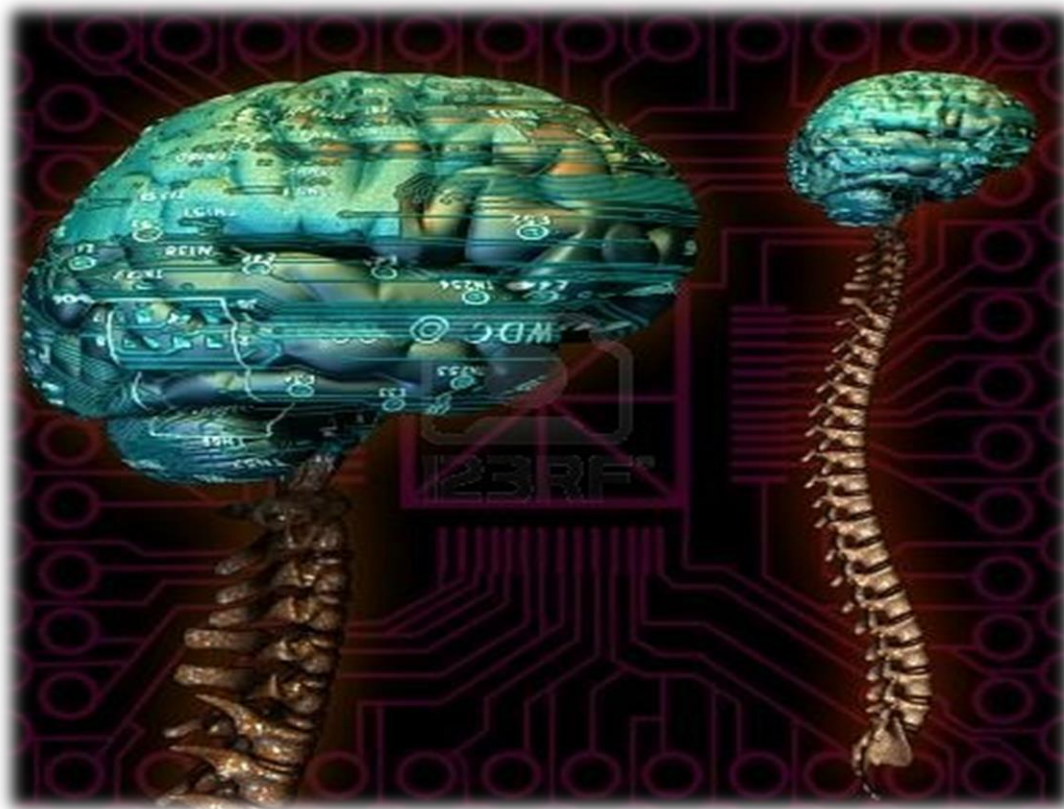




CNS Block



LECTURE (11)

Done by: **BADR ALMISNID**

Reviewed by: **NOOR AL-ZAHRANI**

If there is any mistake please feel free to contact us:

Anatomyteam32@gmail.com

Both - Black

Male Notes - BLUE

Female Notes - GREEN

Explanation and additional notes - ORANGE

Very Important note - Red



Objectives:

By the end of the lecture, the student will 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.**
- ❖ **Describe the main motor & sensory manifestation in case of lesion of the trigeminal & facial nerves.**



NOTES :

5th cranial nerve is mixed while *the 7th is mixed + parasympathetic*

Tic = تقلص عضلات الوجه , *douloureux*= ألم شديد

In the Trigeminal Neuralgia : ophthalmic is rarely involved

Bell's Palsy ::

If the *lower* motor neuron injured >> Whole face is affected

If the *upper* motor neuron injured >> Upper face is intact

Muscles of the 1st pharyngeal arch supplied by "SPECIAL VISCERAL EFFERENT >> TRIGEMINAL"

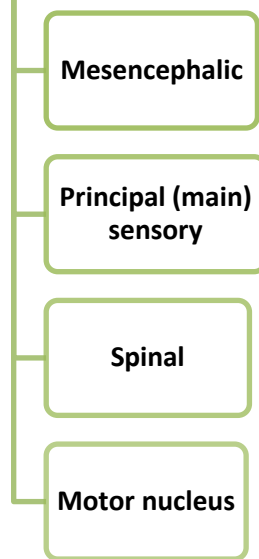
Muscles of the 2nd pharyngeal arch supplied by "SPECIAL VISCERAL EFFERENT >> FASCIAL"

SPECIAL VISCERAL AFFERENT >> FASCIAL : Taste sensation from anterior 2\3 of the tongue

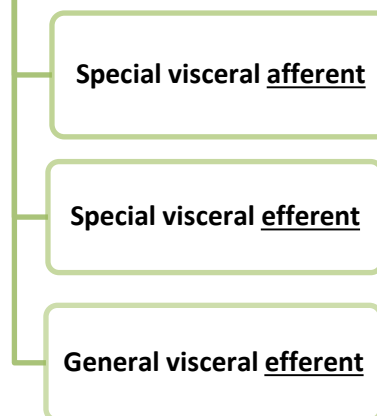
GENERAL VISCERAL AFFERENT >> TRIGEMINAL : General sensation from the face



