PERIPHRAL NERVOUS SYSTEM

THE ORBIT CAVITY & LACRIMAL APPARATUS

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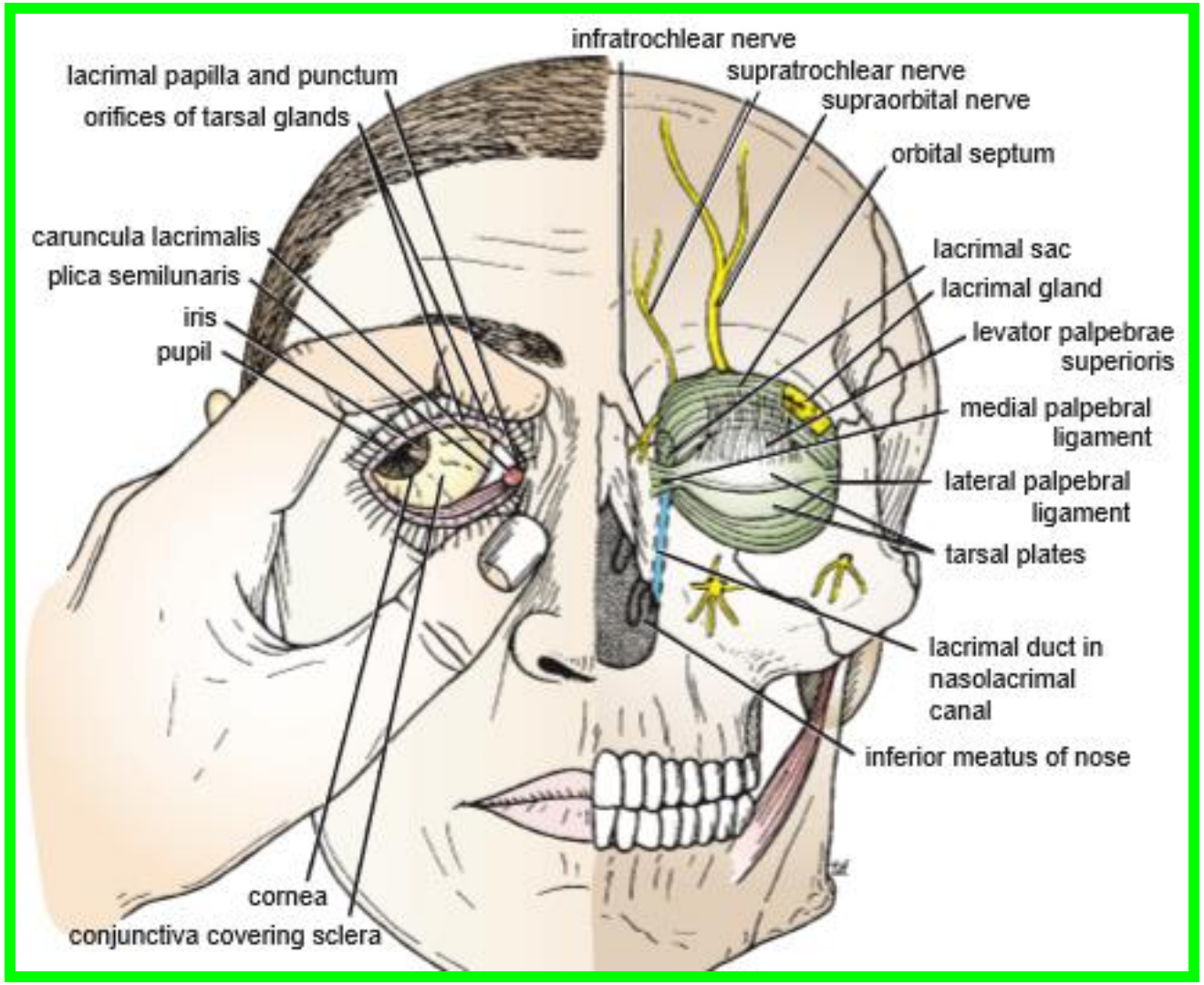
Wednesday 26 February 2025

The Orbital Region

✓**The orbital region** *is the area of the face overlying the orbit and eyeball and includes the upper and lower eyelids and lacrimal apparatus*

✓**The orbits** *are a pair of bony cavities that contain the* ***eyeballs****; their* ***associated muscles****, nerves, vessels, and fat; and most of the lacrimal apparatus.*

✓**The orbital opening** *is guarded by two thin, movable folds,* ***the eyelids***



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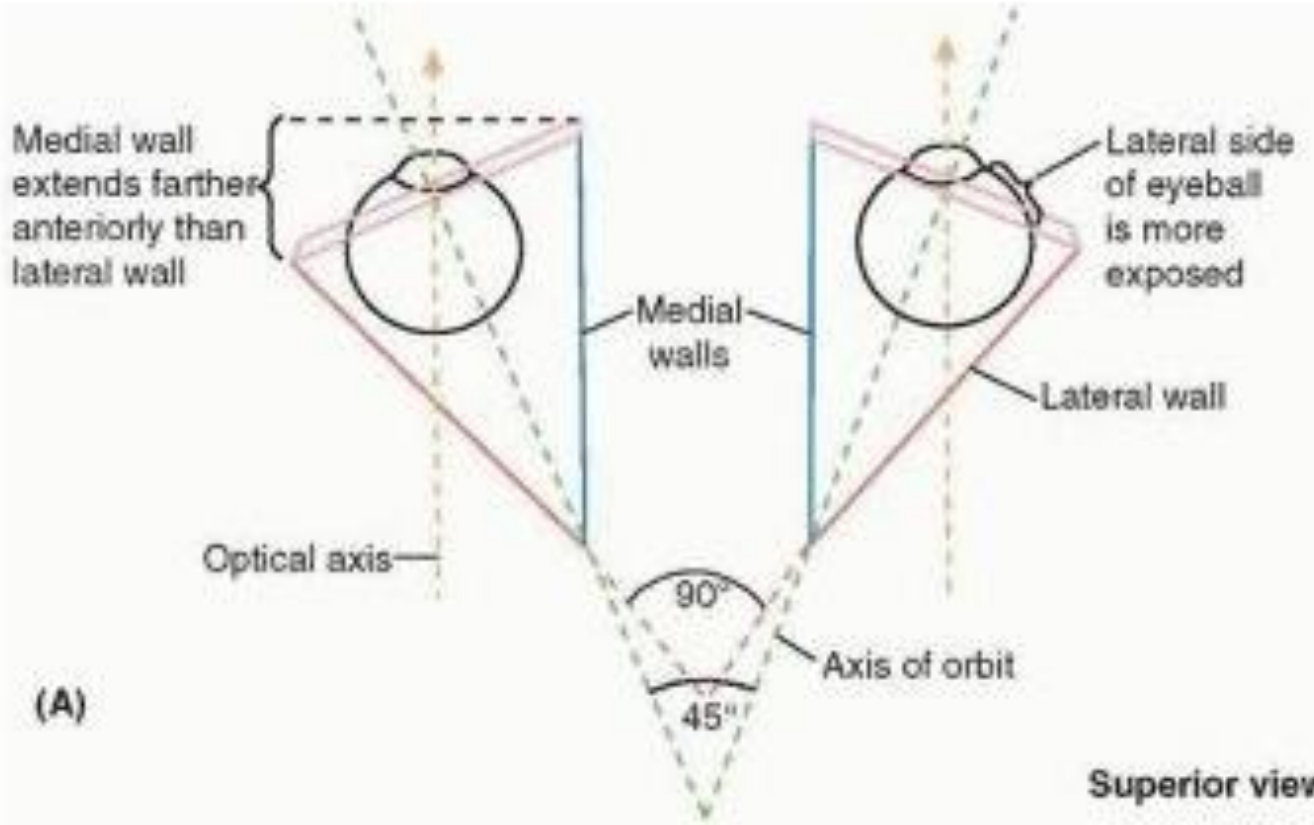
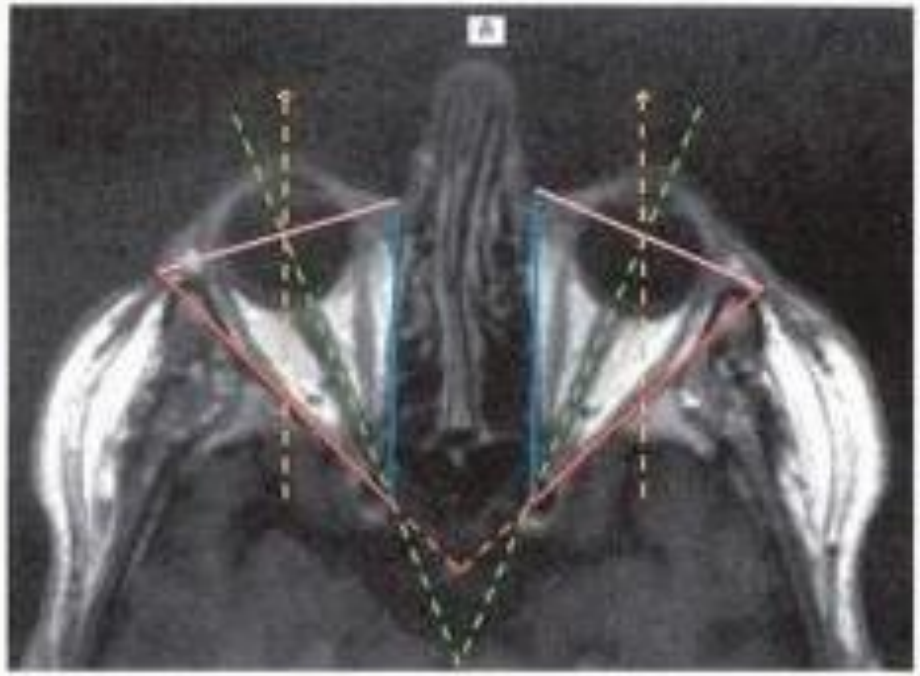
Orbits

❖*The orbits are bilateral bony cavities in the facial skeleton that resemble hollow quadrangular pyramids with their bases directed anterolaterally and their apices, posteromedially*

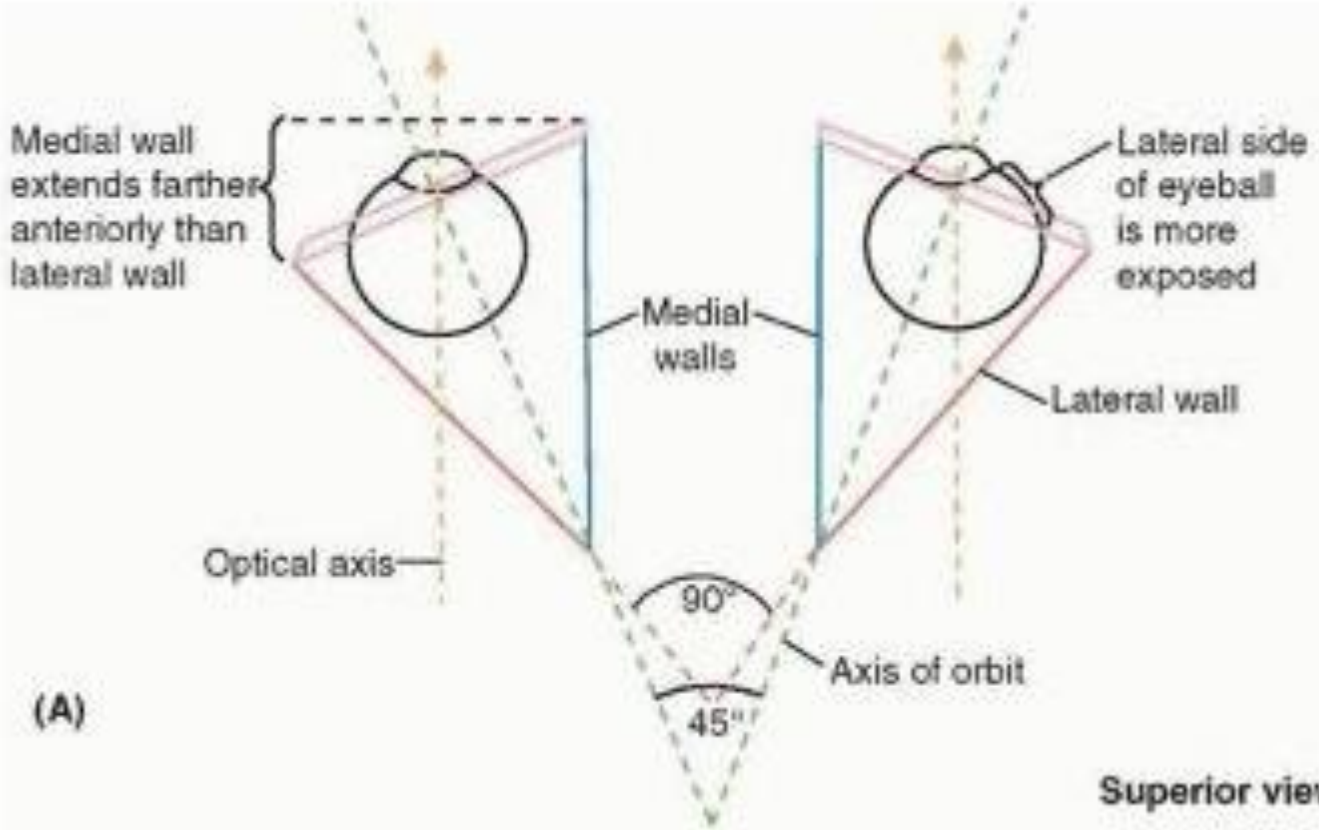


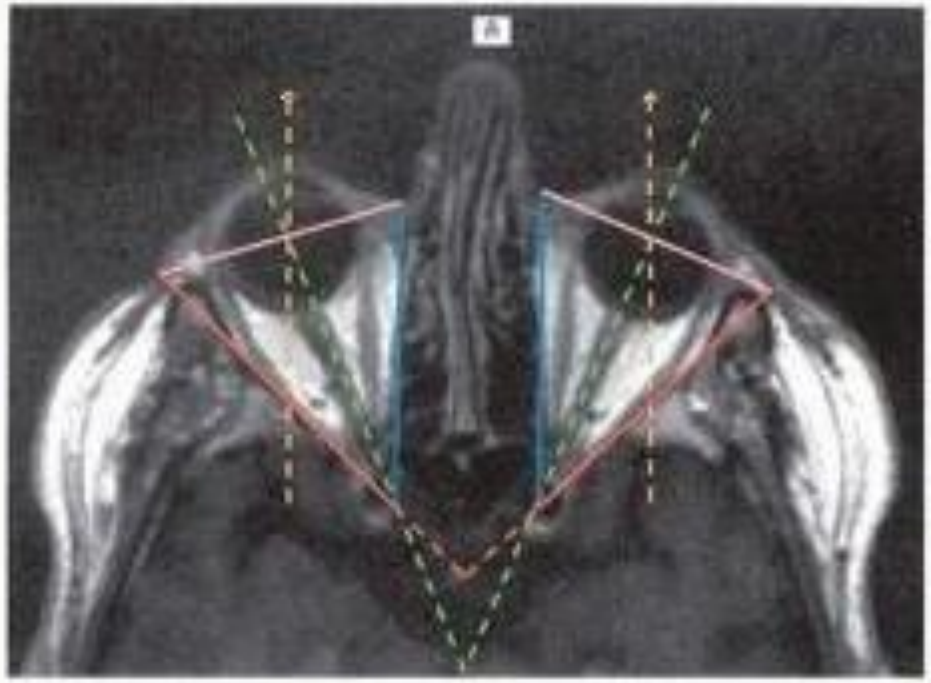


Superior views

Orbits

❖*The medial walls of the two orbits, separated by the ethmoidal sinuses and the upper parts of the nasal cavity, are nearly parallel, whereas their lateral walls are approximately at a right (90°) angle.*



