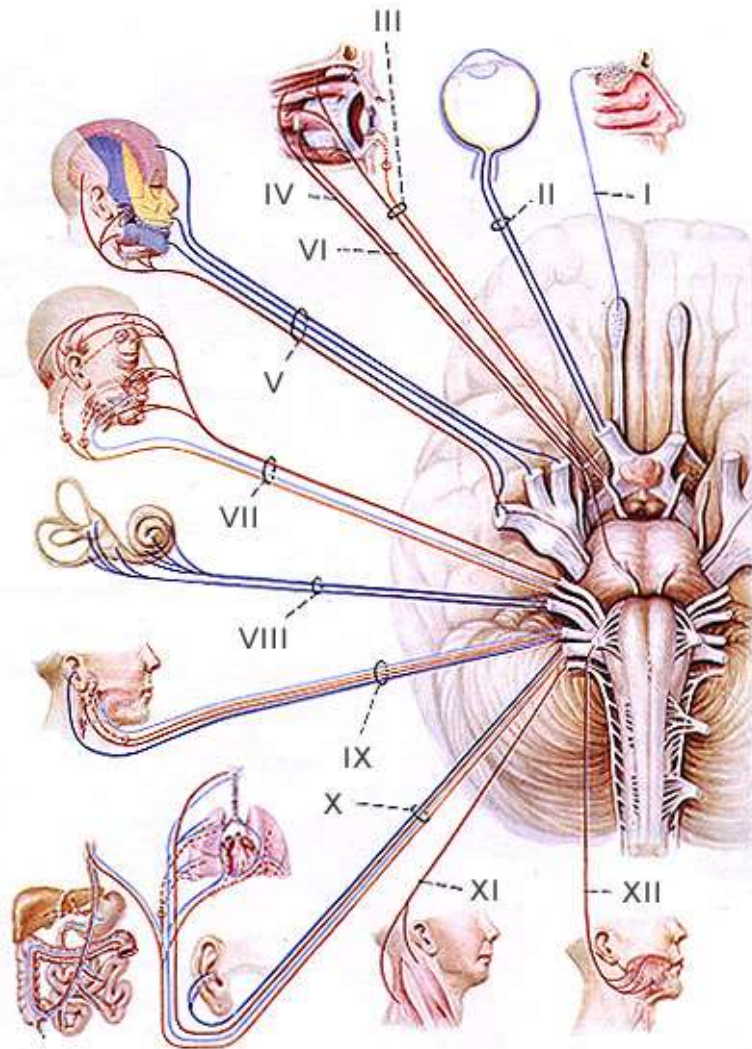


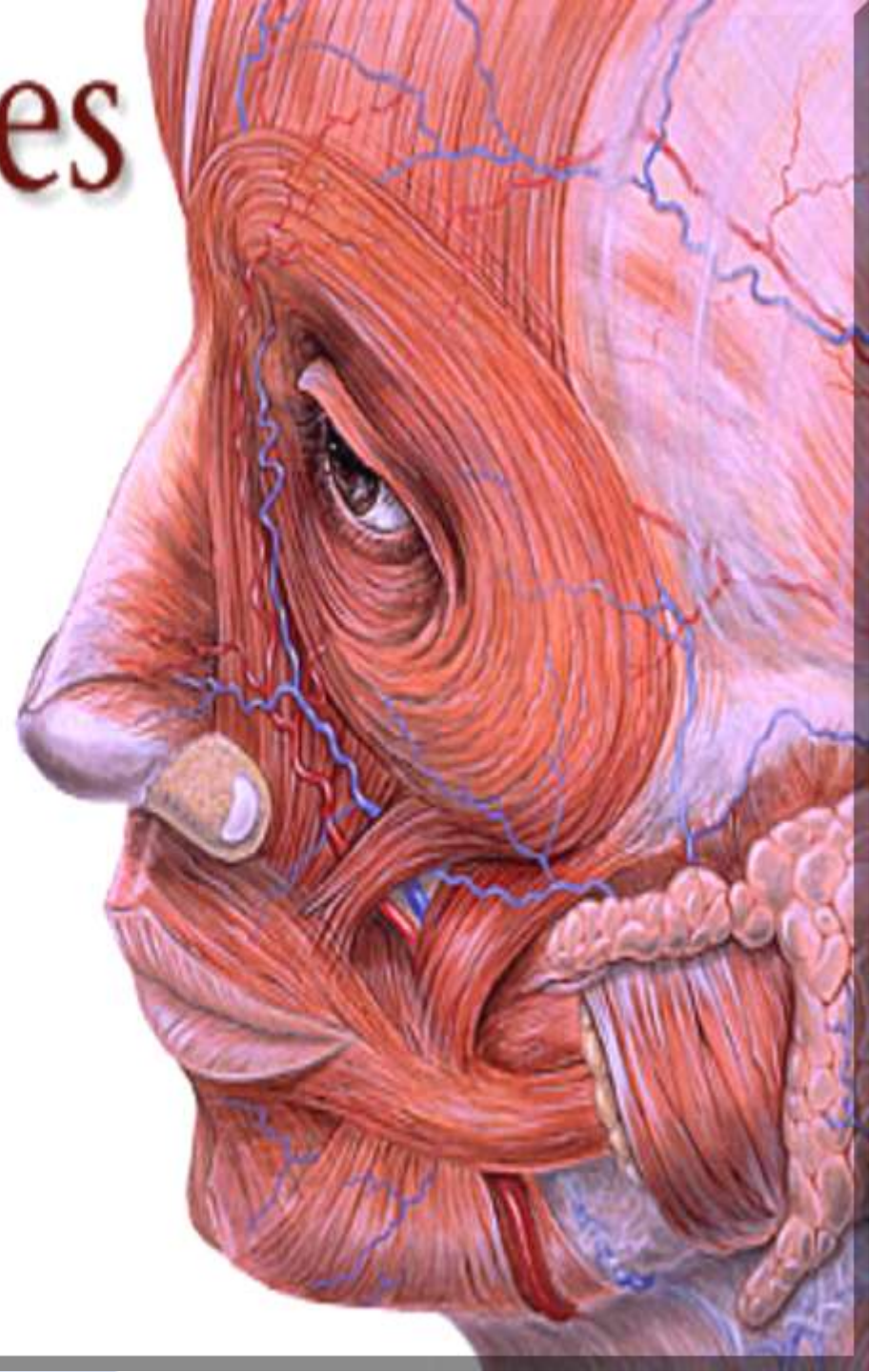
CRANIAL NERVES

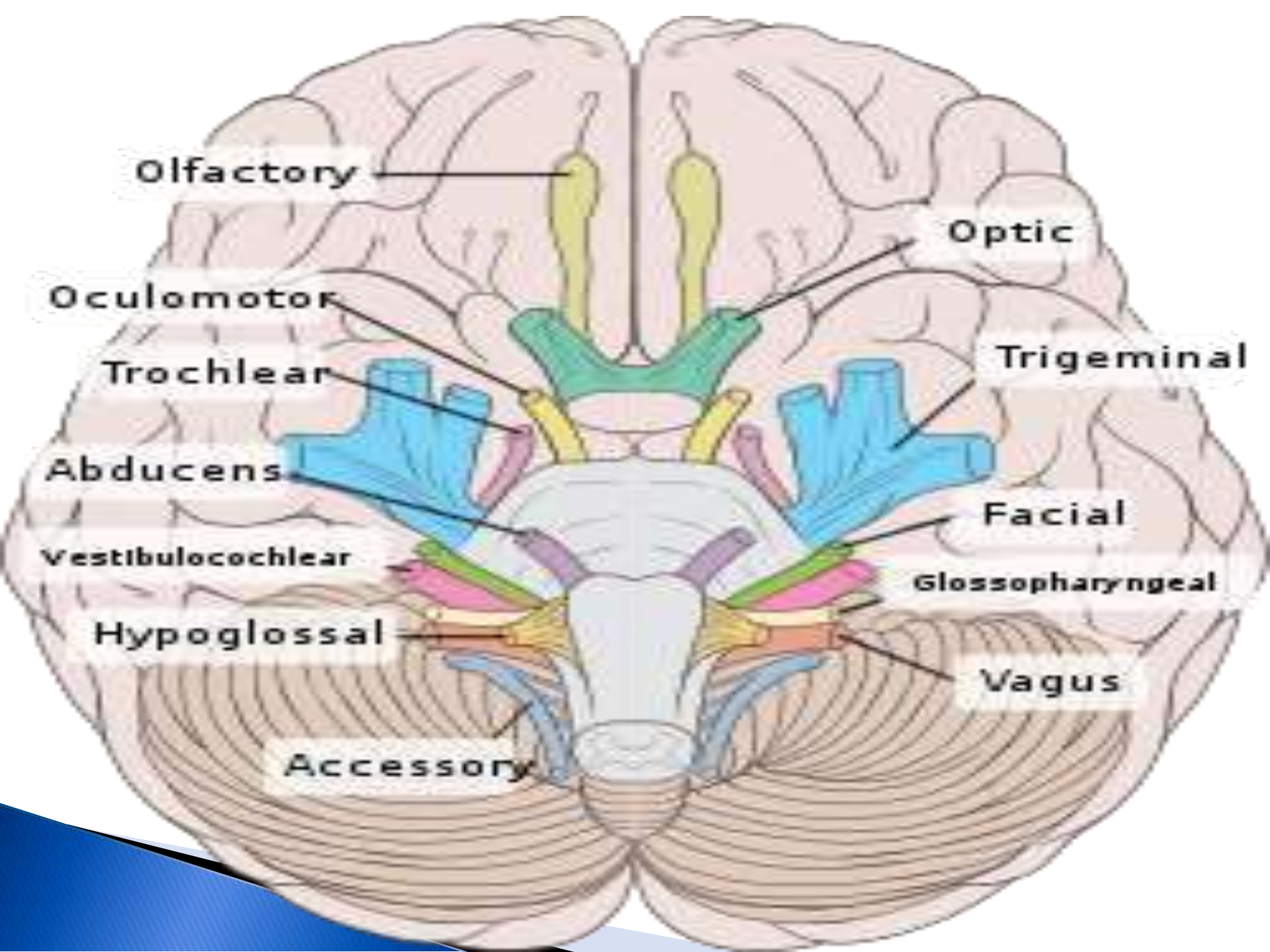


By: Dr. Alaa Sedky

Cranial Nerves

- I Olfactory
- II Optic
- III Oculomotor
- IV Trochlear
- V Trigeminal
- VI Abducens
- VII Facial
- VIII Vestibulocochlear
- IX Glossopharyngeal
- X Vagus
- XI Accessory
- XII Hypoglossal





