

CORNEA & SCLERA

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CORNEA

cornea its a dome-shaped **transparent membrane** that covers the front portion of the eye. It covers the pupil , iris , and anterior chamber (the fluid-filled inside of the eye) , it does contain many nerves and is very sensitive to pain or touch , its major refractory surface

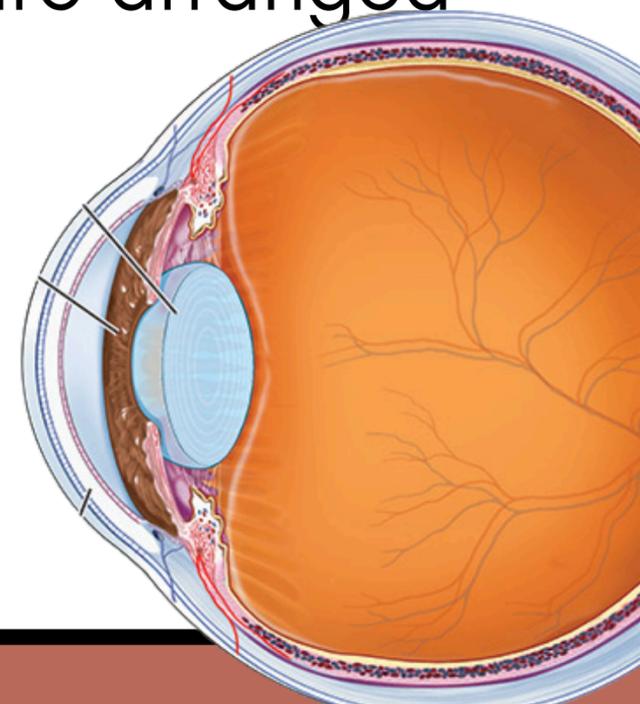
CORNEA'S TRANSPARENCY CAUSED BY :

1- there is no blood vessels (avascular)

2-The collagen fibres that make up the corneal stroma (middle layer) are arranged in a strictly regular, geometric fashion .

- Thickness of cornea : Central : 0.5 -0.6 mm / Periphral : 0.7-1 mm
- Refractive power (60diopters) :

Corneal refractive power : 43D Lense refractive power : 15 D



INFECTIVE CORNEAL DISORDERS

1- Viral keratitis :

Herpes simplex

Herpes Zoster

2- Bacterial keratitis

3- Fungal keratitis

4- Acanthameba keratitis

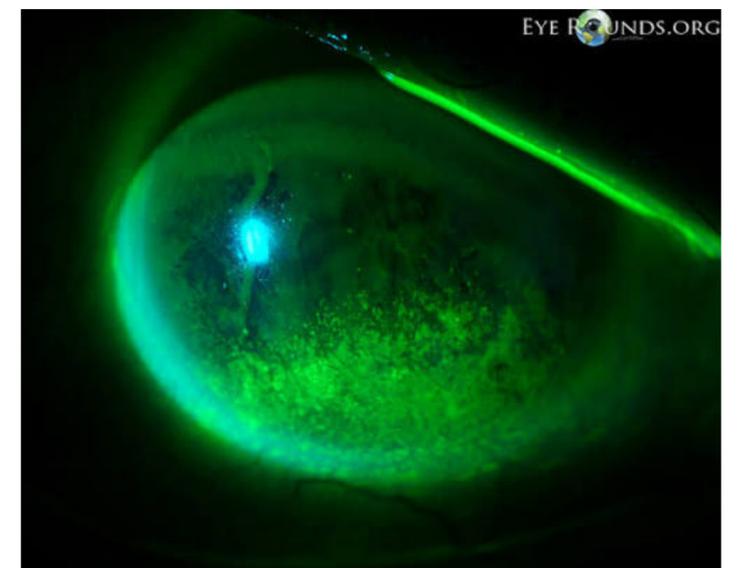
HERPES SIMPLEX KERATITIS

Type 1 HSV is the important cause of ocular symptoms .

Type 2 HSV is more common to cause genital disease but can cause keratitis and chorioretinitis in infants . Infection can be : primary OR secondary

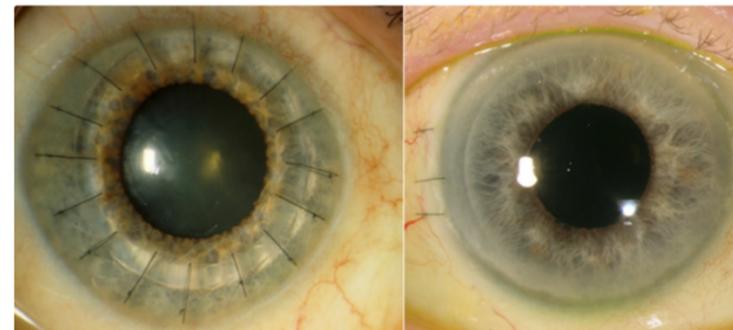
PRIMARY herpes simplex keratitis : As a viral infection it is associated with fever , vesicular rash , follicular conjunctivitis , pre-auricular lymphadenopathy , and can be asymptomatic . Corneal involvement is usually with punctate epithelial damage , and may not be involved .

