

SURGICAL TREATMENT OF RESISTANT KERATITIS

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No financial interest
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What is the role of surgery?

✂ Pain relieive

✂ Tectonic.

✂ Curative

✂ Visual restoration.

When?

- ✂ Resistance.
- ✂ Progression.
- ✂ Impending perforation.
- ✂ Perforation.

How?

Modalities

Debridement/ Sup. keratectomy.

Paracentesis.

Intrastromal injection.

Conjunctival flap.

AMT.

PACK-CXL

Argon laser.

Scleral /corneo scleral patch therapeutic graft

Therapeutic PPK

Debridement:

Surgical removal of corneal epithelium without causing injury to the BM.

Superficial Keratectomy

Surgical removal of corneal epithelium including BM and anterior stroma .

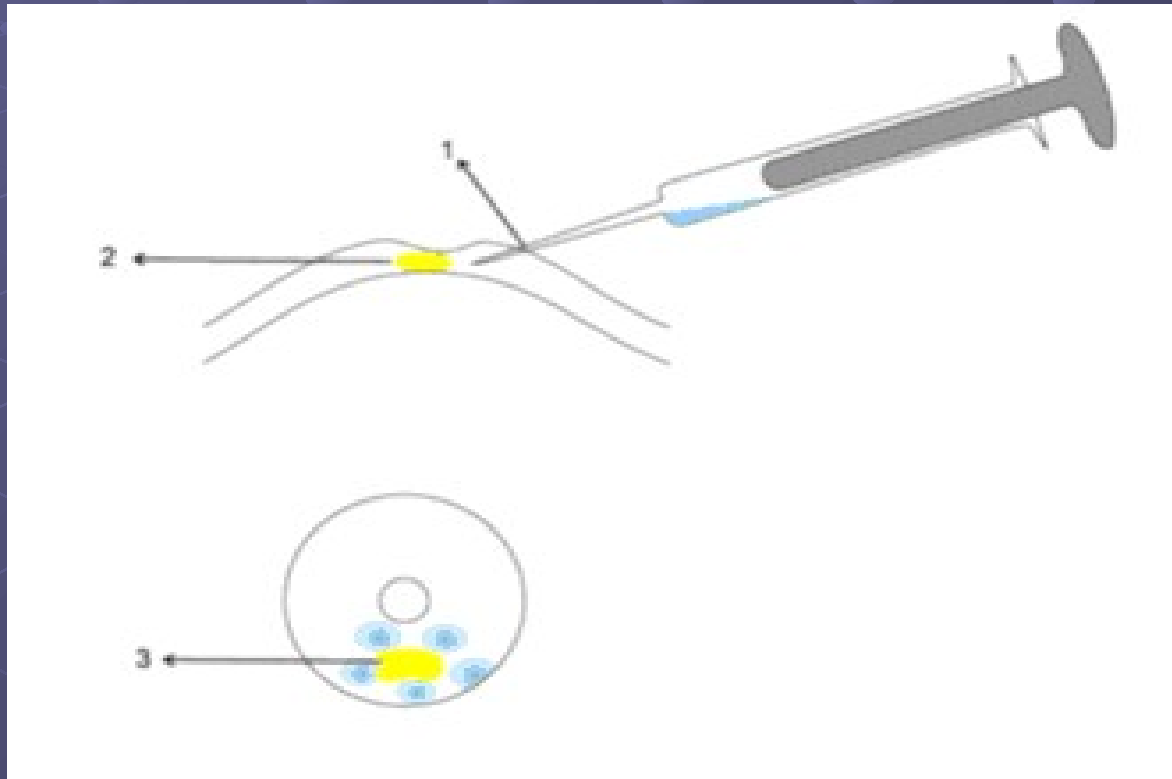
Intrastromal injection



Most Common Antifungal Drugs in Ophthalmic Use : Doses

Voriconazole	Fluconazole	Amphotericin B	Drug
			Route
1%	0.2%	0.15%	Topical
1%	mg/ml 2	Not prepared due to its high toxicity	Subconjunctival
µg/0.1 ml 50	mg/ml 2	to 10 µg 5	Intrastromal (intracorneal)
µg/0.1 ml 50	Not available in literature	to 10 µg/0.1ml 5	Intracameral
µg/0.1 ml 50	µg/0.1 ml 25	to 10 µg/0.1ml 1	Intravitreal

Technique of intrastromal injection:





Conjunctival flaps

For suppurative keratitis after keratectomy.
Corneal stroma (rich in humoral , poor in cell mediated immunity)

Surgical principles:

Conj. only.

Thin.

No tension.

No button hole.

Covers entire area.

Necrotic t. removed.

Types of conj. flaps:

Total (Gundersen):

Epith.removed.

temporary/permenant.....B.M.

Dissection from Tenon.

Chromic sutures.



Partial conj. flap:

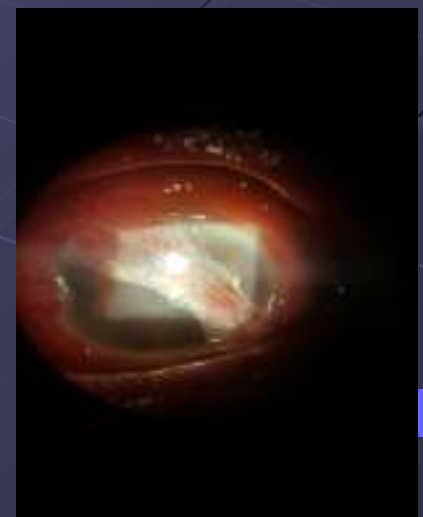
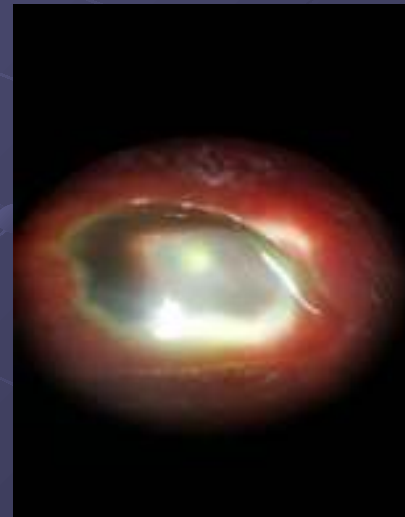
Visual axis remains clear.
Better visualization of A.C.

Types:

Hood.

Bipedicle.

Single pedicle.



Complications:

Necrosis.

Retraction.

Button holing.

Epith.cyst.

S.C.hge.

Amniotic membrane

COMPOSITION

- A single epithelial cell layer, a thick BM, and an avascular stroma
- **Collagens** IV and VII
- Fibroblast **growth factor**, hepatocyte growth factor, and transforming growth factor B
- Various **protease inhibitors**.

AMT advantages

- Prevention of tissue destruction by inhibition of various proteases.
- Anti-inflammatory effect
- Structural support.
- Barrier against PNL from tear film.
- No immune rejection.
- Wound healing augmentation by fibroblast growth factor. (

- Long term drug delivery effect
- Prevention of neovascularization
- Antiviral effect (cystatin E).
- Inhibition of infection.
- Decrease corneal haze.
- Pain reducing effect.

Preparation of AMT

From CS

Serological tests

Antibiotics

Dissection from chorion.

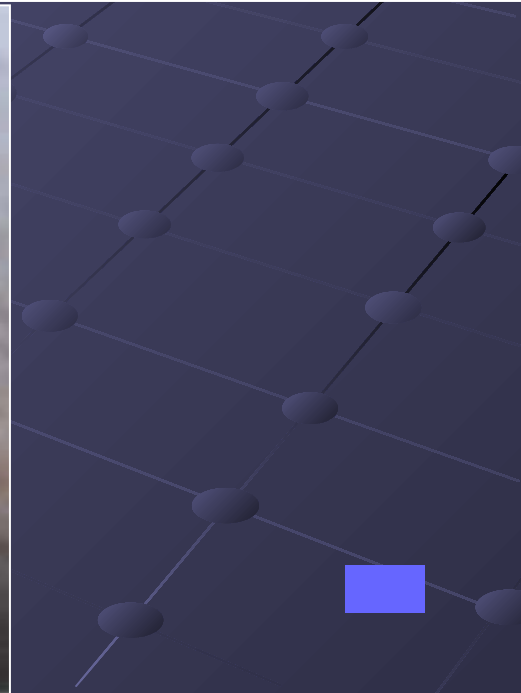
Storage;