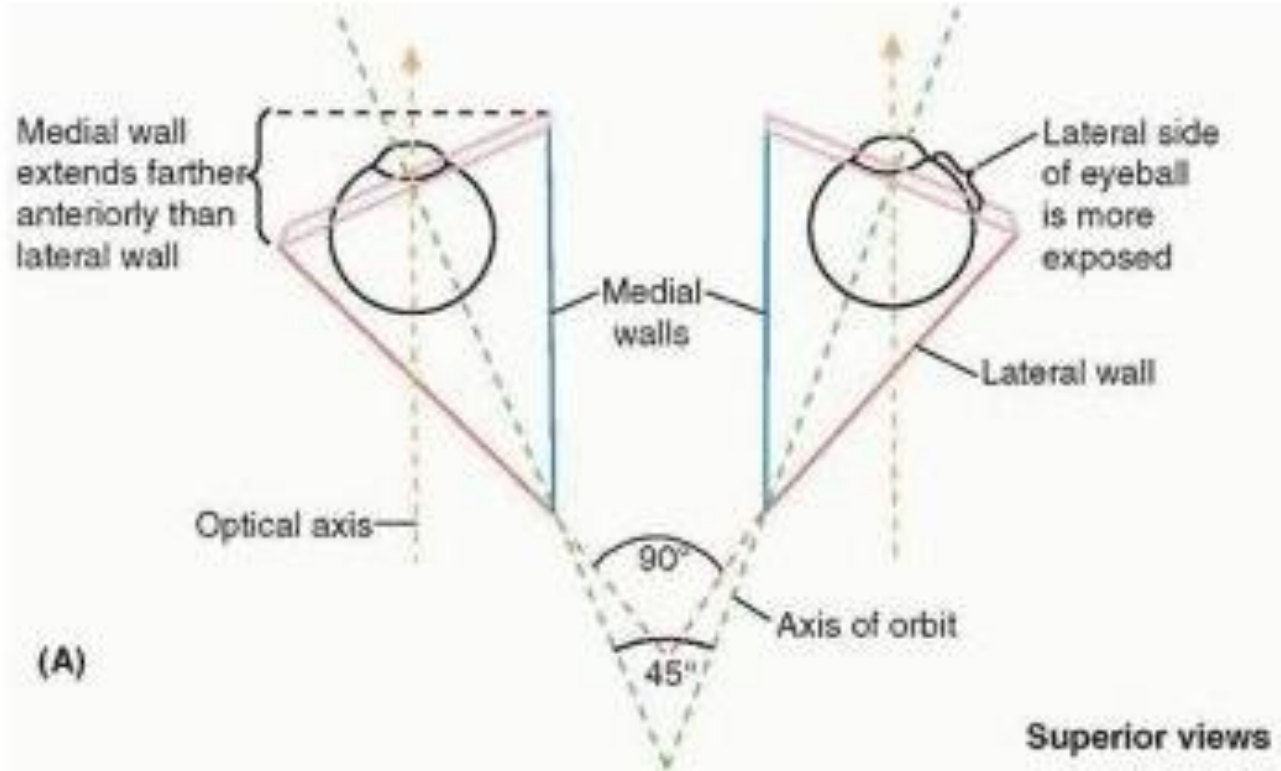


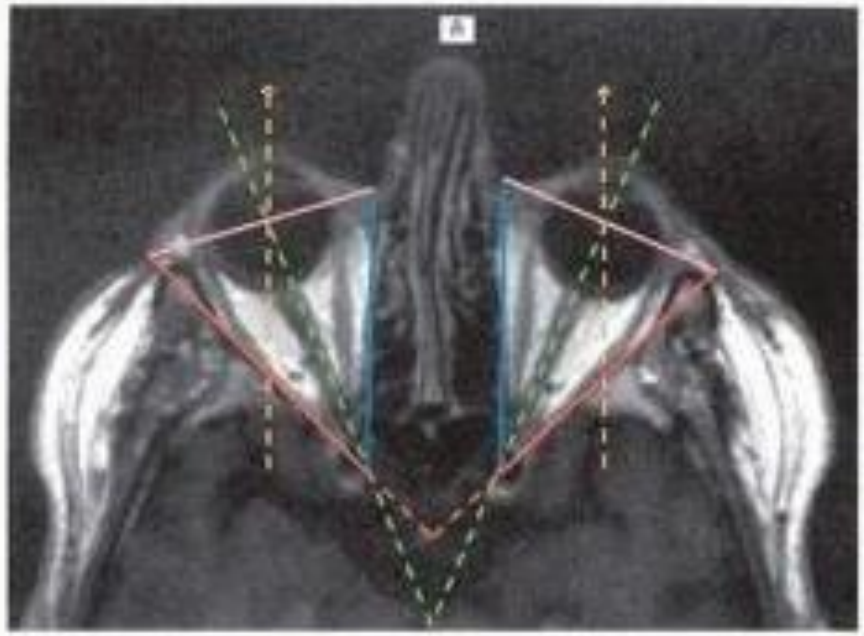
Orbits

✓Consequently, (orbital axes) diverge at approximately 45°.

✓ The optical axes (the direction or line of sight) for the two eyeballs, are parallel, ("looking straight ahead"),

✓The orbits anterior to them contain and protect the eyeballs which include the:



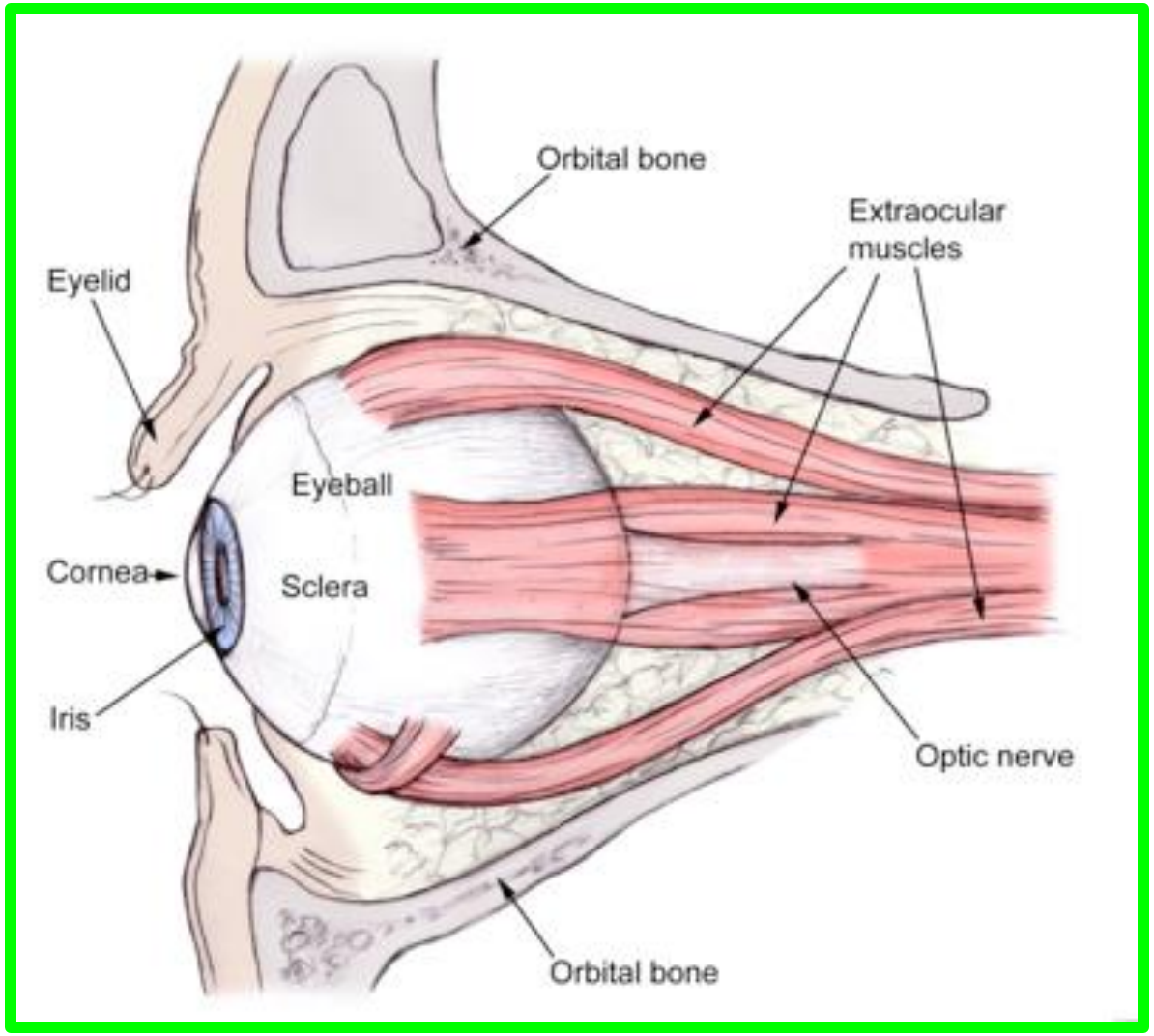


Superior views

Orbits

The orbits and orbital region include the:

- *Eyelids, ..controlling exposure of the anterior eyeball.*
- *Extraocular muscles, which position the eyeballs and raise the superior eyelids.*
- *Nerves and vessels*
- *Orbital fascia.* surrounding the eyeballs and muscles
- *Mucous membrane (conjunctiva) lining the eyelids*



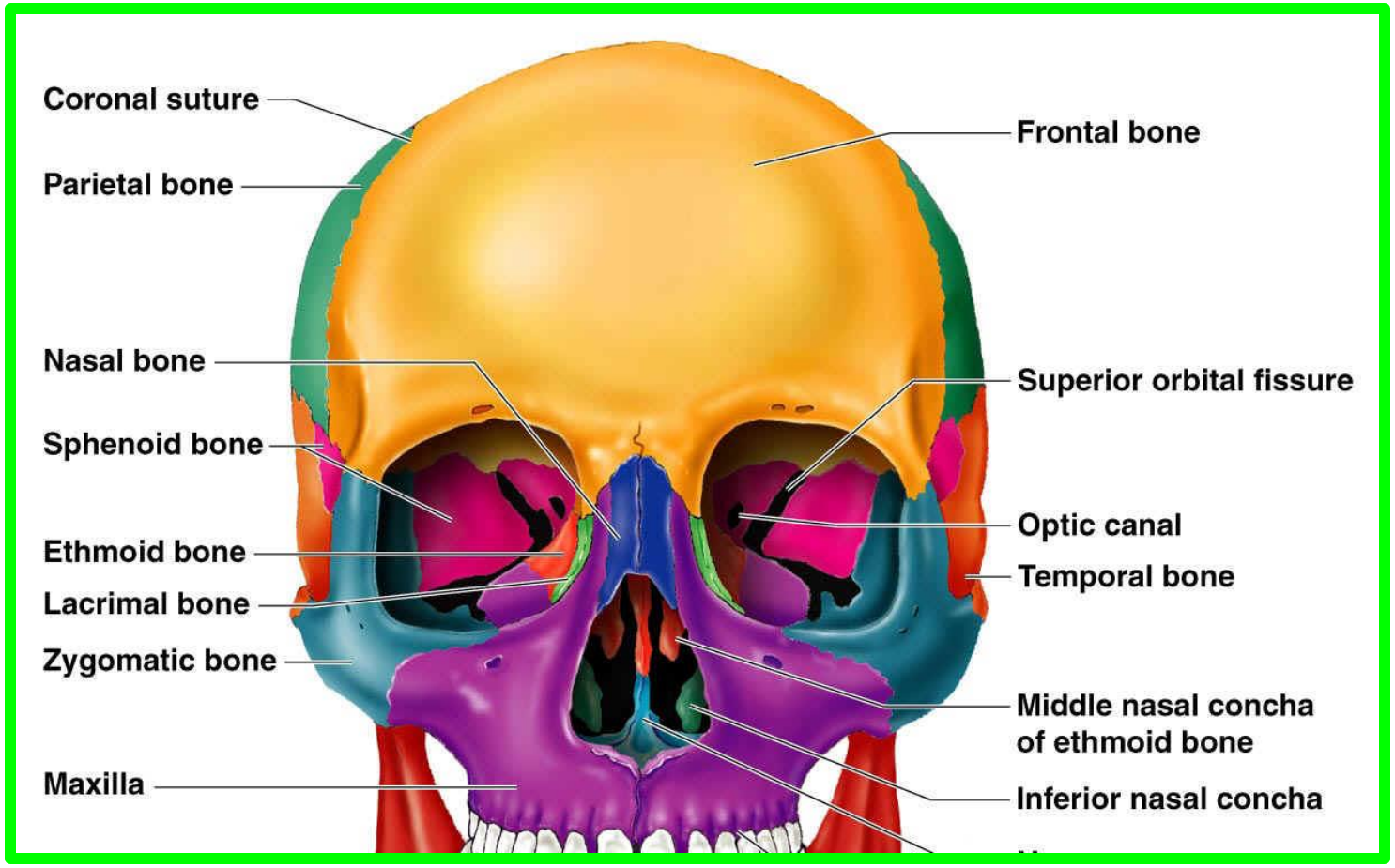
All space within the orbits not occupied by these structures is filled with orbital fat

Orbits

The quadrangular pyramidal orbit has a base, four walls, and an apex

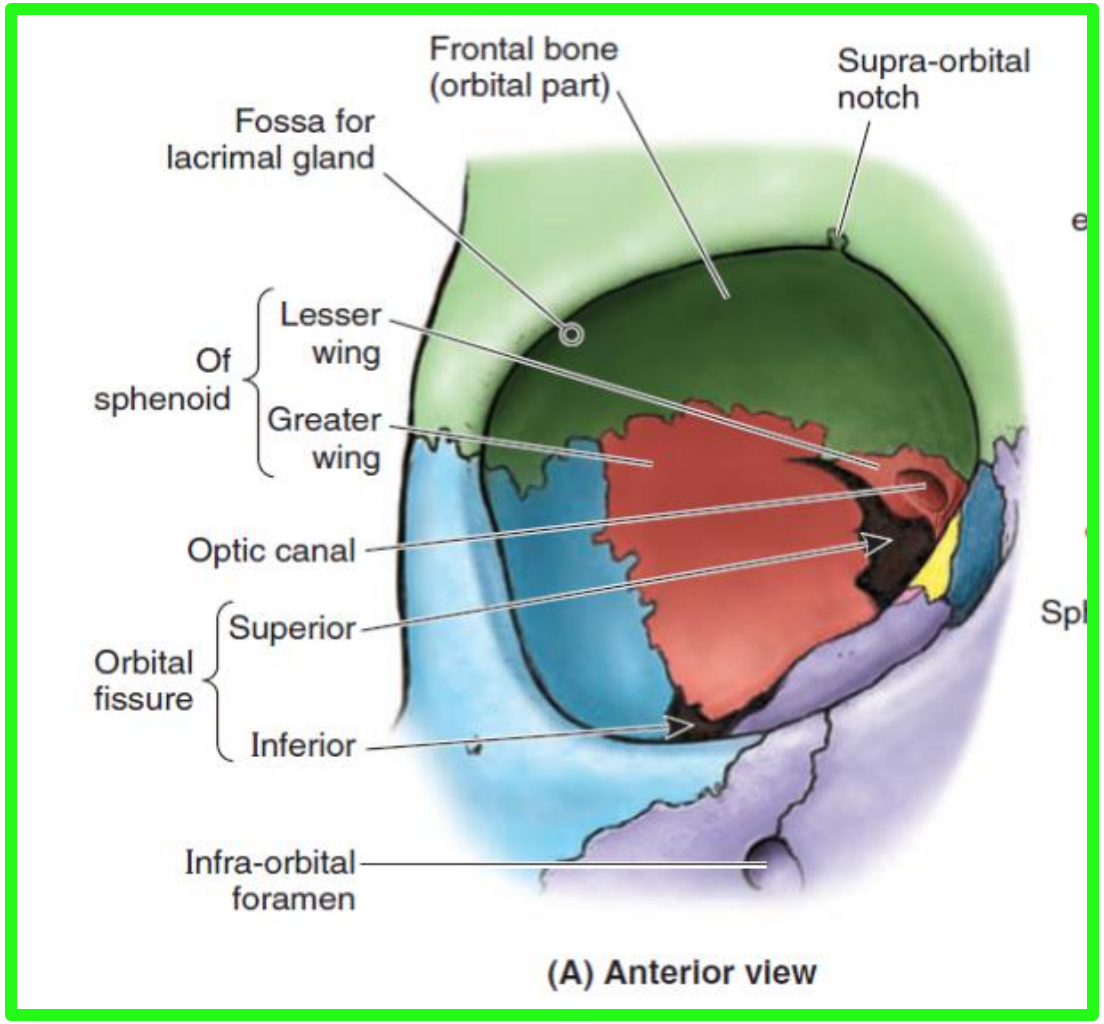
❖The base

- ✓ above by the frontal bone,
- ✓ the lateral margin the processes of the frontal and zygomatic bones,
- ✓ the inferior margin is the zygomatic bone and the maxilla,
- ✓ the medial margin the processes of the maxilla and the frontal bone.