SECONDARY herpes simplex keratitis : Recurrent infections results from reactivation of the the dormant virus . Usually occurs in a debilitated patients



PRESENTATION OF SECONDARY :

- 1- **Dendritic epithelial ulcers** usually heals without scars .
- 2- Stromal involvement : can lead to edema and scarring that may require PKP (penetrating keratoplasty)
- 3- Uveitis (iris , ciliary body , choroid)
- 4- **Disciform keratitis** : which is thought to be an immunological reaction to the virus antigens .
(no epithelial ulceration)
- 5- **decrease corneal sensation**



Penetrating keratoplasty

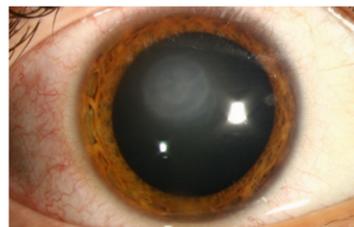
Endothelial keratoplasty

(DSAEK, DMEK)

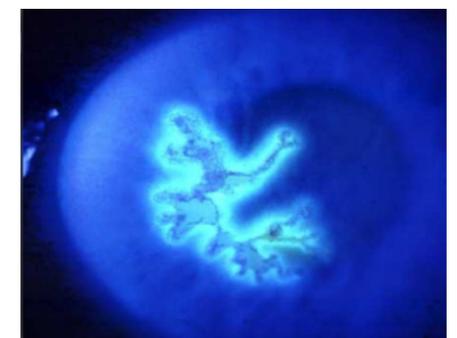
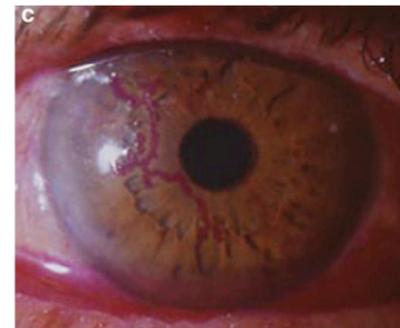
Treatment of HSV :
Topical anti virals as :
Acyclovir ,
(zovirax),Idoxuridine,Vidara
bine, Triflurothymidine
Avoid topical steroids if
epithelial ulcer is present .
Stromal keratitis needs
cautious steroid use .



NORMAL



DISCIFORM



PENTACAM IMAGE

HERPES ZOSTER OPHTHALMICUS (HZO)

Caused by varicella-zoster virus the cause of chickenpox

The **ophthalmic division of the trigeminal nerve** is involved. Ocular involvement is higher if the nasociliary branch of the nerve is involved.

Usually there is a prodromal phase and the patient is unwell.

Manifestation: Usually preceded by

1- **vesicular rash** at the area of the trigeminal distribution

2- Lid swelling

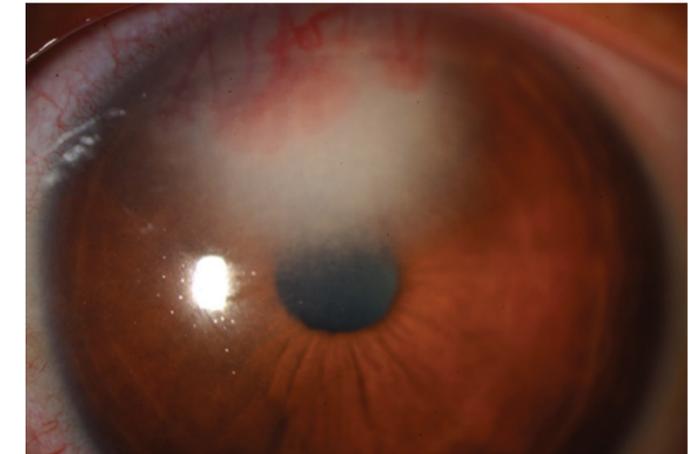
3- keratitis

4- iritis

5- secondary glaucoma



Hutchinson's sign



HZO Treatment:

Systemic antiviral will reduce the **chance of post-herpetic neuralgia**. Topical steroids and antiviral Glaucoma treatment if it occurred. **Both HSV & HZO will cause corneal anesthesia**

2-BACTERIAL KERATITIS MC

Protective factors of bacterial cornea:

Blinking ,Tears washing the debris'Antimicrobial effect of the tears '
,FB entrapment by mucus .

Causative bacteria :

Staph .Epidermidis

Staph .Aureus

Strep.pneumoniae

Pseudomonas 'with lens '

Hemophilus

Predisposing factors of bacterial keratitis :

Dry eye ,Epithelial disturbance, **Contact lens** wear ,Prolonged use of steroids

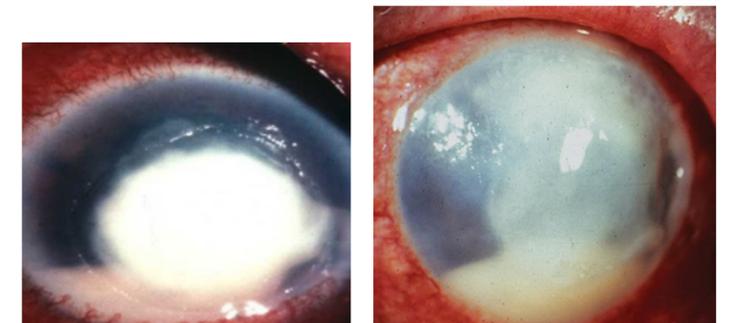
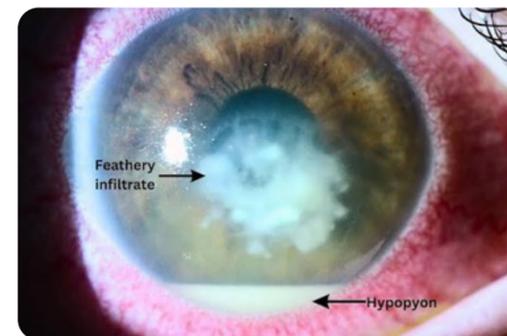
S&S :

