

Academic year 2019-2020

3rd year S 5/6

Head and neck module

Eye and Orbit

Session: 2

Lecture:

Date: 11th May 2020

Module staff:

Dr. Ahmed Alsamak Dr. Ali M. Altaie Dr. Haider K. Saeed Dr. Saif Mohammed
Dr. Ali Talib Dr. Rafid Mosa Dr. Raed Jasim Dr. Nehaya Dr. Nawal Mustafa



Learning objectives

LO 1 : study the structure and function of the orbit and orbital contents (eyeball, ocular muscles, neurovascular structures) and the associated structures (eyelids, lacrimal apparatus)

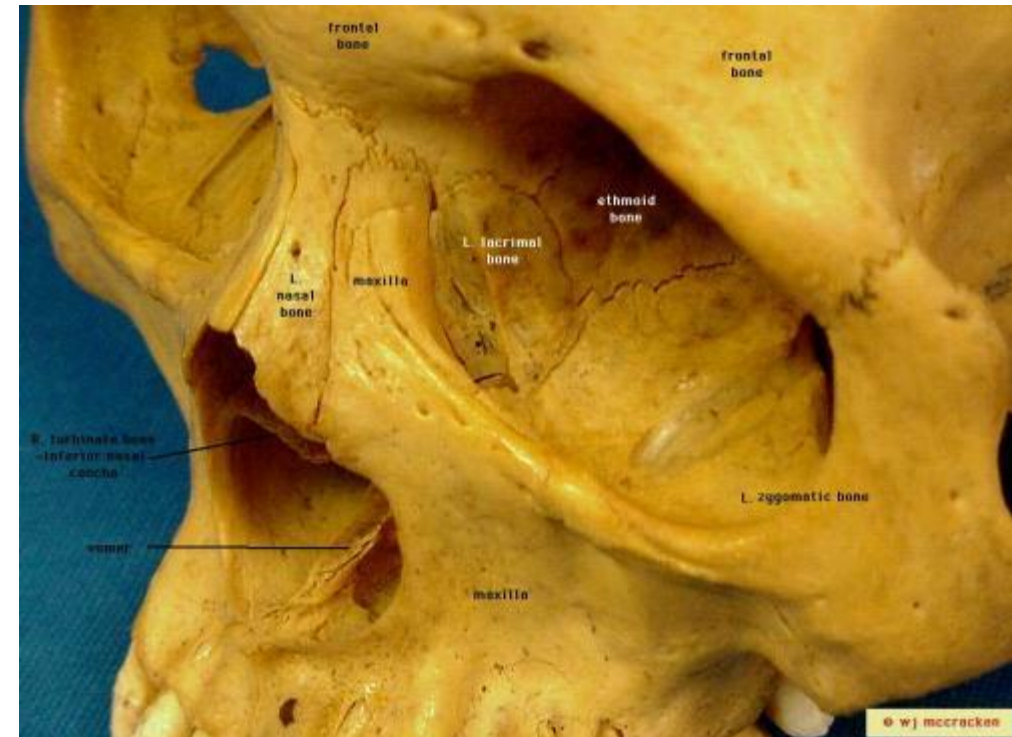
LO 2 : study causes and consequences of damage or disorders affecting the above structures



The Orbit

LO 1

- . **Bony cavity** in facial skeleton
- . Pyramidal shape
- . **Contains**
 - Eyeball
 - Extra-ocular muscles
 - Nerves and vessels
 - Lacrimal gland
 - Fascia and fat



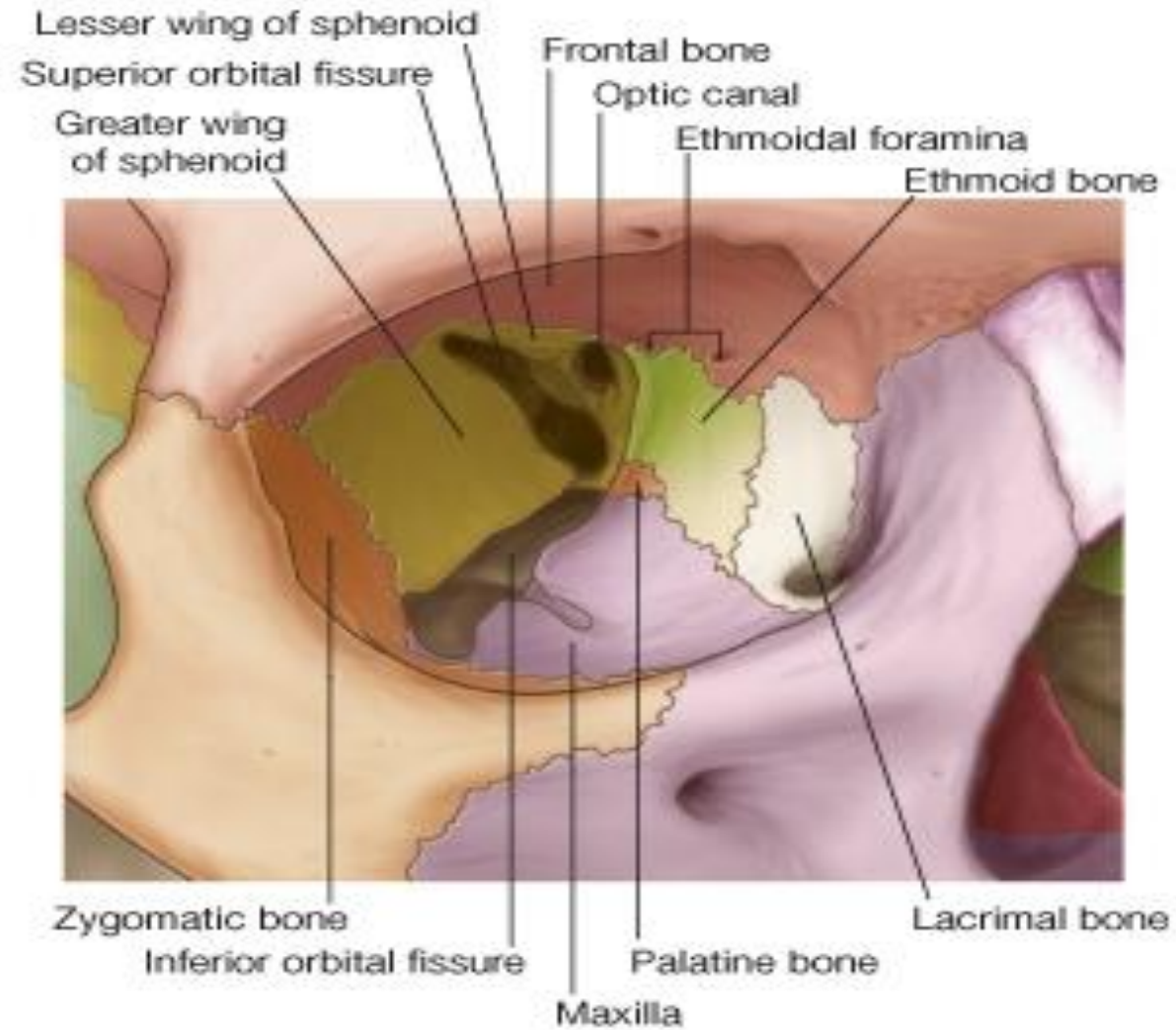
The Orbit

LO 1

Pyramidal – Bones. Covered with peri-orbita (periosteum)

