



Corneal ulceration

- the good, the bad and the down-right ugly



**Corneal
ulceration**
*- the good, the
bad and the
down-right ugly*



By [1], Fair use,
<https://en.wikipedia.org/w/index.php?curid=41755900>

**Corneal
ulceration**
*- the good, the
bad and the
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Corneal Ulcers

- Learning Goals:
 - Normal corneal anatomy
 - Healing
 - When things go wrong ?
 - Treatment cheats



Corneal Ulcers

Common

Corneal has profound healing capacity

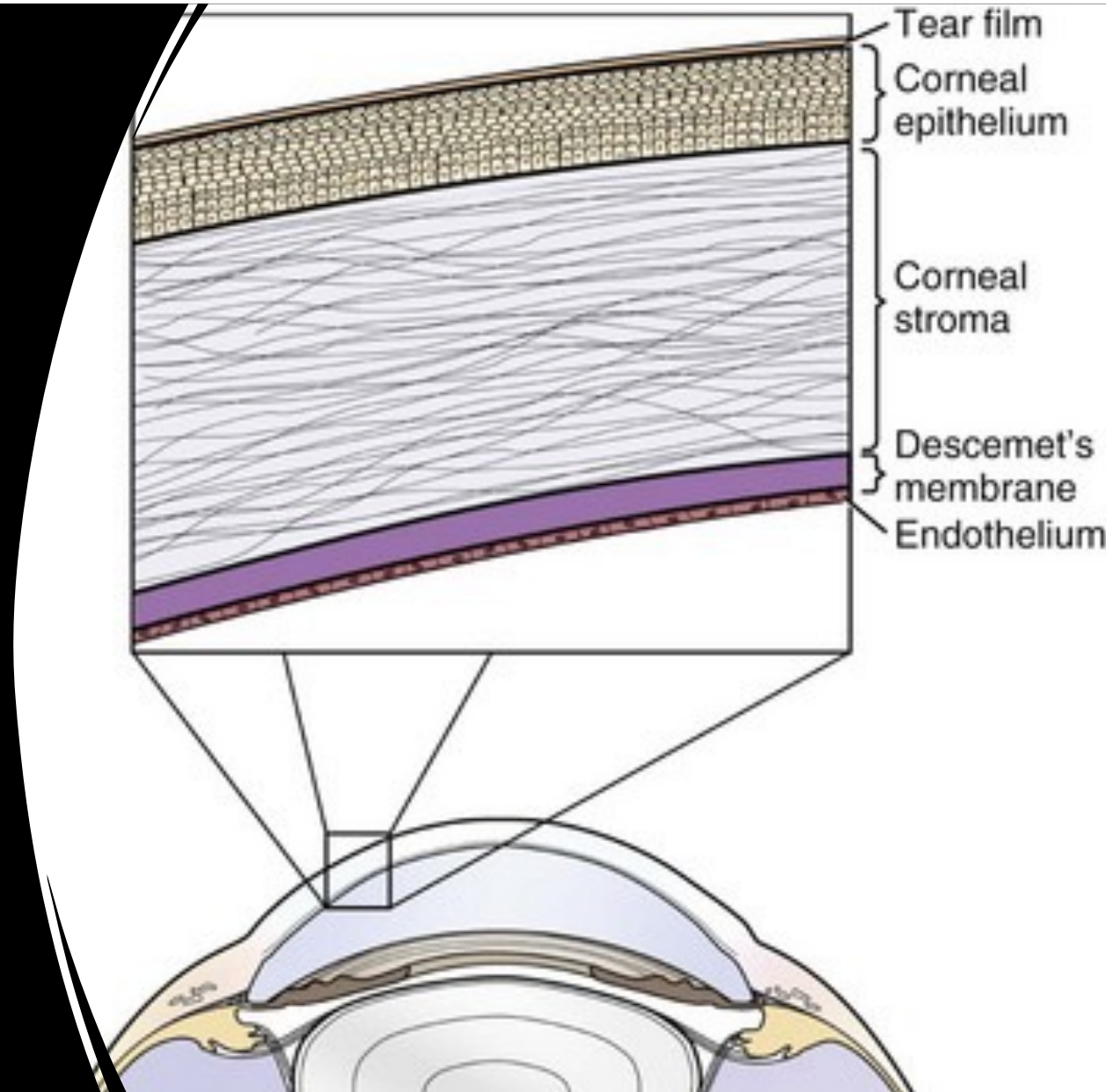
Failure to identify the inciting cause -> can severely impair healing

Appropriate treatment essential



Anatomy

- 4 layers - structural layers
 - Epithelium (plus Basement Membrane)
 - Corneal stroma
 - Descemet's membrane
 - Endothelium
- 5th Layer? Precorneal tear film



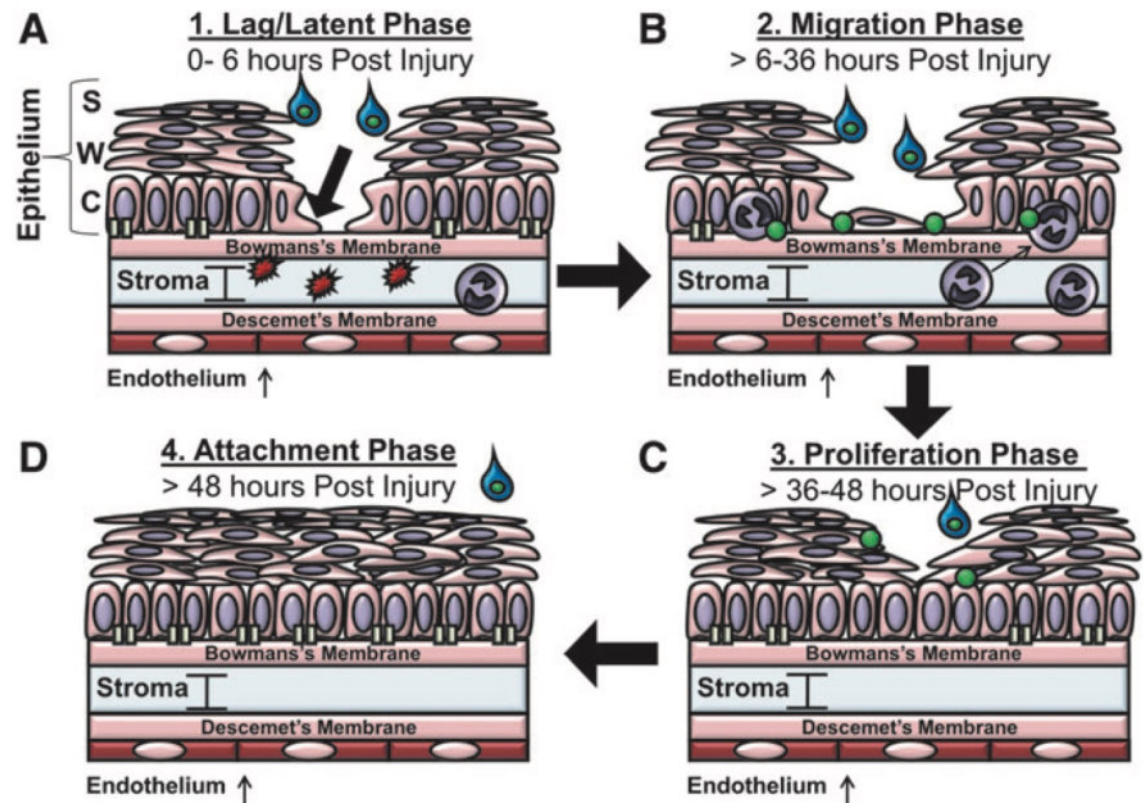
Clinical signs -

- Red
- Blepharospasm
- Excessive lacrimation
- Oedema
- Discharge
- Stain
- Defect



