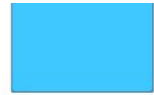


OPHTHALMOLOGY

RR-8.0

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BASIC ANATOMY OF EYE

----- Active space -----

General Features

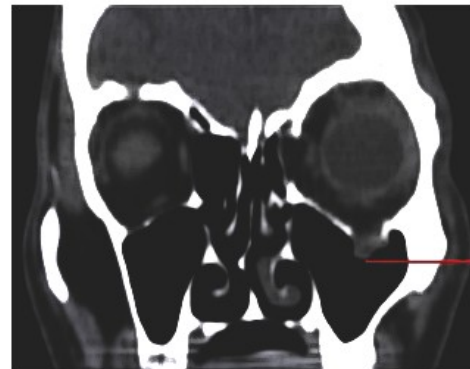
00:01:23

Shape : Aspherical (Oblate spheroid).

Volume : 6 mL.

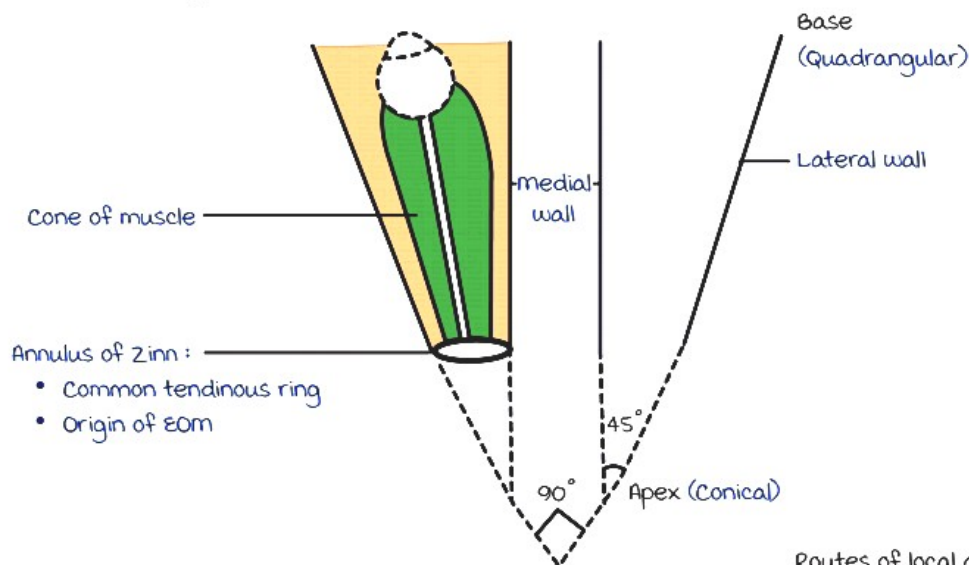
Location : Orbit → 4 walls.

- Thinnest wall : **medial**.
- Weakest wall : **Floor**.
- m/c orbital fracture : Blow out fracture.



Blow out fracture

Orbital Anatomy :



- Annulus of Zinn :
- Common tendinous ring
 - Origin of EOM

Routes of local anaesthesia :

- Retrobulbar ■ : Intraconal space
- Peribulbar ■ : Extraconal space (↓ Complications).

Layers of the Eyeball

Outermost :

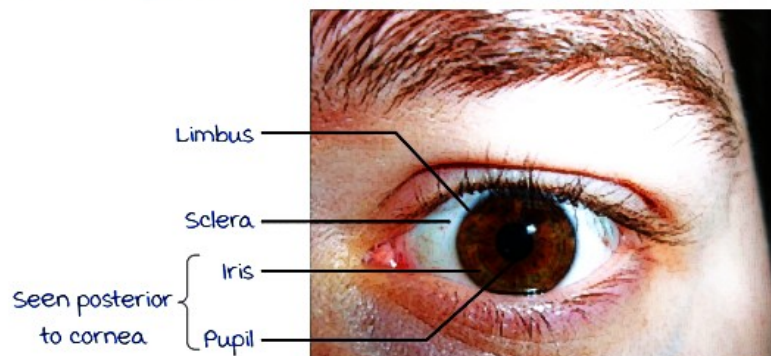
1. Cornea :
 - Transparent.
 - Anterior 1/6th.
 - Convex (Refracts light).
2. Sclera :
 - Opaque (White).
 - Posterior 5/6th.
 - Covered by conjunctiva.
3. Limbus :
 - Corneoscleral junction.
 - Contains stem cells :
 - Specific marker : ABCG2.
 - Universal marker : CD34.

middle : uvea (vascular).