- Apex:** optic canal (for optic nerve)
- Base:** orbital margin surrounding the opening
- Roof:** Orbital part of frontal bone
- Medial wall:** Lacrimal and ethmoid bones
- Lateral wall :** Zygomatic and (greater wing of) sphenoid (thick)
- Floor:** Orbital surface of maxilla
- Fissures/canals that permit the passage of vessels and nerves to the orbit
 - Optic canal
 - Superior orbital fissure
 - Inferior orbital fissure

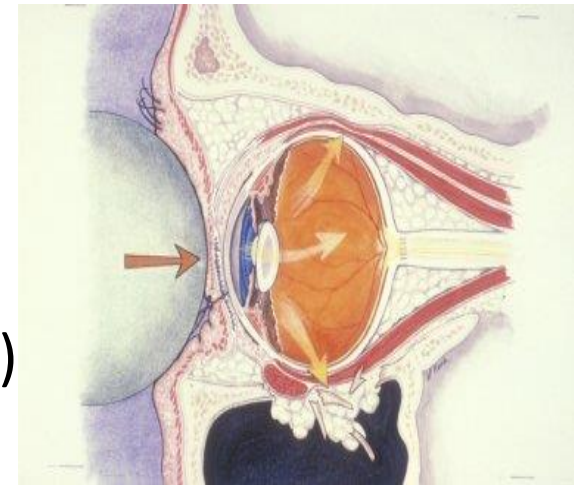




Clinical Consideration

- Blow out fracture
- Medial wall and floor of orbit are thin.
- Fractures occur due to blunt trauma (fighting/tennis balls)
- Increase pressure on orbital structures and eyeball
- Hemorrhage
- Medial wall – related to ethmoid sinuses
- Floor – related to maxillary sinus

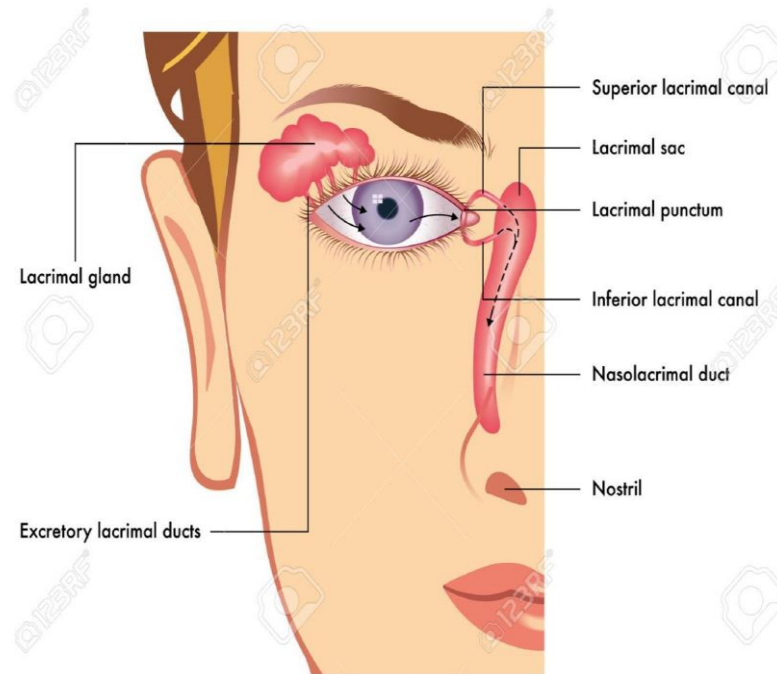
LO2



Lacrimal Apparatus

LO 1

- Lacrimal Gland – lateral part of roof of orbit
- Lacrimal Ducts
- Lacrimal Canaliculi(c)
- Lacrimal Sac(s)
- Nasolacrimal duct(n)



With each eye blink

LO 1

- Eyelids come together from lateral to medial
- Film of fluid over cornea
- Collects together in lacrimal lake which is drained into Canaliculi, then into sac
- Nasolacrimal duct to inferior meatus of nasal cavity



Eye Ball

LO1

Fibrous layer

Sclera:

- Tough and opaque
- shape and resistance
- Attachment of muscle
- Covered anteriorly by conjunctiva

Cornea:

- Transparent
- Anteriorly placed



Vascular layer(Uveal tract)

LO1

Choroid:

- Brown pigmented vascular layer

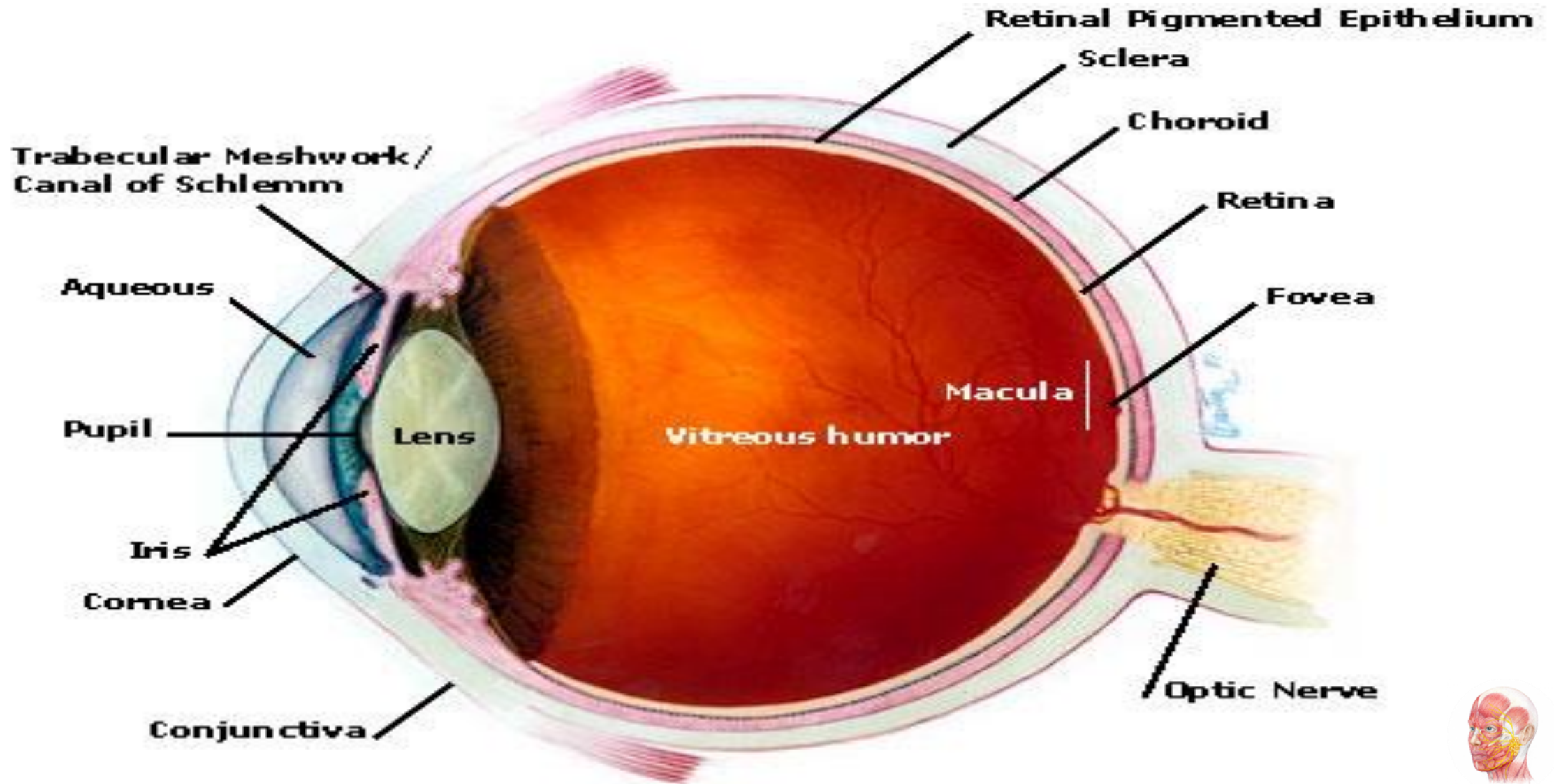
Ciliary Body:

- Muscular and vascular
- Folds: Ciliary processes secreting aqueous humor.
- Provides attachment to the lens.
- Muscular part: Ciliary muscle contraction and relaxation controls thickness of lens.

Iris:

- Anterior to lens
- Central aperture – Pupil – for light transmission
- 2 muscles control size of pupil:
 - Sphincter pupillae – closes pupil (parasympathetic)
 - Dilator pupillae – opens pupil (sympathetic)





Internal Layer(Retina)

LO1

Neural layer for light reception

Fundus: Posterior part of retina

- Circular depression – **Optic disc**
Optic nerves enters eye.
No photoreceptors (blind spot)
- **Macula Lutea** (just lateral to disc)
Special photoreceptor cones for acuity
Fovea centralis is the center of is the macula



Fig. 14. Ophthalmoscopic appearance of the retina to show the macula lutea (yellow around fovea).



Chambers of the eye

LO1

1. **Anterior:** between cornea and iris
2. **Posterior:** between iris and lens

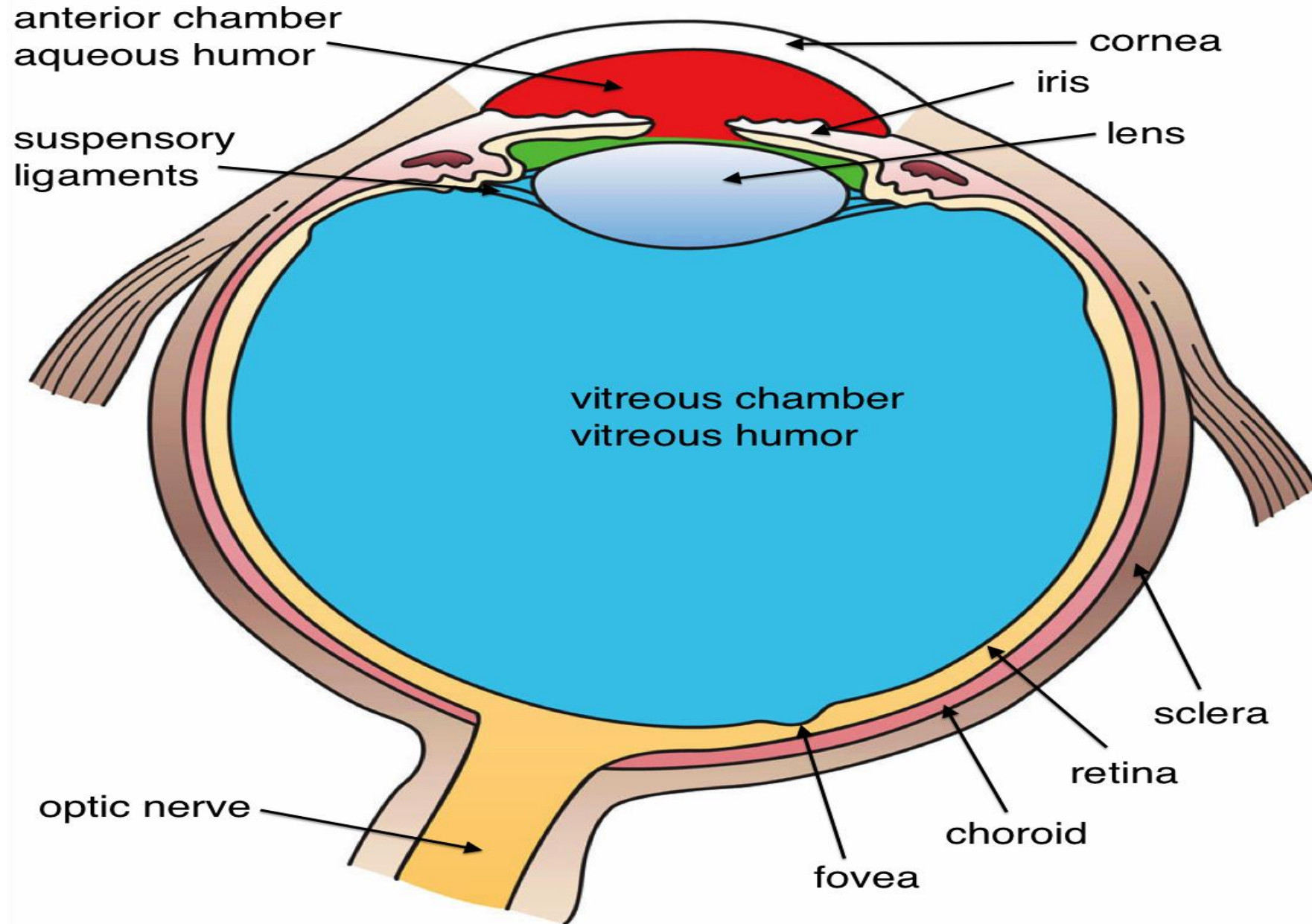
Both contain aqueous humour produced by ciliary body