Olfactory

Optic

Oculomotor

Trigeminal

Trochlear

Abducens

Facial

Vestibulocochlear

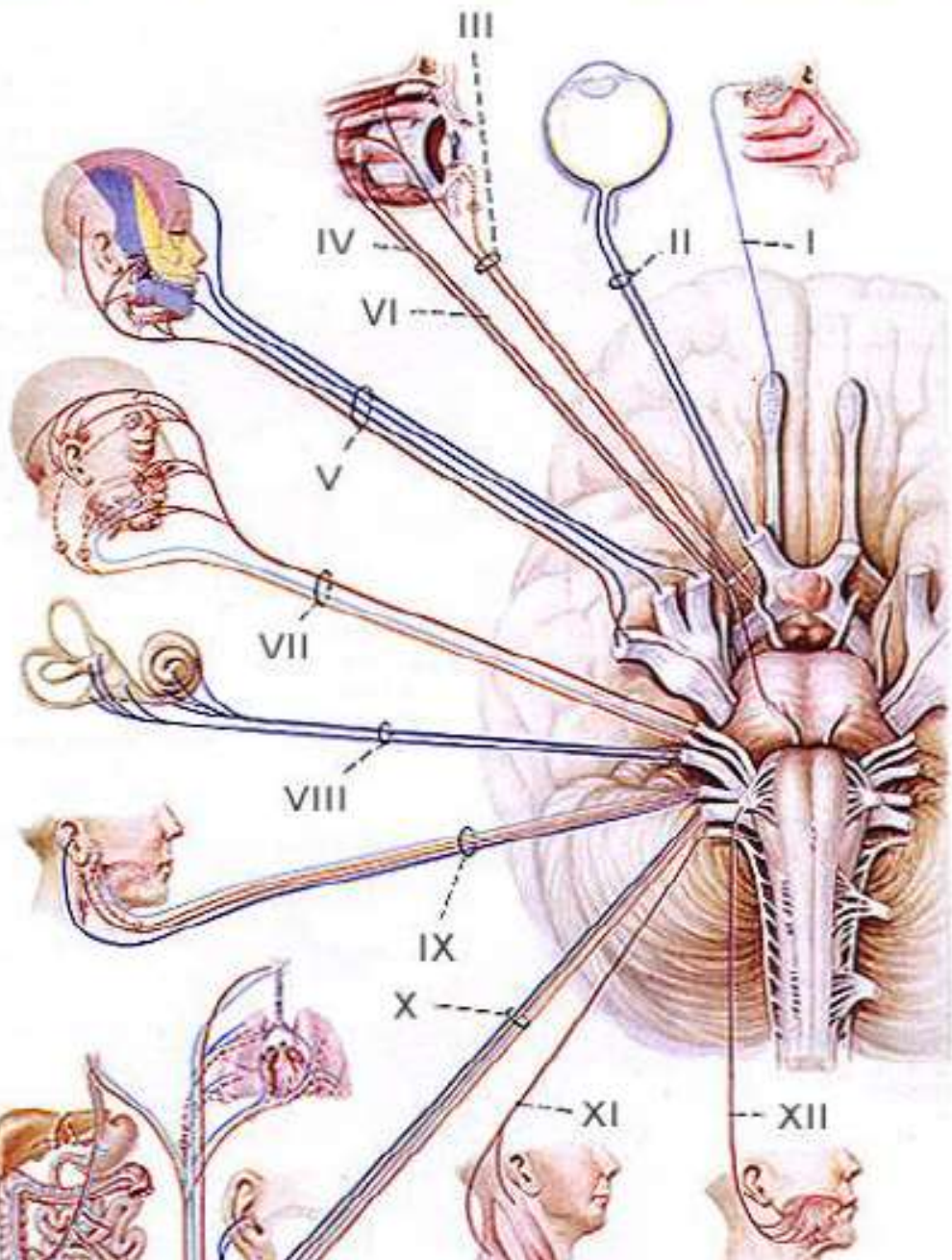
Glossopharyngeal

Hypoglossal

Vagus

Accessory

CRANIAL NERVES



- I Olfactory
 - II Optic
 - III Oculomotor
 - IV Trochlear
 - V Trigeminal
 - VI Abducens
 - VII Facial
 - VIII Vestibulo-cochlear
 - IX Glossopharyngeal
 - X Vagus
 - XI Accessory
 - XII Hypoglossal
- CEREBRAL HEMISPHERE**
- MIDBRAIN**
- PONS**
- MEDULLA**

Cranial nerves are generally named according to their structure or function. For example, the olfactory nerve (I) supplies smell, and the facial nerve (VII) supplies motor innervation to the face. The trigeminal nerve (V) named according to its three heads (Latin: *tri-geminus* meaning triplets), and the vagus nerve (X), named for its wandering course (Latin: *vagus*)

REMEMBER ME...

- SOME
- SAYS
- MONEY
- MATTERS
- BUT
- MY
- BROTHER
- SAYS
- BIG
- BRAIN
- MATTERS
- MOST



- **S**-SENSORY
- **M**- MOTOR
- **B**- BOTH

All in
sequence

OLFACTORY NERVE

»» Cranial Nerve I

I. Olfactory Nerve



❖ Component: **Sensory**

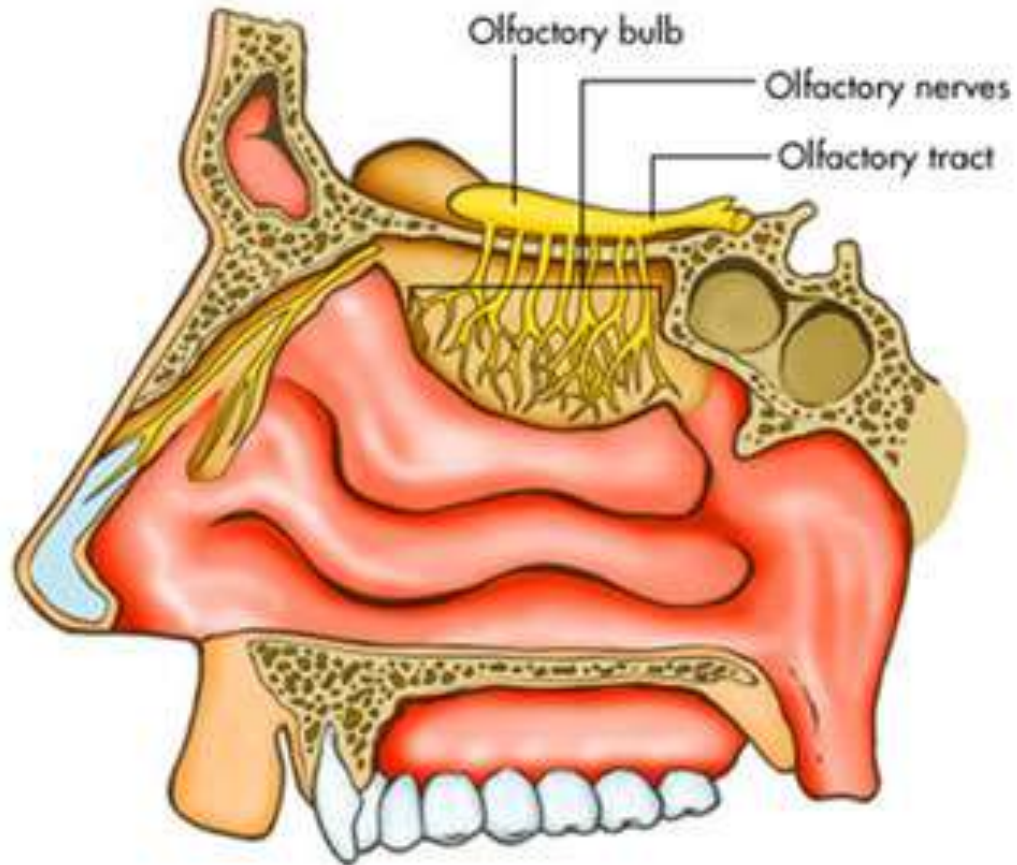
❖ Function: **Smell**

❖ Origin: **Olfactory receptor nerve cells**


❖ Opening to the Skull: **Openings in cribriform plate of ethmoid**

❖ Termination: **olfactory bulb → olfactory tract → olfactory cortex (uncus of temporal lobe)**

Olfactory Nerve



Olfactory Nerve disorders

- ▶ Anosmia or hyposmia (unilateral or bilateral)
 - ▶ Parosmia (head trauma)
 - ▶ Cacosmia (ENT)
 - ▶ Olfactory hallucinations (epilepsy, psychosis)
- 

OPTIC NERVE

»» Cranial Nerve II

II. Optic Nerve

Component: Sensory

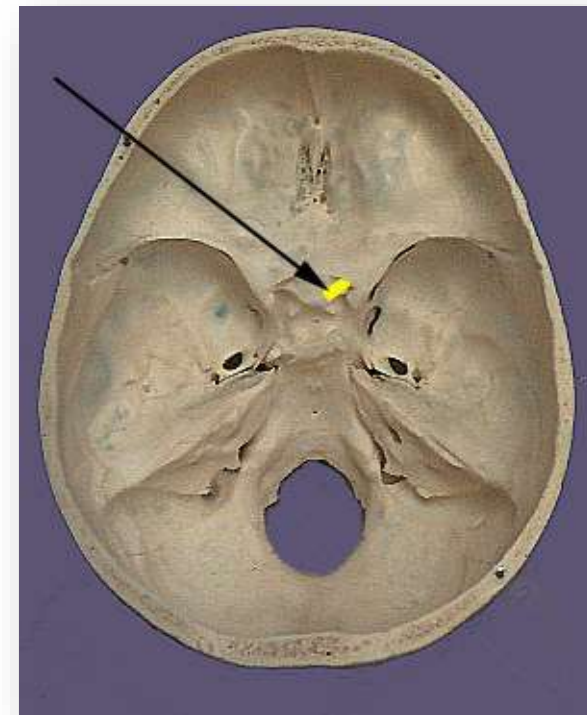
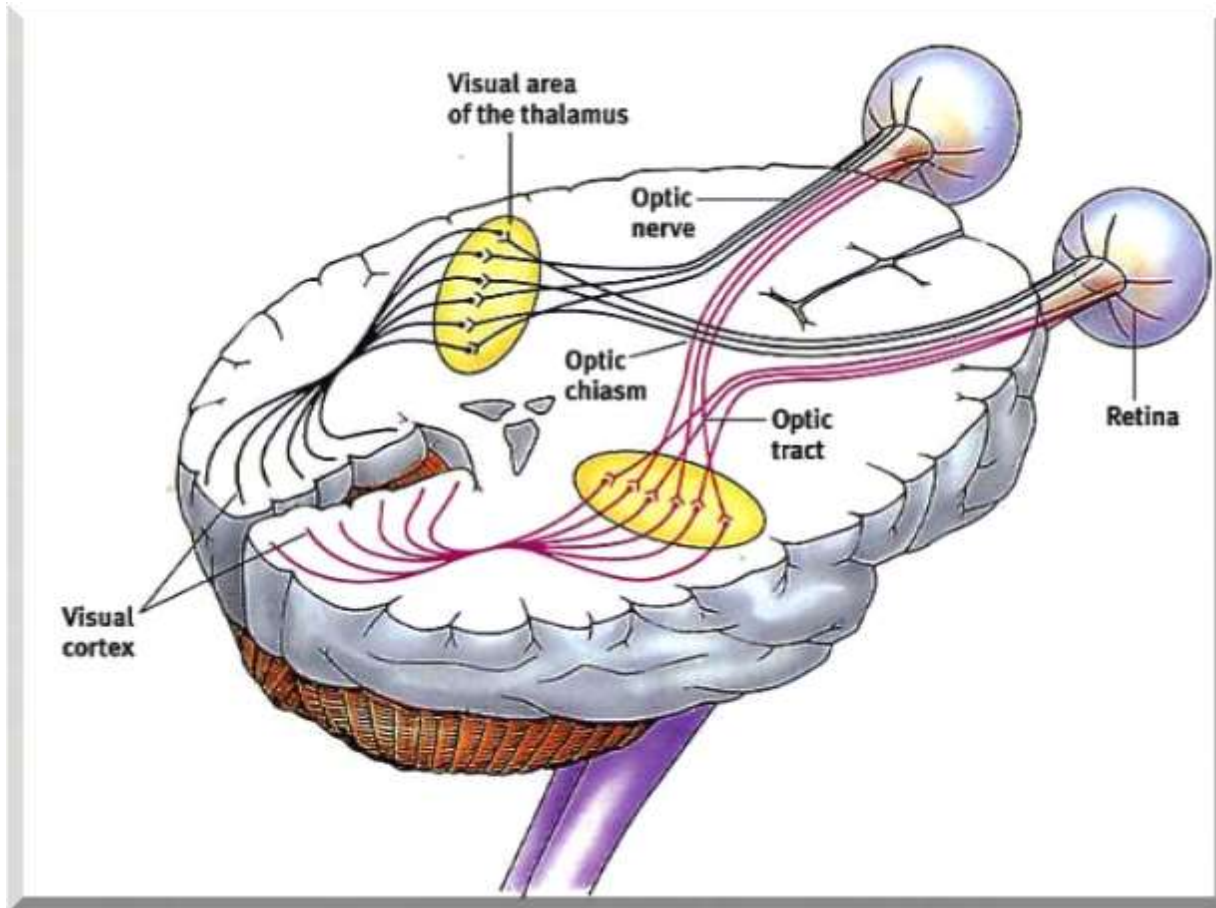
Function: Vision

