



The orbit.

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objects

- 1-Describe the location of the orbit.
- 2-Make a list of structures making the orbit starting from orbital margin.
- 3-Define each component.
- 4-Describe openings into orbital cavity.
- 5-Define the orbital fascia.
- 6-Describe muscles of the orbit, their cone arrangement, origin, insertion, nerve supply and their function.
- 7-Describe the nerves of the orbit.
- 8-Name the foramen point of entry. Their course and their targets.
- 9-Describe blood supply and lymph drainage of the orbit.
- 10-Make a list of structures making the eyeball starting from the optic disc.

objects

11-Define each part.

12-Make sure to use essential keywords in your definitions.

13-Discuss the structure of coats of the eye.

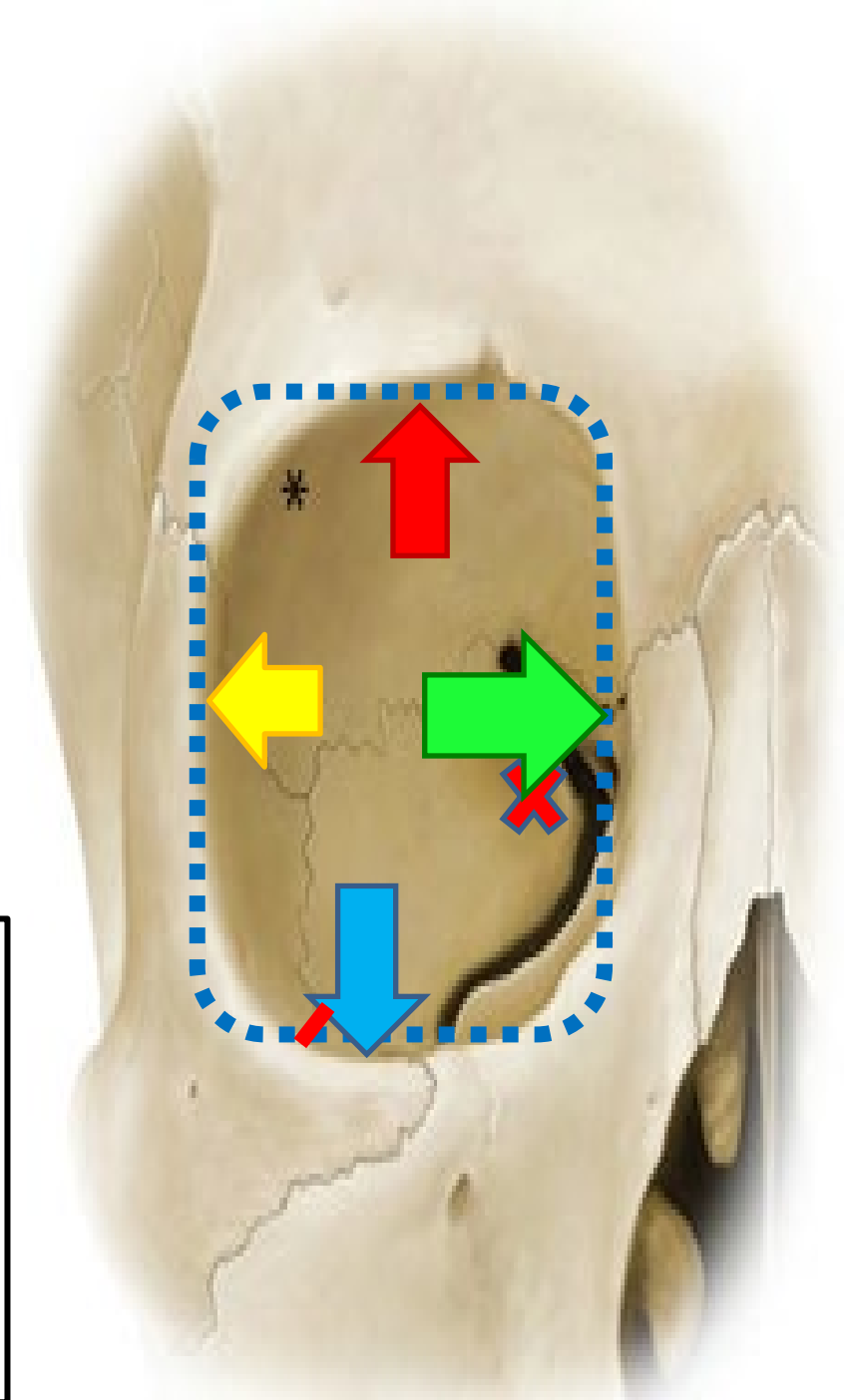
14-Describe the anterior modifications of the eye coats.

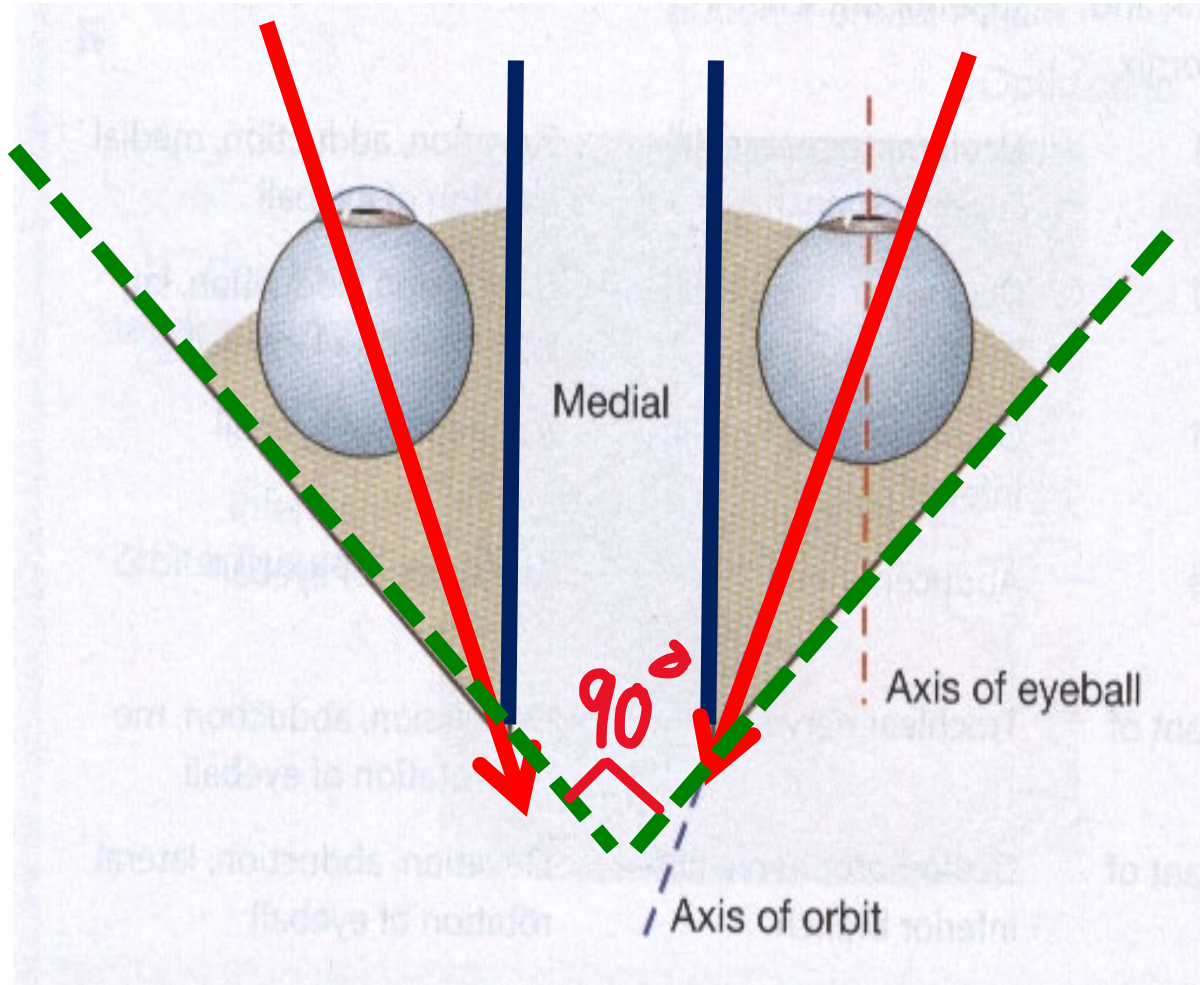
15-Describe the contents of the eye ball.

Bony Orbit

- 4 sided pyramid
- Apex → backwards
- Base → orbital opening on the face
- 4 walls → roof/ floor/ medial / lateral walls

- ❑ Long axis of each orbit is directed backwards & medially
- ❑ Medial walls of the 2 orbits are parallel to each other
- ❑ Lateral walls are set at right angles to each other





1) Orbital opening →
base of the pyramid
→ opens on the face

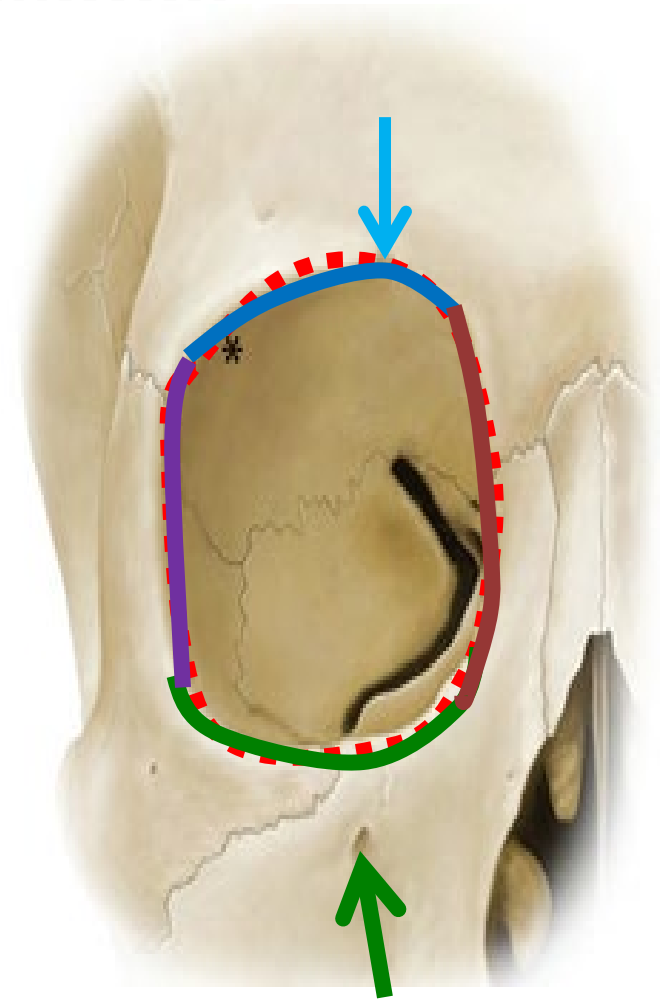
→ Has 4 margins:

a) Supraorbital margin
shows the
supraorbital notch →
transmits supraorbital
nerve & vessels

a) Infraorbital margin →
below it shows
infraorbital
foramen → transmits
infraorbital nerve &
vessels

a) Lateral orbital margin
b) Medial orbital margin

Orbital opening



Roof of orbit has:

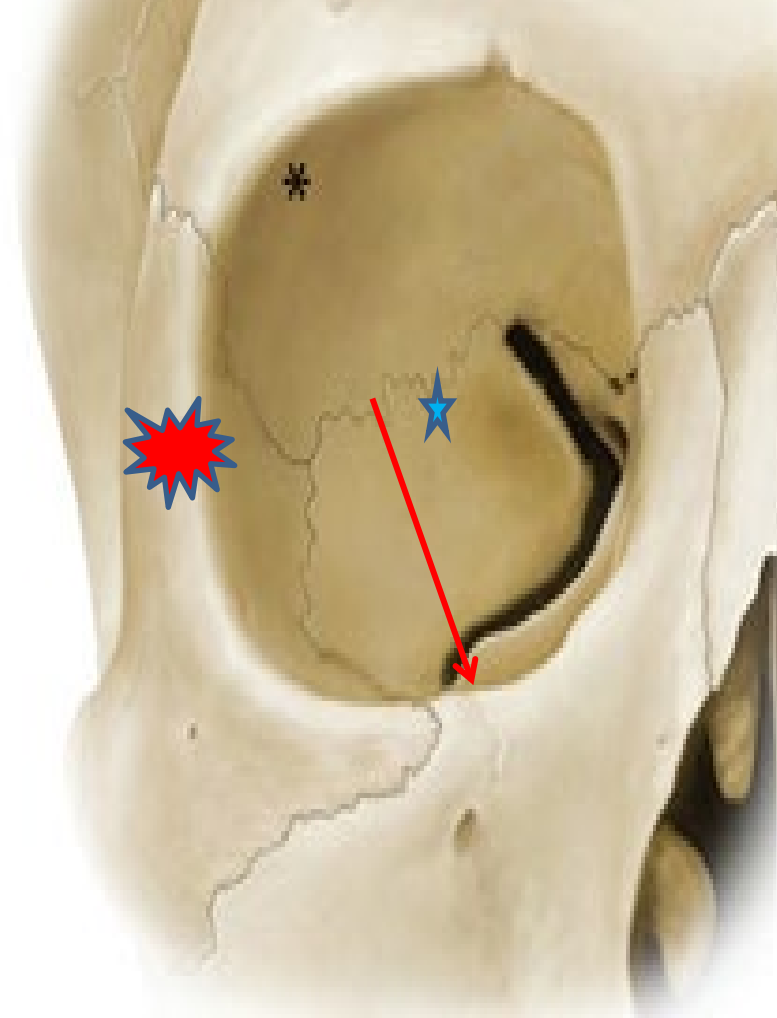
1) Lacrimal fossa

(anterolaterally) →
lacrimal gland

2) **Optic canal** (posteriorly
at junction of roof with
medial wall) → optic
nerve & ophthalmic
artery

3) Trochlear fossa

(anteromedially) →
trochlea for tendon of
superior oblique muscle

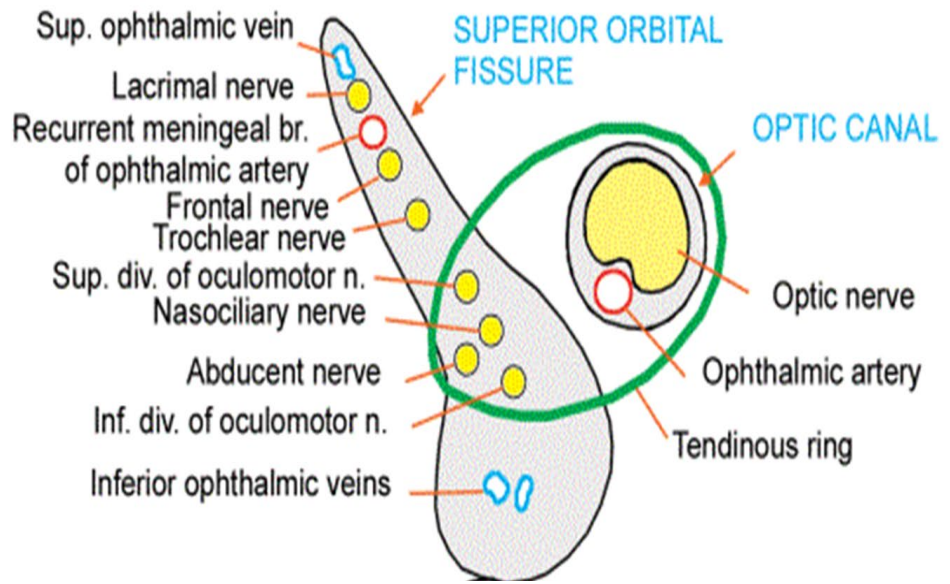
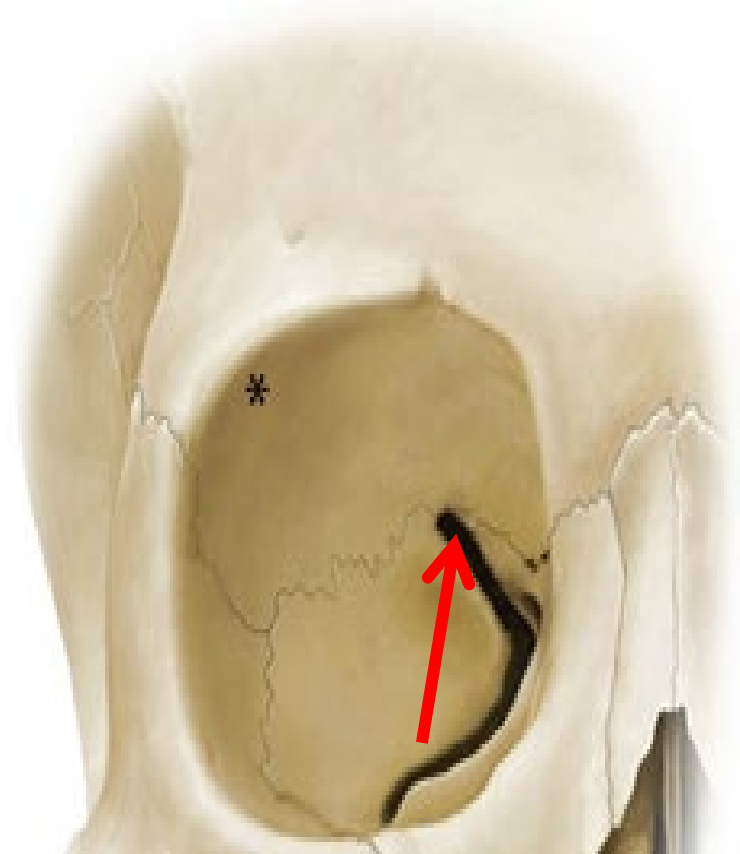


Lateral wall:

- At junction of roof & lateral wall posteriorly
→ **Superior orbital fissure SOF**
- Structures passing through SOF are arranged as follows from lateral to medial:

Live Free To See No Insult At all

**Lacrimal/ Frontal/
Trochlear/ Superior
division of oculomotor/
Nasociliary/ Inferior
division of oculomotor/
Abducent**

