

☆ Anatomy ☆

1st – 7th Cranial Nerves

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Cranial nerve	Fiber's type	Ms supply	Function
1 st	Sensory	-	Smell
2 nd	Sensory	-	Vision
3 rd	Motor	<ul style="list-style-type: none"> Levator palpebrae superioris, Superior, medial and inferior recti. Inferior oblique muscles of the eyeball. 	<ul style="list-style-type: none"> Elevation of the upper eyelid. Turning the eye upward, downwards and medially. Constricting the pupil. Accommodating the eyes.
4 th	Motor	1. Superior oblique ms.	Rotates the eye ball downwards and laterally.
6 th	Motor	1. Lateral rectus ms.	Rotates the eye ball laterally

Divisions of 5 th CN	Type		Subdivisions	Innervations
Ophthalmic	Sensory		Frontal	supplies skin of face & scalp
			Lacrimal	supplies skin of face & lacrimal gland
			Nasociliary	supplies skin of face, nasal cavity & eyeball
Maxillary	Sensory			Upper teeth, gums & maxillary air sinus: (posterior, middle & anterior superior alveolar nerves).
				Face: (zygomaticofacial & infraorbital nerves).
Mandibular	<u>Mixed</u>	S E N S O R Y	Lingual	General sensations from anterior 2/3 of tongue
			Inferior alveolar	Lower teeth, gums & face.
			Buccal	Face
			Auriculotemporal	auricle, temple, parotid gland & TMJ
		Motor		Four muscles for mastication and other four

Divisions of VII CN By site	Branches	Innervation
Facial canal	Greater petrosal nerve	carries preganglionic parasympathetic fibers to lacrimal, nasal & palatine glands
	Chorda Tempani	carries: a) preganglionic parasympathetic fibers to submandibular & sublingual glands. b) taste fibers from anterior 2/3 of tongue
	Nerve to stapedius	
After Stylomastoid Foramen	Posterior auricular	to occipitofrontalis
	Muscular branches	to posterior belly of digastric & stylohyoid.
Inside parotid gland	To 5 terminal motorbranches : <ol style="list-style-type: none"> 1. Temporal. 2. Zygomatic. 3. Buccal. 4. Mandibular. 5. Cervical. 	

CN	Nuclei	Fiber's type
1 st	Anterior olfactory nucleus	SSA
2 nd	Ganglion cells of retina	SSA
3 rd	- Main oculomotor nucleus GSE - Accessory nucleus (Edinger-Westphal nucleus). GVE	GSE GVE
4 th	The motor nucleus is located in the mid brain periaqueductal grey matter at the level of inferior colliculus	GSE
5 th	Slide No. 6	GSA, SVE
6 th	The small motor nucleus located in the floor of the 4 th ventricle in caudal pons beneath the facial colliculus	GSE
7 th	Slide No.7	SVA,SVE,GVE

- **Special Sensory Afferent (SSA)**
- **Special Visceral Afferent (SVA)**
- **General Somatic Efferent (GSE)**
- **General Visceral Efferent (GVE)**
- **Special Visceral Efferent (SVE)**
- **General Somatic Afferent (GSA)**

Trigeminal Nuclei

Sensory

All goes under GSA

Motor

SVE

Mesencephalic (Pons
and Mid brain)

proprioceptive fibers from
face

**Main (pricipal)
sensory** (Pons)

Touch from face

Spinal (pons, medulla &
upper 2-3 cervical
segments of spinal cord)

Pain and temprature from
face

Motor Nucleus (Pons)

supplies muscles of
mastication and other **four
muscles** (not imp to know
the names)

Facial Nuclei



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graph TD; A[Facial Nuclei] --> B[Parasympathatic(GVE)]; A --> C[Sensory(SVA)]; A --> D[Motor(SVE)]; B --> E["parasympathetic secretory fibers to lacrimal, submandibular, sublingual, nasal & palatine glands"]; C --> F["carrying taste sensation from anterior 2/3 of the tongue"]; D --> G["supplying muscles developed from the 2nd pharyngeal arch."];
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The diagram is a hierarchical flowchart. At the top is a box labeled 'Facial Nuclei'. A vertical line descends from this box and splits into three horizontal lines, each leading to a box below. The left box is labeled 'Parasympathatic(GVE)', the middle 'Sensory(SVA)', and the right 'Motor(SVE)'. From each of these three boxes, a vertical line descends to a final box at the bottom. The bottom-left box describes parasympathetic secretory fibers to various glands. The bottom-middle box describes carrying taste sensation from the anterior 2/3 of the tongue. The bottom-right box describes supplying muscles developed from the 2nd pharyngeal arch.

Parasympathatic(GVE)

Sensory(SVA)

Motor(SVE)

parasympathetic secretory fibers to lacrimal, submandibular, sublingual, nasal & palatine glands

carrying taste sensation from anterior 2/3 of the tongue

supplying muscles developed from the 2nd pharyngeal arch.