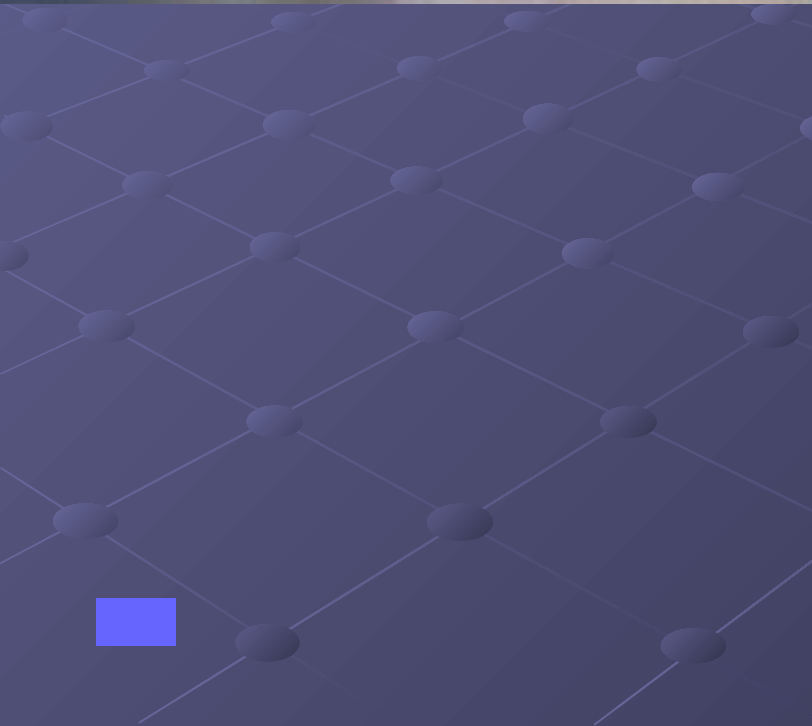
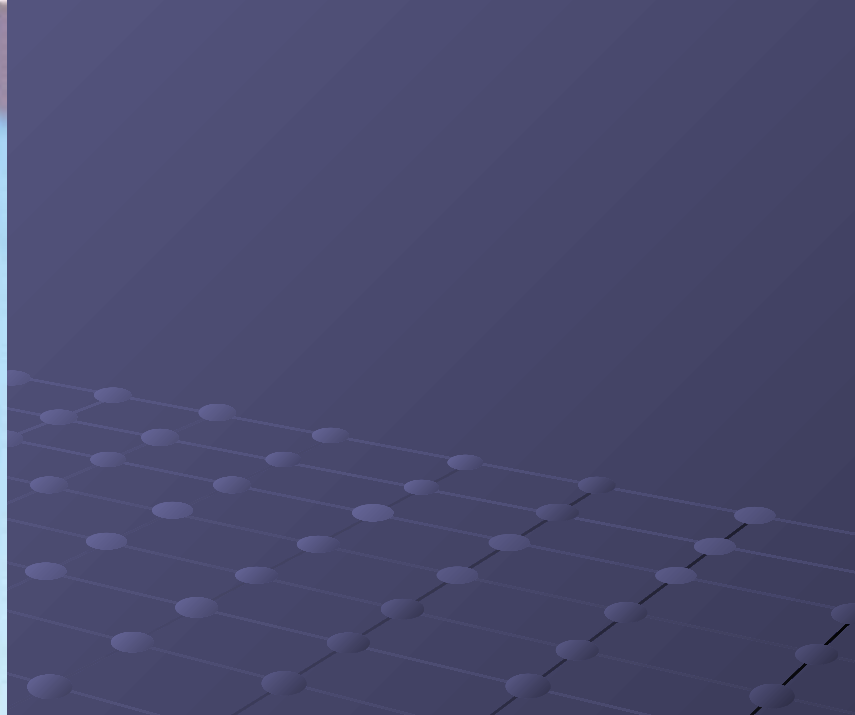
-70 ° C /DMEM and glycerol (

SURGICAL TECHNIQUES

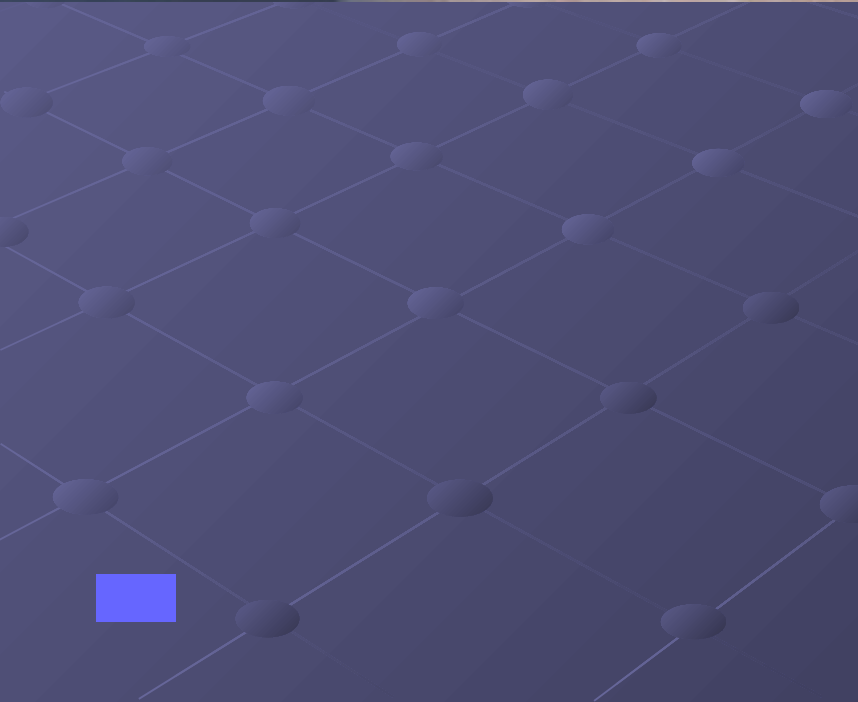
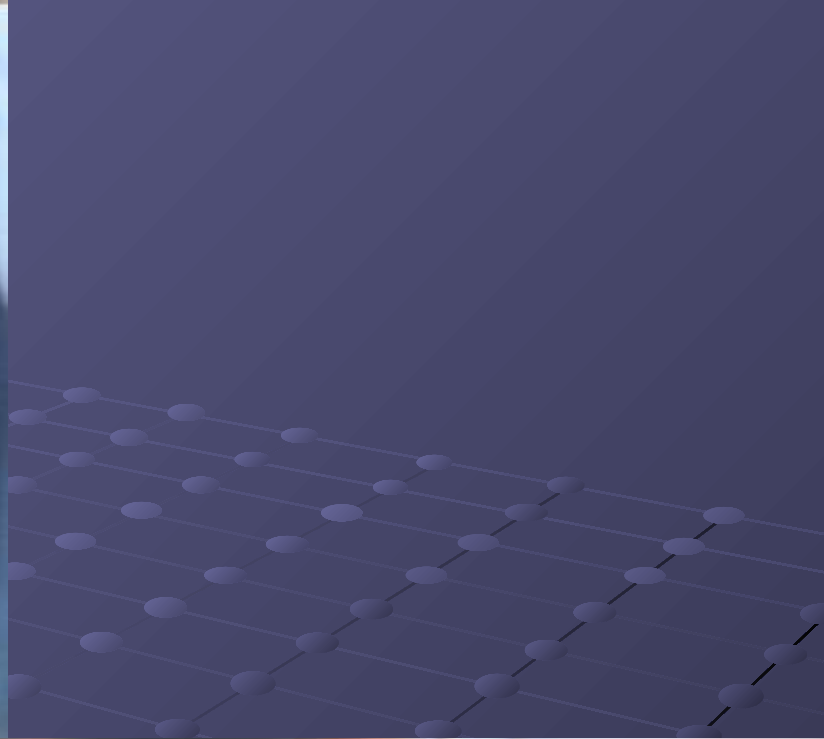
- **TEMPORARY**: epith. down/ whole cornea to improve vision. (as a patch)
- **PERMENANT** :epith.up/ to prevent perforation (as a graft)