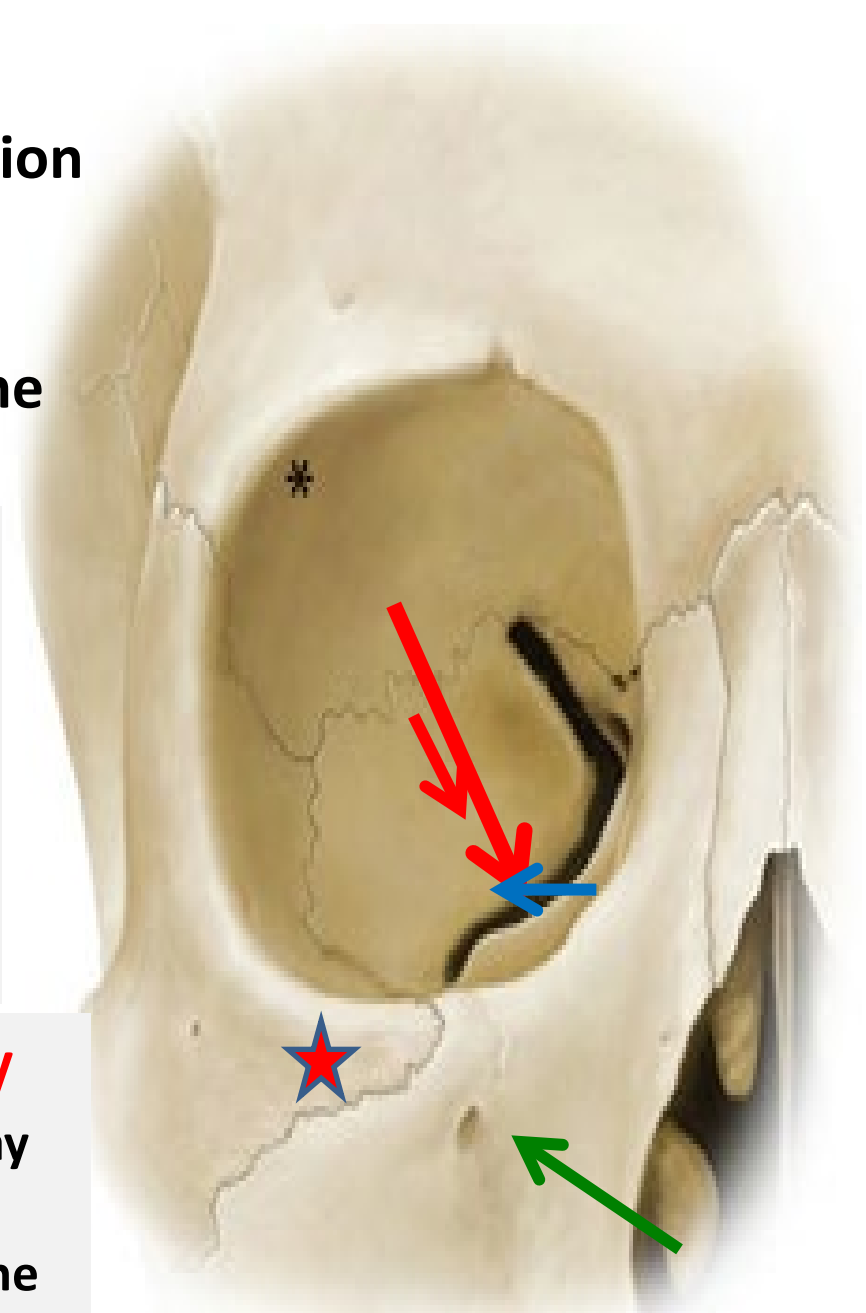


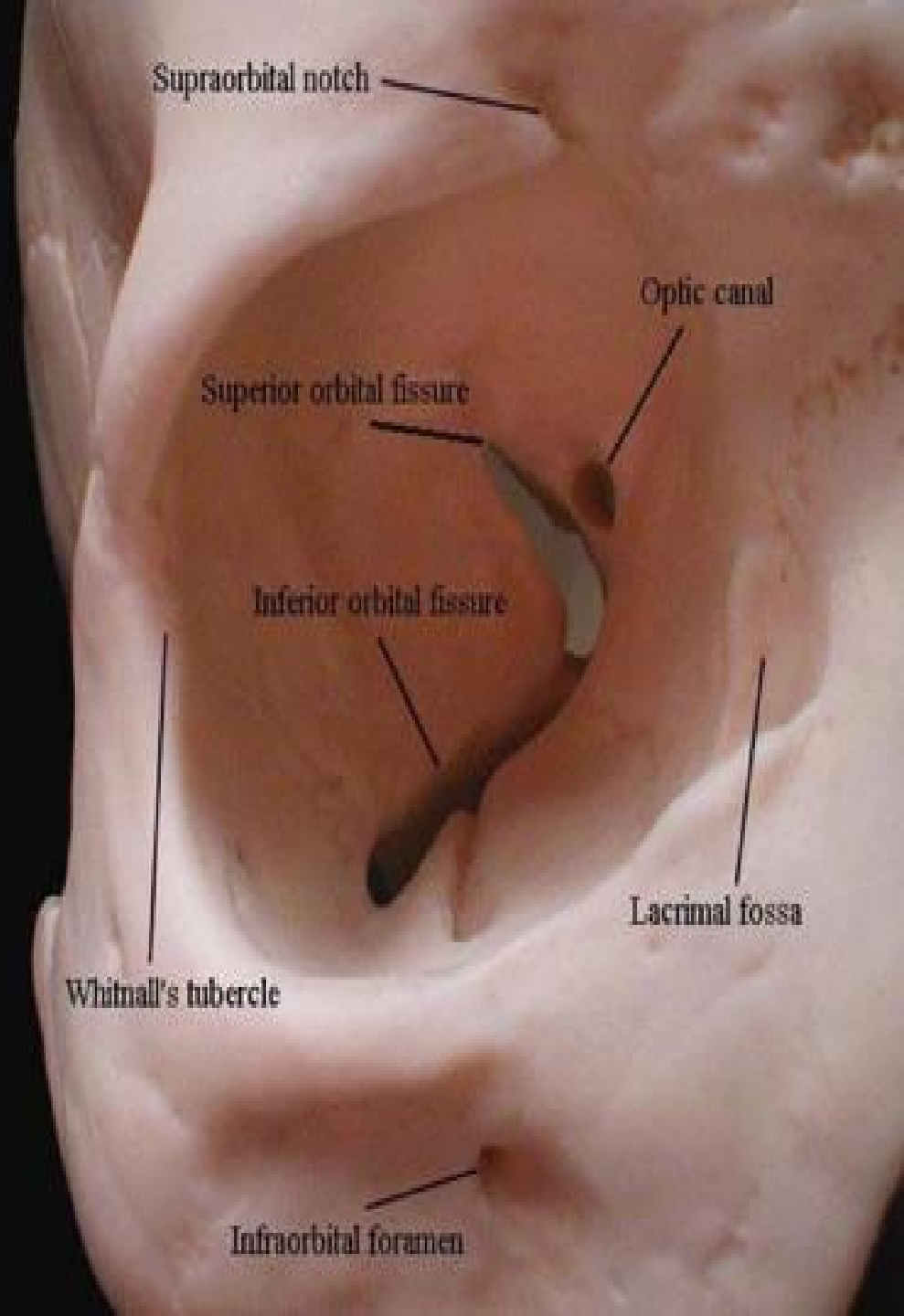
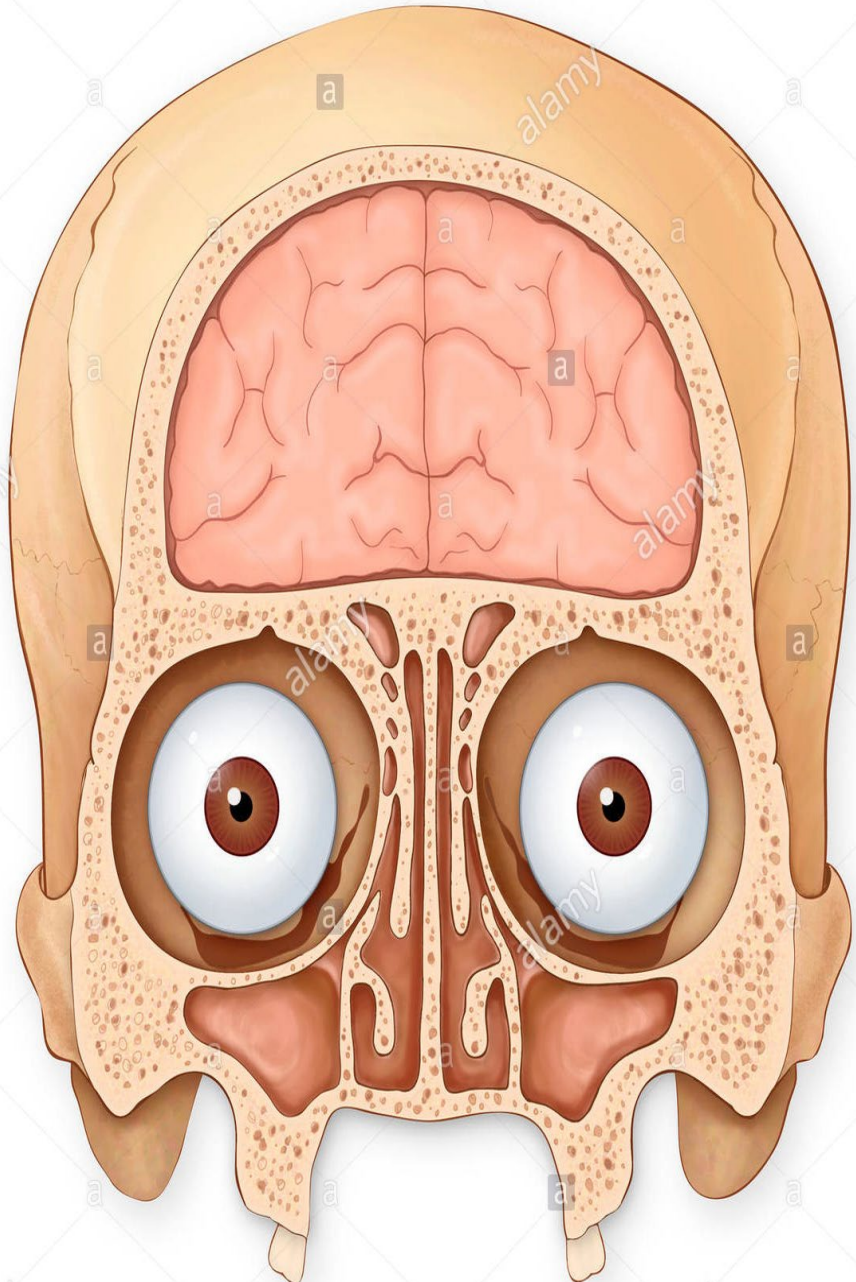
Floor:

- ❑ Inferior orbital fissure IOF → at junction of lateral wall & floor
- ❑ Through it orbit communicates with infratemporal fossa & pterygopalatine fossa.

❑ Inferior orbital fissure →
infraorbital groove → infraorbital canal →
infraorbital foramen →
transmits infraorbital nerve & vessels

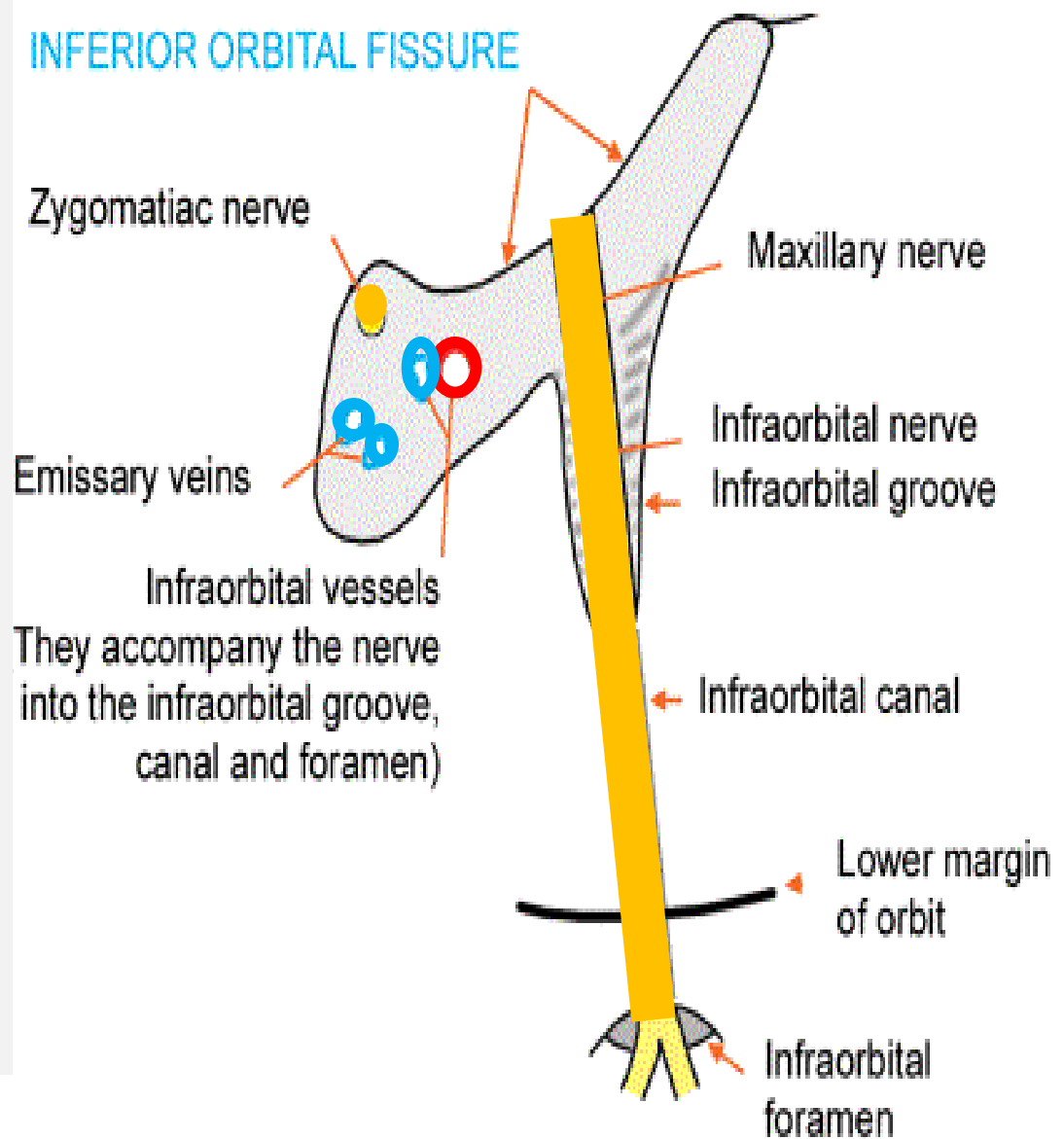
- ❑ Floor of orbit is related to **maxillary air sinus**. [A severe blow to the orbit may cause the contents of the orbital cavity to explode downward through the floor of the orbit into the maxillary sinus]





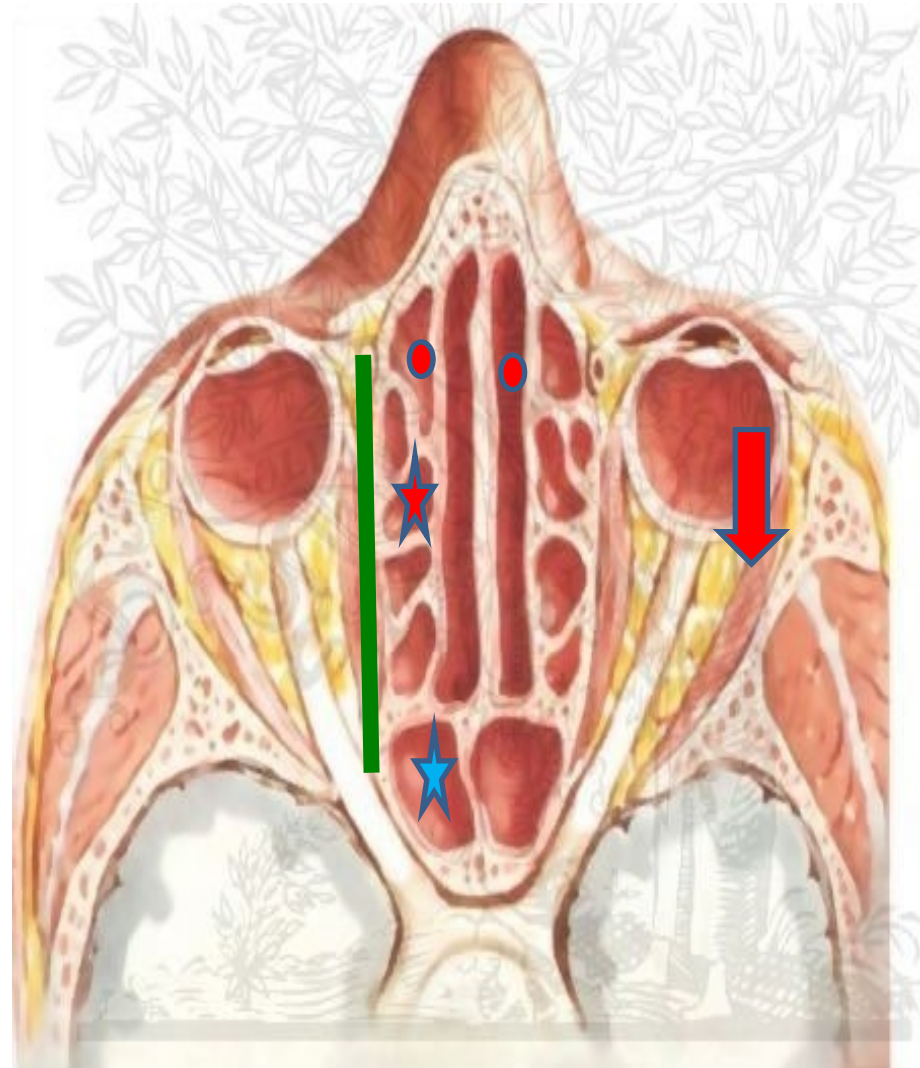
❑ IOF transmits:

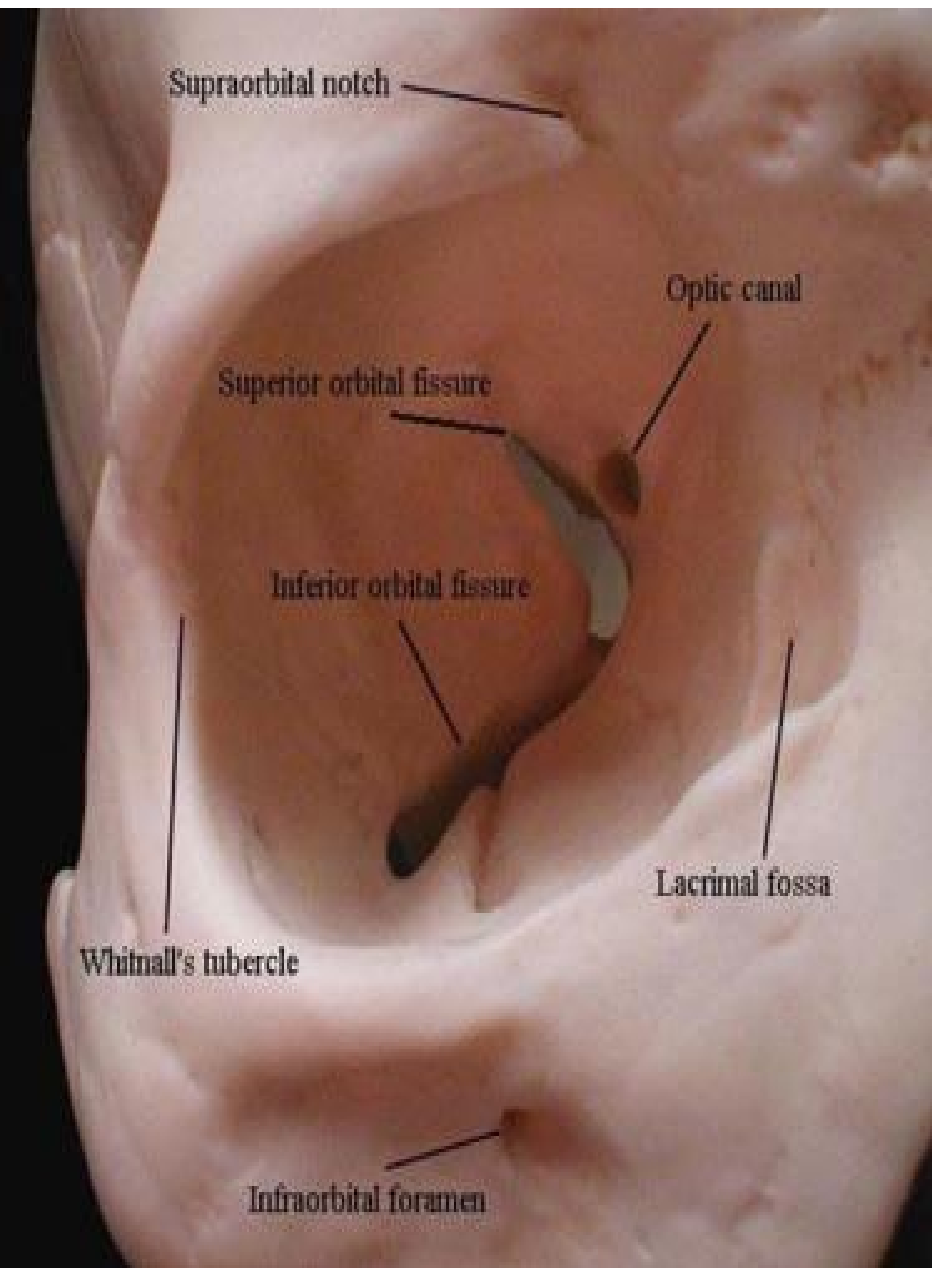
- 1) Continuation of maxillary nerve (infraorbital n)
- 2) Zygomatic nerve
- 3) Orbital branches of pterygopalatine ganglion
- 4) Infraorbital vessels
- 5) Communications between inferior ophthalmic vein & pterygoid venous plexus.



Medial wall:

- Separates **orbit** from **ethmoidal & sphenoidal** air sinuses
- **Lacrimal groove** anteriorly → lodges lacrimal sac
- **Anterior & posterior ethmoidal foramina** → lie at junction of medial wall & roof → transmit ant. & post. ethmoidal nerves & vessels





CONTENTS OF ORBIT

1) Eyeball

2) Fasciae

3) Muscles : a) of upper eyelid → Levator palpebrae superioris

b) of eyeball : Intrinsic → i) constrictor pupillae

ii) dilator pupillae

iii) ciliary muscle

Extrinsic → 4 recti & two obliques

4) Nerves: a) Sensory → 1. Optic nerve/ 2. Brs of Ophthalmic {lacrima, frontal, nasociliary}

3. Brs of maxillary { zygomatic, infraorbital }

b) Motor → 1. Oculomotor III 2. Trochlear IV 3. Abducent VI

c) Autonomic → 1. Ciliary ganglion / 2. Sympathetic &

parasympathetic n

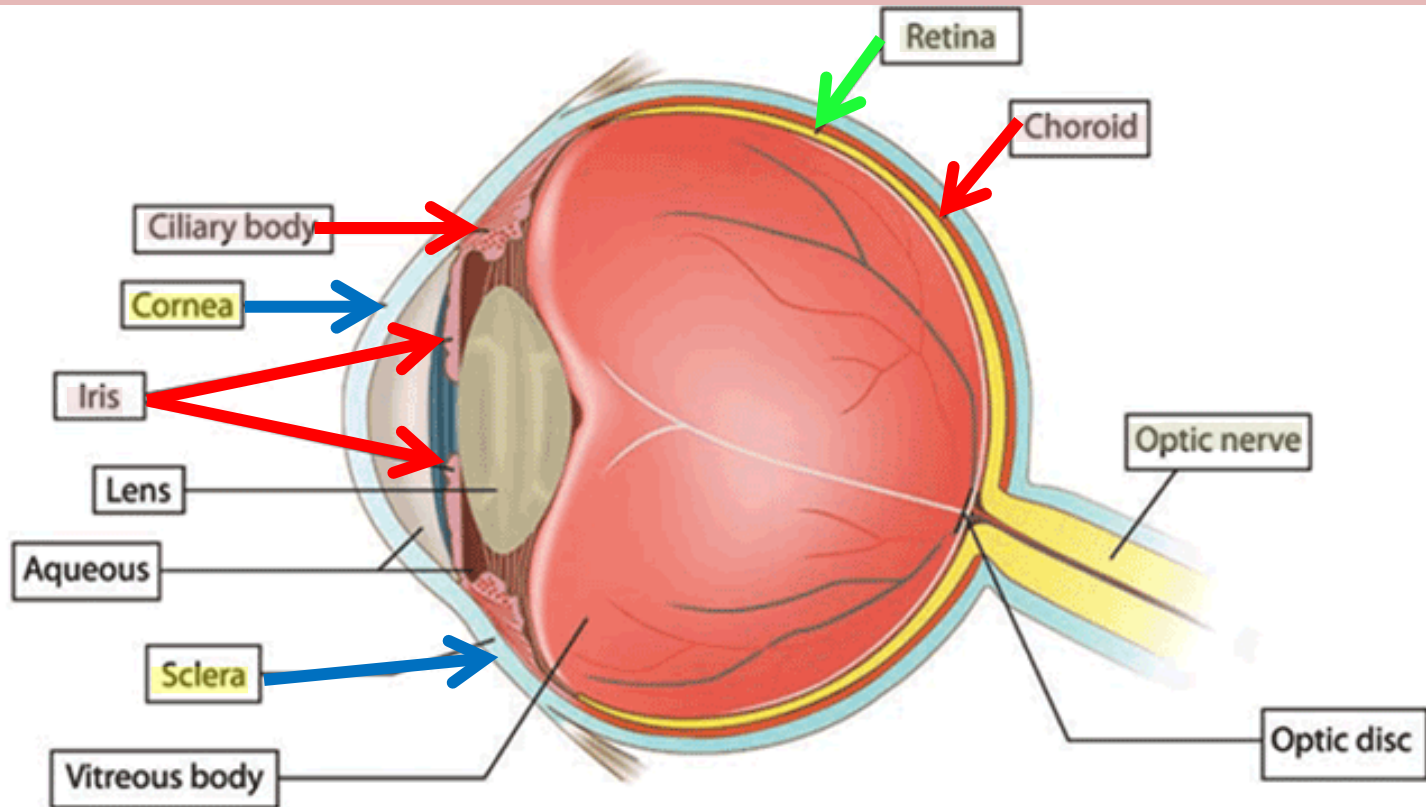
5) Blood vessels: ophthalmic artery / superior & inferior ophthalmic veins/ infraorbital vessels

6) Lacrimal apparatus: lacrimal gland/ lacrimal sac/ nasolacrimal duct

7) Orbital fat

Eyeball consists of 3 layers:

- 1) **Fibrous layer:** cornea and sclera
- 2) **Vascular layer:** choroid, ciliary body and iris
- 3) **Nervous layer:** retina



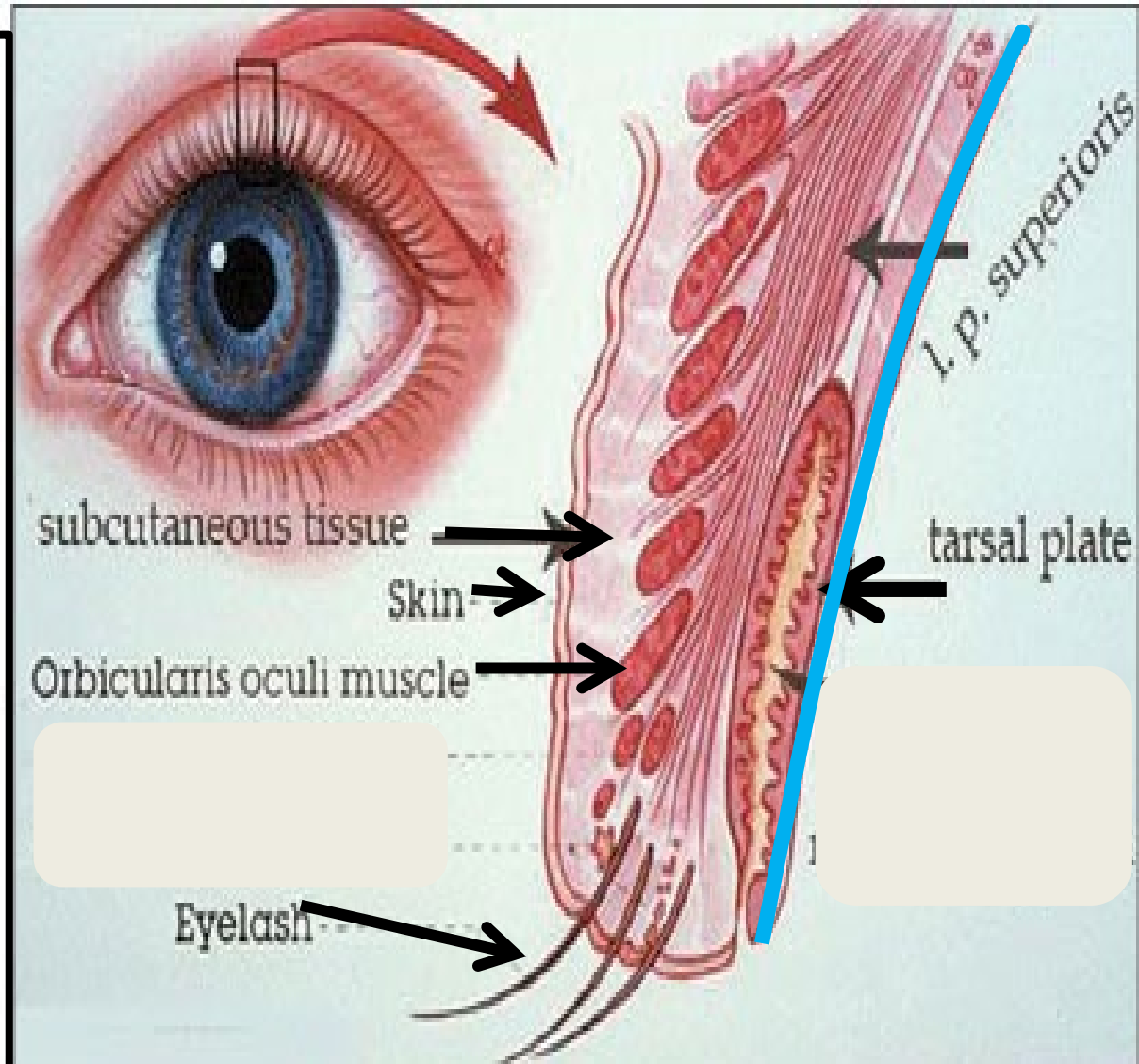
❑ **Structure:**

1) Skin

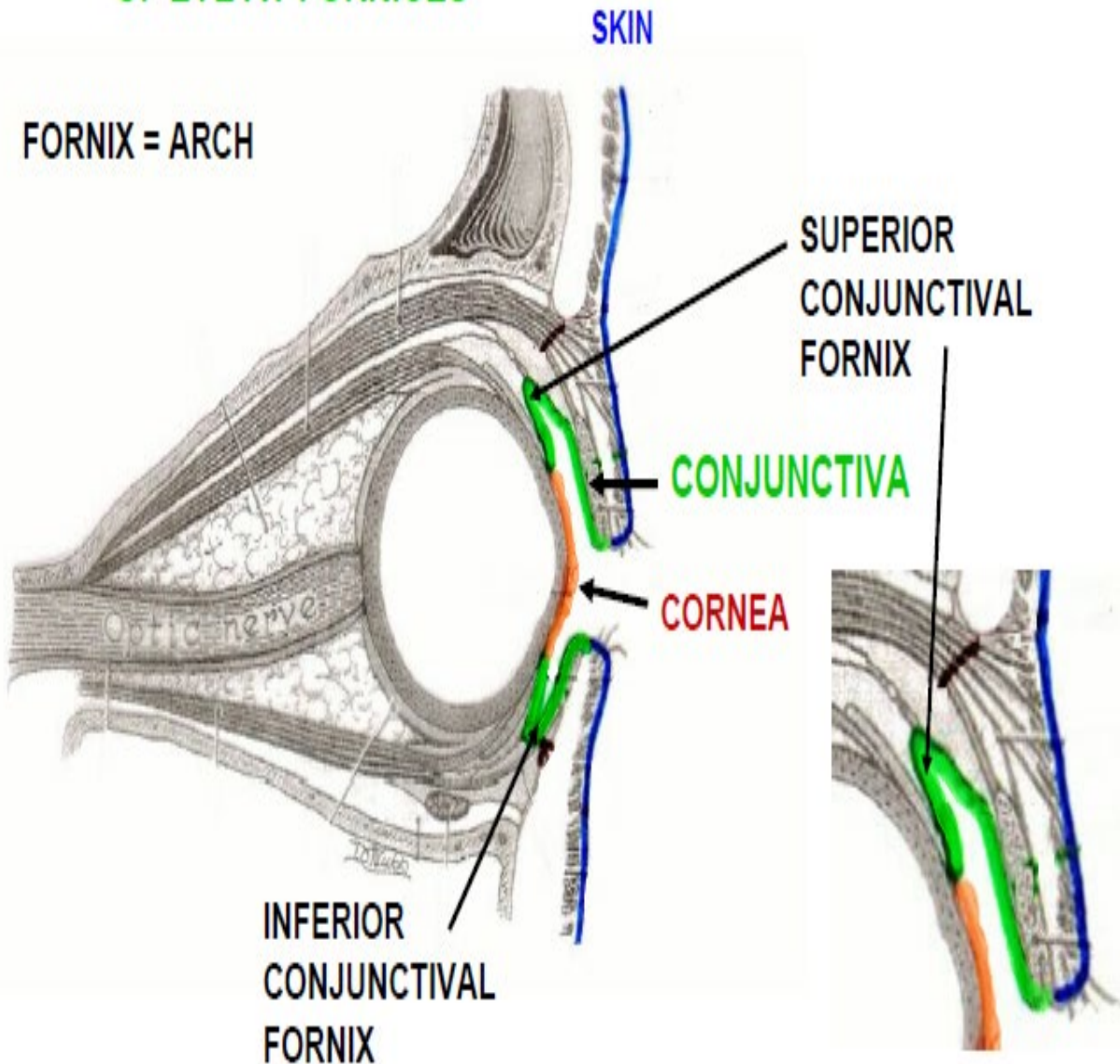
2) Superficial fascia without any fat containing palpebral part of orbicularis oculi

3) Palpebral fascia → it's thickening form tarsal plates in the eyelids & palpebral ligaments at the angles to stiffen lid margin

4) Conjunctiva → lines tarsus



5) CONJUNCTIVA - MEMBRANE COVERING INSIDE OF LID - FUSES TO SCLERA - REFLECTED TO CORNEA OF EYE AT FORNICES

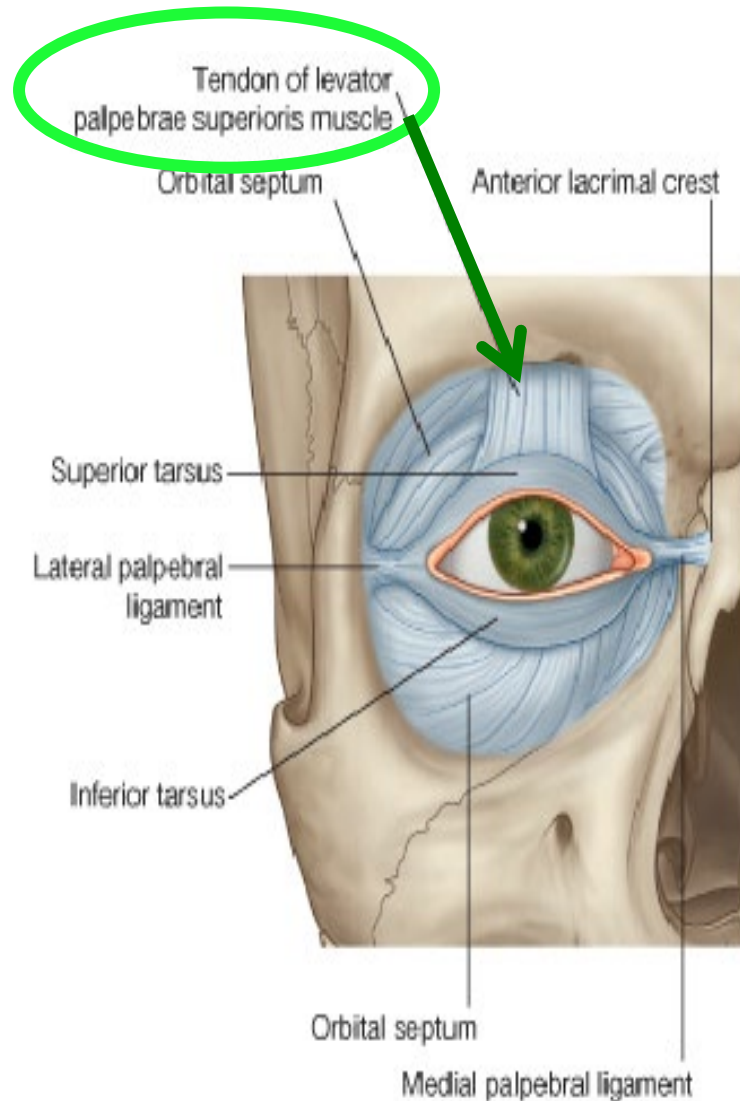


Levator Palpebrae Superioris Muscle

❖ Attaches from roof of orbit just above & ant. to optic canal → superior tarsus & skin of upper eyelid