Severe pain ,Redness ,Purulent discharge, RED EYE Visual impairment **Hypopyon** (Accumulation of WBCs in the anterior chamber)

Management

Culture & sensitivity / gram stain / corneal scrapings
Intensive topical AB If complications as **corneal perforation** happen it may need tissue adhesives and some times urgent grafting

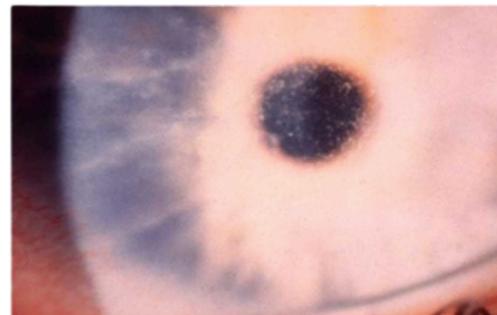
Bacterial keratitis should be treated as an ophthalmic emergency because of the risk of irreversible vision loss



Hypopyon

3- ACANTHAMEBIA KERATITIS

- A freshwater ameba is the causative factor .
- Increased incidence in swimming with contact lenses
- **Very painful keratitis**
- **Ring shape infiltrate**
- Treatment with chlorhexidine & polyhexamethelene .
- Grafting may be required



4- FUNGAL KERATITIS

- More common in **warm climates**
- Suspect it when :
 - ** **No** response to antibacterial
 - ** History of **vegetable matter trauma**
 - ** **Prolonged use of steroids**
- The corneal opacity is fluffy and **satellite lesions** may be seen.
- Special & prolonged cultures
- Treatment with anti fungals



Summary

Keratitis overview		
	Characteristic features	Therapy
Bacterial keratitis	<ul style="list-style-type: none">• Most common form of keratitis• ↑ Risk with wearing contact lenses• Purulent discharge and/or hypopyon• Round corneal infiltrate or ulcer	<ul style="list-style-type: none">• Topical broad-spectrum antibiotics (e.g., ciprofloxacin)
Herpes zoster keratitis	<ul style="list-style-type: none">• ↓ Corneal sensation• Punctate lesions on the corneal surface (early disease)• Vesicular eruption on forehead, bridge, and tip of the nose	<ul style="list-style-type: none">• Oral acyclovir, valacyclovir, or famciclovir• Topical steroids
Herpes simplex keratitis	<ul style="list-style-type: none">• Dendritic or geographic <u>corneal ulcer</u>	<ul style="list-style-type: none">• Topical trifluridine or ganciclovir
Acanthamoeba keratitis	<ul style="list-style-type: none">• ↑ Risk with wearing contact lenses• Corneal ring infiltrate	<ul style="list-style-type: none">• Topical antiseptic (e.g., chlorhexidine) with propamidine

CORNEAL SHAPE DISORDERS

KERTOCONUS

This is an abnormal curvature of the cornea form of corneal ectasia (dilatation) that results in central corneal thinning and different degrees of astigmatism

- The cause of keratoconus is believed to be from a defect in the collagen tissue that makes up the eye .
- Usually **painless** and progressive and appears during puberty
- May be associated with ocular & systemic diseases and **eye rubbing** (vernal kertaconjunctivitis, down's syndrome, marfan's syndrome)
- **Symptoms** : Blureed vission , sensitivity to light , defective vision (progressive myopia), glare at night .

