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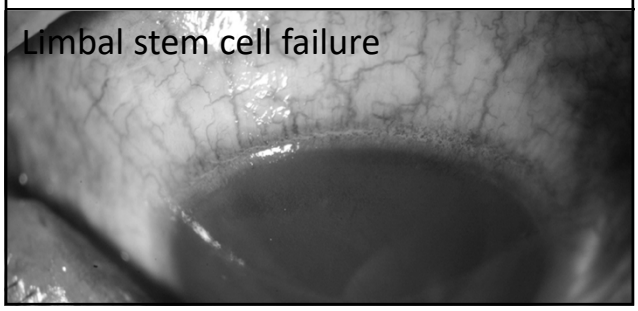

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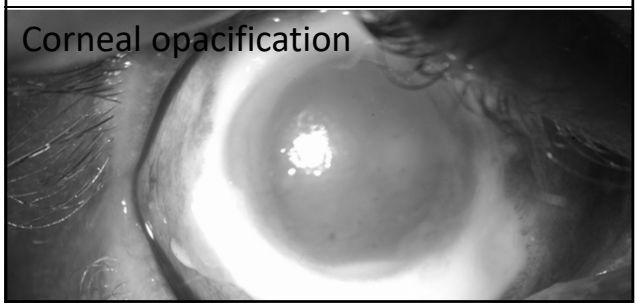

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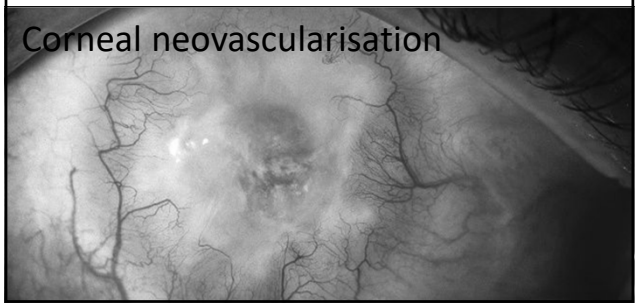

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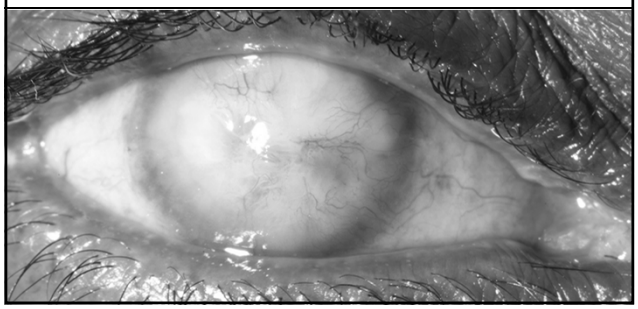

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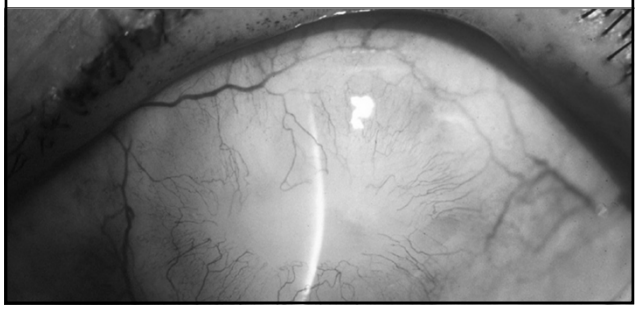

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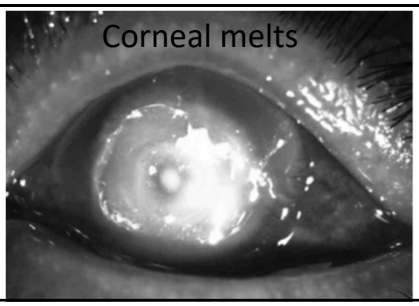