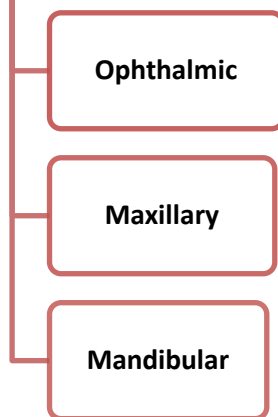
Trigeminal



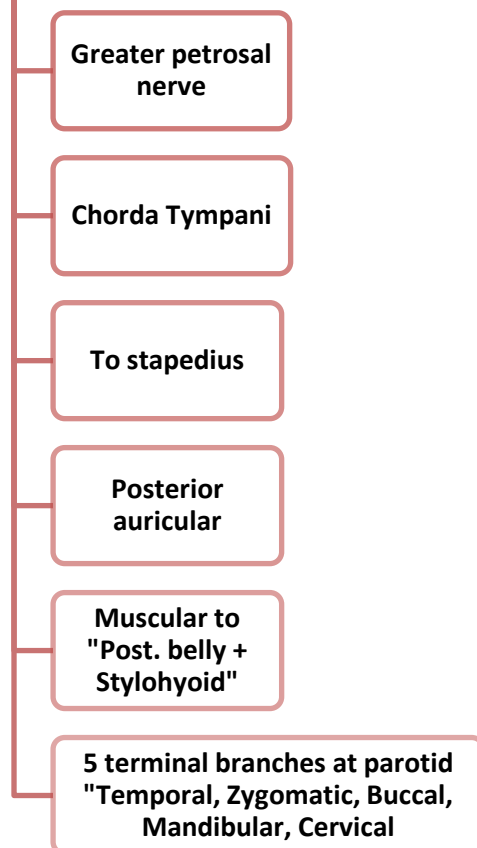
Fascial



Trigeminal

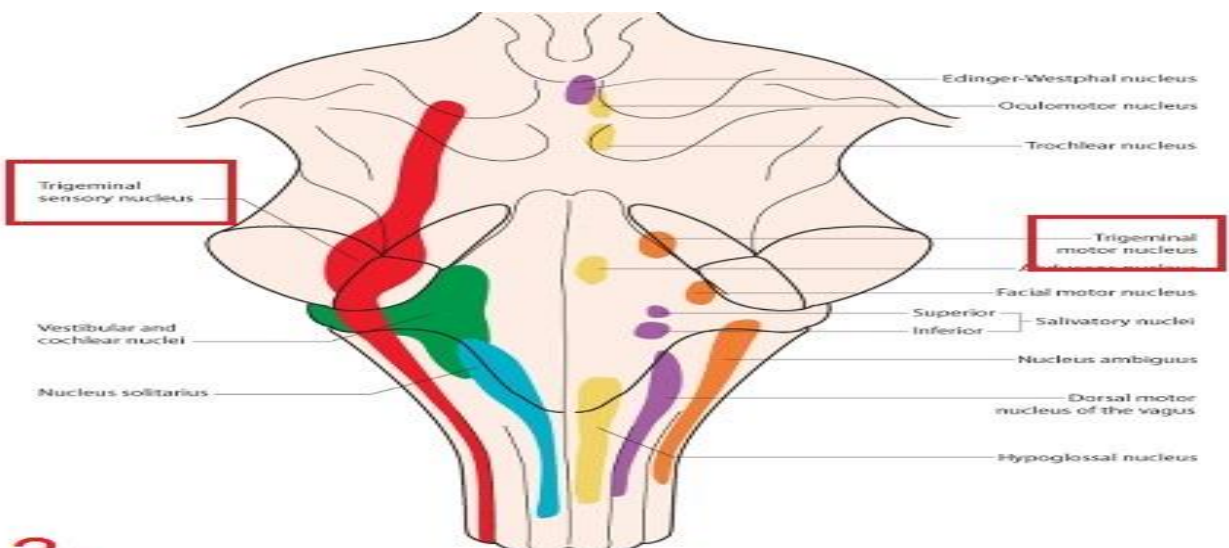
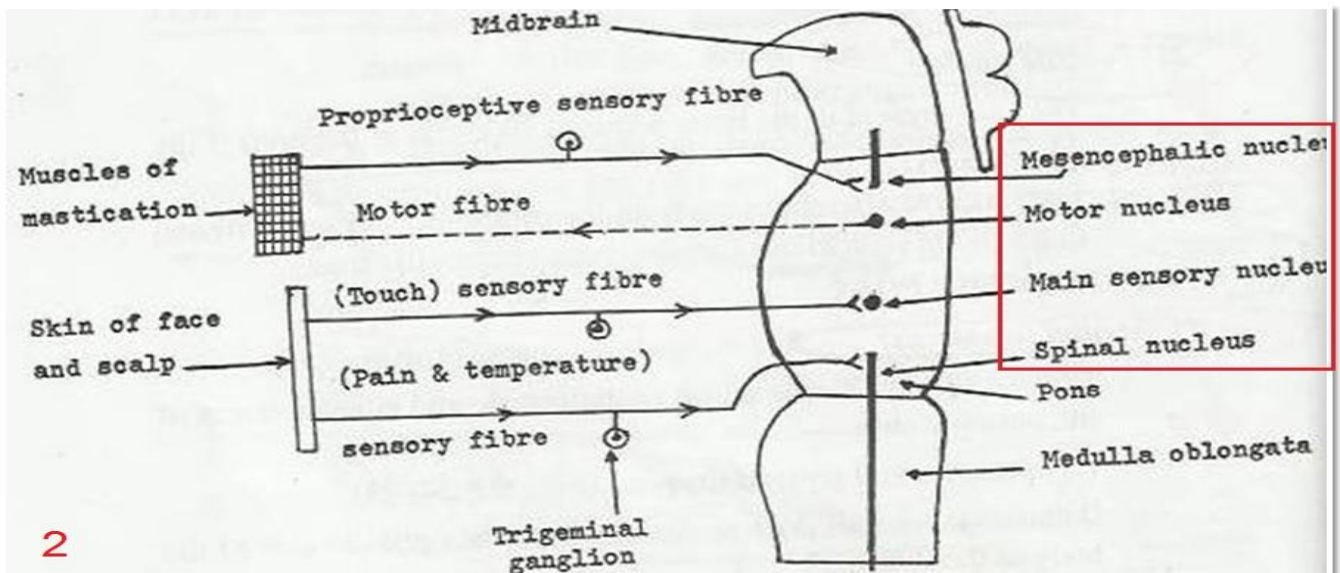
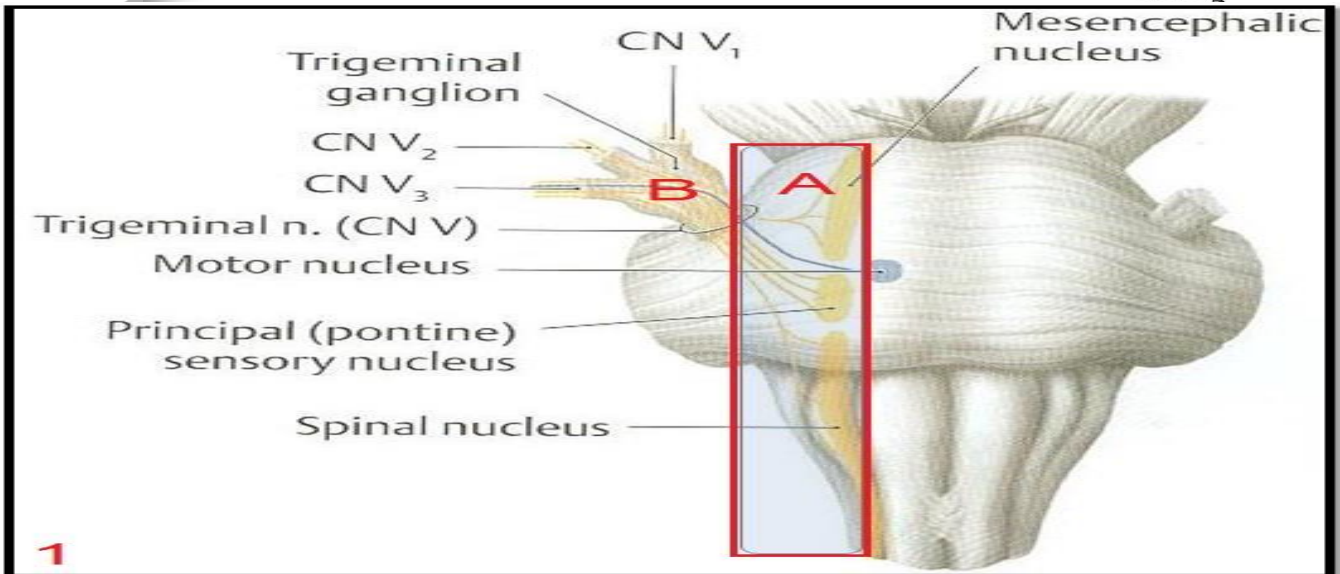


