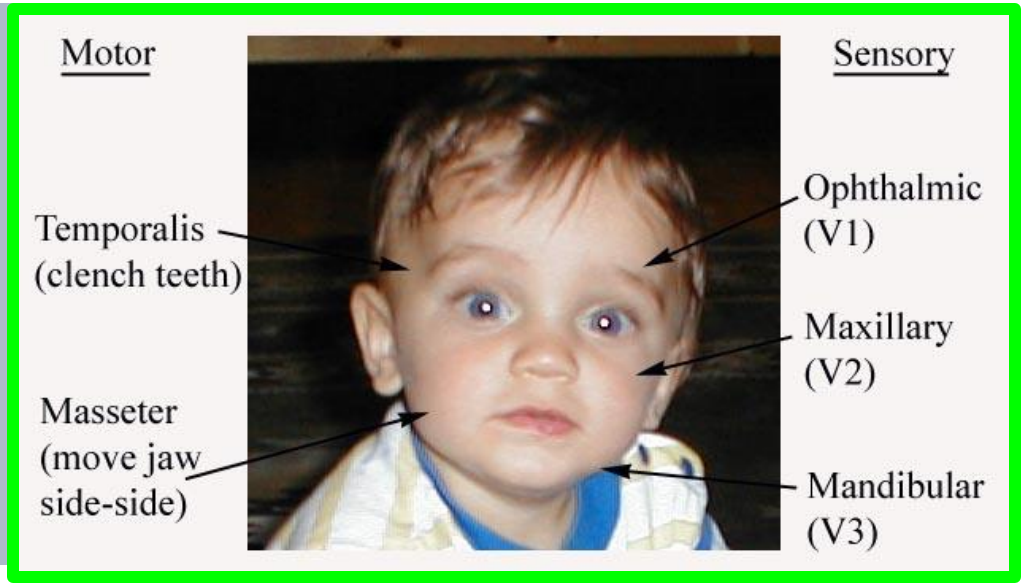


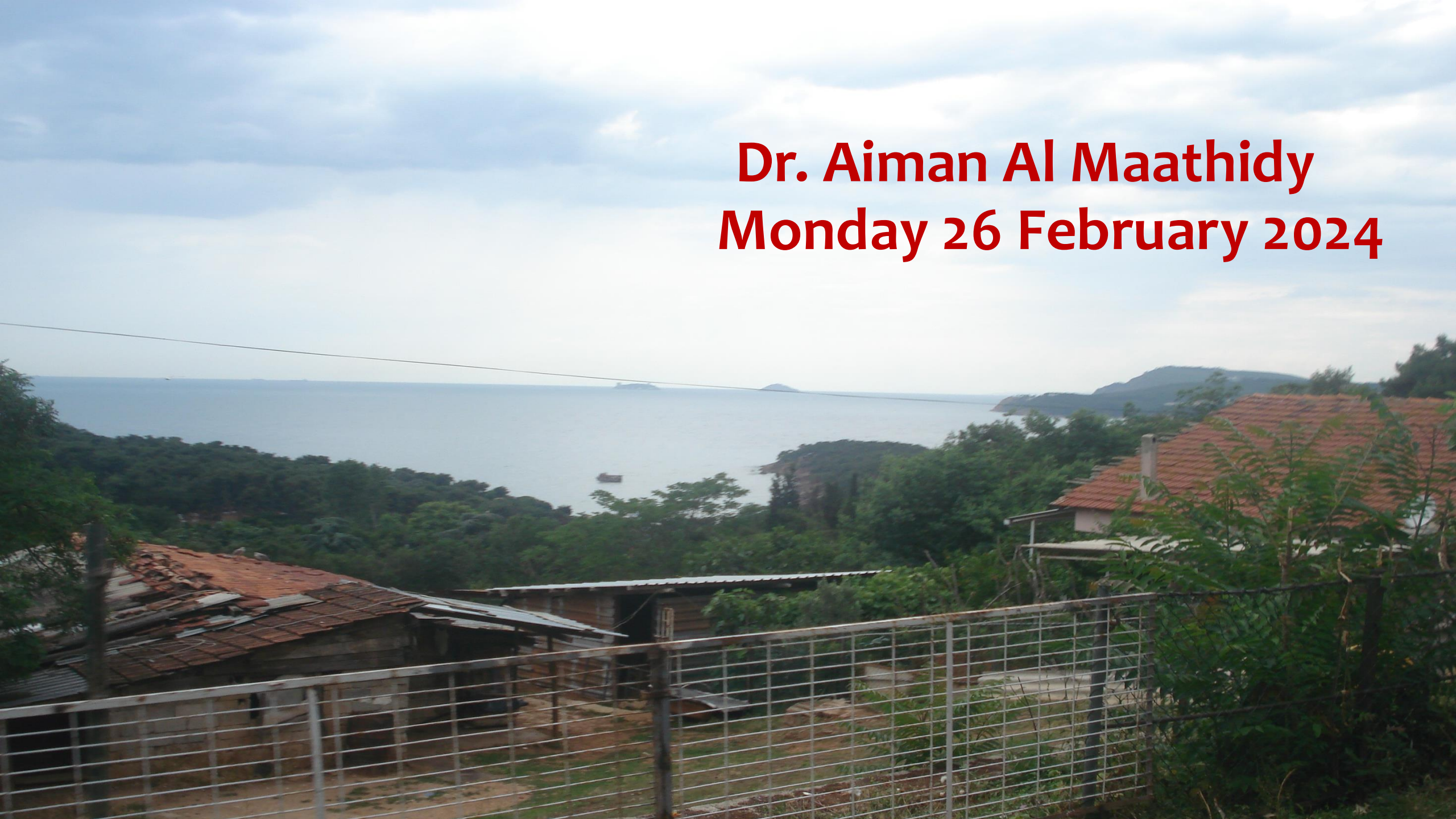


Testing the Integrity of the Trigeminal Nerve

The sensory function can be tested by using a cotton wisp over each area of the face supplied by the divisions of the trigeminal nerve

The motor function can be tested by asking the patient to clench the teeth. The masseter and the temporalis muscles, which are innervated by the mandibular division of the trigeminal nerve, can be palpated and felt to harden as they contract

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