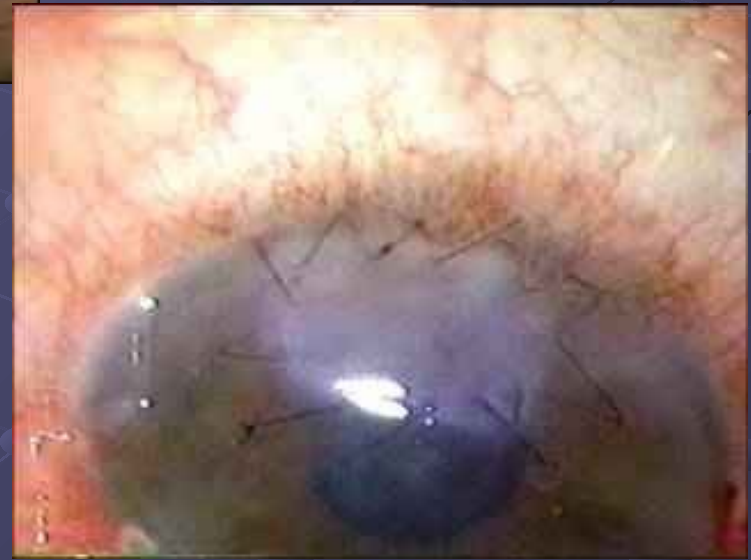
Bandage contact lens (*Kim JC et al 2001*)











PACK-CXL

Mechanism of action: Not Fully Known

- ✂ Photo-activation of a chromophore can release reactive oxygen species and theoretically reduce microbial load, similar to a disinfectant.
- ✂ •Oxidation of pathogen DNA and RNA
- ✂ •ROS **damage of pathogen** cell walls
- ✂ •Increased corneal **stiffness** and resistance to enzymatic digestion
- ✂ •Killing of inflammatory and immune cells (apoptosis)

PACK-CXL Protocol

- **Standard Dresden protocol** most commonly used
- Epithelium-off
- Application of isotonic riboflavin for 30 minutes (5 minute intervals)
- 365-nm UVA light exposure (3mW/cm²) for 30 minutes
- (AS-OCT)
- A minimal corneal thickness of 400 μm is required

Important Considerations

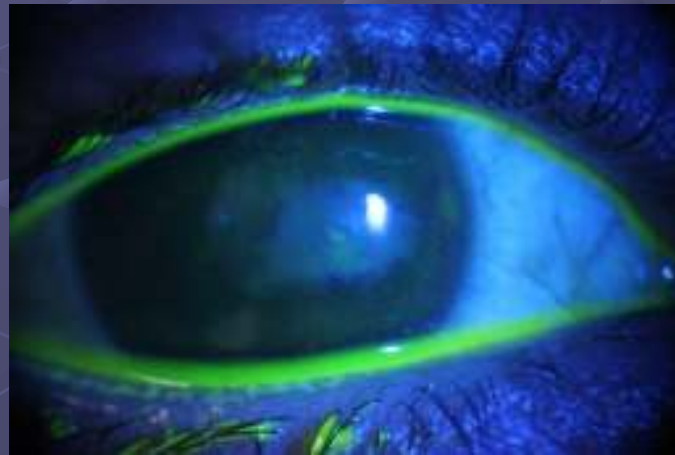
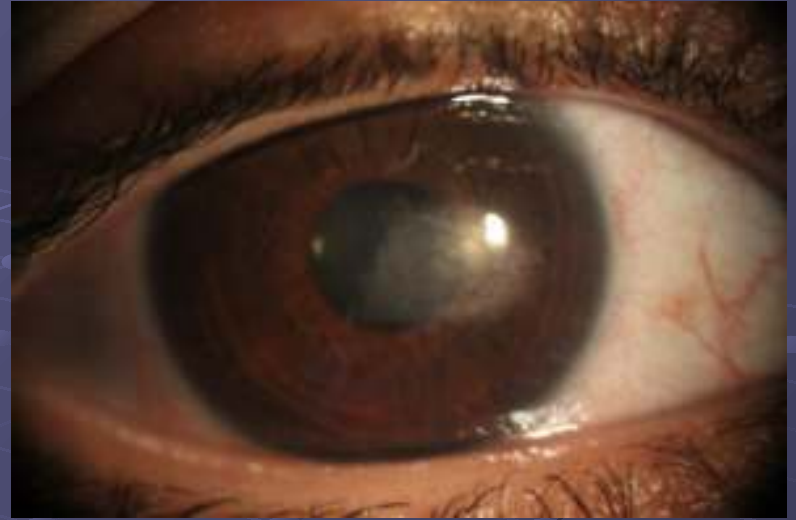
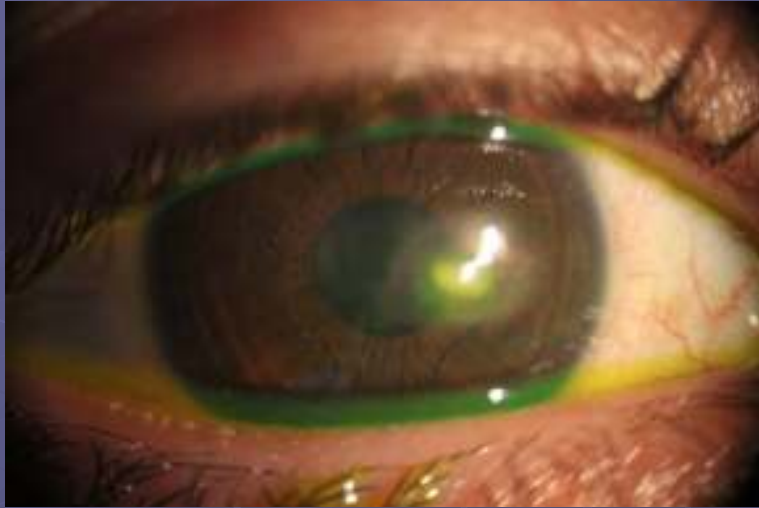
- Hypotonic riboflavin in borderline thin corneas.
- Use of riboflavin/UV-A should be avoided herpes simplex.
- Fluorescein stain should be avoided before CXL

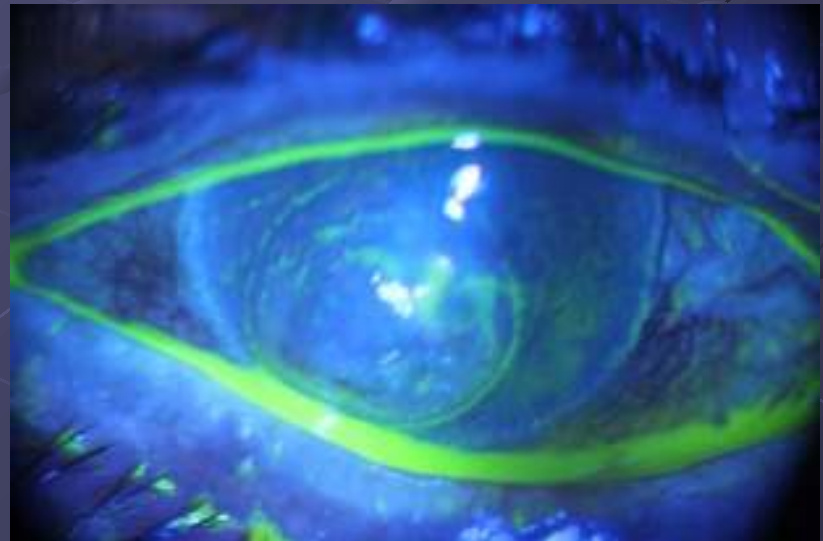
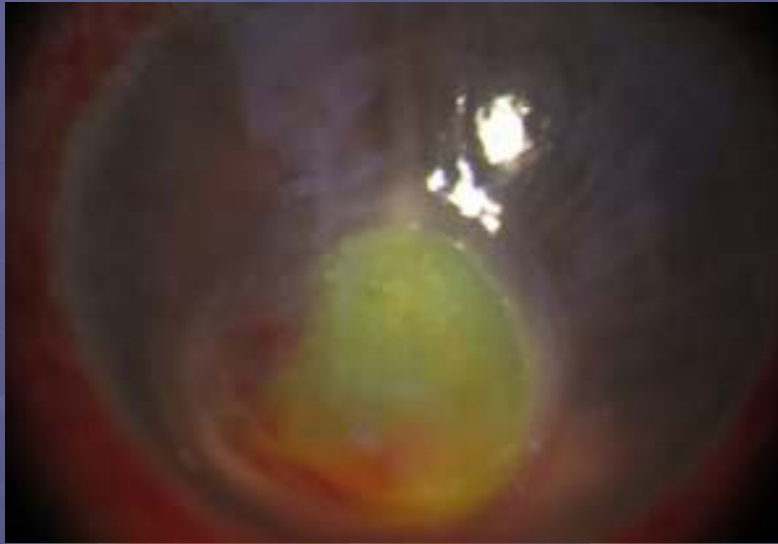
Presence of hypopyon associated with lower success rate