❖ Supplied by oculomotor nerve III

❖ Elevates upper eyelid



Innervation of the eyelids

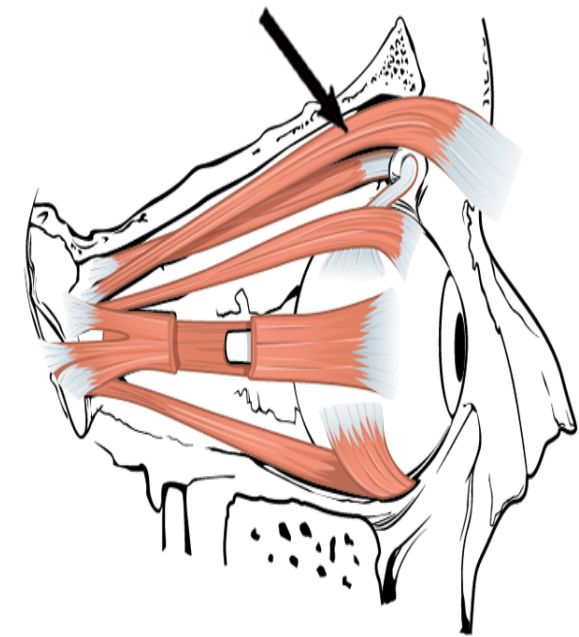
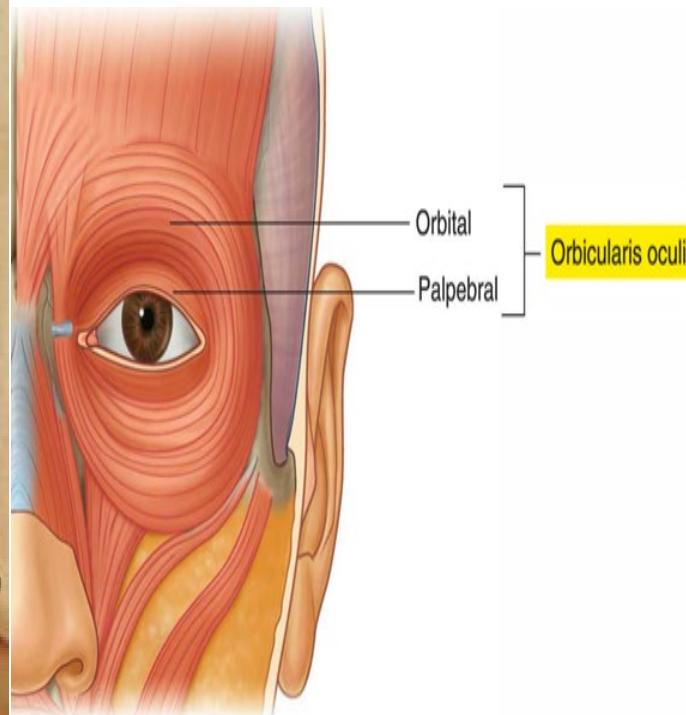
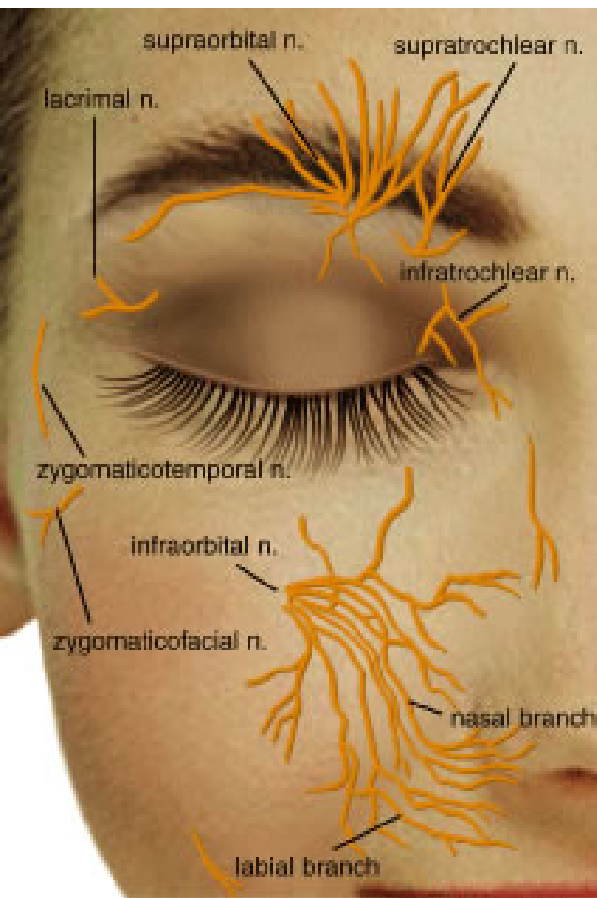
Sensory

Trigeminal {upper eyelid → brs of ophthalmic}
(Lower eyelid → brs of maxillary)

Facial VII →
Orbicularis oculi

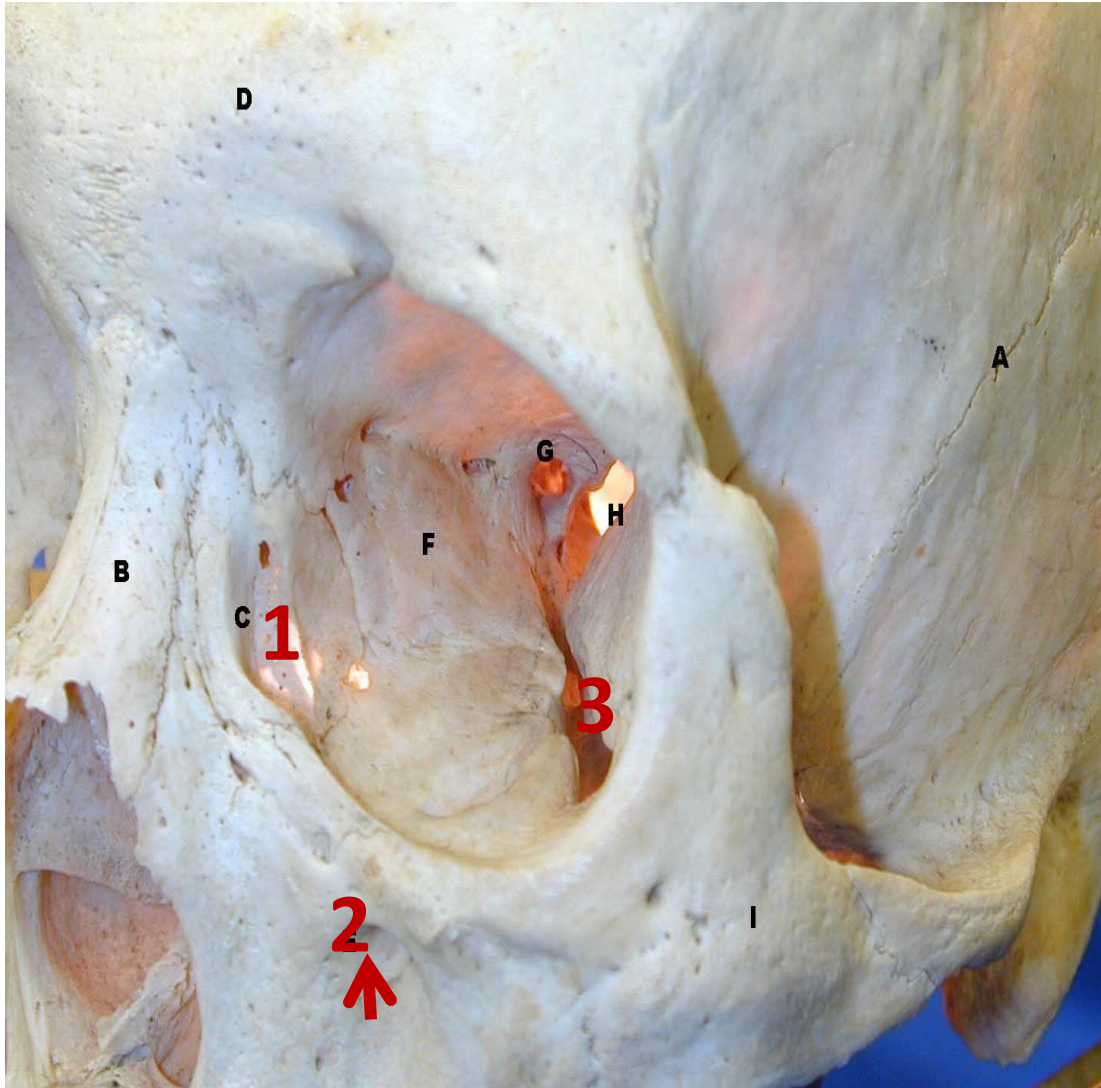
Motor

Oculomotor
III → LPS





Self Assessment



1) Mention the structure related to **1**

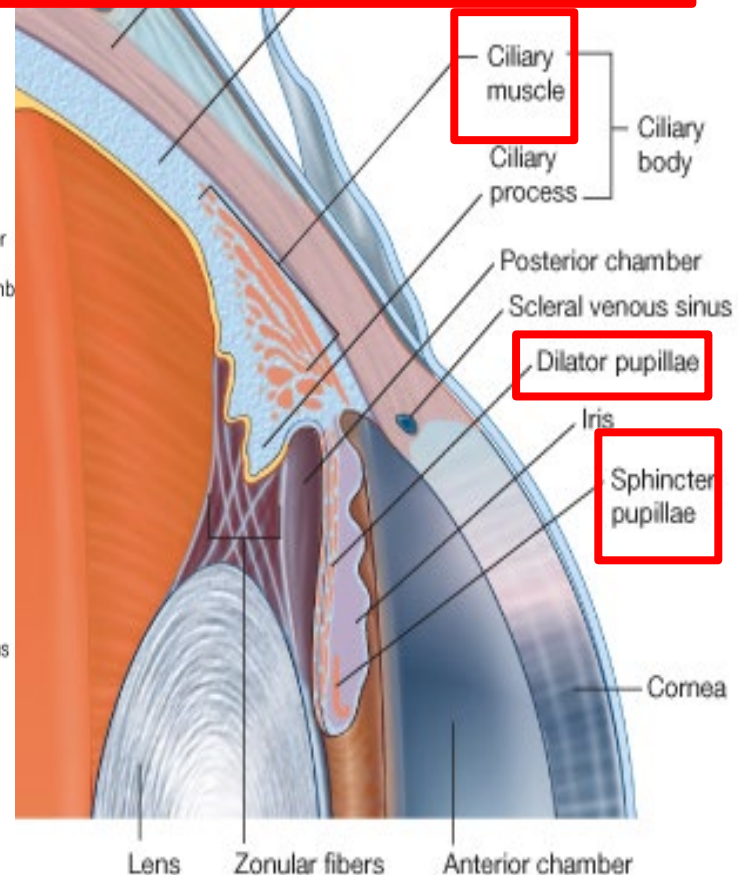
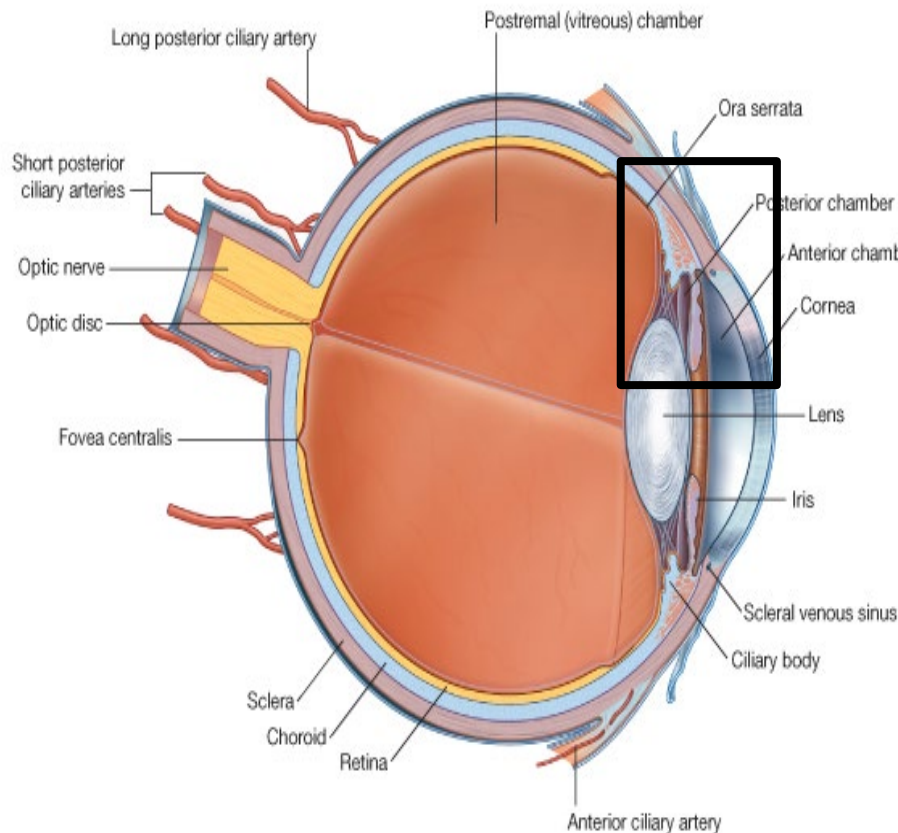
2) Mention one structure passing through **2**

3) Define **3**

Intrinsic Muscles of the Eyeball

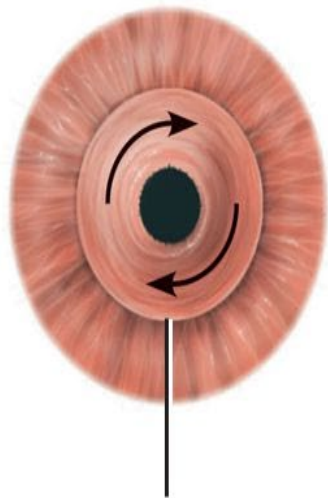
3 smooth involuntary muscles supplied by autonomic nerves:

- 1) Constrictor (sphincter) pupillae → parasympathetic supply
- 2) Dilator pupillae → sympathetic supply
- 3) Ciliary muscle → parasympathetic supply → its contraction allows the lens to become more convex for accommodation to near vision

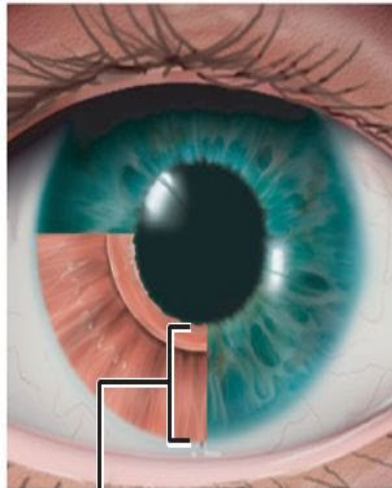


Action of Intrinsic Muscles

Parasympathetic +



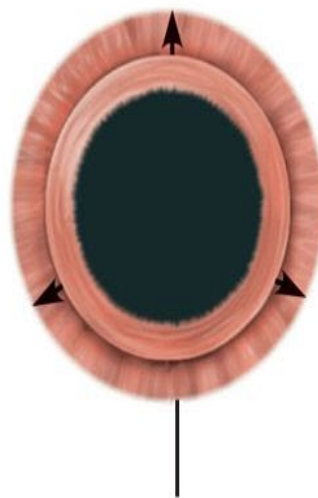
Sphincter pupillae muscle contraction decreases pupil size.



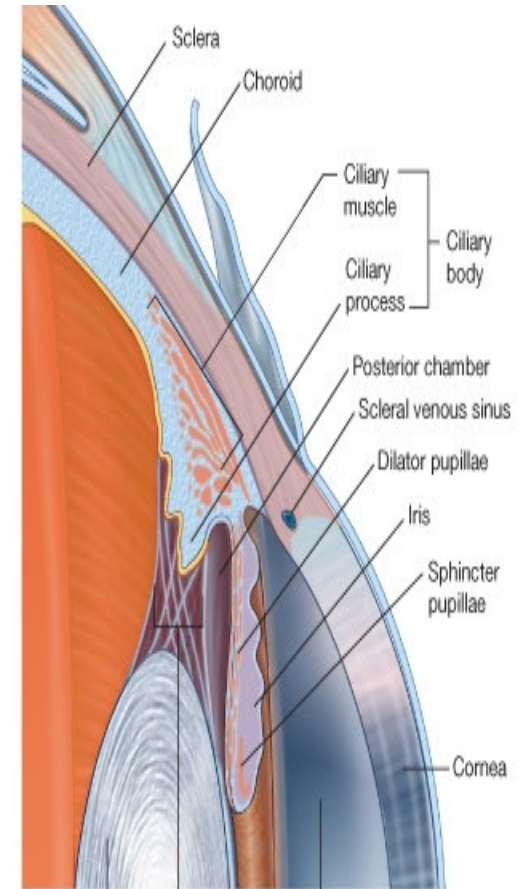
Iris (two muscles)

- Sphincter pupillae
- Dilator pupillae

Sympathetic +



Dilator pupillae muscle contraction increases pupil size.



