

Canine Corneal Ulcers

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Update

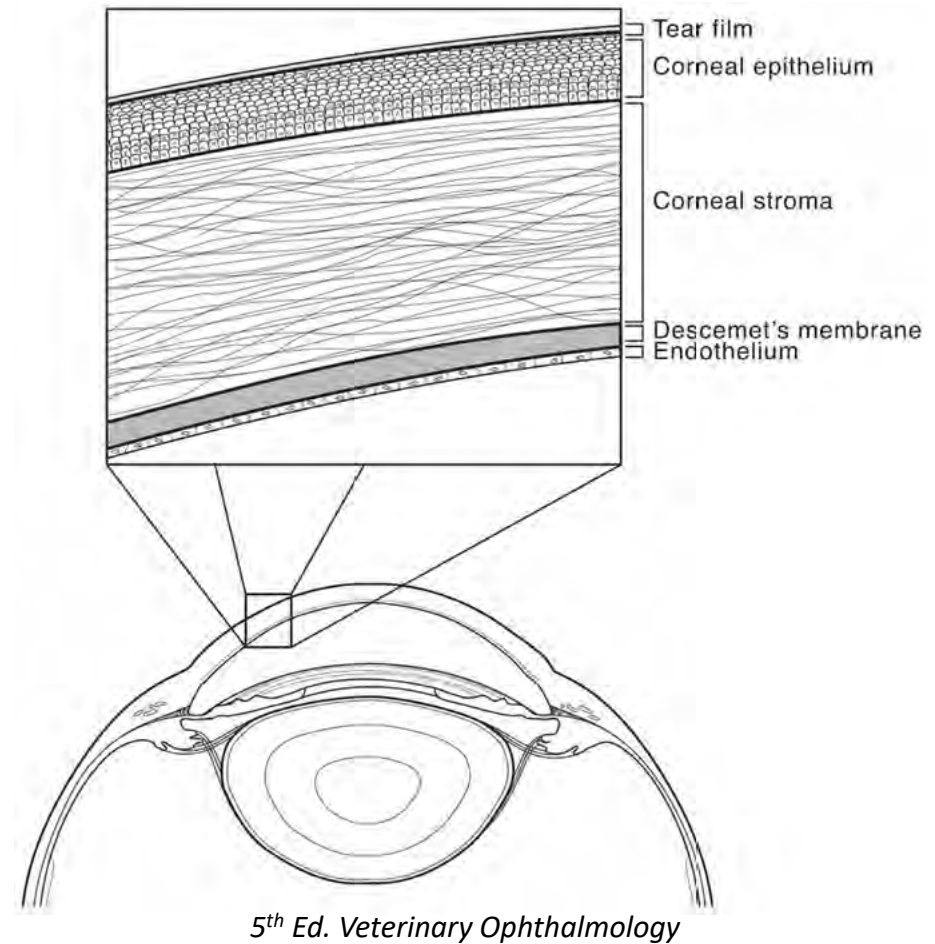
- Rose C. Vogel, DVM, DACVO

Overview

- Corneal anatomy
- Corneal wound healing
- Diagnostics
- Ulcer depth and descriptions
- Treatments
- Recheck schedule recommendations
- Surgical options upon referral

Corneal Anatomy

- ~550um thickness
- Four corneal layers
 - Epithelium
 - Stroma
 - Descemet's membrane
 - Endothelium



Corneal wound healing

- Epithelial healing
 - Epithelial sliding and mitosis
 - Initially thin
- Stromal healing
 - Edema and neutrophils
 - Keratocytes → fibroblasts
 - Collagen and extracellular matrix components

Corneal wound healing

- Endothelial healing
 - Injury leads to decrease in number of cells

Corneal wound healing

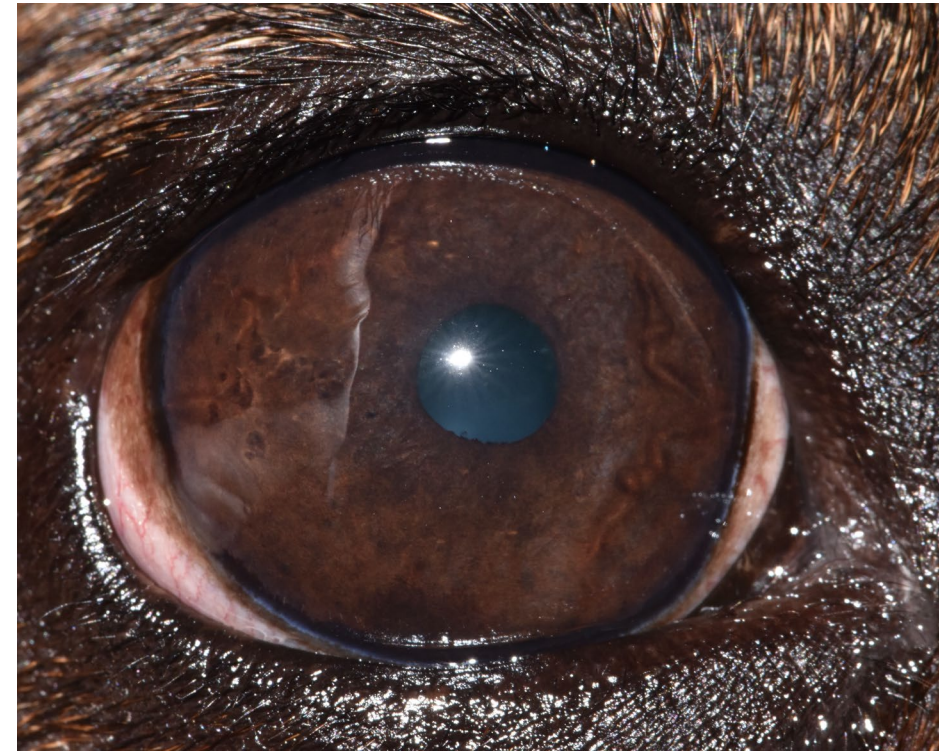
- Corneal perforation healing
 - Immediate phase - Fibrin plug forms
 - Leukocytic phase - Neutrophils and mononuclear cells
 - Epithelial phase - sliding and mitosis
 - Fibroblastic phase - fibroblasts enlarge and create collagen
 - Endothelial phase - enlarge and slide, minimal mitotic activity
 - Final phase – decreased cellularity

Initial exam

- History
- Complete eye examination
- Schirmer Tear Test, Intraocular pressure, Fluorescein

Corneal exam

- Normal cornea is clear, smooth, and moist
- Abnormalities
 - Corneal edema
 - Calcium or cholesterol
 - Scars
 - Superficial or deep neovascularization
 - Pigment
 - Sequestrums (cat)
 - Foreign bodies
 - Rough or dull surface
 - Defects in cornea



Clinical signs

- Blepharospasm
- Epiphora
- Rubbing
- Enophthalmos and elevated third eyelid
- “Red eye” – conjunctival hyperemia
- Corneal edema and neovascularization
- Corneal defect
- Reflex uveitis



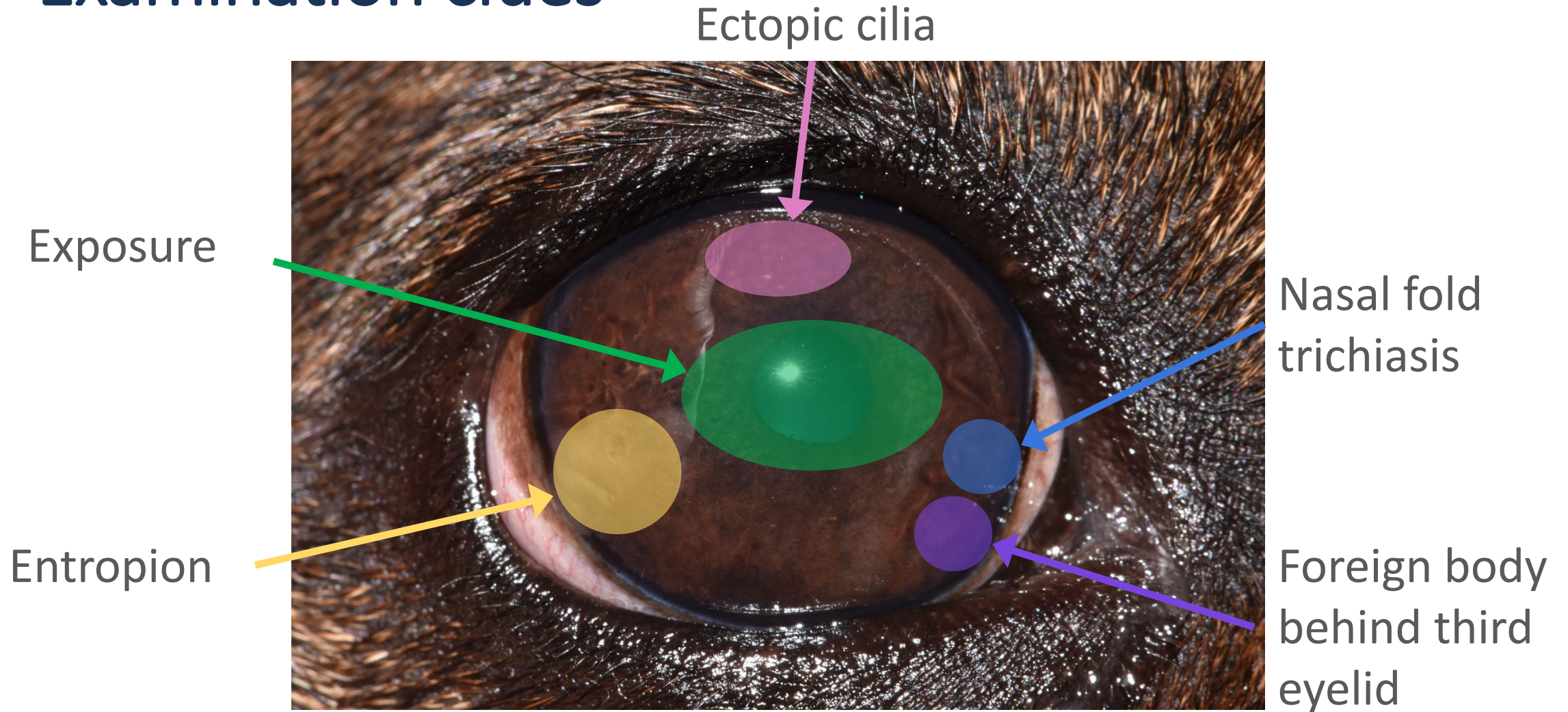
Corneal ulcer exam

- Determine etiology
- Determine depth
- Are there complicating factors?
- Rate of progression

Corneal ulcer causes

- Injury
 - Trauma (to globe or eyelid), foreign body, chemical or thermal insult
- Conformation
 - Entropion, lagophthalmos, nasal fold trichiasis
- Abnormal hair
 - Ectopic cilia, distichia
- Acquired
 - KCS, facial nerve paralysis, eyelid masses, indolent ulcer, buphthalmia/exposure, anesthesia, etc.