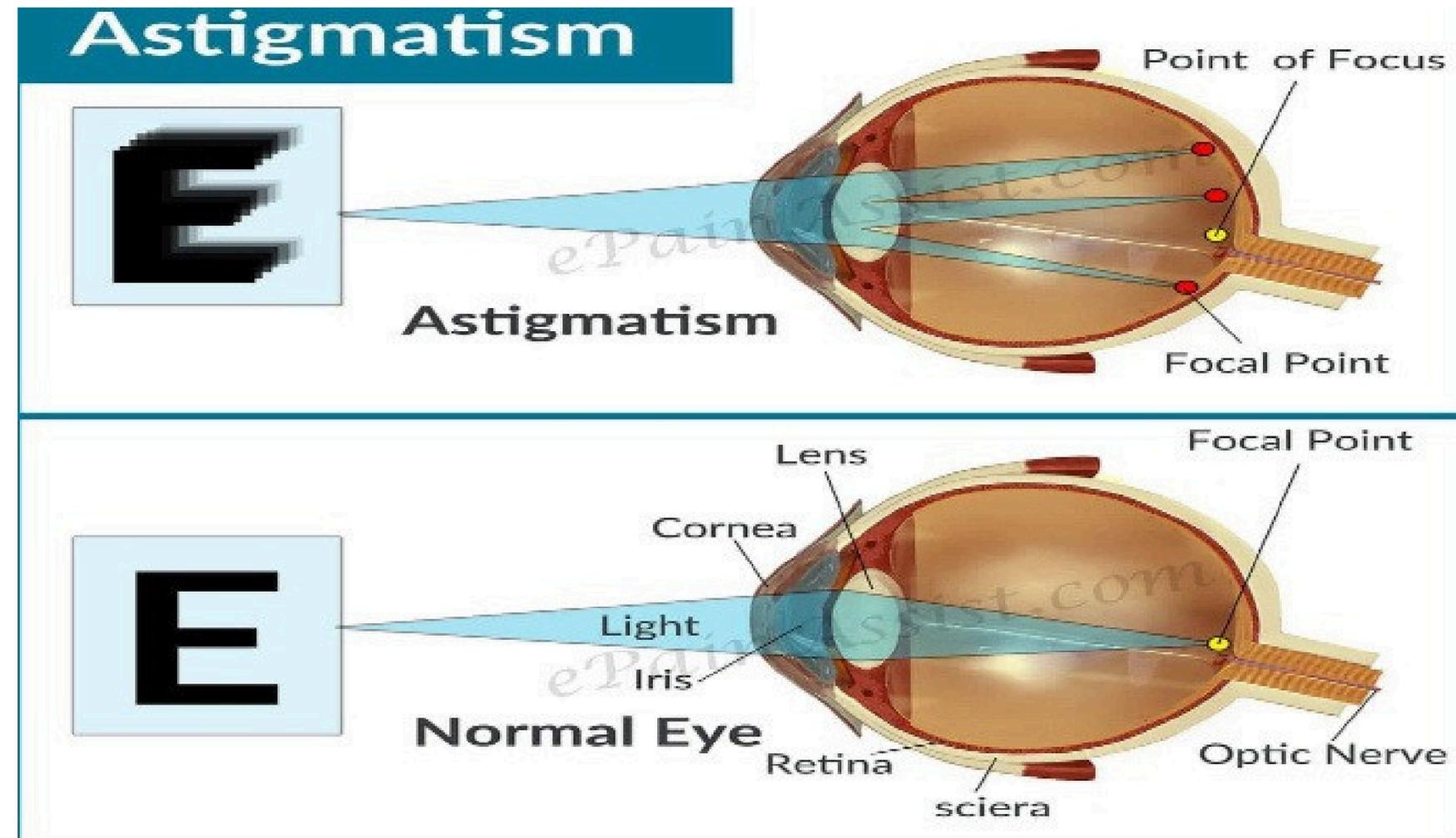


Glare at night :

difficulty of seeing in the presence of bright light .



Glare at night



Signs :

-Munson's sign : angulation of lower lid during inferior gaze due to corneal protrusion **ADVANCED CASES OF KERATOCONUS**

-Fleischer's ring : pigmented ring surround the cornea

-Rizzuti's sign : sharply focused beam of light near nasal limbus produced by temporal illumination of cornea

Diagnosis :

is usually made with microscopic examination of the eye and by corneal topography



Treatment:

1- GLASS

2- LENSE (RIGID GAS PERMEABLE)

3- SURGICAL :

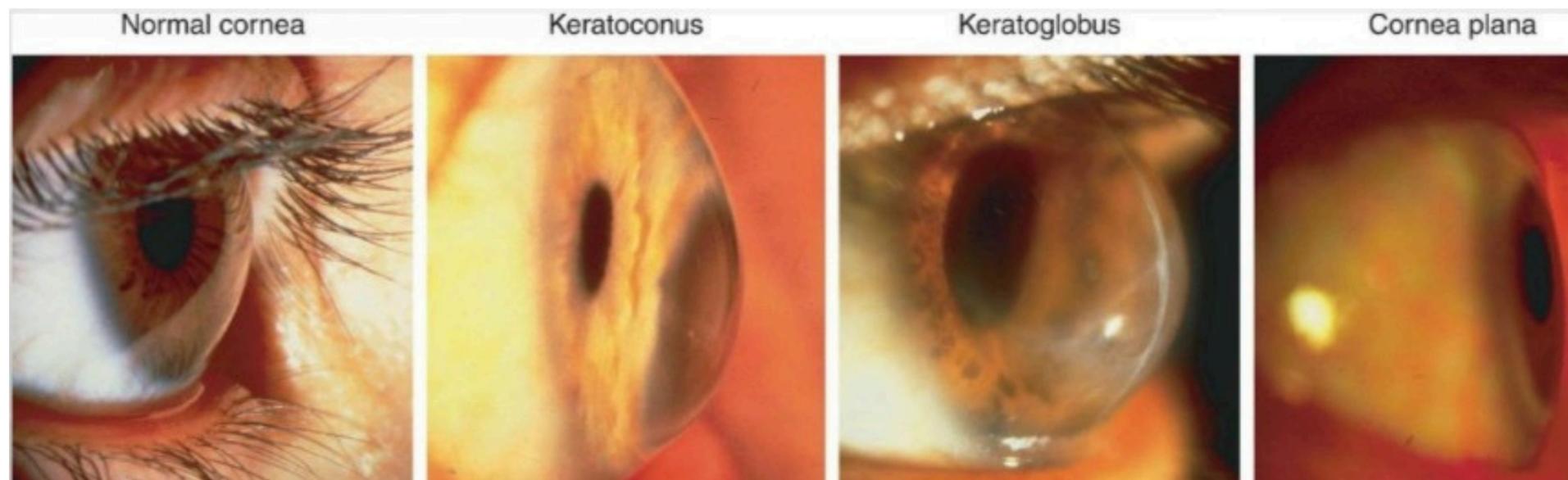
A- PENETRATING KERATOPLAST (CORNEAL TRANSPLANTATION)

B- DEEP ANTERIOR LAMELLAR KERATOPLASTY

PEOPLE WITH KERATOCONUS ARE POOR CANDIDATES FOR LASIK AS THE LASER PROCEDURE MAKES THE CORNEA THINNER AND FURTHER WEAKENS IT.