Origin: Back of the eyeball

Opening to the Skull: Optic Canal

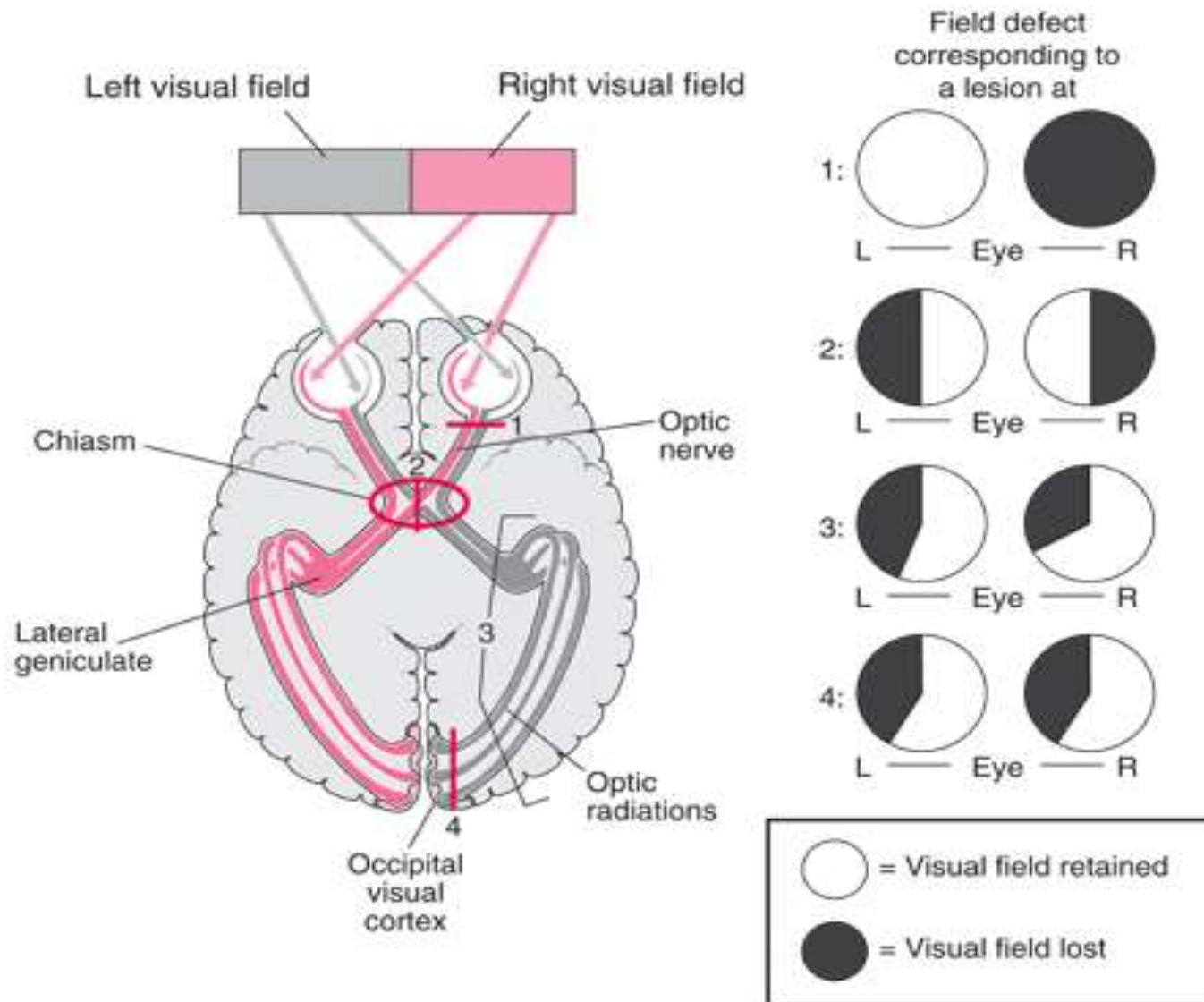


II. Optic Nerve



Higher visual pathways—lesion sites and corresponding visual field defects.

With retrochiasmal lesions, visual field defects tend to become more symmetric (congruous), as shown with the occipital lesion in #4.



OCCULOMOTOR NERVE

»» Cranial Nerve III

III. Oculomotor Nerve

- Component: Motor and autonomic

- Function:
 - Raises upper eyelid
 - Turns eyeball upward, downward and medially
 - Constricts pupil
 - Accommodates the eye

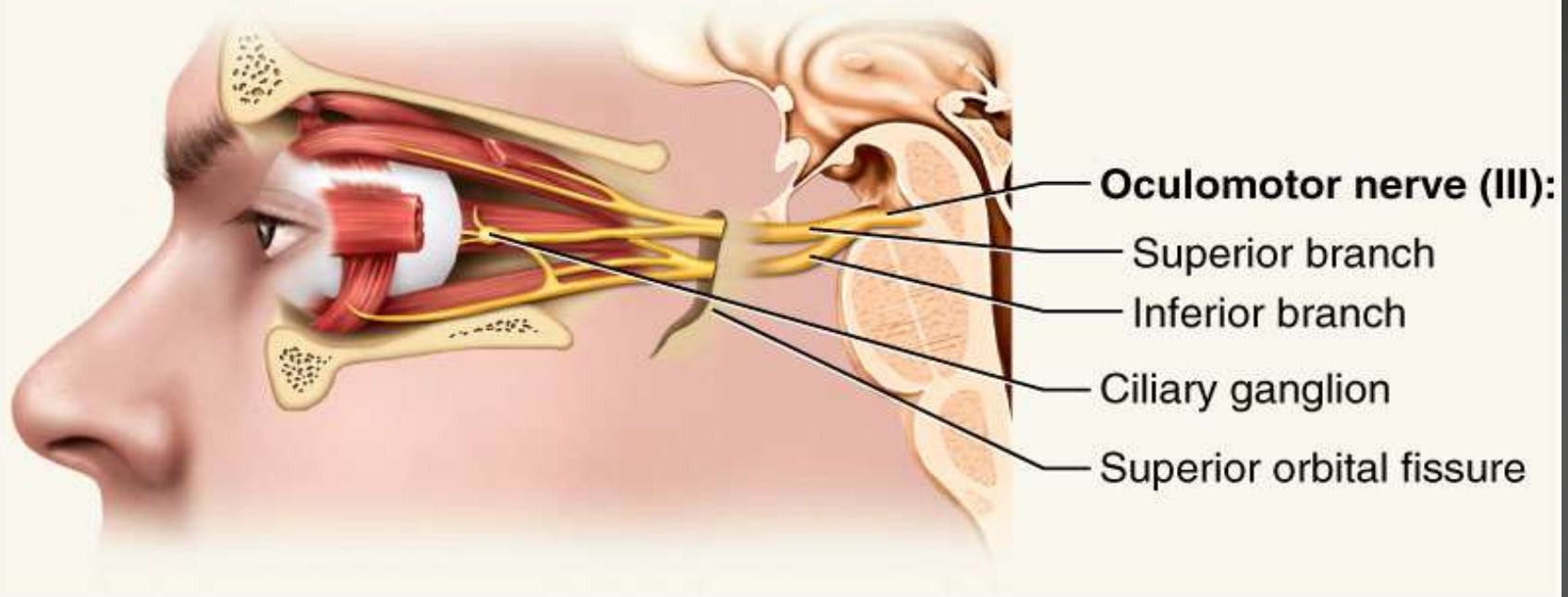


- Origin: Anterior surface of the midbrain

- Opening to the Skull: Superior orbital fissure

Oculomotor Nerve III

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- ▶ Somatic and Autonomic motor function
- ▶ **Eye movement** (Superior, inferior, medial rectus muscles and inferior oblique muscle), **opening of eyelid** (levator palpebrae superioris), **constriction of pupil** (circular muscle), **focusing** (ciliary muscle and accommodation)

