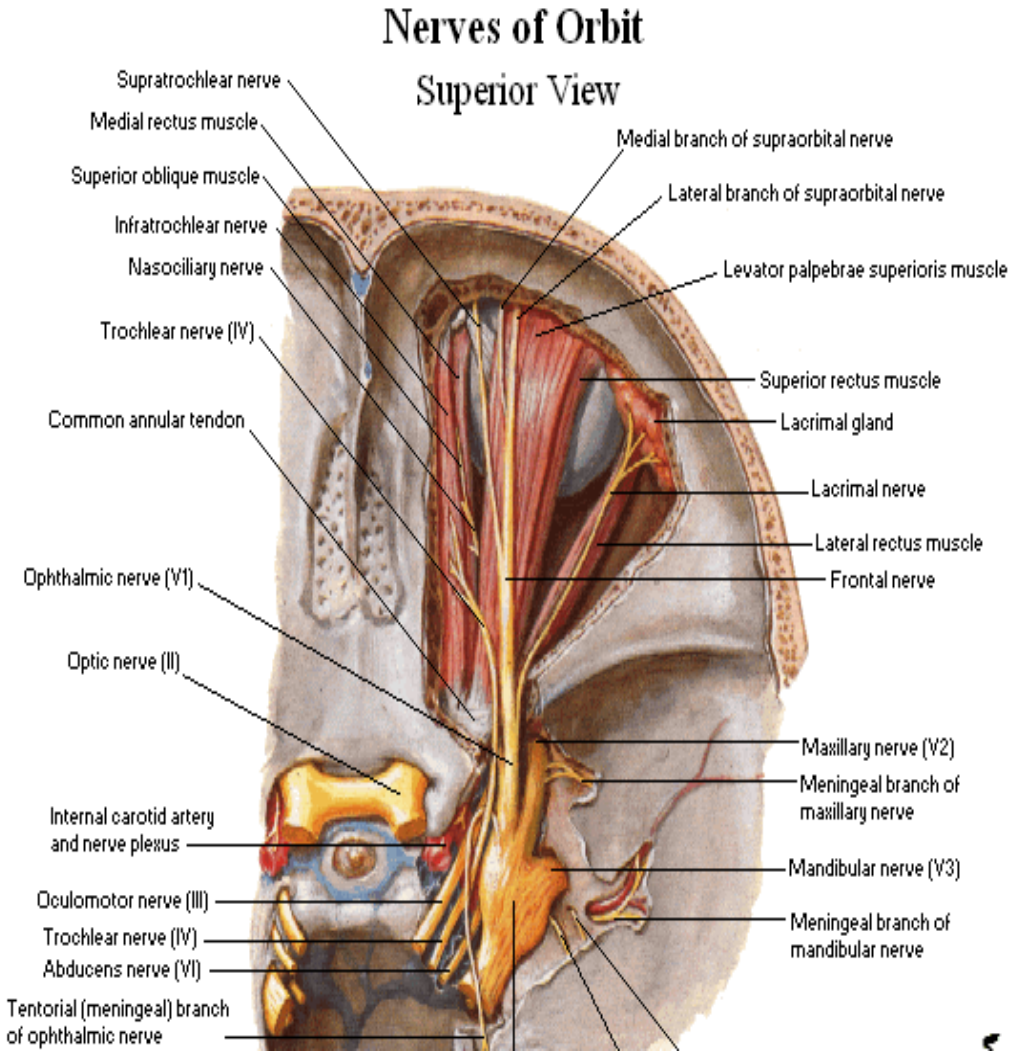
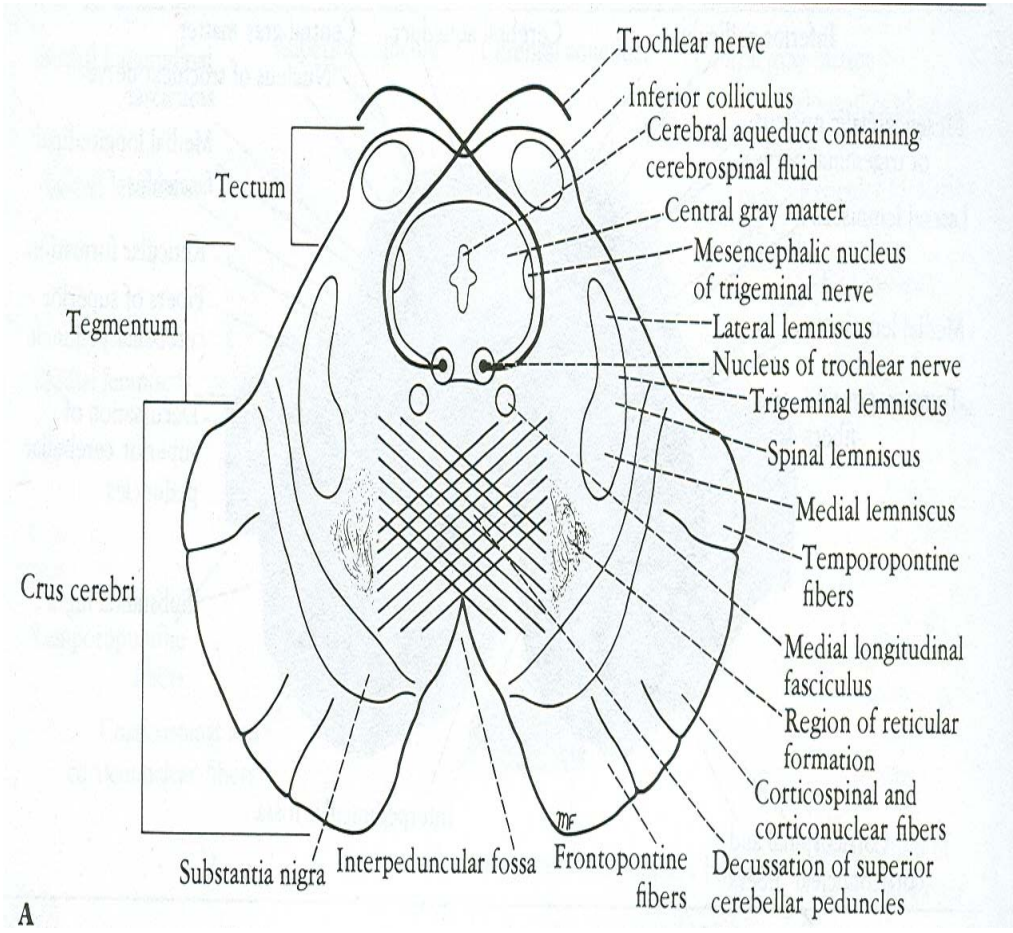
Trochlear nerve

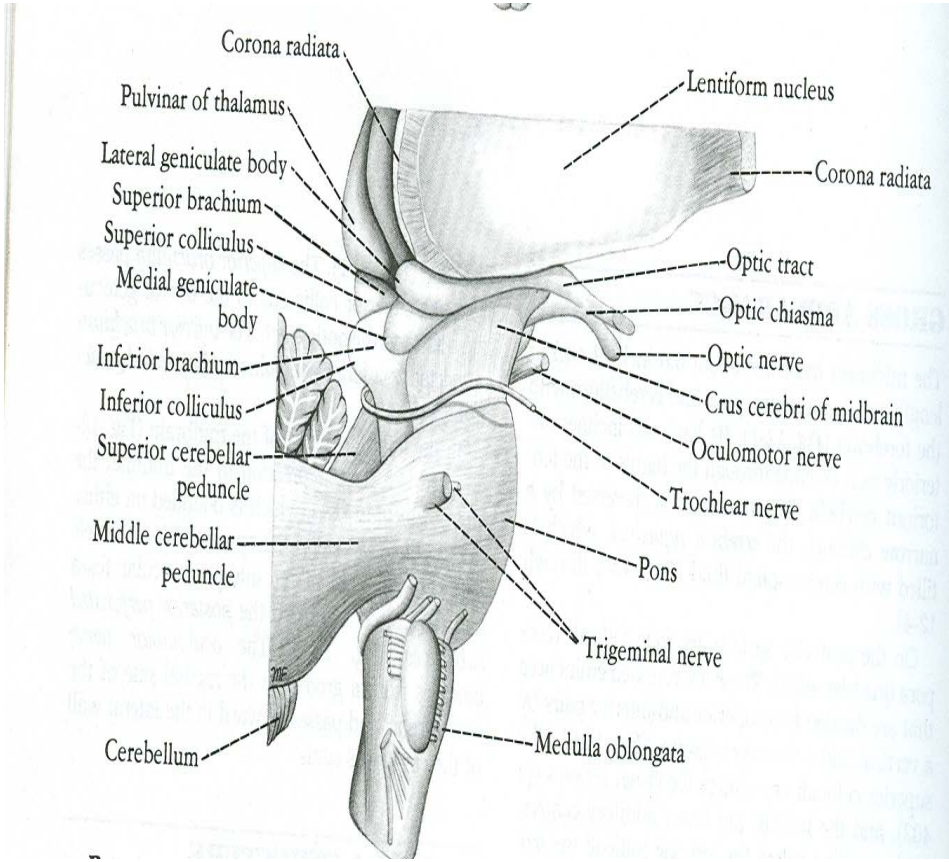
- Fourth cranial nerve
- Supplies the superior oblique muscle
- Functional component:
  - Somatic efferent
  - General somatic afferent



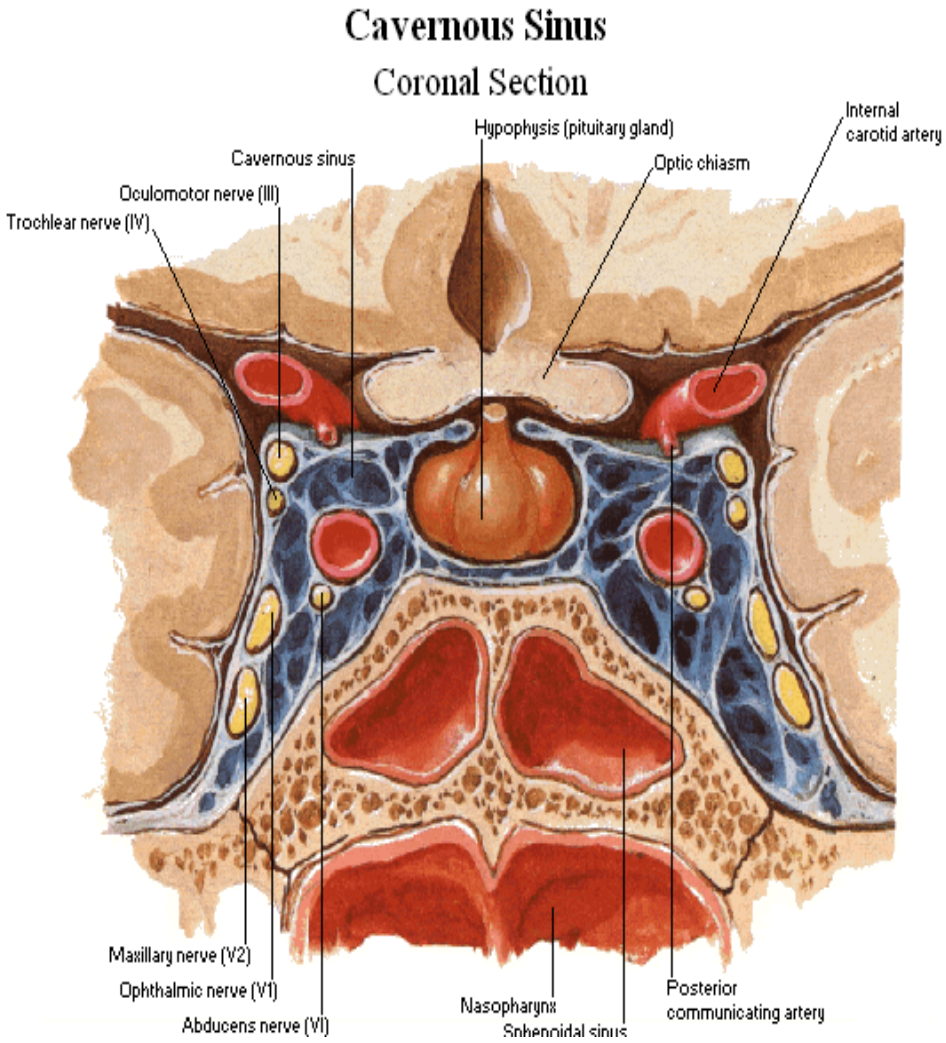
- Nucleus is situated in the ventromedial part of central grey matter of mid brain at the level of inferior colliculus
- Trochlear nerve emerges from superior medullary velum just below the inferior colliculus