Drains out into canal of Schlemm of sclerae (venous blood)

Vitreous body

- Transparent gel
- Between lens and retina
- Transmits light





Clinical Consideration

LO2

- Conjunctivitis
- Sub-conjunctival Hemorrhage
- Corneal foreign Body
- Corneal Laceration
- Corneal Ulcer
- Iritis
- Acute Glaucoma
- Papilledema



Conjunctivitis

LO2

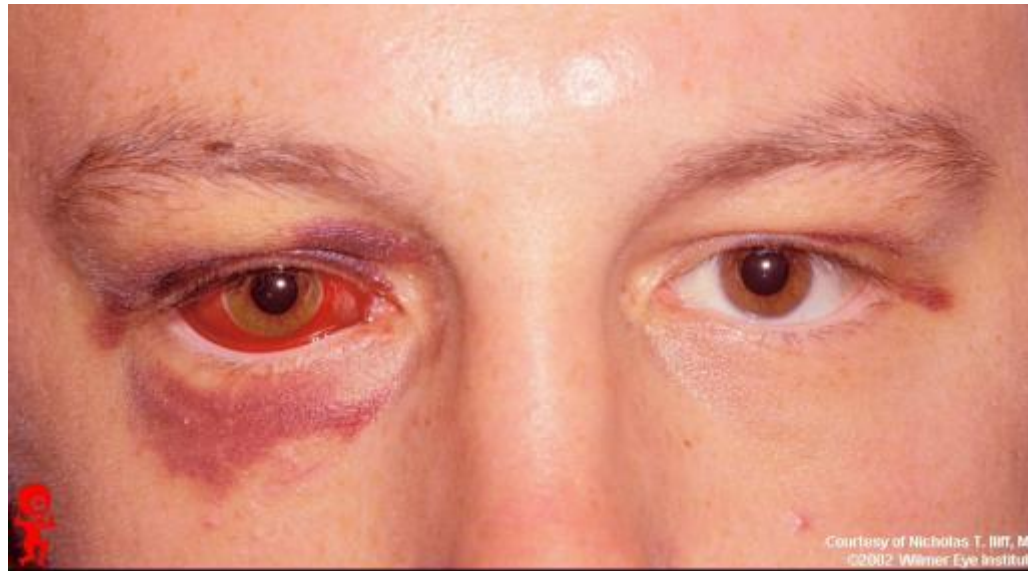
- Bacterial, viral, allergic
- Burning, itching, gritty eyes
- Purulent discharge in bacterial