TROCHLEAR NERVE

»» Cranial Nerve IV

IV. Trochlear Nerve

✓ Component: **Motor**



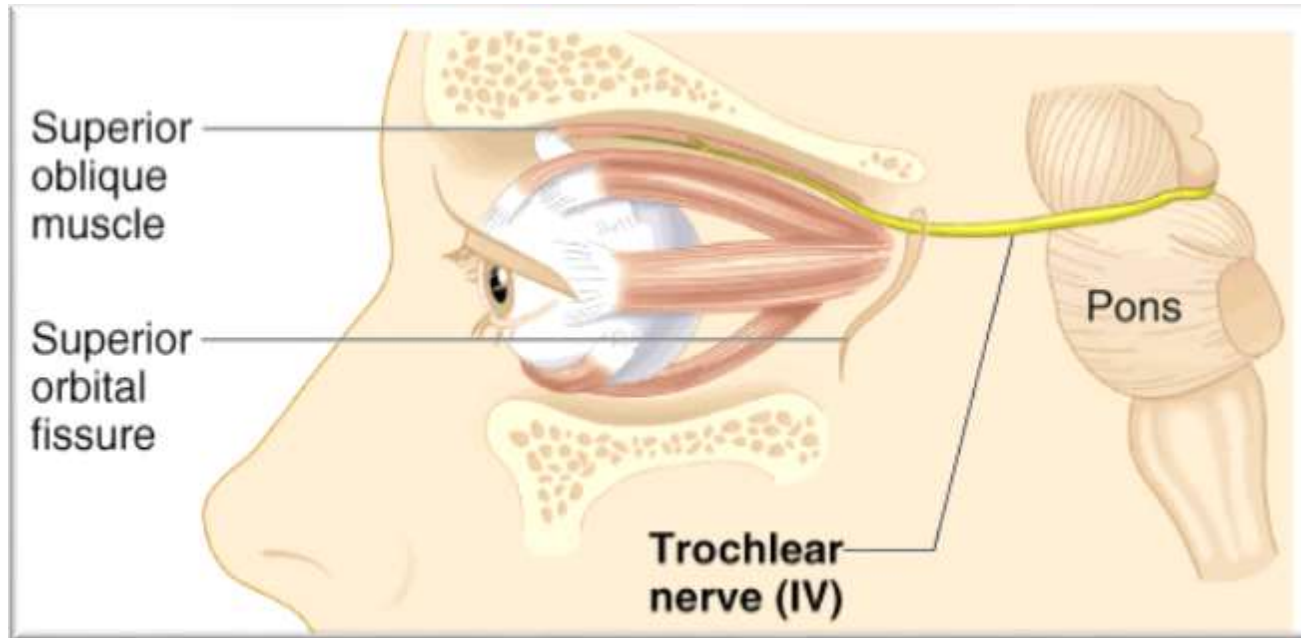
✓ Function: **Assisting in turning eyeball downward and laterally**



✓ Origin: **Posterior surface of the midbrain**

✓ Opening to the Skull: **Superior orbital fissure**

IV. Trochlear Nerve



TRIGEMINAL NERVE

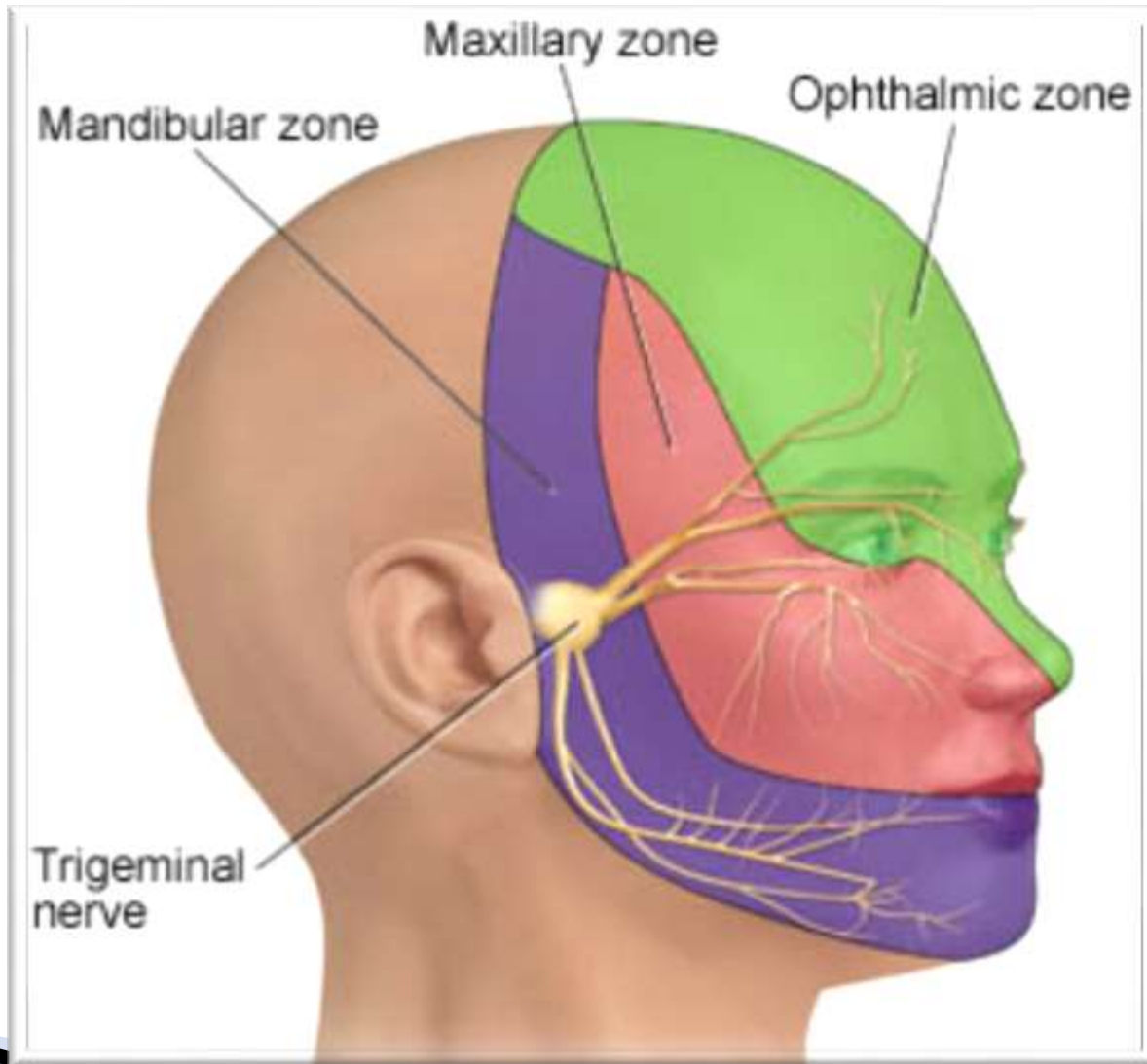
»» Cranial Nerve V

V1. Ophthalmic Nerve

V2. Maxillary Nerve

V3. Mandibular Nerve

V. Trigeminal Nerve



V1. Ophthalmic Nerve

❖ Component: Sensory

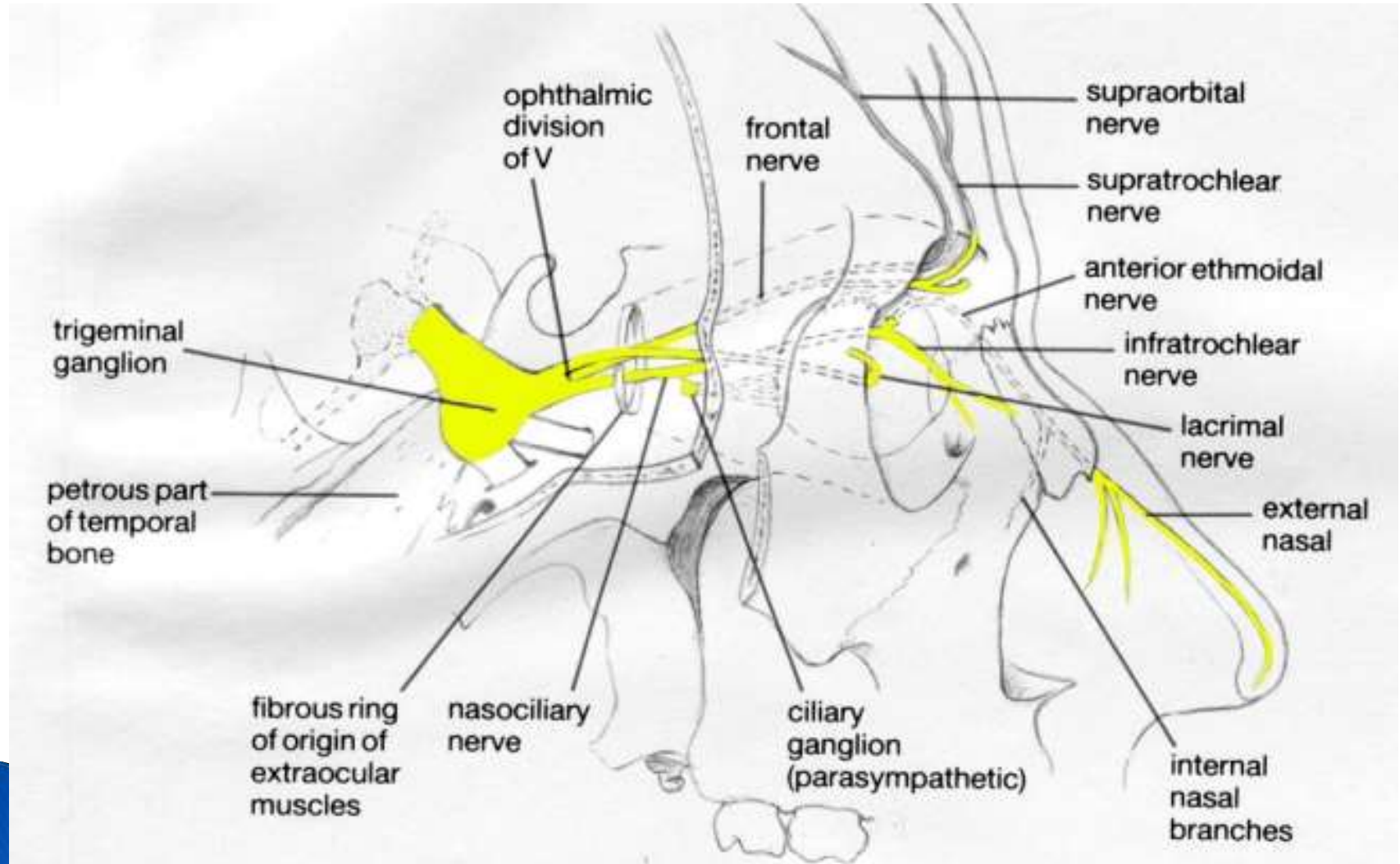
❖ Function:

- ❖ Cornea
- ❖ Skin of forehead
- ❖ Scalp
- ❖ Eyelids and nose
- ❖ Mucous membranes of paranasal sinuses and nasal cavity