Healing

- Varies depending on the ulcer
- 4 phases
 - Latent
 - Migration
 - Proliferation
 - Attachment Phase



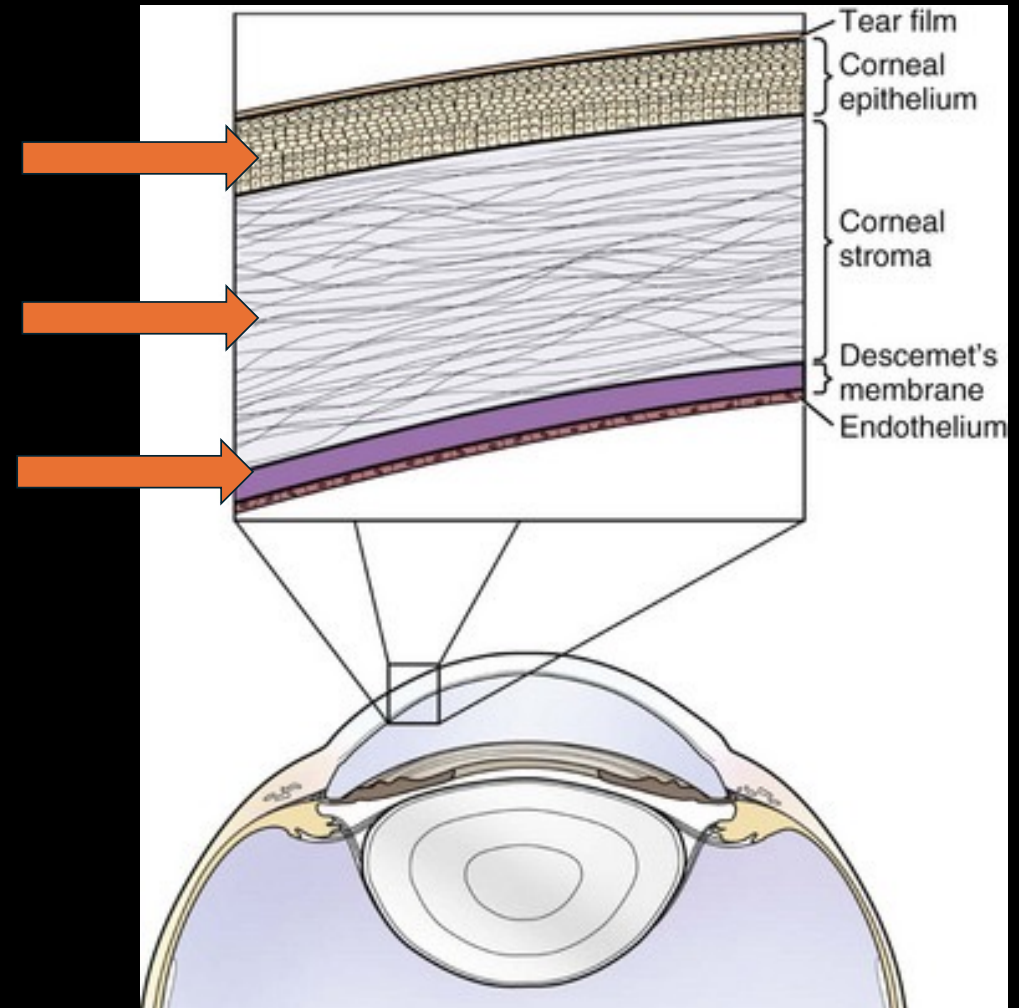
Ulcer Classification

- Depth
 - Epithelial / Superficial
 - Stroma : Anterior vs Mid vs Deep
 - Descemetocoele
- Location
- Cause / Association
- Define the healing :
 - Complicated vs uncomplicated
 - Healing / Non- healing
 - Infected / Non infected



Ulcer Depth

- Depth Classified as
 - Epithelial / Superficial
 - Stroma : Anterior vs Mid vs Deep
 - Descemetocoele



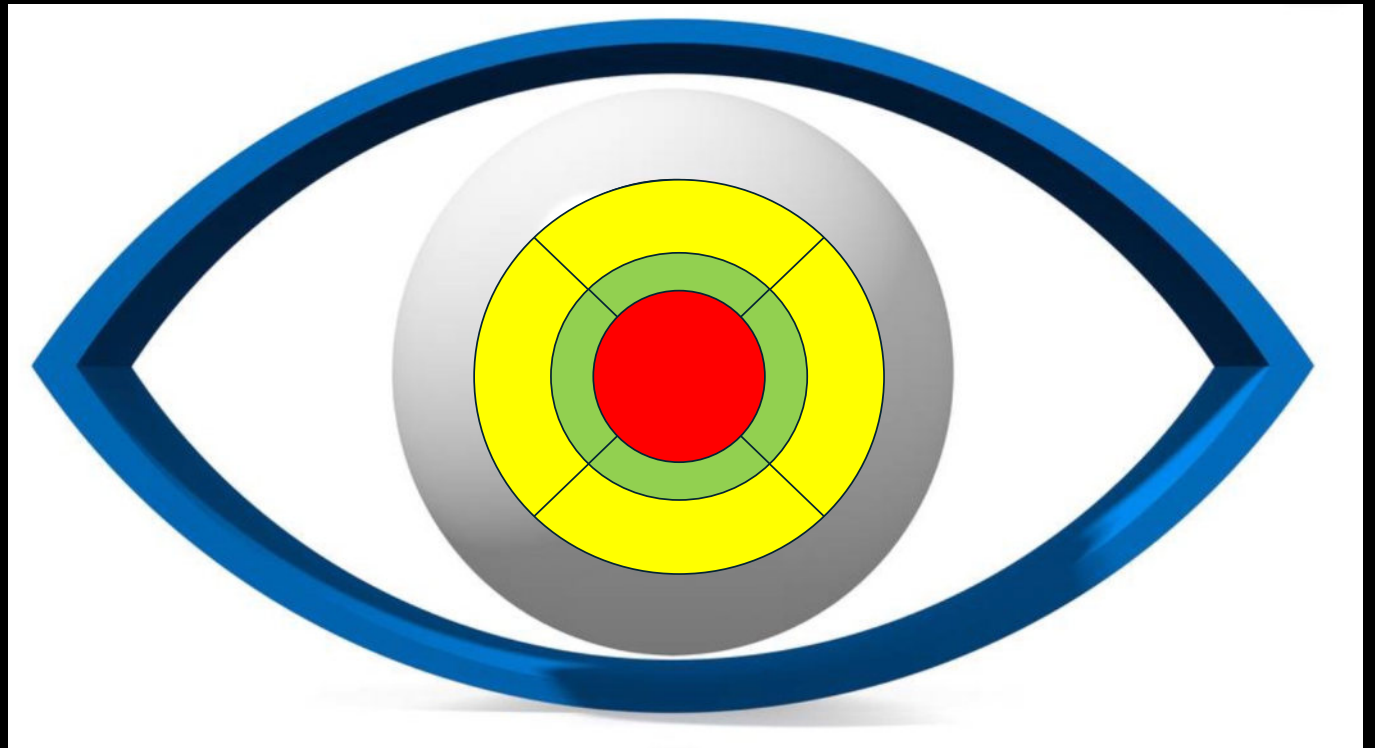
Ulcer Location

- Location

- Axial

- Paraxial

- Peripheral



Ulcer Classification

- Cause / Association:

- Foreign Body
- Immune Mediated
 - Chronic superficial Keratitis
- Disease
 - Systemic vs Ocular



Ulcer Classification

- Cause / Association:

- Foreign Body
- Immune Mediated
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Veterinary Ophthalmology Fifth Edition 2021 John Wiley & Sons, Inc

Ulcer Classification - association

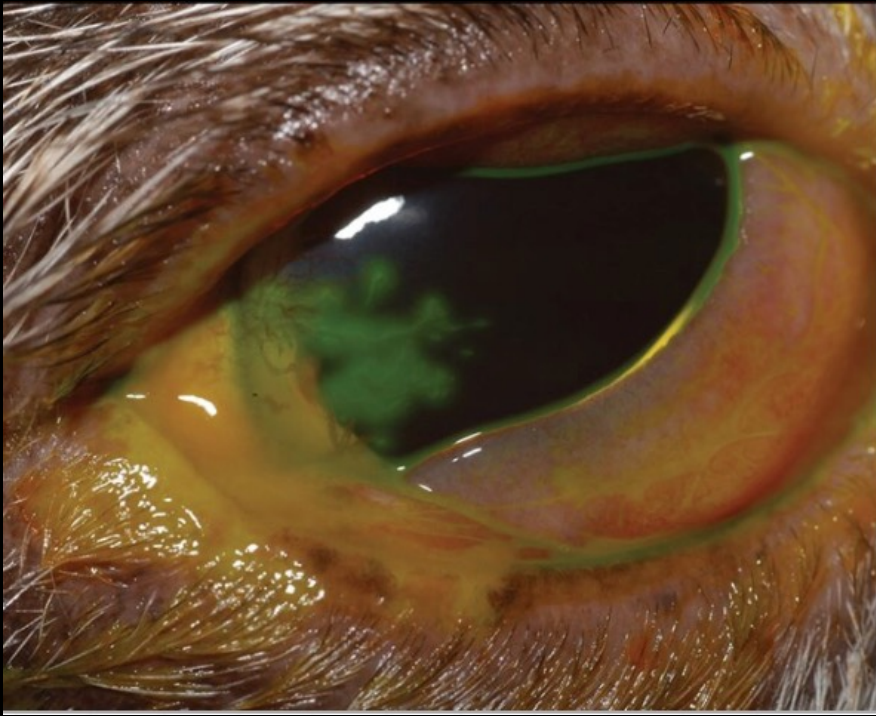
- Cause / Association:

- Systemic
- Ocular / Orbital

- The eyes are attached to a patient!



Ulcer Classification



- Cause / Association:
- Systemic –
 - Hyperadrenocorticism
 - Diabetes
 - Herpes – Feline and Canine

Ulcer Classification



- **Cause / Association:**

- Ocular / Orbital
 - Buphthalmia
 - Retrobulbar disease
 - Distichiasis / Trichiasis
 - Corneal degeneration (Systemic ?)
 - Sequestrum

Ulcer Classification

• Cause / Association:

- Ocular / Orbital
 - Buphthalmia
 - Secondary to glaucoma
 - Retrobulbar disease
 - Distichiasis / Trichiasis
 - Corneal degeneration (Systemic ?)
 - Corneal Sequestrum



Ulcer Classification

- **Cause / Association:**

- Ocular / Orbital

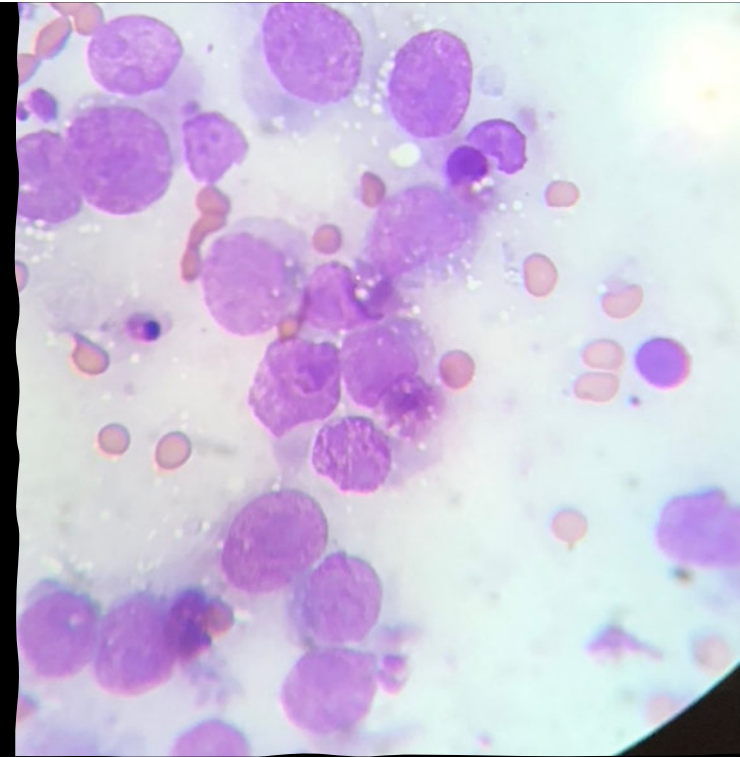
- Buphthalmia

- Retrobulbar disease

- Distichiasis / Trichiasis

- Corneal degeneration (Systemic ?)

- Corneal Sequestrum



Ulcer Classification

- Cause / Association:
- Ocular / Orbital
 - Buphthalmia
 - Retrobulbar disease
- Distichiasis / Trichiasis / Ectopic Cilia
- Corneal degeneration
- Corneal Sequestrum