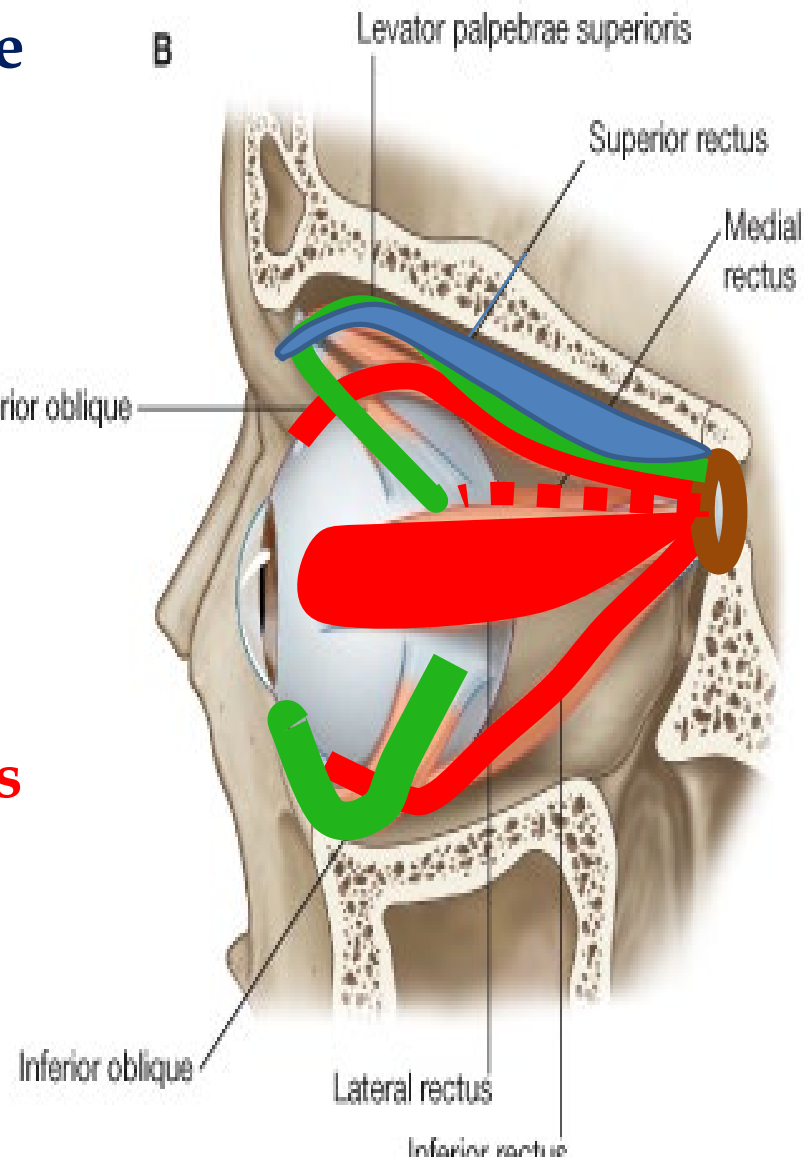
Extraocular Muscles

1) **Levator palpebrae superioris**

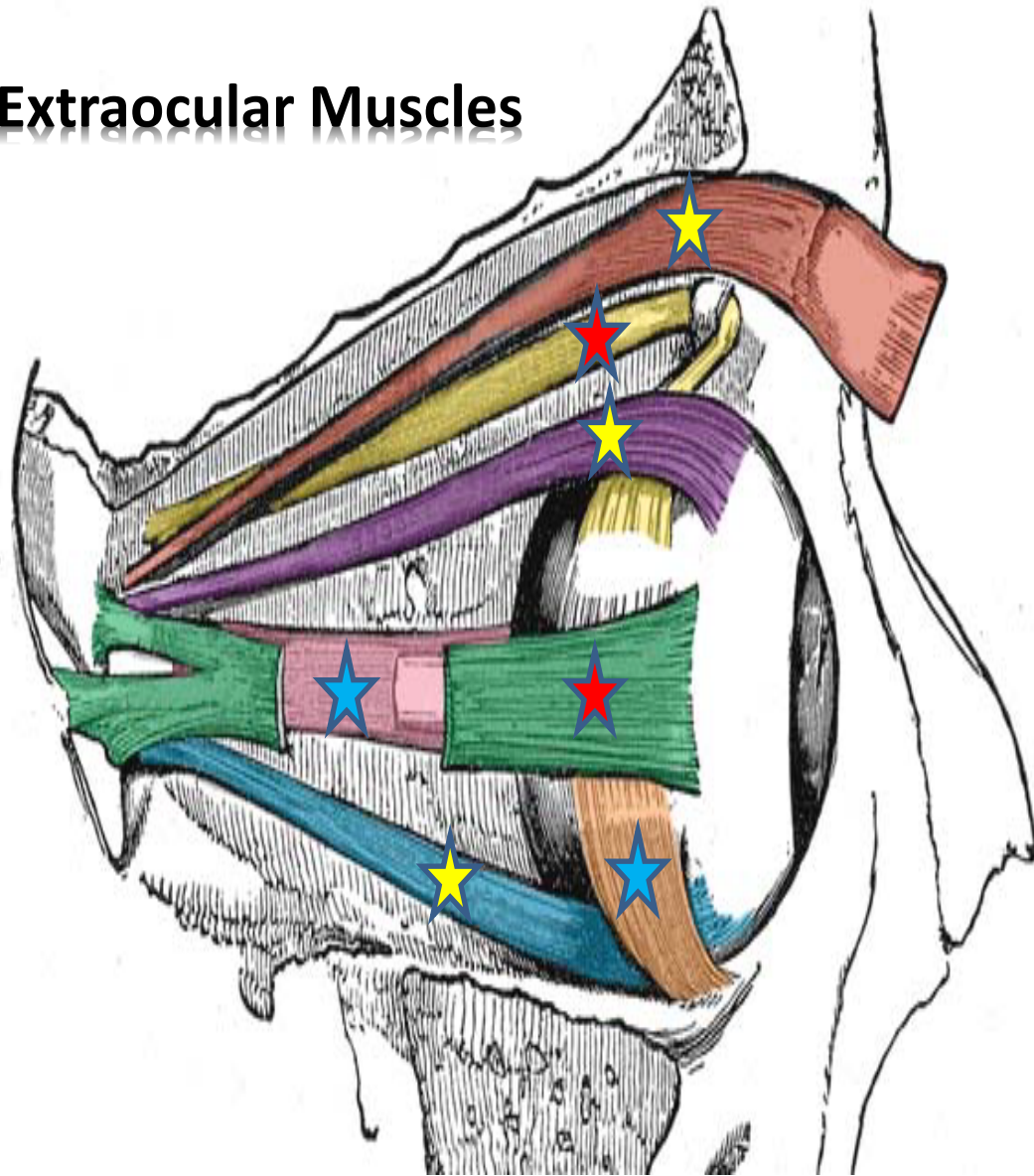
2) **4 Recti muscles**

- superior rectus
- inferior rectus
- medial rectus
- lateral rectus.

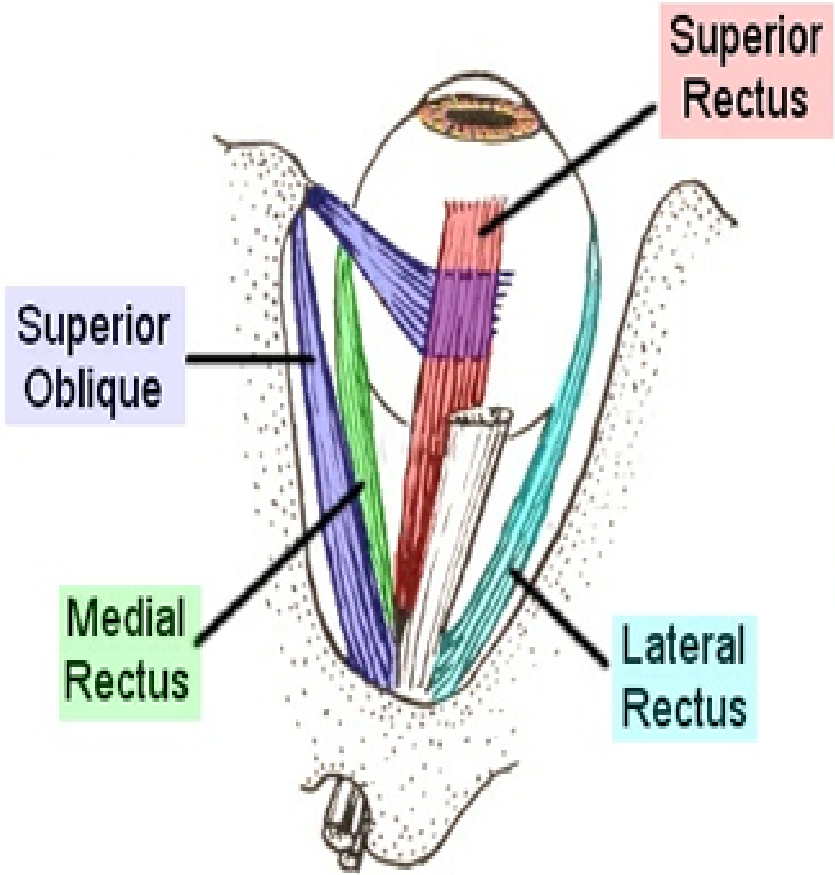
3) **2 oblique muscles**
superior and
inferior oblique



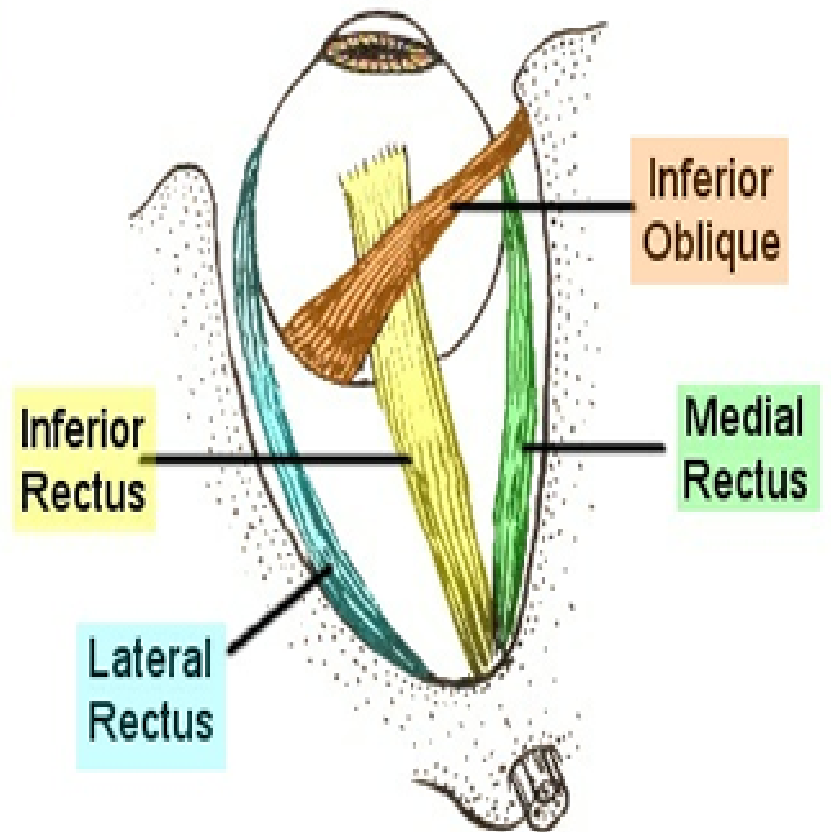
Extraocular Muscles



- Levator palpebrae superioris
- Superior oblique
- Inferior oblique
- Superior rectus
- Medial rectus
- Lateral rectus
- Inferior rectus