❖ Origin: Anterior aspect of the pons

❖ Opening to the Skull: Superior orbital fissure

V1. Ophthalmic Nerve



V2. Maxillary Nerve

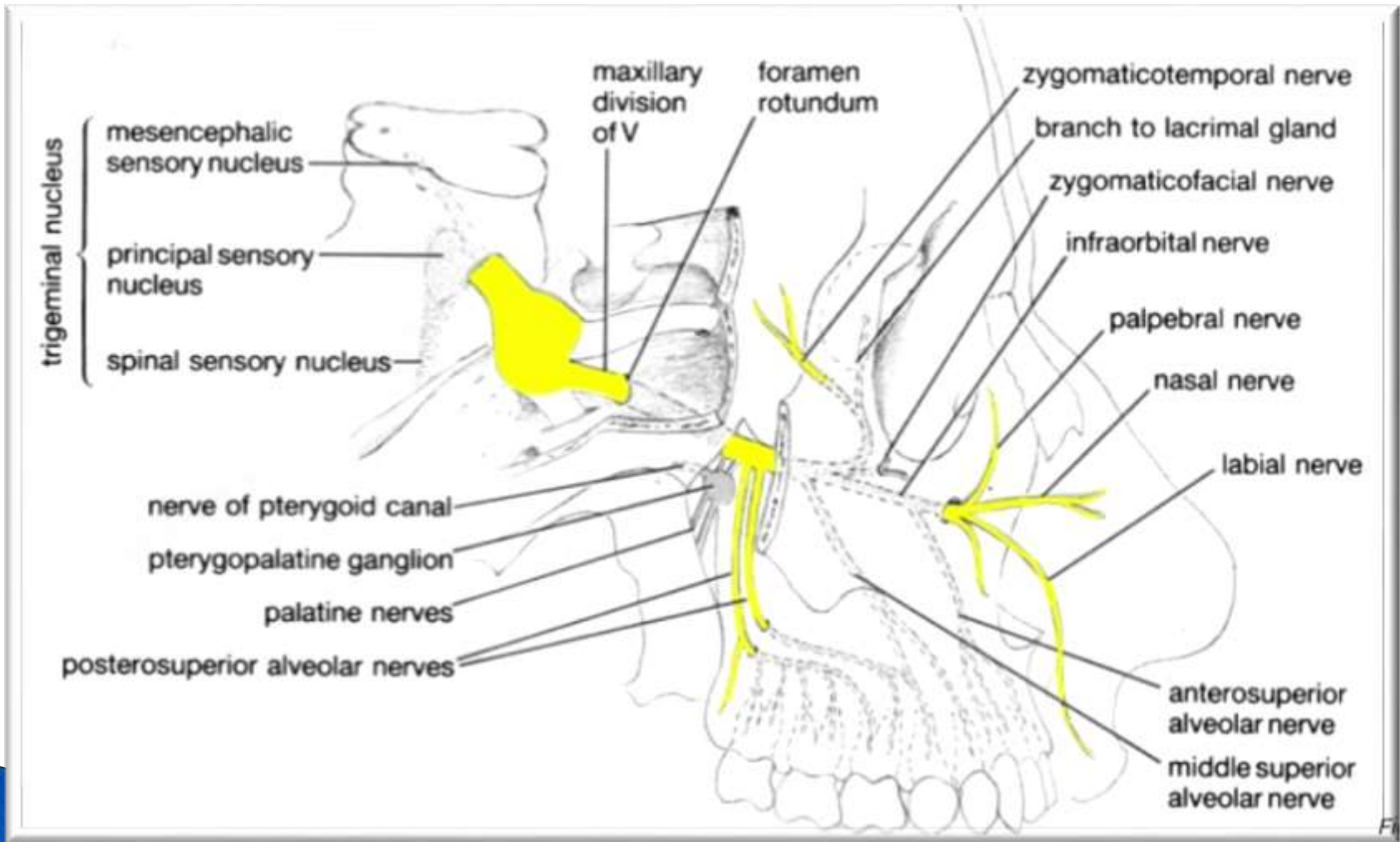
- Component: Sensory

- Function:
 - Skin of the face over maxilla
 - Teeth of the upper jaw
 - Mucous membrane of the nose, the maxillary sinus and palate

- Origin: Anterior aspect of the pons

- Opening to the Skull: Foramen ovale

V2. Maxillary Nerve



V3. Mandibular Nerve

- Component: a. Motor

- Function:
 - Muscles of mastication
 - Mylohyoid
 - Anterior belly of digastric
 - Tensor veli palatine
 - Tensor tympani

- Origin: Anterior aspect of the pons

- Opening to the Skull: Foramen Rotundum

V3. Mandibular Nerve

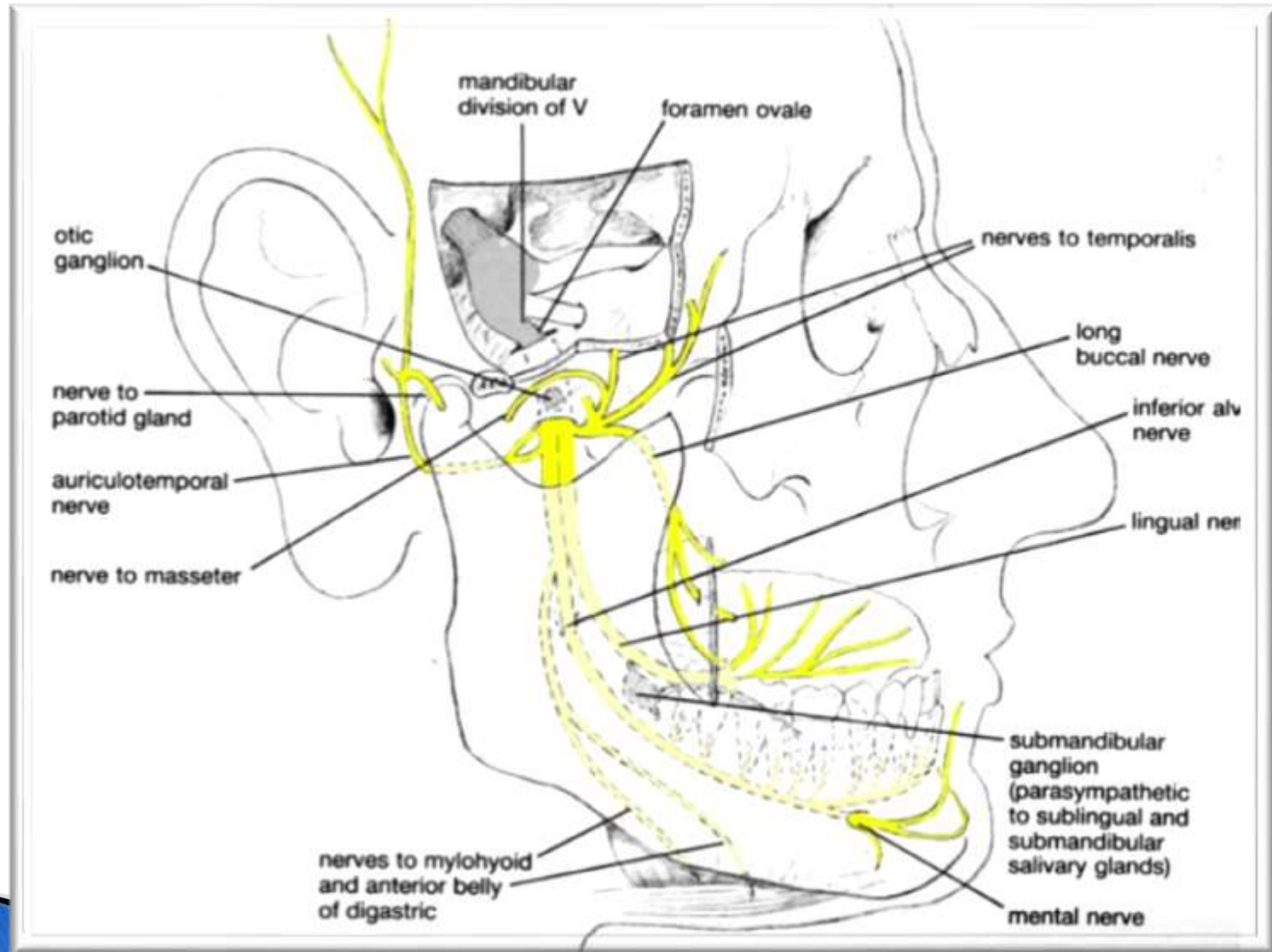
- Component: b. Sensory

- Function:
 - Skin of cheek
 - Skin over mandible and side of head
 - Teeth of lower jaw and TMJ
 - Mucous membrane of mouth and anterior part of tongue

- Origin: Anterior aspect of the pons

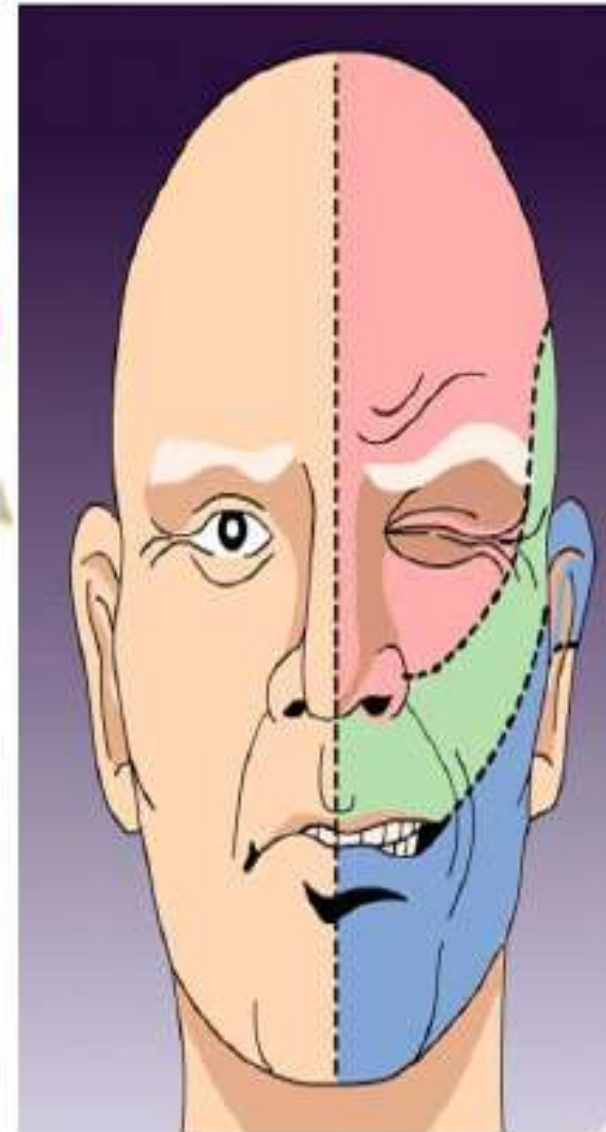
- Opening to the Skull: Foramen Rotundum

V3. Mandibular Nerve



CN V – TRIGEMINAL NERVE(cont..)