Ulcer Classification



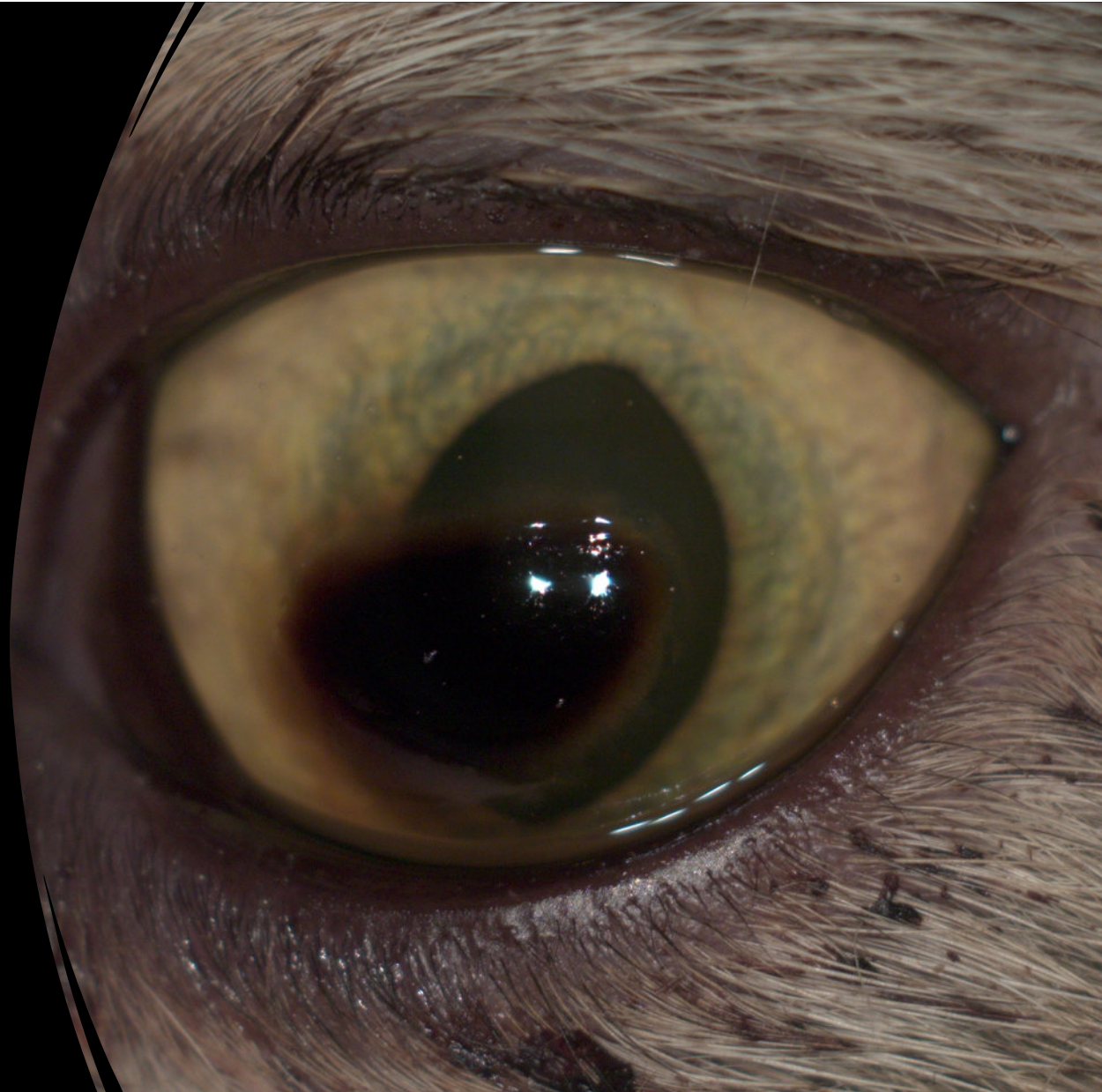
- Cause / Association:
- Ocular / Orbital
 - Buphthalmia
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- Corneal Sequestrum

Ulcer Classification

- **Cause / Association:**

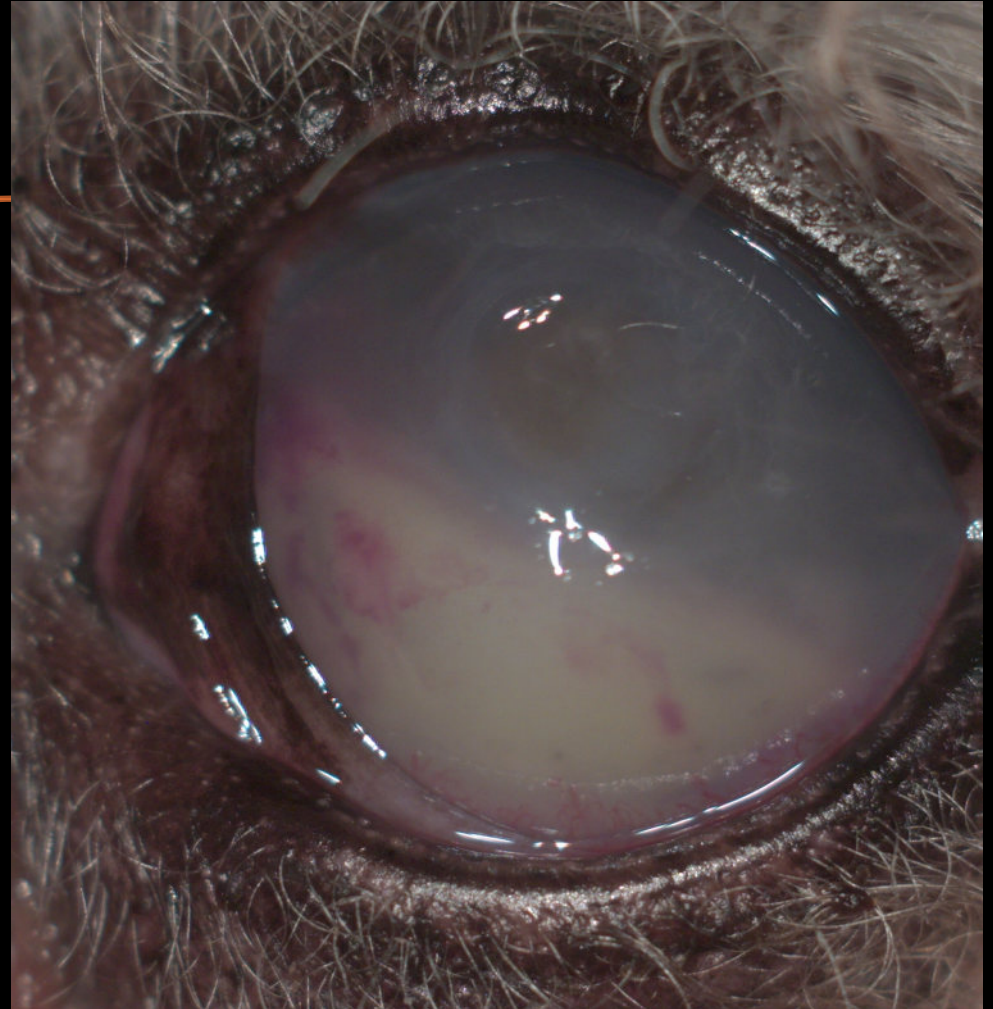
- Ocular / Orbital

- Buphthalmia
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- Corneal Sequestrum