Examination clues



Corneal ulcers

- Simple or infected?
- Superficial or deep?
- Already ruptured?
- Indolent?

Simple corneal ulcer

- Trauma
- Superficial (no loose edges)
- Can have
 - mild corneal edema, miosis, enophthalmia, blepharospasm
- Should not have
 - Cellular infiltrate, hypopyon, neovascularization

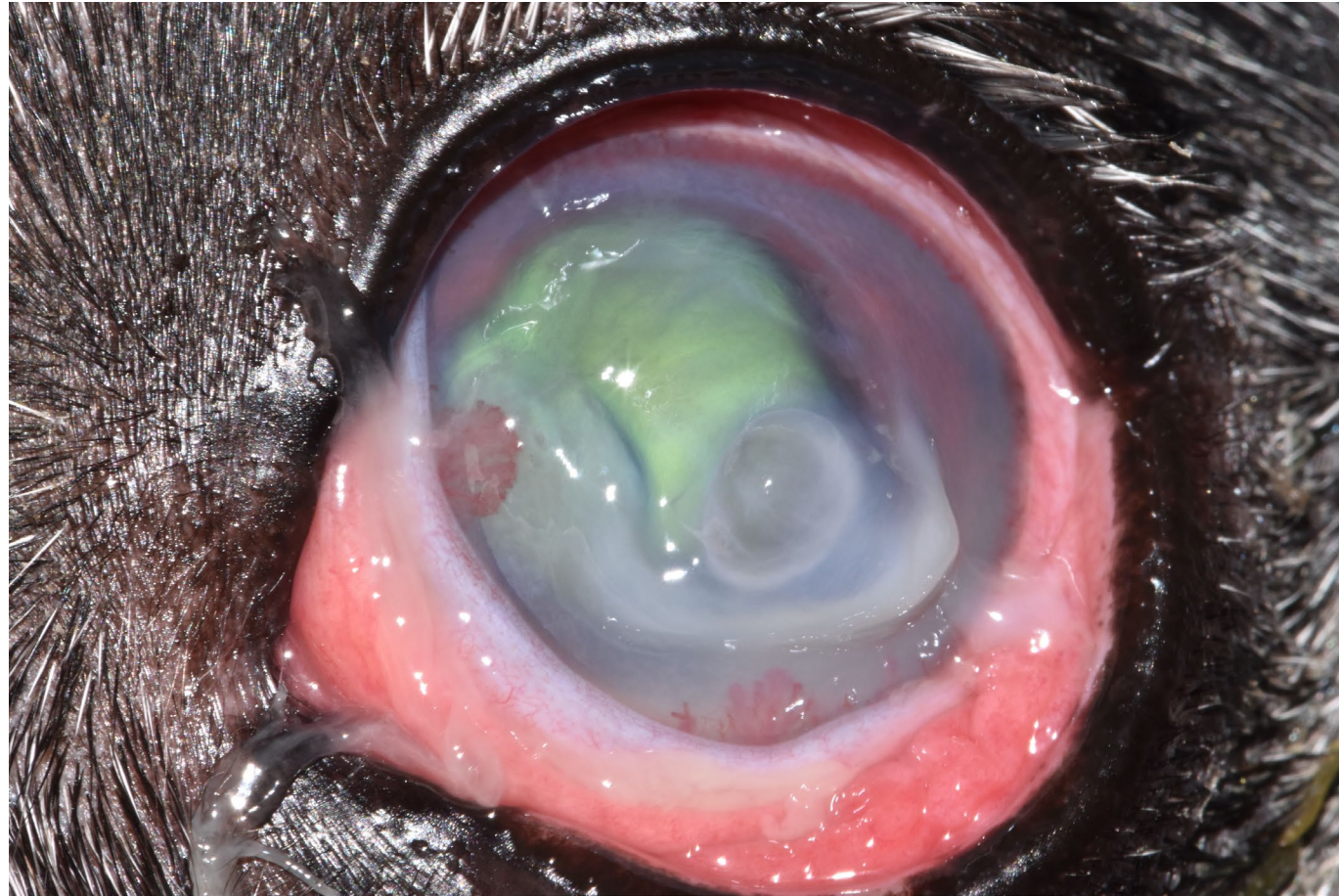
Simple (superficial) corneal ulcer



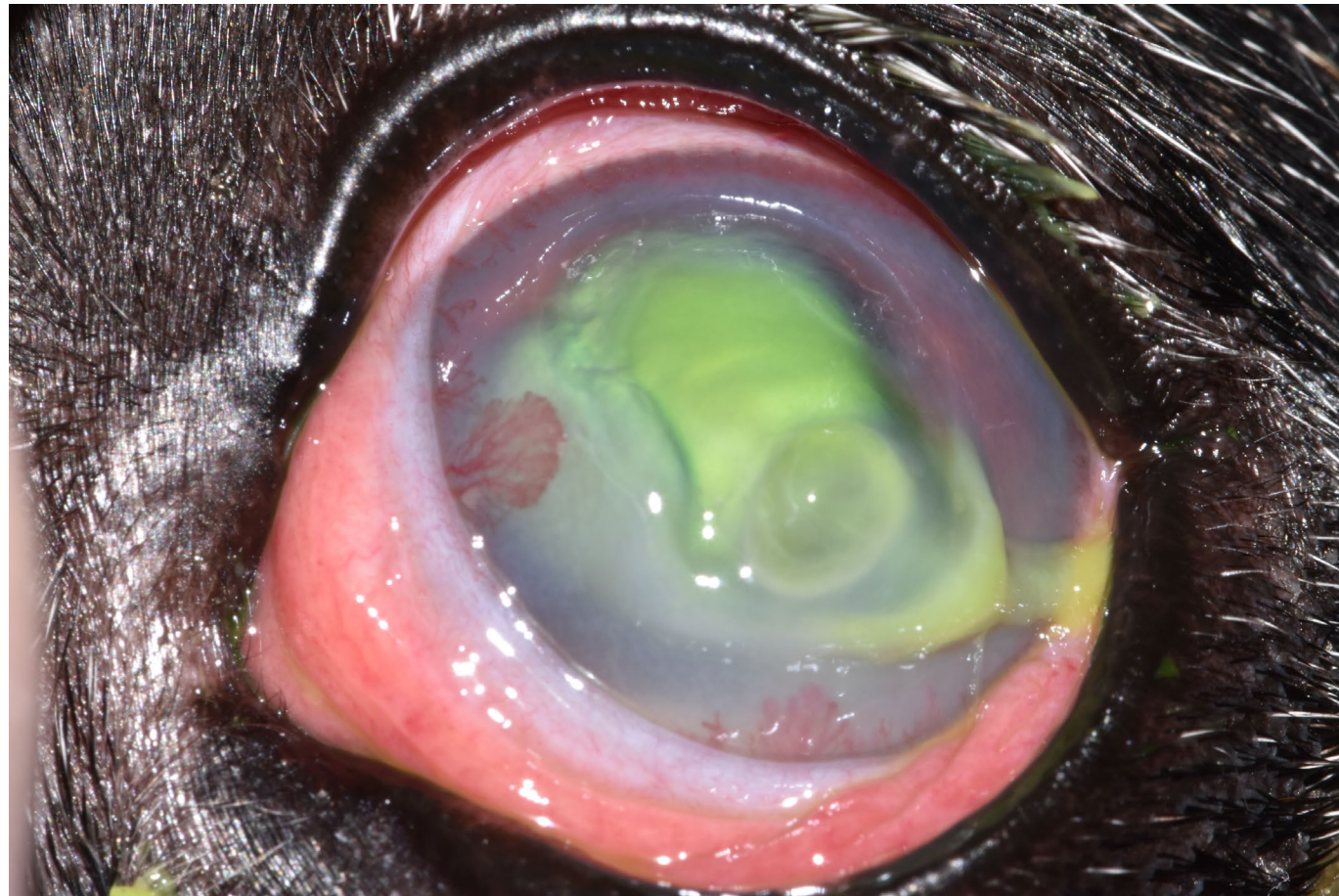
Infected corneal ulcer

- Any stromal loss
- Can have
 - Enophthalmia, blepharospasm, mucoid discharge, **cellular infiltrate**, **significant corneal edema**, +/- **corneal malacia**, neovascularization, **hypopyon**, flare, miosis, etc.