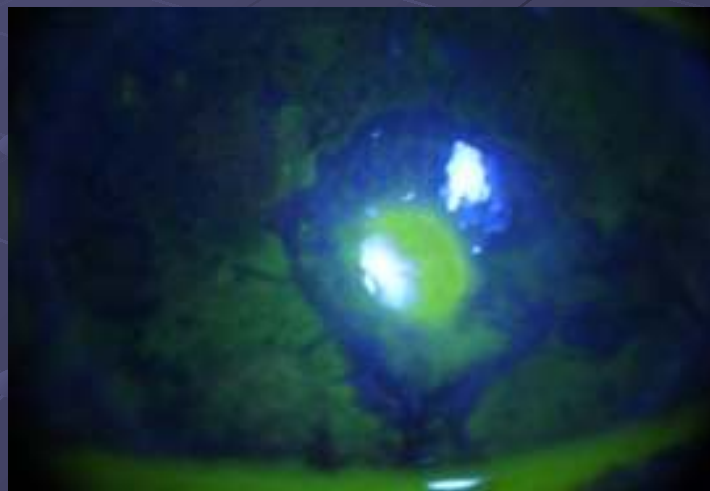
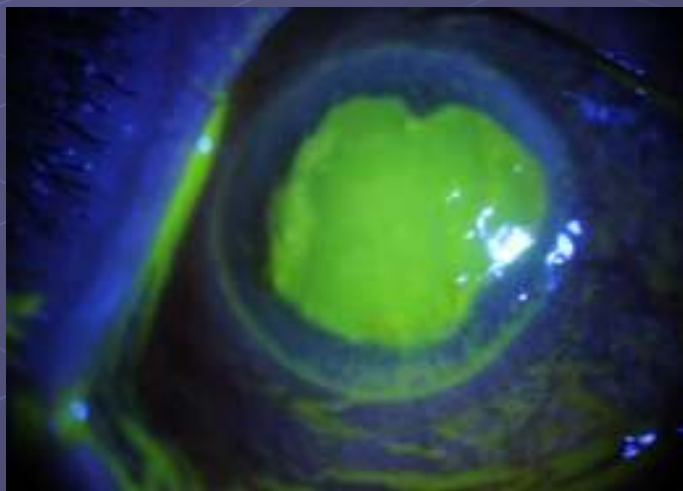
A better treatment response with superficial corneal infiltrate involving the anterior third of the stroma

Proposed Variations to Standard Dresden Protocol

- Avoid enlarging epithelial defect to avoid delayed healing
- Higher concentration (0.25 vs 0.1%) for ↑ fungicidal effect
- Lower concentrations (0.03 vs 0.09% with longer UVA exposure) for ↑ bactericidal effect
- Prolonging riboflavin instillation time ↑ collagen compaction, ↑ resistance to enzymatic digestion
- May use accelerated protocol (16 mW/cm² for 5 min, 36 mW/cm² for 2.5 min) –controversial









The Open Ophthalmology Journal

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RESEARCH ARTICLE

Is Corneal Collagen Cross-Linking Beneficial as an Adjunct to the Conventional Treatment of Bacterial Keratitis?

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Abstract:

Background:

Argon laser

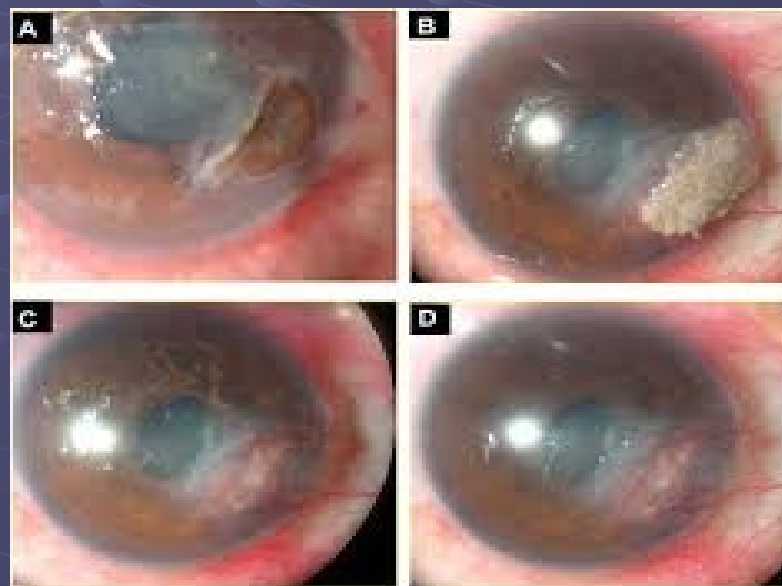


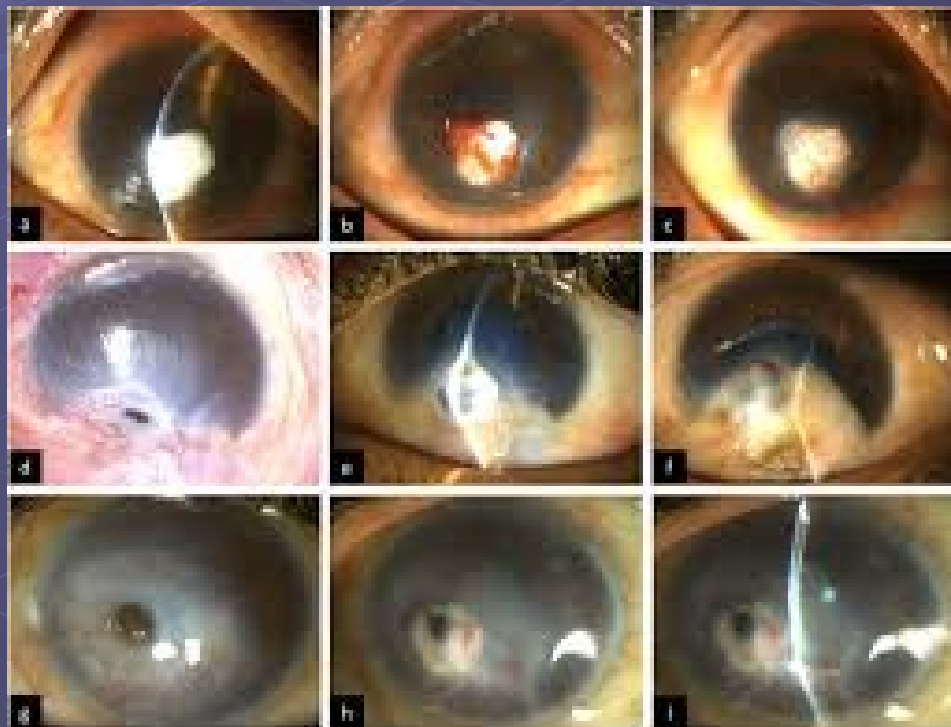
Scleral patch therapeutic graft:

- ✂ Suitable for large or small ulcers or perforations.
- ✂ Auto or allografting.

Advantages:

- ✂ No tissue rejection.
- ✂ Readily available.
- ✂ No heterologous antigenic sensitization for later corneal grafting

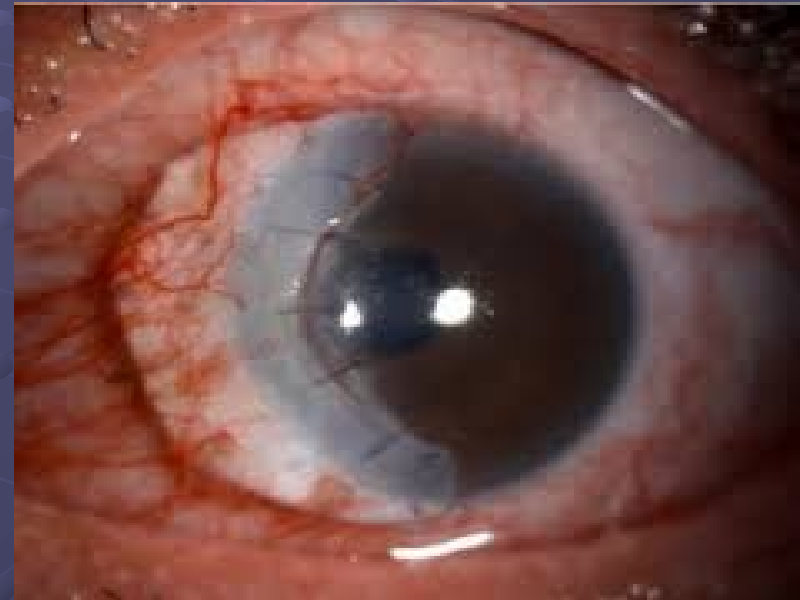
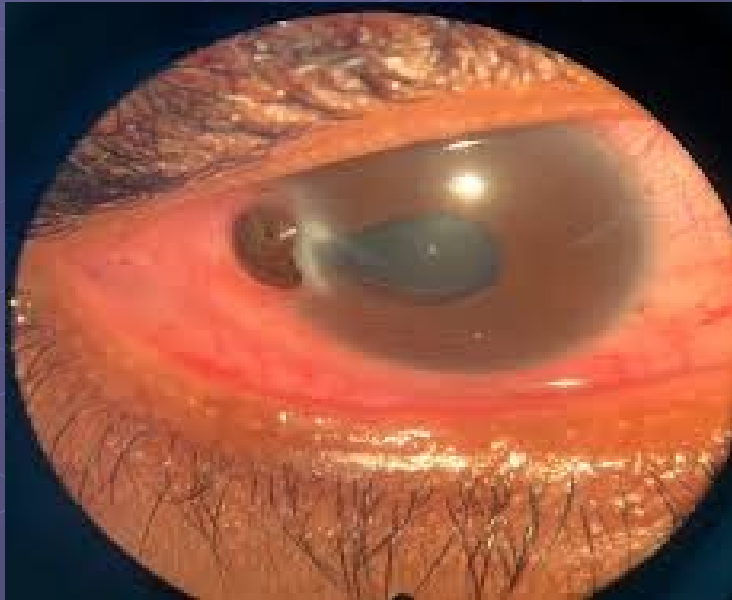




