

Corneal surgery

AN INTRODUCTION



Wet lab session 3:

CORNEAL SURGERY

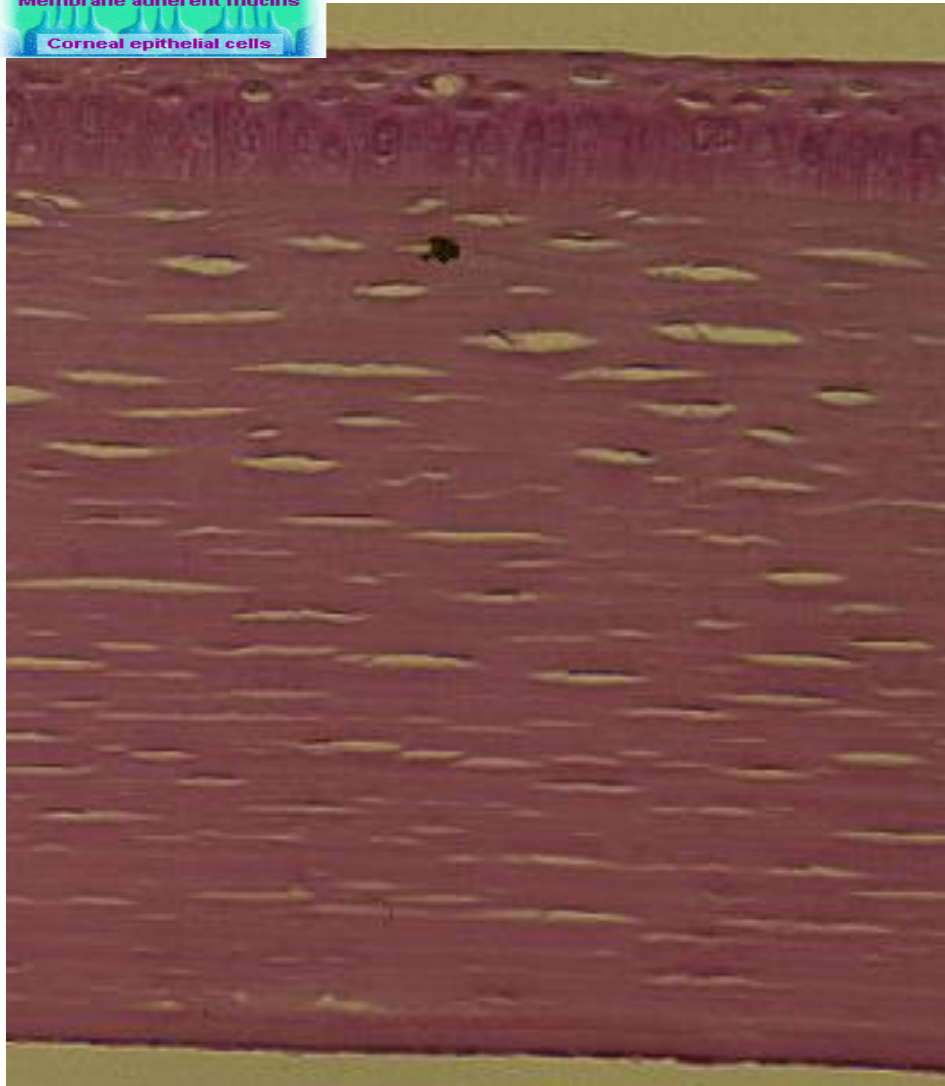


Anatomy check list

- Reminder of corneal anatomy
- Assess lid and orbital anatomy – what are the implications for corneal health in your patient?
- Identify limbus
- Anterior cornea-check corneal reflectance, is corneal epithelium intact?
- Posterior cornea – check corneal transparency