Fascial



TRIGEMINAL NERVE

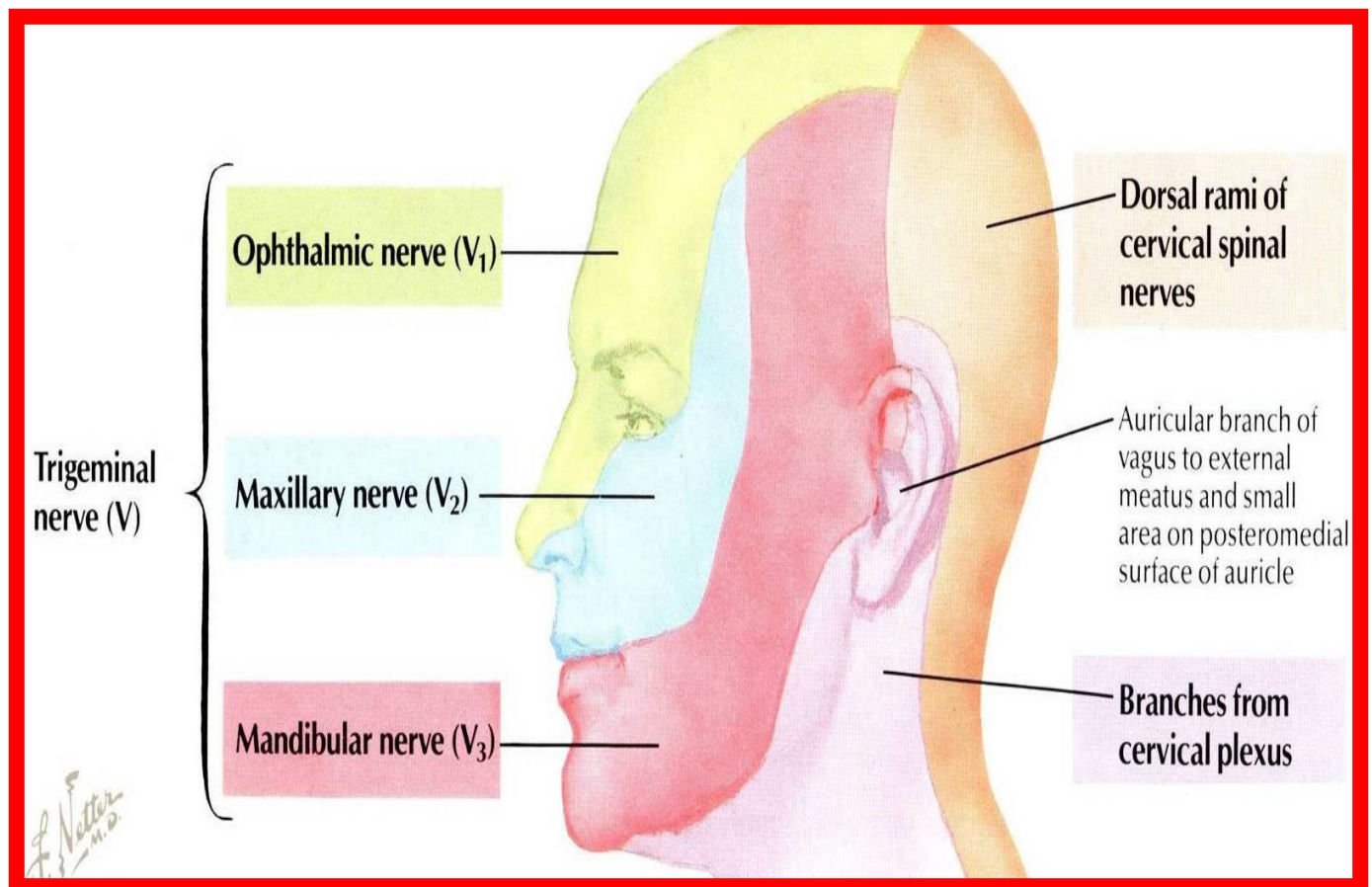
TYPE	Mixed (sensory & motor).	
FIBERS	1- General somatic afferent: Carrying general sensations from face.	2- Special visceral efferent: Supplying muscles developed from the 1st pharyngeal arch. (8 muscles).
NUCLEI Four Nuclei: (3 sensory + 1 Motor). *1(A)*2 *3	General somatic afferent (sensory)	Special visceral efferent (motor)
	1- Mesencephalic (Pons & midbrain): receives proprioceptive fibers from muscles of mastication. 2- Principal (main) sensory (Pons): receives touch fibers from face & scalp. 3- Spinal (Pons, medulla & upper 2-3 cervical segments of spinal cord): receives pain & temperature sensations from face & scalp.	4- Motor nucleus (Pons): supplies: <ul style="list-style-type: none"> Four muscles of mastication: (temporalis, masseter, medial pterygoid & lateral pterygoid). Other four muscles: (Anterior belly of digastric, mylohyoid, tensor palati & tensor tympani). <p>Join only with mandibular division</p>
GANGLION *1(B)	Site	Importance
	Occupies a depression in the middle cranial fossa. covering the trigeminal impression in the petrous temporal.	Contains cell bodies: <ol style="list-style-type: none"> Whose dendrites carry sensations from the face. Whose axons form the sensory root of trigeminal nerve.
COURSE *1	Emerges from the middle of the ventral surface of the pons at the junction of middle cerebellar peduncle by 2 roots (<u>L</u> arge <u>L</u> ateral sensory root & small <u>m</u> edial <u>m</u> otor root). Divides into 3 divisions (dendrites of trigeminal ganglion): Pure sensory: [1- Ophthalmic.(V ₁) 2- Maxillary.(V ₂)] Mixed: 3- Mandibular.(V ₃)	





Sensory nerve supply of face

all sensory of the face supply by trigeminal nerve (upper part from Ophthalmic, middle part from Maxillary and lower part from Mandibular) ,except the area above the angle of mandible which supply by branch of cervical plexus.





Divisions of trigeminal nerve:

1- Ophthalmic. (Pure sensory)

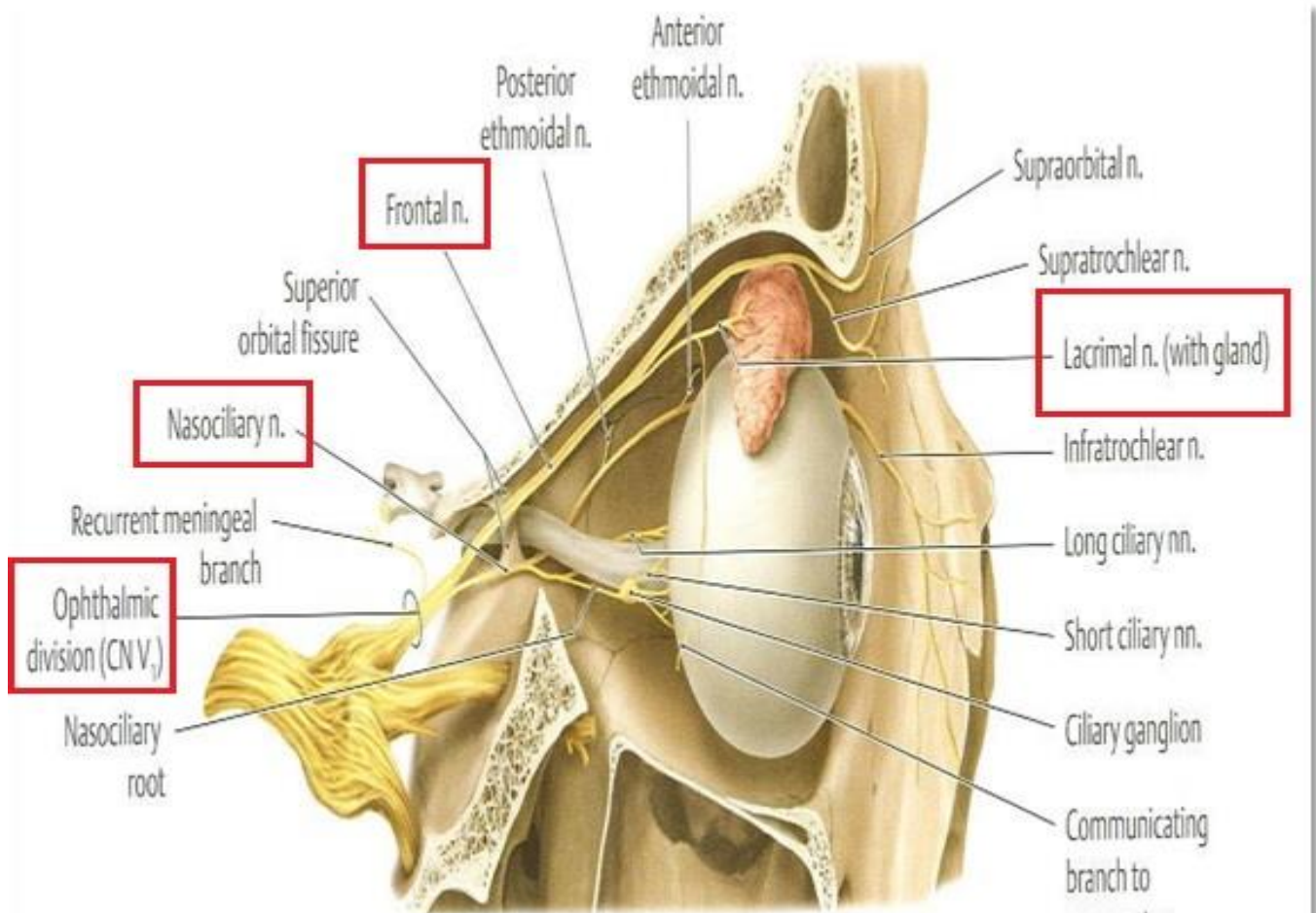
Divides into:3 branches:

Frontal, Lacrimal & Nasociliary which pass through (SOF) superior orbital fissure to the orbit.

A) Frontal (**middle**): supplies skin of face & scalp.

B) Lacrimal (**lateral**): supplies skin of face & lacrimal gland.

C) Nasociliary (**medial**): supplies skin of face, nasal cavity & eyeball.





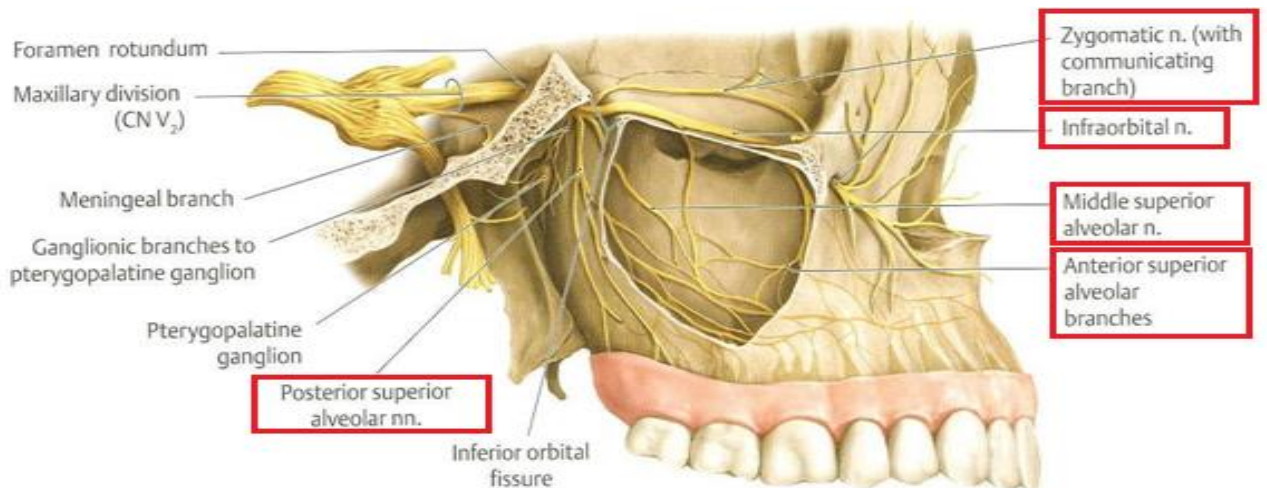
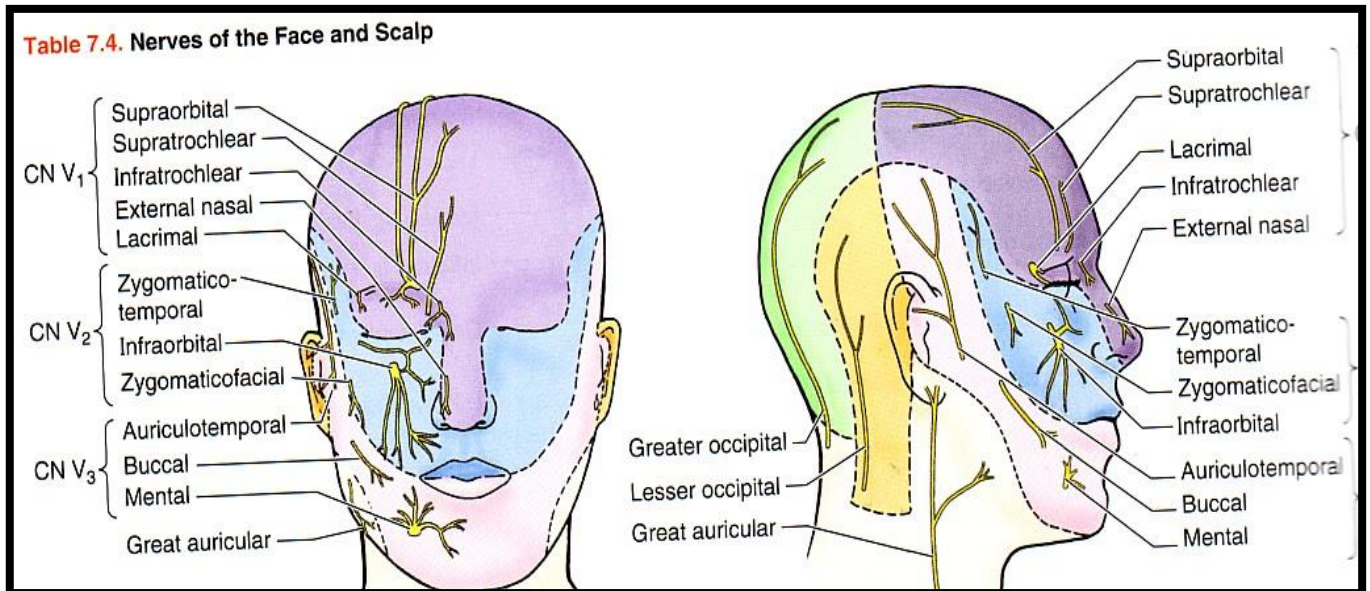
2- Maxillary. (Pure sensory)

Pass through foramen rotundum.

Supplies:

A) Upper teeth, gums & maxillary air sinus by anterior, posterior & middle superior alveolar nerves.

B) Face by zygomaticofacial & infraorbital nerves.





3- Mandibular. (Mixed)

Pass through foramen oval.