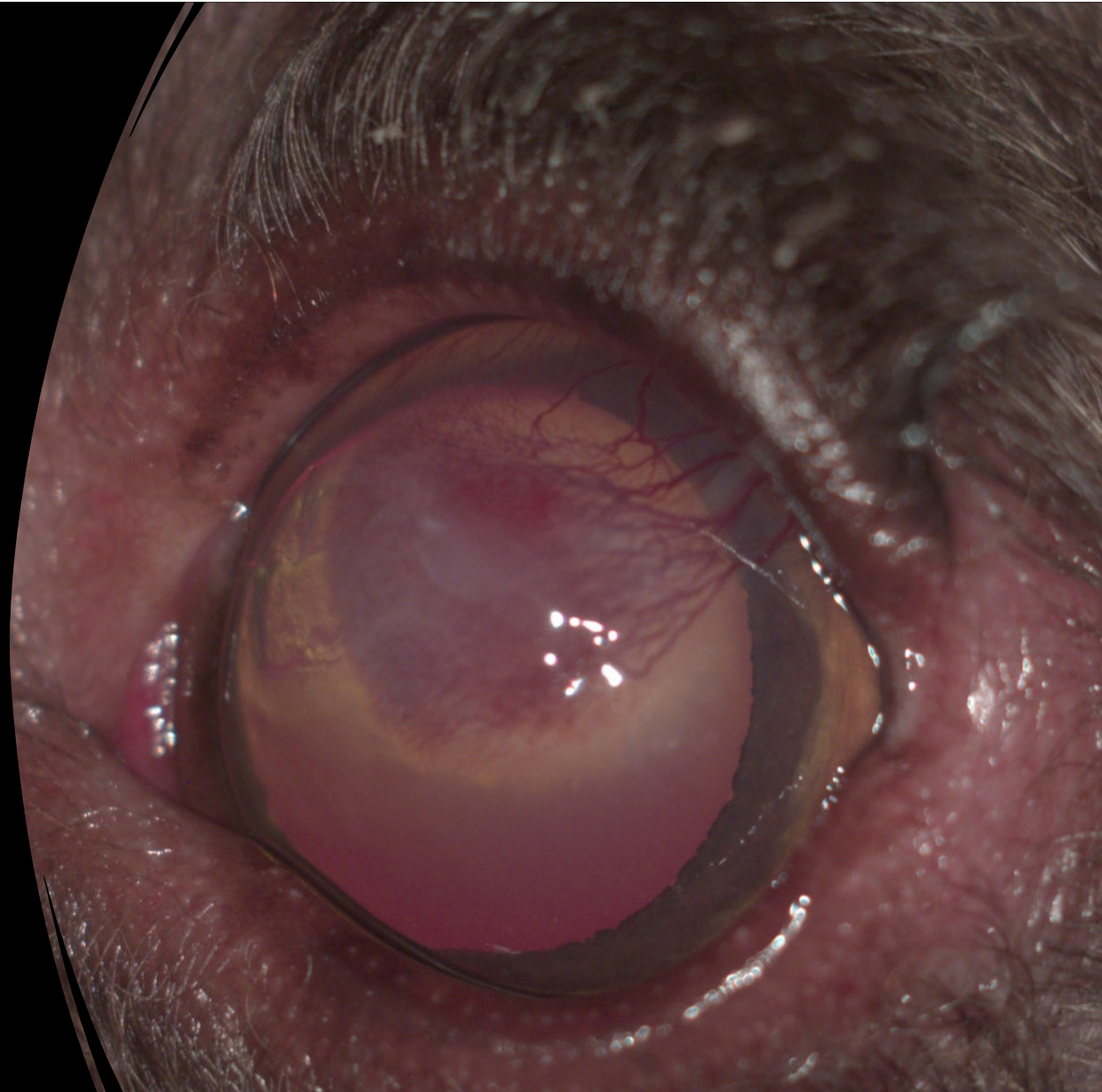
Ulcer Classification

- Infected / Non infected
 - Signs to watch for:
 - Hypopyon
 - Milky appearance
 - “Corneal melt”
 - Pain
 - Miosis



Ulcer Classification

- Define the healing :
Complicated vs uncomplicated
 - Healing / Non- healing
 - Look for Vascular response



Quiz

- Vascular response indicates severity?
 - NO!
 - Indicates Chronicity

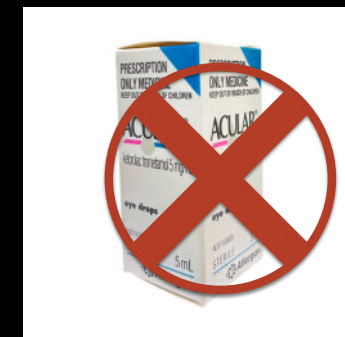


Superficial Ulcers (aka “The Good”)



Superficial Ulcers (aka “The Good”)

- Heal: 72h -7 days Healing
- Treatment options
 - Topical antibiotics – Chloramphenicol
 - Pain relief - Systemic
 - Atropine
 - Lubricant - Hyaluronate based



Non - healing ulcers

- What are they?
 - Not - healed within 7 days
 - Not all indolent
- Approach?



Non - healing ulcers

- When to investigate further treatment
 - Based on further diagnosis – Indolent ulcer, Entropion, Cilia etc
 - What are you going to change? Antimicrobial? – Not usually

Why ?

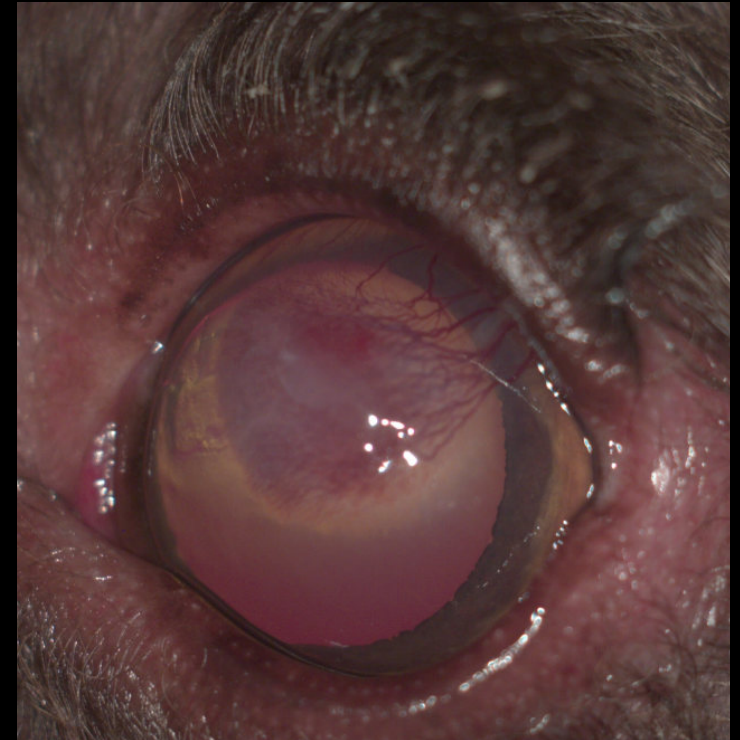
- Missed an underlying cause
 - Entropion
 - Conformation -Breed
 - Exposure
 - TEAR LEVELS
 - Neurological status - Palpebral, Corneal Reflexes

Assessment?

- Cilia
- Foreign bodies
- Mineral Deposits
- Cornea oedema - Endothelial dystrophy
- True Infection
- SCCED
- Systemic disease

Non - healing ulcers

- When to investigate further treatment
 - Based on further diagnosis – Indolent ulcer, Entropion, Cilia etc
 - What are you going to change?
 - Antimicrobial – Not usually
 - Assessment?