Infected corneal ulcer



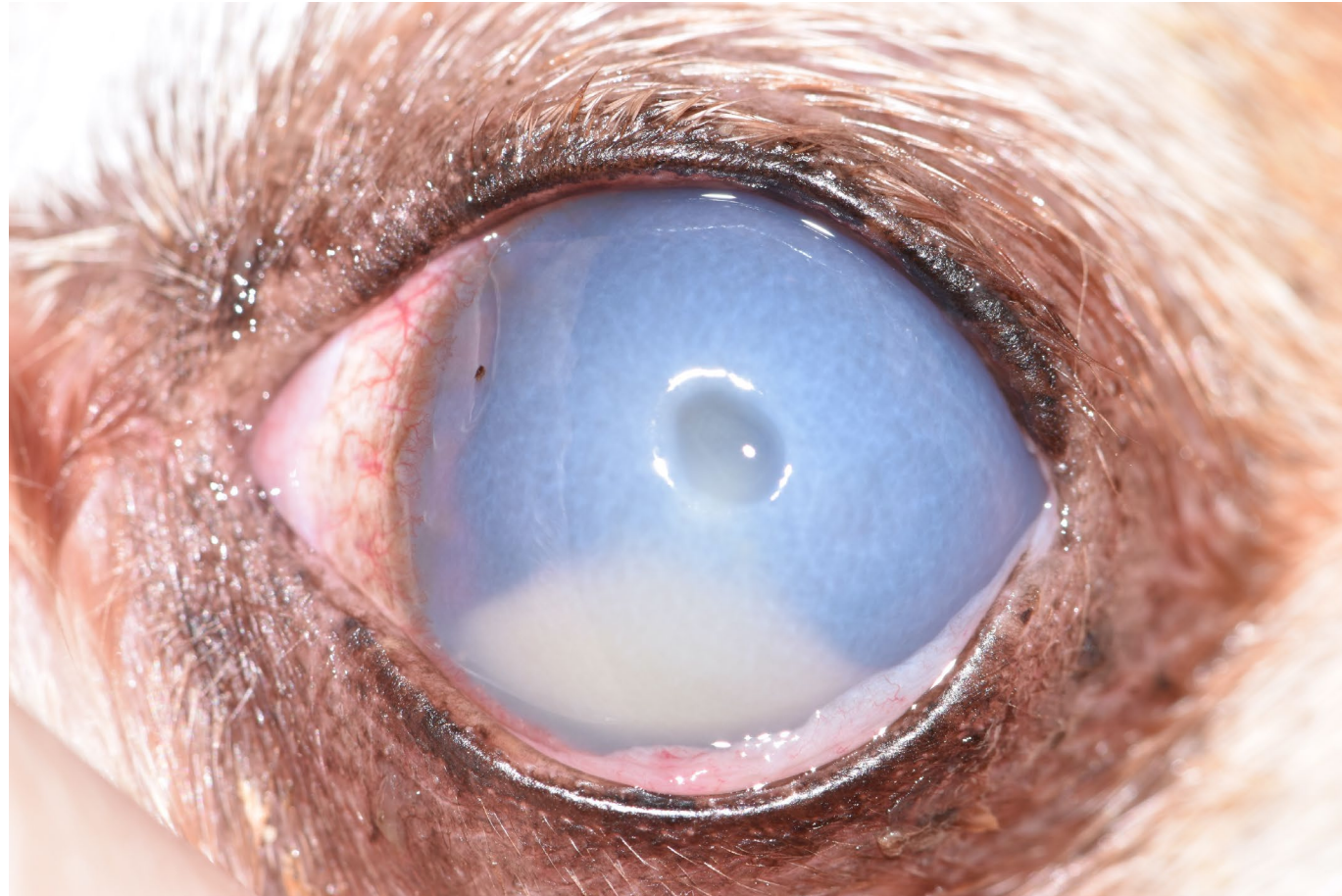
Infected corneal ulcer



Deep corneal ulcer

- Stromal loss
 - Anterior stromal
 - Midstromal
 - Deep stromal
- Descemetocoele

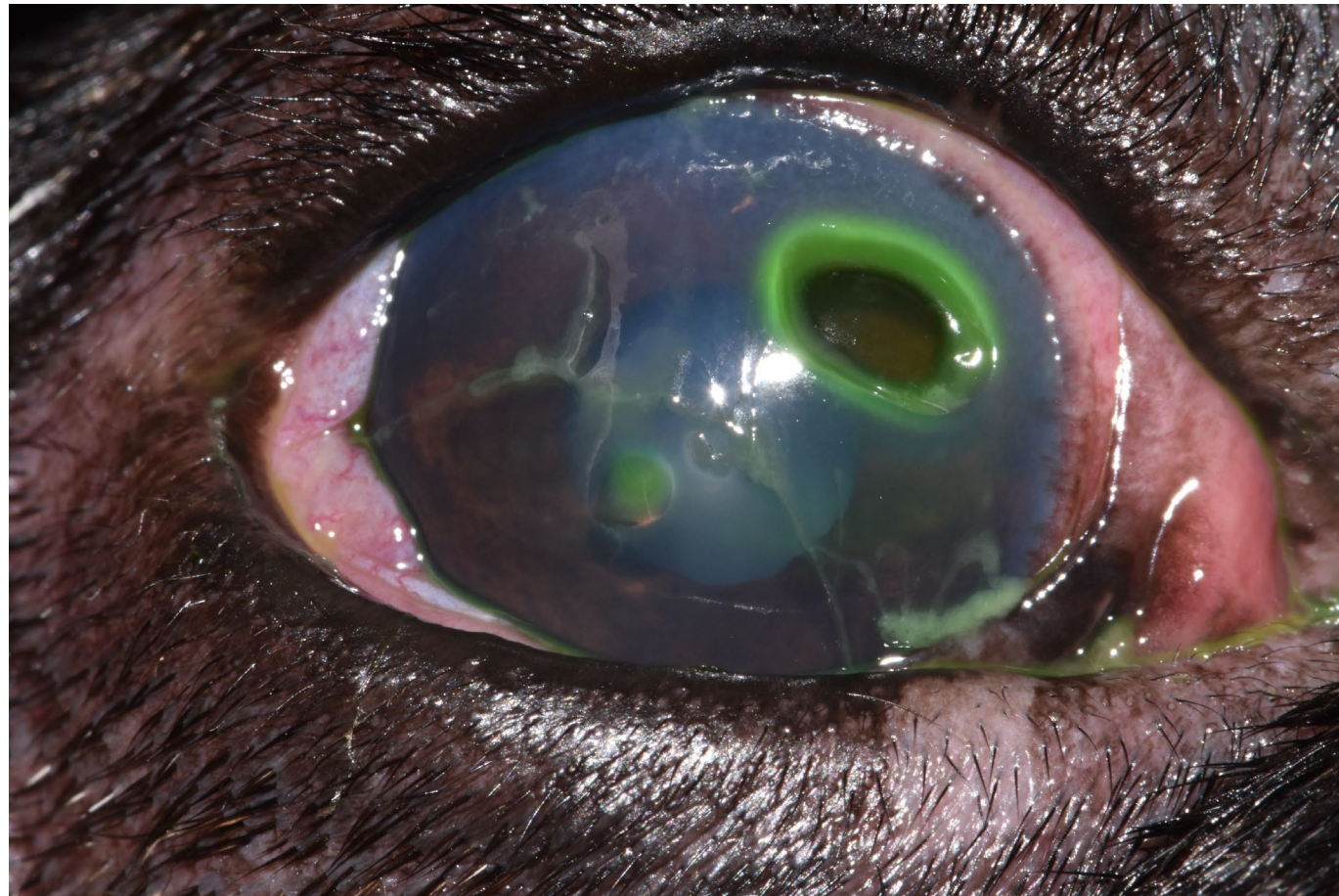
Midstromal corneal ulcer



Stromal ulcer and descemetocoele



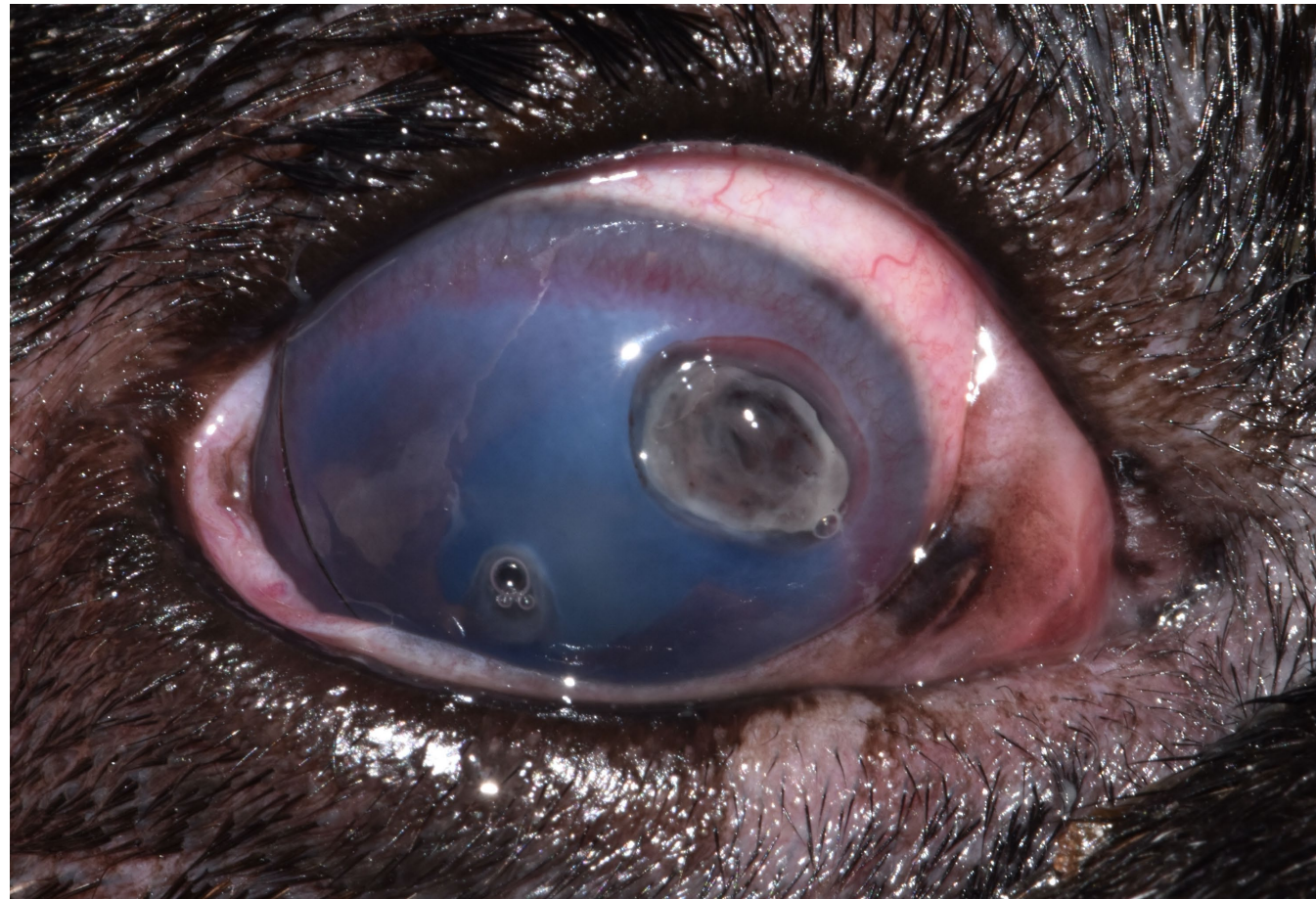
Stromal ulcer and descemetocoele



Corneal rupture

- Sealed or leaking?
 - Seidel test
- Formed anterior chamber or collapsed?
- Fibrin or iris plug
- Hyphema