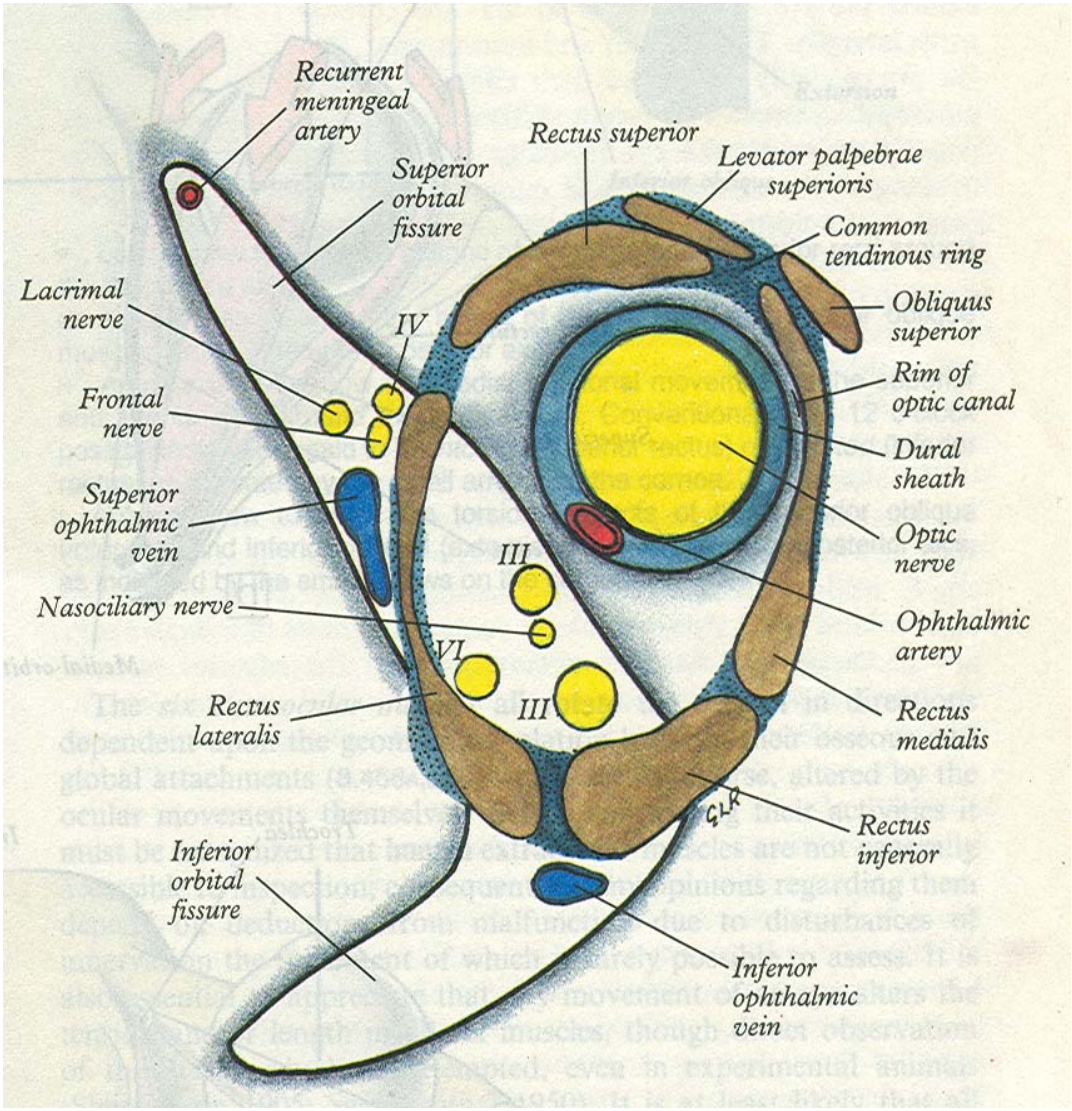
- Nerve winds around the superior cerebellar peduncle and the cerebral peduncle just above the pons
- Passes between superior cerebellar &posterior cerebral arteries to appear lateral to cerebral peduncle



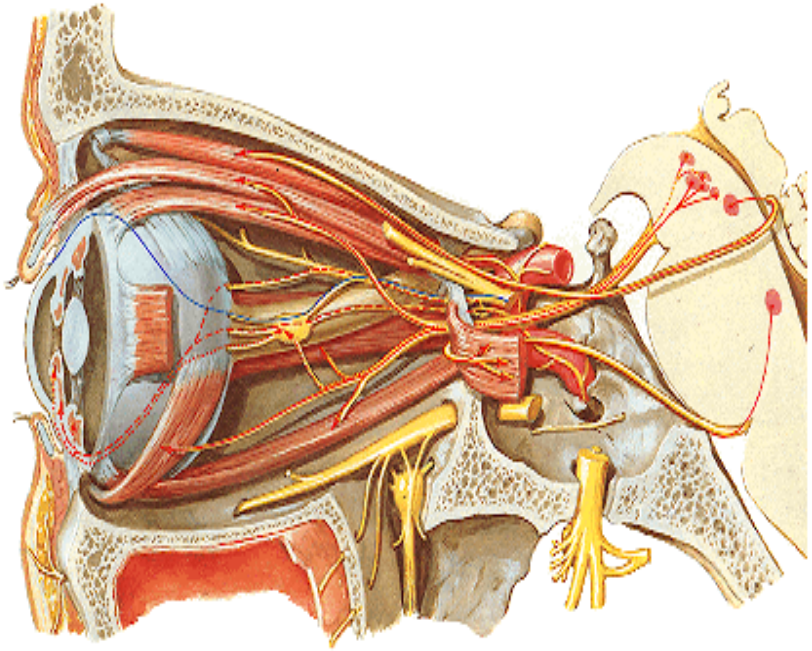
- Nerve enters cavernous sinus by piercing the posterior corner of its roof
- Runs forwards in the lateral wall of cavernous sinus between the oculomotor and ophthalmic nerves
- In the anterior part it crosses over the third nerve



- Enters the orbit through the lateral part of superior orbital fissure



- In the orbit ,it passes medially above the origin of Levator palpebrae superioris
- Ends by supplying the superior oblique muscle through its orbital surface

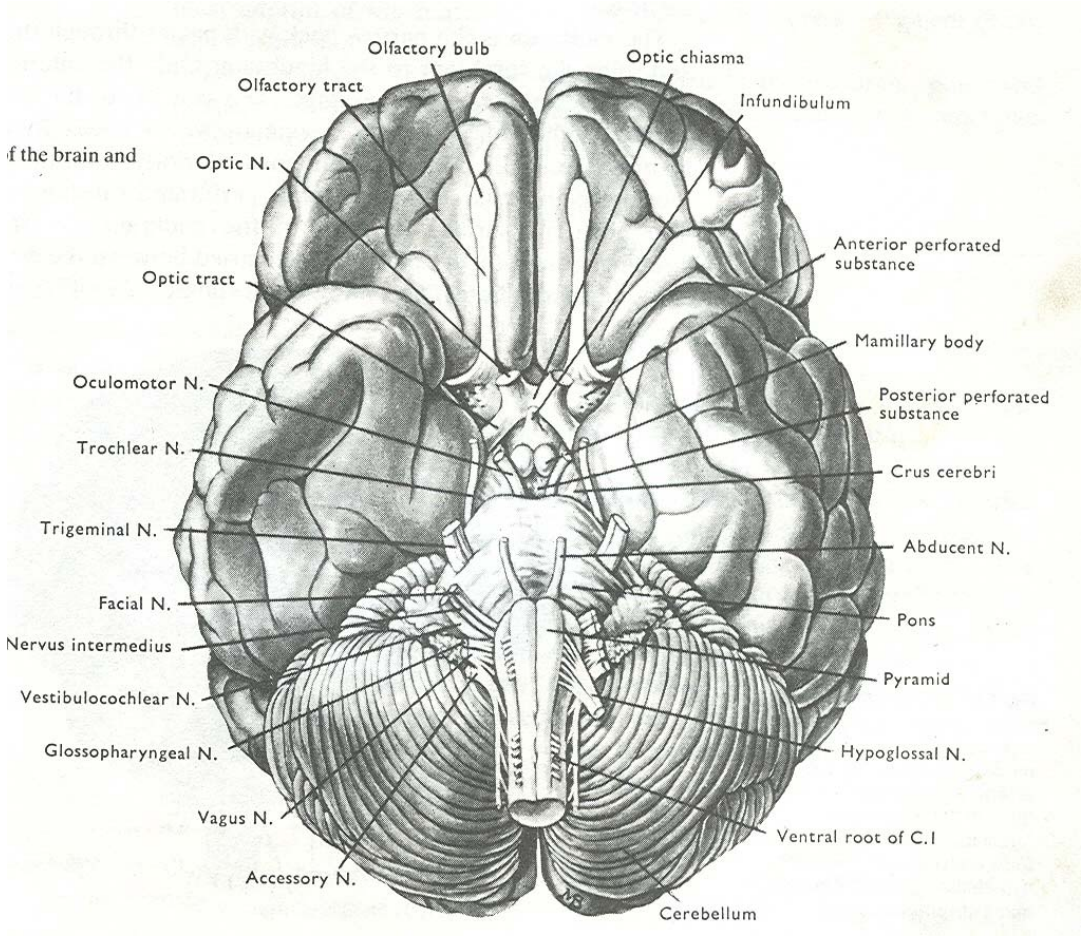


Applied anatomy

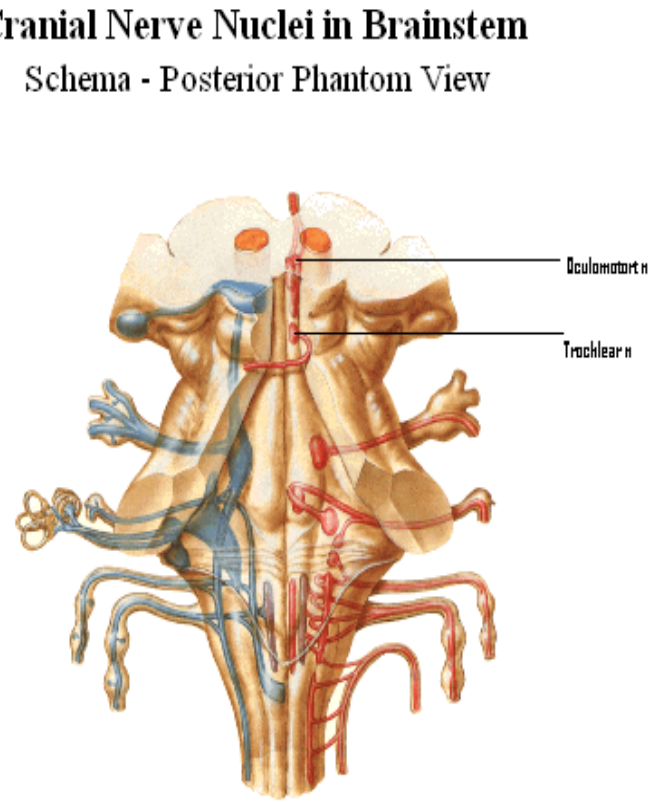
- Damage results in Diplopia on looking downwards
- Vision is single as long as eyes look above the horizontal plane

Abducent Nerve

- 6TH cranial nerve
- Supplies the lateral Rectus muscle
- Functional component:
  - Somatic efferent
  - General somatic afferent