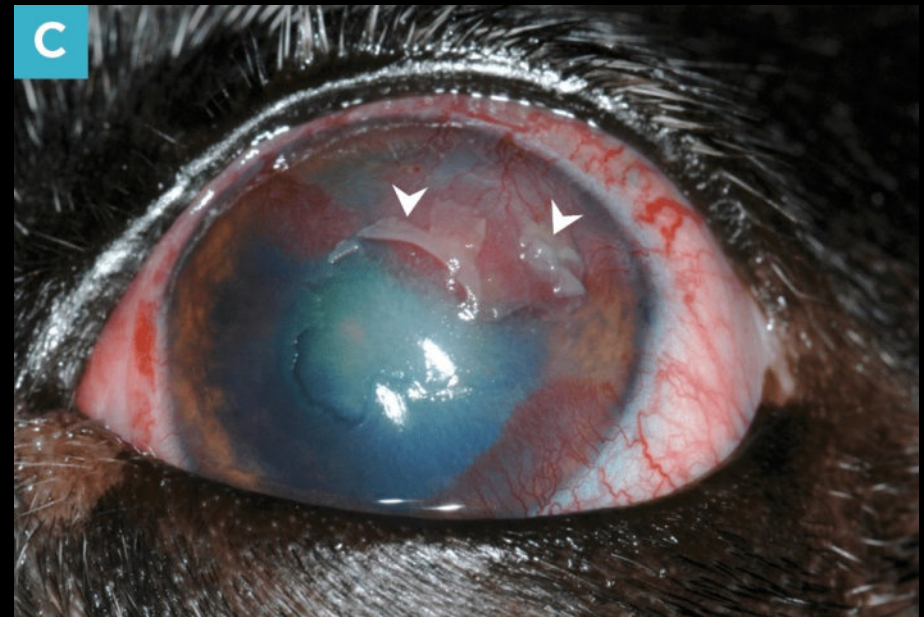


Non - healing ulcers

Non-healing Ulcers

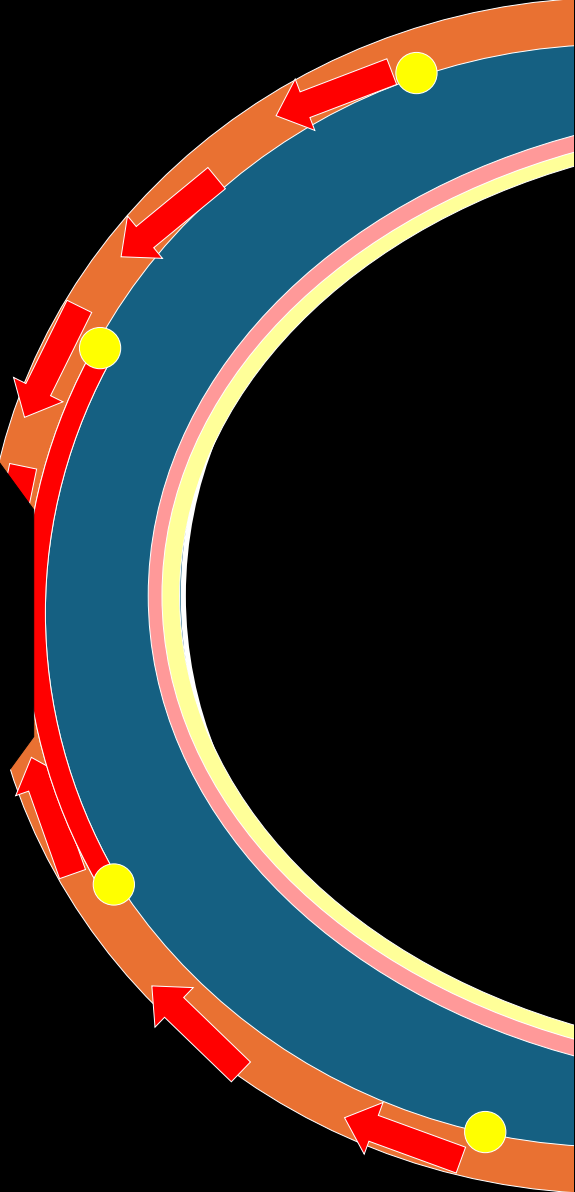


epithelial



<https://todaysveterinarypractice.com/ophthalmology/indolent-corneal-ulcers/>

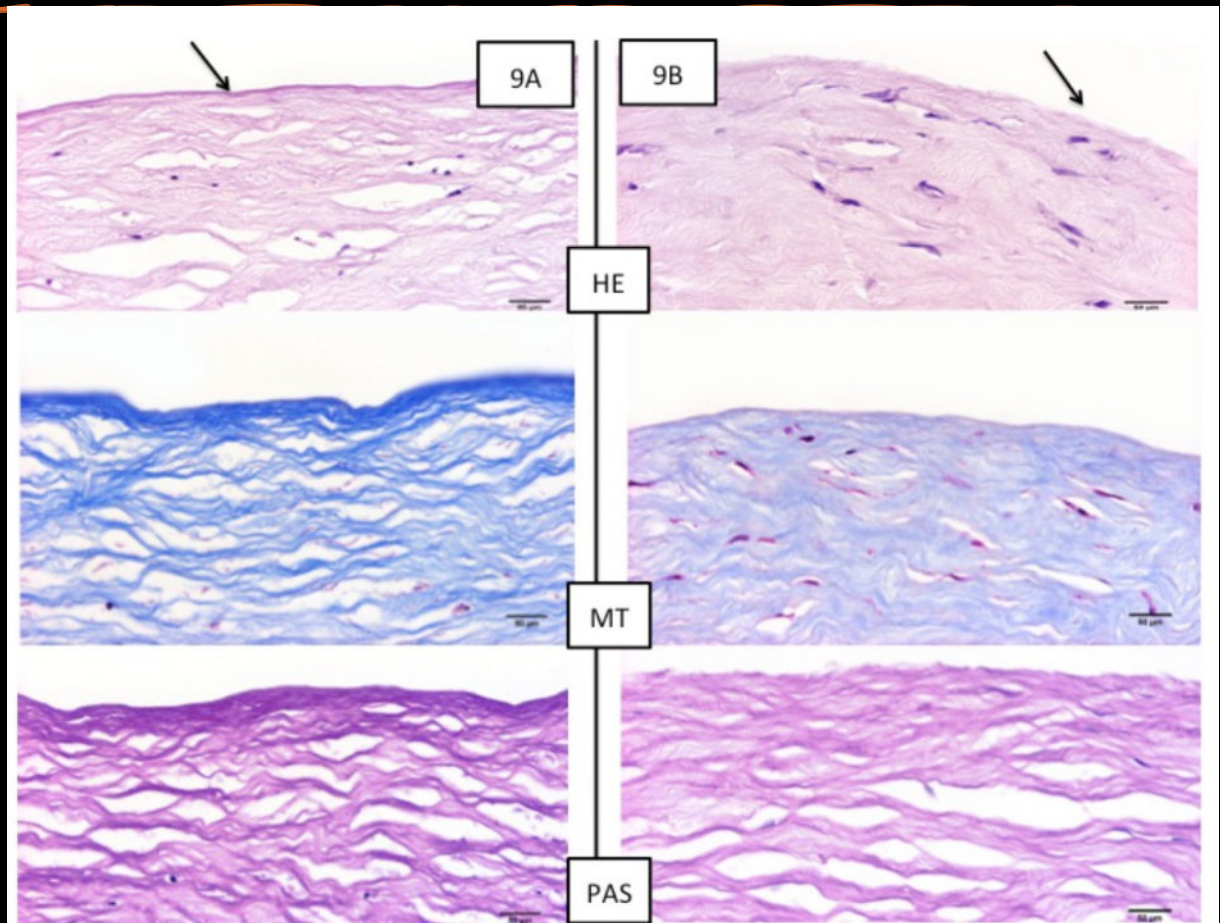
Indolent Ulcers



Non-healing Ulcers

Why Not Grid?