Rupture



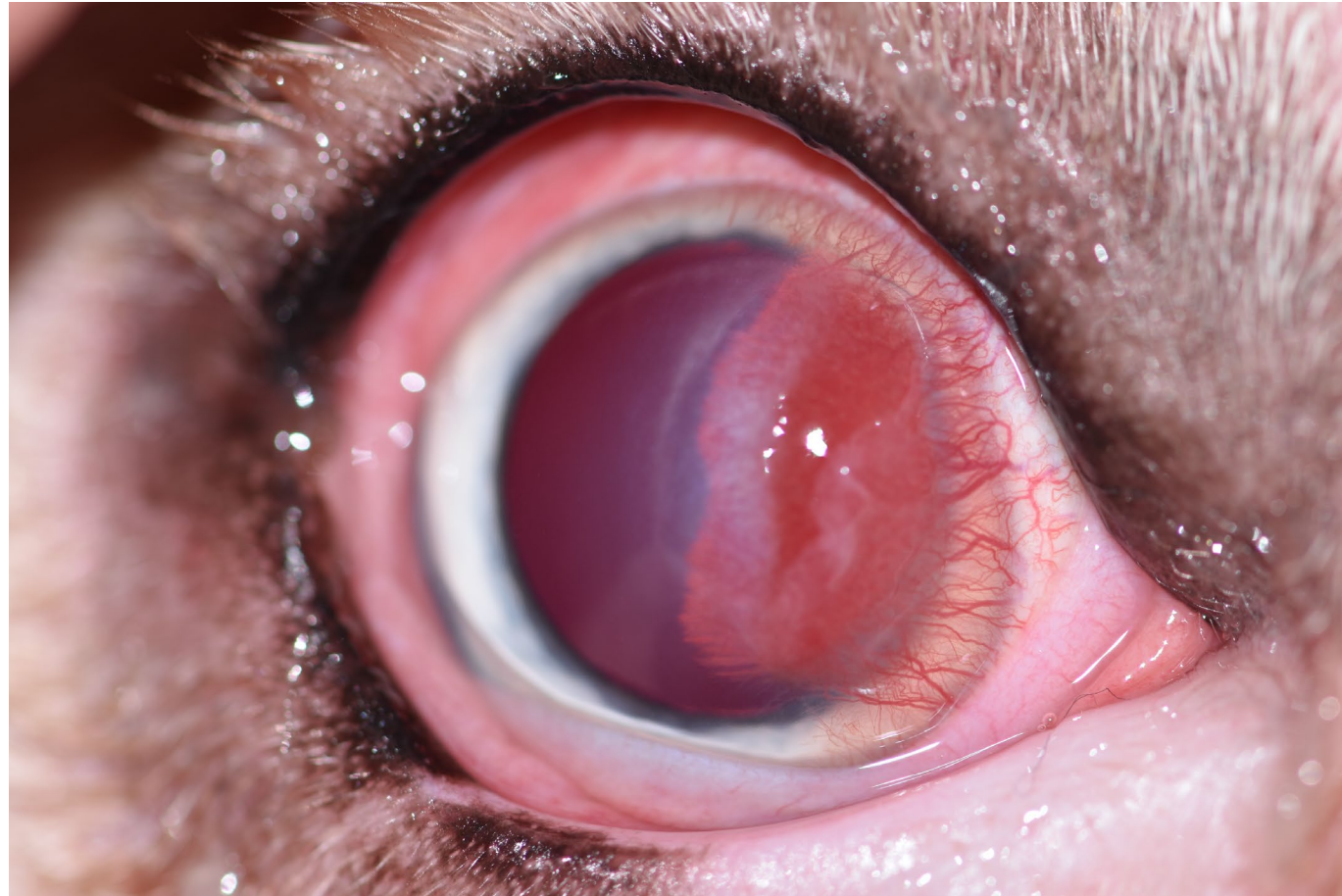
Rupture



Indolent ulcer

- Chronic superficial ulcer
- Loose epithelial edges
- May have mild corneal edema
- +/- neovascularization or granulation tissue

Indolent ulcer



Treatment: Superficial ulcer

- Topical antibiotic
- Topical atropine
- E-collar

Recheck: Superficial ulcer

- Brachycephalic: next day
- Mesocephalic or dolichocephalic: next 2-3 days

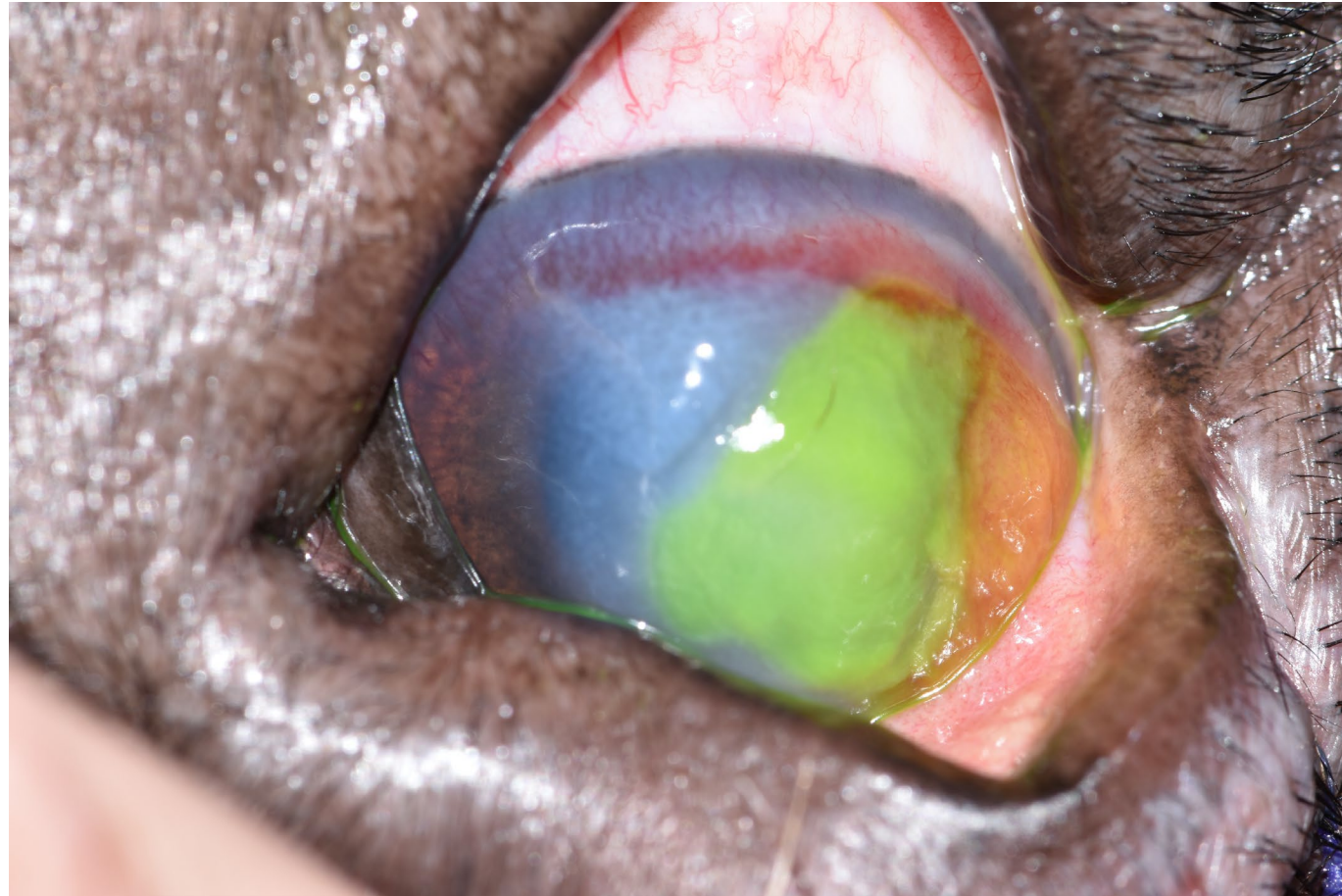
Treatment: Infected corneal ulcer

- Prior to starting
 - Review a corneal cytology
 - Submit a corneal culture
- Cocci
 - Topical Cefazolin in artificial tears
 - Topical Tobramycin
- Rods
 - Topical ofloxacin/ciprofloxacin
- Serum
- Atropine
- E-collar