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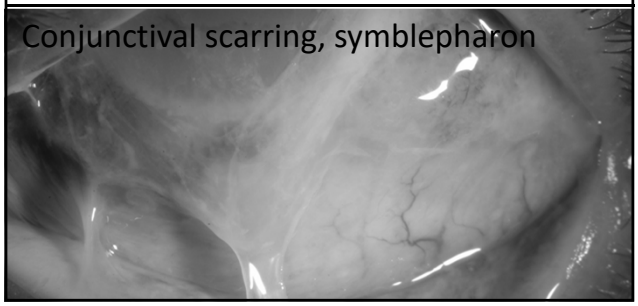

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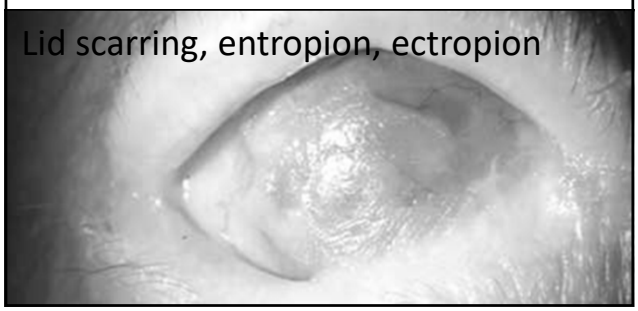

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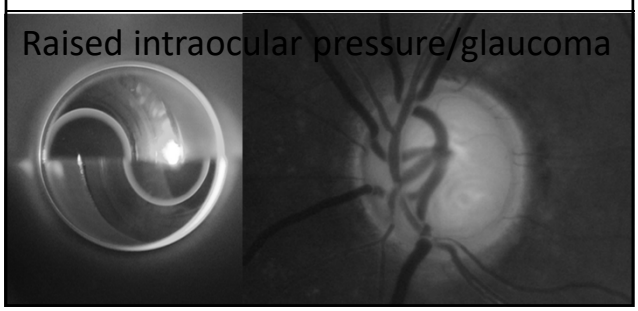
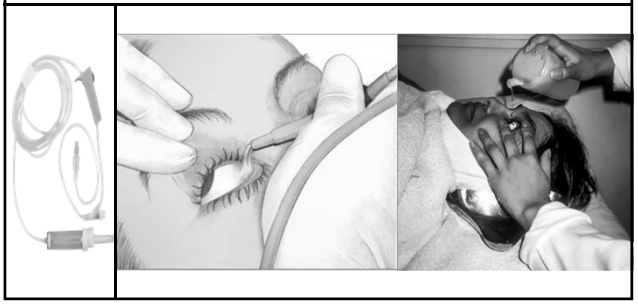


Commercial irrigation packs

Other options

Irrigation

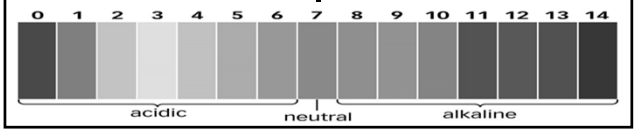


Irrigation

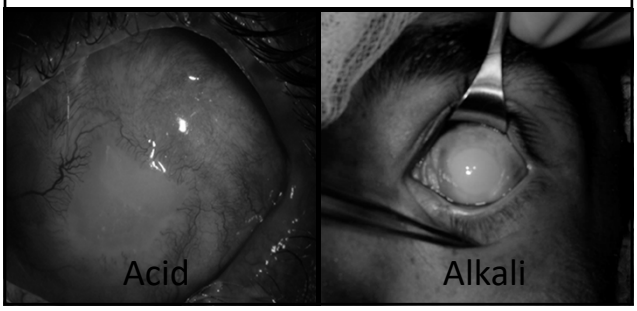
Acid vs. Alkali

- Precipitate tissue protein
- Creates barrier
- Hydrofluoric acid is exception

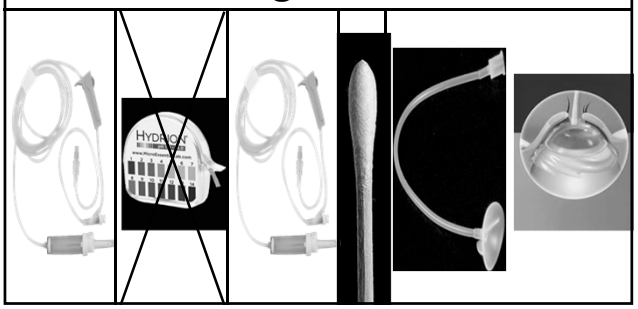
- Lipophilic
- Deposits in tissues → saponification → proteolytic enzymes → necrosis
- Penetrate more, inc AC