Corneo scleral tectonic graft



pre-operative



Therapeutic keratoplasty

TIPS

Flieringa ring

All necrotic tissue excised with a 1 mm safety margin

Irrigation with antimicrobial

Synechiae and hypopyon removal.

Graft diameter not more 8 mm

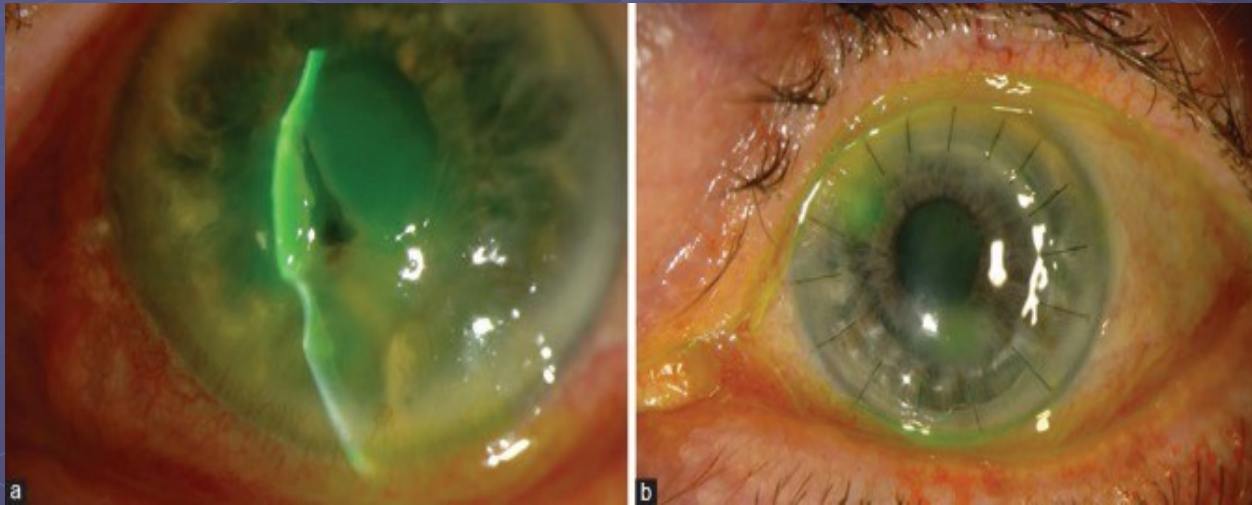
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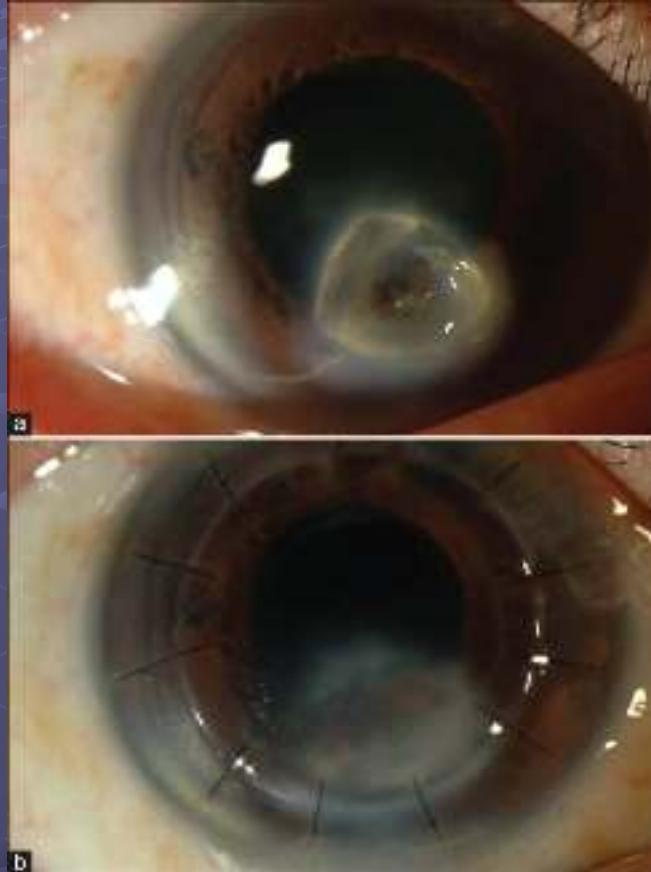
Criteria for success;

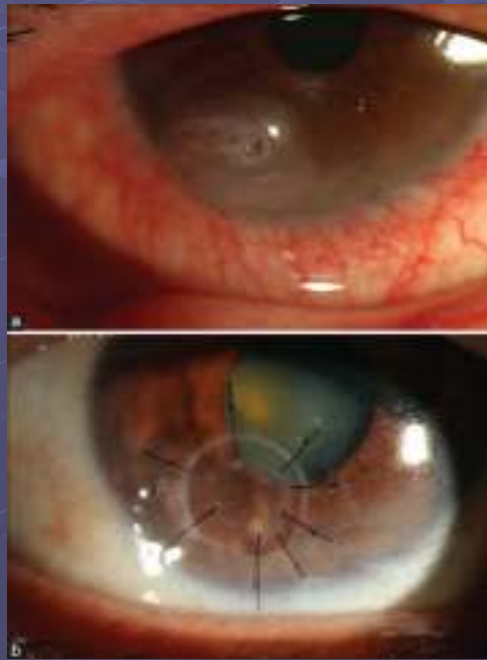
Early interference

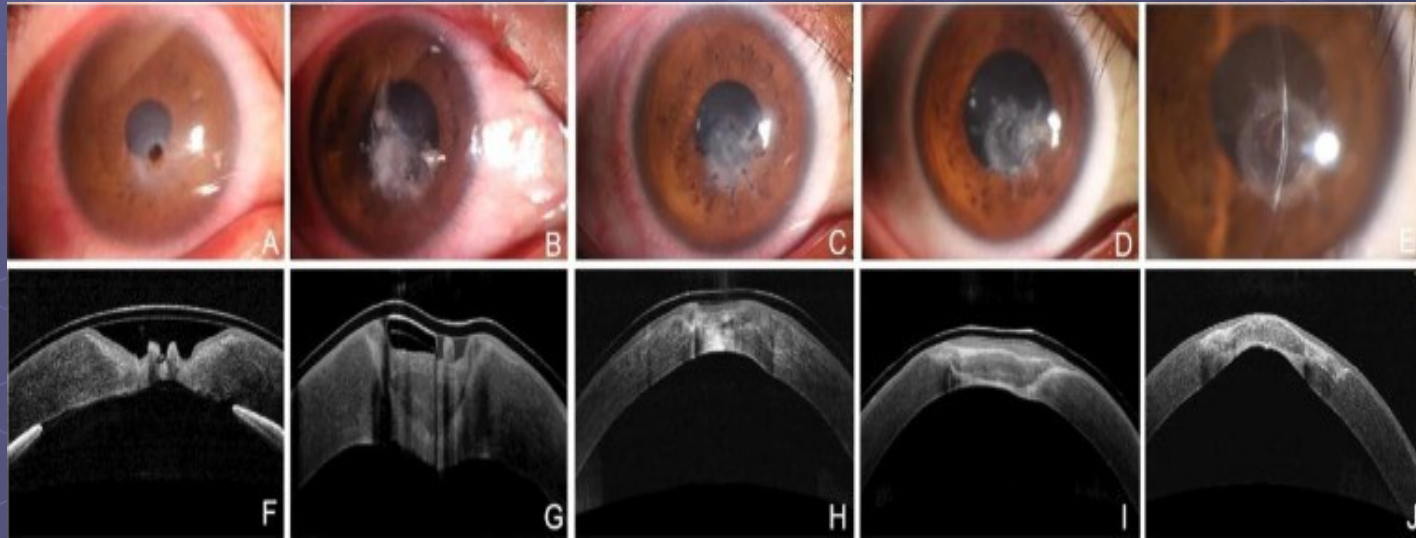
Small sized graft (less than 7mm)