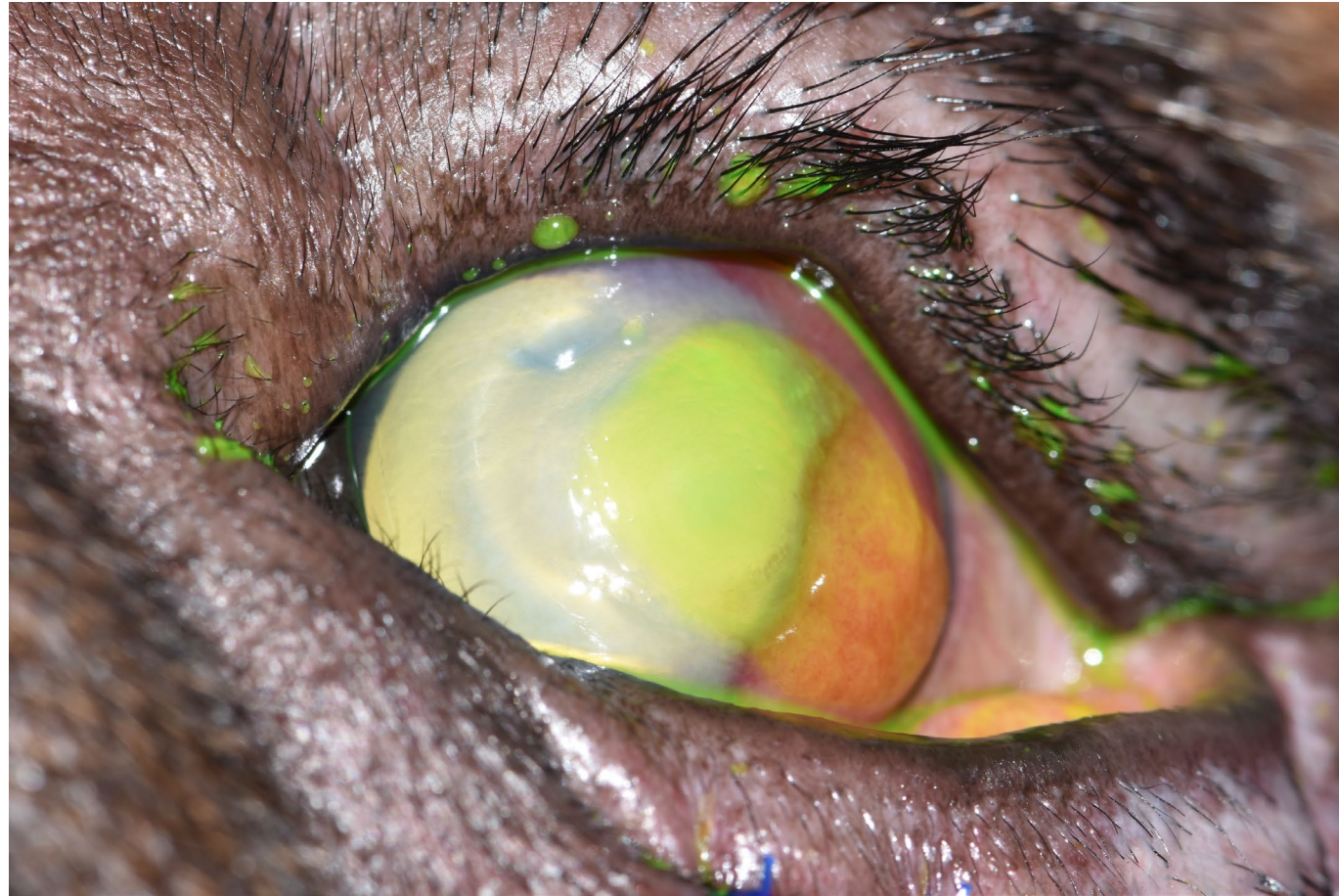
Treatment: Infected corneal ulcer

- Serum and antibiotic choice: q2 hours for 24-48 hours
- Recheck next day
- If improving, q4 hours for 48 hours, then q6 hours until recheck
- Recheck next 2-4 days
- Use atropine q12 hours until well dilated pupil, then can decrease to q24hours
- Taper antibiotic frequency to avoid epithelial toxicity