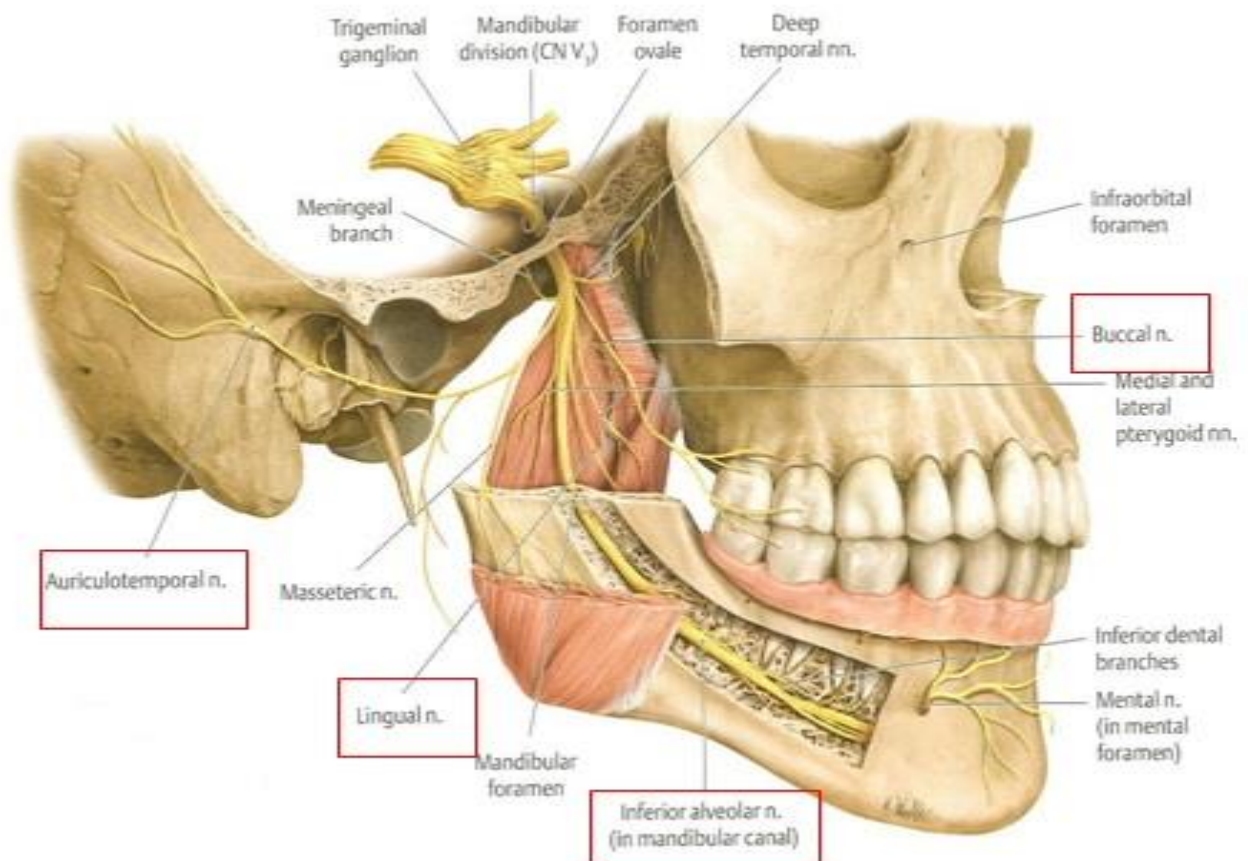
- **Sensory branches:**

1- Lingual: General sensations from anterior 2/3 the of tongue.

2- Inferior alveolar: Lower teeth, gums & face.

3- Buccal: Face, (cheek of the upper jaw).

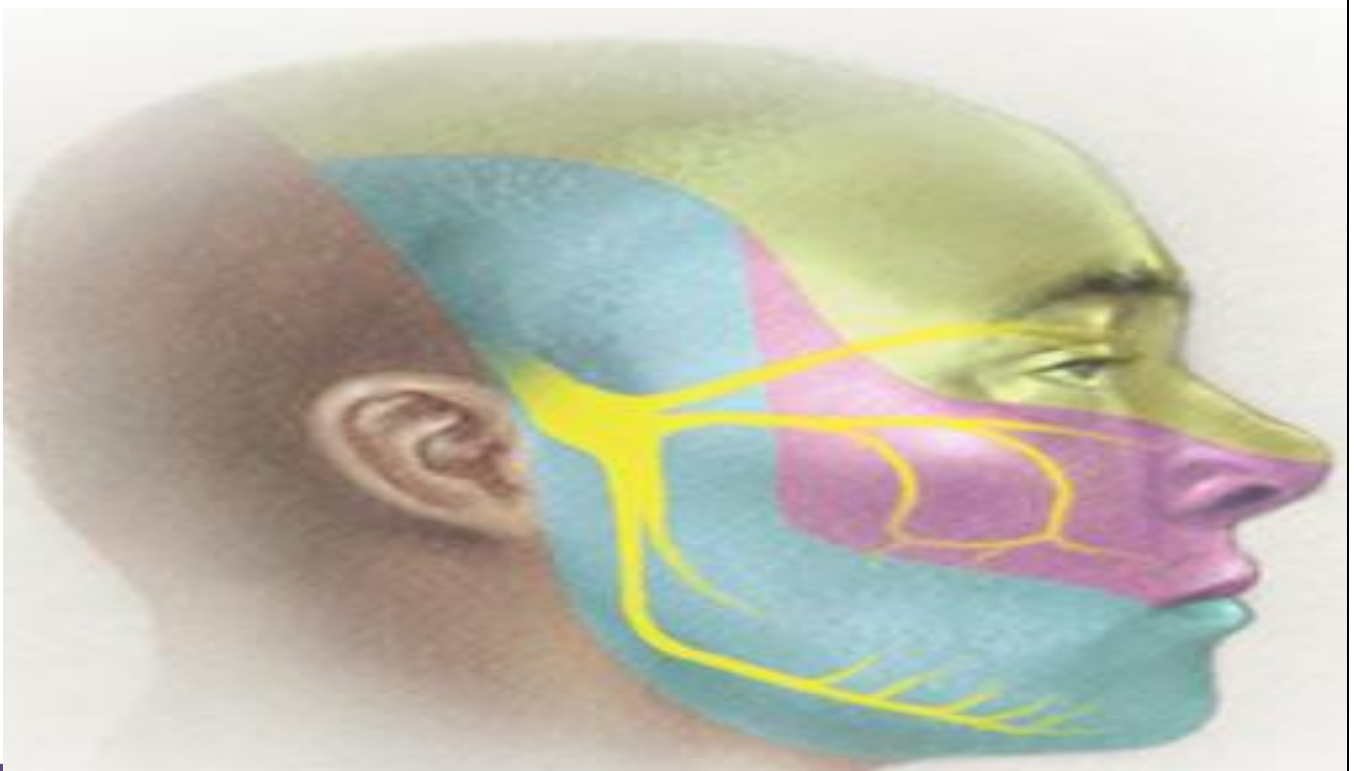
4- Auriculotemporal: auricle, temple, parotid gland & TMJ
(Temporomandibular joint).