1. Iris :
 - Sphincter pupillae : miosis (Constriction).
 - Dilator pupillae : mydriasis (Dilatation).
2. Ciliary body :
 - Pars plicata (Anterior) :
 - Ciliary projections : Secrete aqueous.
 - Pars plana (Posterior) :
 - Relatively avascular (Point of entry into fundus).
3. Choroid :
 - Posteriormost.
 - ↑vascularity.

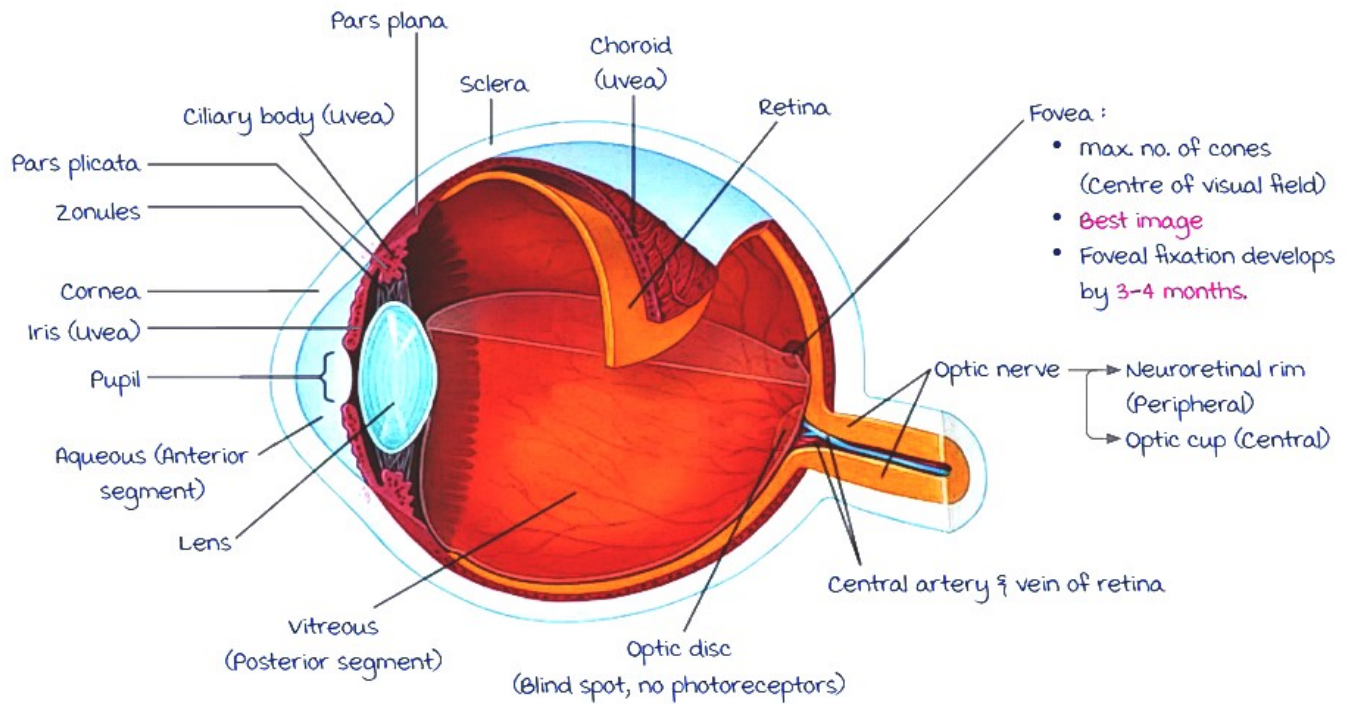
Inner : Retina (Neurosensory).

- Converts sensory impulses into neural signals.



Cross-section of Eyeball :

----- Active space -----



Note : Pars plana gives the site of entry into vitreous.

Limbal Pathologies :

1. Limbal dermoid :

- Benign, congenital tumour.
- Choriostomatous tissue ⊕ (Bone, cilia, hair follicles etc).

2. Pterygium :

- Limbal stem cell deficiency.
- Conjunctiva grows over cornea (Normally, conjunctiva only covers the sclera).