- *Tic douloureux* or **trigeminal neuralgia**
- Paroxysmal attacks of severe, short, sharp, stabbing pain affecting one or more branch of the nerve.
- Most excruciating pain known (?)
- Caused by inflammation of nerve
- In severe cases, nerve is cut; relieves agony but results in loss of sensation on that side of the face



ABDUCENT NERVE

»» Cranial Nerve VI

VI. Abducent Nerve



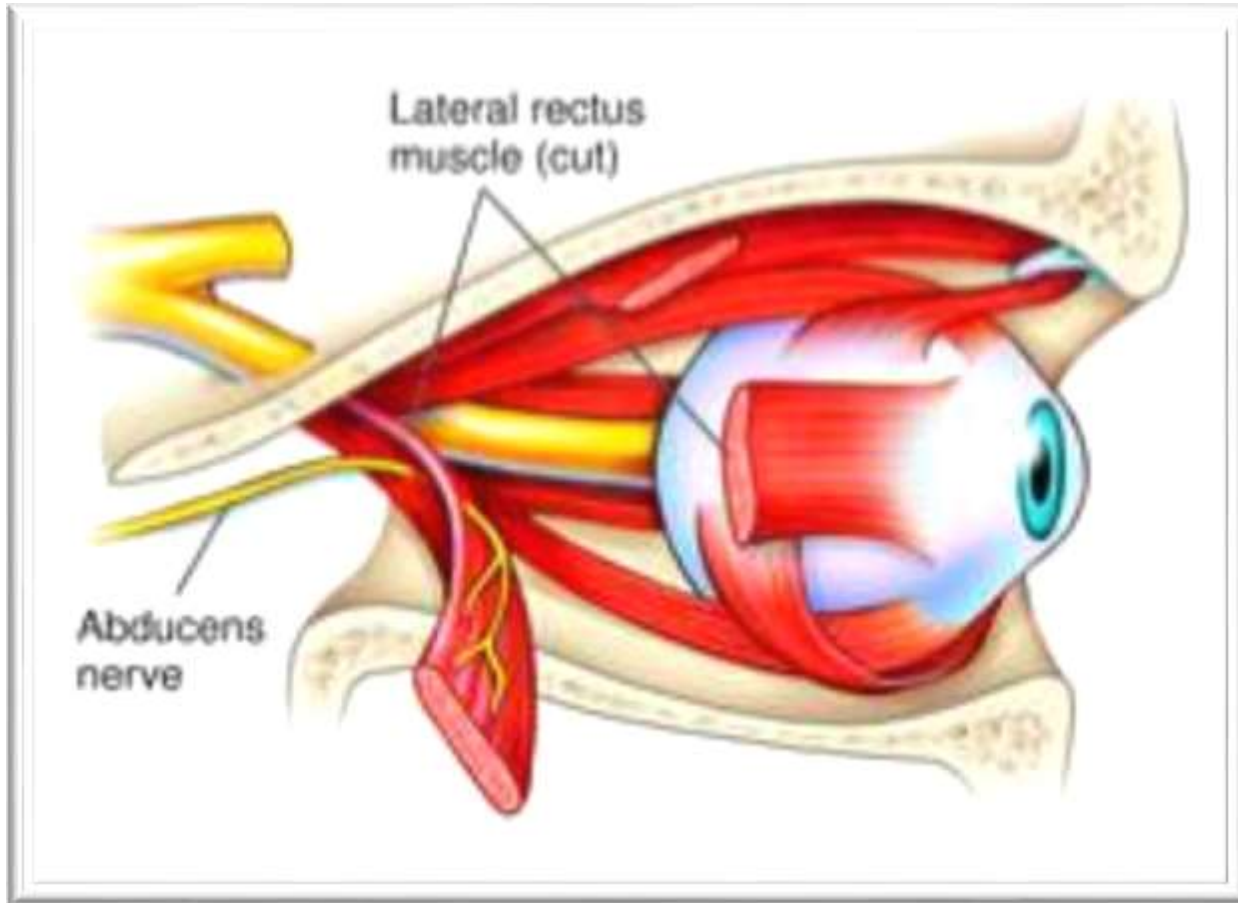
✓ Component: **Motor**

✓ Function: **Lateral rectus muscle turns eyeball laterally**

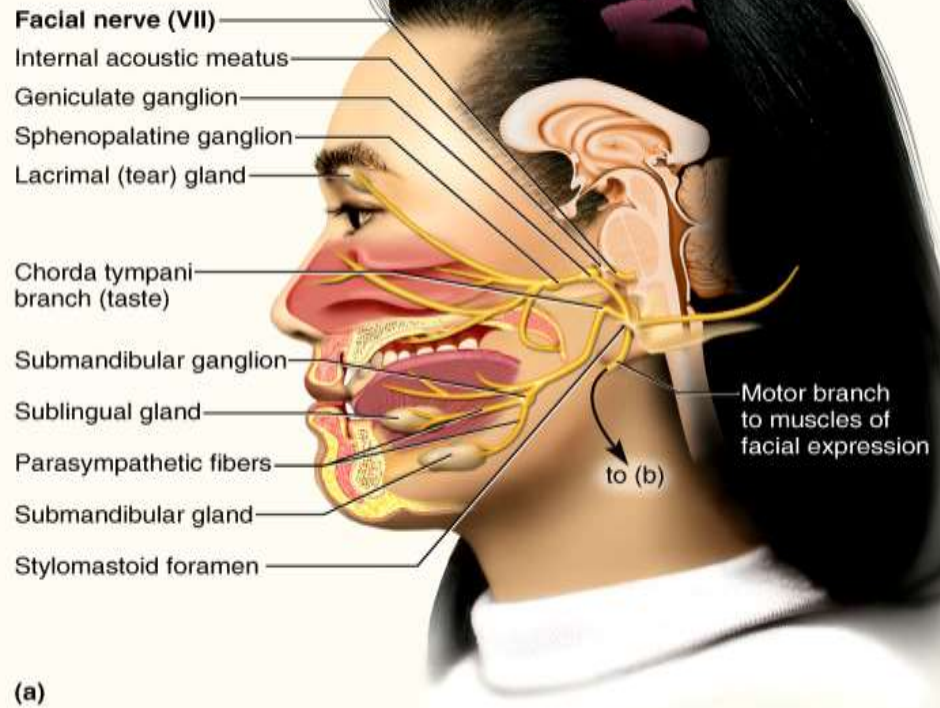
✓ Origin: **Anterior Surface of hindbrain between pons and medulla**

✓ Opening to the Skull: **Superior orbital fissure**

VI. Abducent Nerve



Facial Nerve VII



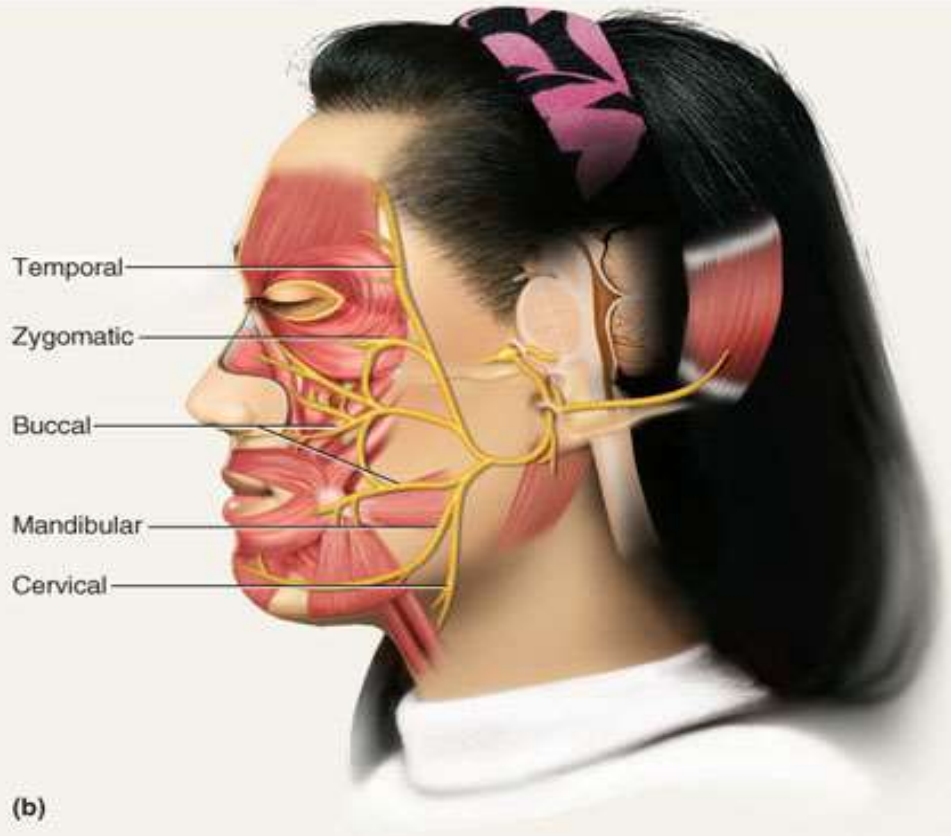
- ▶ Somatic Motor: facial expressions
- ▶ Autonomic Motor : salivary and lacrimal glands, mucous membranes of nasal and palatine mucosa
- ▶ Special Sensory : taste on anterior 2/3 of tongue

Branches of Facial Nerve

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(c)

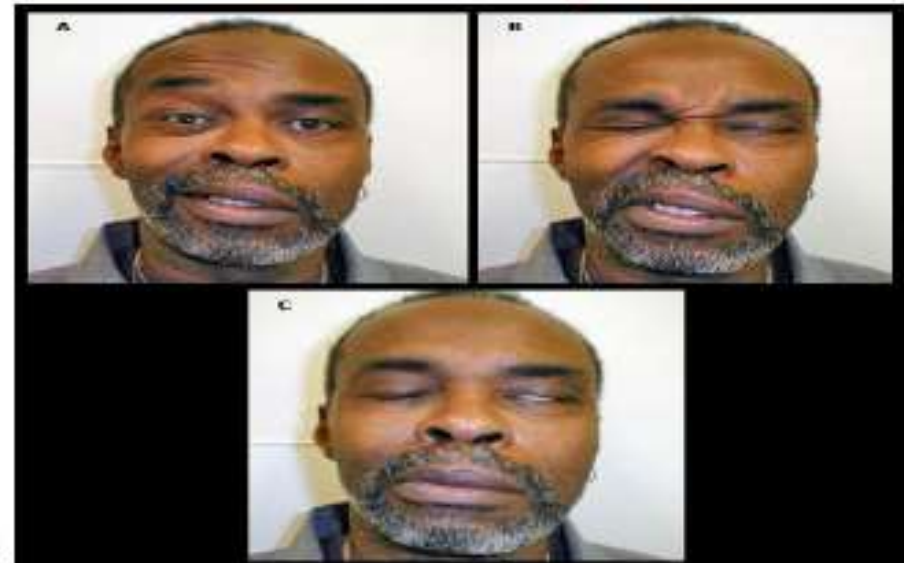


(b)