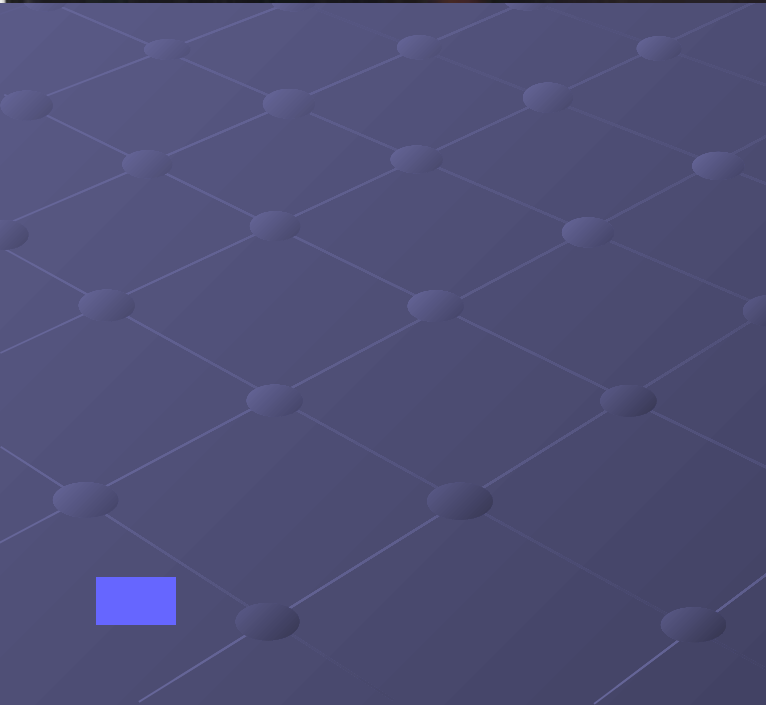
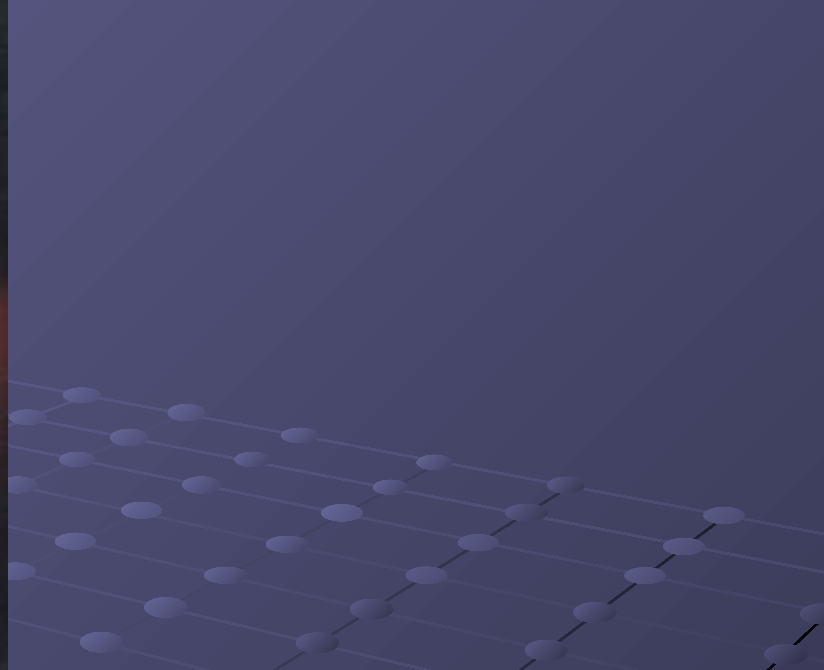
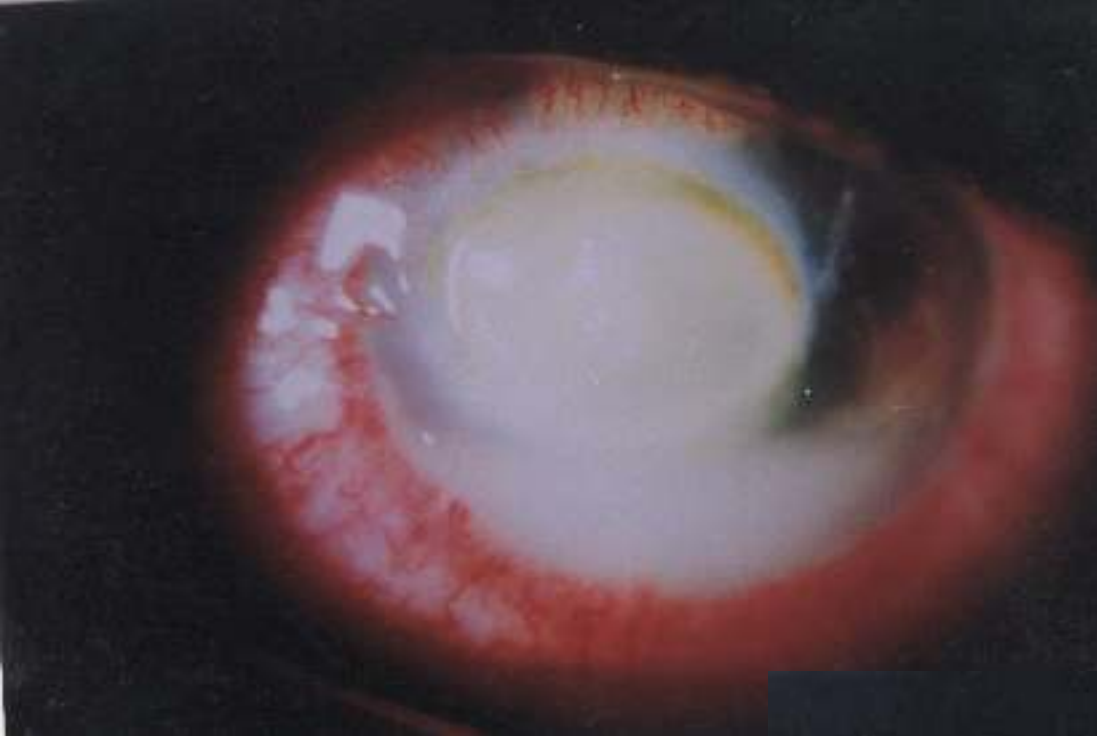
Complete inclusion of the pathology.