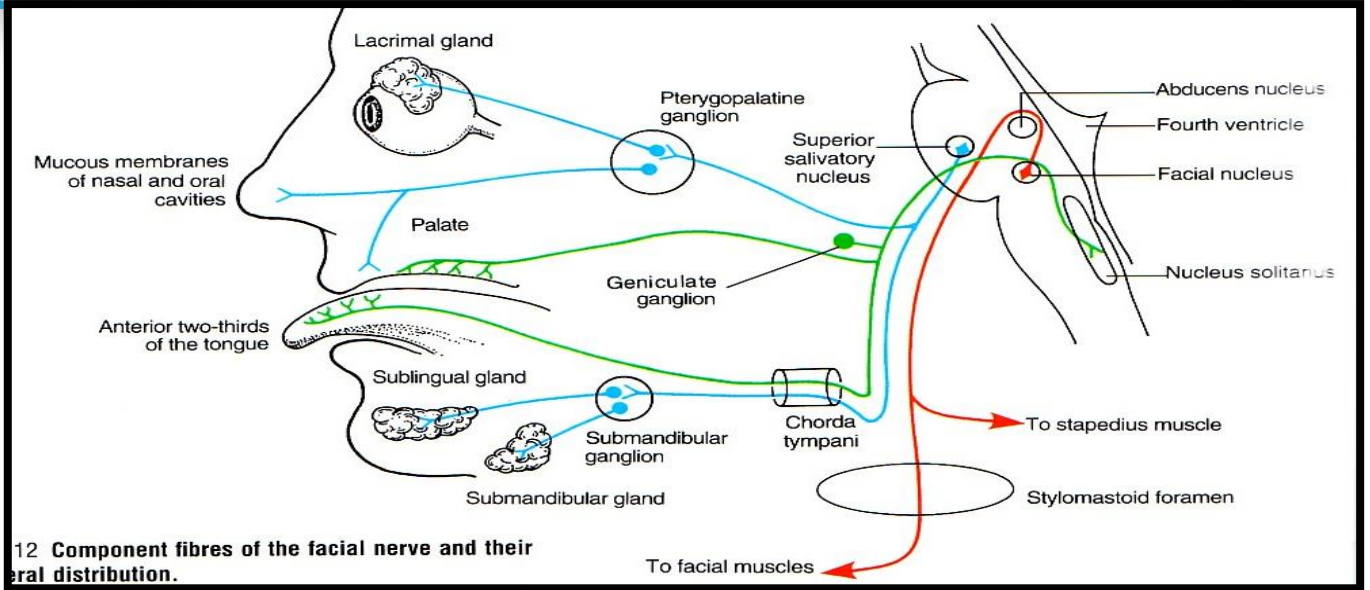
Trigeminal neuralgia

- Compression, degeneration or inflammation of the 5th cranial nerve may result in a condition called **trigeminal neuralgia** or tic douloureux.
- This condition is characterized by recurring episodes of intense stabbing, sever, excoriating pain radiating from the angle of the jaw along one or more branches of the trigeminal nerve on one side.
- **Usually involves maxillary & mandibular branches**, rarely in the ophthalmic division.
- Usually above 50 years and more in females.
- Can result from a redundant loop of superior cerebellar artery.
- **Surgery** is the treatment of choice.

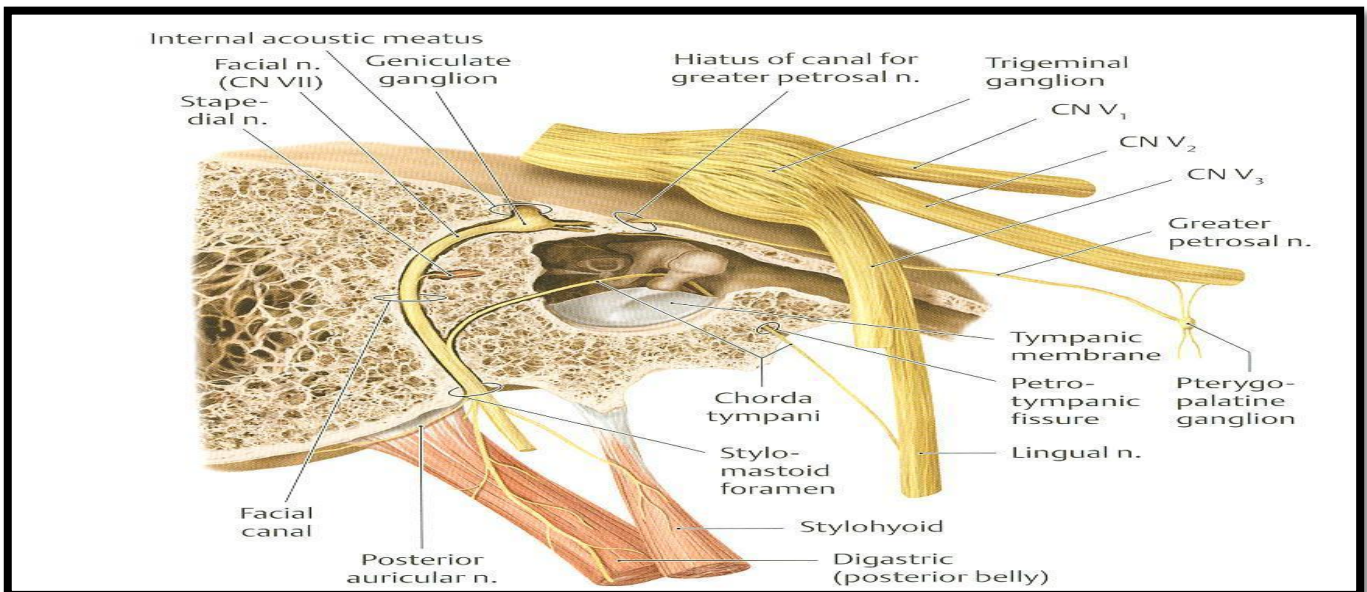
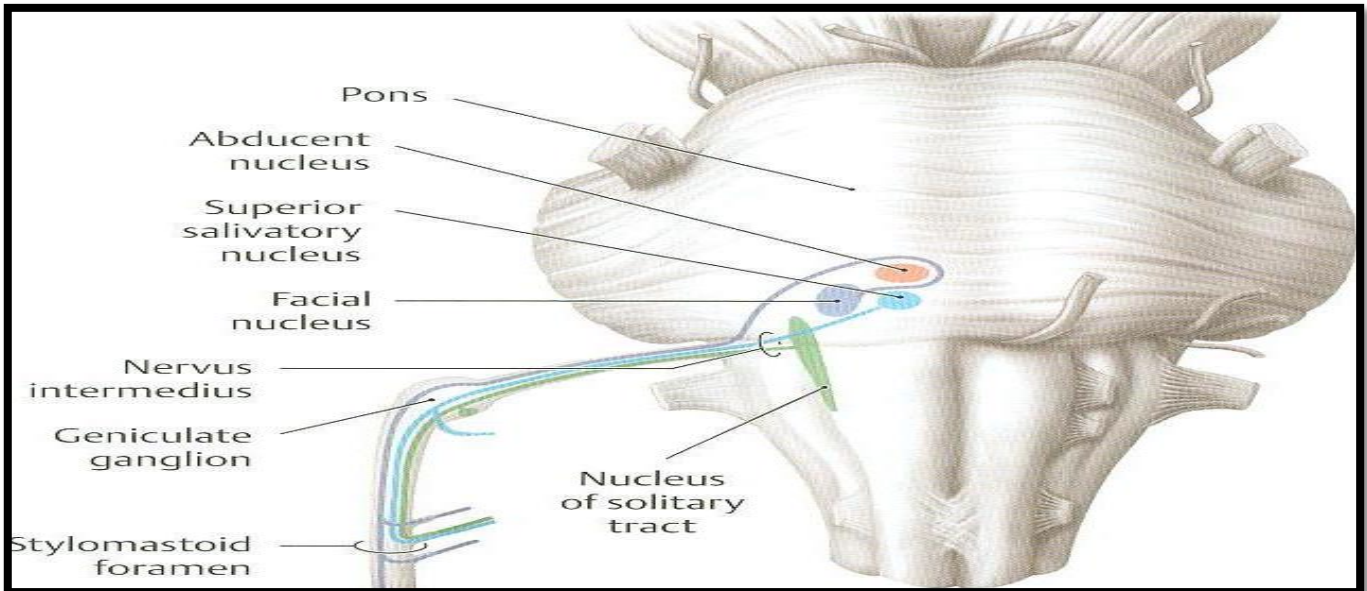


FACIAL NERVE

TYPE	Mixed (Motor, Special sensory & 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: parasympathetic secretory fibers to submandibular, sublingual, lacrimal, nasal & palatine glands.	
NUCLEI Three 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 the face, Muscles of the scalp, Posterior belly of digastric, Stylohyoid, Platysma, Stapedius & muscle of auricle
	General visceral efferent:	Superior salivatory nucleus: sends preganglionic parasympathetic secretory fibers to Sublingual, Submandibular, Lacrimal, Nasal & Palatine glands.
COURSE	<ul style="list-style-type: none"> ❖ Emerges from the cerebellopontine angle (common place to Infected tumor) by 2 roots: <ol style="list-style-type: none"> 1- <u>Medial motor</u> root: contains <u>motor</u> fibers. 2- Lateral root (nervous intermedius): contains parasympathetic & taste fibers. ❖ Passes through internal acoustic meatus with VIII cranial nerve to inner ear where it runs in facial canal. ❖ Emerges from the stylomastoid foramen and give 2 branches. ❖ enters the parotid gland where its gives 5 branches. (The most superficial structure within parotid gland) 	