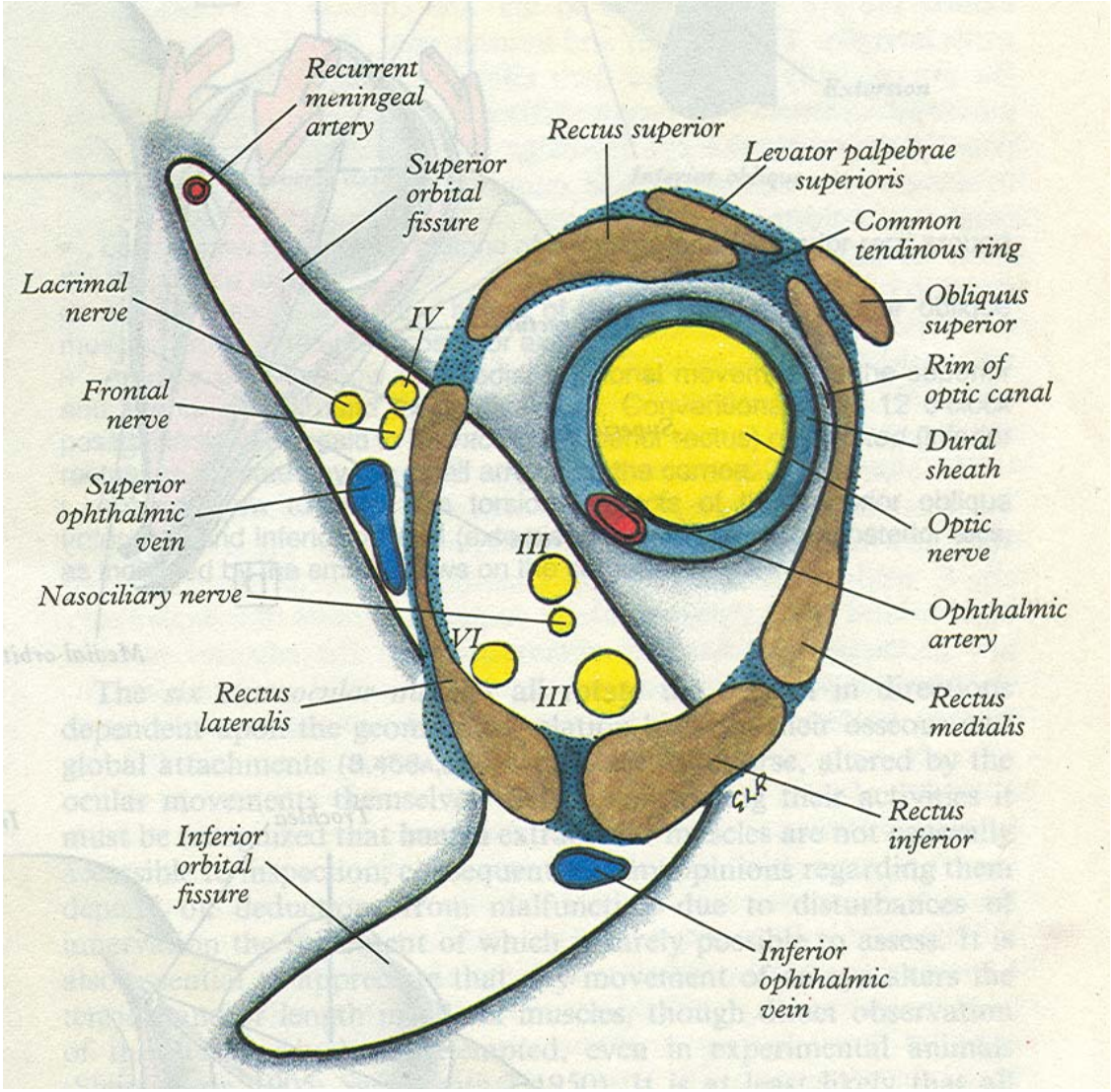


- Nucleus is situated in the lower part of the pons in the floor of the fourth ventricle, deep to facial colliculus
- Nerve is attached to the lower border of the pons ,just opposite the upper end of the pyramid

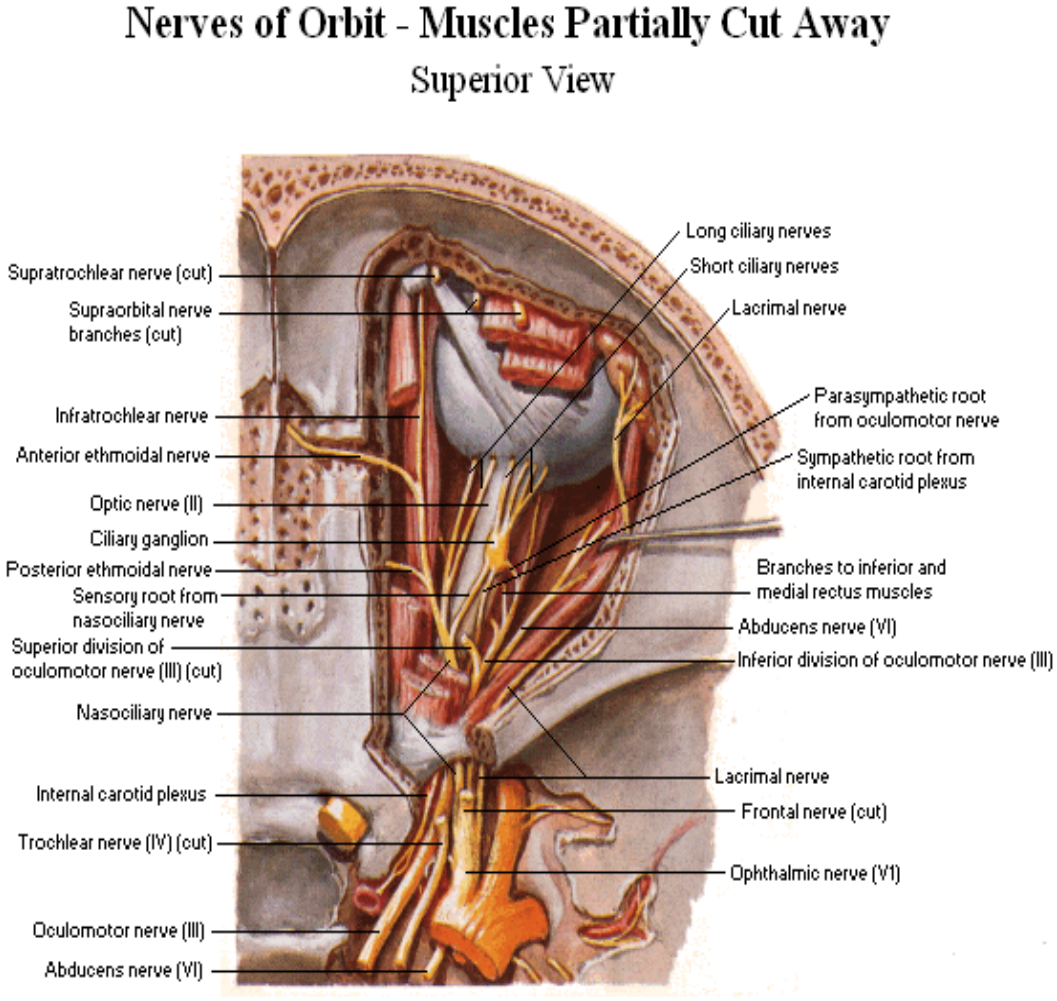


- The nerve then runs upwards, forwards and laterally through the cisterna pontis to reach the cavernous sinus by piercing the posterior wall at a point lateral to the dorsum sellae and superior to apex of petrous temporal
- Passes beneath the petrosphenoid ligament and bend sharply forwards

- Enters the orbit through middle part of superior orbital fissure

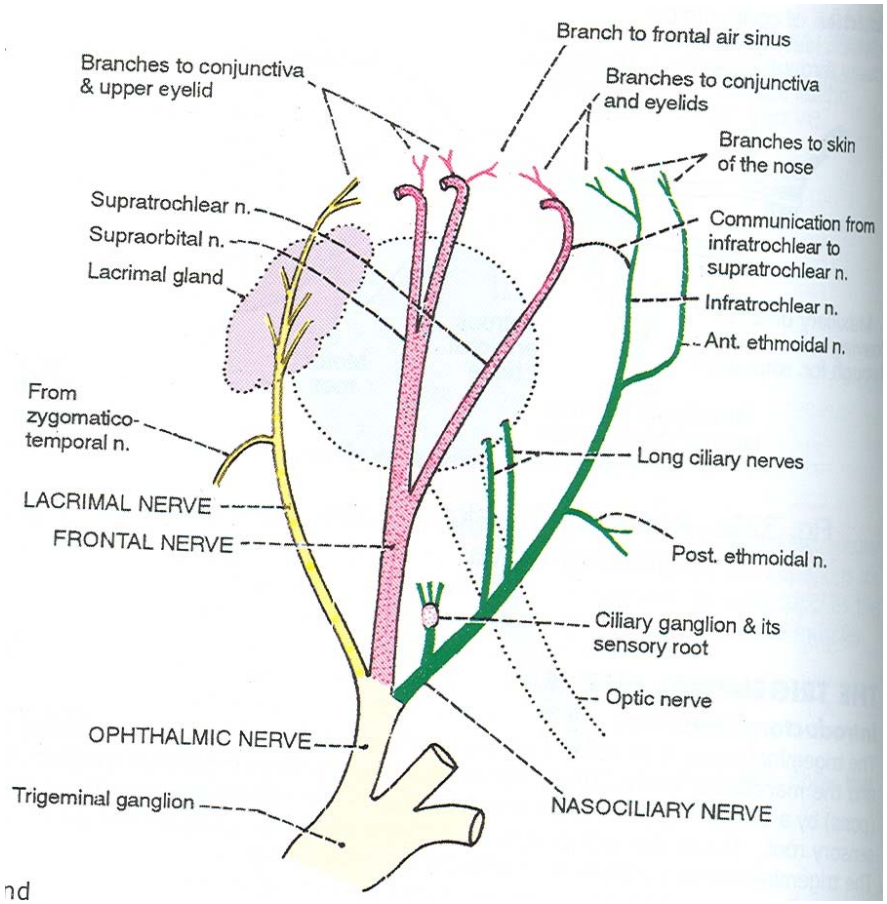


- In the orbit nerve end by supplying the lateral Rectus from its ocular surface
- Applied anatomy: paralysis results in medial or convergent squint and Diplopia

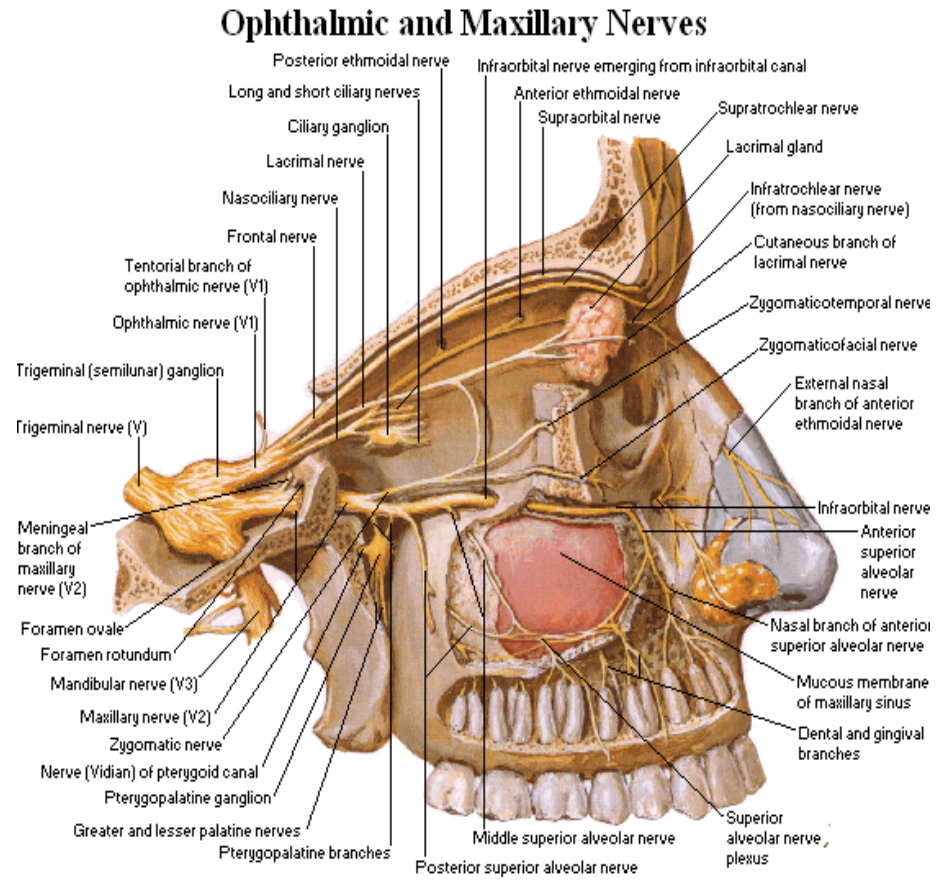


Branches of ophthalmic nerve

- Lacrimal nerve : smallest of three terminal branches of ophthalmic nerve
- Enters the orbit through lateral part of superior orbital fissure
- Runs along the upper border of lateral Rectus along with the lacrimal artery