2.KERATOGLOBUS

DISORDER OF THE EYE IN WHICH STRUCTURAL CHANGES WITHIN THE CORNEA CAUSE IT TO BECOME EXTREMELY THIN AND CHANGE TO A MORE GLOBULAR SHAPE THAN ITS NORMAL GRADUAL CURVE.



Central corneal degenerations

BAND KERATOPATHY :

is a corneal degeneration that is most often composed of fine dust-like **calcium deposits** in the sub-epithelium, Bowman's layer and the anterior stroma. It is typically a band-shaped, horizontal opacity that grows from peripheral cornea toward the central cornea

Associated with :

Hypercalcemia

Chronic intraocular inflammation

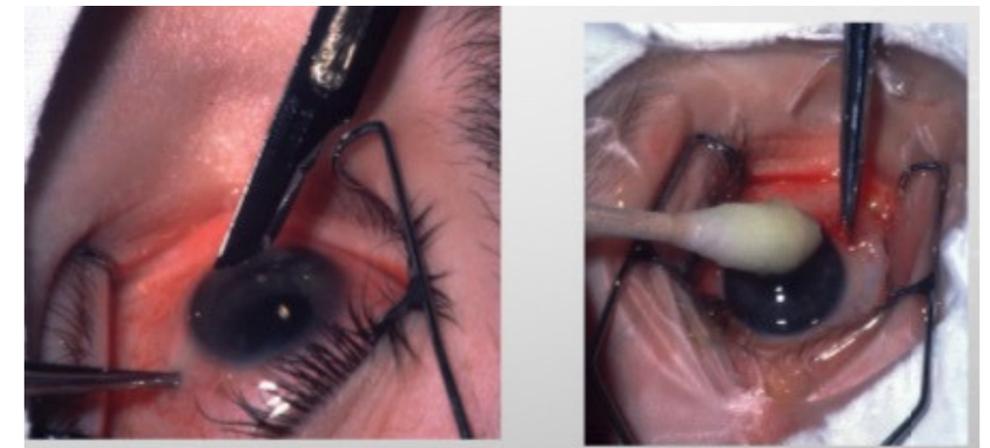
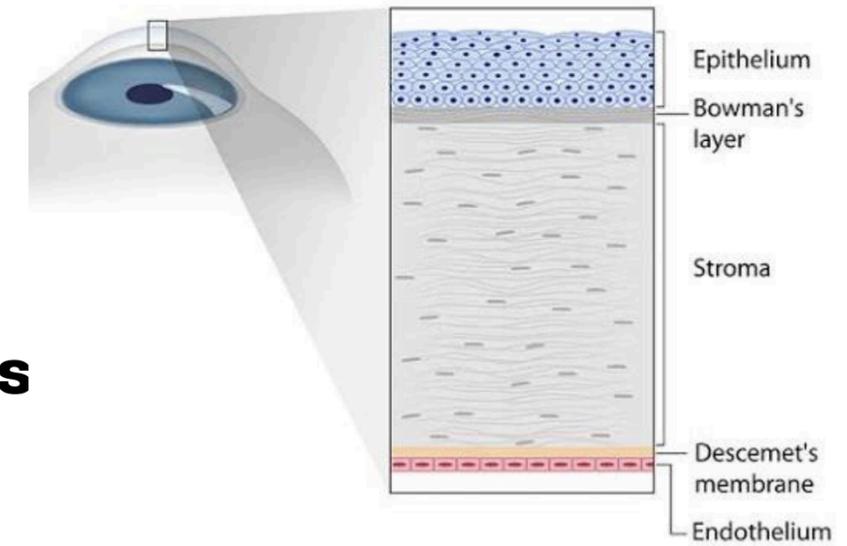
Glaucoma

Presentation :

Defective vision , irritation , foreign body sensation

Treated :