BELLS PALSY

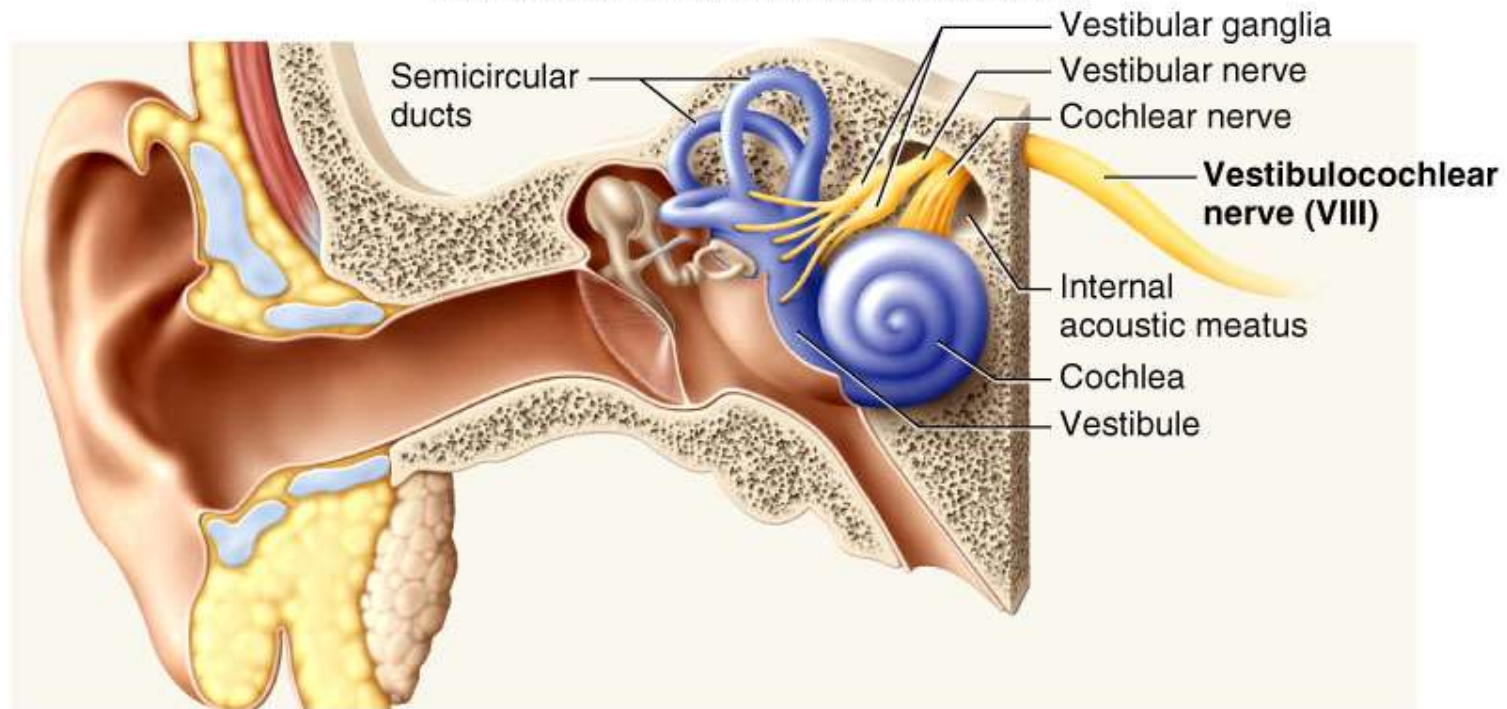
- **Bell's palsy:** paralysis of facial muscles on affected side and loss of taste sensation
- Caused by herpes simplex I virus, trauma,
- Lower eyelid droops
- Corner of mouth sags
- Eye cannot be completely closed (dry eye may occur)

- Lacrimation is seldom affected
- Condition may disappear spontaneously without treatment
- **Bells phenomenon- Upward and outward movement of eye**



Vestibulocochlear Nerve VIII

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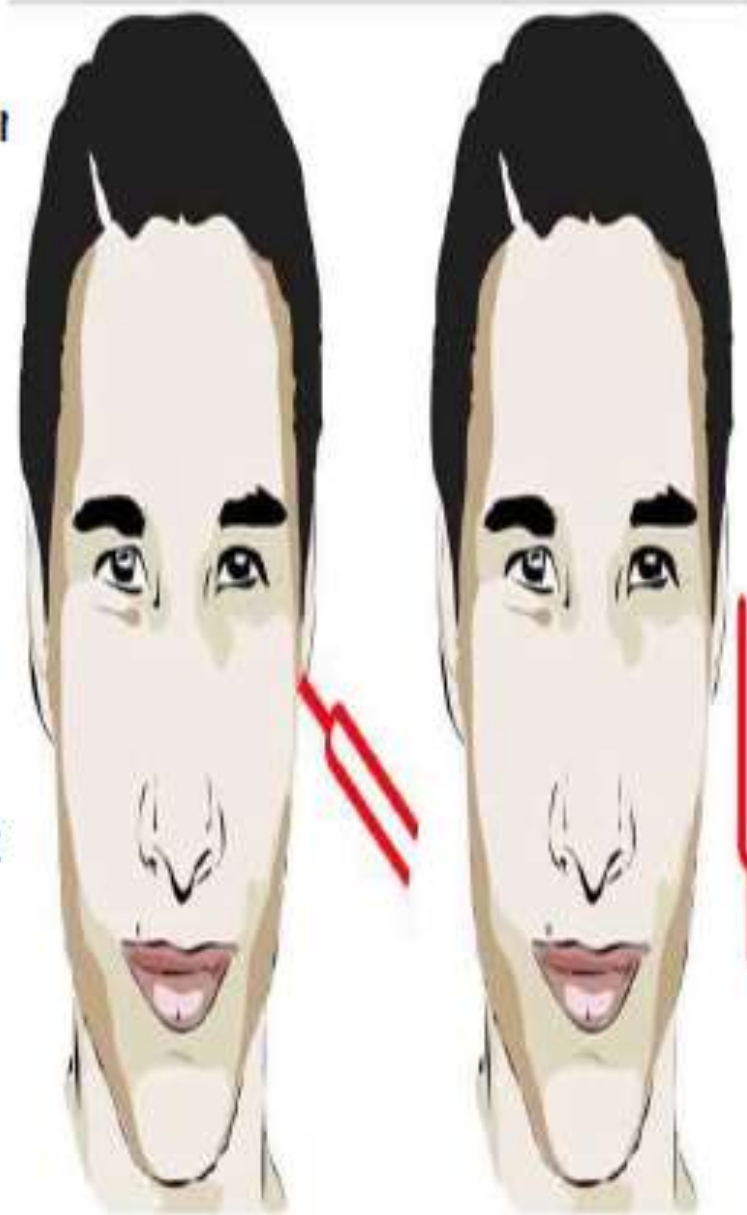


- ▶ Special Sensory
- ▶ Provides hearing (cochlear branch) and sense of balance (vestibular branch)
- ▶ Damage produces deafness, dizziness, nausea, loss of balance and nystagmus

COCHLEAR NERVE

Rinne's test-

- For comparing bone and air conduction
- Tuning fork placed at the mastoid till the sound stop being heard
- Then is placed in front of ear to be tested
- +ve Rinne test i.e. air and bone both are retained
- -ve Rinne test i.e. air is lost but bone is retained (conductive deafness)
- If both are lost i.e. **sensorineural deafness**



Rinne's Test

With a 512 Hz tuning fork press against the mastoid bone and then hold it 1cm away from the ear.

'Which is louder, behind the ear or in front?'

COCHLEAR NERVE(cont..)

- **Weber's test-**

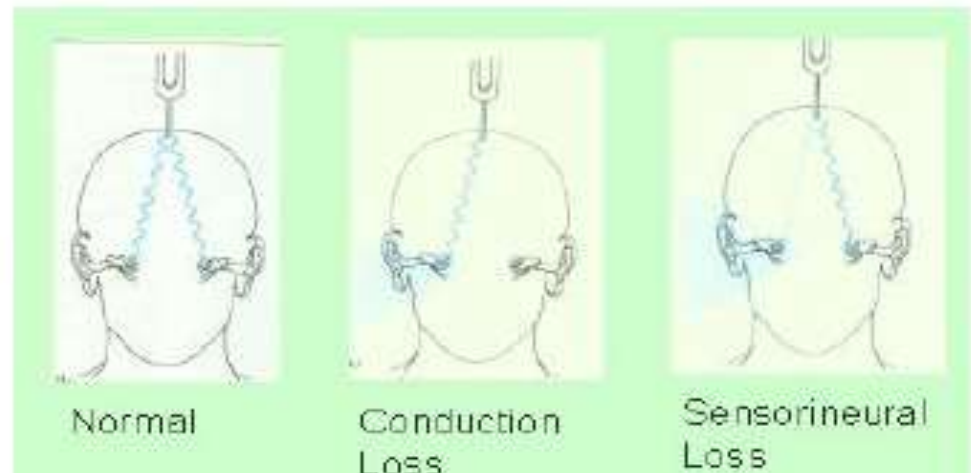
- Evaluates lateralization
- Use vibrating tuning fork on top of patient's head, ask patient where he hears it (one or both sides).
- Normally heard equally on both the sides
- If one ear is occluded then it acts like a resonating chamber and hear more on that side
- Conductive deafness- involved side
- Sensorineural- Uninvolved side



Weber's Test

512 Hz Tuning Fork placed in midline.

'Where can you hear the buzzing noise?'