Limbal dermoid



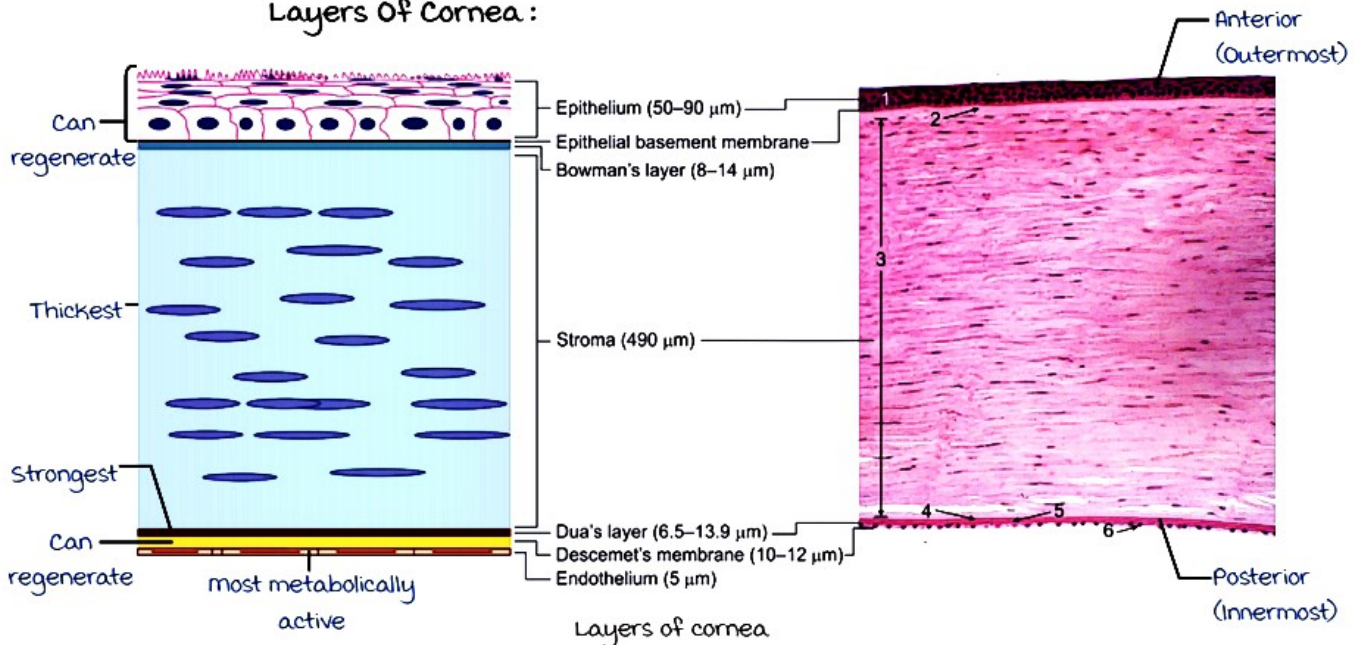
----- Active space -----

CORNEA AND SCLERA

Anatomy Of Cornea

00:01:00

Layers Of Cornea :



1. Epithelium :

- Non-keratinized stratified squamous epithelium.
- Layers :
 - Superficial : Squamous (microvilli ⊕) → Adhesion of tear film).
 - Basal : Columnar (mitosis ⊕) → **Regeneration**).

2. Bowman's layer :

- False basement membrane (**PAS -ve**).
- Acellular
(No regeneration → Heals by scar formation → **Corneal opacity** → LOV).

Corneal opacities :

	Pupillary margin	Iris details	Depth of involvement
Nebular (Faintest)	visible	visible	Bowman's & superficial stroma
macular	visible	Not seen	≤ 1/2 stroma
Leucoma (most opaque)	Not seen	Not seen	≥ 1/2 stroma

Nebular opacity : **maximum discomfort** (Induces irregular astigmatism).

Leucoma : **maximum visual loss**.

3. Stroma : made of collagen (m/c Type I) & GAGs (m/c keratan sulphate).

----- Active space -----

4. Dua's layer : Strongest corneal layer.

5. Descemet's membrane (DM) :

- Previously called the strongest layer.
- Regeneration (+).
- **Schwalbes line** : Peripheral termination of DM.

6. Endothelium :

- metabolism (+).
- maintains **corneal transparency**.