Orbits

❖*The apex is at the optic canal in the lesser wing of the sphenoid just medial to the superior orbital fissure.*



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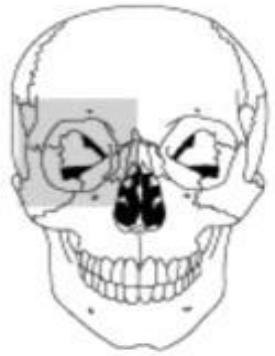
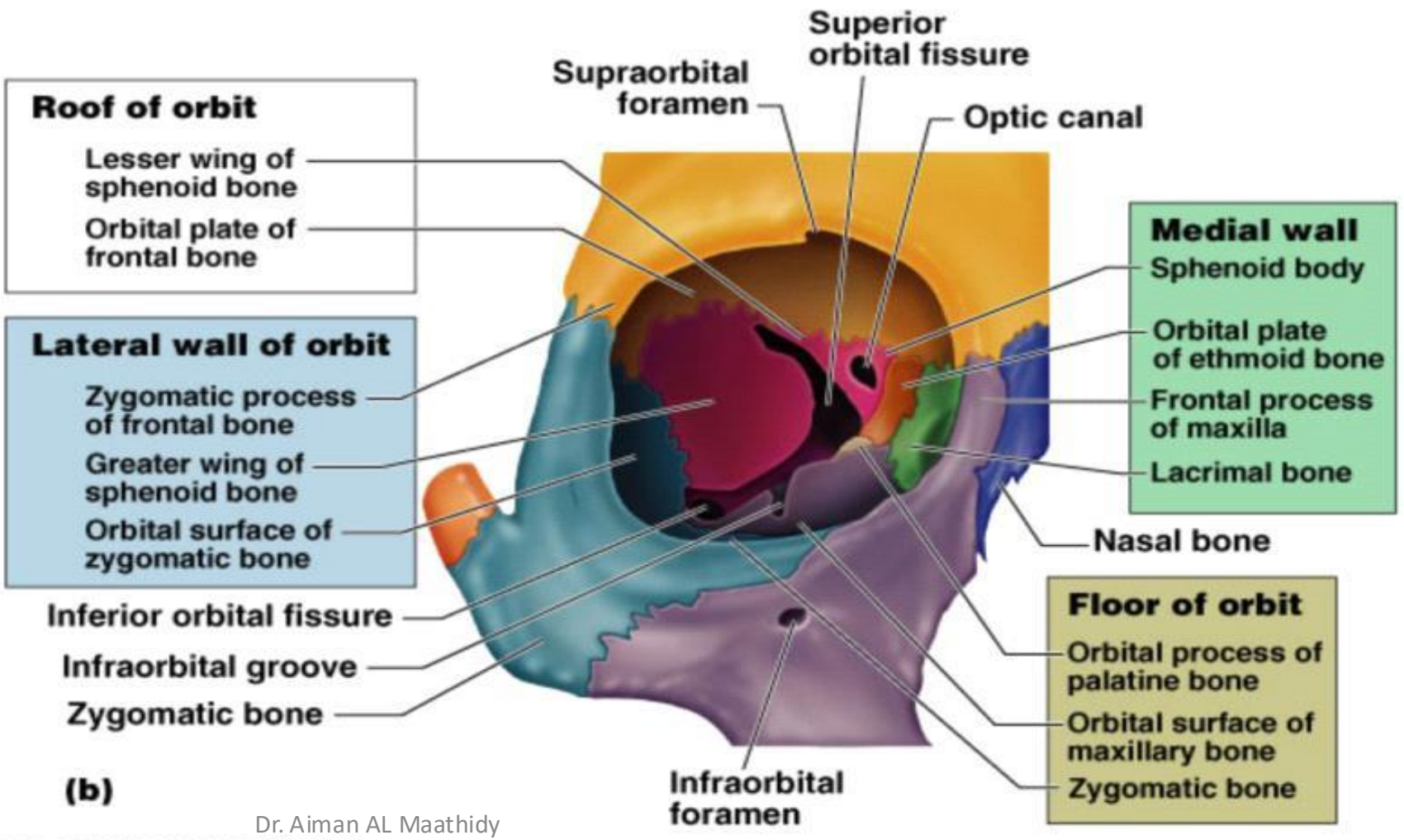
Orbits

- ❖ The superior wall (roof)
- ❖ The medial walls
- ❖ The inferior wall (orbital floor)
- ❖ The lateral wall





Openings into the Orbital Cavity

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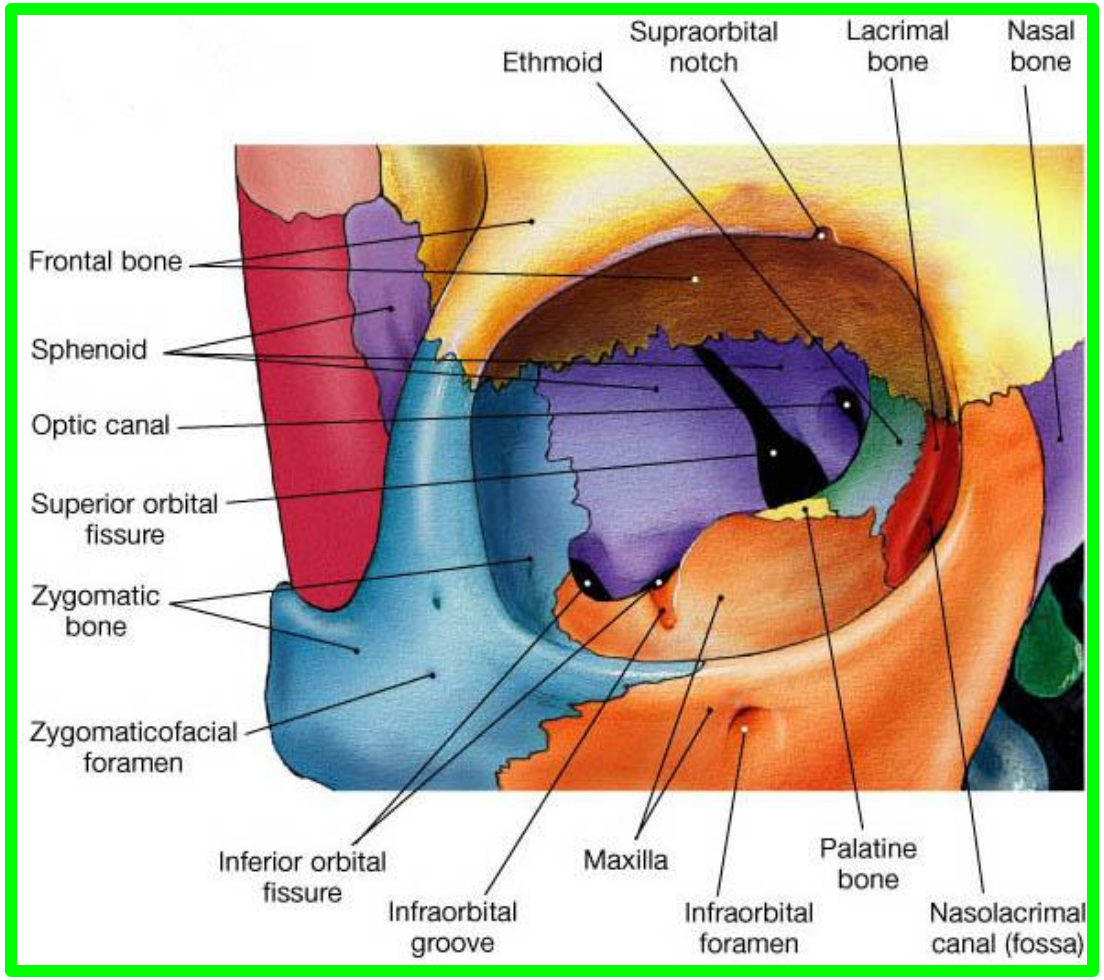
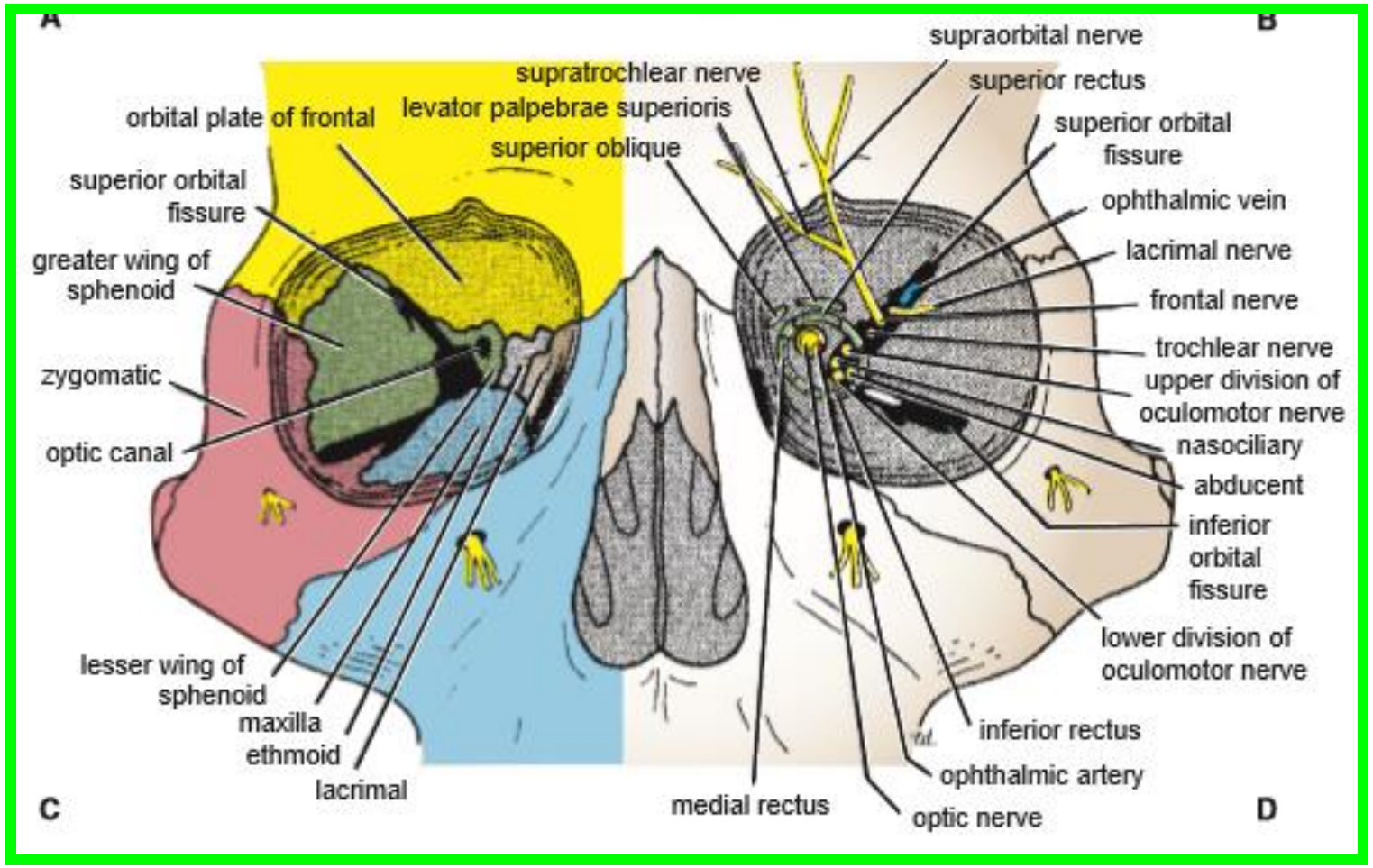
- ***Orbital opening:*** *About one sixth of the eye is exposed; the remainder is protected by the walls of the orbit.*
- ***Supraorbital notch (Foramen):*** *It transmits the supraorbital nerve and blood vessels*
- ***Infraorbital groove and canal:*** *in the orbital plate of the maxilla, they transmit the infraorbital nerve and blood vessels.*
- ***Nasolacrimal canal:*** *Located anteriorly on the medial wall; it communicates with the inferior meatus of the nose It transmits the nasolacrimal duct.*



Openings into the Orbital Cavity

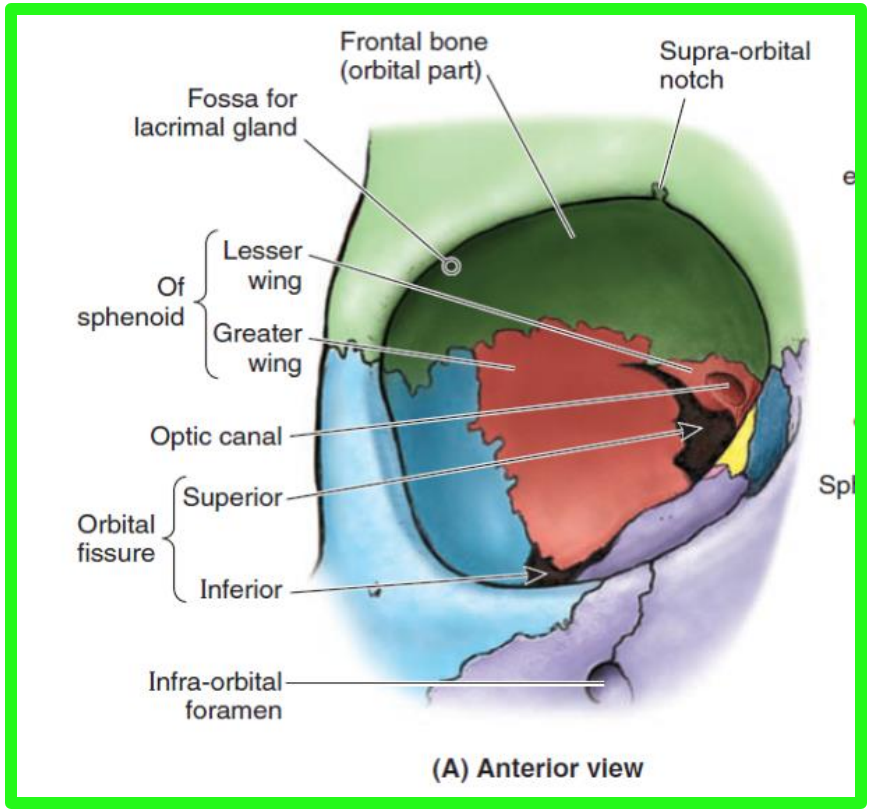
❑*Inferior orbital fissure:* it communicates with the pterygopalatine fossa. It transmits the maxillary nerve and its zygomatic branch, the inferior ophthalmic vein, and sympathetic nerves.

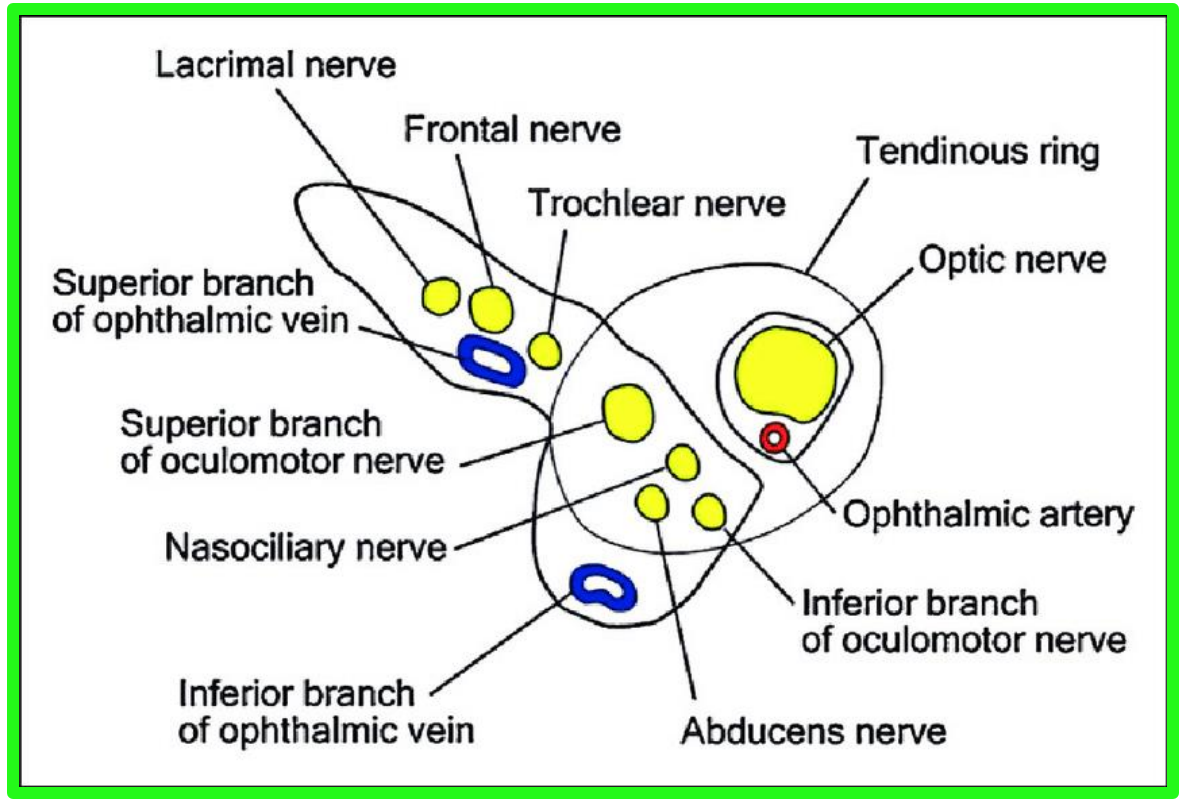
❑*Optic canal:* it communicates with the middle cranial fossa. It transmits the optic nerve and the ophthalmic artery.