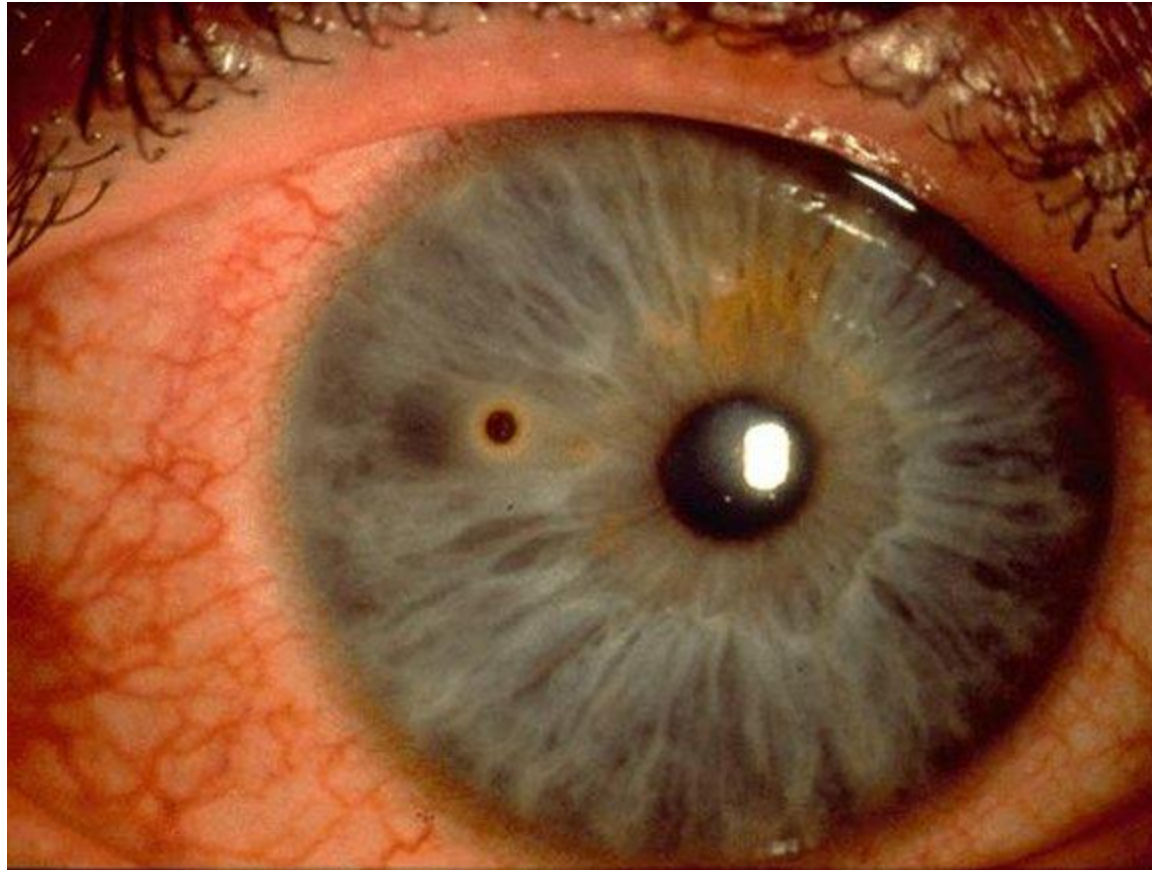
Sub-conjunctival hemorrhage

LO2

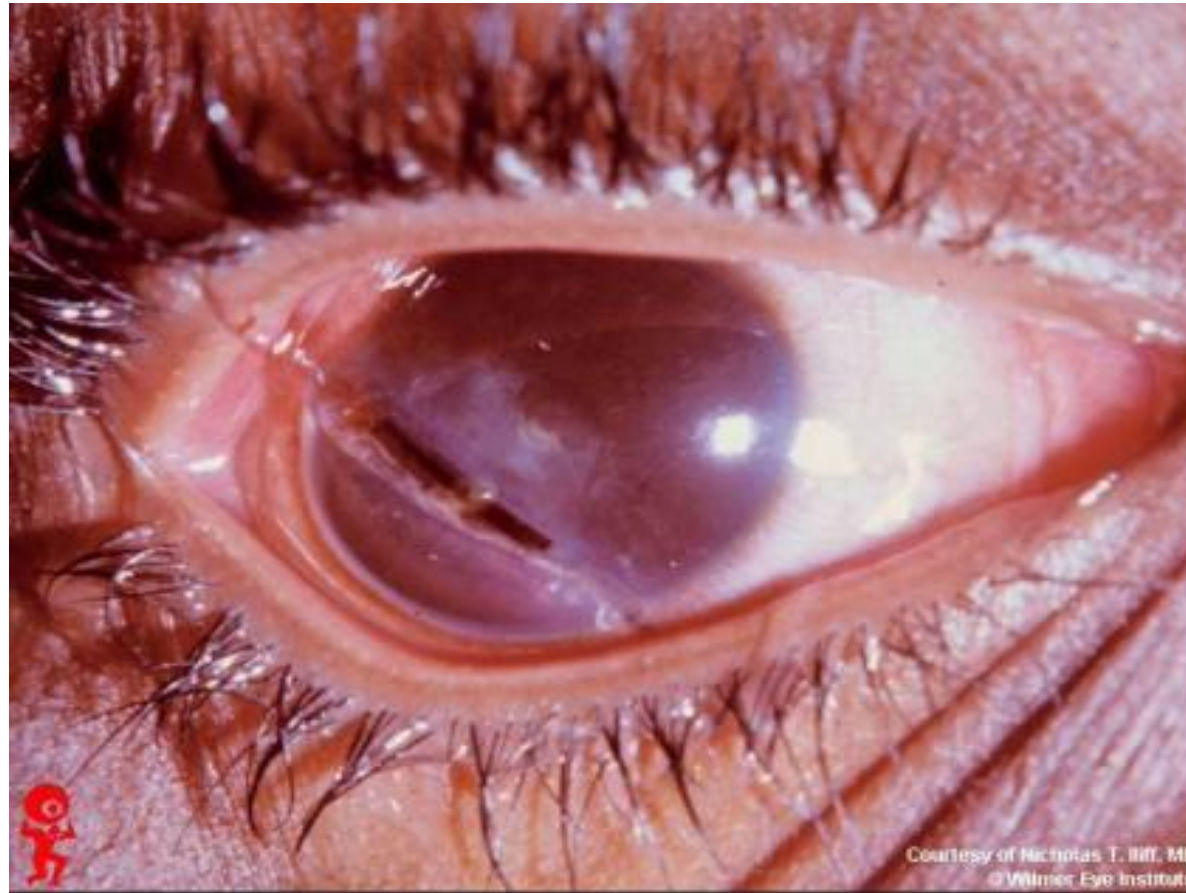
- Hypertension, trauma, raised intra-abdominal pressure, bleeding disorder, idiopathic



Corneal foreign Body



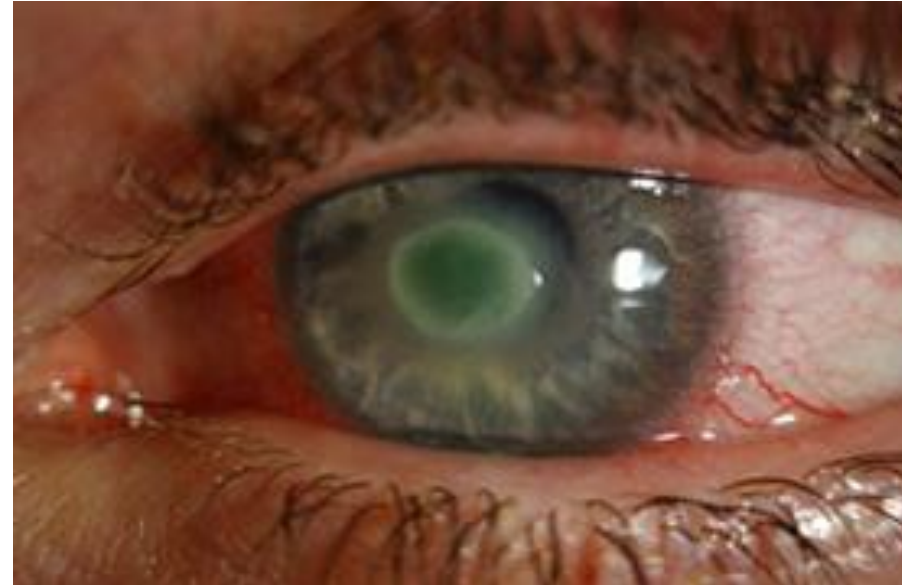
Corneal Laceration



Corneal Ulcer

LO2

- Trauma
- Contact Lens
- Infection – Bacterial, viral, fungal
- Red eye
- Ulcer stains with fluorescein
- Aggressive antibiotic therapy
- Corneal grafting if required



Glaucoma

LO2

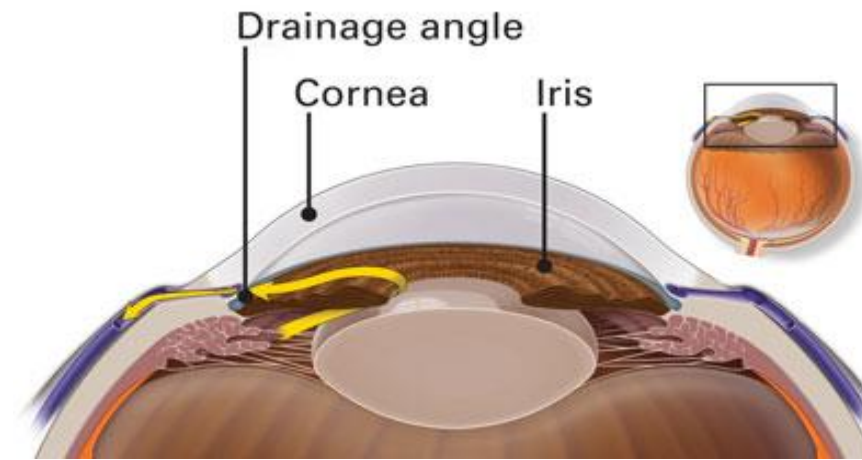
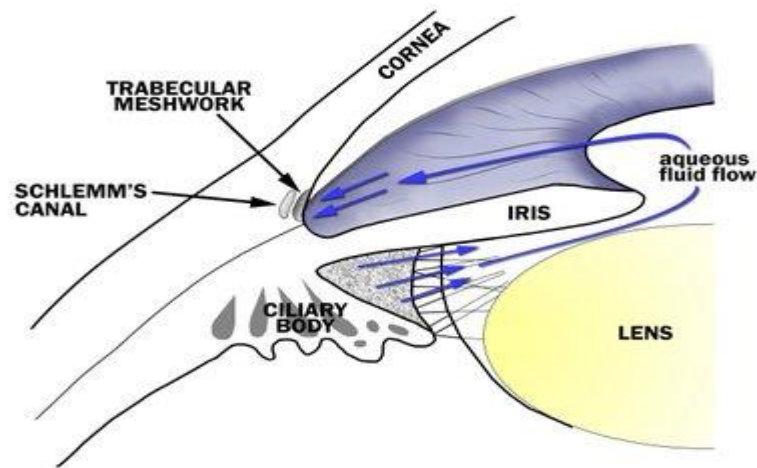
Group of diseases usually due to **RAISED INTRA-OCULAR PRESSURE**

It is two main types :

1. **Chronic glaucoma** which is the most common type and it is asymptomatic
2. **Acute glaucoma**: Pain, nausea, reduced vision, photophobia.