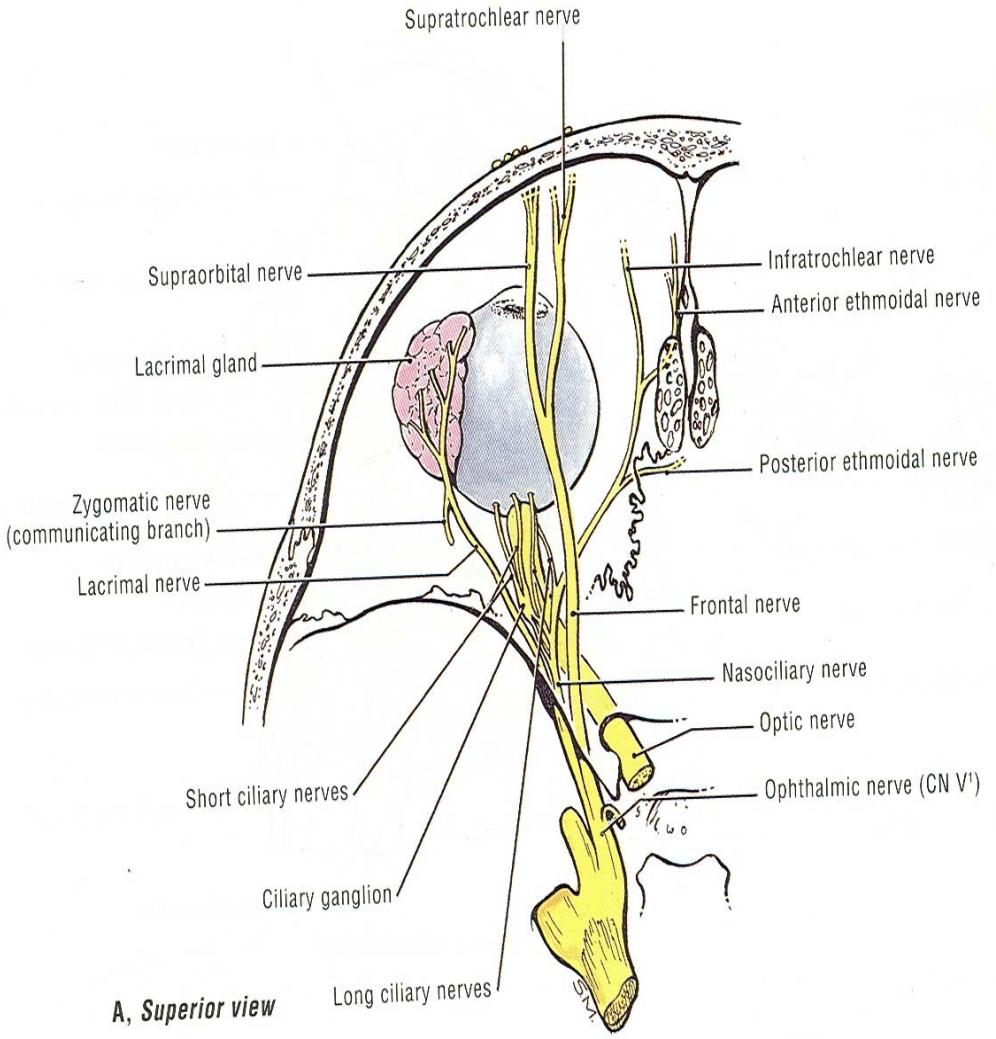


- Anteriorly receives a communication from zygomaticotemporal nerve
- Passes deep to lacrimal gland
- Ends in the lateral part of upper eyelid
- Supplies lacrimal gland, the conjunctiva & lateral part of upper eyelid

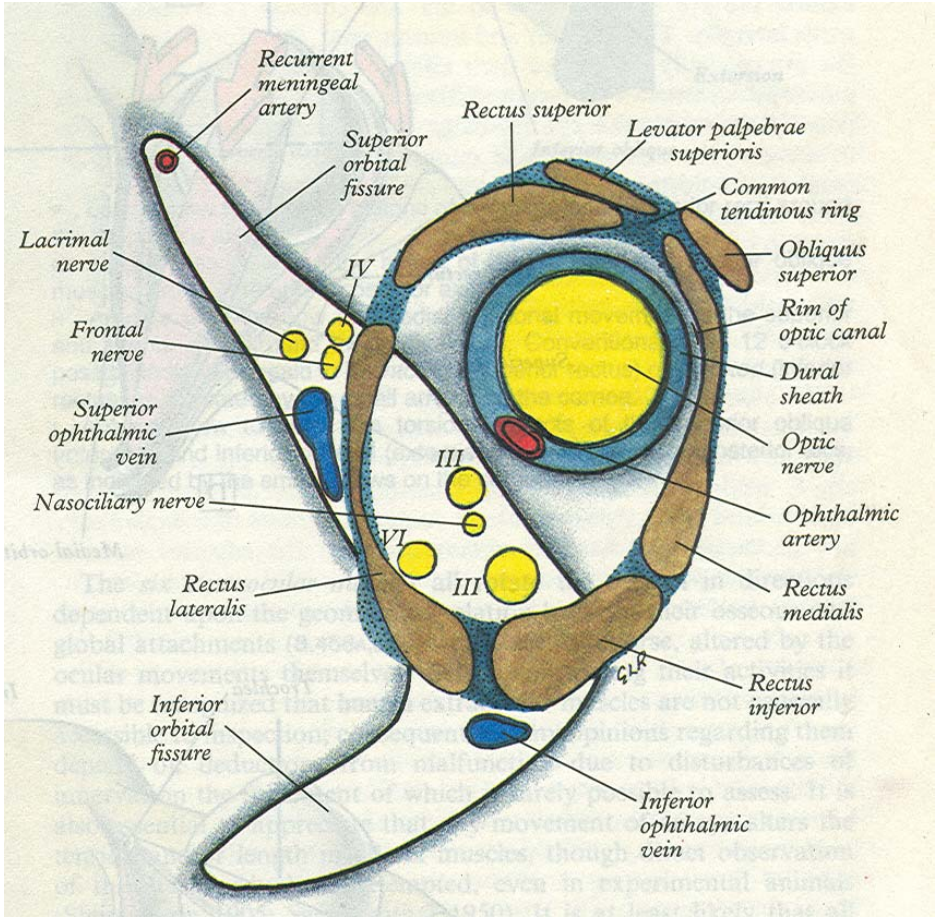


Frontal nerve

- Largest of the three branches of ophthalmic nerve
- Begins in the lateral part of cavernous sinus

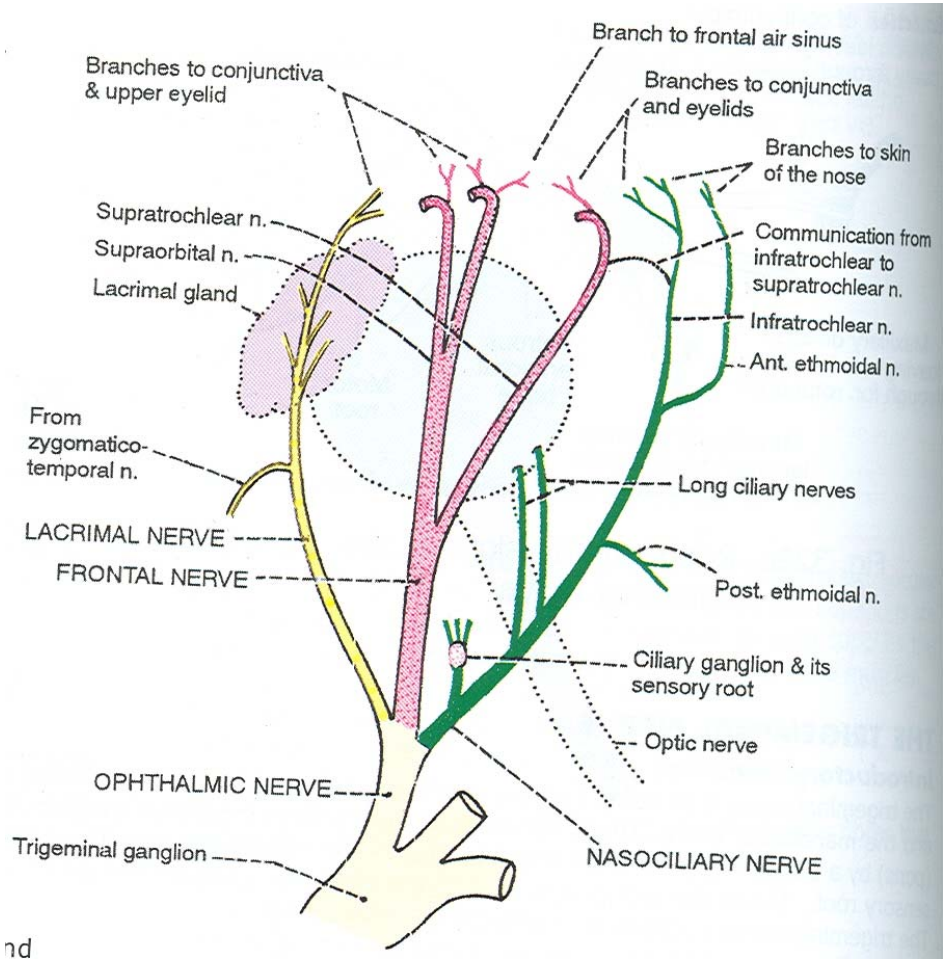


- Enters the orbit through superior orbital fissure
- Runs forwards on the superior surface of LPS
- In the middle of orbit it divides in to supra orbital and supra Trochlear nerve