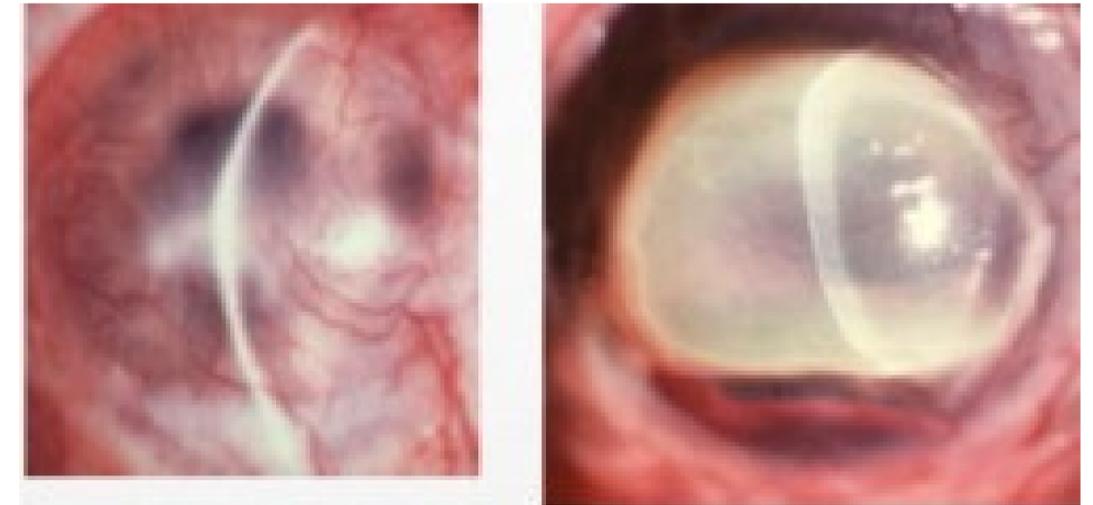
by chemical chelation or eximer laser



Peripheral corneal degenerations

1- Mooren's ulcer :

immunological painful peripheral corneal thinning , ulceration involving the superficial one third of stroma . Connective tissue disease associated as RA &WG . Treatment requires immunosuppressive treatment .



2- Arcus senilis:

A lipid deposition that is separated from the limbus by clear cornea .. It may be a sign of hyperlipidemia . No treatment is needed.



CORNEAL GRAFTING (TRANSPLANTATION) (KERATOPLASTY)

Indications:

- 1- Restore corneal clarity
- 2- Removal of infected cornea
- 3- Restore corneal regularity

Types :

Surgical procedure to replace damaged cornea with healthy donor tissue:

- 1- Lamellar
 - 2- Penetrating
- Highly privileged avascular tissue

Technique :

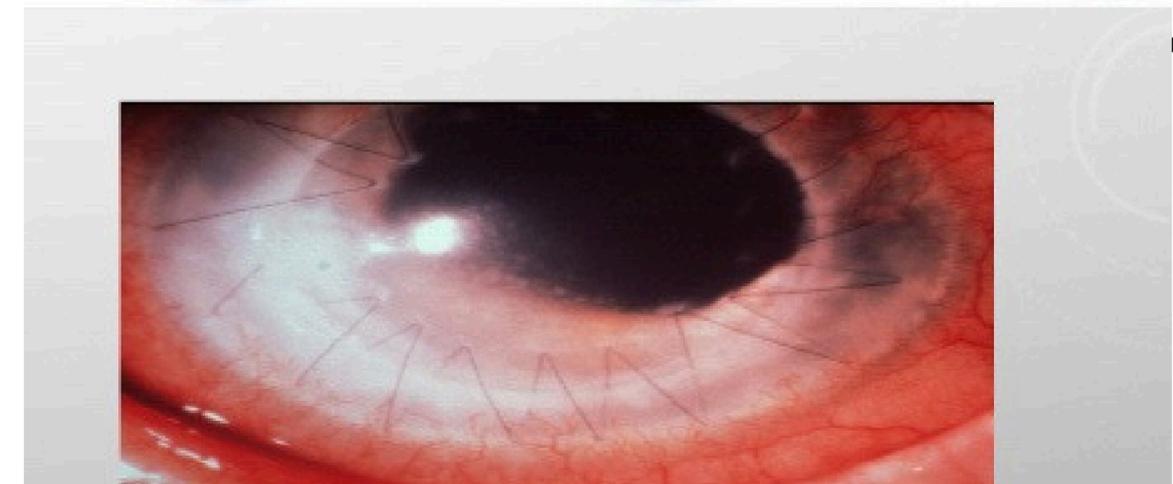
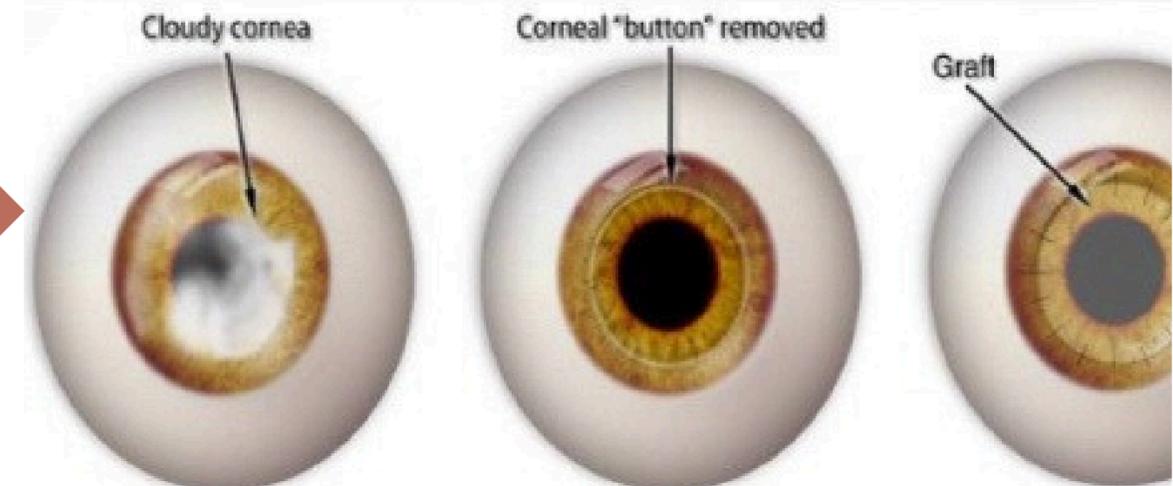
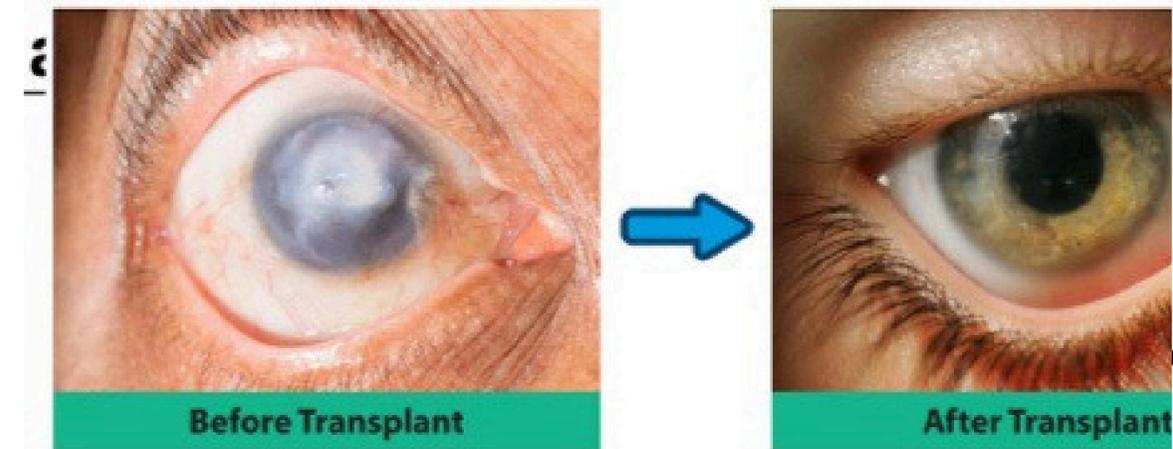
Recipient preparation, Donor preparation ,Suturing
Follow up