Aqueous humour from posterior chamber travels to anterior chamber. Normally re-absorbed into canal of Schlemm (venous drainage) around the circumference of cornea. Any cause of obstruction leads to increased intra-ocular pressure.



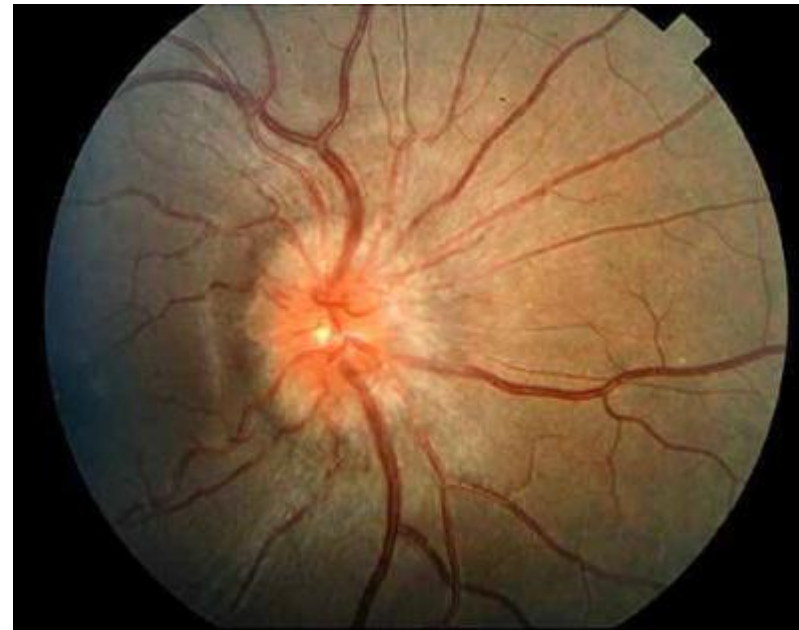
Papilledema

LO2

- Swelling of optic disc on fundoscopy
- Optic nerve surrounded by meninges which cover brain
- Any cause of increased intracranial pressure can cause it
- Blurred enlarged disc



normal

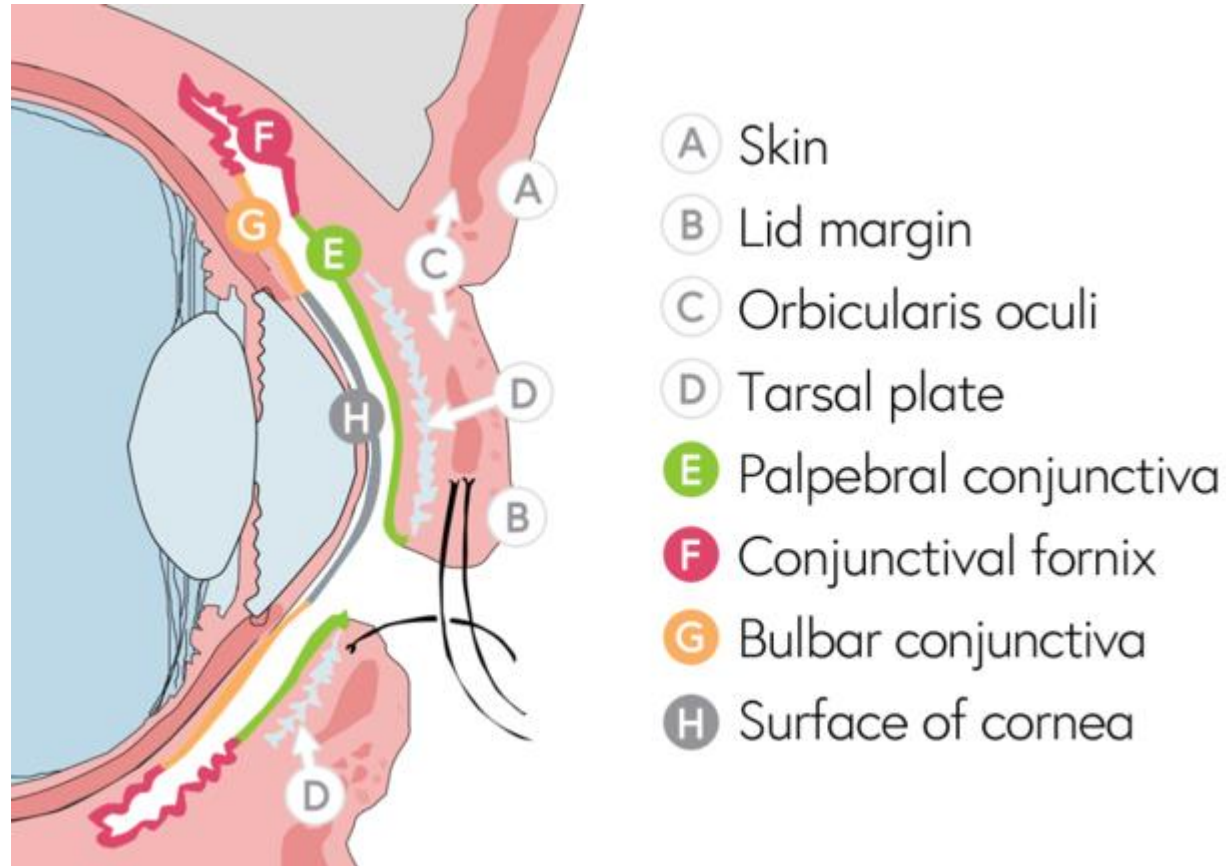


abnormal



Eyelids – Palpabrae

LO1





Movement of the eyelids by the orbicularis oculi and levator palpebrae superioris muscles innervated by the facial and oculomotor nerves respectively.