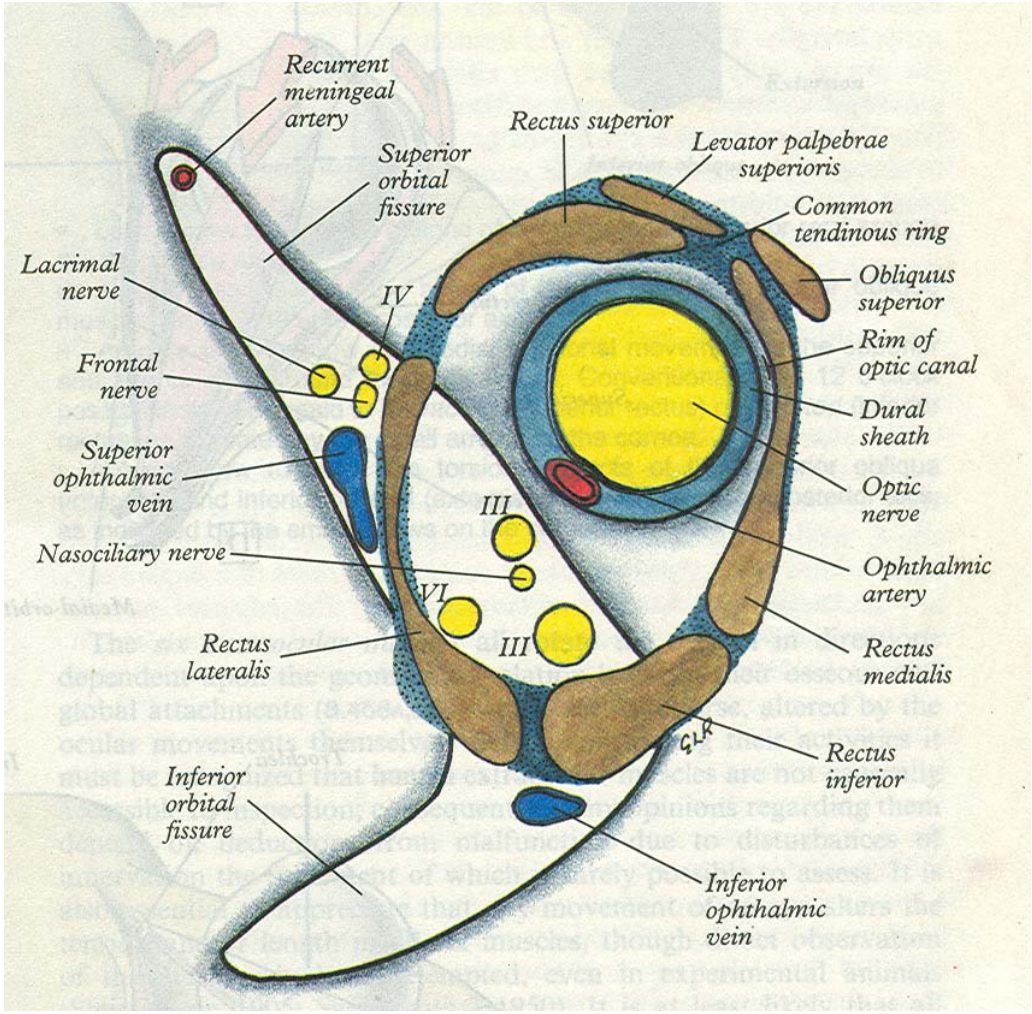


Nasociliary nerve

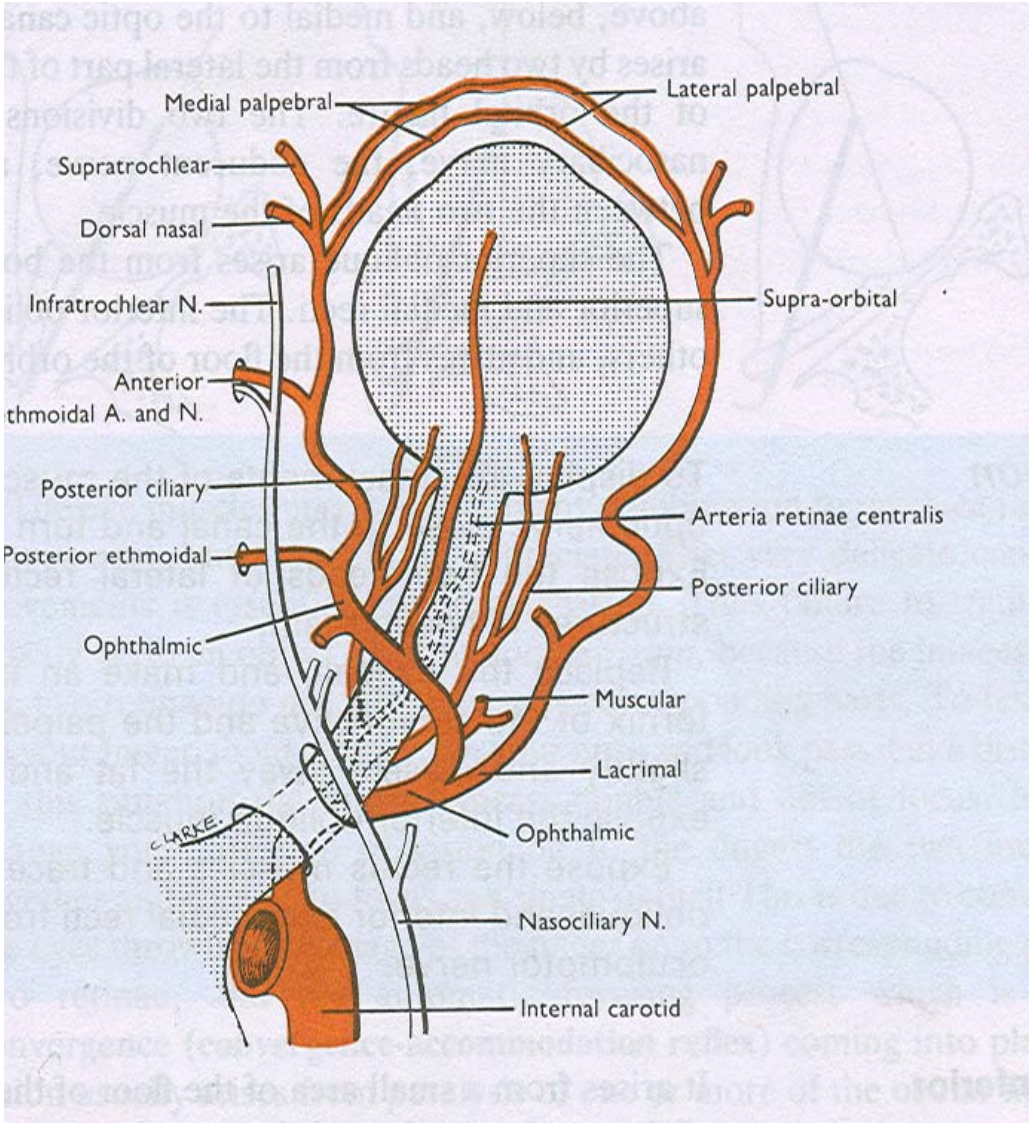
- One of the terminal branches of ophthalmic nerve
- begins in the lateral wall of cavernous sinus



- Enters the orbit through superior orbital fissure between the two divisions of the oculomotor nerve

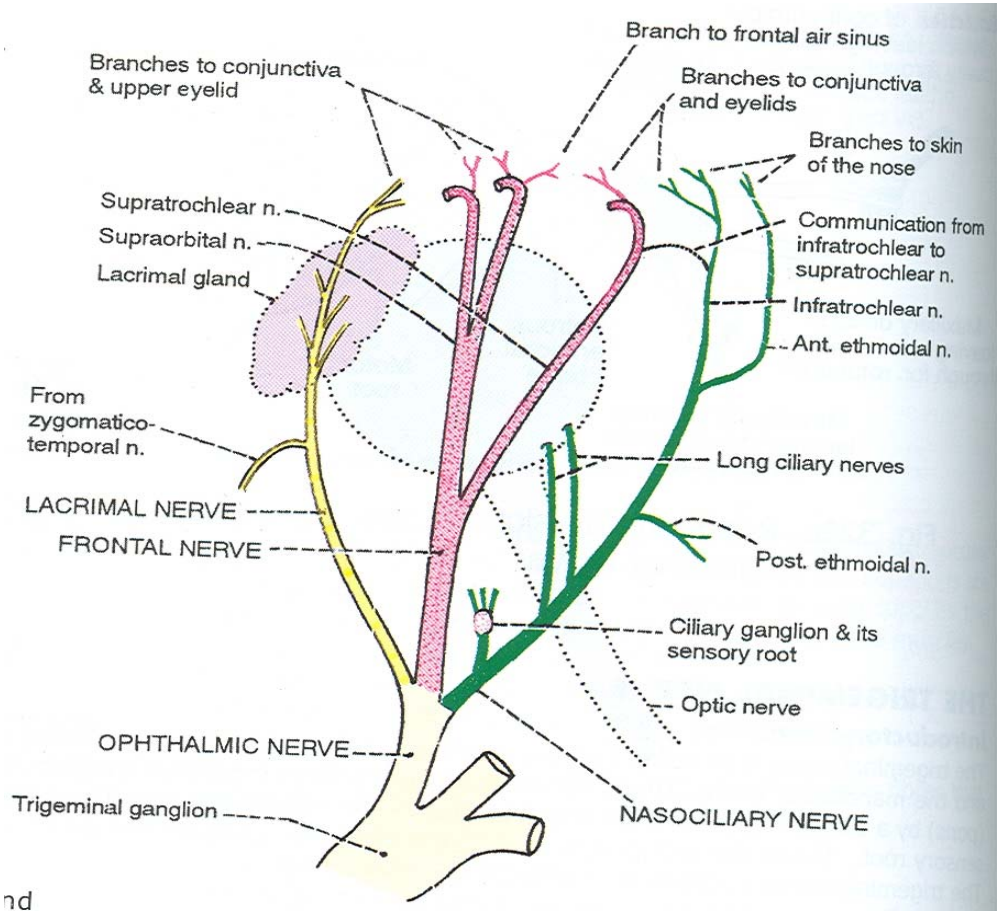


- Crosses above the optic nerve from lateral to medial side and runs along the medial wall of the orbit between the superior oblique and medial Rectus
- ends at anterior ethamoidal foramina by dividing in to infra trochlear and anterior ethamoidal nerve



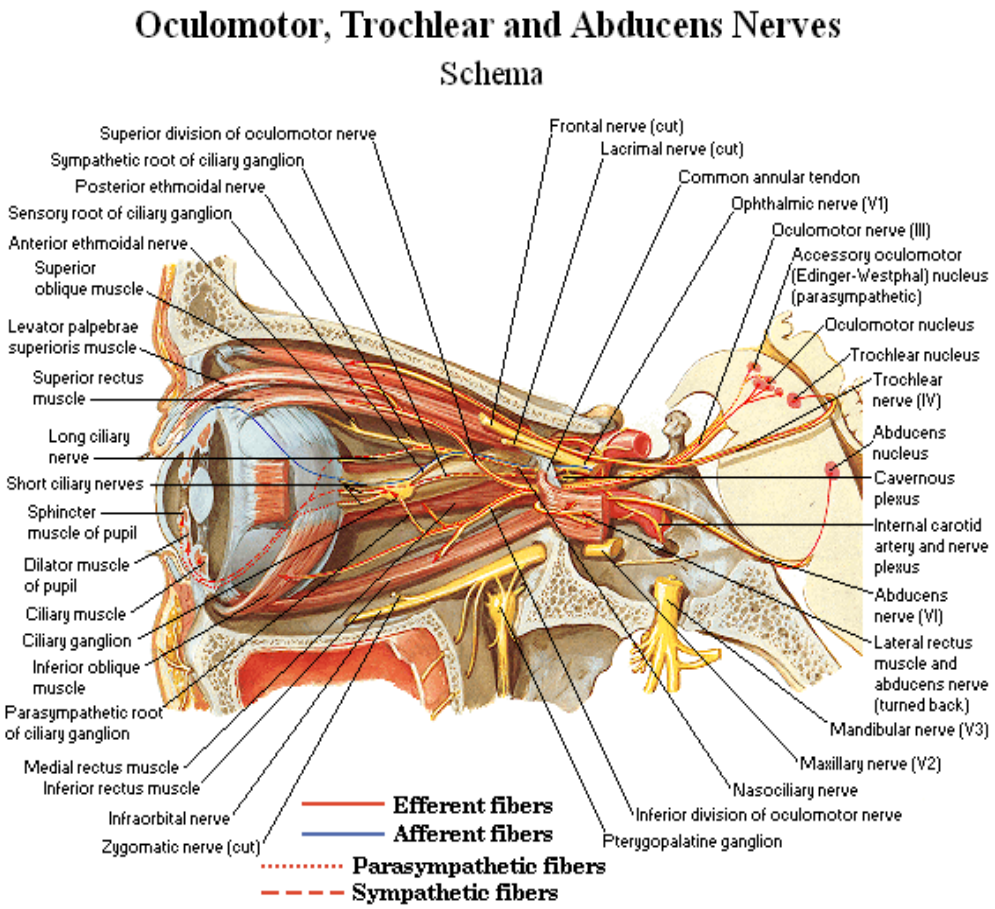
Branches of nasociliry nerve

- A communicating branch to ciliary ganglion
- Two or three long ciliary nerve
- The posterior ethamoidal nerve
- Infra Trochlear nerve
- Anterior ethamoidal nerves

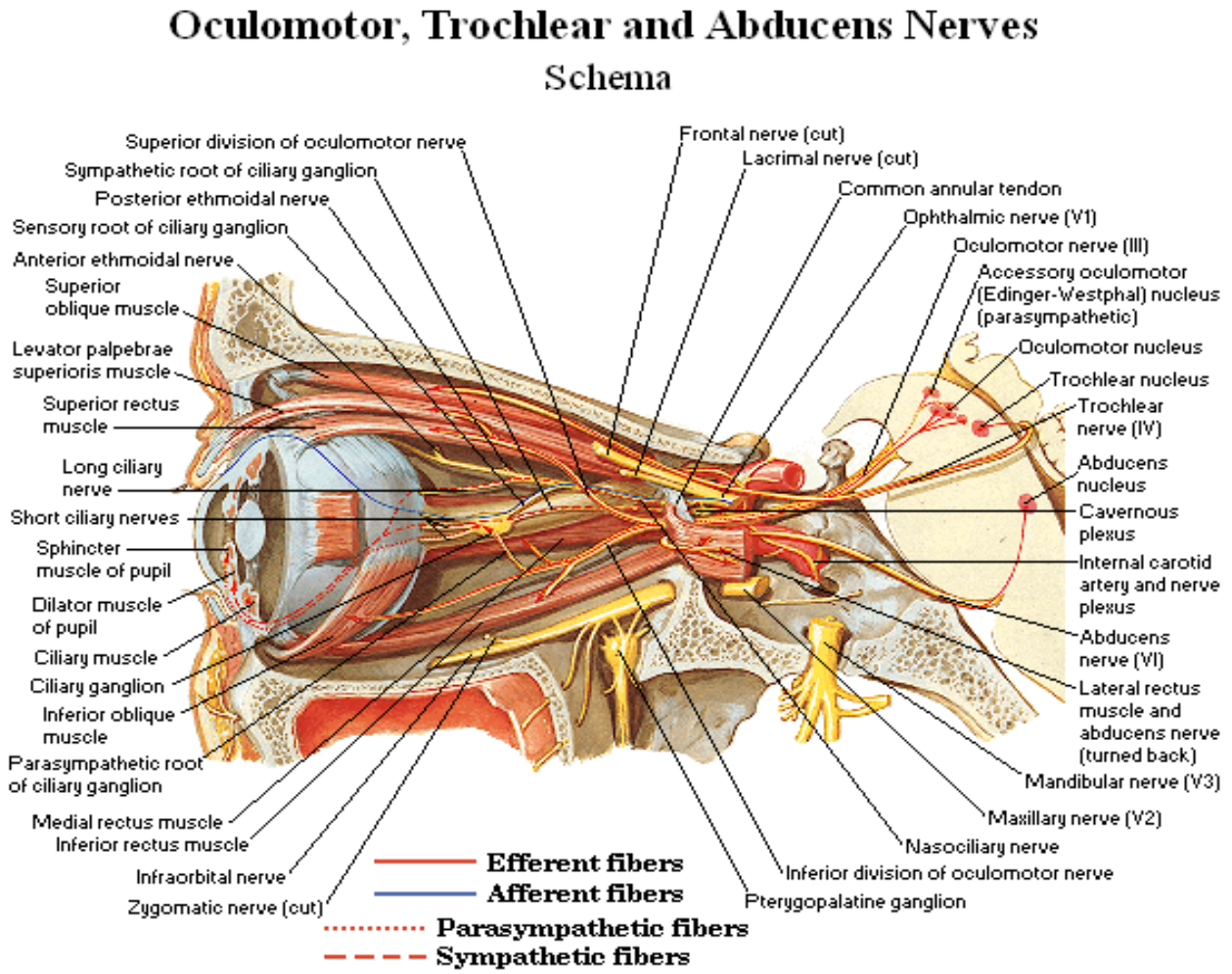


Infraorbital nerve

- Continuation of maxillary nerve
- Enters the orbit through inferior orbital
- Runs forward on the floor of the orbit in the infra orbital groove then in the infra orbital canal
- Emerges on the face through infra orbital foramen