- Scarring
- Doesn't address the pathogenesis
 - Hyalinized Acellular Zone



Non –healing Ulcers

Why Not TEL Flap?

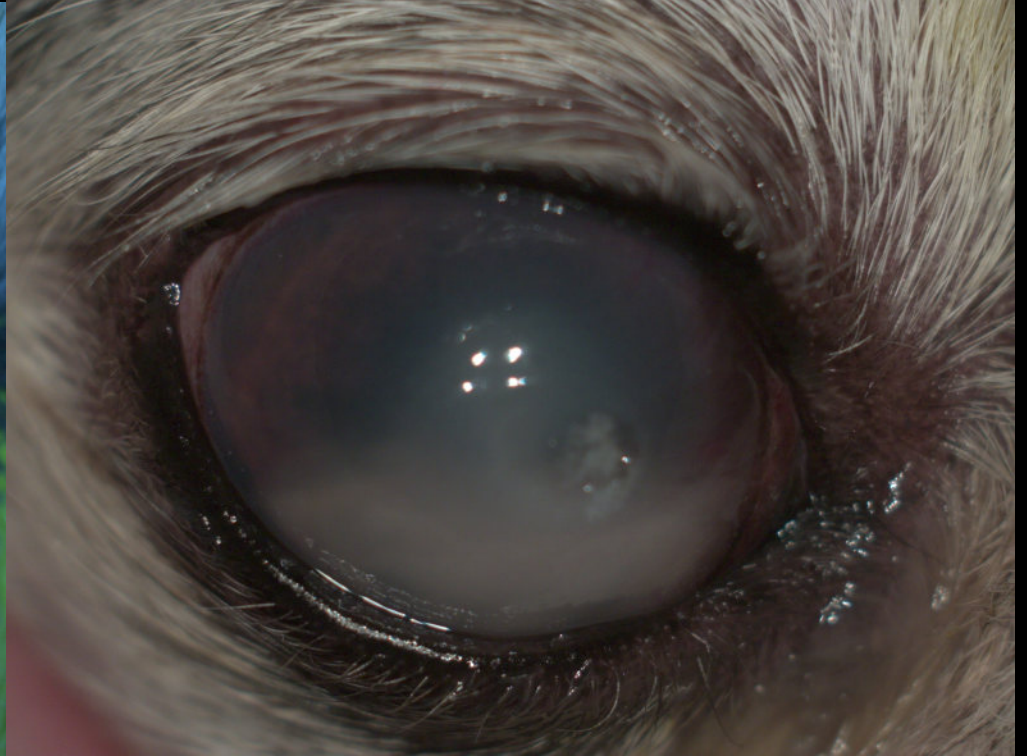
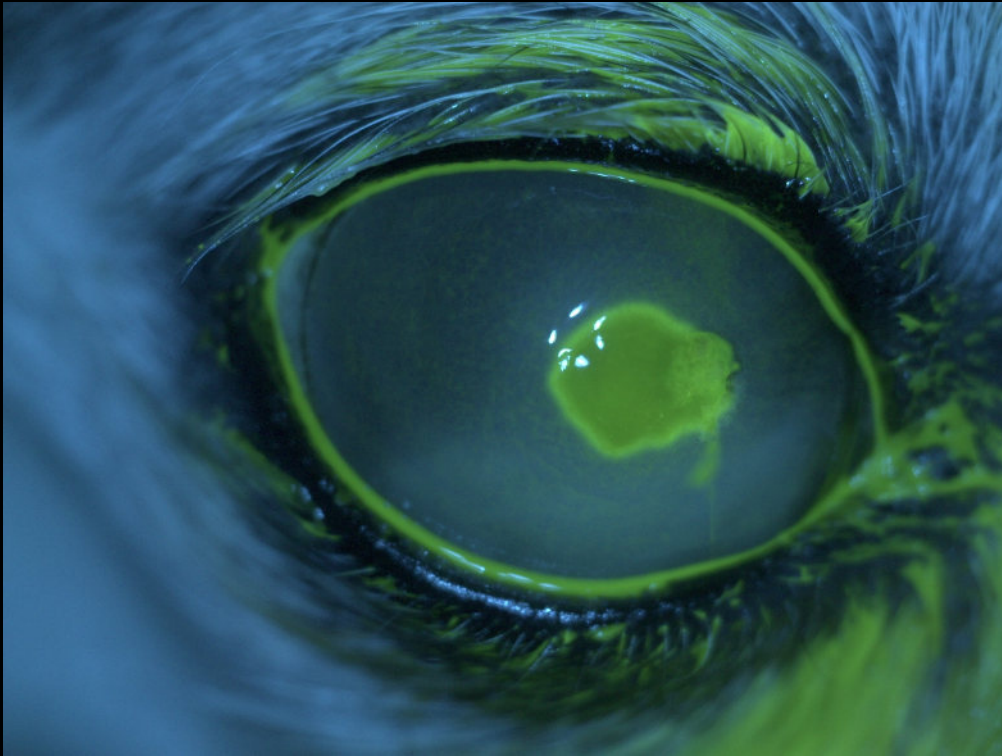
- Can't assess healing
- Doesn't provide tectonic support
- Better options



Deep Corneal / Infected Ulcers (aka “The Bad”)



Deep Corneal / Infected



Deep Corneal / Infected

- Deep complicated ulcers / Melting ulcers
- Recognize underlying cause and address
- Appropriate management
 - Diagnostics -> Cytology
- HALT MICROBIAL GROWTH



Deep Corneal / Infected

- Approach:

- Antimicrobial : Ofloxacin, Gentamicin / Tobramycin, Fortified Cephazolin, Chlorsig - hrly
- Halt keratomalacia: Doxycycline > EDTA > N-acetylcysteine > Plasma (every hour)
 - Caution biological products
- Uveitis - Atropine QID -> BID
- Pain - NSAIDS and OPIODS



Comparison of the efficacy of various concentrations and combinations of serum, ethylenediaminetetraacetic acid, tetracycline, doxycycline, minocycline, and N-acetylcysteine for inhibition of collagenase activity in an in vitro corneal degradation model