Functions of eyelids

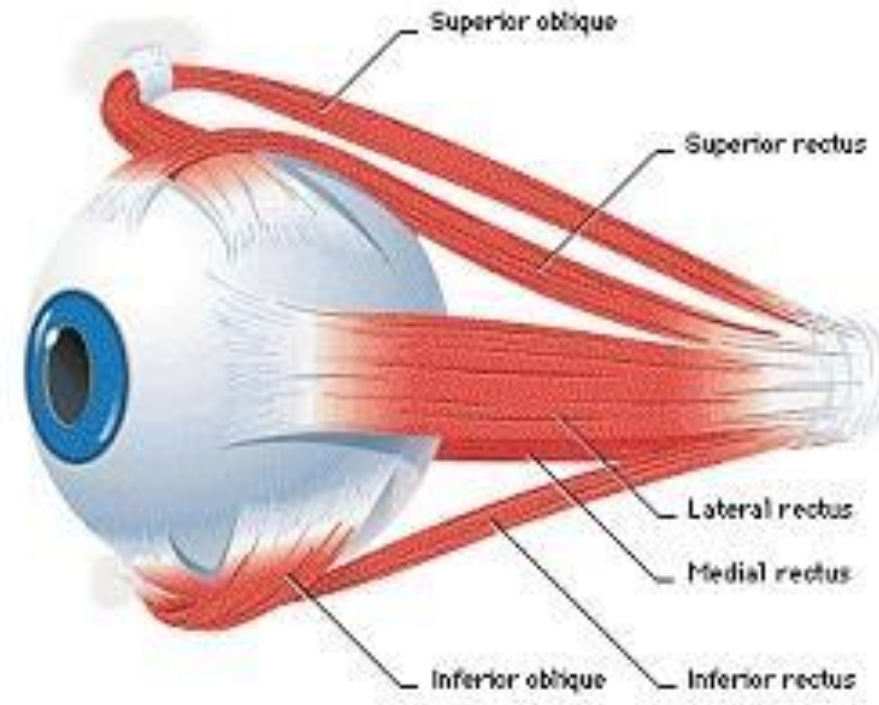
protect the cornea and the eyeball from injury

keep the cornea moist by covering it with lacrimal fluid.

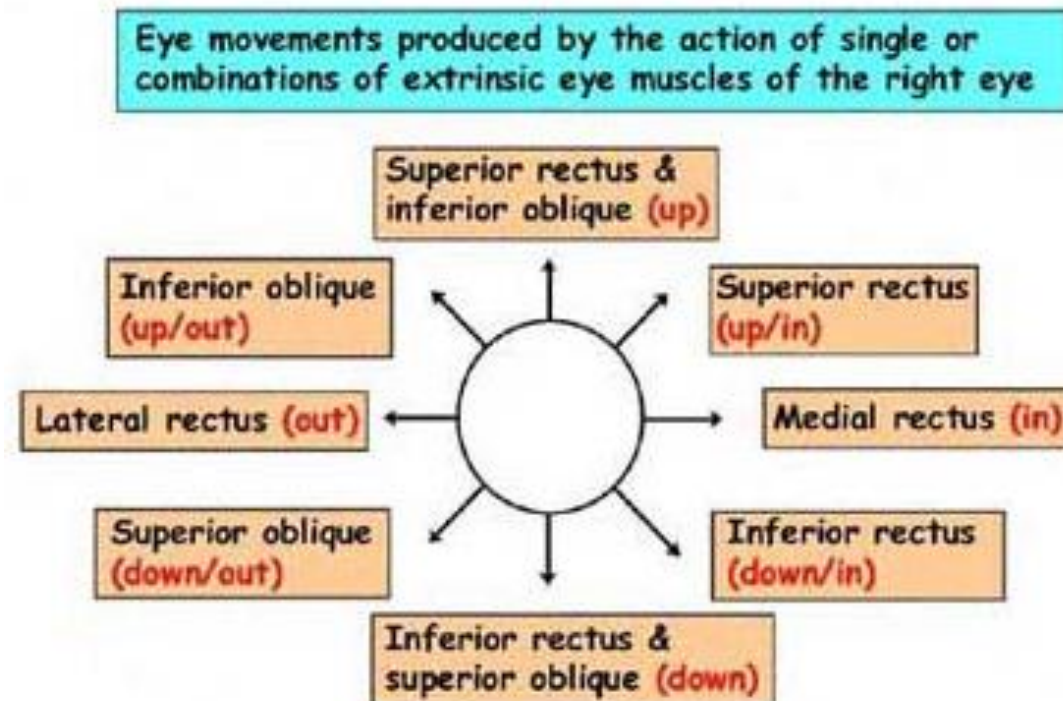
Extra-ocular Muscles

LO1

- 6 Muscles that move the eye ball
- 1 for upper eyelid elevation
- Levator palpebrae superioris
- Superior rectus
- Inferior rectus
- Medial rectus
- Lateral rectus
- Superior oblique
- Inferior oblique



- Innervated by **Cranial Nerves**:
- LPS, SR, IR, MR, IO - CN III (**Oculomotor nerve**)
- LR – CN VI (**Abducens nerve**)
- SO – CN IV (**Trochlear nerve**)



Nerves and Vessels

LO1

- Nerves:

- Optic Nerve (CN II) – Vision
- Oculomotor Nerve (CN III) – Eye movement (SR/IR/MR/IO)
- Trochlear Nerve (CN IV) – SO
- Abducens Nerve (CN VI) – LR
- Ophthalmic division of Trigeminal Nerve (V_1) – its branches supply sensation to orbit, eyelids, forehead, eyeball

- Arteries:

- Ophthalmic Artery
- Branch of Internal Carotid Artery
- Central artery of retina is a branch – pierces optic nerve and emerges at disc

- Veins:

- Ophthalmic veins that drain into the cavernous sinus within cranial cavity



Clinical Consideration

LO2

- Nerve palsies: CN III, IV, VI
- Paralysis of muscle(s) supplied.
- Some limitation of ocular movement
- DIPLOPIA (double vision) on using the muscle

- CN III: Paralysis of most ocular muscles
- Ptosis
- Eyeball is abducted and depressed due to unopposed action of LR and SO
- Diplopia
- CN VI: Paralysis of lateral rectus
- Unable to abduct the eye



Central retinal artery is a terminal branch

LO2

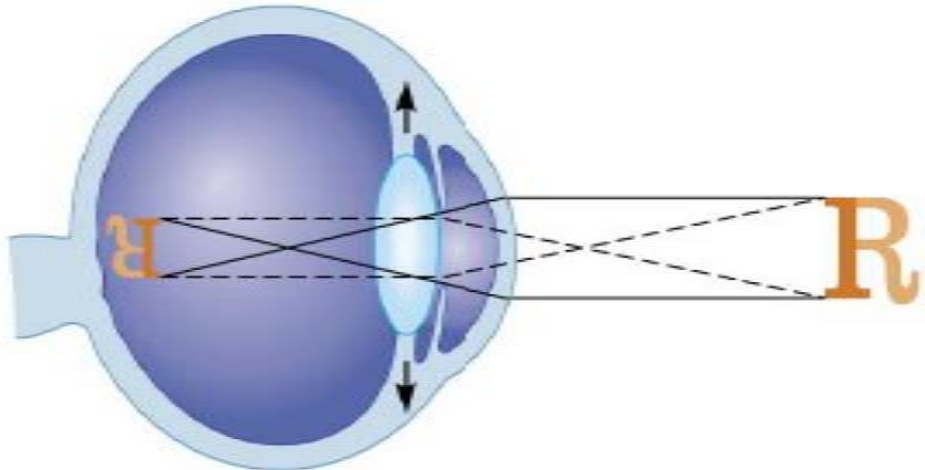
- Obstruction in any of its branches by an **EMBOLUS** can result in NEAR TOTAL BLINDNESS in the affected area.