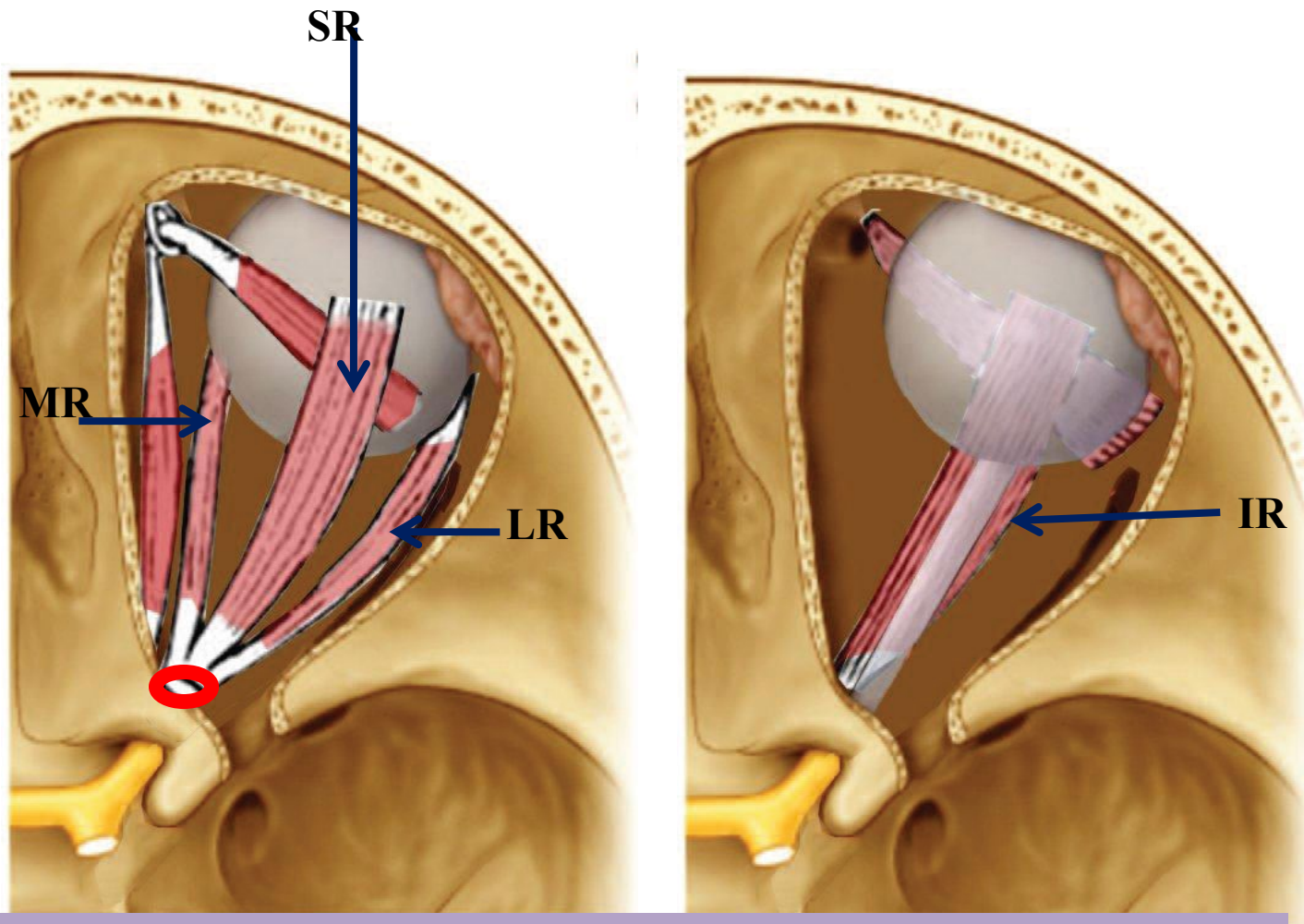


Right Eye
Superior View



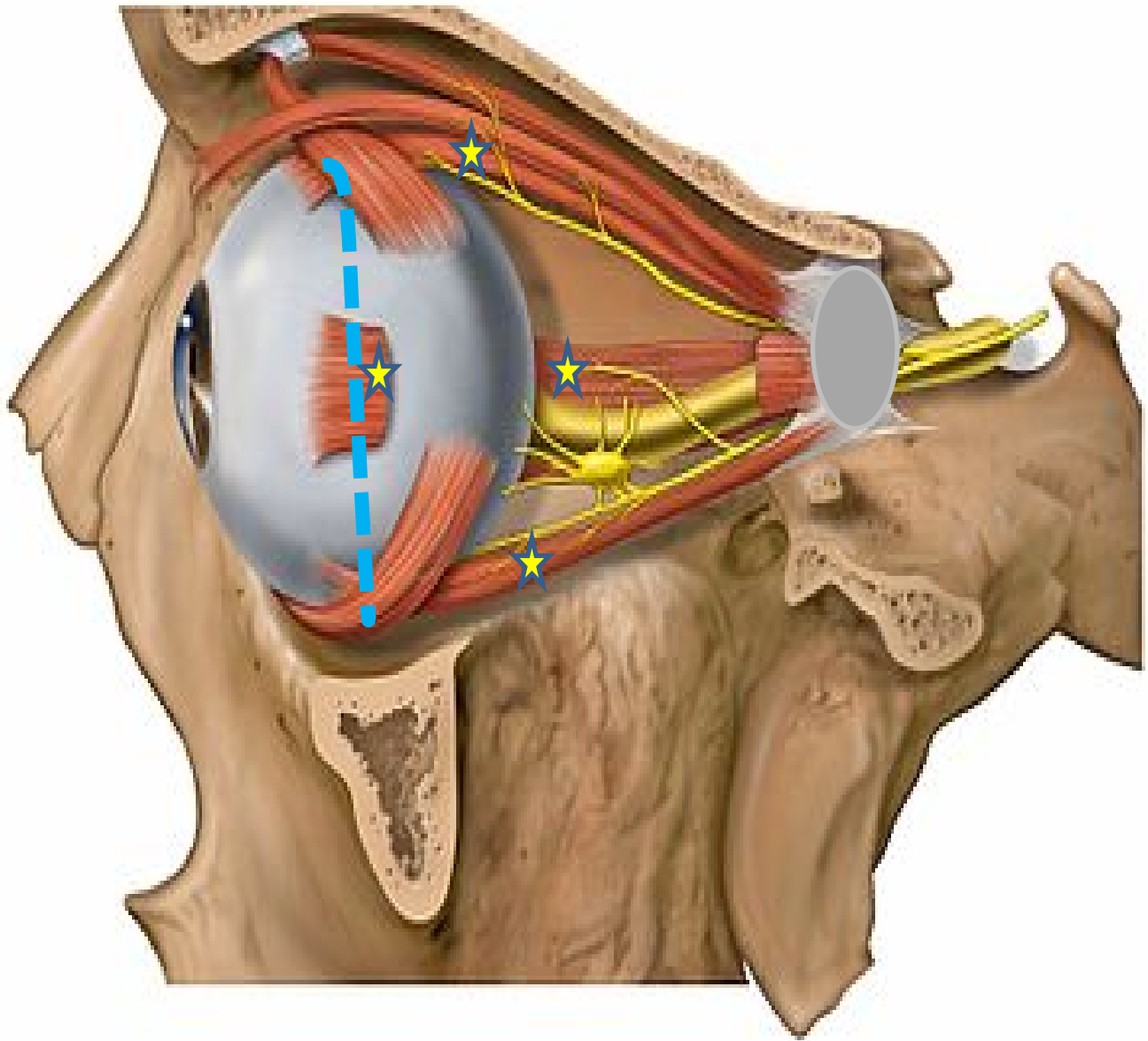
Right Eye
Inferior View

The 4 Recti Muscles



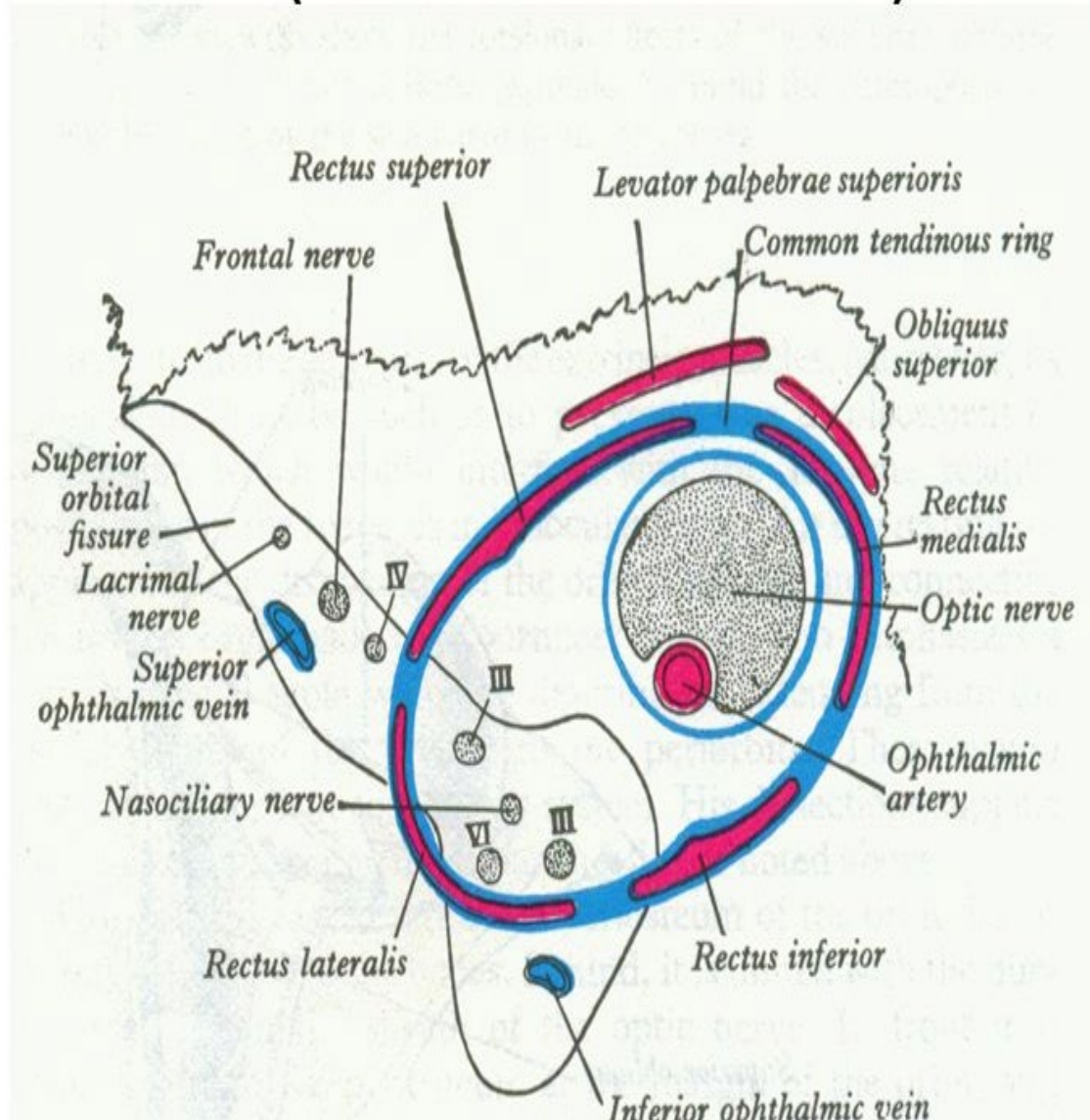
The 4 recti muscles: arise from the **common tendinous ring** and are inserted into sclera in front of the equator of the eyeball

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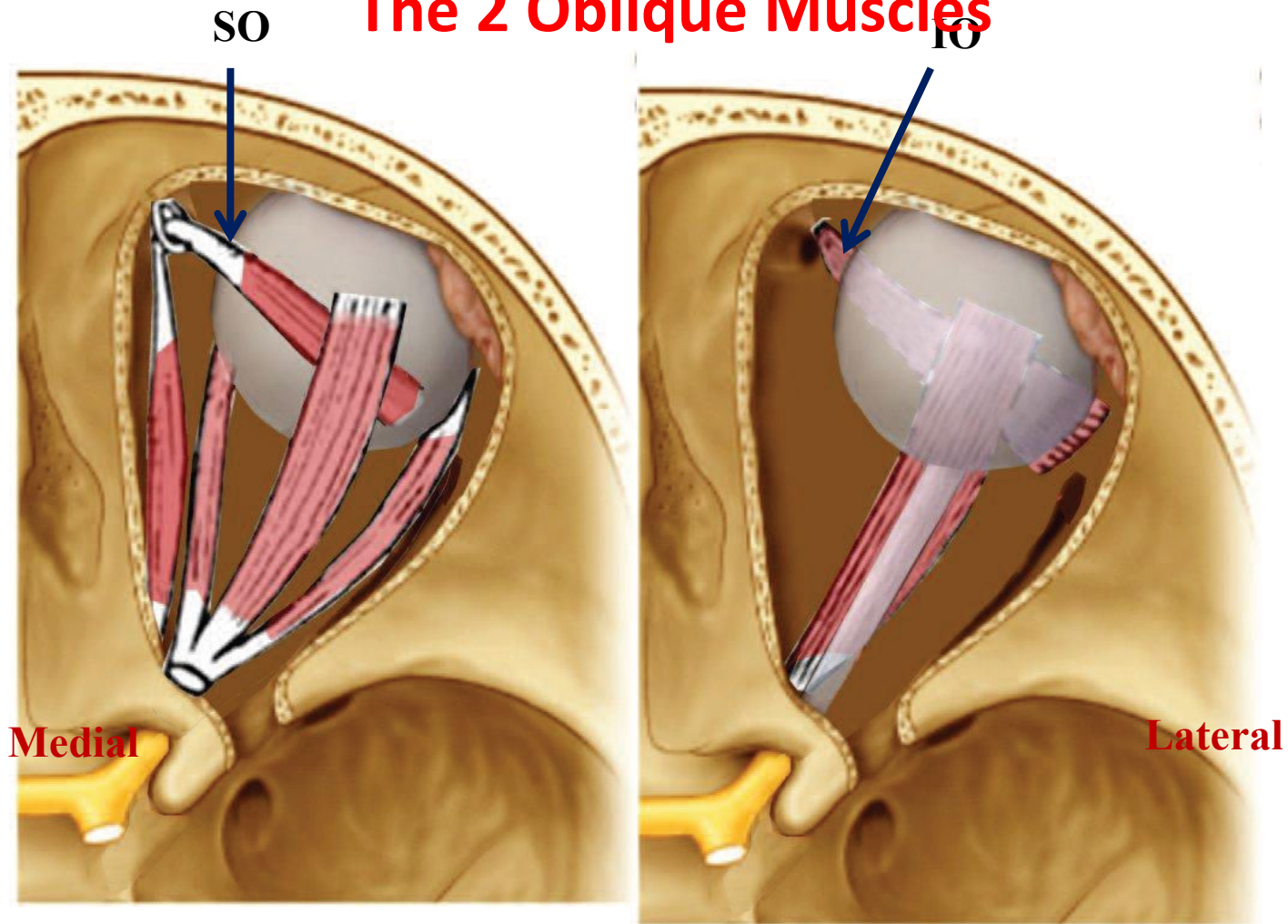


Common tendinous ring (annulus of Zinn)

It is a fibrous ring that surrounds the optic canal & part of the SOF

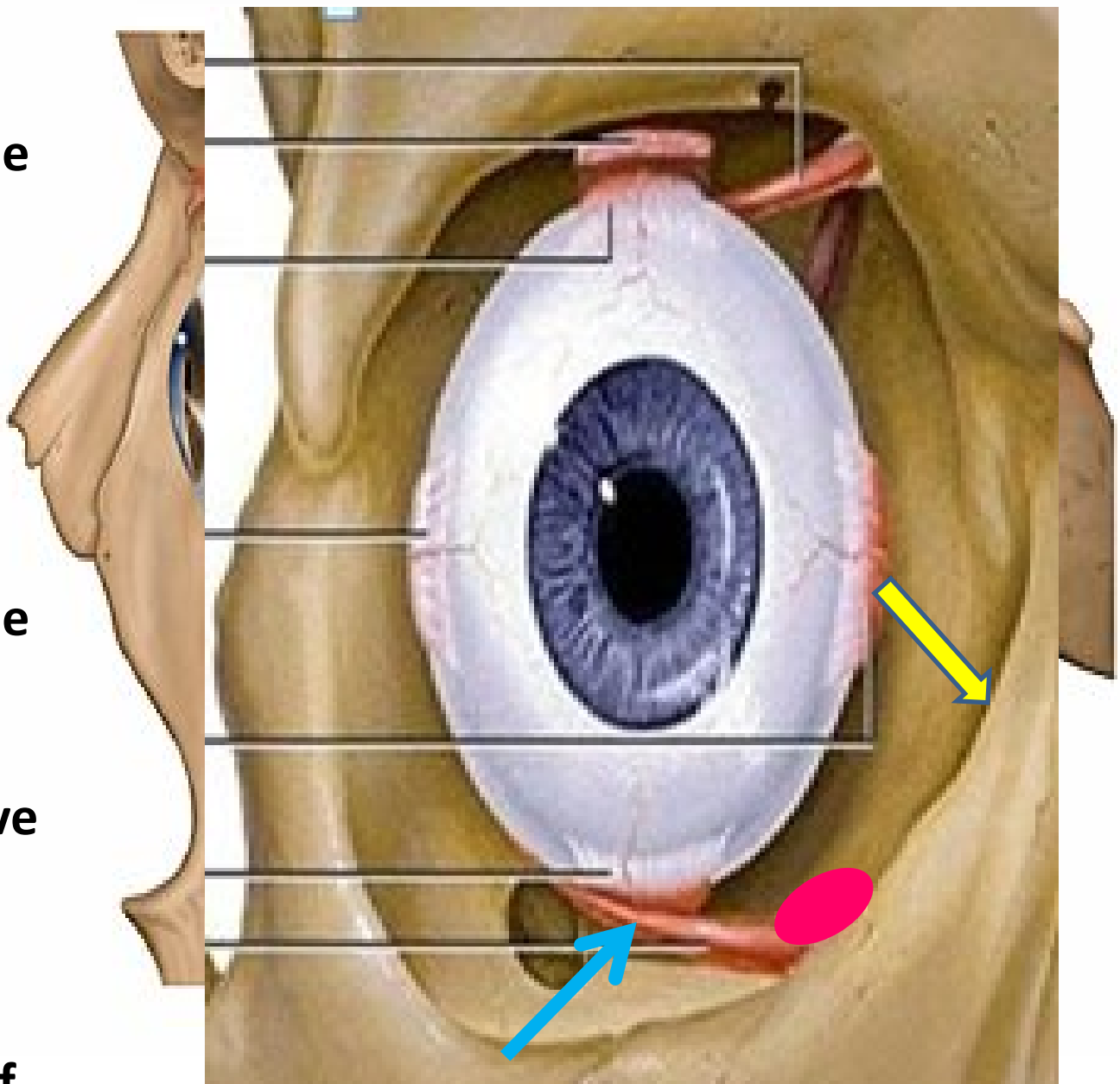


The 2 Oblique Muscles



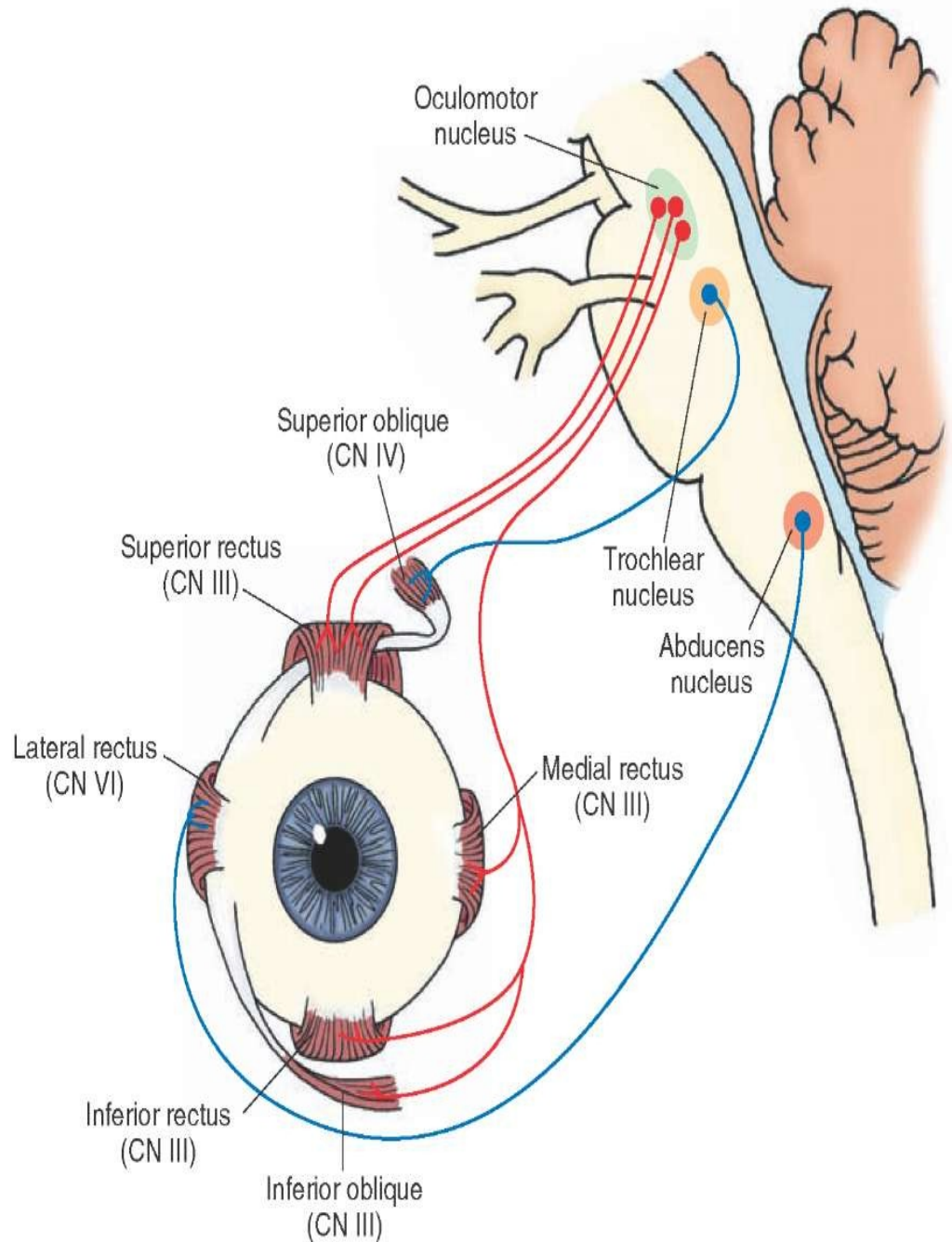
Superior oblique SO arises from the roof of orbit just superomedial to optic canal
Inferior oblique IO arises from the floor of orbit just lateral to lacrimal groove
Both are inserted into sclera behind the equator of the eyeball

- ❑ **Superior oblique** SO arises from the roof of orbit just superomedial to optic canal
- ❑ **Inferior oblique** IO arises from the floor of orbit just lateral to lacrimal groove
- ❑ **Both** are inserted into sclera behind the equator of the eyeball



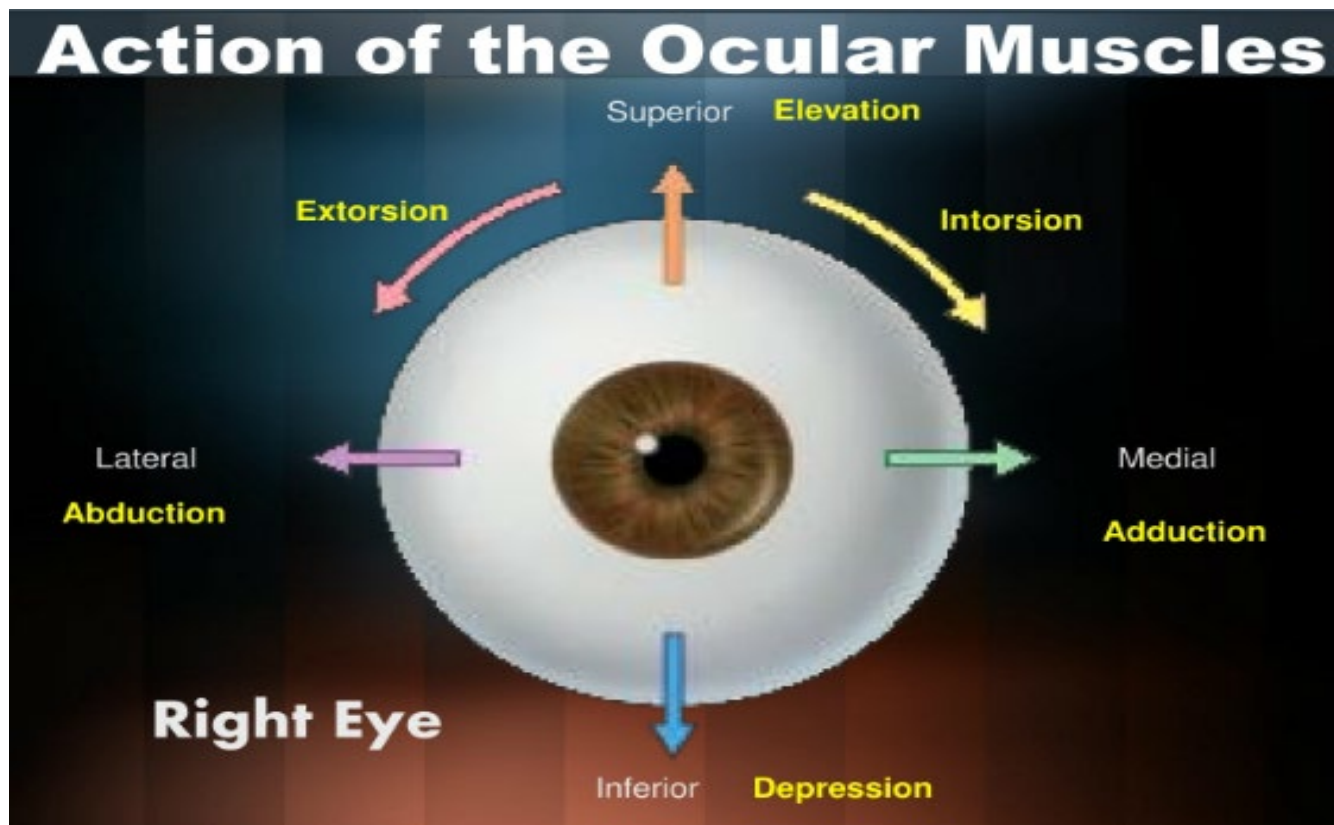
Nerve supply
of the extrinsic
muscles of the
eye:

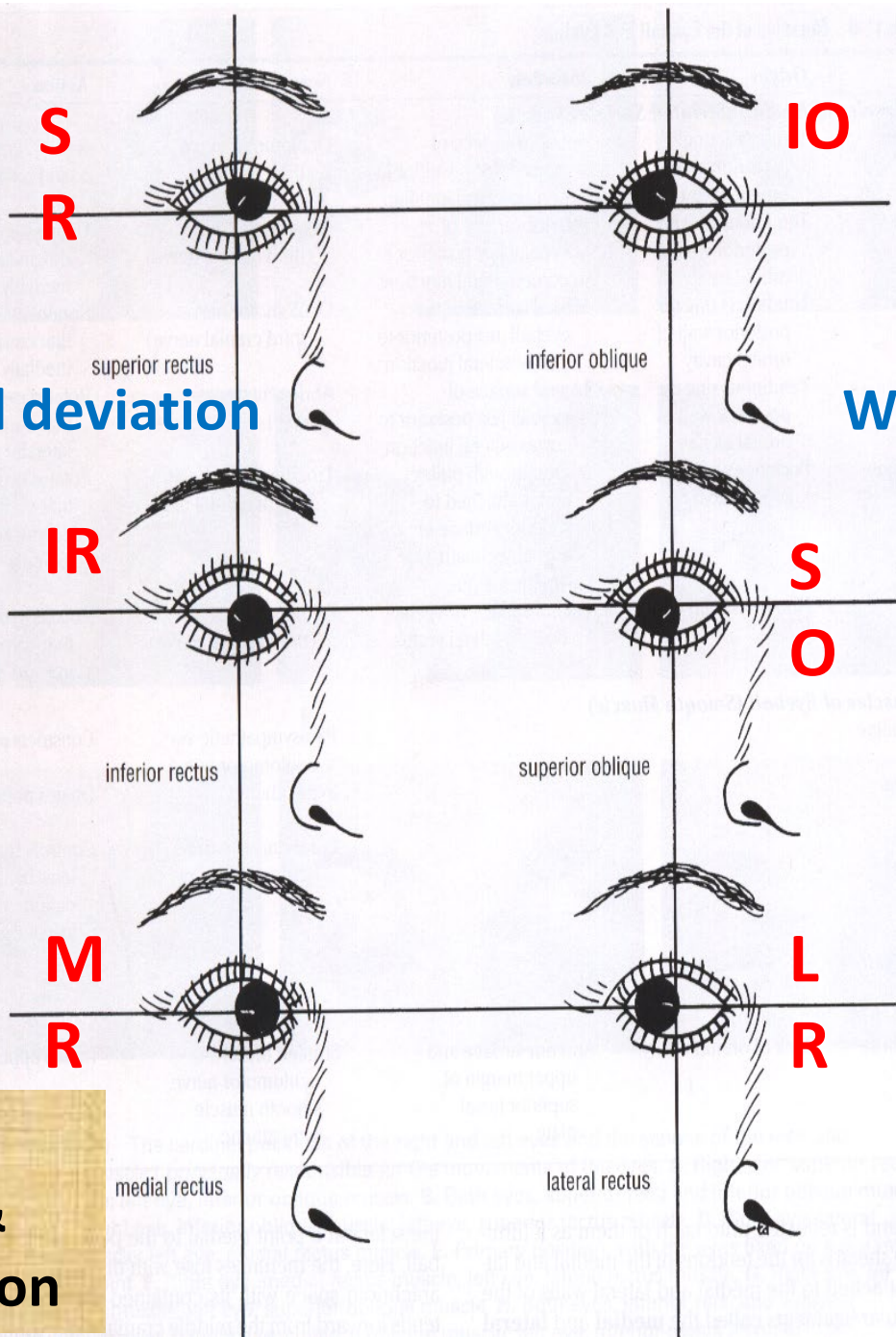
All are
supplied by
oculomotor
(III) except
SO4
(Trochlear) and
LR6 (Abducent)



Possible movements of the eye ball occur around 3 axes:

- 1-Transverse → elevation and depression
- 2- Vertical → adduction and abduction
- 3- Anteroposterior → intorsion and extorsion





With medial deviation

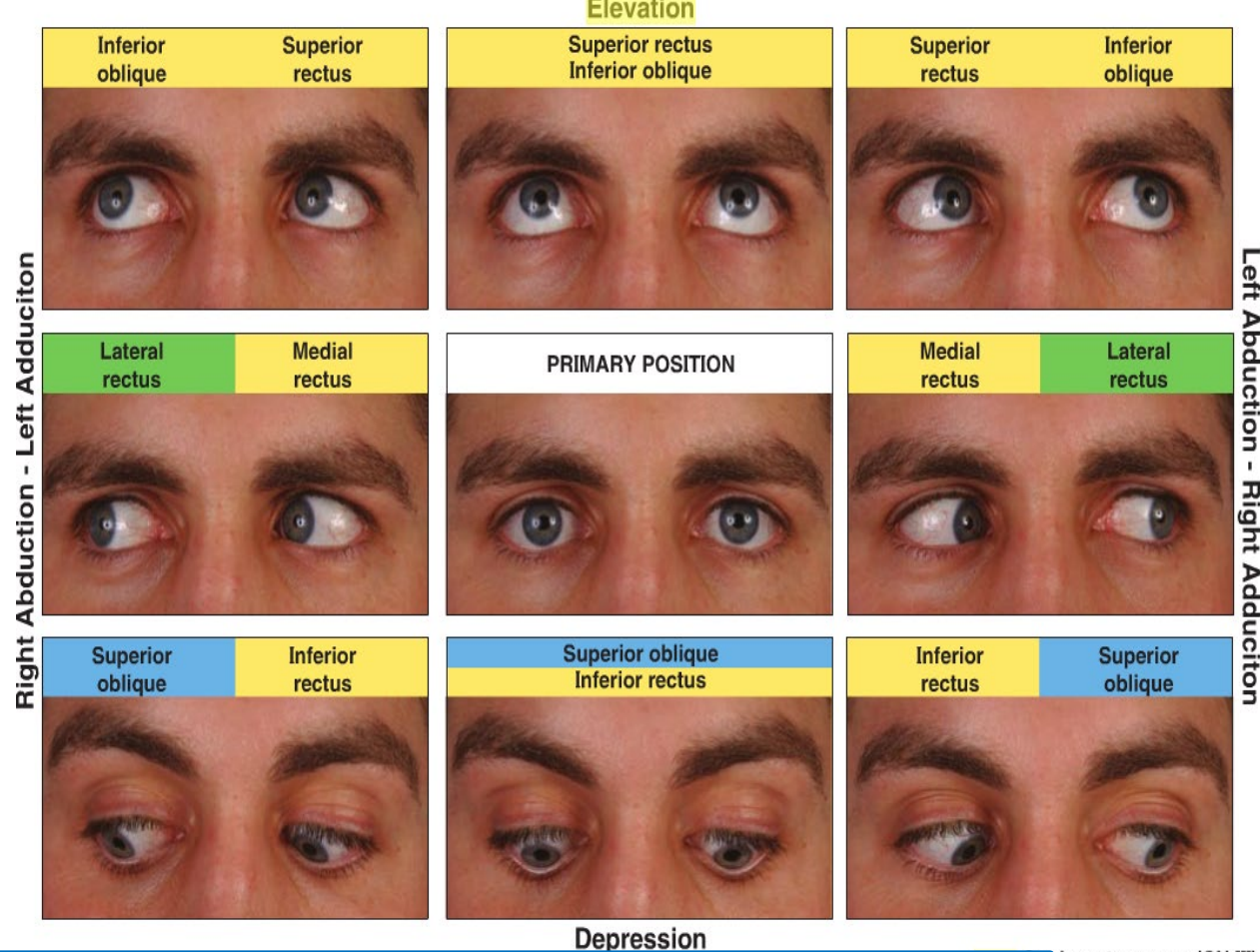
With lateral deviation

2 Superior muscles (SR & SO) → intorsion

2 Inferior muscles (IR & IO) → extorsion

Action of individual muscles:

- 1) **LPS** → elevation of upper eyelid
- 2) **MR** → adduction
- 3) **LR** → abduction
- 4) **SR** → elevation, adduction & intorsion
- 5) **IR** → depression, adduction & extorsion
- 6) **SO** → depression, abduction & intorsion
- 7) **IO** → elevation, abduction & extorsion

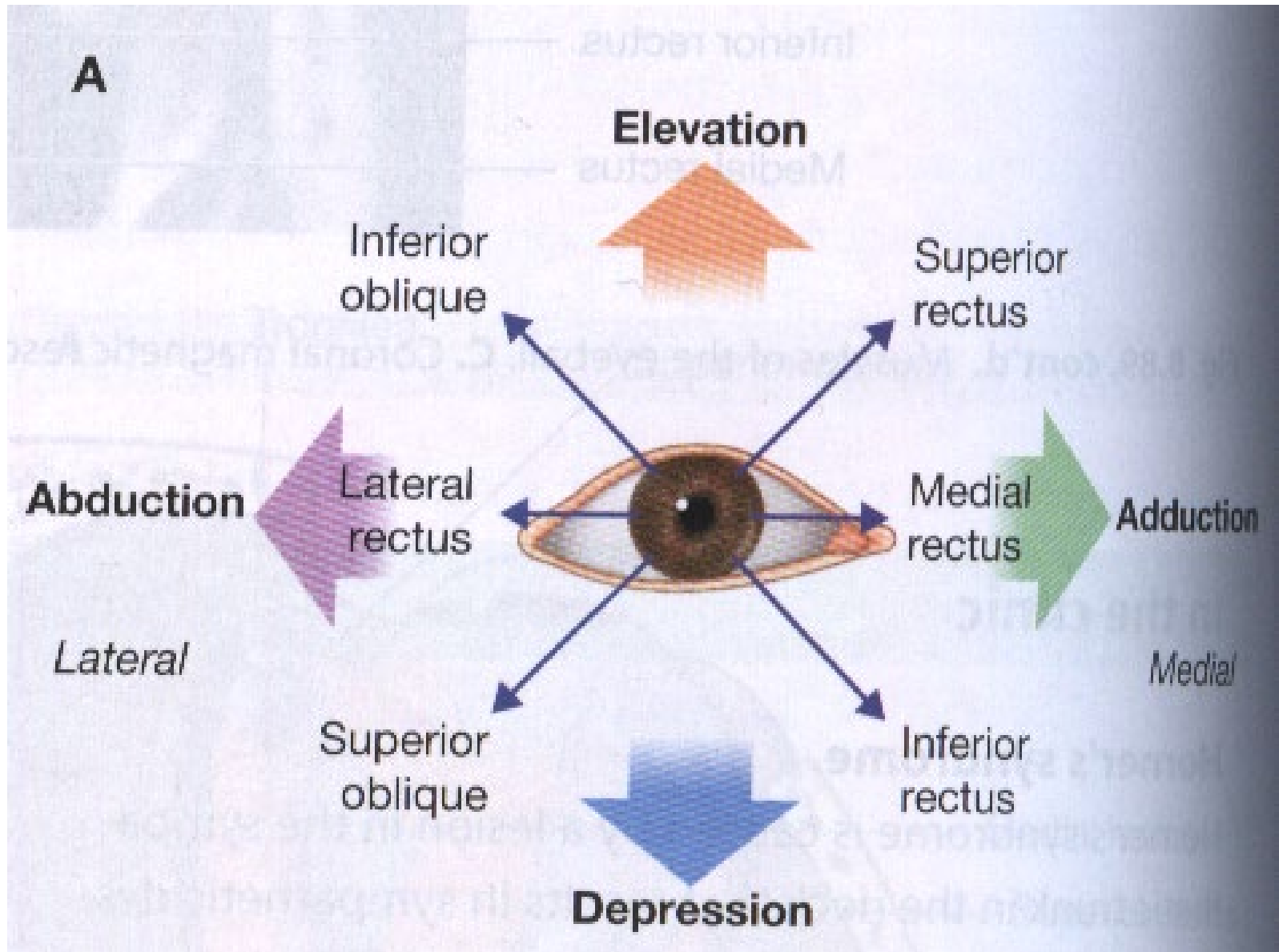


Single pure movements:

- Elevation → SR & IO
- Depression → IR & SO
- Adduction → MR, SR & IR
- Abduction → LR, SO & IO
- Intorsion → SO & SR
- Extorsion → IO & IR

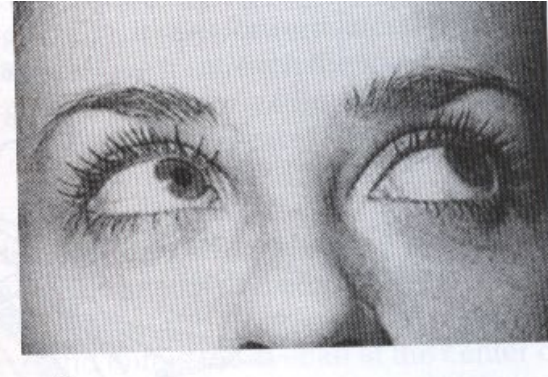
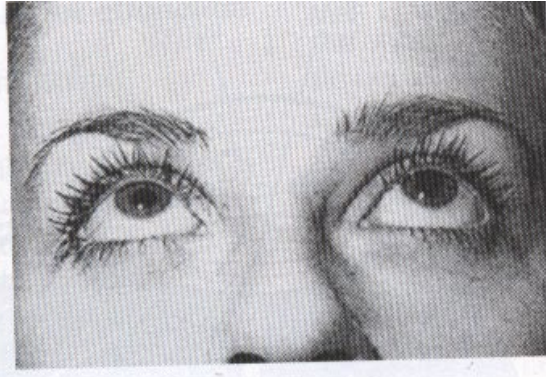
Intorsion (medial rotation) → superior oblique and superior rectus

Extorsion (lateral rotation) → inferior oblique and inferior rectus



Identify the muscle producing the eye movement.

movement.



A

B

C



D

E

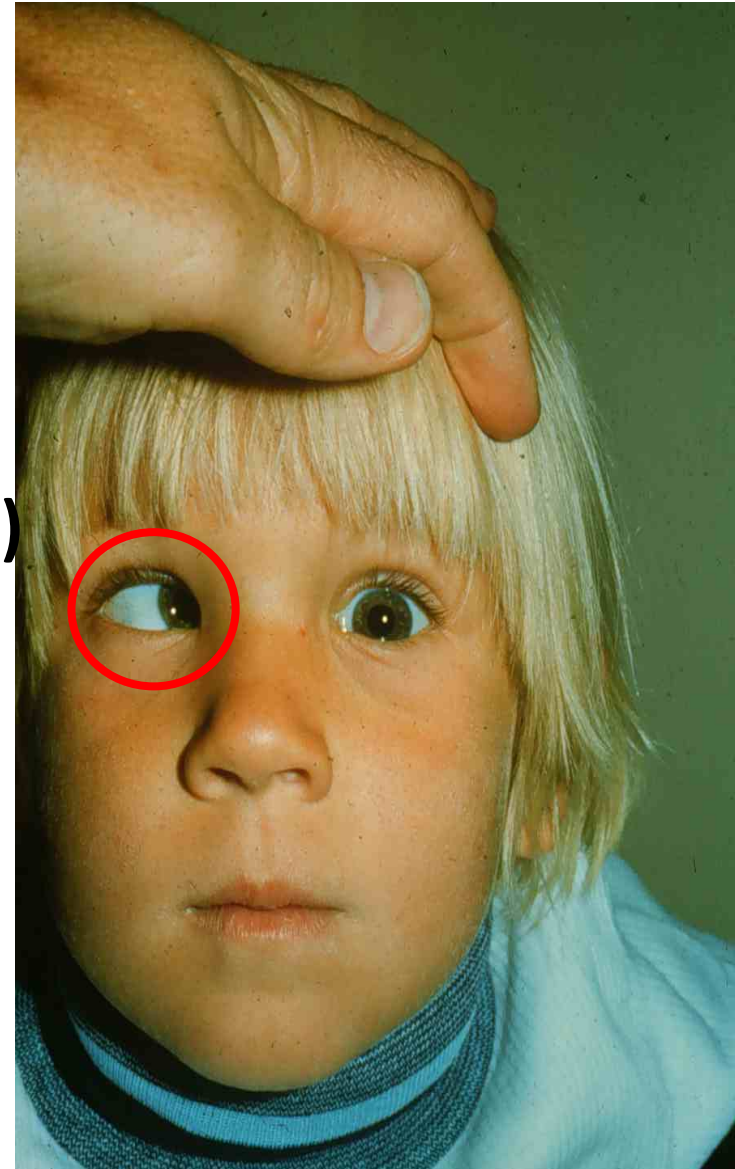
F



DIY

Which of the following best describes the condition of this boy's right eye? (squint)