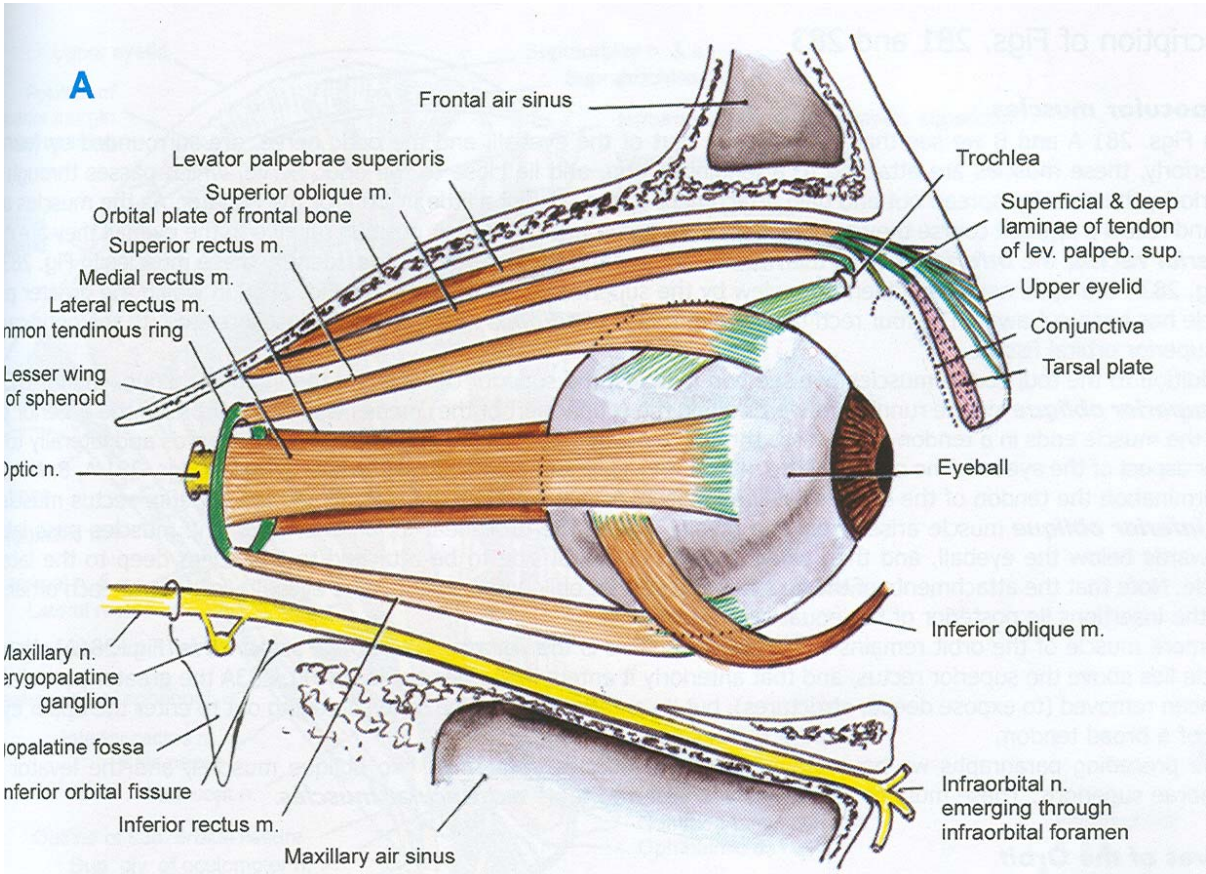


- Terminates by dividing in to palpebral ,nasal and labial branches
- Accompanied by infra orbital branch of maxillary artery and vein



branches

- Middle superior alveolar
- Anterior superior alveolar
- Palpebral, nasal & labial branch

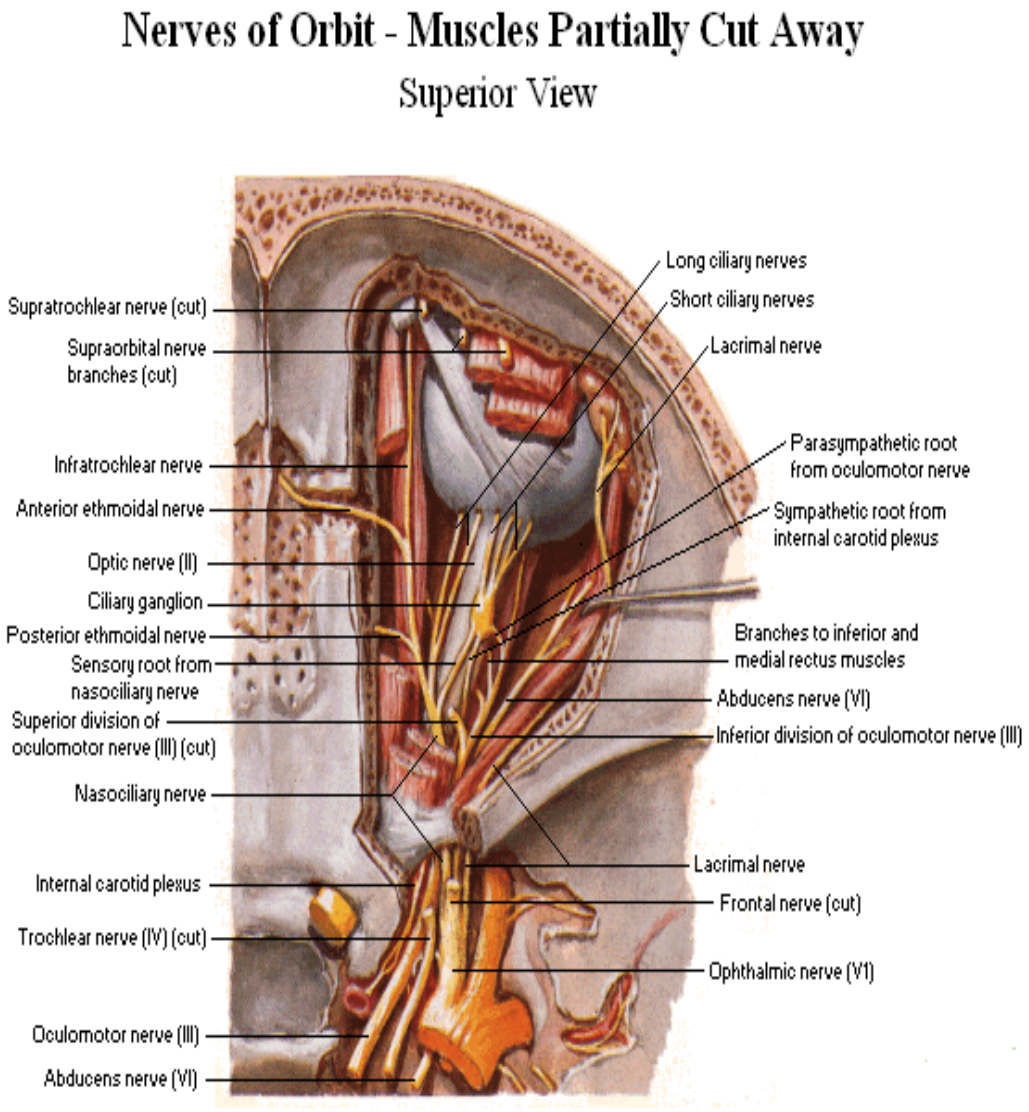


Ciliary ganglion

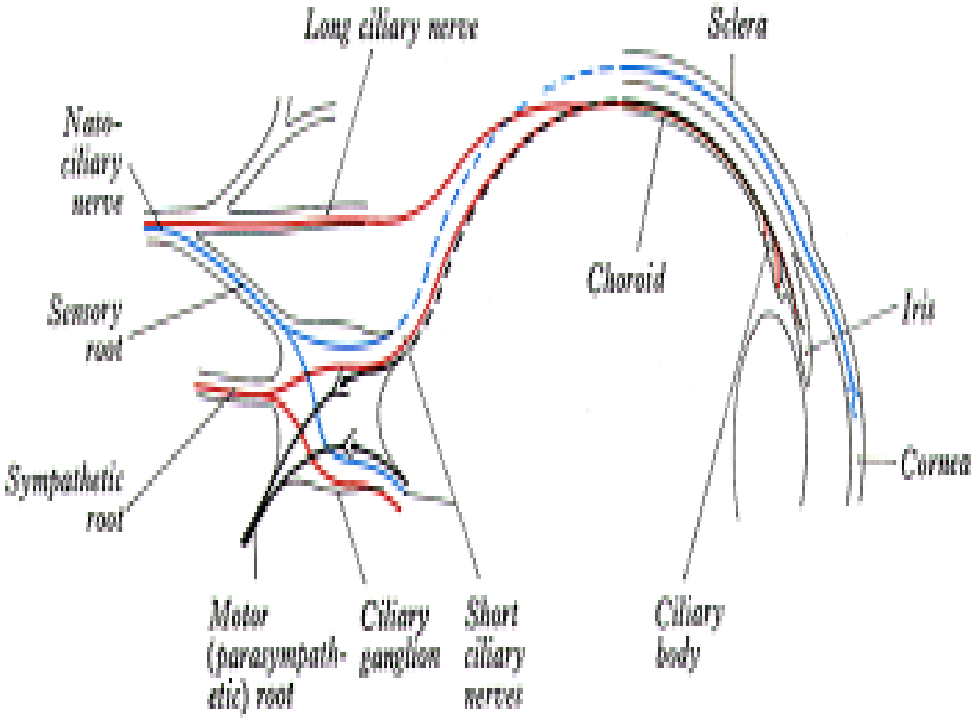
- Lies between the optic nerve and lateral rectus

Receives three roots

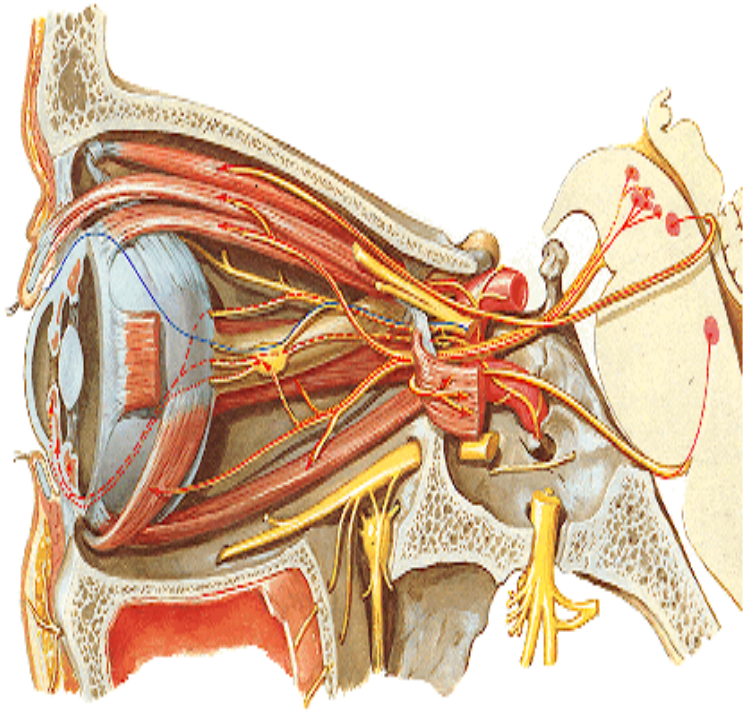
- Motor or parasympathetic
- sympathetic
- Sensory



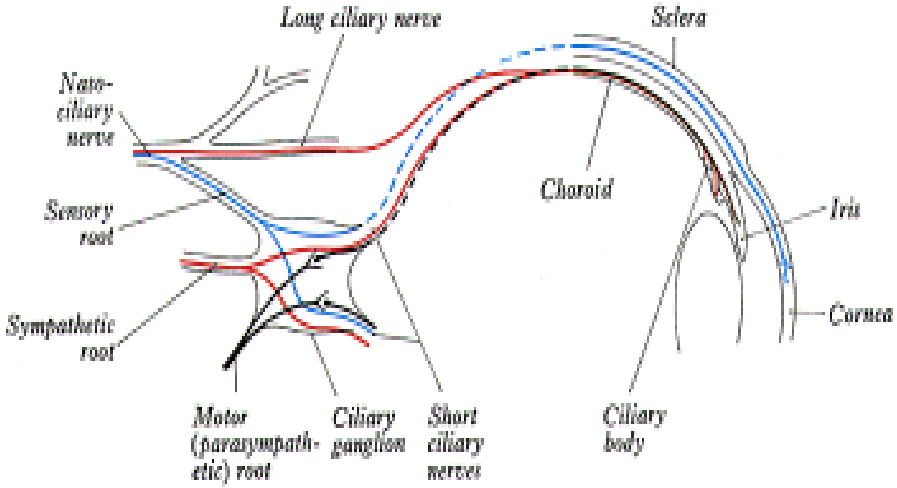
- Parasympathetic root: Fibers arise from edinger westphal nucleus
- Travel through trunk of 3rd nerve
- Enter the nerve to inferior oblique from which a branch to ciliary ganglion is given
- Cells of the ganglion give origin to post ganglion fibers
- PG fibers pass through short ciliary nerves to sphincter pupillae & ciliaris



- Sympathetic root:
- Branch from internal carotid plexus, contains postganglionic fibers from superior cervical ganglion
- Pas out of ganglion without relay in to short ciliary nerves
- Supply blood vessels of eyeball
- May supply dilator pupillae