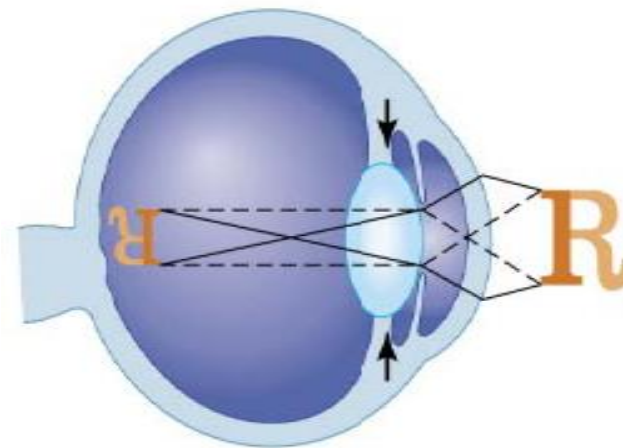
Lens

LO1

- Capsule
- Elastic lens fibers
- Attached to ciliary process
- Ciliary muscle contraction can cause tension and relaxation of the lens
- Circular fibers – bulging
- Radial fibers – flattening



(a) Lens is flattened for distant vision

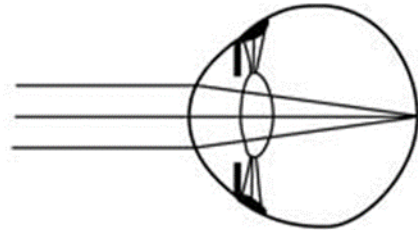


(b) Lens bulges for close vision

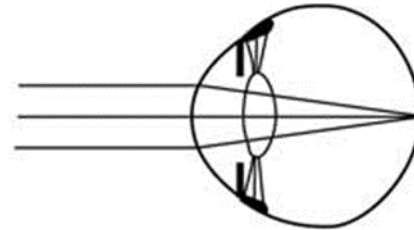


Abnormalities of vision

LO2

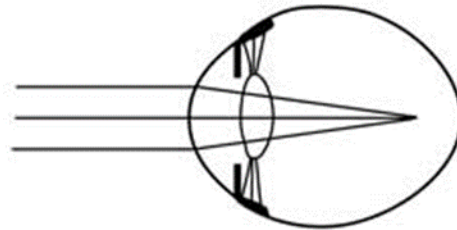


Normal eye



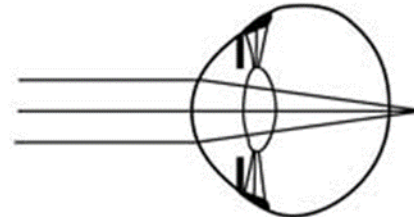
Normal eye

Myopia

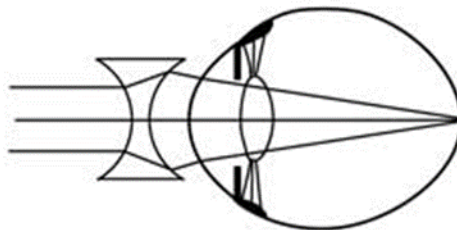


Light focused in front of retina

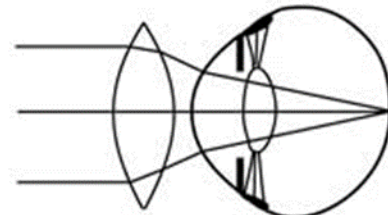
Hypermetropia



Light focused behind the retina



Corrected with concave lens



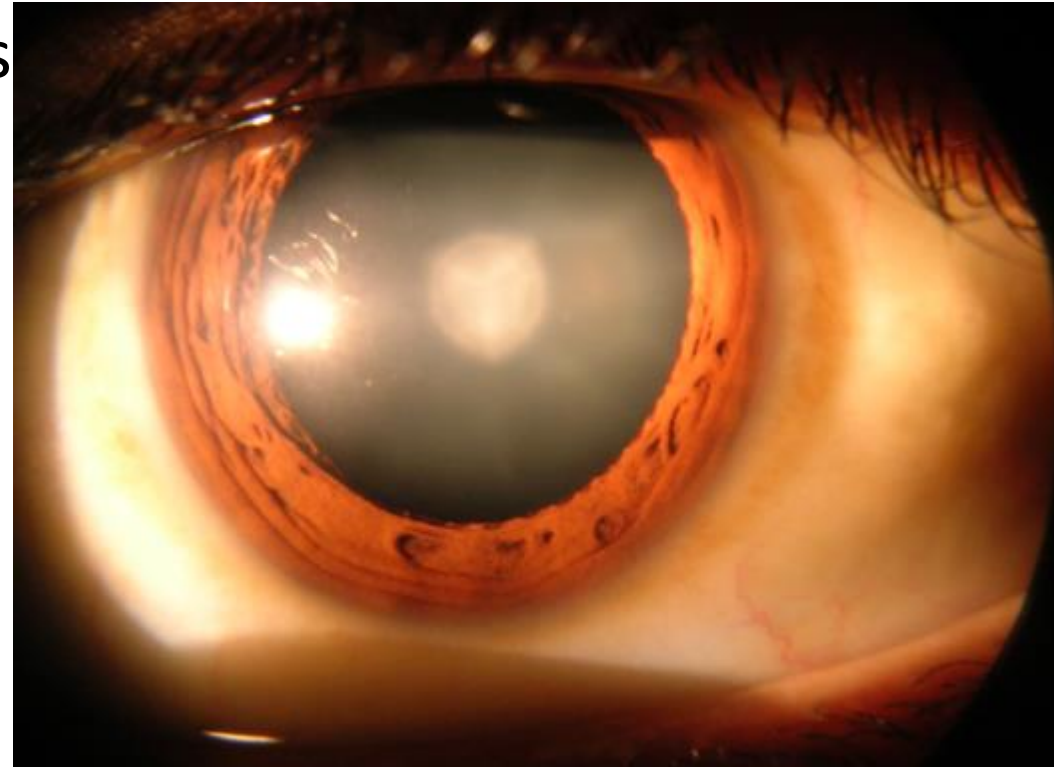
Corrected with convex lens



Cataract

LO2

- Opacity of lens – clouding
- Interferes with vision
- Lens appear whitish



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شكرا جزيلا