Openings into the Orbital Cavity

❑ ***Superior orbital fissure:*** *it* **communicates with the** ***middle cranial fossa.*** *It transmits* ***the lacrimal nerve*****, the** ***frontal nerve*****, the** ***trochlear nerve*****, the** ***oculomotor nerve*** **the** ***abducent nerve*****, the** ***nasociliary nerve*****, and** ***the superior ophthalmic vein*****.**

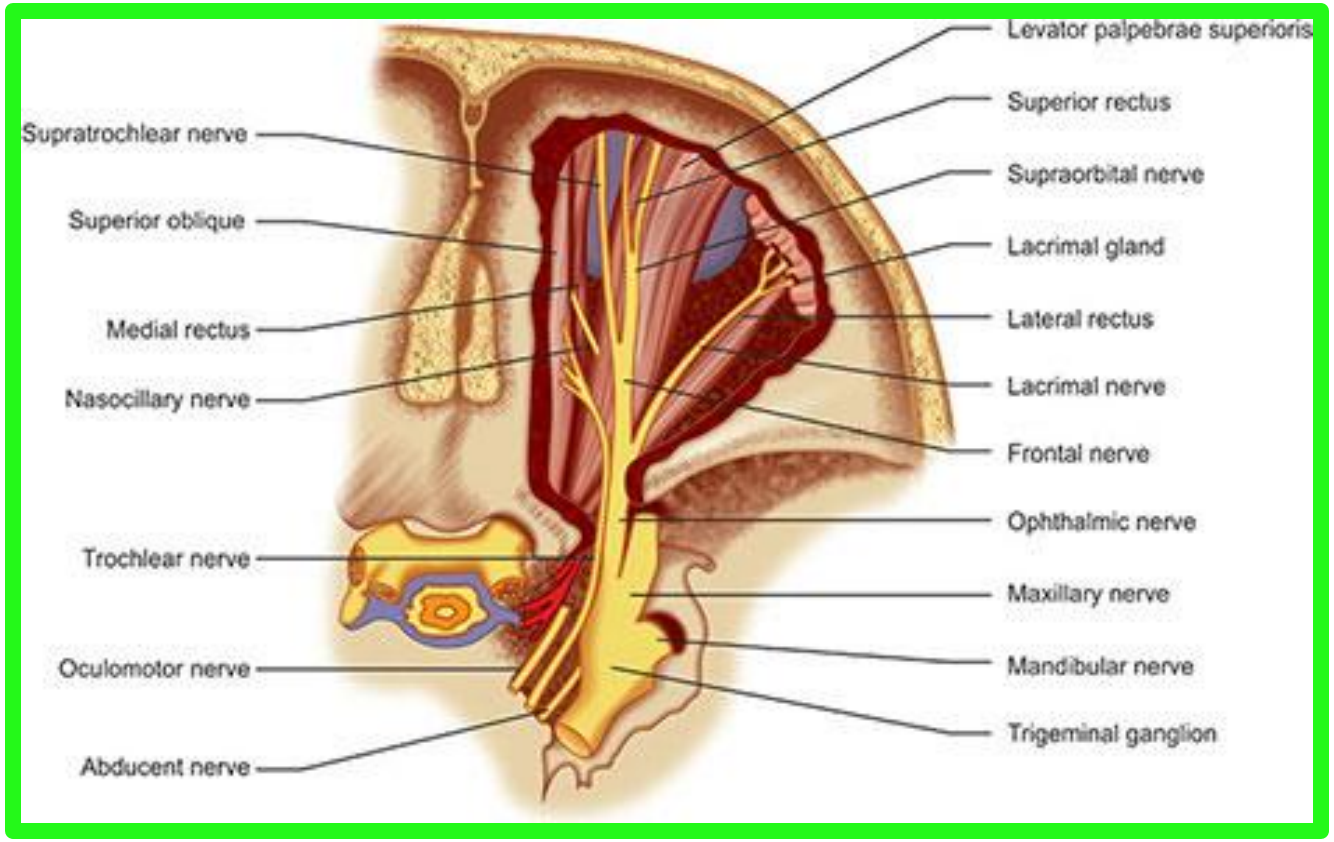




Nerves of the Orbit

❖*Optic Nerve :* ***enters the orbit from the middle cranial fossa by passing through the optic canal . It is accompanied by the ophthalmic artery***

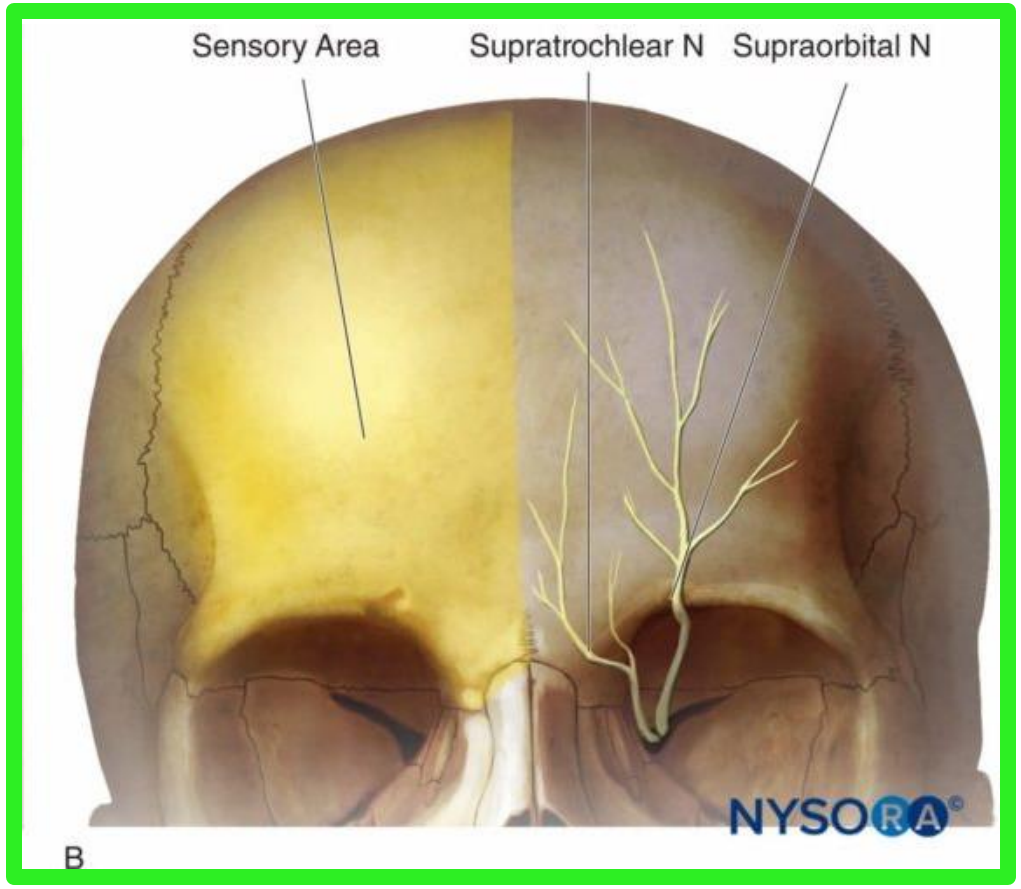
❖*Lacrimal Nerve:* ***arises from the ophthalmic division of CN V. It enters the orbit through the upper part of the superior orbital fissure***

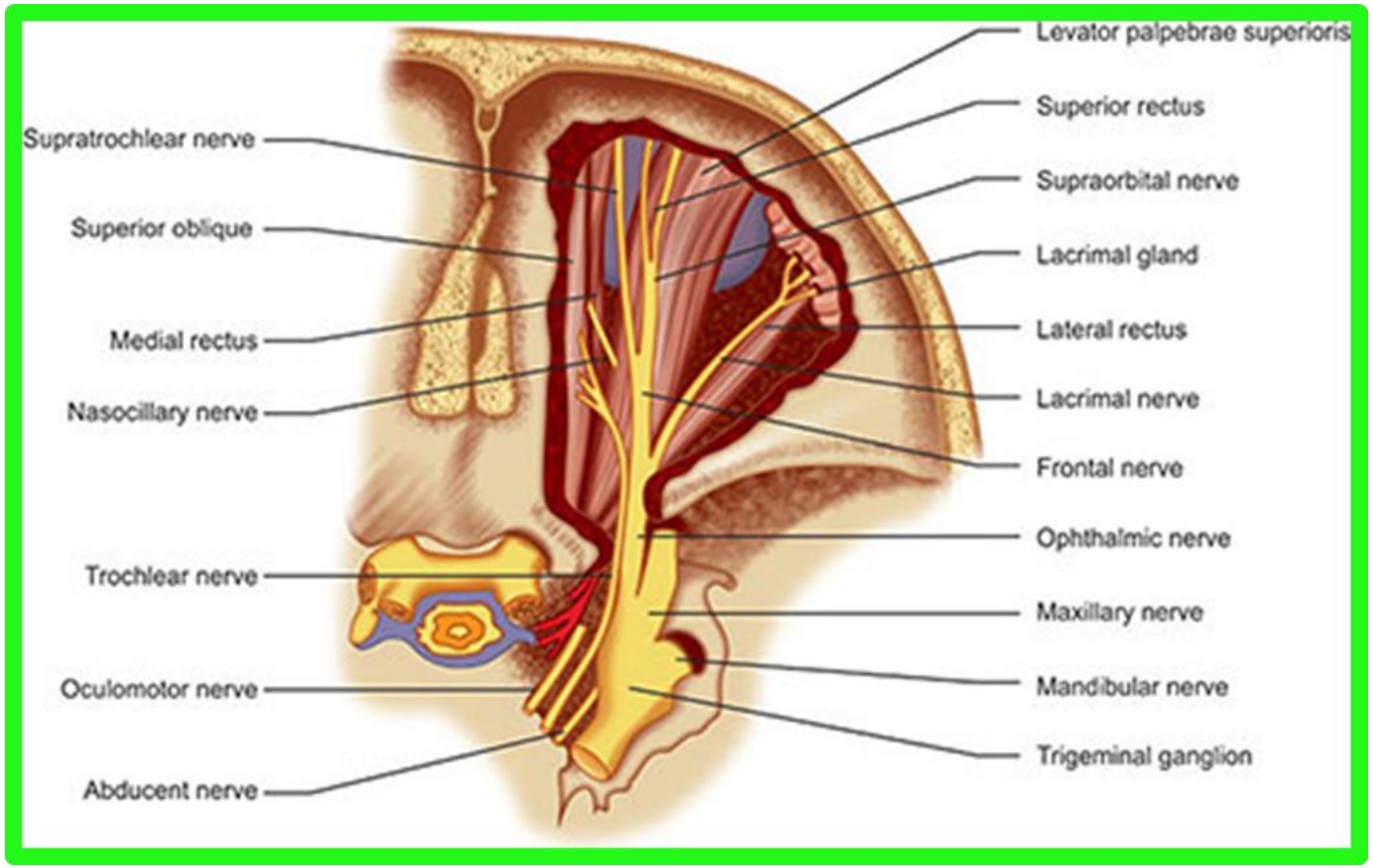


Nerves of the Orbit

❖ *Frontal Nerve : from the ophthalmic division of CN V .*

It enters the orbit through the upper part of the superior orbital fissure. It divides into the supratrochlear and supraorbital nerves





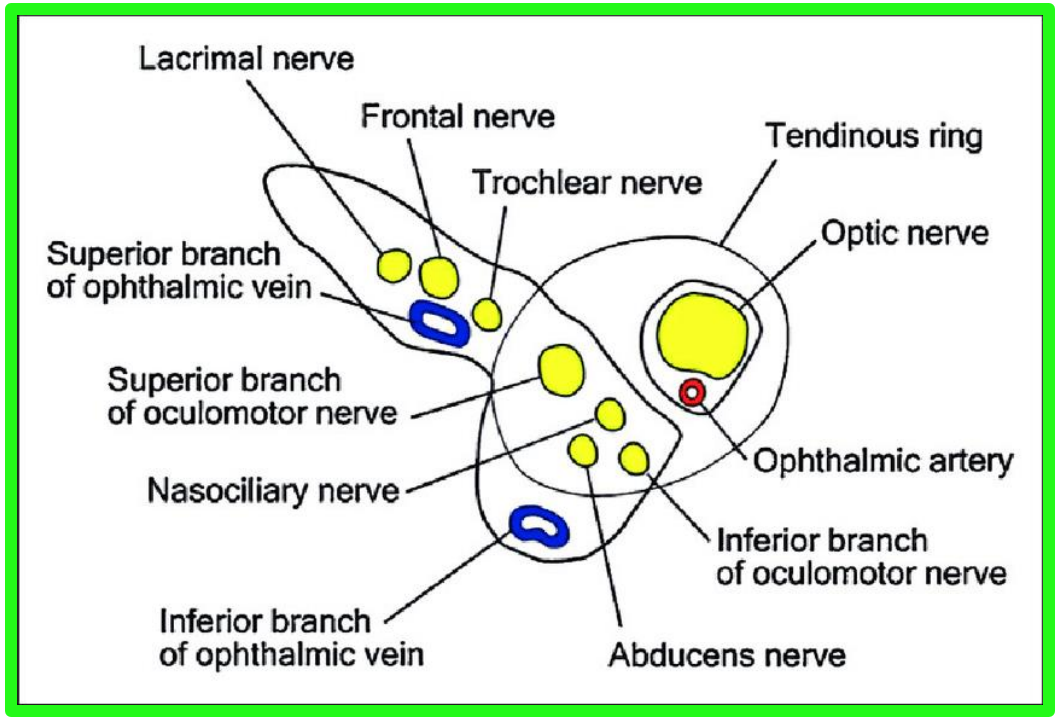
Nerves of the Orbit

❖ *Trochlear Nerve* enters the orbit through *the upper part* of the superior orbital fissure. It runs forward and supplies *the superior oblique muscle*

❖ *Oculomotor Nerve* enters the orbit through *the lower part* of the superior orbital fissure