Risk :

relatively safe

- 1- eye infection
- 2- glaucoma
- 3- rejection of donor cornea

Surgical procedure to replace damaged cornea with healthy donor tissue



Sclera :

Thick white, opaque, fibrous layer The whole surface covered by **tenon's capsule which provides attachment to the extra-ocular muscles .**

Layers of sclera :

1-Episclera :

anterior and posterior ciliary arteries

2-Sclera proper (stroma) :

relatively avascular

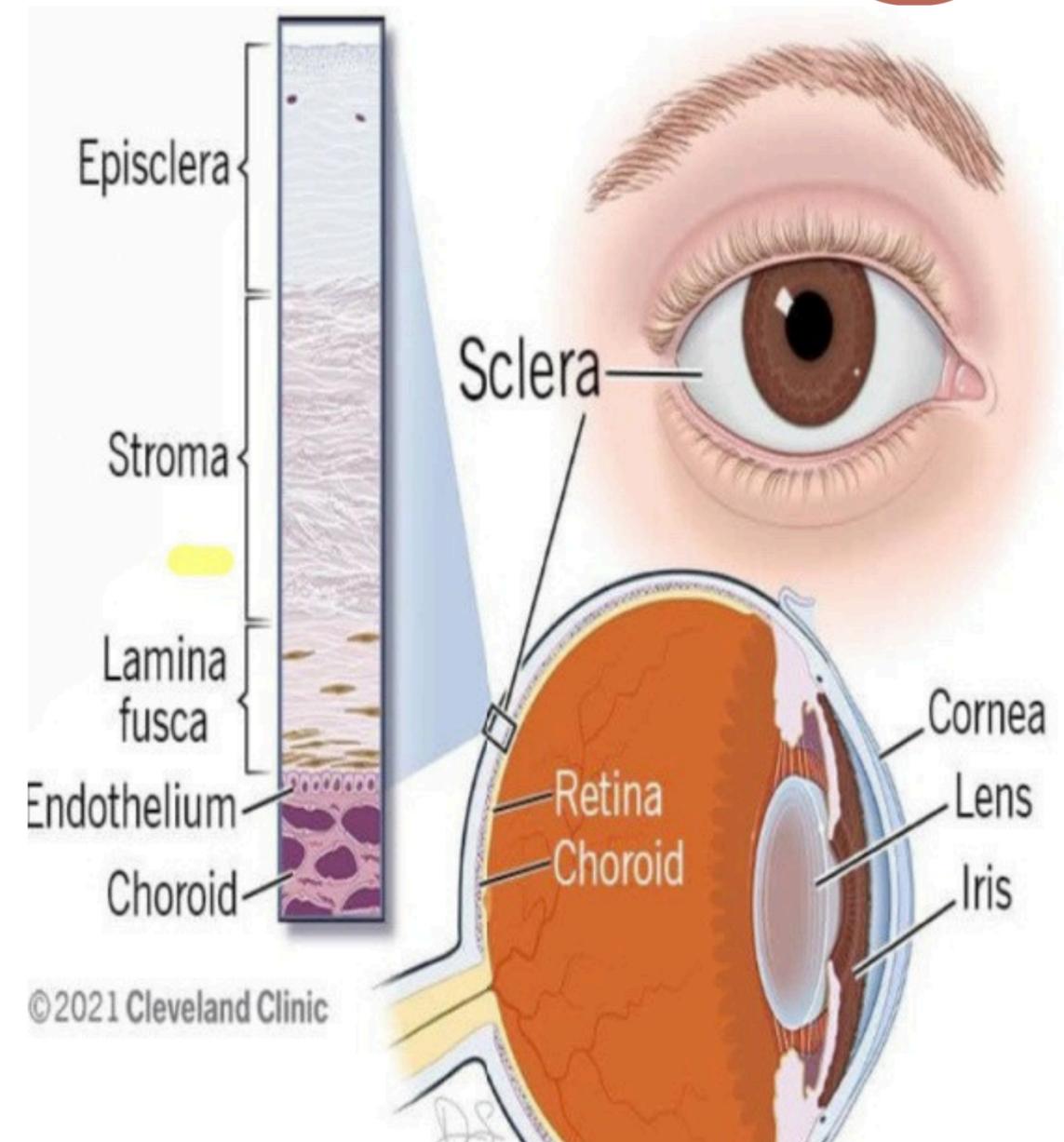
3-Lamina fusca Blood supply :