Remember

- **Small Ship Make Money But My Brother Said Big Boat Make More**
- M = motor
- S = sensory
- B = both (motor & sensory)
- Parasympathetic (3,7,9 & 10th CN)

Lesions

Olfactory 1st CN

- Anosmia (complete)
- Hyposomia (Reduced)
- When the lesion in:

1st order neuron (Olfactory N) → unilateral loss of smell

2nd order neuron (Olfactory tract) → bilateral weakness of smell

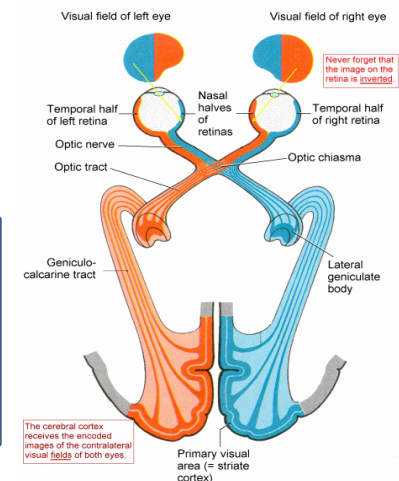
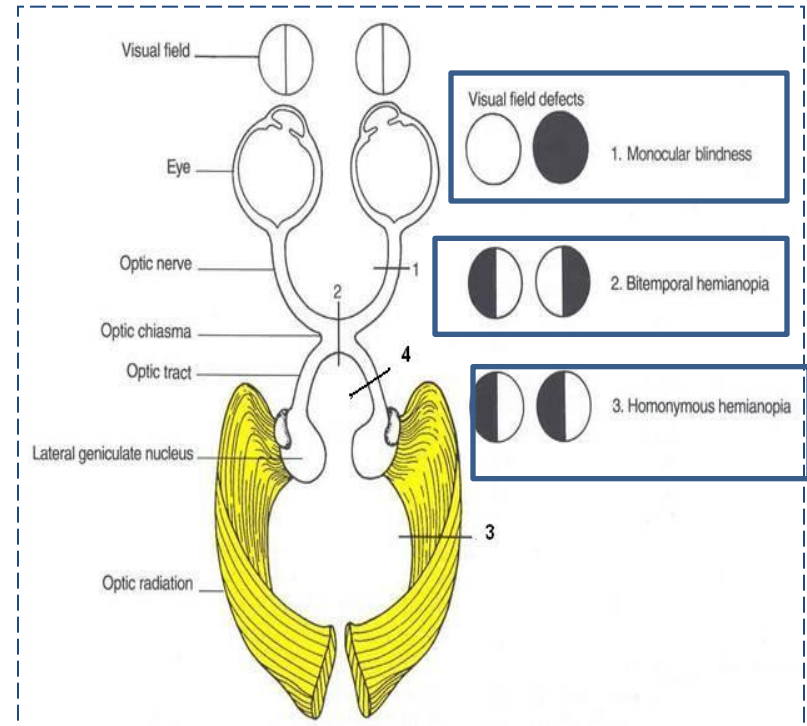
Optic 2nd CN

Cut at level 1. A lesion of the right optic nerve causes a total **loss of vision in the right eye**

Cut at level 2. A lesion of the optic chiasm causes a loss of vision in the temporal half of both visual fields: **bitemporal hemianopsia**.

Cut at level 3 & 4. A lesion of the right optic radiation & right optic tract causes a loss of vision in the left hemi field: **contralateral homonymous hemianopsia**.

❖ A lesion of **both visual cortices** causes a **complete blindness**.



- 4 order neuron
- Optic nerve is the second order neuron

Oculomotor nerve palsy 3rd CN

- **Lesion results in:**

- Ptosis (eyelid)
- Lateral squint
- Diplopia
- Pupillary dilatation
- Loss of accommodation
- Impaired downward & outward movement of the eye ball on the damaged side.

The preganglionic parasympathetic fibers run superficially in the nerve and are affected by external pressure. Consequently, **the first sign of compression of the oculomotor nerve is ipsilateral slowness of the pupillary response to light.**

Ptosis (drooping of the eyelid)



Normal eye alignment



Lateral squint

Trochlear nerve palsy

- Lesion results in **diplopia** & inability to rotate the eye infero-laterally.
- The eye deviates; upward and slightly inward.
- Person has difficulty in walking downstairs



Abducent nerve palsy 6th CN

Lesion results in:

- **Medial squint** with an inability to direct the affected eye laterally.
- A nuclear lesion may also involve the nearby nucleus or axons of the facial nerve, causing paralysis of all the **ipsilateral facial muscles**.



Normal eye alignment



Medial squint

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 , excoriating pain radiating from the angle of the jaw along a branches of the trigeminal nerve.
- Usually involves maxillary & mandibular nerves, rarely in the **ophthalmic** division.

Bell's Palsy

- Damage to facial nerve results in paralysis of facial muscles: Facial (Bell's palsy); lower motor neuron lesion (whole face affected **on same side of lesion**)
- NB. In upper motor neuron lesion (upper face is intact, **lower part of face is affected on opposite side of lesion**) .
- Face is distorted: drooping of lower eyelid, sagging of the angle of the mouth, dribbling of saliva, loss of facial expressions, loss of chewing, blowing, sucking, unable to show teeth or close the eye on affected side

Facial nerve 7th CN



Good Luck