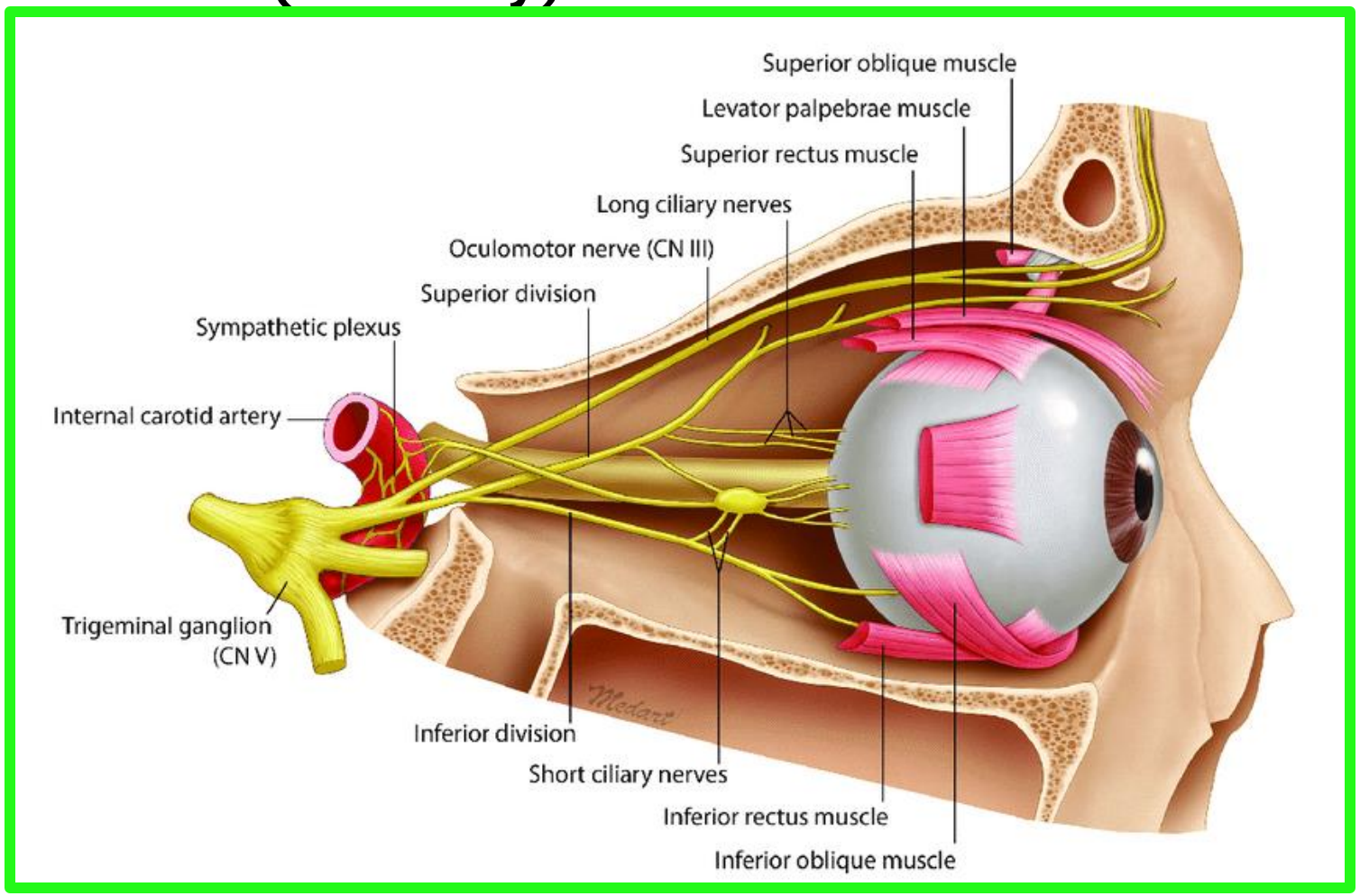
❖ *Nasociliary Nerve* arises from the *ophthalmic division CN V.* It enters the orbit through *the lower part* of the superior orbital fissure

❖ *Abducent Nerve* enters the orbit through *the lower part* of the superior orbital fissure. It supplies *the lateral rectus muscle*



Ciliary Ganglion

- **Type:** it is a small **parasympathetic ganglion** (size of the pin's head).
- **Site:** in the posterior part of the orbit (near the apex).
- **Relations :** it lies between optic nerve (medially) and lateral rectus (laterally)



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Ciliary Ganglion

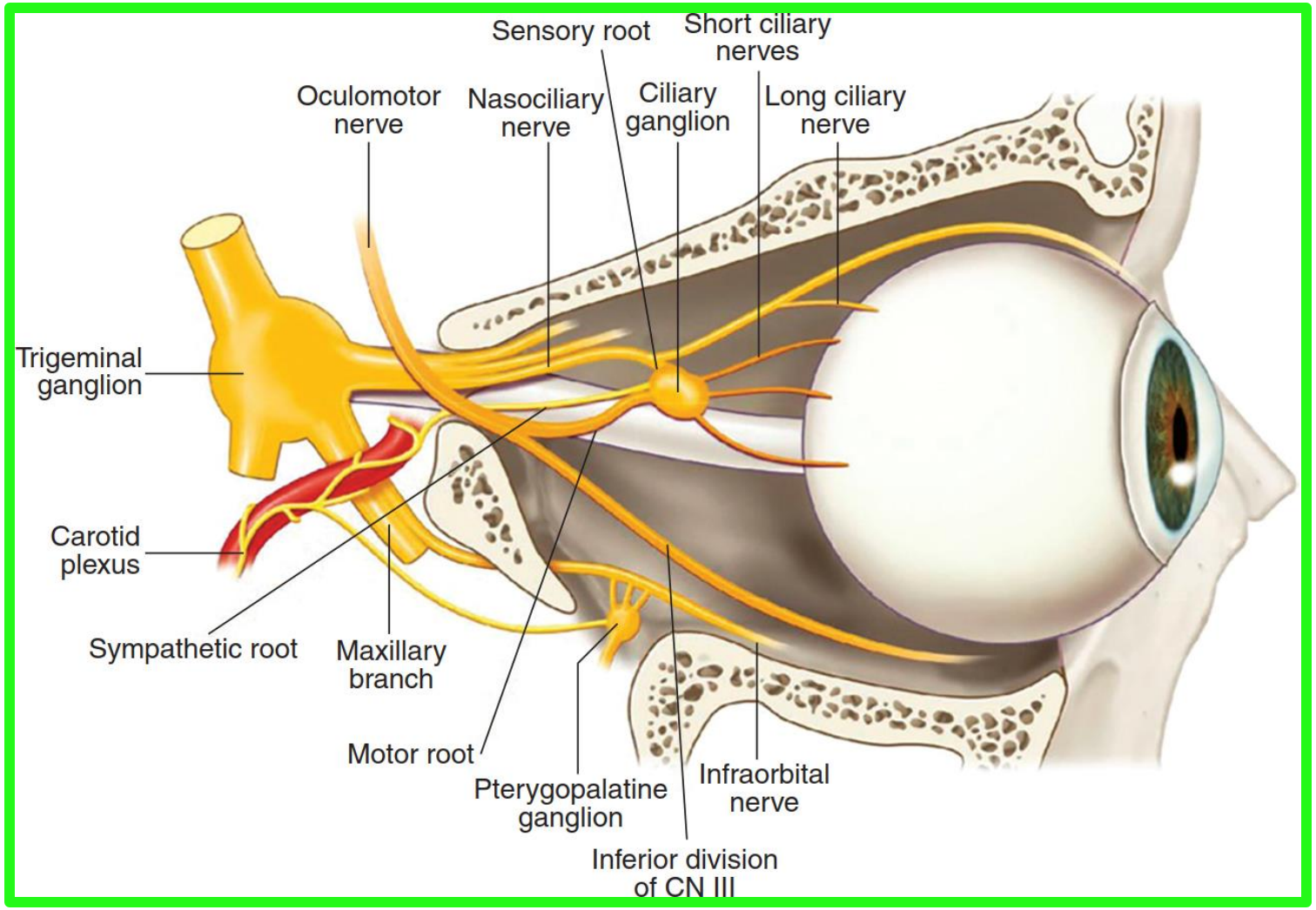
- **Roots:**

1- Sensory root: From nasociliary nerve.

2- Sympathetic root: from the sympathetic plexus around the ophthalmic Art.

3- Parasympathetic root:

Preganglionic fibers arise from the Edinger Westphal nucleus → Oculomotor nerve → nerve to inferior oblique muscle → relay in the ganglion.



Ciliary Ganglion

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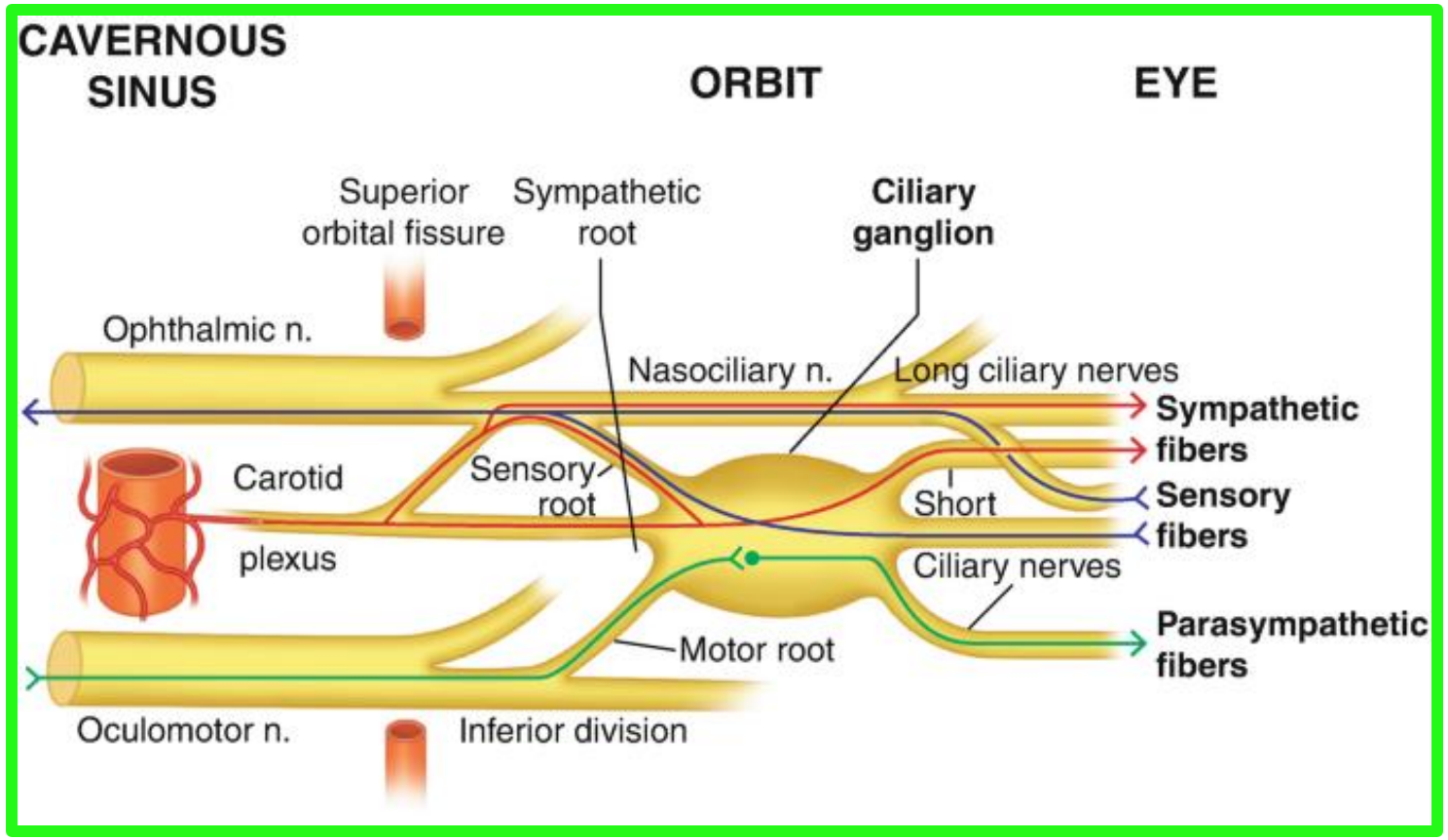
- **Branches:** 8-10 short ciliary nerves supply:

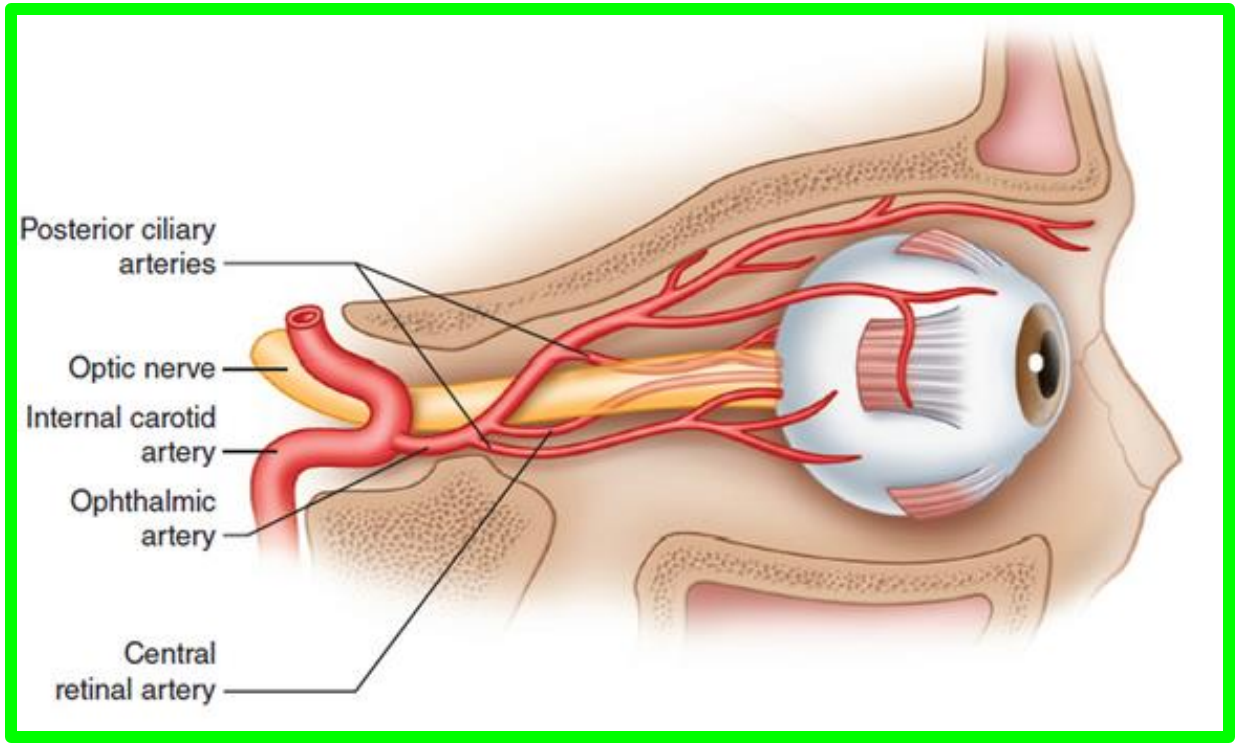
(1) Parasympathetic fibers to the sphincter pupillae and ciliary muscles.
(2) Sympathetic Fibers to the dilator pupillae muscle and blood vessels
(3) Sensory to the cornea , iris and choroid.



Blood Vessels of the Orbit

Ophthalmic Artery

- is a branch of the internal carotid artery after that vessel emerges from the cavernous sinus.
- It enters the orbit through the optic canal with the optic nerve.
- It runs forward and crosses the optic nerve to reach the medial wall of the orbit.
- It gives off numerous branches, which accompany the nerves in the orbital cavity.