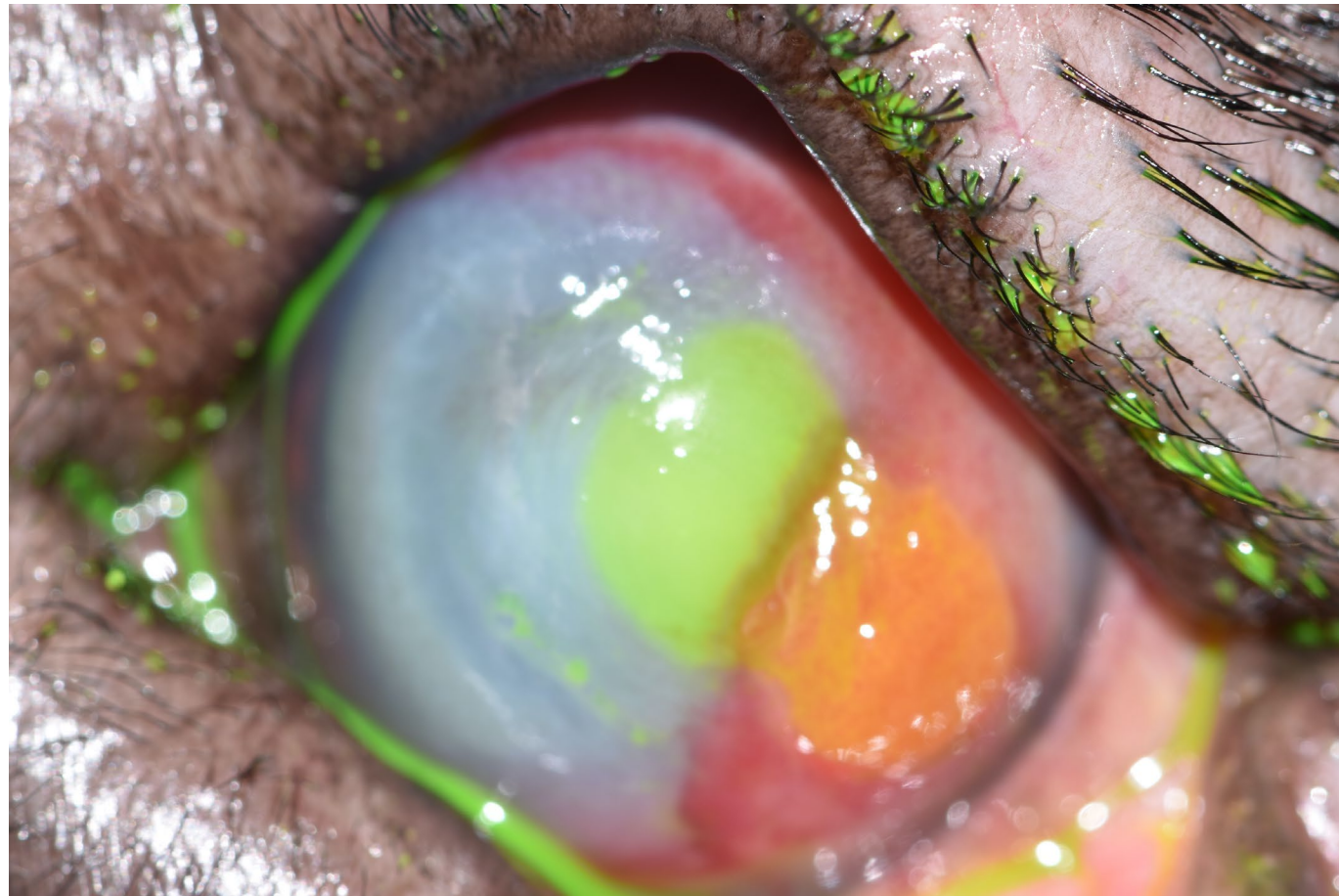
Infected corneal ulcer progression



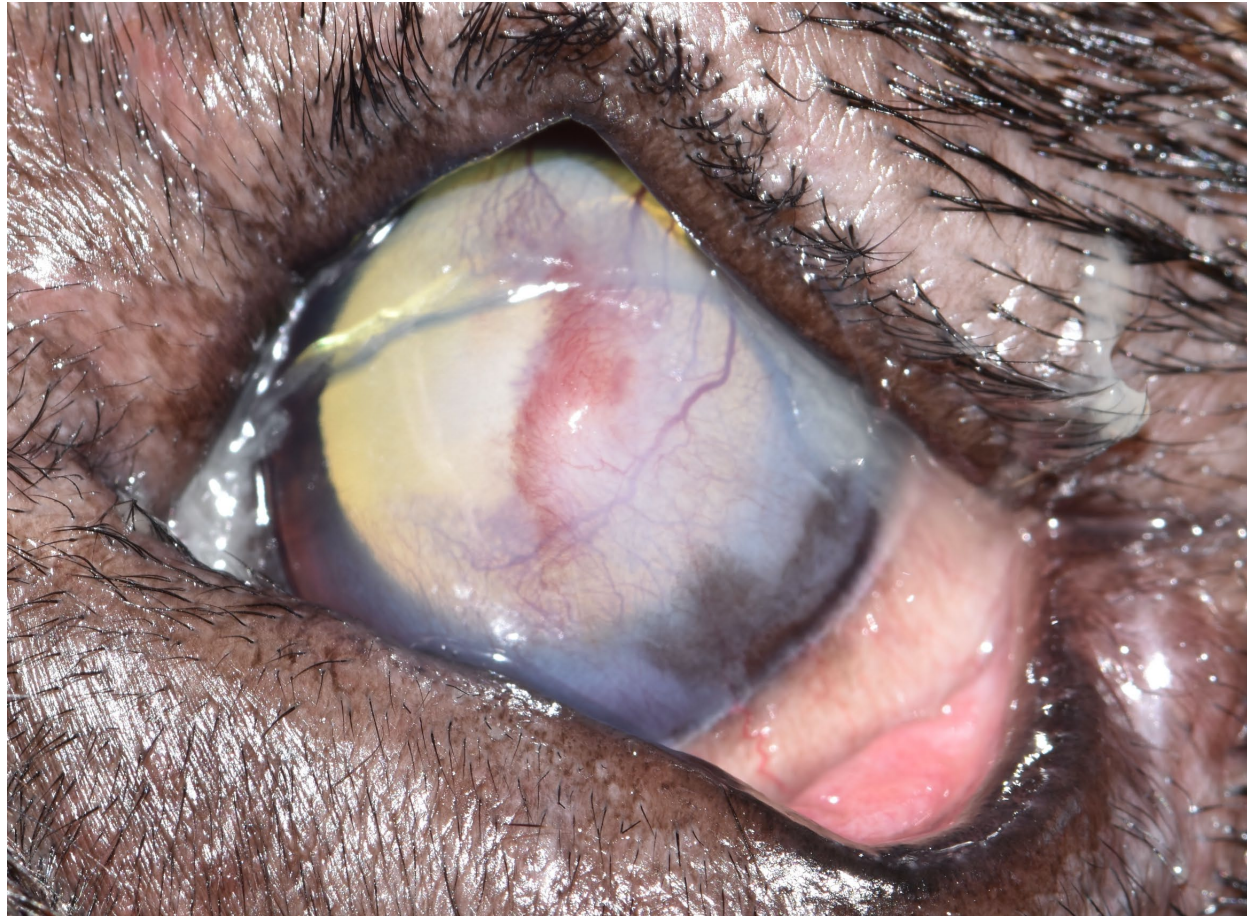
Infected corneal ulcer progression



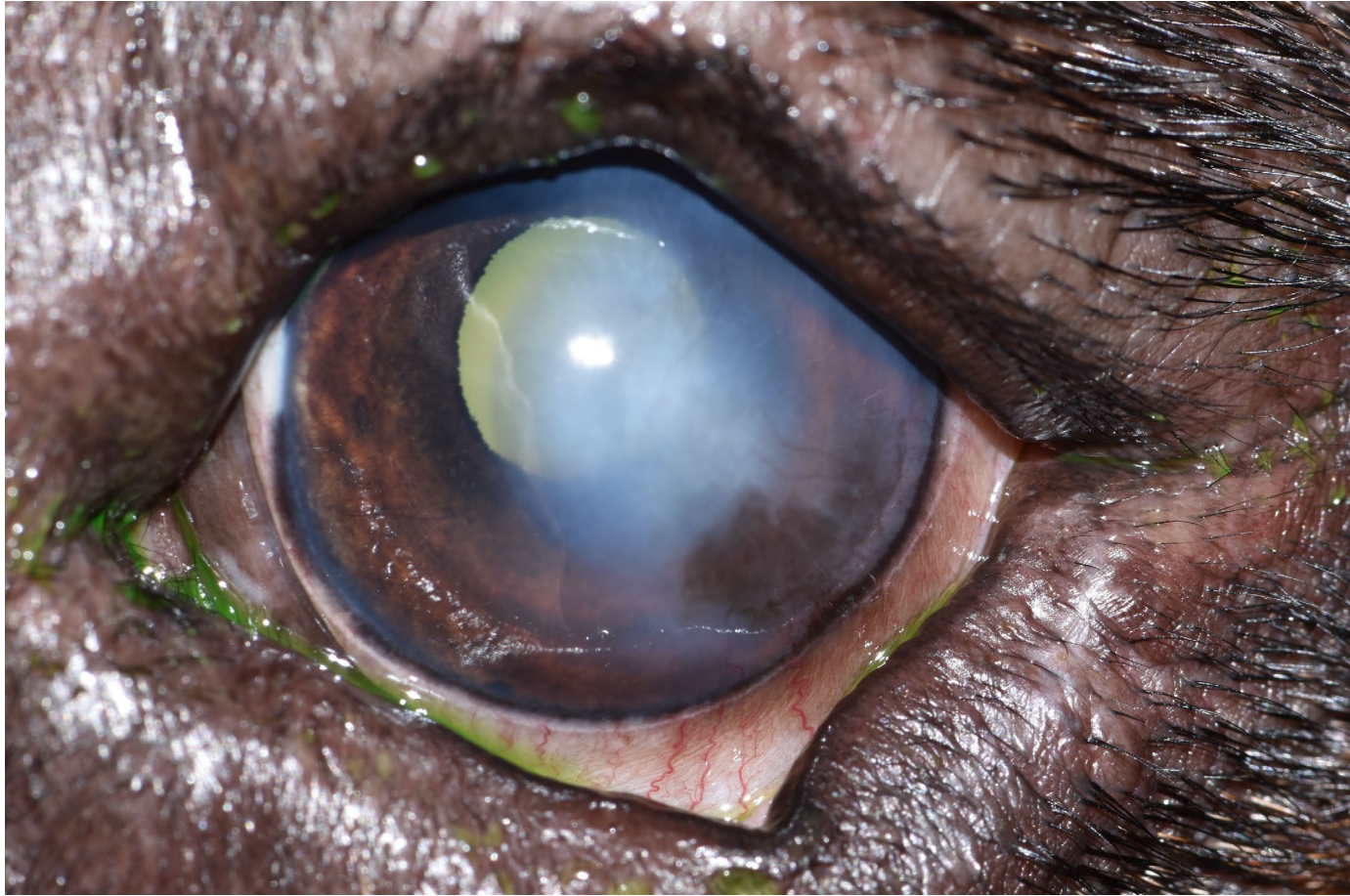
Infected corneal ulcer progression



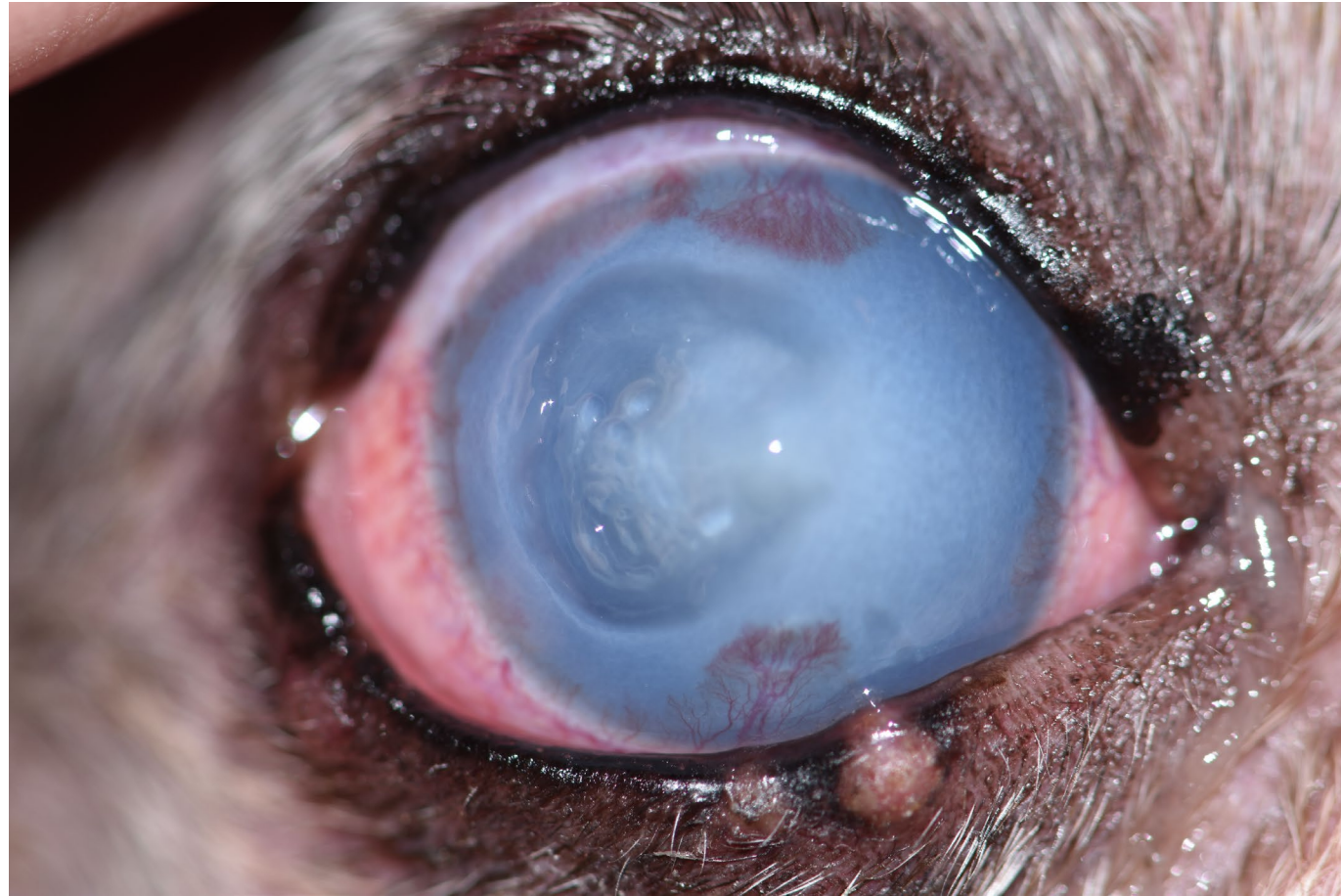
Infected corneal ulcer progression



Infected corneal ulcer progression



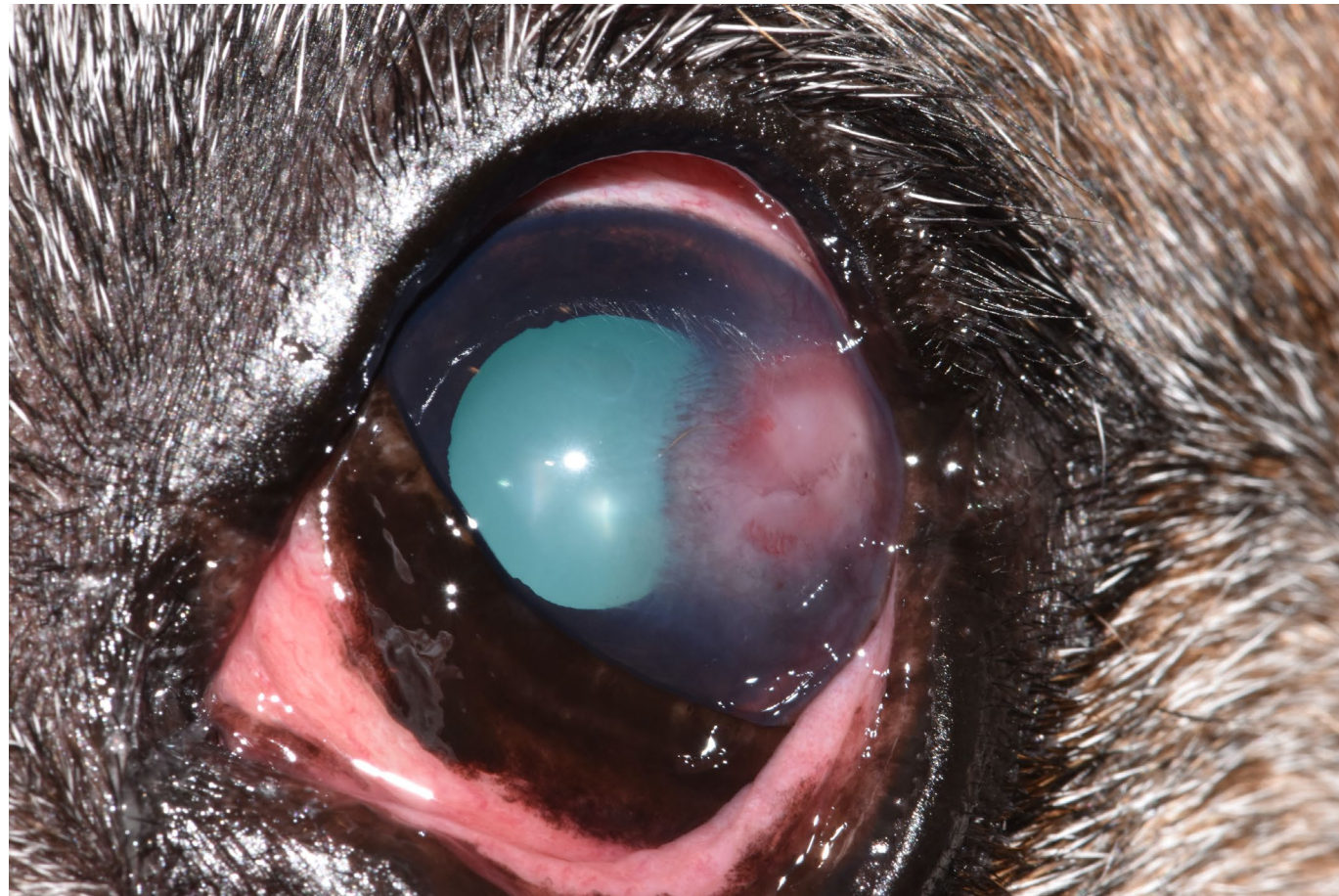
Corneal bullae



Treatment: Indolent ulcer

- Topical antibiotic
- Topical atropine
- E-collar
- Debridement
 - Cotton tip applicator
 - Diamond burr or grid keratotomy
 - Contact lens placement
- Warn owners that these can be frustrating
- Rarely become serious

Indolent ulcer



Recheck: Indolent ulcer

- 2 weeks
- May need repeat debridement