Acid vs. Alkali



Irrigation



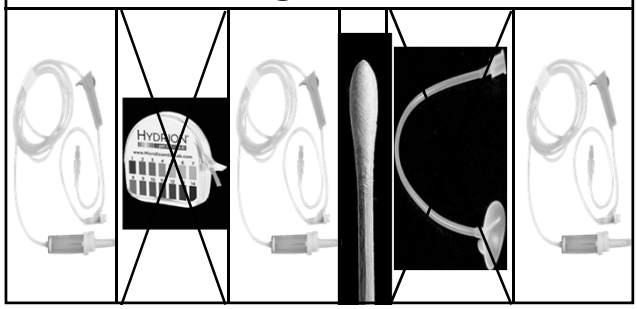
Irrigation

Systematic review:

- Immediate irrigation with tap water had significantly better outcomes
- Patients tolerate Balanced Salt Solution (BSS) more than any other irrigation fluid
- Prompt commencement of irrigation is more important than irrigation solution
- Prolonged irrigation in a primary care setting results in shorter duration of treatment at the hospital
- Currently insufficient evidence to determine optimal eye irrigation methods

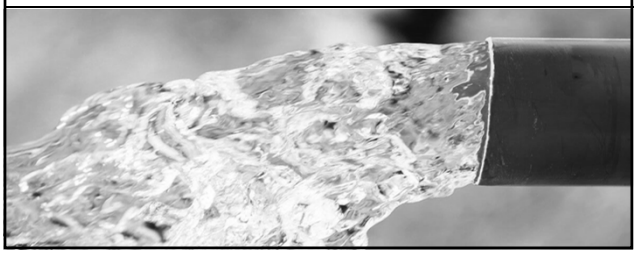
Chau et al, Systematic Reviews and Implementation Reports 2010 8(12):470-519

Irrigation



Phases of injury/healing

Irrigate ⟵ Immediate ⟶ Irrigate



Phases of injury/healing

Irrigate ⟵ Immediate ⟶ Irrigate

Acute	Early	Late
• First 7 days • Contaminant removal • Epithelialisation • Inflammatory mechanisms evolve	• 8-21 days • Inflammation, scarring • Ulceration: Collagenase Metalloproteinase Other proteases	• 21 days onwards • Either: Healing Complications

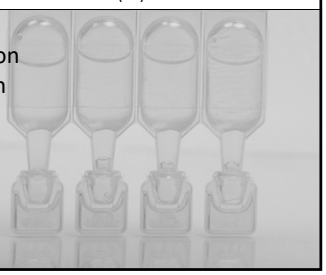
Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)

Promote epithelialisation
Reduce risk of recurrent erosion
Accelerate visual rehabilitation



Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral

Ascorbate: Alkali injury reduces AC ascorbate
Fibroblasts then can't synthesise collagen
Topical and oral ascorbate:
- speed healing/collagen synthesis
- reduce ulceration and perforation
- potentiate the effect of citrate

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral

Tetracyclines: Reduce matrix metalloproteinases
Prevent degradation of collagen
Reduce risk of ulceration
Doxycyline most potent

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral
Control inflammation	Corticosteroids drops Citrate drops

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral
Control inflammation	Corticosteroids drops Citrate drops

Corticosteroids: Mainstay for reducing inflammation and tissue injury
Reduce conjunctival goblet cell loss
Intensive for at least 7 days
Taper at 2 weeks (inhibit repair process, ulceration risk)
Ascorbate drops allow steroid drops to be used for longer