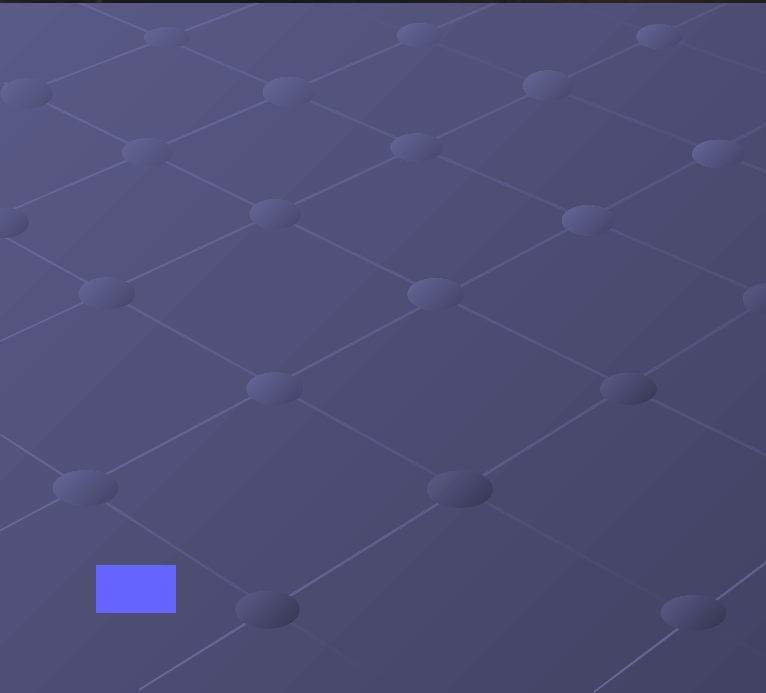


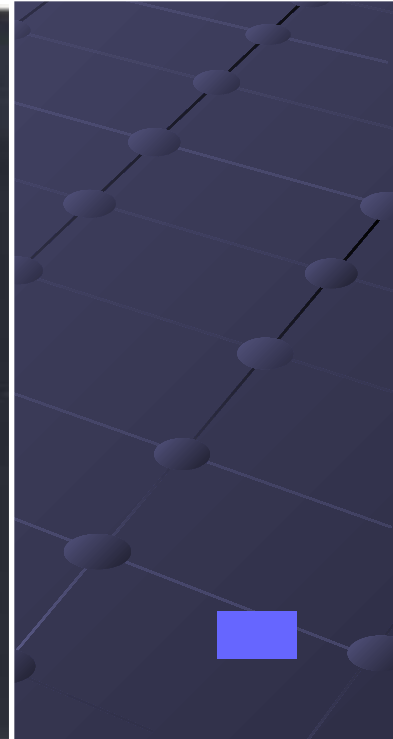
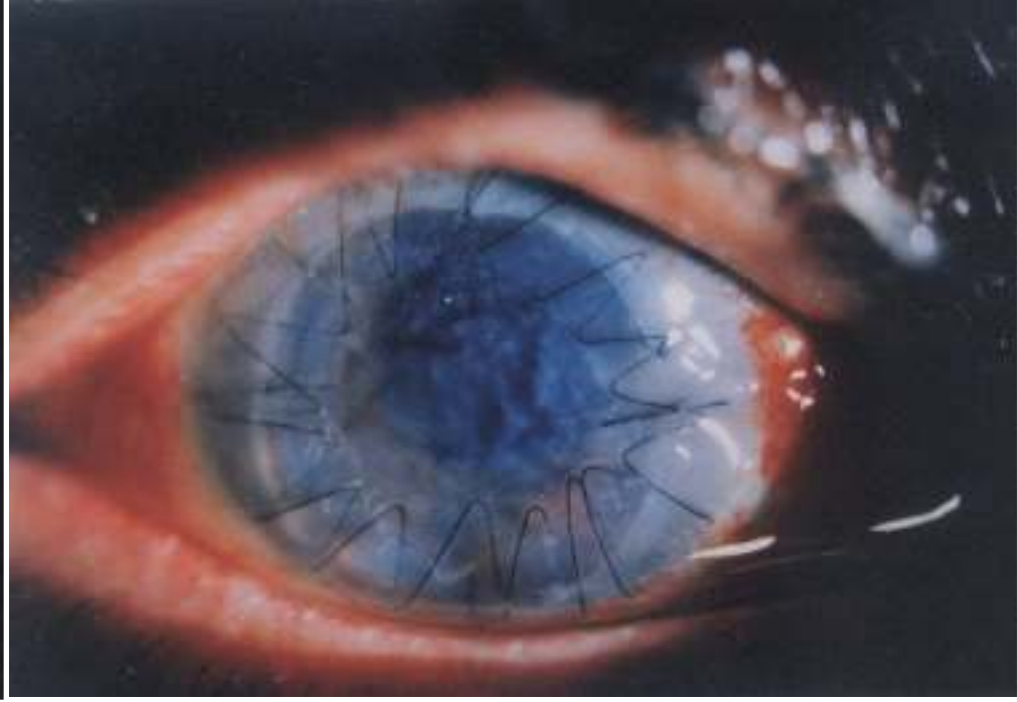


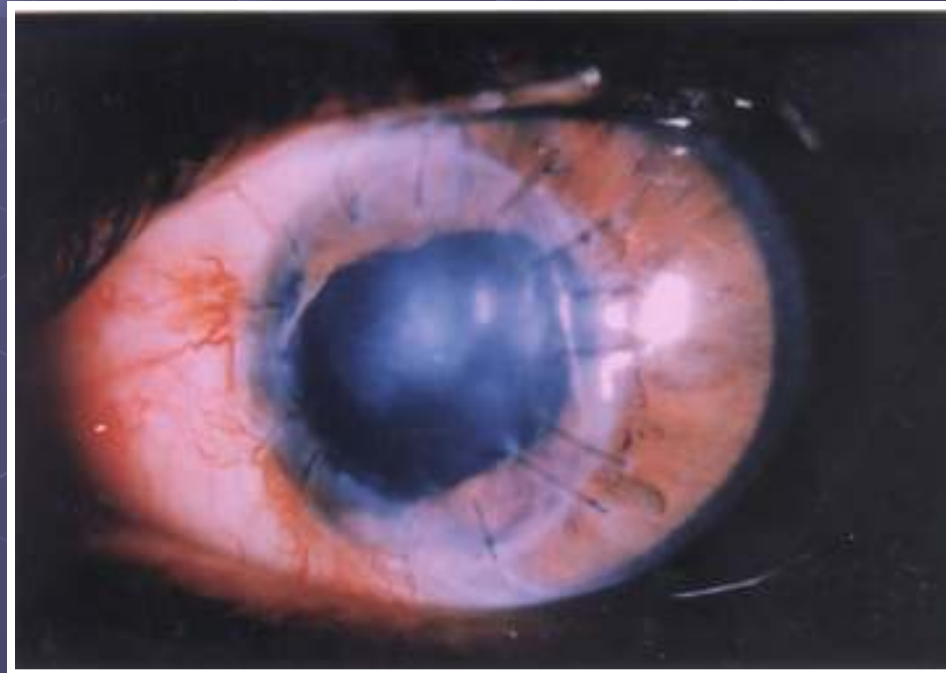
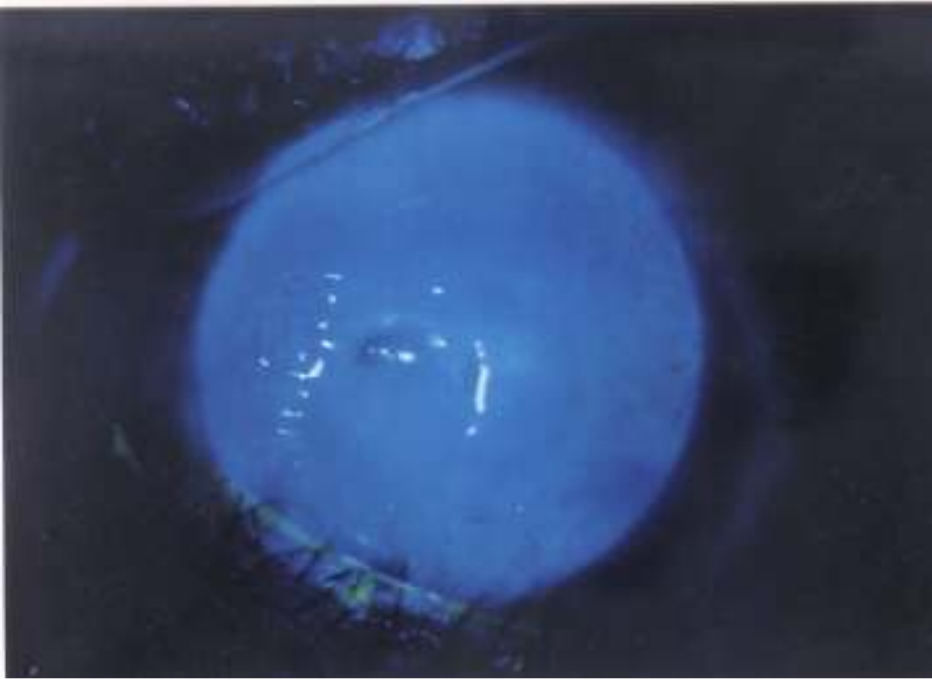