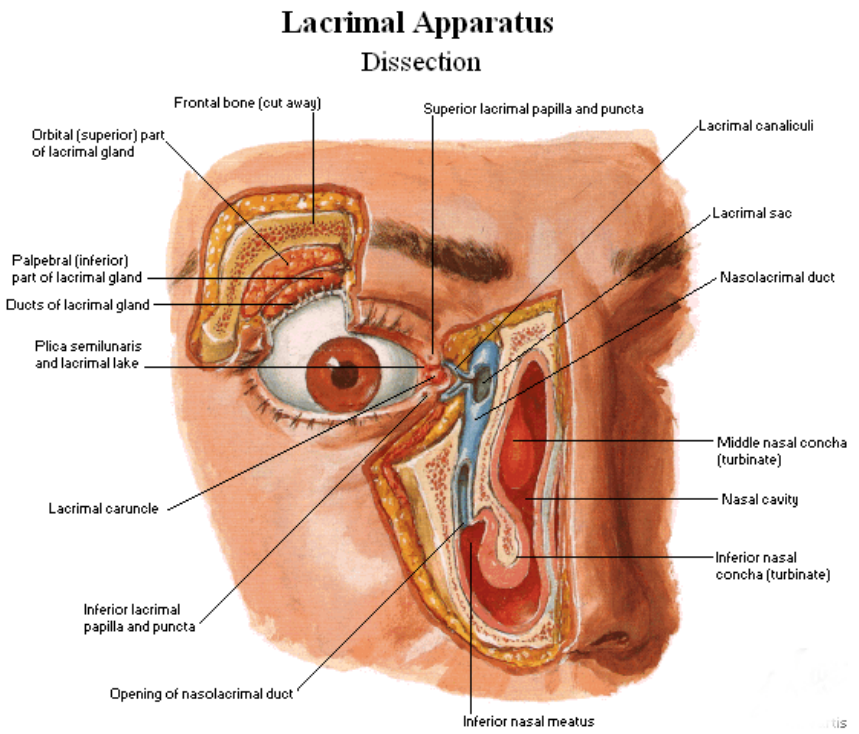


- Sensory root:
- From Nasociliary nerve
- Contains sensory fibers from the eyeball
- Fibers pass through ganglion without relay
- Branches: 8-10 short ciliary nerves which pierce the sclera at the entrance of optic nerve. These contain all the three type of fiber from ganglion



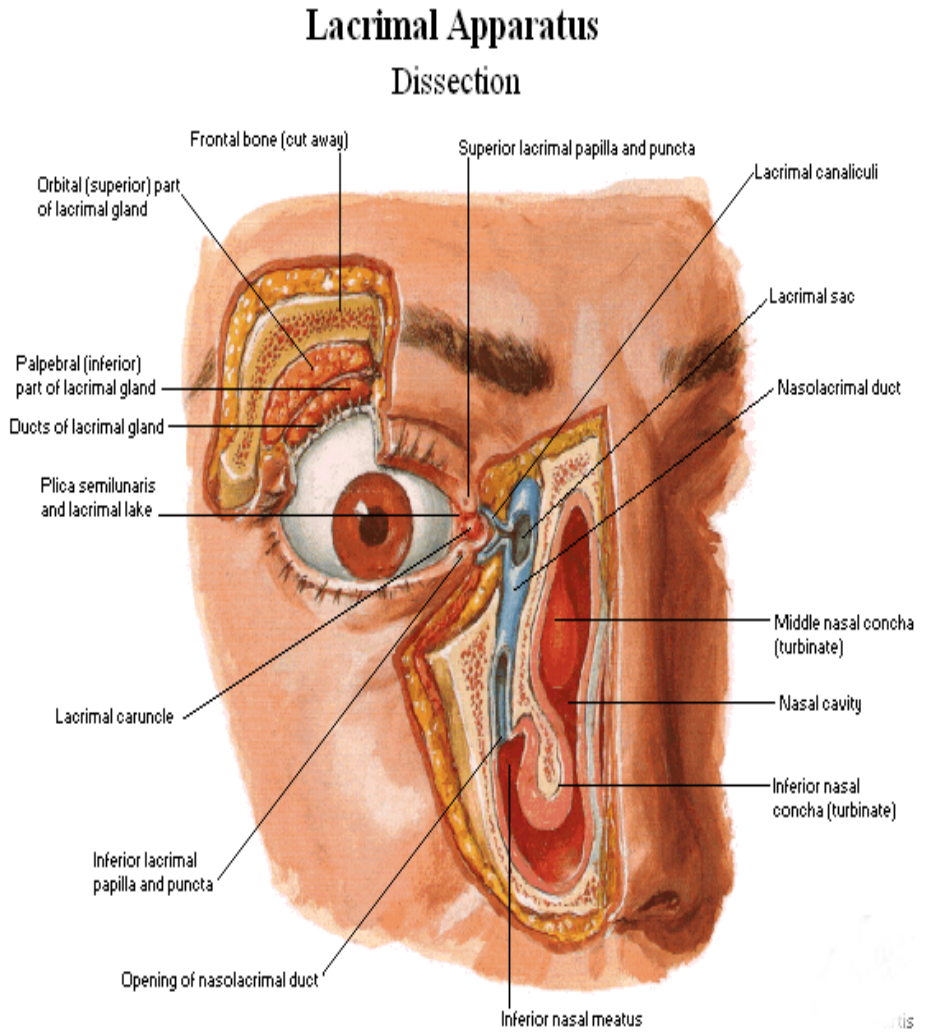
Lacrimal apparatus

- Structures connected with the drainage of the lacrimal fluid. Made of following parts : Lacrimal glands &its ducts
- Conjunctival sac
- Lacrimal puncta & L canaliculi
- Lacrimal sac
- Nasolacrimal duct

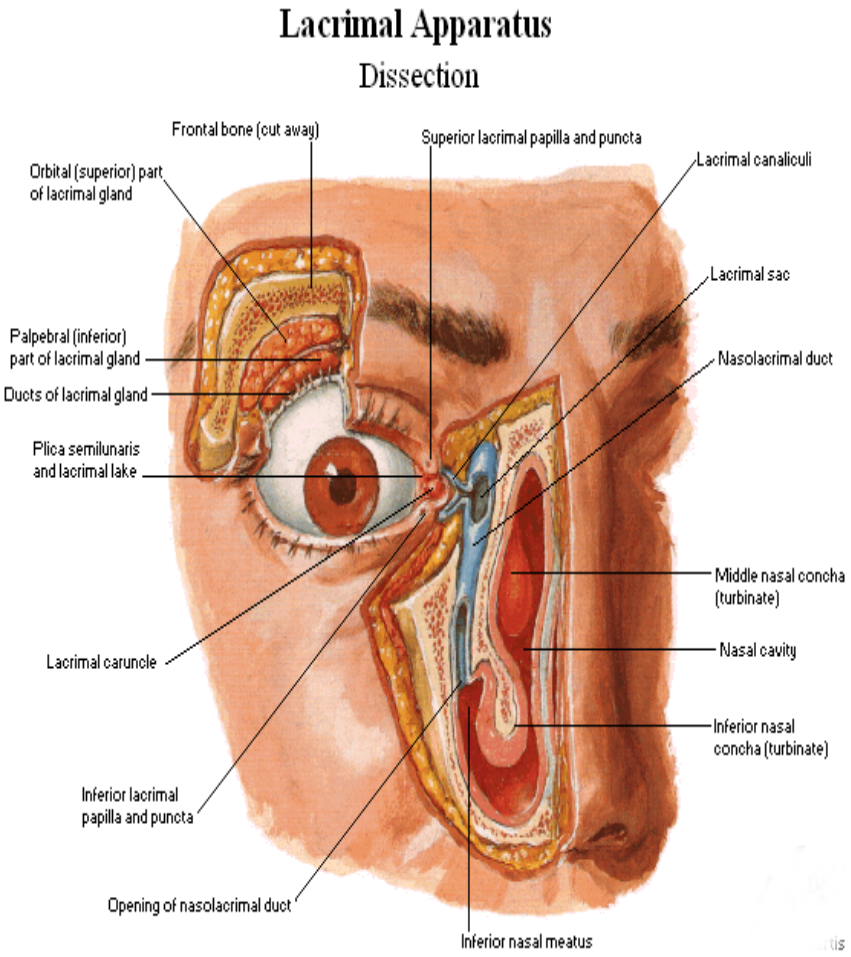


Lacrimal gland

- Serous gland
- Situated in lacrimal fossa & partly on the upper eyelid
- Small accessory lacrimal glands are found in Conjunctival fornices

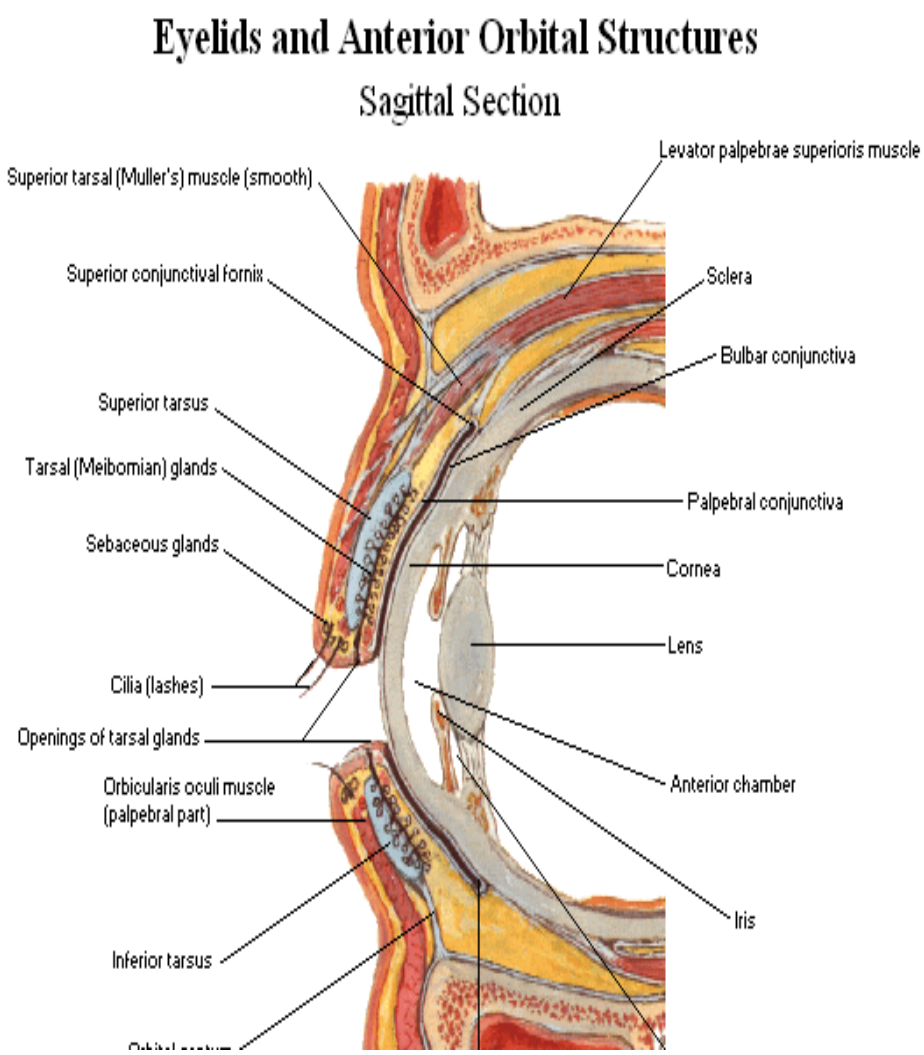


- J shaped muscle ,indented by LPS in to orbital & palpebral part
- 10-12 duct of this gland open in superior Conjunctival fornix
- Ducts of orbital part pass through palpebral part