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





BRANCHES OF FACIAL NERVE

■ In facial canal:

1- Greater petrosal nerve: carries preganglionic **parasympathetic fibers to lacrimal, nasal & palatine glands.**

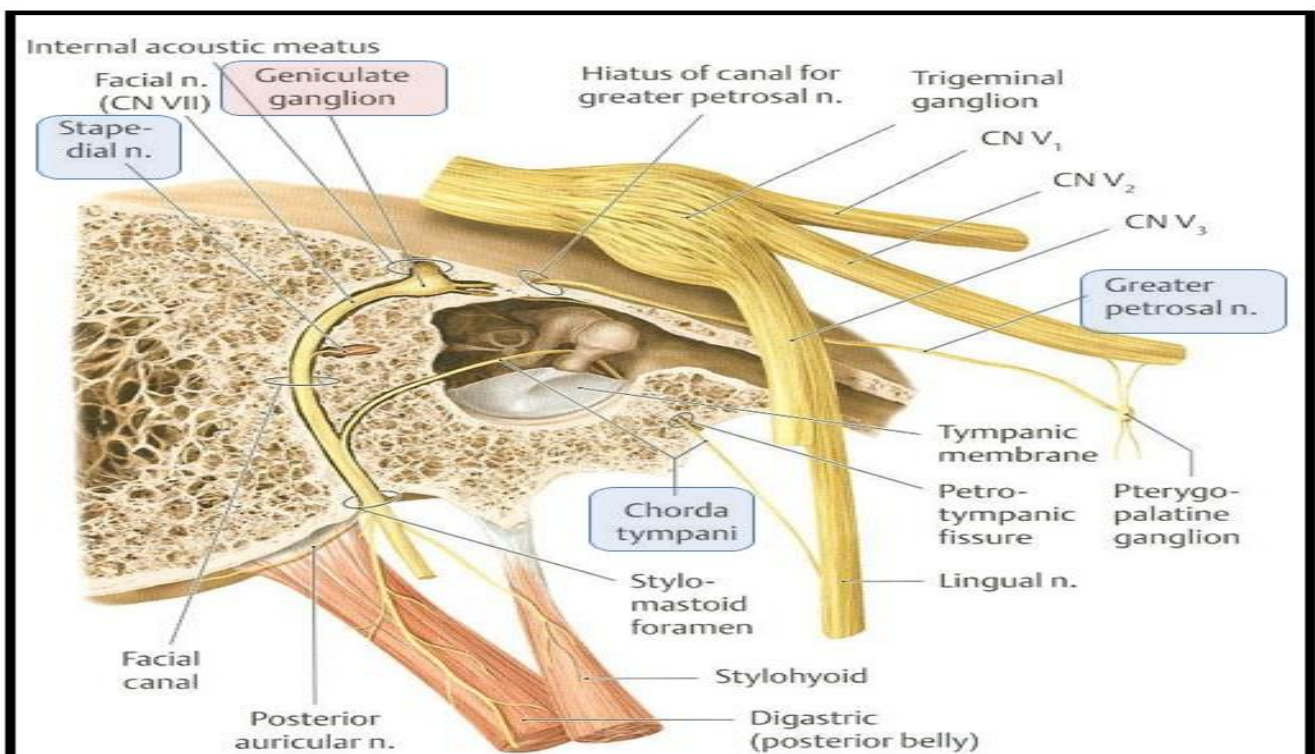
2- Chorda tympani: carries:

A) Preganglionic **parasympathetic fibers to submandibular & sublingual salivary glands.**

B) Taste fibers from **anterior 2/3rd** of the tongue.

3- Nerve to stapedius.

N.B.: Geniculate ganglion: contains cell bodies of neurones carrying taste sensations from anterior 2/3 of tongue.





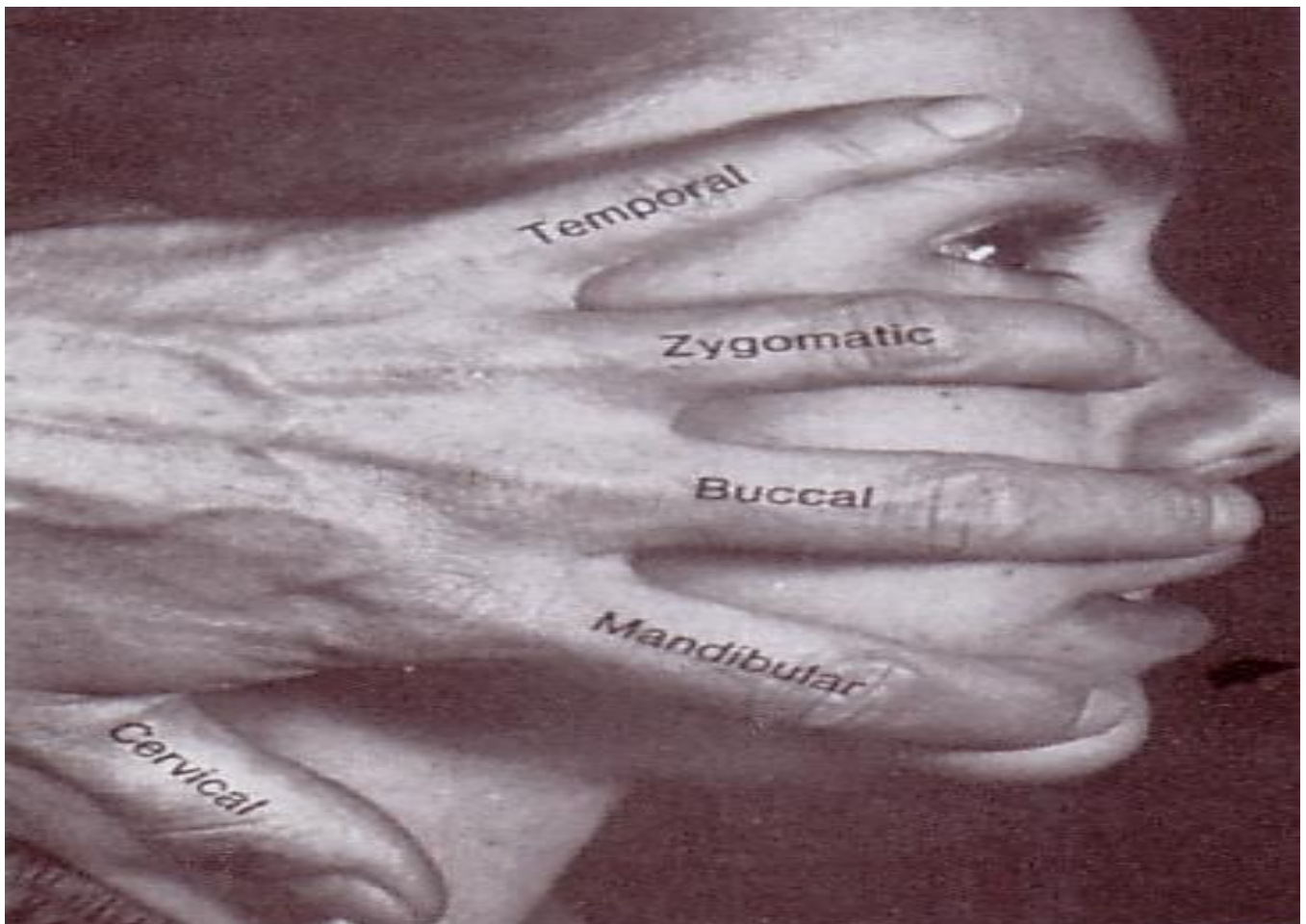
▪ Just as it emerges from the stylomastoid foramen it gives:

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

▪ Inside parotid gland:

Gives 5 terminal motor branches:

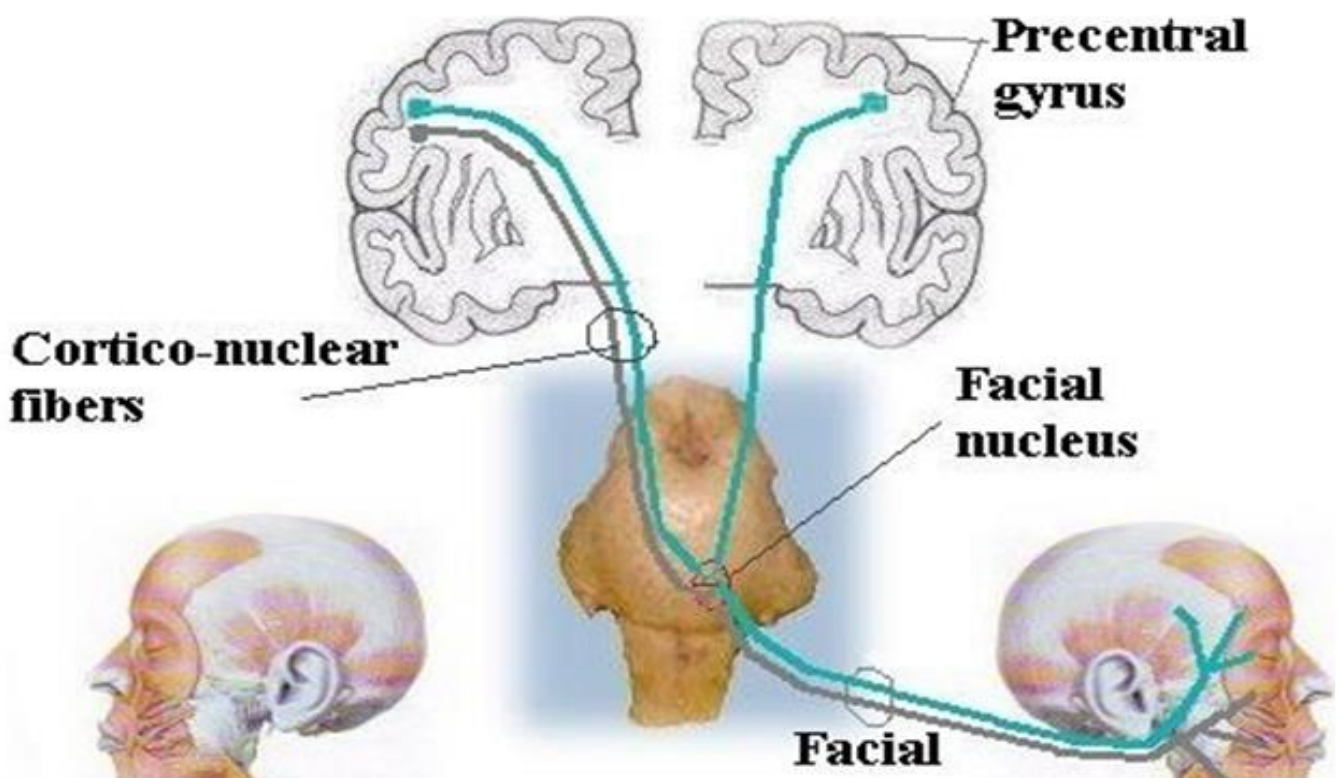
Temporal, Zygomatic, Buccal, Mandibular & Cervical.





Bell's Palsy

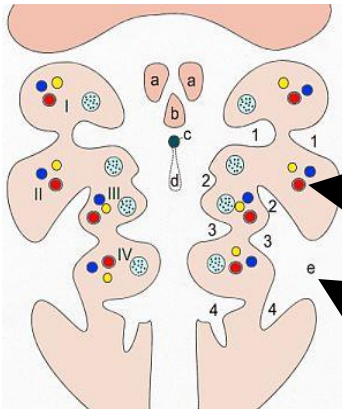
- Damage of the **facial nerve** results in **paralysis of muscles of facial expressions** : Facial (Bell's) palsy; lower motor neuron lesion (**whole face affected**).
- NB. In upper motor neuron lesion (upper face is intact) .
- Face is distorted:
 - Drooping of lower eyelid,
 - Sagging of mouth angle,
 - 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**.





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).
- **All motor fibers** are included in the **mandibular division** & supply muscles of mastication.



- **Pharyngeal arches:**
 - 1- Muscles that supplied by trigeminal nerve are derived from 1st pharyngeal arch.
 - 2- Muscles that supplied by facial nerve are derived from 2nd pharyngeal arch.

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.



1-Which one of these nuclei is responsible for receiving the touch from face and scalp ?

- A) mesencephalic
- B) Main sensory nuclei
- C) principle sensory

2-Which one of these is a muscle of mastication ?

- A) mylohyoid
- B) tensor palati
- C) masseter

3-Which one Occupies a depression in the middle cranial fossa ?

- A) trigeminal motor nucleus
- B) trigeminal ganglion
- C) none of them

4-Axons of cells of motor nucleus join only the.....

- A) Ophthalmic
- B) mandibular
- C) maxillary

5-General sensations from anterior 2/3 the of tongue comes from

- A) trigeminal>>mandibular>>lingual
- B) trigeminal>>maxillary>>lingual
- C) fascial>>lingual



6-Recurring episodes of intense stabbing along a branch called.....

- A) anosmia
- B) trigeminal nuerolgia
- C) both

7-Which one of these is feature of the Bell's Palsy ?

- A) stabbing pain
- B) dropping of lower eyelid
- C) none of them

8-Fascial nerve emerges from witch Foramen ?

- A) Stylomastiod
- B) maxillary
- C) Stylohyoid

9-Which one emerges from Cerebellopontine angle ?

- A) Trigemonal
- B) Fascial
- C) none of them

10-Muscles developed from the 2nd pharyngeal arch from ?

- A) Special visceral afferent
- B) Special visceral efferent
- C) General visceral efferent

11-Taste sensations from anterior 2/3 the of tongue comes from

- A) Special visceral afferent
- B) Special visceral efferent
- C) General visceral efferent

12- Lower motor neuron lesion will cause ?

- A) 7th nerve injury
- B) 5th nerve injury
- C) 8th nerve injury



13-Which one of these nuclei is responsible for receiving the proprioceptive fibers from muscles of mastication ?

- A) mesencephalic
- B) spinal
- C) principle sensory

14-Stimulation of which of the following nerves could lead to salivation and lacrimation?

- A) Facial
- B) Trigeminal
- C) VAGUS

15-Lesion of mandibular nerve may result in :

- A) Loss of lacrimation
- B) Loss of sensory supply to the upper teeth
- C) Loss of general sensation of anterior 2/3 of tongue

Q	Ans
1	B
2	C
3	B
4	B
5	A
6	B
7	B
8	A
9	B
10	B
11	A
12	A
13	A
14	A
15	C

GOOD LUCK

Anatomy Team Leaders:

Fahad AlShayhan & Eman AL-Bedica.