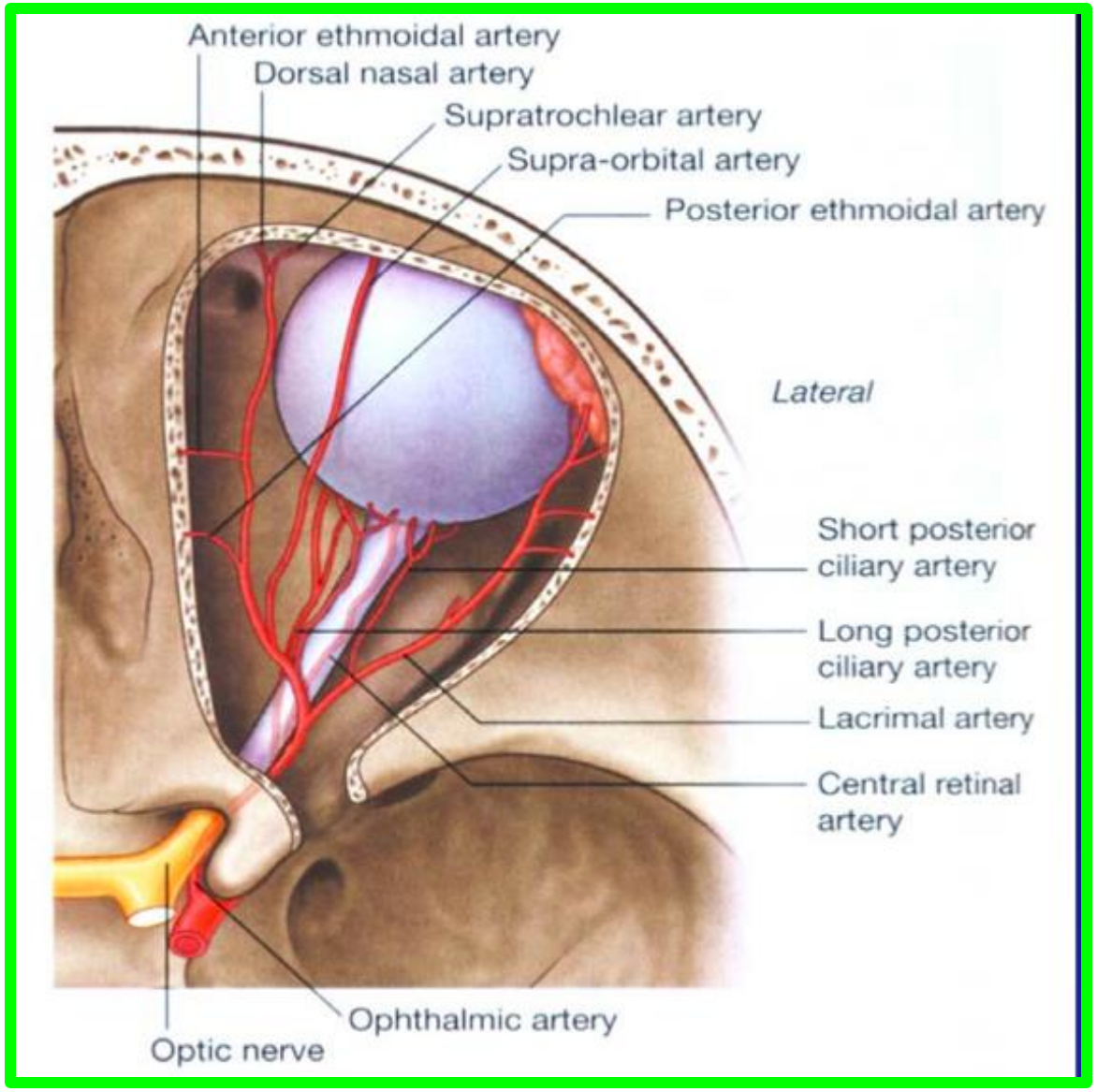


Branches of the Ophthalmic Artery

■■ **The central artery of the retina** is a small branch that pierces the meningeal sheaths of **the optic nerve** to gain entrance to the nerve and enters the eyeball at the center of **the optic disc.**

■■ **The muscular branches**

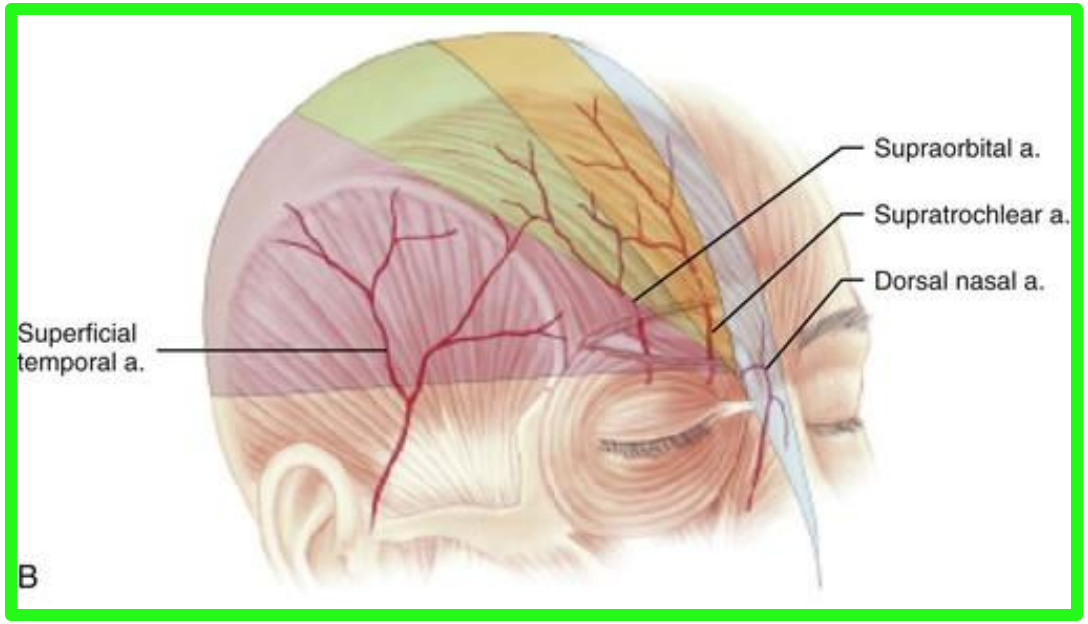
■■ ***The lacrimal artery*** **to the** ***lacrimal gland***

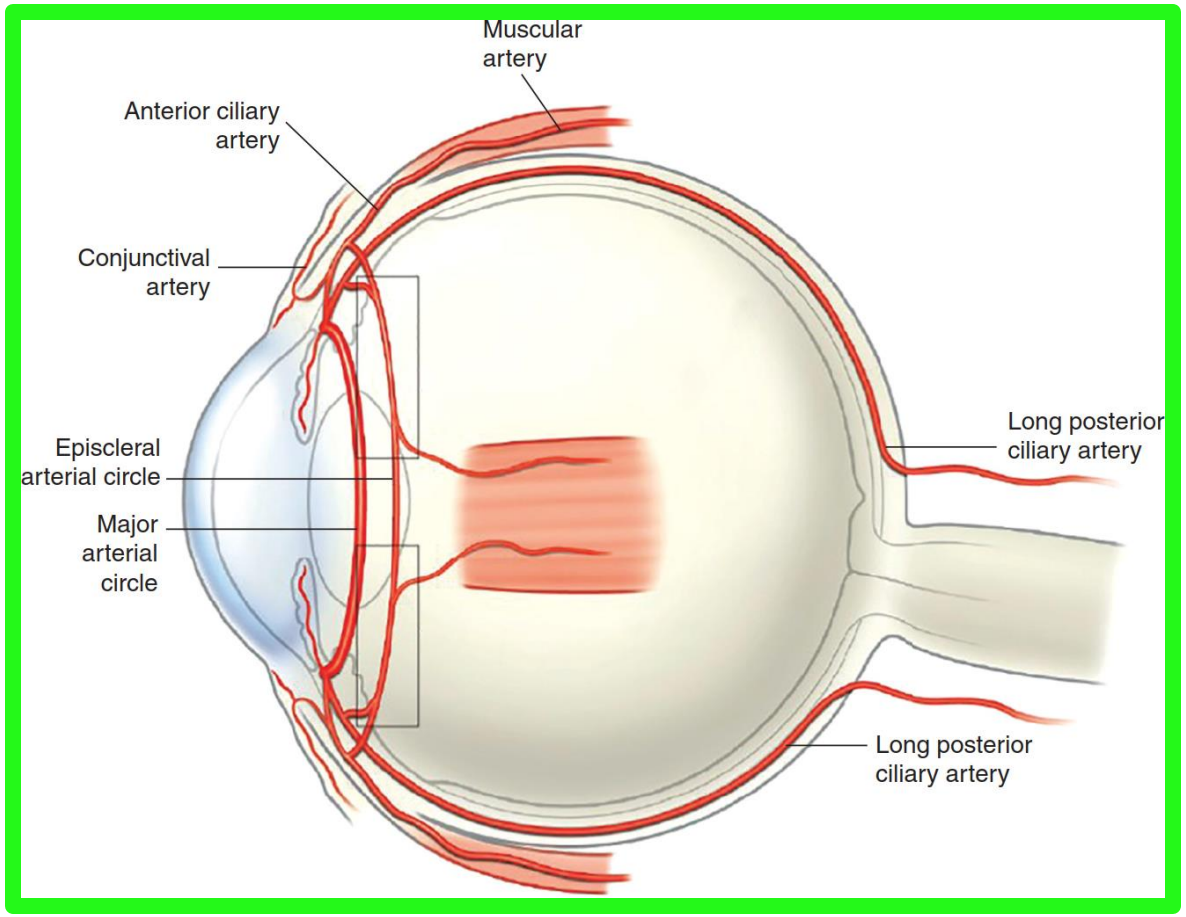


Branches of the Ophthalmic Artery

■■ The ciliary arteries can be divided into anterior and posterior groups. The former group enters the eyeball near the corneoscleral junction; the latter group enters near the optic nerve.

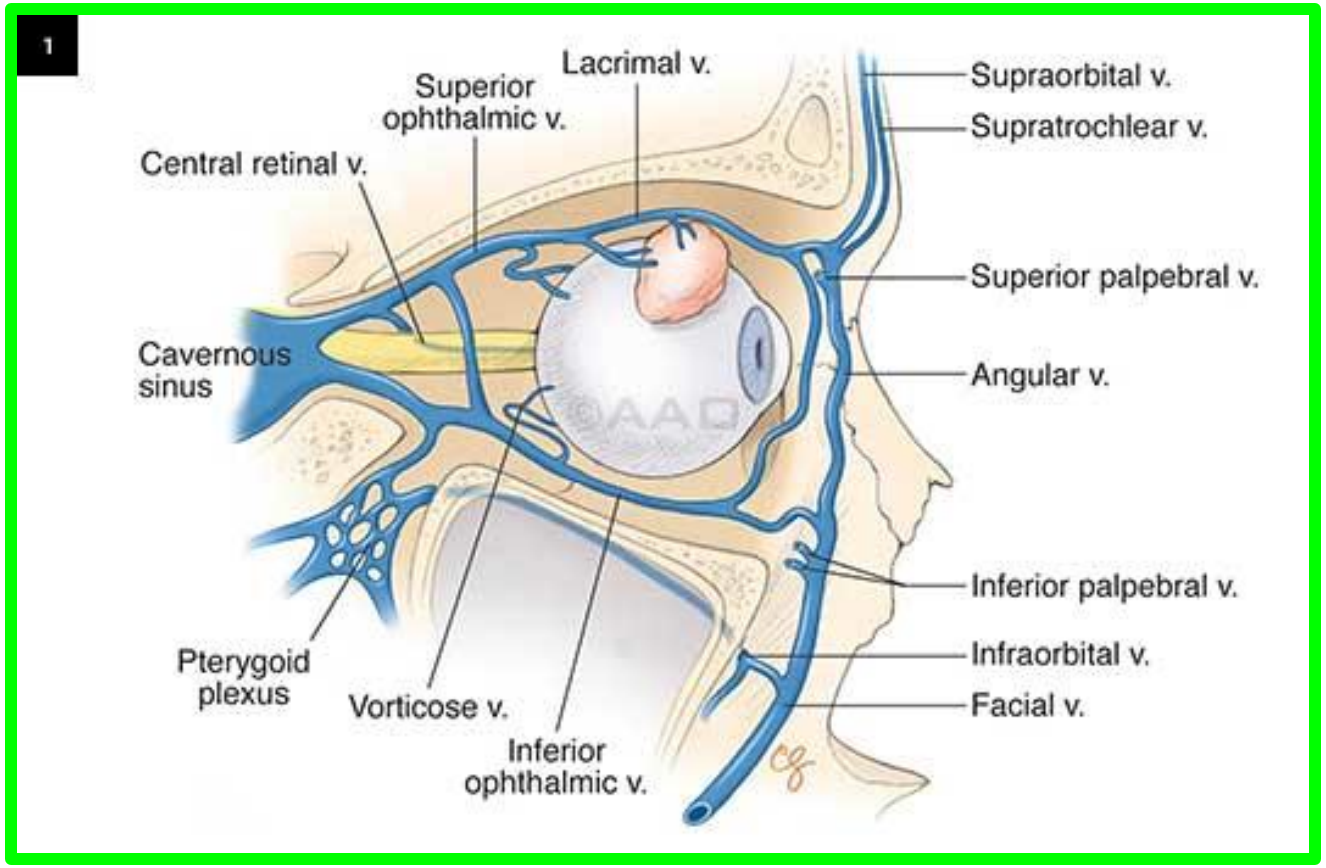
■■ The supratrochlear and supraorbital arteries are distributed to the skin of the forehead





Ophthalmic Veins

- The superior ophthalmic vein communicates in front with the facial vein
- The inferior ophthalmic vein communicates through the inferior orbital fissure with the pterygoid venous plexus.
- Both veins pass backward through the superior orbital fissure and drain into the cavernous sinus



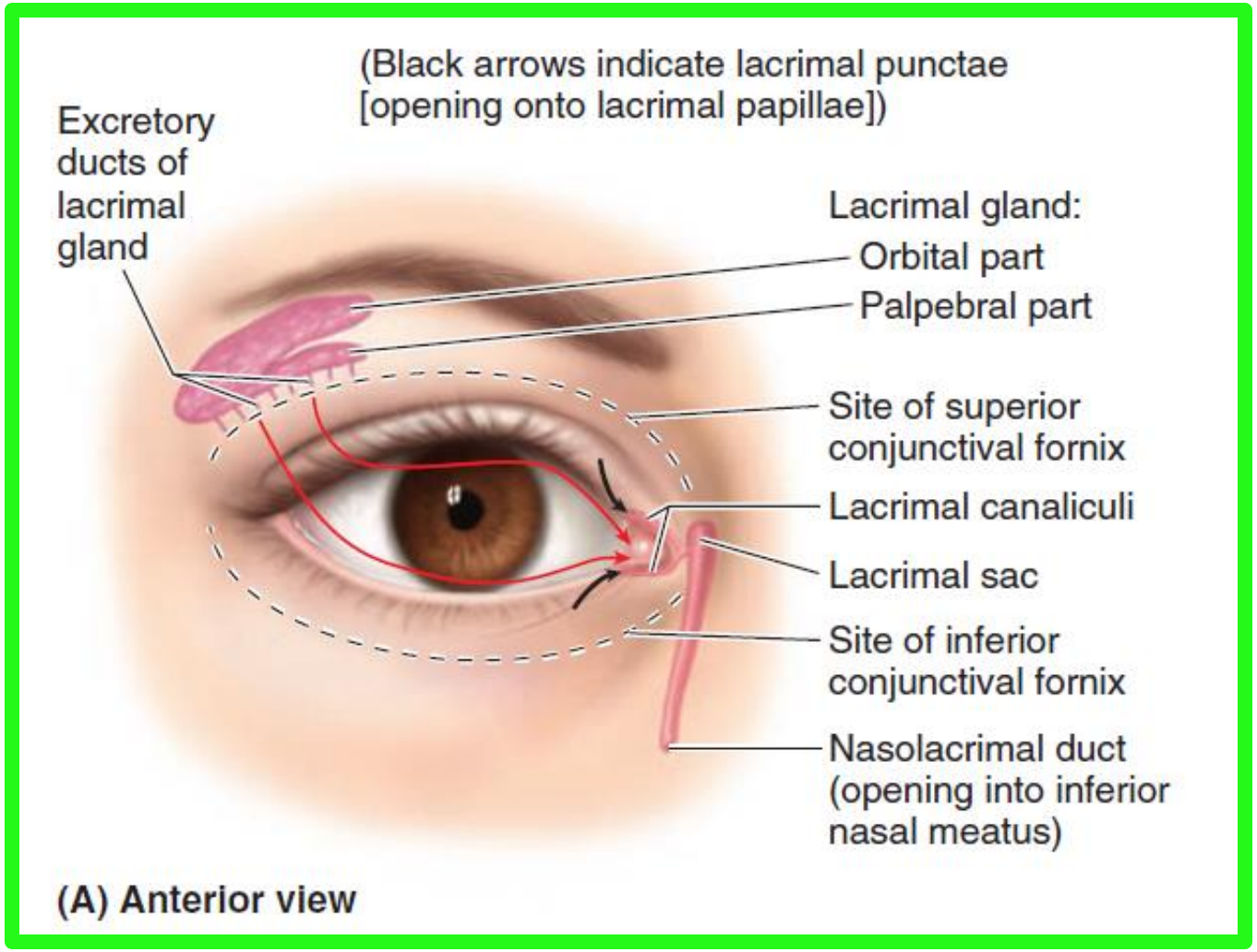
Lacrimal Apparatus

(1) Lacrimal Gland

The gland is consist of

- ❑ Large orbital part
- ❑ Small palpebral part

✓ **It is situated above the eyeball in the anterior and upper part of the orbit posterior to the orbital septum**



✓ **The gland opens into the lateral part of the superior fornix of the conjunctiva by 12 ducts.**