- Underlying ocular condition – may require longer therapy

Indolent ulcer – healed



Options at referral

- Diamond burr debridement
- Contact lens placement
- Cytology and culture
- Corneal repair
 - Conjunctival pedicle graft
 - Corneoconjunctival transposition
 - Biosis graft

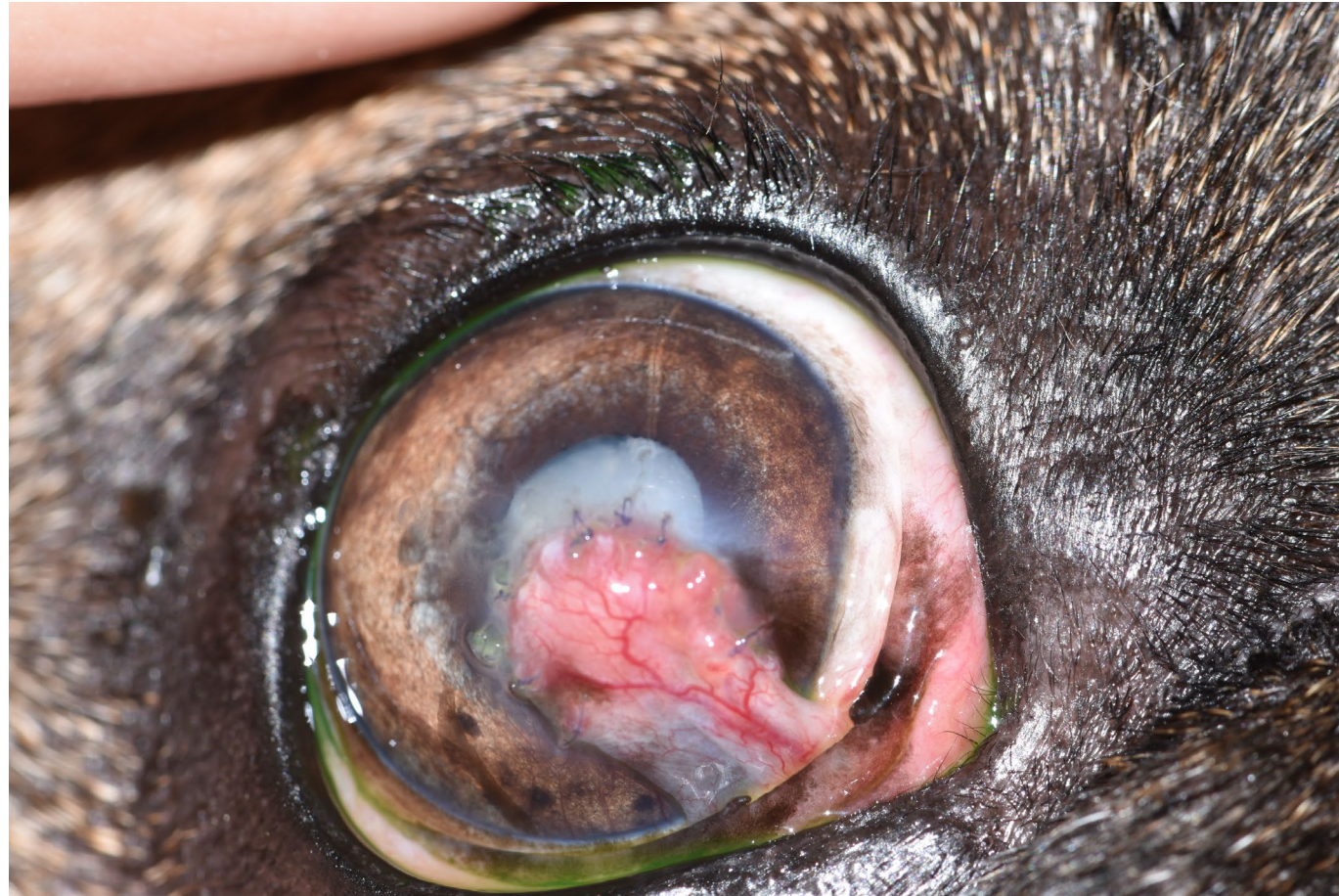
Corneal Perforation



Conjunctival pedicle graft



Conjunctival pedicle graft



Feline Sequestrum



Feline corneoconjunctival transposition



Feline corneoconjunctival transposition



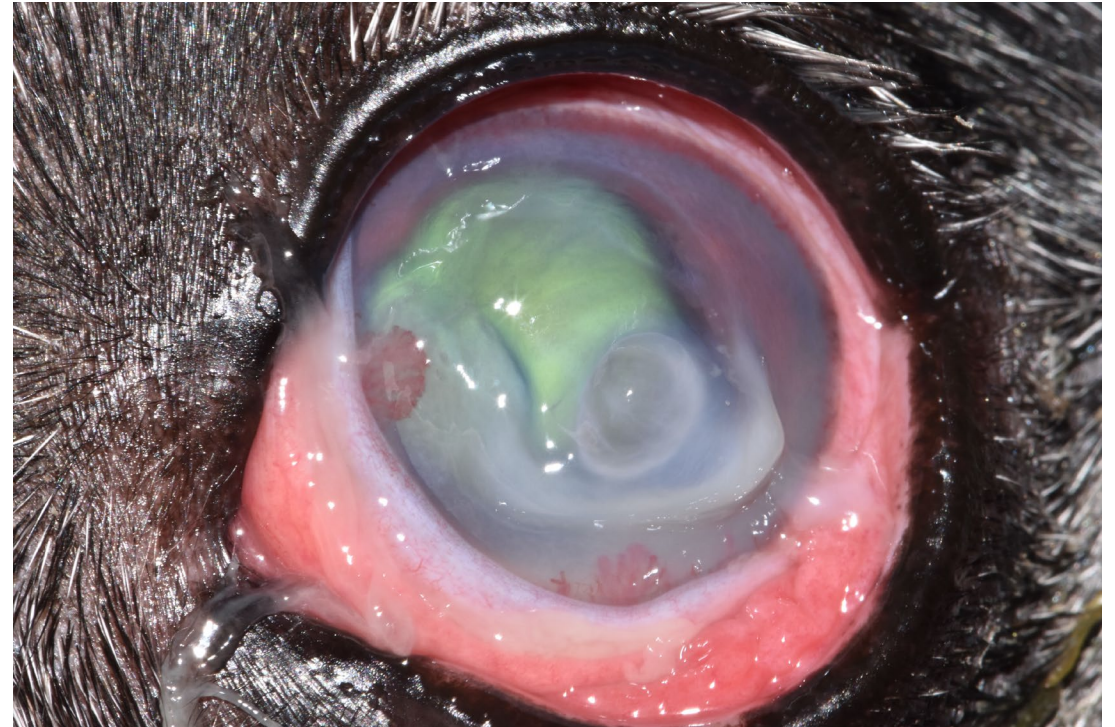
Feline corneoconjunctival transposition



Questions

True or False

- This image show signs of corneal infection.
 - True
 - False



Follow up

- This eye healed with medical management.