● **Function :**

1-protection of intraocular component

2-provide attachment sites for extra-ocular muscles .

3-maintain the shape of eye ball .



EPISCLERITIS

Inflammation of the episclera, the superficial layer of the sclera
Rarely associated with systemic diseases Usually cause **mild** discomfort **Self limiting** and may respond to topical anti-inflammatory .

SCLERITIS

More serious and severe disease Usually associated with **connective tissue diseases** as **RA** Can be ischemic and inflammatory Usually shows a swollen red areas that can be diffuse or focal

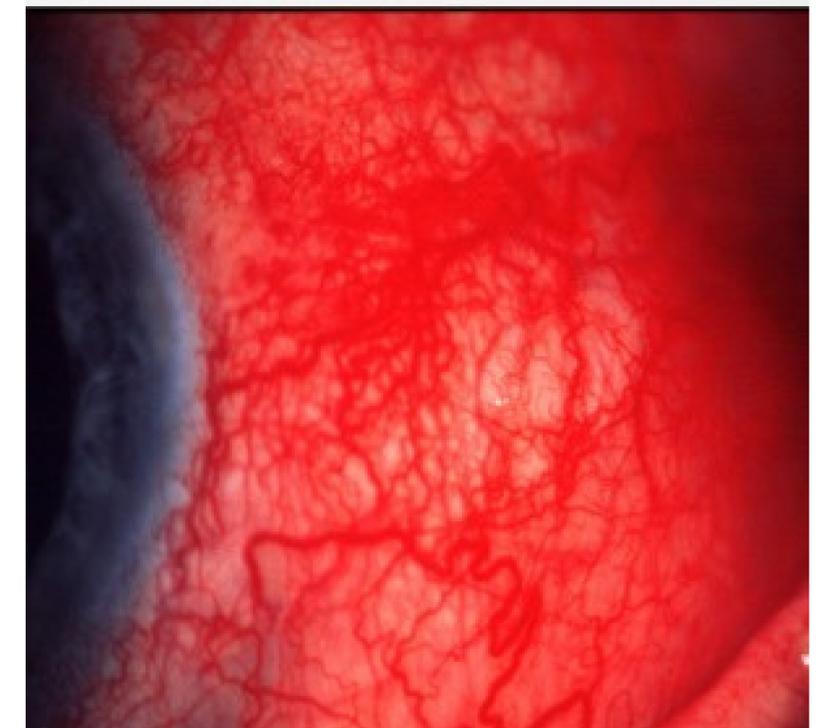
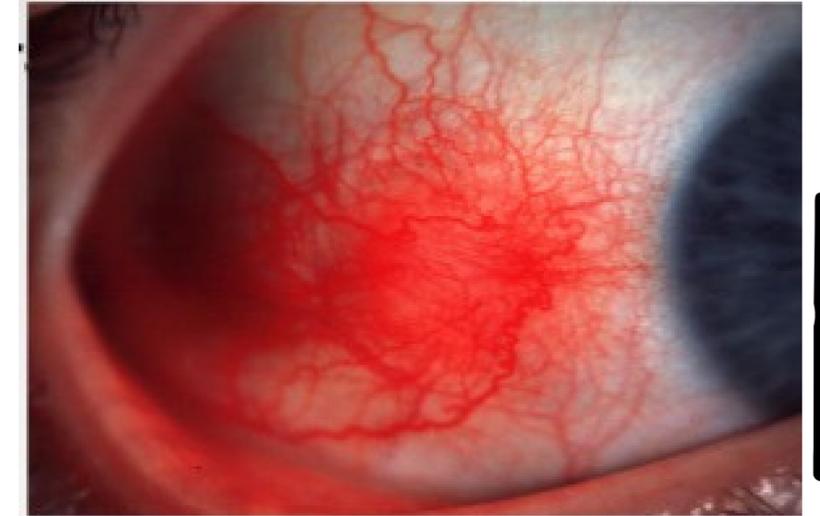
Can be anterior and posterior .

Complication of scleritis :

Scleromalacia (thinning of the sclera)
Keratitis ,Uveitis ,Cataract ,Glaucoma

Treatment of scleritis :

- High dose steroids
- Immunosuppressive agents.
- Treatment of complications





THANK YOU