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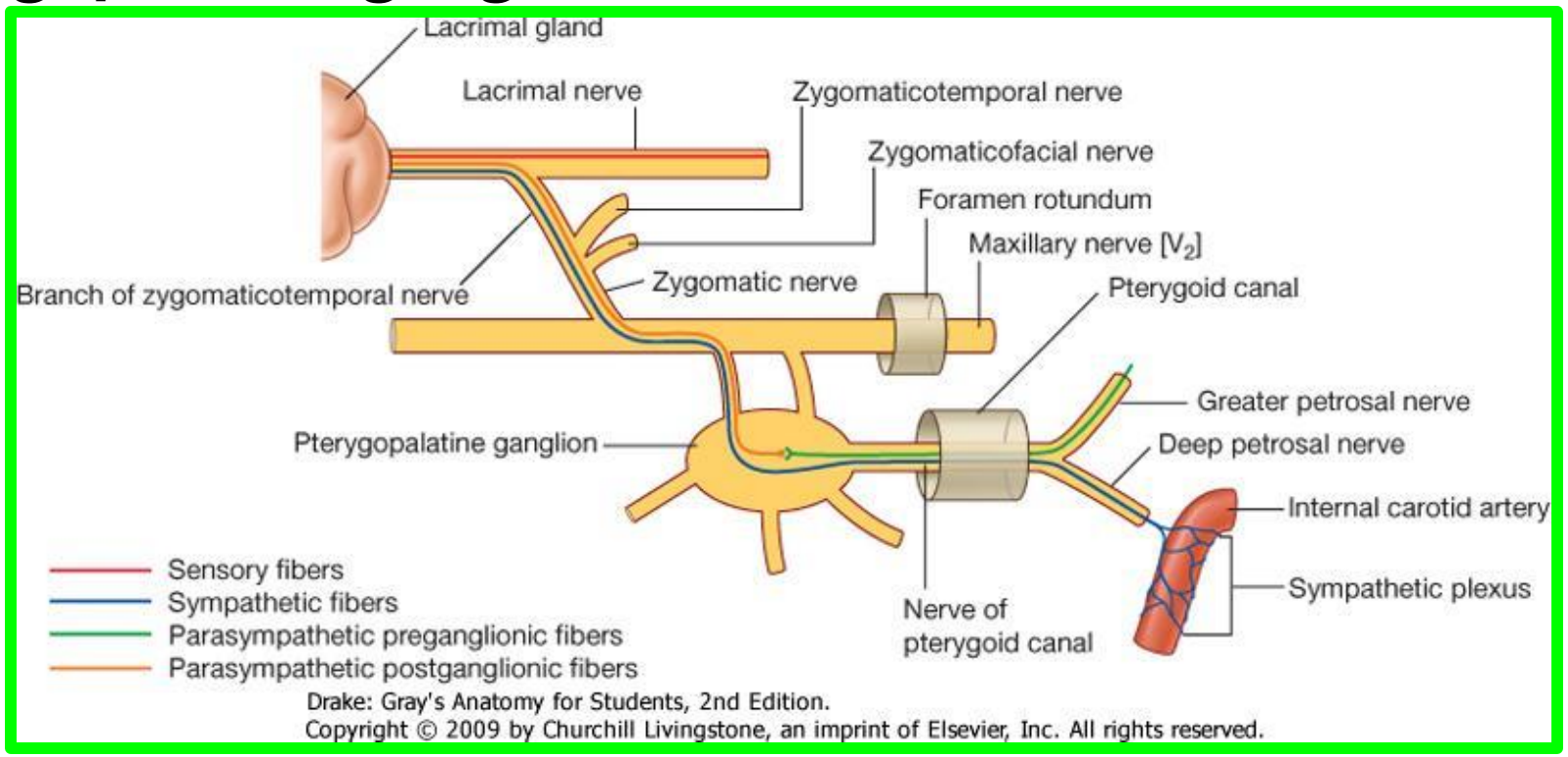
❖ The nerve supply of lacrimal gland is:

- ❑ Sensory: Lacrimal branch of ophthalmic nerve
- ❑ Sympathetic fibers: from the superior cervical sympathetic ganglion

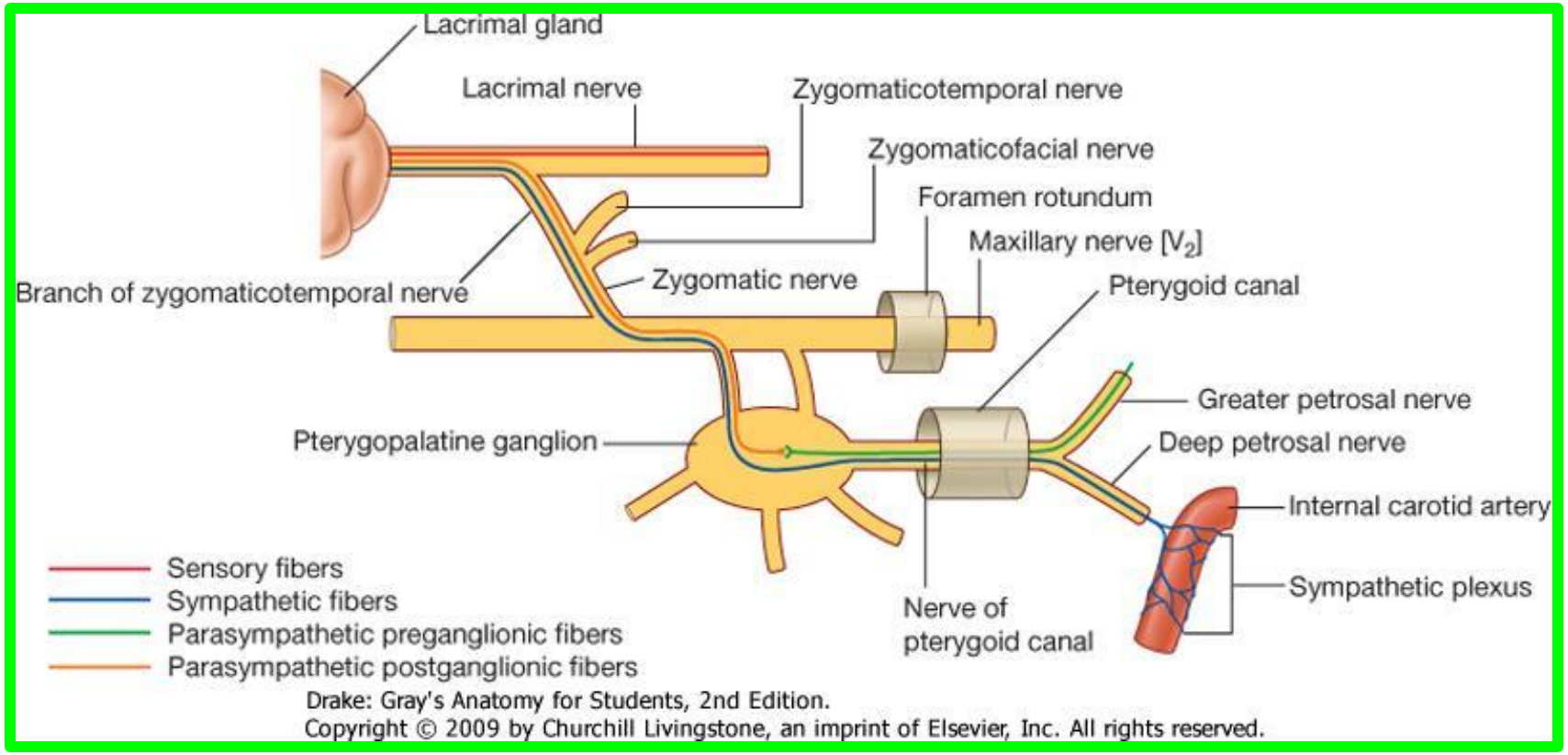
Vasoconstrictive, postsynaptic sympathetic fibers—brought from the superior cervical ganglion by the internal carotid plexus and deep petrosal nerve—join the parasympathetic fibers to form the nerve of the pterygoid canal and traverse the pterygopalatine ganglion.



❑ Parasympathetic.

❖ The presynaptic parasympathetic secretomotor fibers are conveyed from the facial nerve by the greater petrosal nerve and then by the nerve of the pterygoid canal to the pterygopalatine ganglion, where they synapse with the cell body of the postsynaptic fiber.

❖ The postganglionic fibers join the zygomaticotemporal nerve and enter the lacrimal nerve to supply the gland.



Drake: Gray's Anatomy for Students, 2nd Edition.

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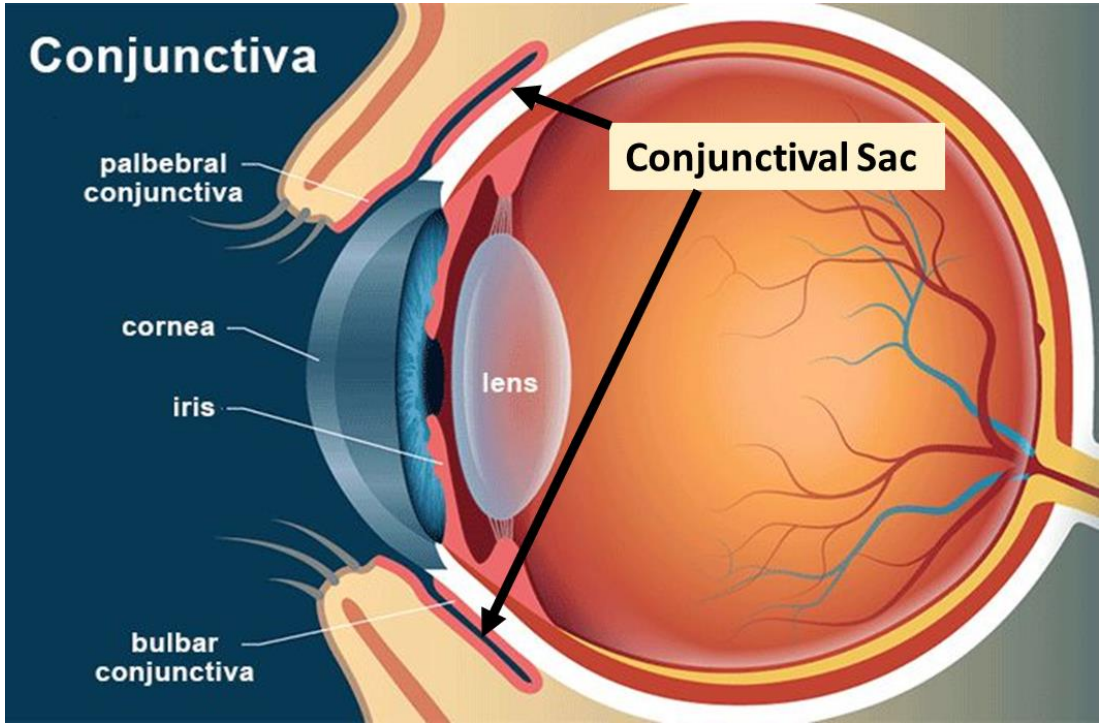
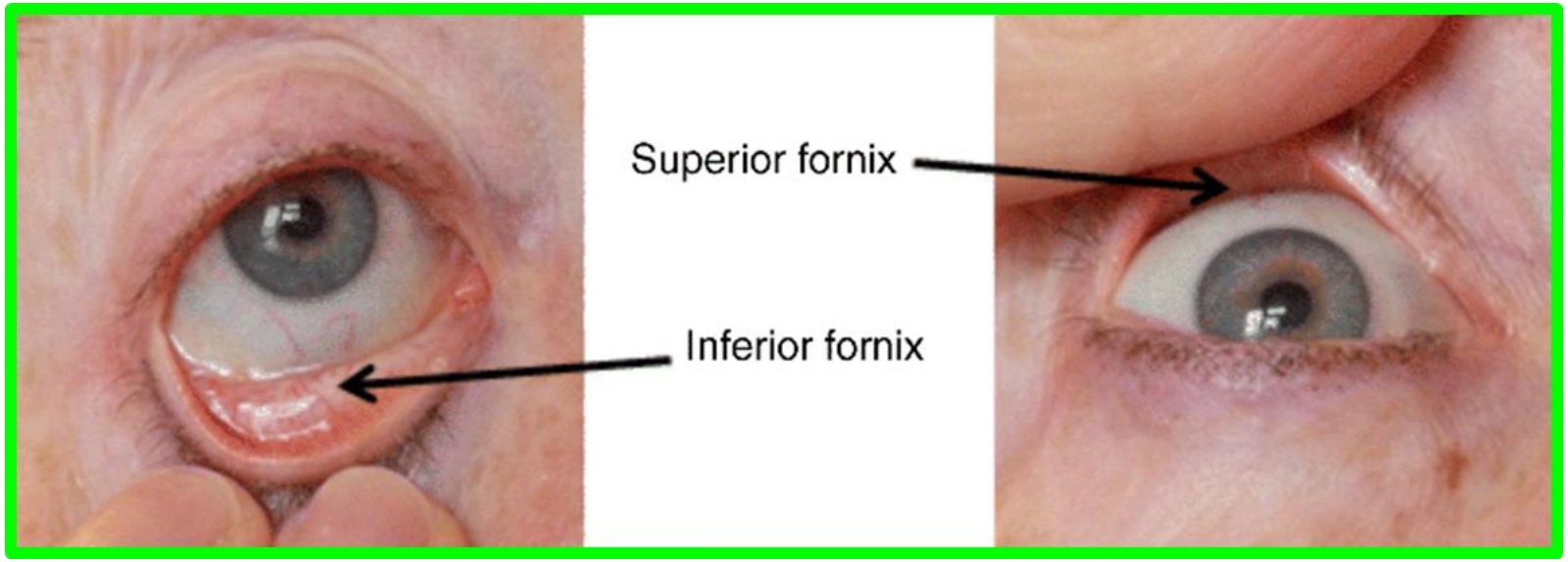
(2) Conjunctival sac:

- The conjunctiva is a membrane which lines the eye lids and is reflected to cover the anterior part of the eye ball (except the cornea)
- The lines of reflection of the conjunctiva from the upper and lower lid on to the eye ball are called superior fornix and inferior fornix.





(2) Conjunctival sac:

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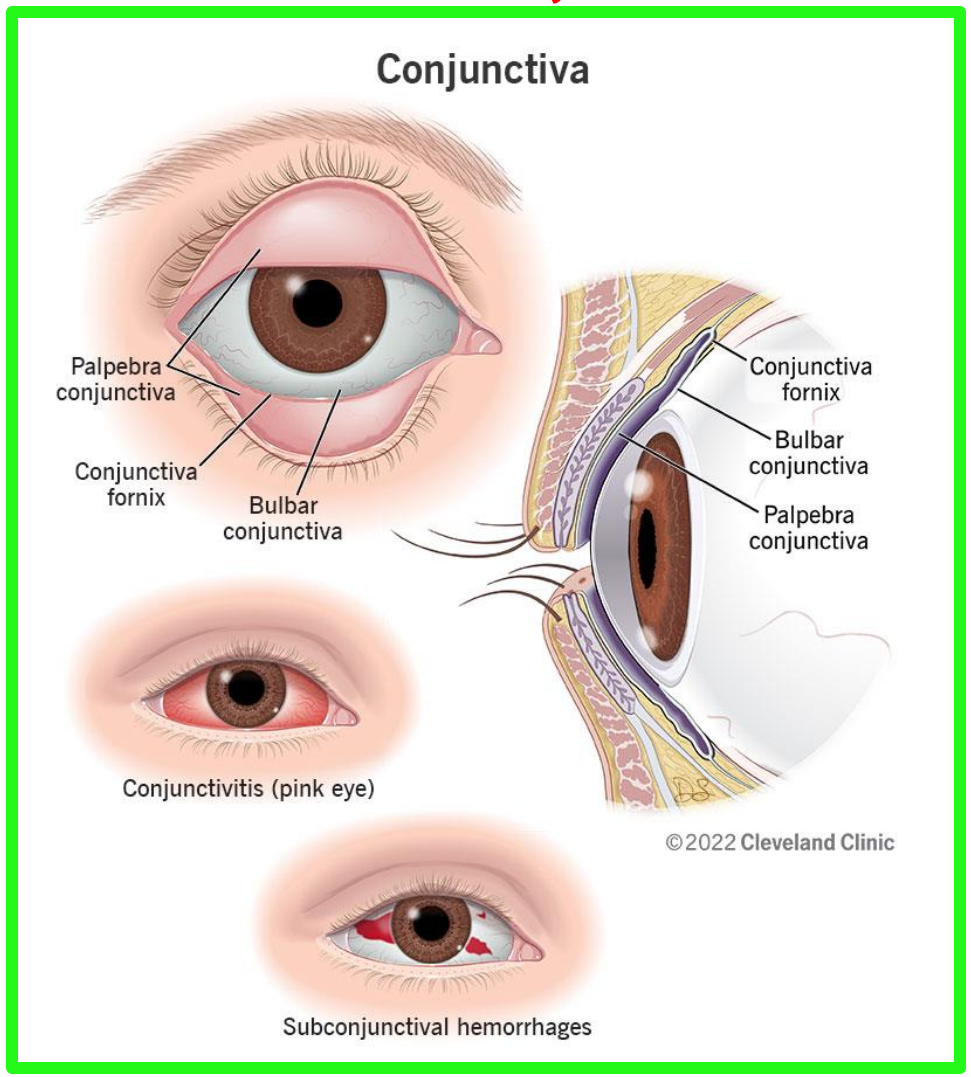
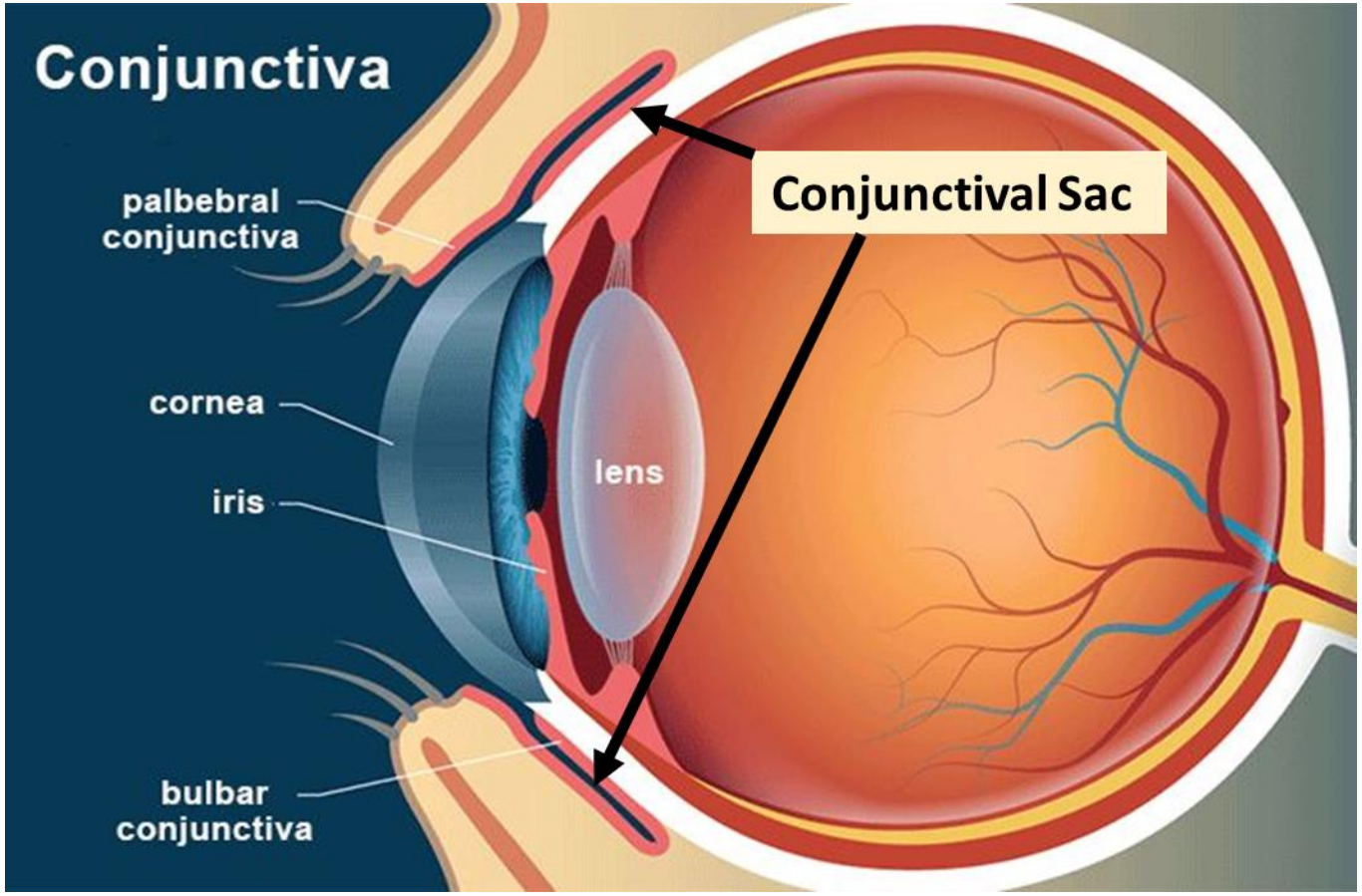
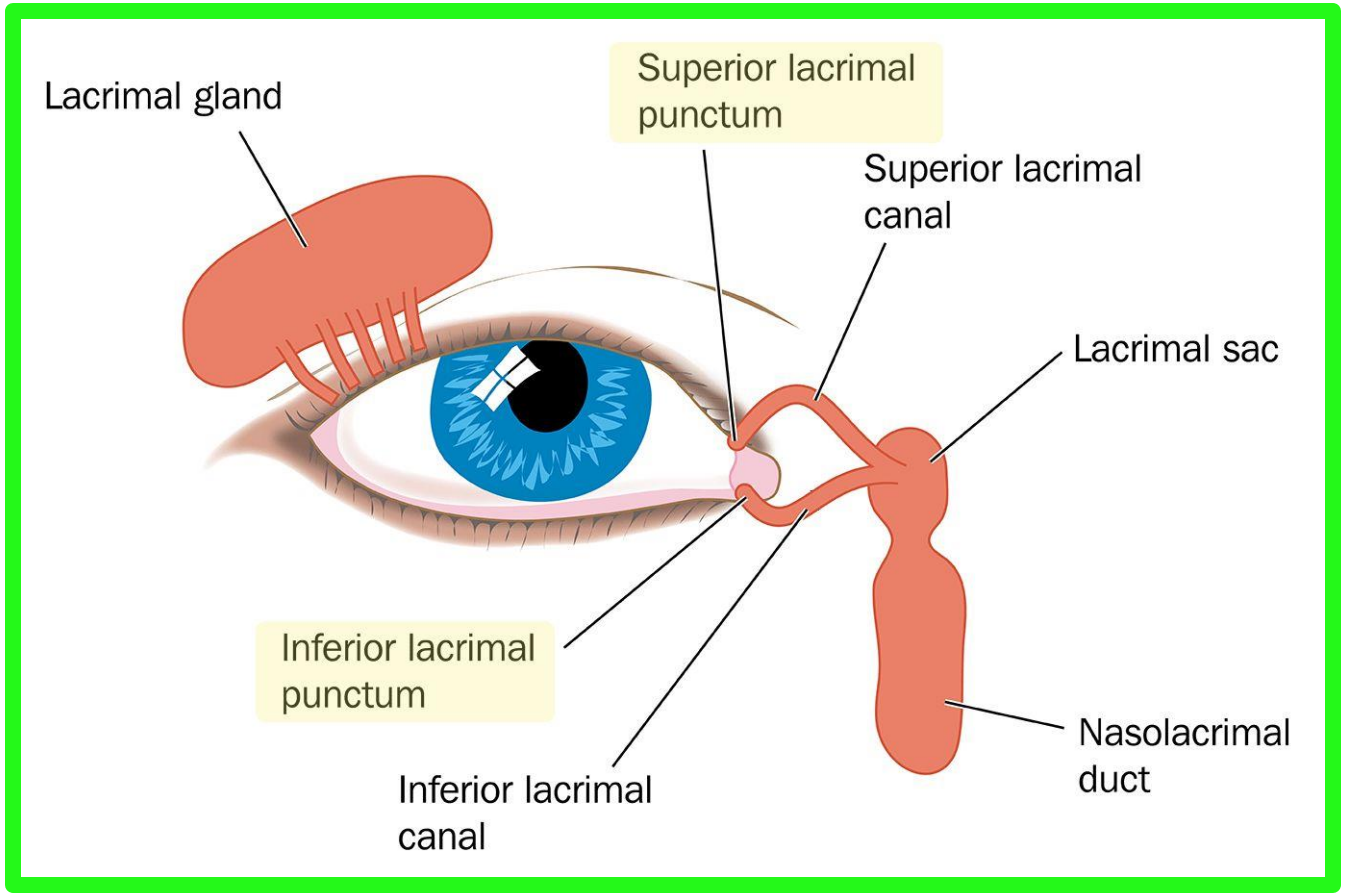
- When the eye lids are closed, the space between them and the eye ball is called the conjunctival sac.

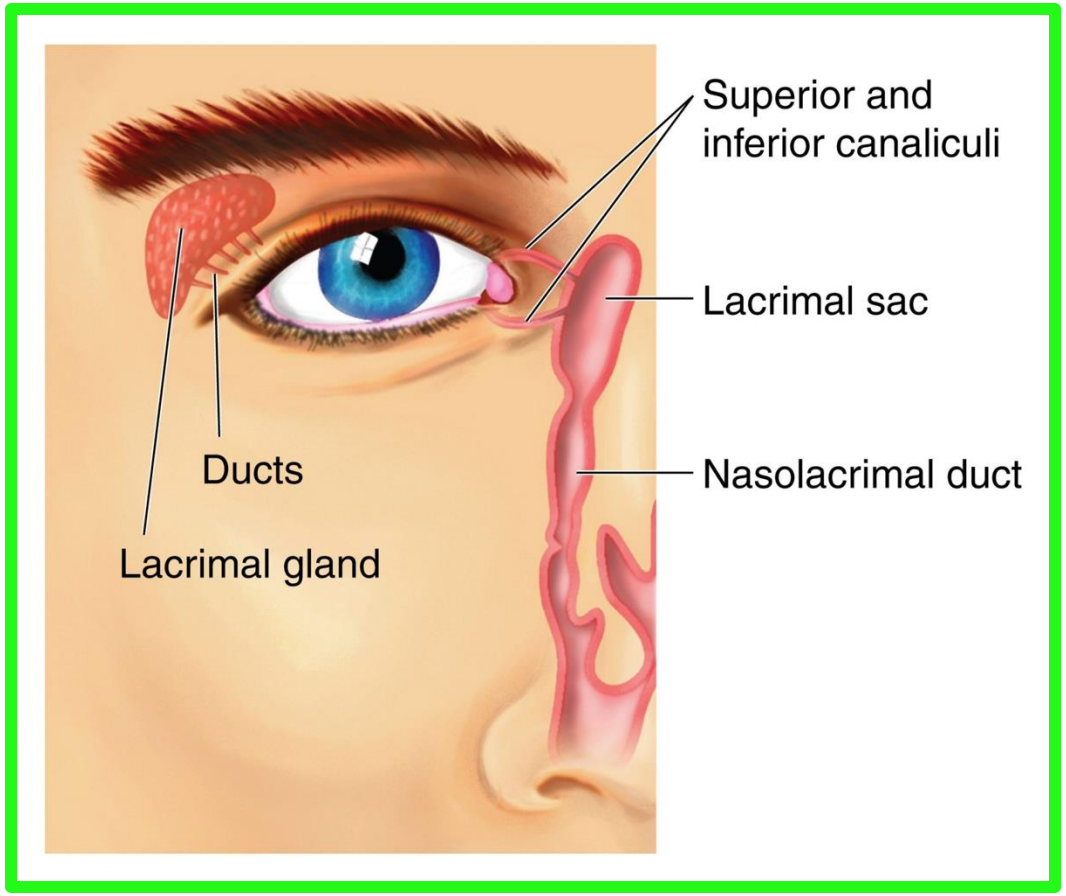




(3) Lacrimal canaliculi

- **The lacrimal puncti are 2 minute openings presents in the medial ends of the margins of the upper and lower eye lids.**
- **These puncti lead to 2 canaliculi opening in the lacrimal sac.**



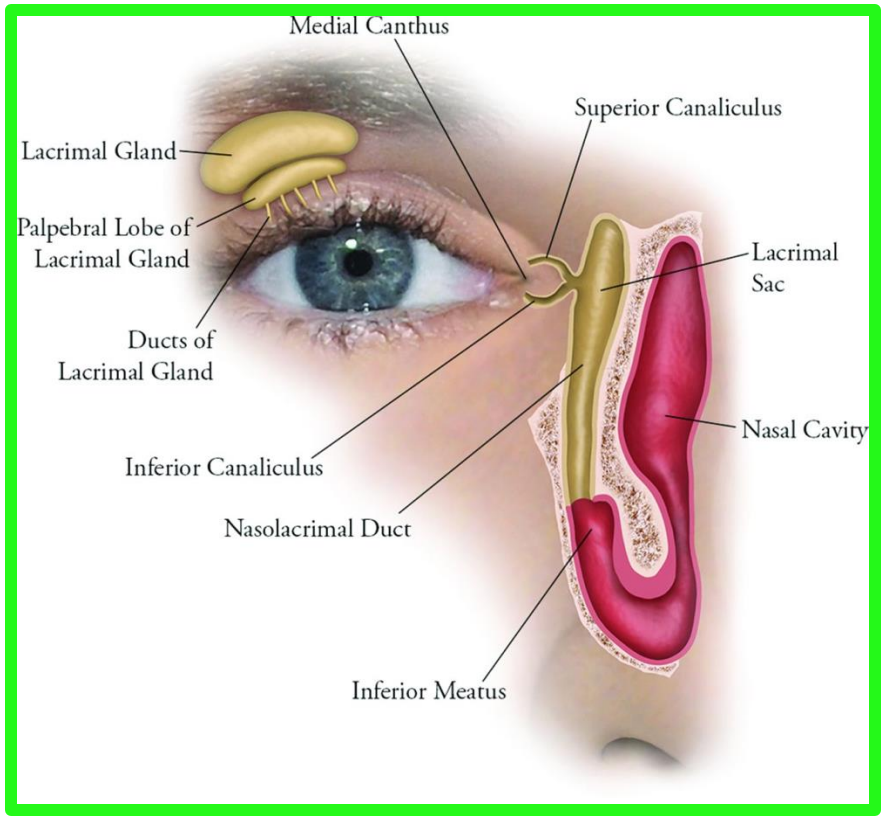


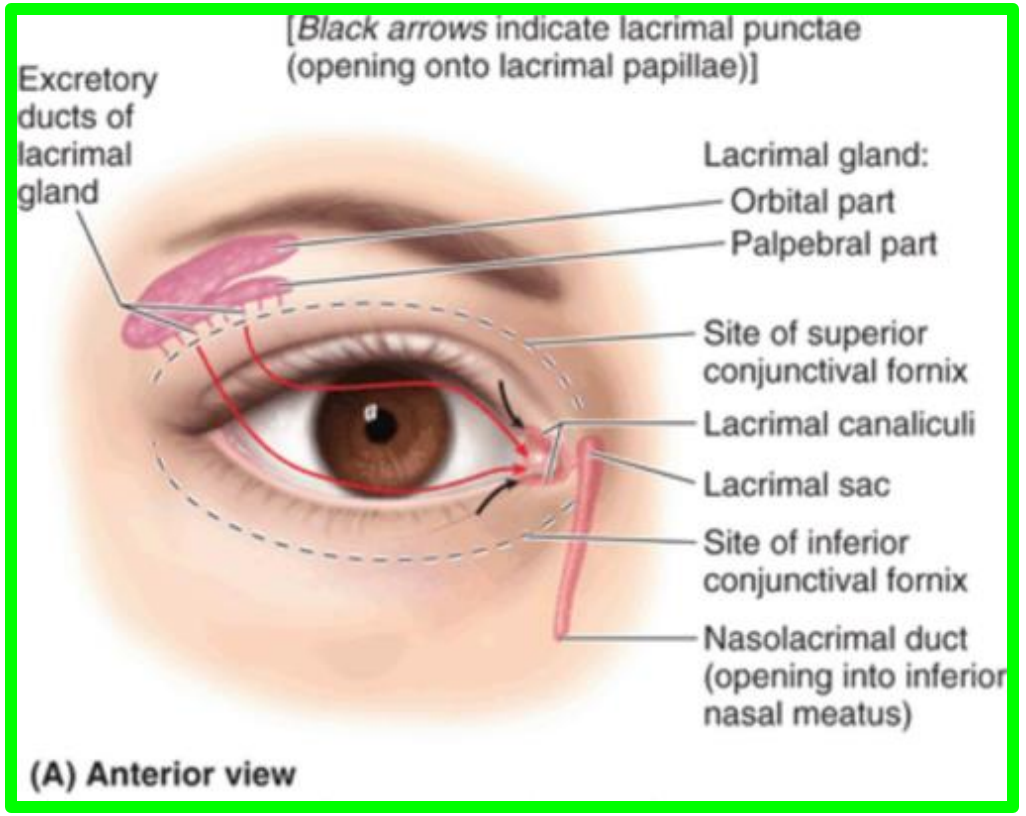
(4)lacrimal sac: lies in the lacrimal groove.

- The lacrimal duct {is about 1.3 cm} arises from the sac and passes through the nasolacrimal canal to open in the inferior meatus of the nose.

❑ Circulation of the tear

The tears → conjunctival sac → lacrimal puncti → lacrimal canaliculi → lacrimal sac → naso-lacrimal canal → inferior meatus of the nose



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