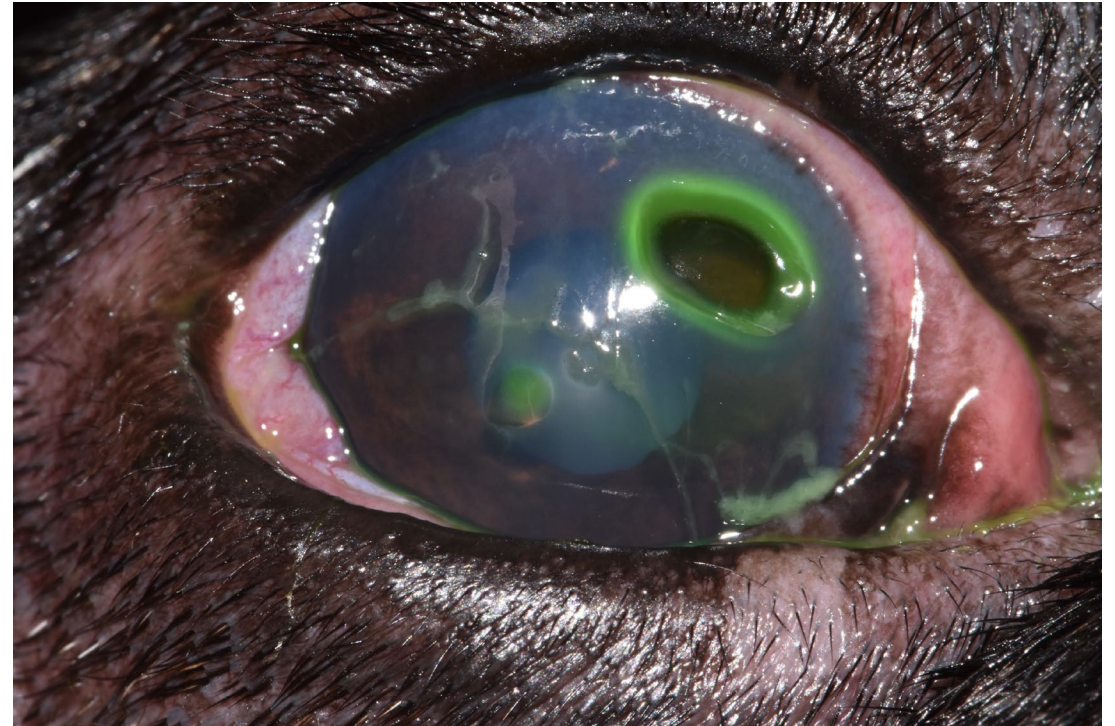


True or False

- A diamond burr debridement or grid keratotomy is an appropriate therapy for a stromal ulcer.
 - True
 - False

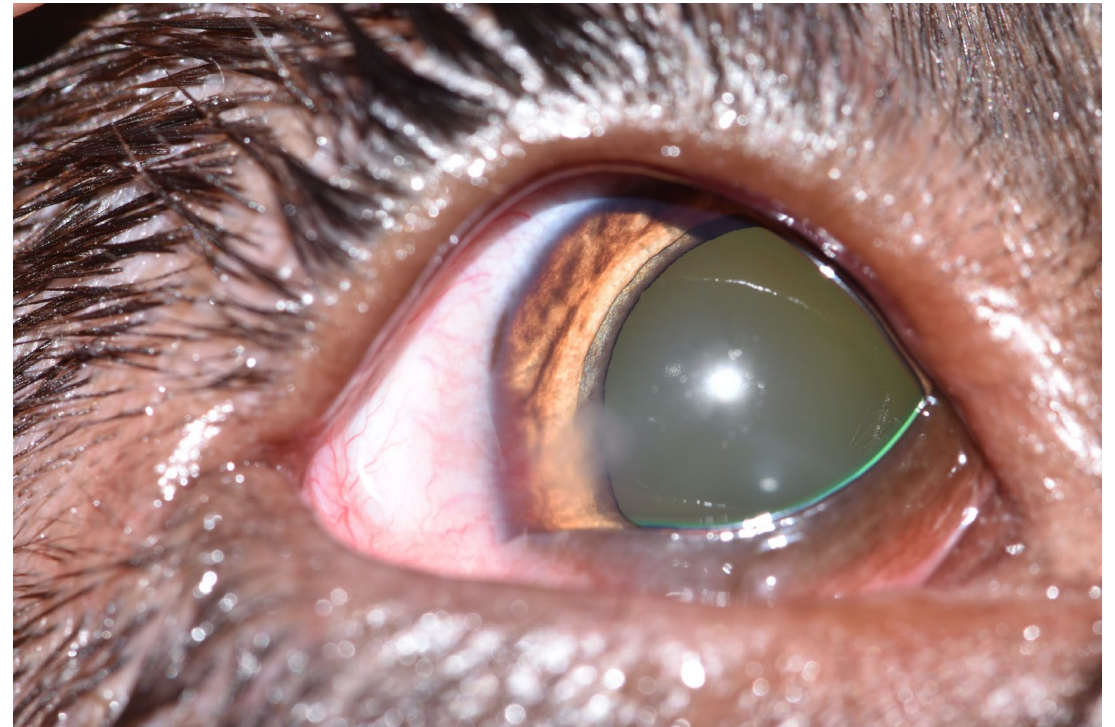
Questions

- What ulcer depth is shown in the dorsomedial lesion?
 - a) Superficial
 - b) Stromal
 - c) Descemetocoele
 - d) Perforation



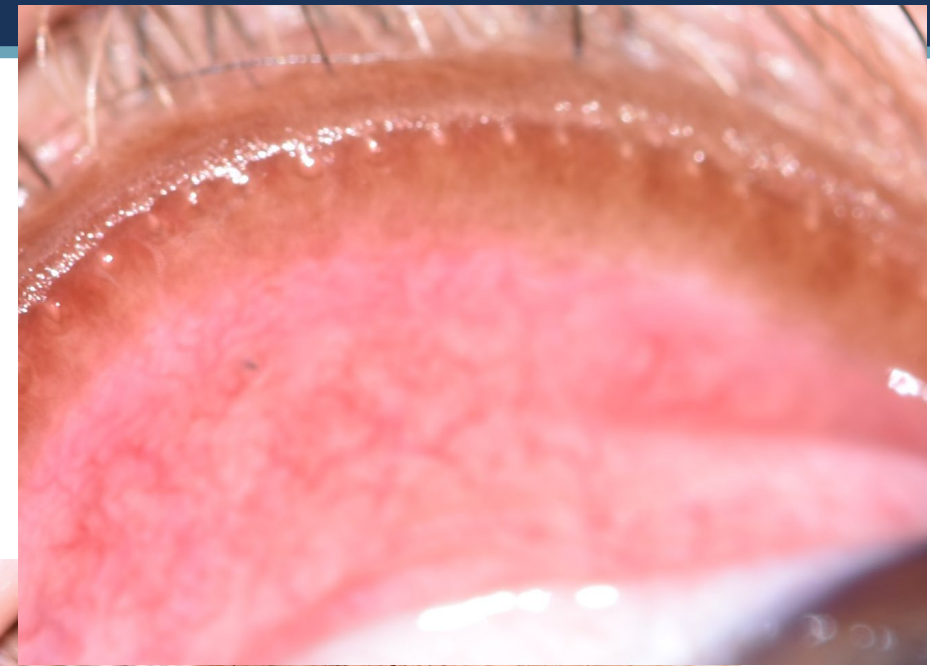
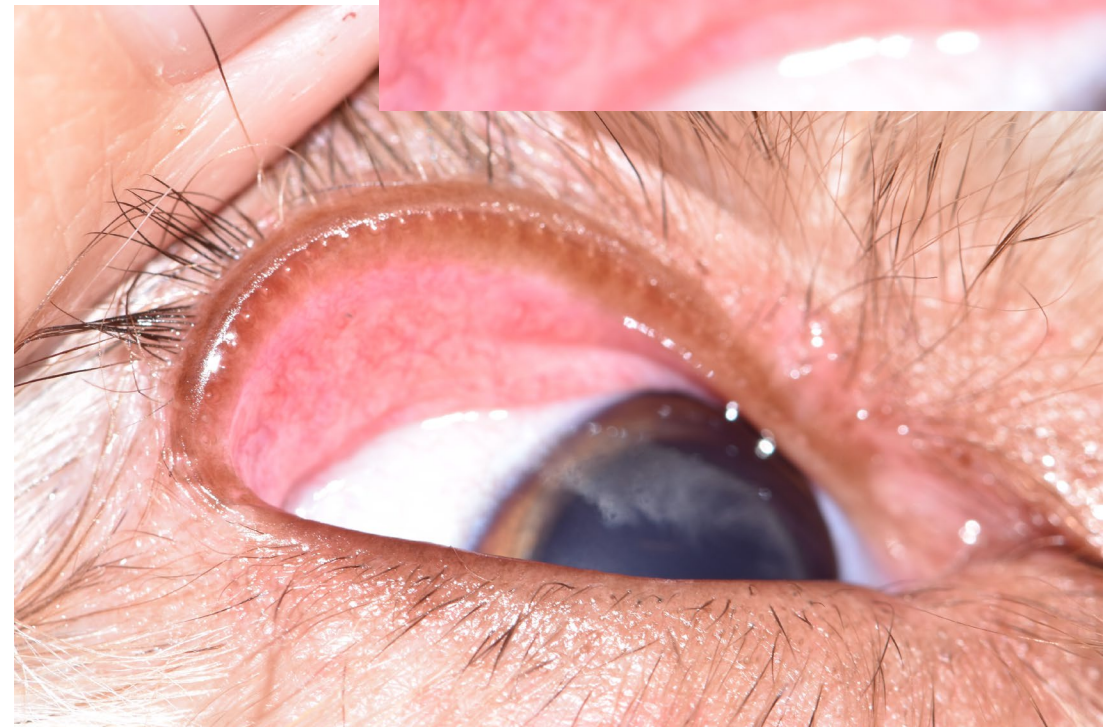
Questions

- A 1 year old Labrador retriever presents with a ventrolateral superficial corneal ulcer. What is the most likely reason you found during your exam?
 - a) Ectopic cilia
 - b) Distichia
 - c) Lateral entropion
 - d) Foreign body behind third eyelid



Questions

- A 1 year old Havanese mix presents with chronic epiphora, intermittent blepharospasm, redness and previously had a dorsal ulcer. Name the lesion in the image:
 - a) Ectopic cilia
 - b) Distichia
 - c) Entropion
 - d) Ectropion



Thank you