- A. Trochlear nerve palsy**
- B. Abducent nerve palsy**
- C. Ptosis (drooping of upper eyelid)**
- D. Ophthalmic nerve damage**
- E. Oculomotor nerve injury**



VESSELS OF THE ORBIT

Arterial Supply



Ophthalmic Artery

Venous Drainage

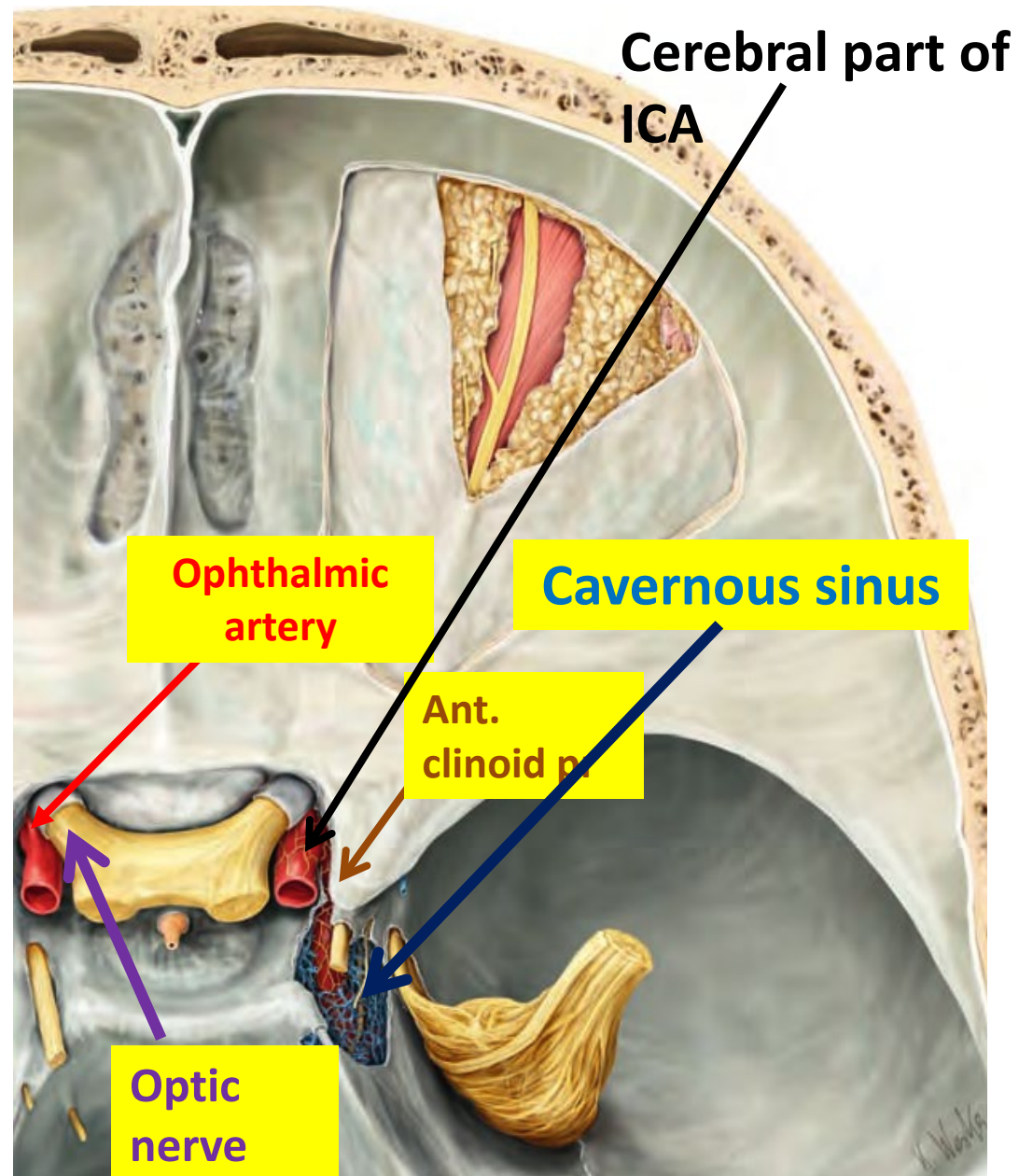


Superior Ophthalmic Vein
Inferior Ophthalmic Vein

OPHTHALMIC ARTERY

Ophthalmic artery:

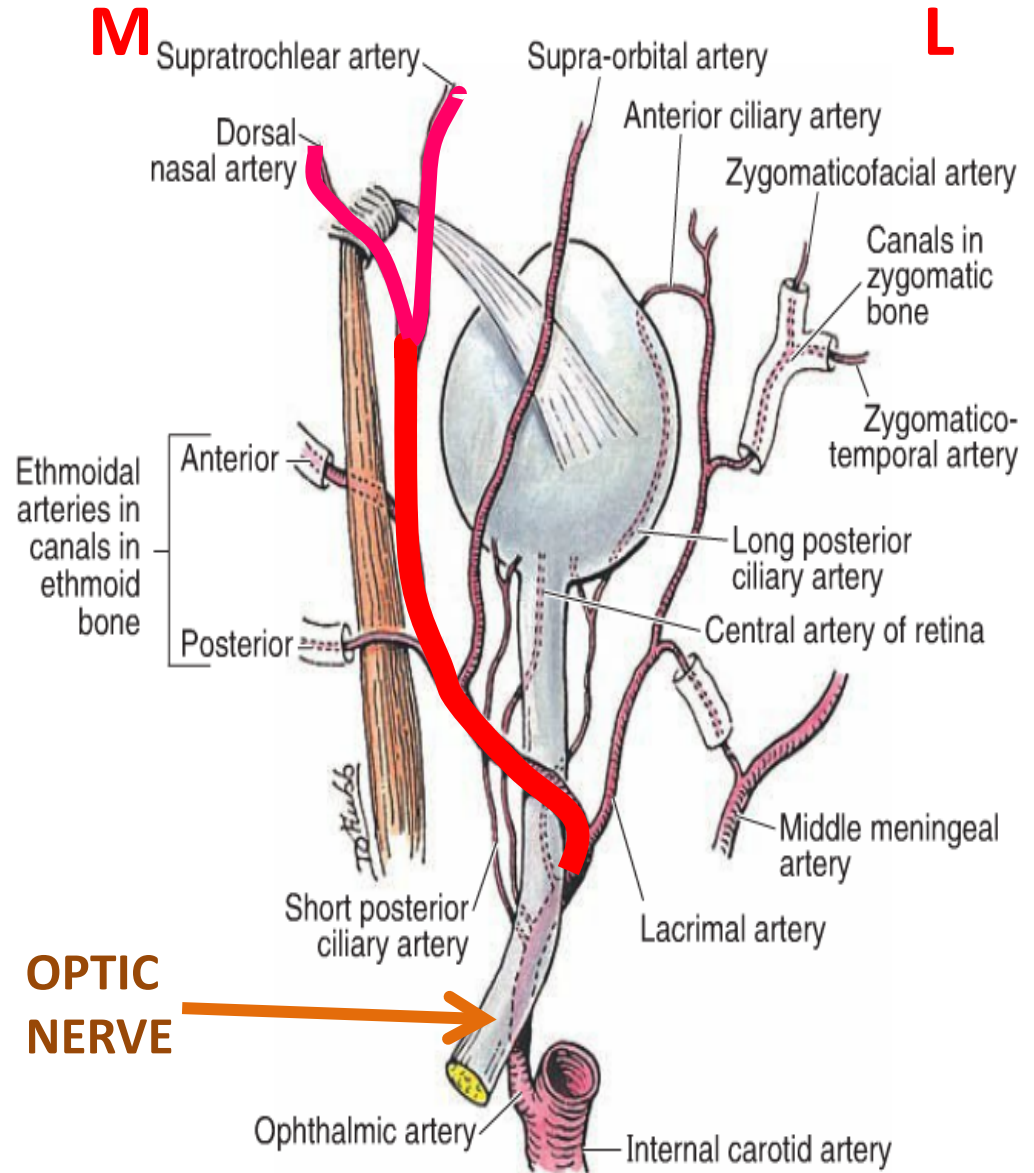
- ❑ Br of cerebral part of internal carotid artery as it emerges from roof of cavernous sinus medial to anterior clinoid process.
- ❑ It enters orbit through optic canal inferolateral to optic nerve



□ In orbit → it crosses above optic nerve from lateral to medial.

□ It runs forwards along medial wall of orbit parallel to nasociliary nerve.

□ It terminates near medial angle of eye → supratrochlear & dorsal nasal arteries.



Branches of ophthalmic artery:

➤ They accompany brs of ophthalmic nerve.

1) **Branches to eyeball** ➔

a) **Central artery of retina** ➔ **End Artery**

(supplies optic nerve & retina). Its occlusion ➔ **complete blindness**

b) **Posterior ciliary arteries** (2 long & 7 short)

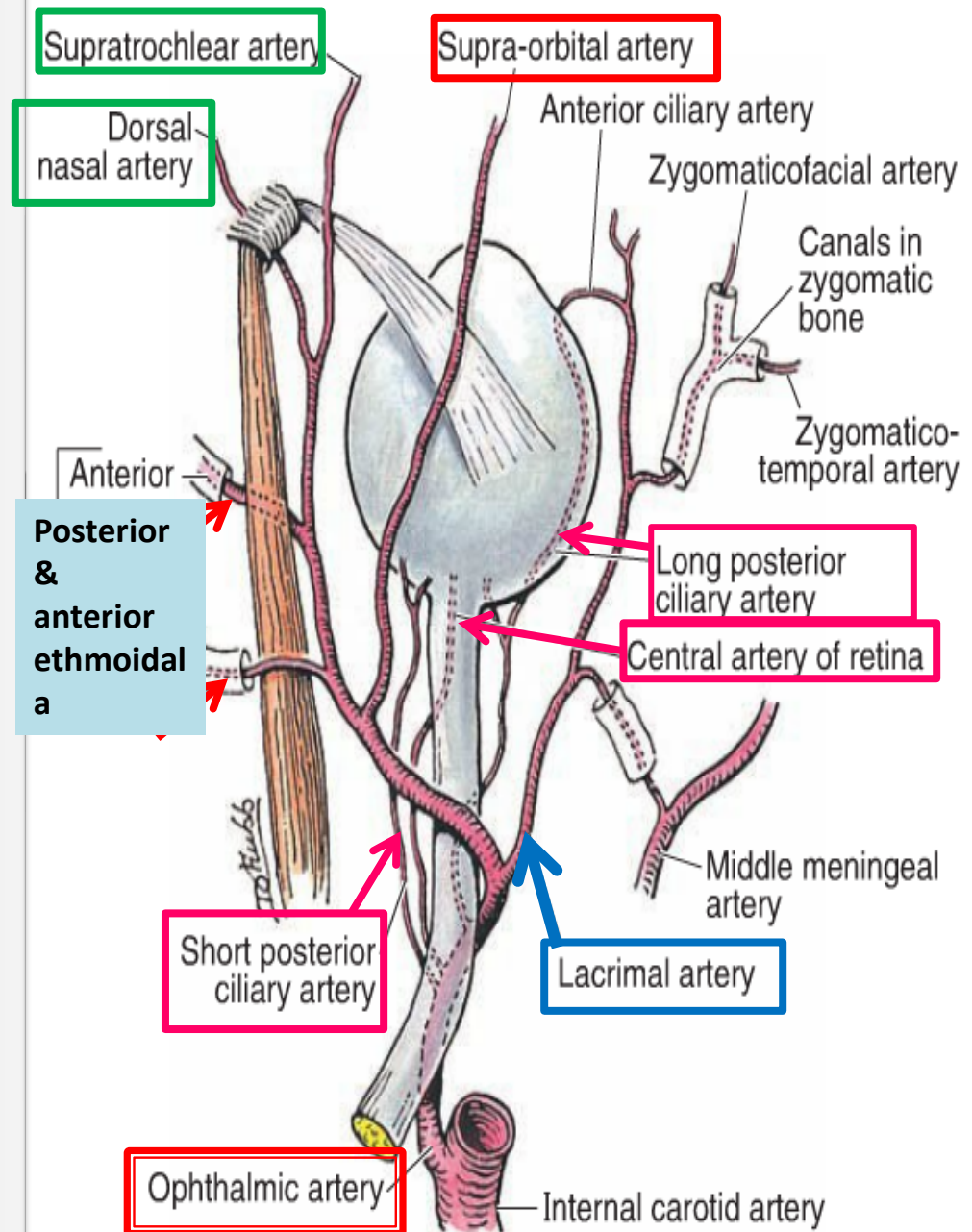
2) **Brs to orbital muscles** ➔ muscular brs

3) **Brs along lateral part of orbit** ➔

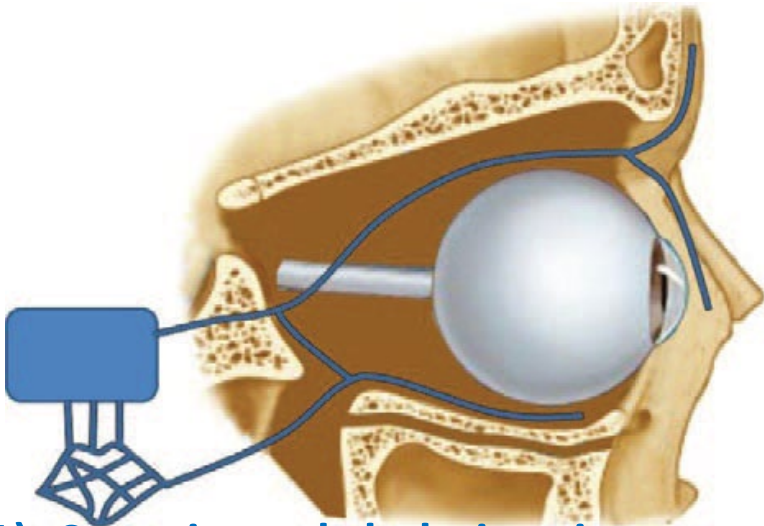
lacrimal artery to lacrimal gland

4) **Brs along medial wall of orbit** ➔ nasal cavity/ external nose/medial part of eyelids/ forehead:

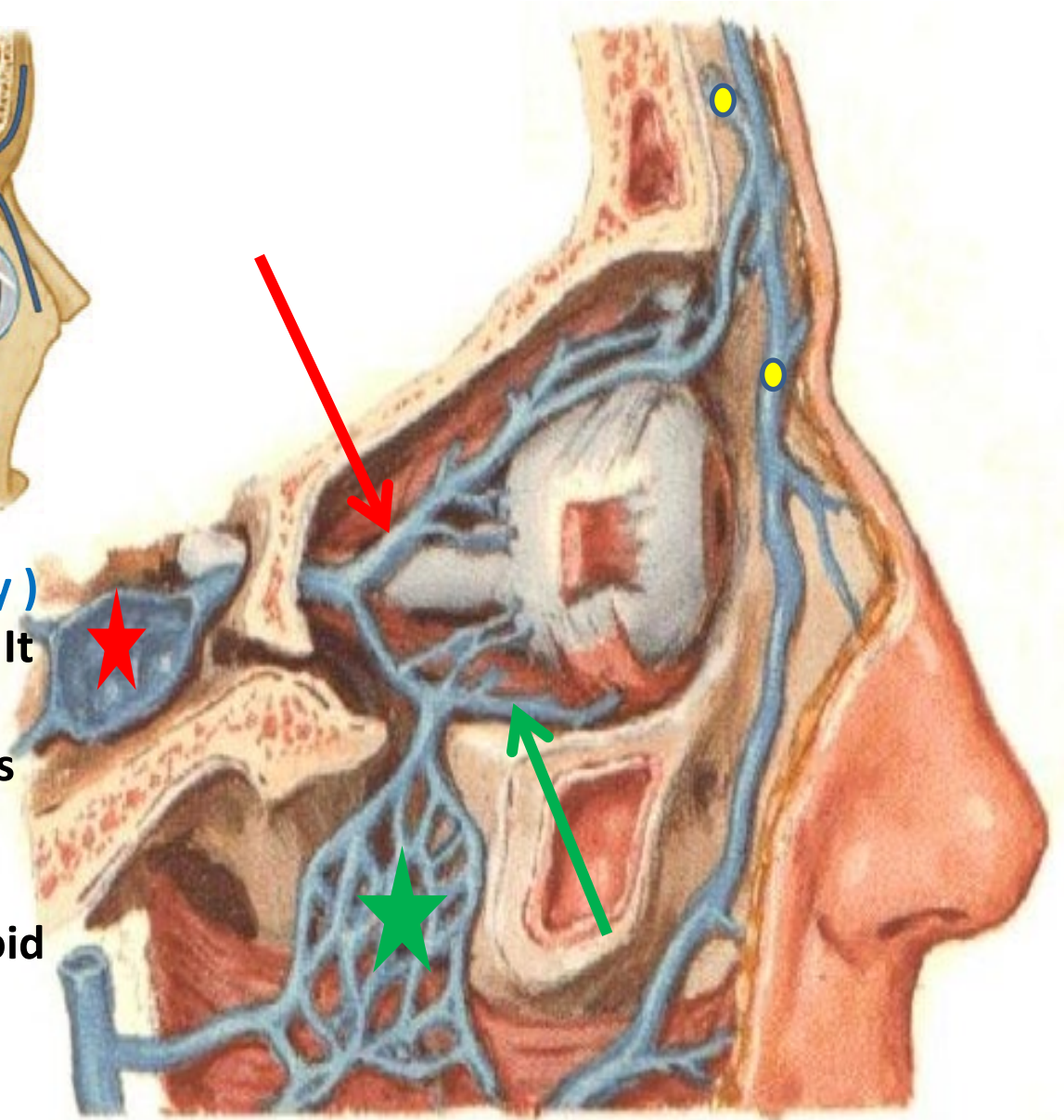
1. Post. ethmoidal
2. Ant. ethmoidal
3. Medial palpebral
4. Supraorbital
5. Supratrochlear
6. Dorsal nasal



Ophthalmic Veins



- 1) **Superior ophthalmic vein**
(accompanies ophth. artery)
→ SOF → cavernous sinus. It communicates ant. with supraorbital & angular veins
- 2) **Inferior ophthalmic veins**
→ joins sup. ophth. vein & communicates with pterygoid venous plexus through IOF



Muscles or nerves that are responsible for adducting the eyeball include all of the following , Except:

- a- Medial rectus
- b- Superior rectus
- c- Inferior oblique
- d- Oculomotor nerve
- e- Inferior rectus



Thank you