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral
Control inflammation	Corticosteroids drops Citrate drops

Citrate drops: Sodium citrate inhibits collagenase activity
Significantly reduces risk of corneal ulceration
Citrate/ascorbate combination reduces ulcer risk further

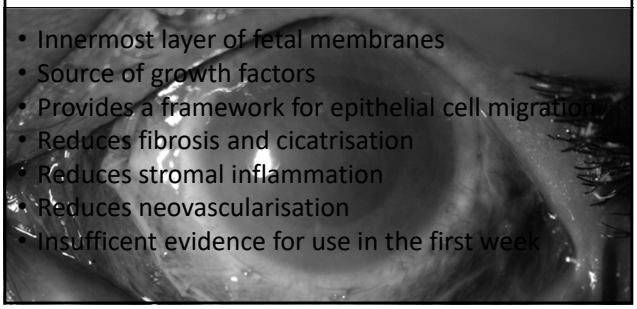
Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral
Control inflammation	Corticosteroids drops Citrate drops
Adjuvant therapy	Antibiotic drops Anti-glaucoma drops/oral Cycloplegic drops

Treatment – the evidence

Promotion of epithelialisation	Artificial tears (PF)
Support repair and minimise ulceration	Ascorbate - drops and oral Tetracyclines oral
Control inflammation	Corticosteroids drops Citrate drops
Adjuvant therapy	Antibiotic drops Anti-glaucoma drops/oral Cycloplegic drops
Surgical treatment	Debridement (↓ proteolytic enzymes) Amniotic membrane transplant

Amniotic membrane transplant

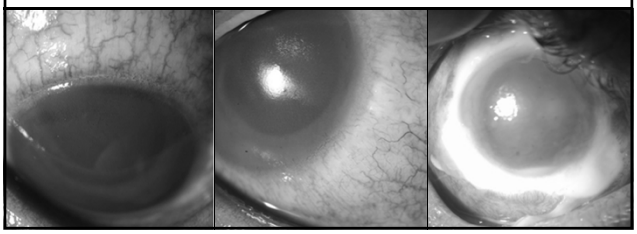


- Innermost layer of fetal membranes
- Source of growth factors
- Provides a framework for epithelial cell migration
- Reduces fibrosis and cicatrisation
- Reduces stromal inflammation
- Reduces neovascularisation
- Insufficent evidence for use in the first week

So which treatment?

Grading the injury

Classifications: Roper Hall and Dua
Aid management and prognosis



Grading the injury

Roper Hall classification

Grade	Cornea	Limbal ischaemia	Prognosis
I	Corneal epithelial damage	None	Good
II	Corneal haze, but iris details visible	<33%	Good
III	Total epithelial loss, stromal haze, iris details obscured	33%-50%	Guarded
IV	Opaque cornea, iris obscured	50%-100%	Poor

Grading the injury

Dua classification

Grade	Limbal involvement	Conj involvement	Analogue (limbus/conj)	Prognosis
I	None	None	0/0	Very good
II	<3 clock hours	<30%	0.1-3 /1%-29%	Good
III	3-6 clock hours	30-50%	3.1-6 / 31%-50%	Good
IV	6-9 clock hours	50-75%	6.1-9 / 51%-75%	Good to guarded
V	9-12 clock hours	75-100%	9.1-11.9 / 75.1-99.9	Guarded to poor
VI	12 clock hours	100%	12/100	Very poor

Treatment		
MILD	• Topical antibiotics • Topical steroid	 Reduce inflammation
LESS MILD/ SEVERE	• Topical steroid ↑↑↑ • Topical ascorbate • Oral vitamin C • Topical citrate • Oral doxycycline • Topical cycloplegia • Topical/oral IOP lowerers	Reduce inflammation ↑ collagen synthesis ↑ collagen synthesis ↓ collagenase activity Inhibit MMPs

Irrigate Irrigate Irrigate