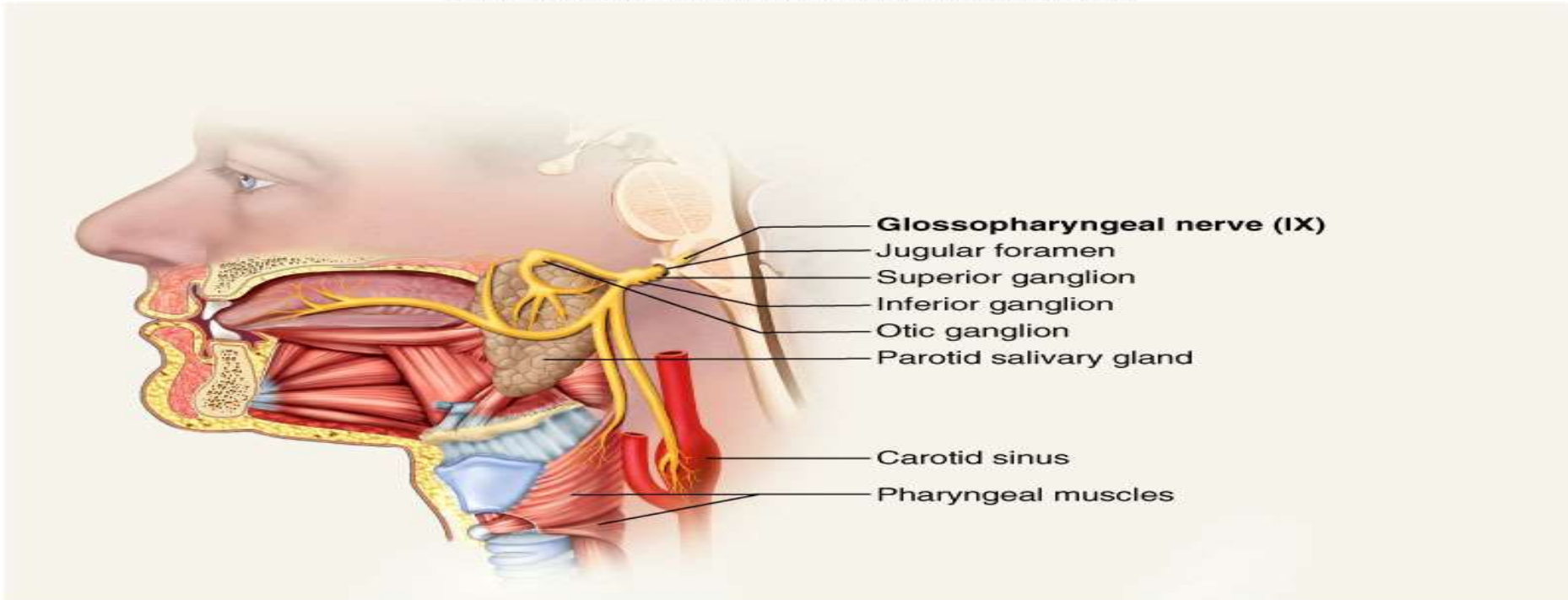
Normal

Conduction
Loss

Sensorineural
Loss

Glossopharyngeal Nerve IX

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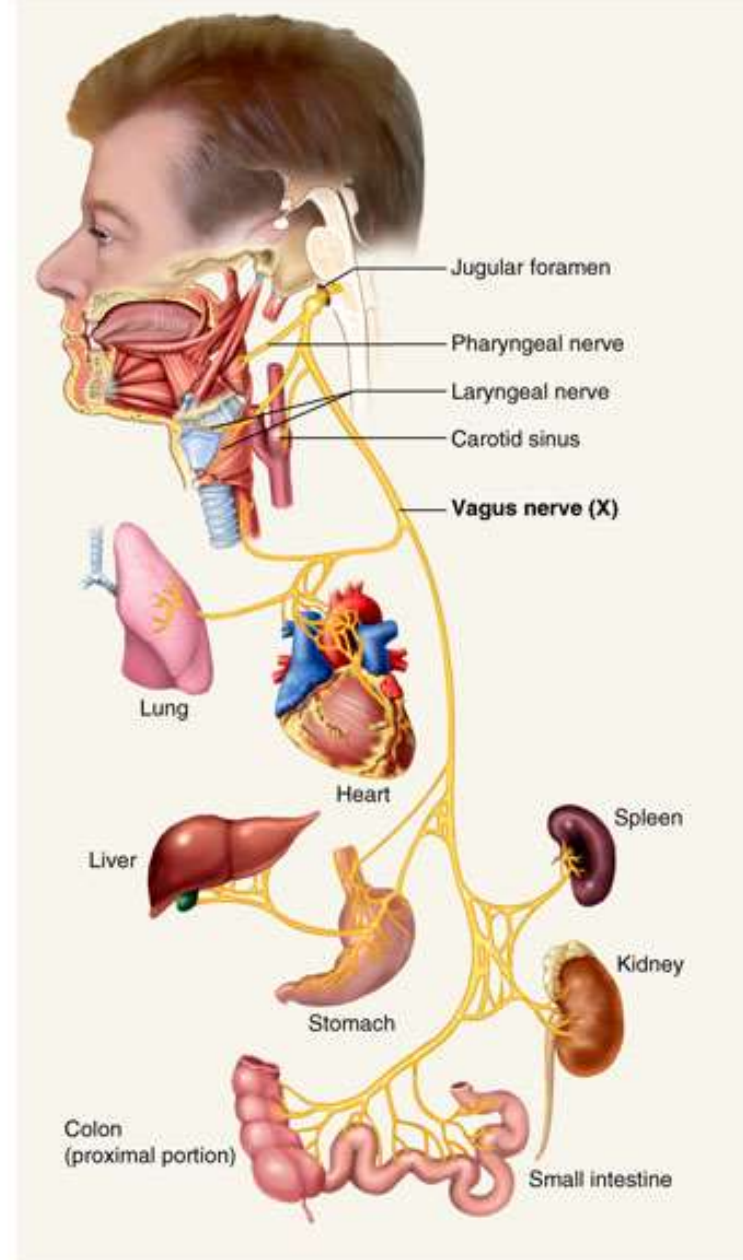


- ▶ Somatic motor :Swallowing and voice production via pharyngeal muscles (**stylopharyngeus muscle**)
- ▶ Autonomic motor : salivation (**parotid gland**)
- ▶ Sensations from posterior 1 /3 of tongue including taste
- ▶ Sensations from baroreceptors and chemoreceptors

Vagus Nerve X

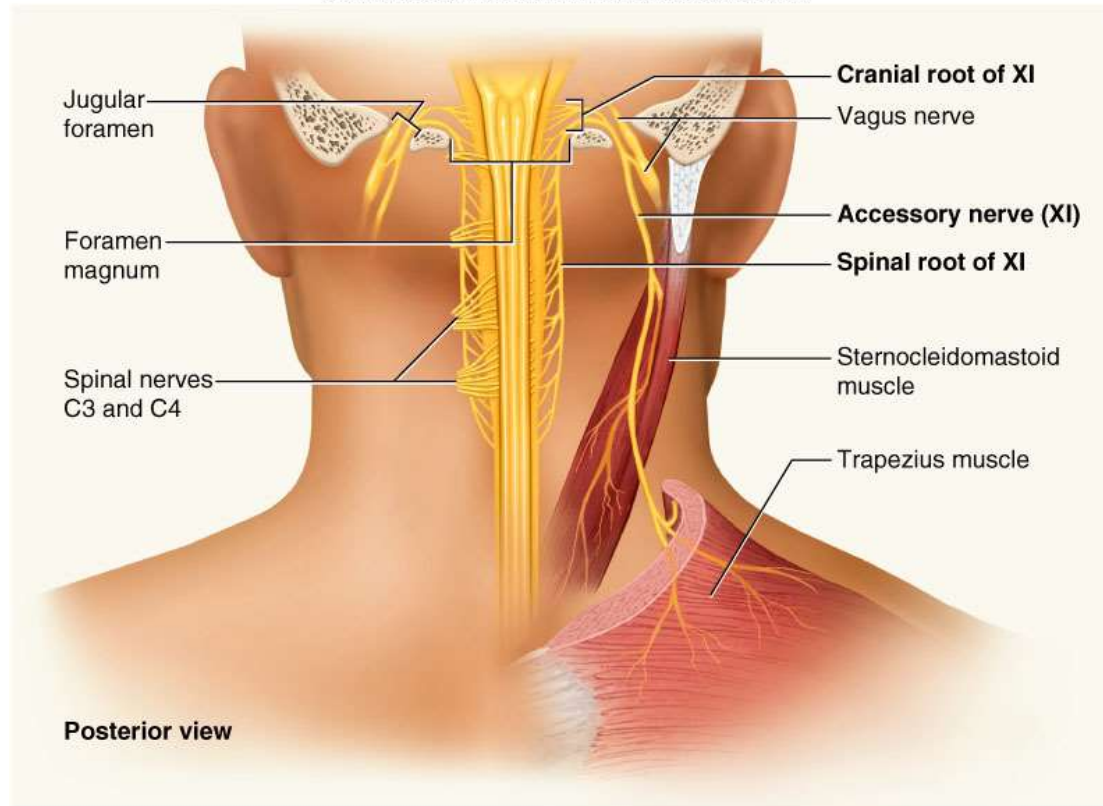
- ▶ Sensations from skin at back of ear, external acoustic meatus, part of tympanic membrane, larynx, trachea, esophagus, thoracic and abdominal viscera
- ▶ Sensations from baroreceptors and chemoreceptors
- ▶ Special sensory – taste from epiglottis and pharynx
- ▶ Somatic motor – Swallowing and voice production via pharyngeal muscles
- ▶ Autonomic motor – smooth muscle of abdominal viscera, visceral glands secretions, relaxation of airways, and normal or decreased heart rate.

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Accessory Nerve IX

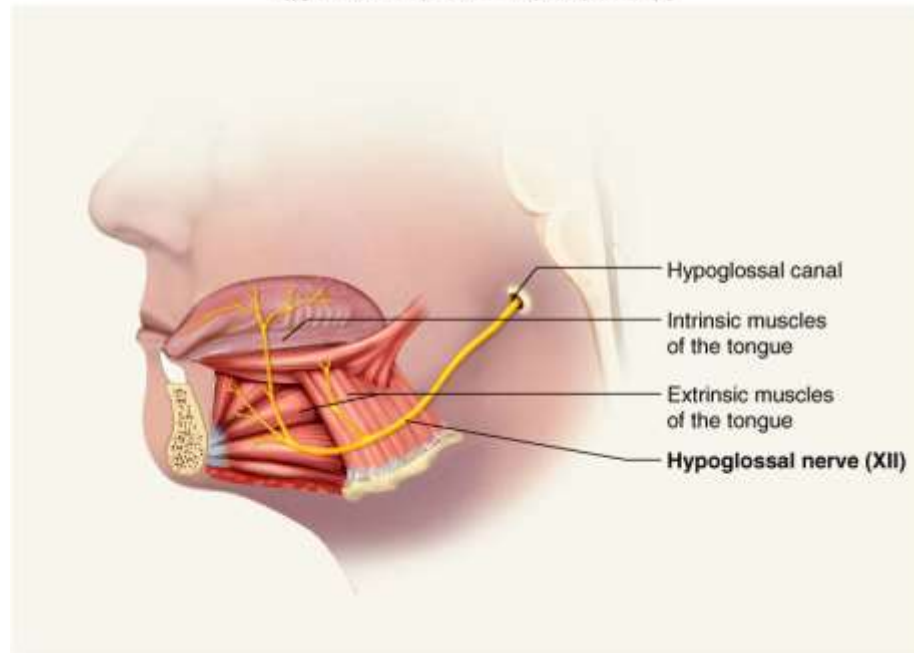
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- ▶ Swallowing, head, neck and shoulder movement via trapezius and sternocleidomastoid and pharyngeal muscles
- ▶ Damage causes impaired head, neck, shoulder movement

Hypoglossal Nerve XII

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- ▶ Tongue movements for speech, food manipulation and swallowing
- ▶ If both are damaged – can't protrude tongue
- ▶ If one side is damaged – tongue deviates towards injured side

Pseudobulbar palsy

Description

Pseudobulbar palsy results from disease of the corticobulbar tracts. Bilateral tract damage must occur for clinically evident disease as the muscles are bilaterally innervated.

Presentation

- ▶ Tongue – paralysed; no wasting initially and no fasciculations; 'Donald Duck' speech.
- ▶ Palatal movements absent.
- ▶ Dribbling persistently.
- ▶ Facial muscles – may also be paralysed.
- ▶ Reflexes – exaggerated, eg jaw jerk.
- ▶ Nasal regurgitation may be present.
- ▶ Dysphonic.
- ▶ Dysphagic.
- ▶ Emotional lability may also be present.

Bulbar palsy

Description

- ▶ Bulbar relates to the medulla. Bulbar palsy is the result of diseases affecting the lower cranial nerves (VII–XII).

Presentation

- ▶ Lips – tremulous.
- ▶ Tongue – weak and wasted and sits in the mouth with fasciculations.
- ▶ Drooling – as saliva collects in the mouth and the patient is unable to swallow.
- ▶ Dysphagia
- ▶ Absent palatal movements.
- ▶ Diminished or absent gag and palatal reflexes.
- ▶ Dysphonia

THANK YOU