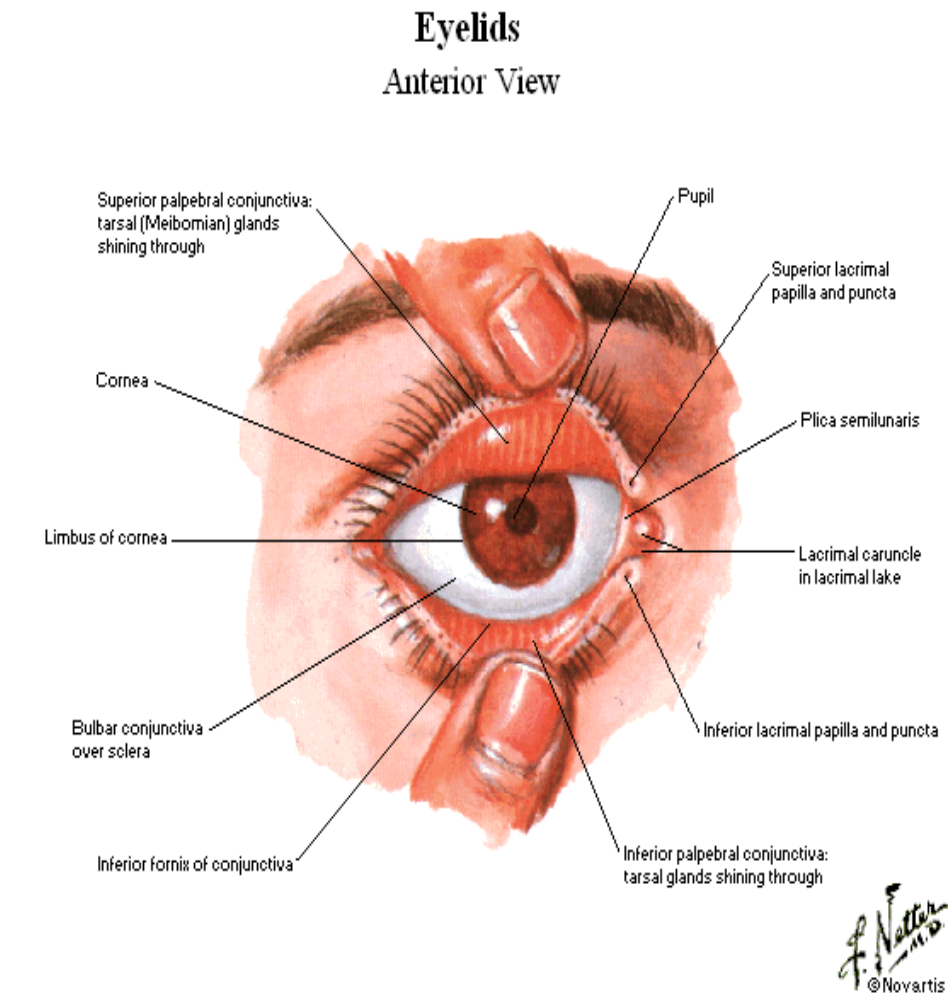
Conjunctival sac

- Potential space between palpebral and lacrimal conjunctiva
- Palpebral conjunctiva is thick opaque & adherent to tarsal plate
- Bulbar conjunctiva is thick transparent & loosely attached to eyeball



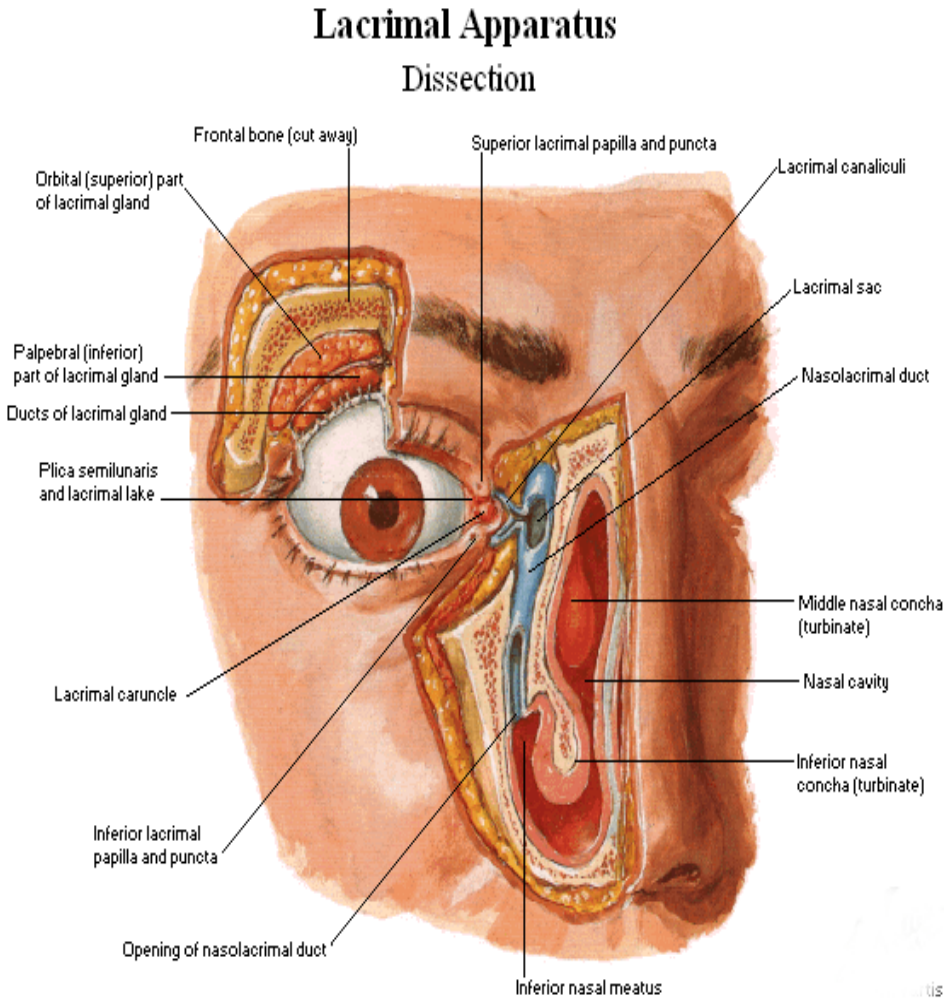
Lacrimal puncta &canaliculi

- Is In each eye lid at the summit of lacrimal papilla, lacrimal punctum is found
- Lacrimal Canaliculi start from punctum
- 10 cm long
- Has a vertical &horizontal part
- Open close to each other in lacrimal sac behind the medial palpebral ligament



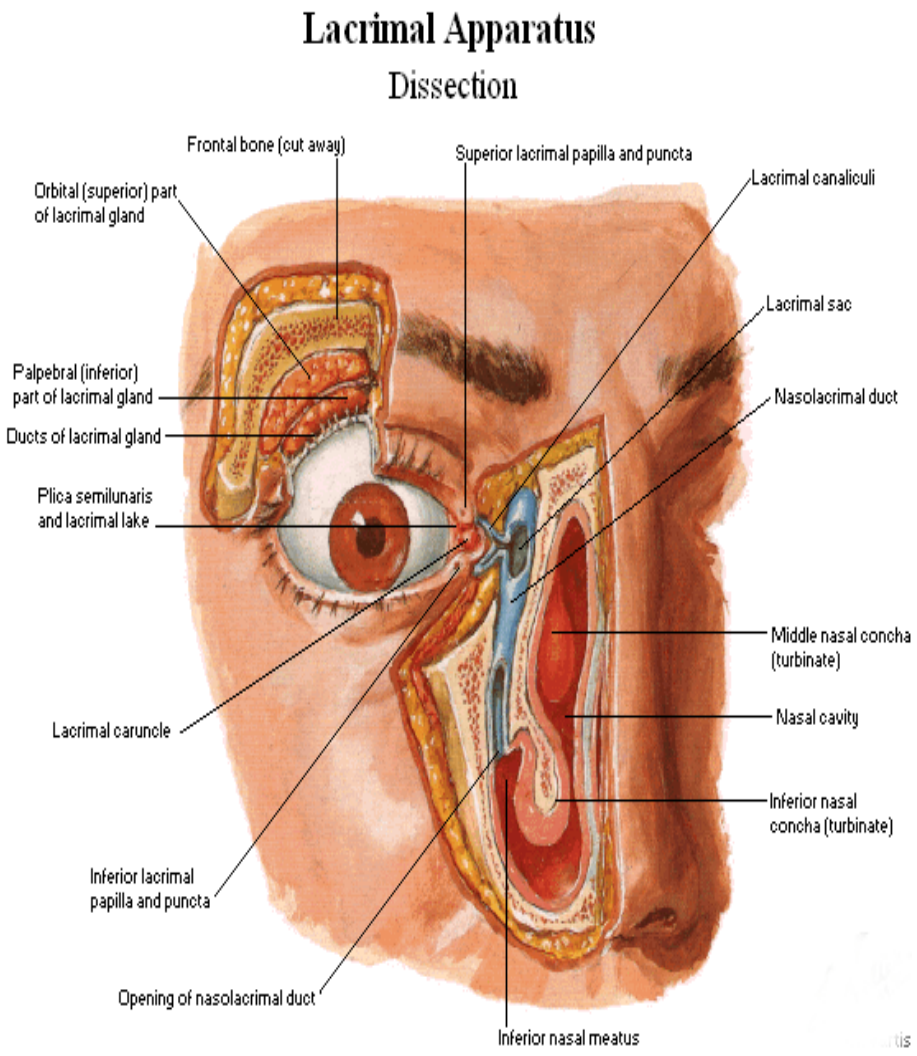
Lacrimal sac

- 12 x 5 mm in size
- Situated in the lacrimal groove behind the medial palpebral ligament
- Upper end is blind
- Lower end continuous with nasolacrimal duct



Nasolacrimal duct

- Membranous passpge,18 mm long
- Begins at the lower end of lacrimal sac
- Runs downwards, backwards &laterally
- Opens into inferior meatus of nose
- Valve of Hasner at the lower end of duct

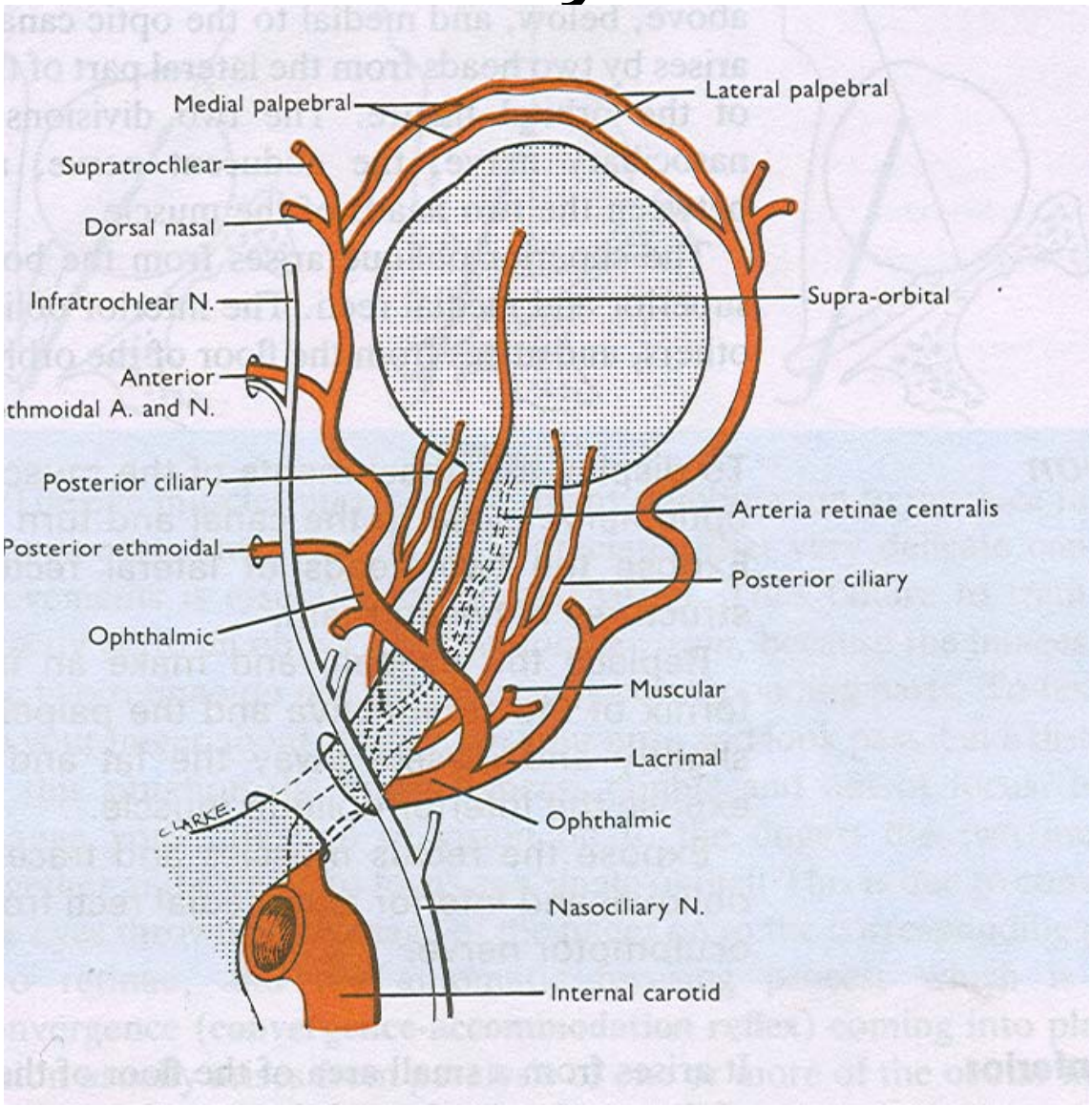


Applied anatomy

- Inflammation of lacrimal sac is called dacryocystitis
- Congenital absence or noncanalisation of nasolacrimal duct result in excessive lacrimation

Ophthalmic artery

- Branch of intracerebral part of ICA
- Runs in the optic canal inferolateral to optic nerve
- In orbit crosses optic nerve from above



Branches

- Central artery
- Lacrimal artery
    - Recurrent meningeal
    - Zygomatic
- Posterior ciliary's branches
- Supraorbital branch
- Posterior ethamoidal artery
- Anterior ethamoidal artery
- Supratrochlear artery
- Medial palpebral
- Dorsal nasal