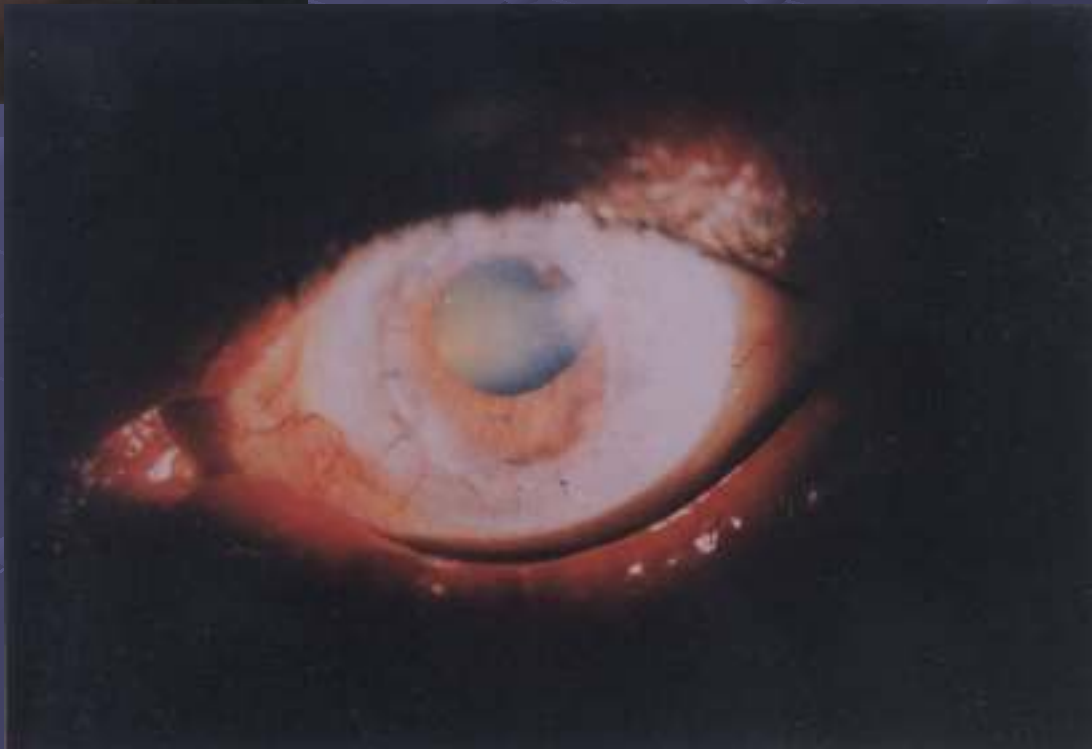
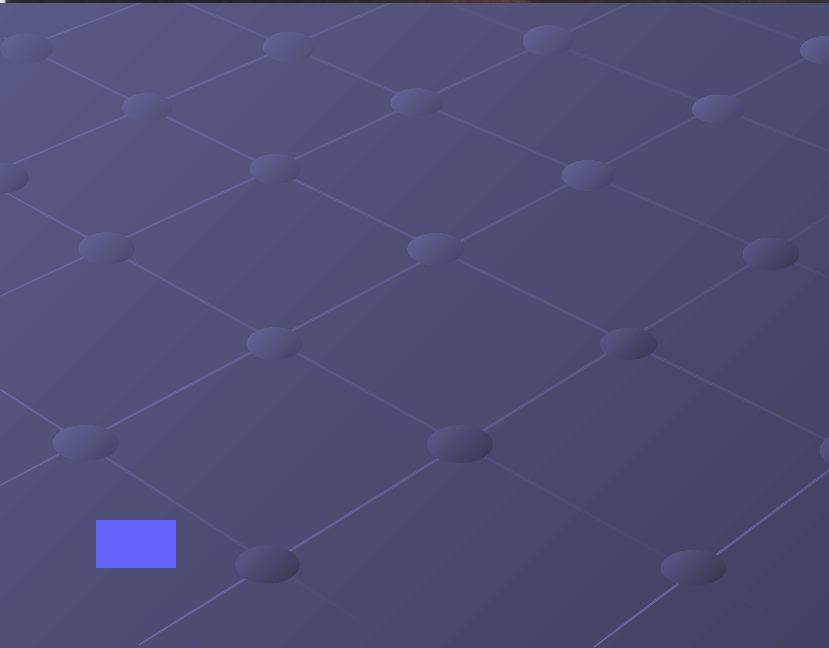
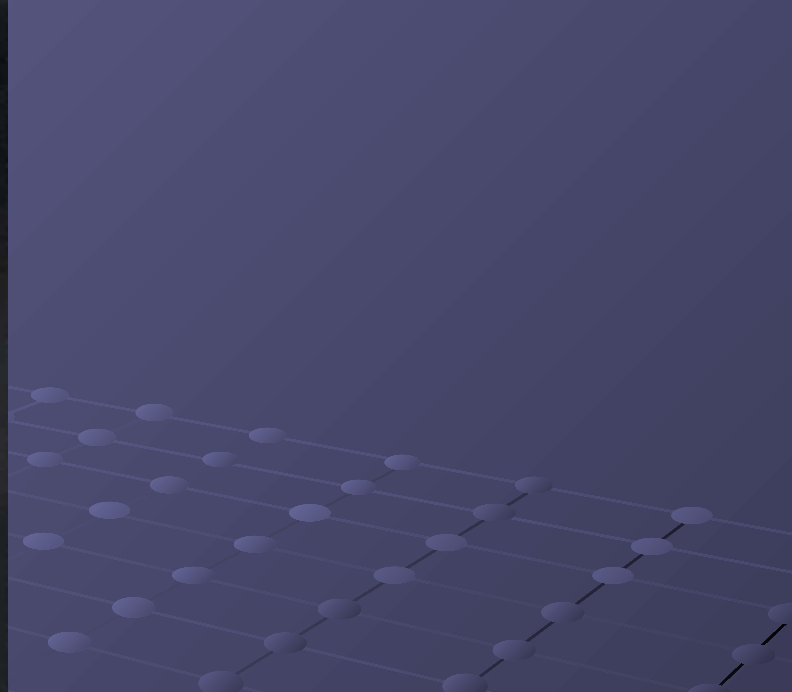




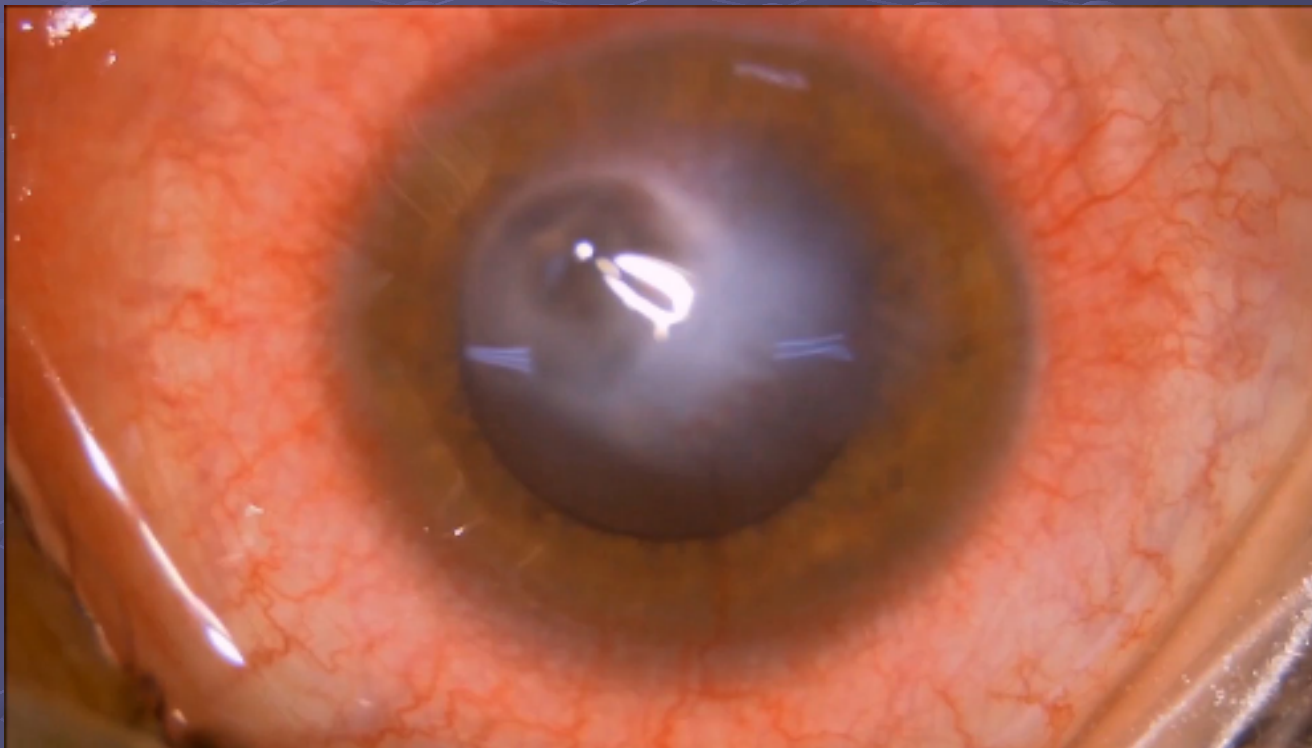












THANK YOU