No. of endothelial cells (Cells/mm ²)	Significance
2400-3000	Normal
<2400	Corneal compensation
<500 (Critical point)	Corneal decompensation → Edema → Hazy cornea

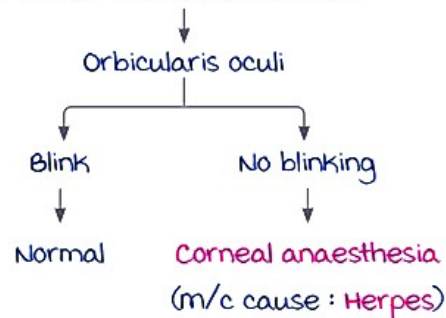
Note : Counted using **specular microscopy**

Nerve Supply (Sensory) :

TON : Trigeminal → Ophthalmic → Nasociliary

Test for corneal sensations :

Cotton wisp → Touch cornea → **CN V** (Afferent) → Brain → **CN VII** (Efferent)



General Properties of Cornea :

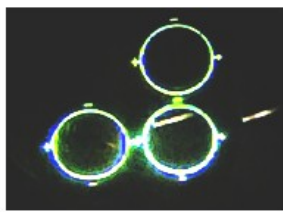
Corneal shape : Convex (Converging) } Curvature ∝ Power
 Corneal power : +43D to +44D
 Corneal colour : Transparent (Appears black)

1. Pachymetry :

- measures corneal thickness (CT).
- Normal CT ~ 540 microns/0.54 mm.

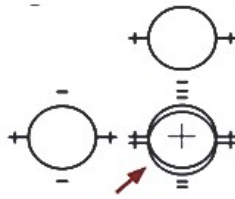
2. Keratometry :

- measures corneal curvature.
- Astigmatism : vertical curvature \neq Horizontal curvature.

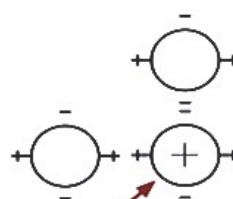


Keratometer

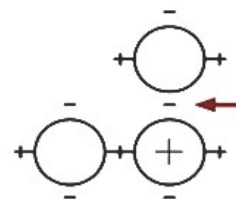
Positioning of
keratometric
mires



Incorrect



Incorrect



Correct

3. Topography :

Examination of corneal surface using Placido disc.



4. Staining :

a. Fluorescein dye :

- Stains areas of broken epithelium (Ulcer base).

• Other uses :

- Goldmann's applanation tonometry.
- Seidel's test (To locate site of perforation).
- Tear film break up test (To detect dry eyes).



Orange dye used

Viewed under
Cobalt blue filter

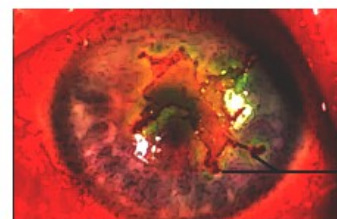


Green fluorescence

Areas of
broken
epithelium

b. Rose Bengal dye :

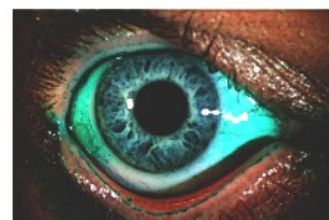
Stains areas of necrotic tissue (Ulcer margins)



Necrotic
tissue (Red)

c. Lissamine green dye :

- Stains both cornea + conjunctiva.
- Used in dry eyes > Corneal ulcer.
- Does not destroy normal tissue (Non-toxic).



Corneal Ulcer

00:26:45

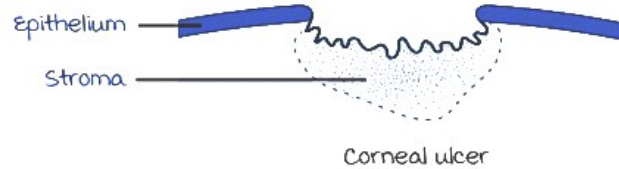
----- Active space -----

Loss of epithelium + Necrosis of underlying tissue

w/o necrosis

Abrasion.