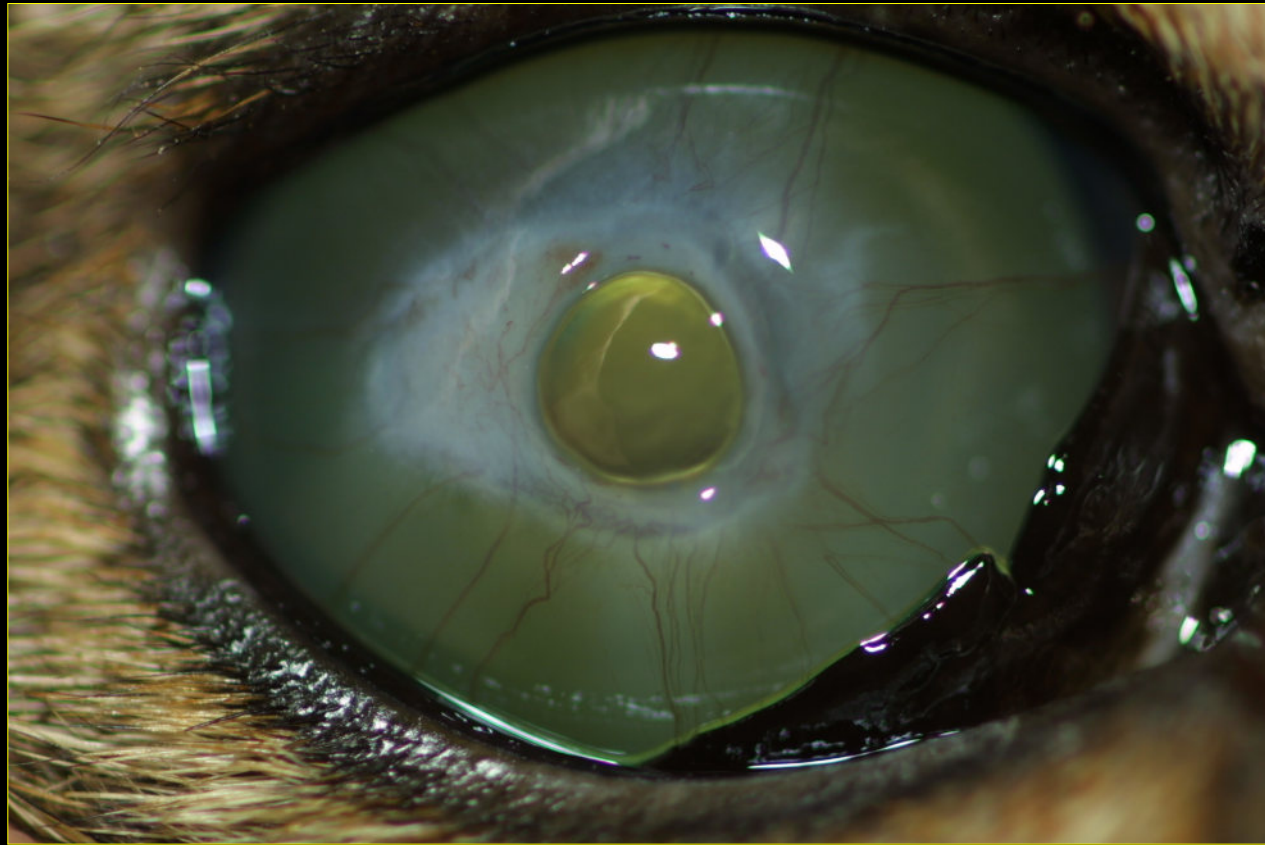


Surgical Ulcers (aka “The Ugly”)



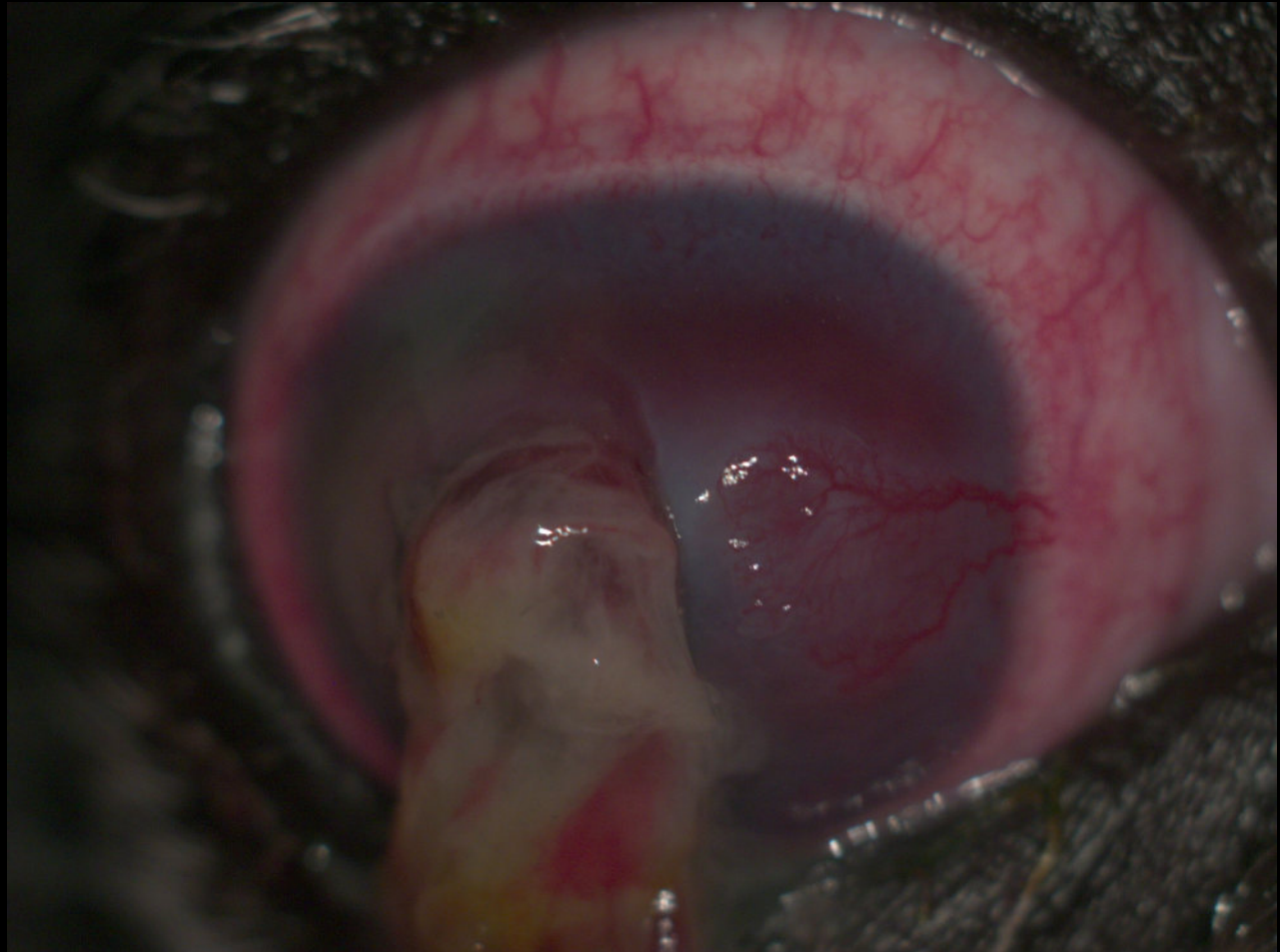
Surgical Ulcers

- No infection - Ideally
- Treatment prior to referral.
 - Control infection, uveitis
- Surgical Options
 - CCT
 - Conjunctival grafting
 - Biosis disc



Surgical Ulcers

- Immediate Referral
- Initial treatment –Prior to referral
 - Atropine
 - Ocuflor.
 - Pain relief
 - Opiods
 - NSAID



Surgical Ulcers

- Sometimes
- Enucleation is the only option



Key Take Home Points

- Define the ulcer:

- Depth
- Location
- Cause / Association

- Define the healing :

- Complicated vs uncomplicated
- Healing / Non- healing
- Infected / Non infected

Don't randomly change antibiotics

Don't perform grid keratotomies

TROY



Questions?