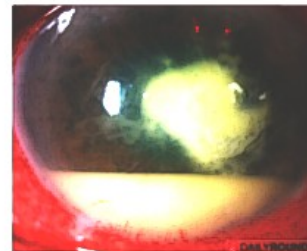
(Regenerates)



BACTERIAL CORNEAL ULCER

Pneumococcus/S. pneumoniae :

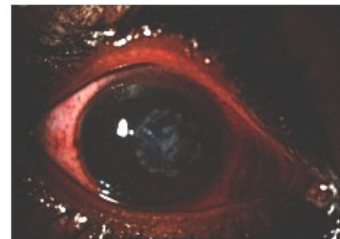
- m/c cause (India).
- *Ulcus serpens* : Snake shaped ulcer.
- *Hypopyon* : mobile & sterile collection of pus in anterior chamber.



Hypopyon

Nocardia :

- Seen in traumatic cases.
- Wreath/pin head pattern ulcer



wreath/Pin head pattern ulcer

Note :

Pseudomonas :

m/c cause of corneal ulcer in contact lens users.

Organisms that can penetrate intact cornea :

mnemonic : High Level CNS

- *Haemophilus aegyptius*
- *Listeria*
- *Corynebacterium diptheriae*
- *Neisseria gonorrhoeae*
- *Neisseria meningitidis*
- *Shigella*

management :

mnemonic : SS

1. Scrape base of ulcer using blunt edge of 15 no. blade.
2. Gram staining & culture.
3. Start fortified antibiotics.
4. Supportive therapy : Atropine → Cycloplegia relieves pain.
5. Avoid steroids.

----- Active space -----

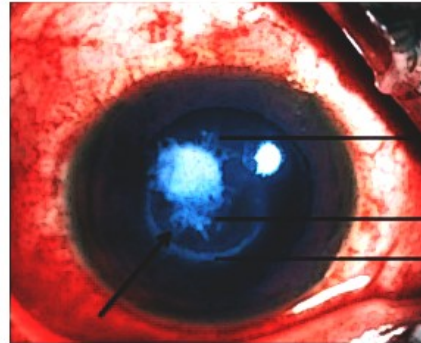
FUNGAL CORNEAL ULCER

- m/c cause : **Aspergillus** (Filamentous, septate).
- H/o : Trauma with **vegetative material**.

Symptoms : mild pain & redness.

Signs :

- Dry ulcer.
- Feathery margins.
- Satellite lesions.
- **Wessley immune ring** (Ag-Ab reaction).
- Hypopyon : **Immobile & unsterile**.



Fungal corneal ulcer

Satellite lesion

Feathery margin

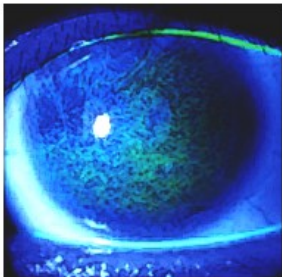
Wessley immune ring

Treatment :

- DOC : **5% Natamycin** eye drops.
- Rest of the management is similar to bacterial corneal ulcers.

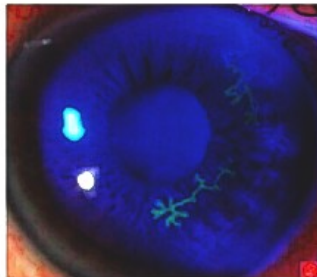
HERPETIC KERATITIS

Disease Progression :



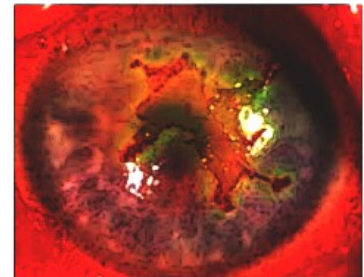
Superficial punctate keratitis

If untreated →



Dendritic ulcer

If untreated →



Geographic ulcer

Treatment :

- **3% Acyclovir** eye ointment.
- Steroids **contraindicated**.

Other Lesions d/t Herpes :

- Necrotising stromal keratitis
 - Disciform keratitis/endothelitis
 - Metaherpetic keratitis/neutrophic ulcer : **CN V atrophy/palsy** → Corneal anaesthesia.
- Rx : **Topical steroids** (Intact epithelium) + Oral acyclovir

Note :

1. Neuroparalytic ulcer (Not d/t herpes) : **CN VII palsy** → Loss of blinking (Lagophthalmos) → **Exposure keratitis** → Neuroparalytic ulcer.
2. Lagophthalmos seen in Leprosy & Bell's palsy.