Corneal anatomy



Corneal anatomy

- **Anterior cornea**
 - rapid turnover
 - protects cornea
 - **reflects** light

Basement membrane

- **Posterior cornea**
 - Slow turnover
 - **Transmits** light



Corneal anatomy

Dermatology

- **Anterior cornea**
 - rapid turnover
 - protects cornea
 - **reflects** light

Basement membrane

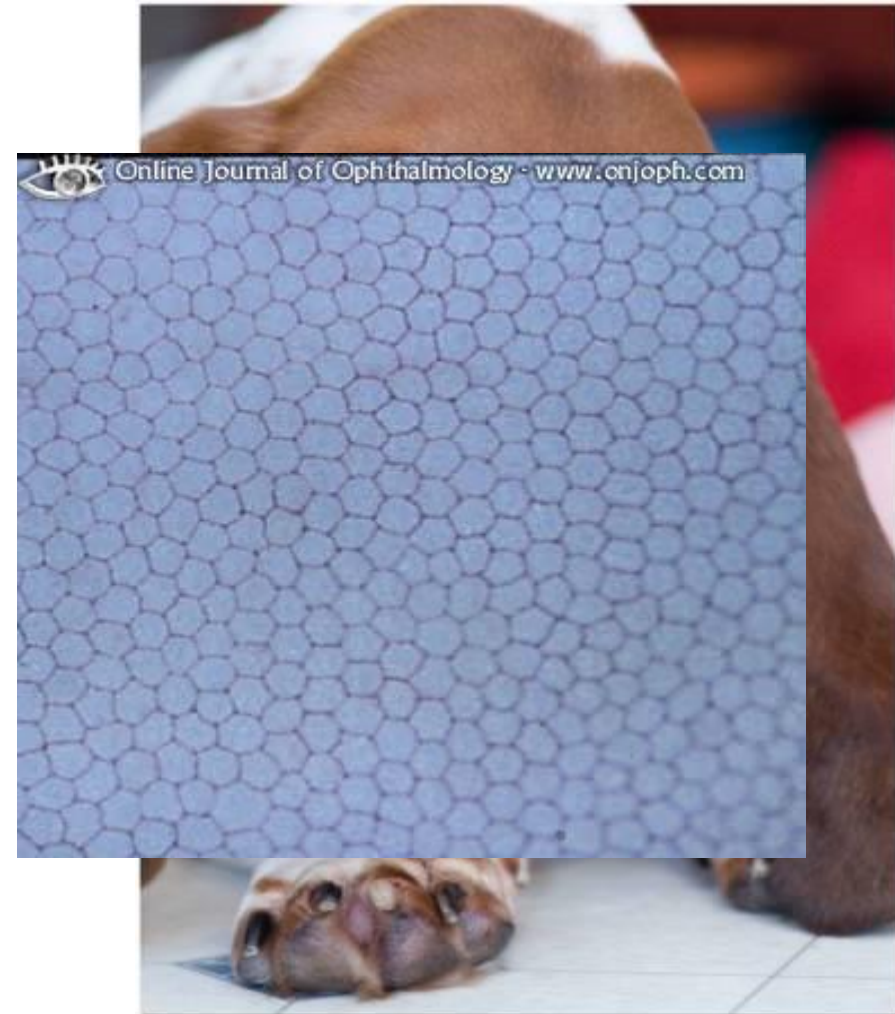
- **Posterior cornea**
 - Slow turnover
 - **Transmits** light

Orthopedics



Why is the cornea clear and the sclera white?

- Transparency
 - Smooth surface which means....
 - Healthy tear film
 - Lipid phase
 - Aqueous phase
 - Mucin
 - Intact epithelium – rapid turnover
 - Regular arrangement stromal fibres – slow turnover, relative dehydration
 - Absence blood vessels, simple cellular structure
 - Relative dehydration - functional endothelium
 - Transparent endothelium



Corneal “reflex” – assess anterior cornea

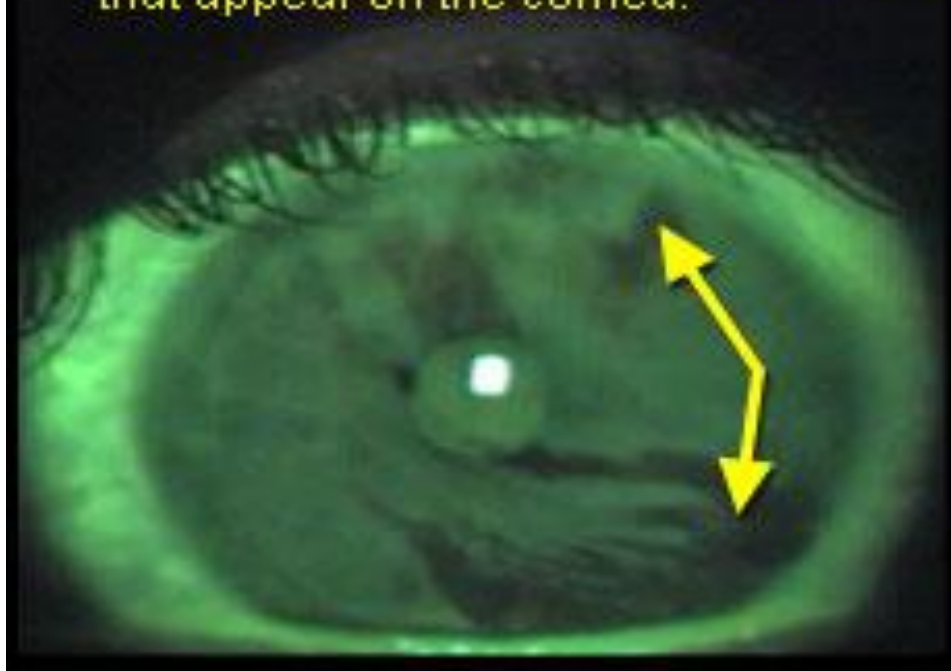
Normal reflection = normal:

- Tear film function
 - Lipid
 - Aqueous
 - Mucin
- Epithelium
- Basement membrane



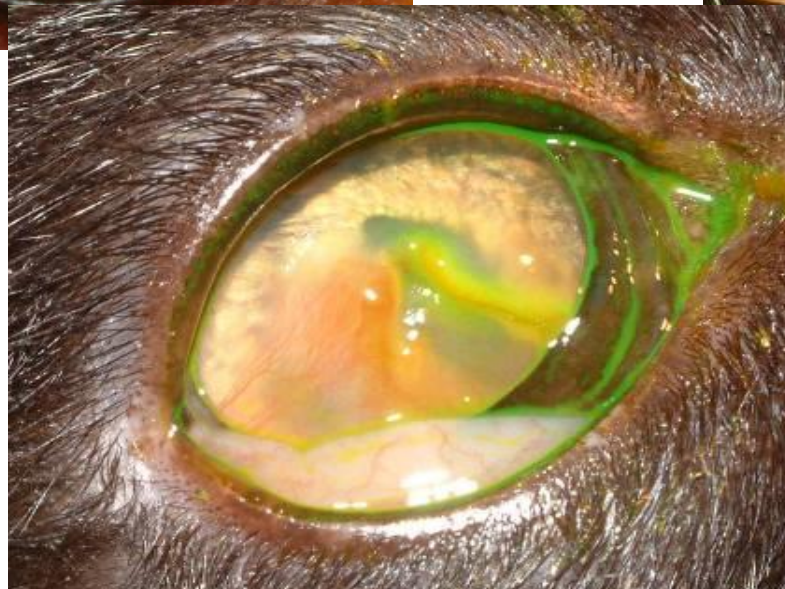
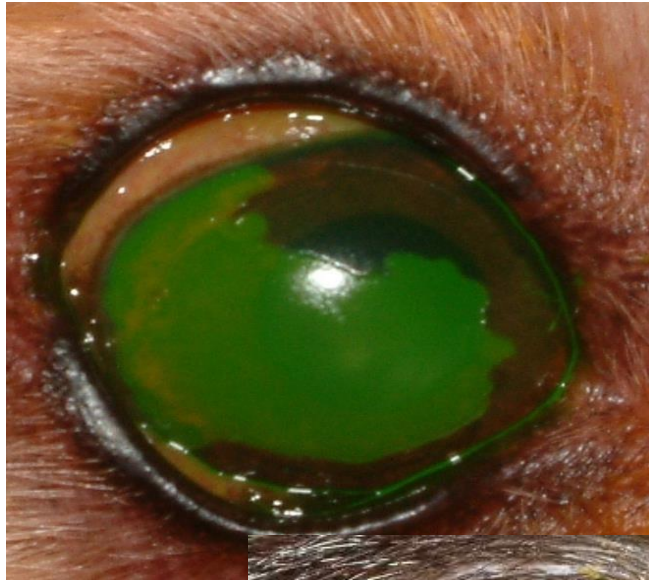
Tear film quality - TBUT

Tear film break up viewed with fluorescein stain on a patient with dry eye. Dry spots (tear film break up) are indicated by the dark areas that appear on the cornea.



- (NIBUT)

Staining patterns:



!!!!!!!!!!!!WARNING!!!!!!!!!!!!

**KNOW WHAT YOU
ARE TREATING**

Managing the indolent ulcer: Key skills



UNDERSTAND HOW
THEY FORM &
IATROGENIC FACTORS



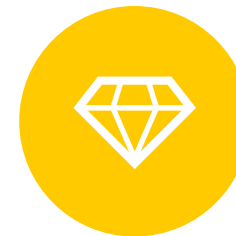
CORNEAL SAMPLING



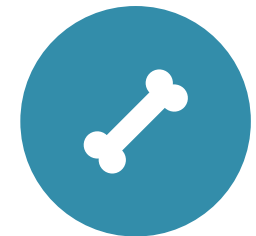
EPITHELIAL
DEBRIDEMENT



PUNCTATE
KERATOTOMY

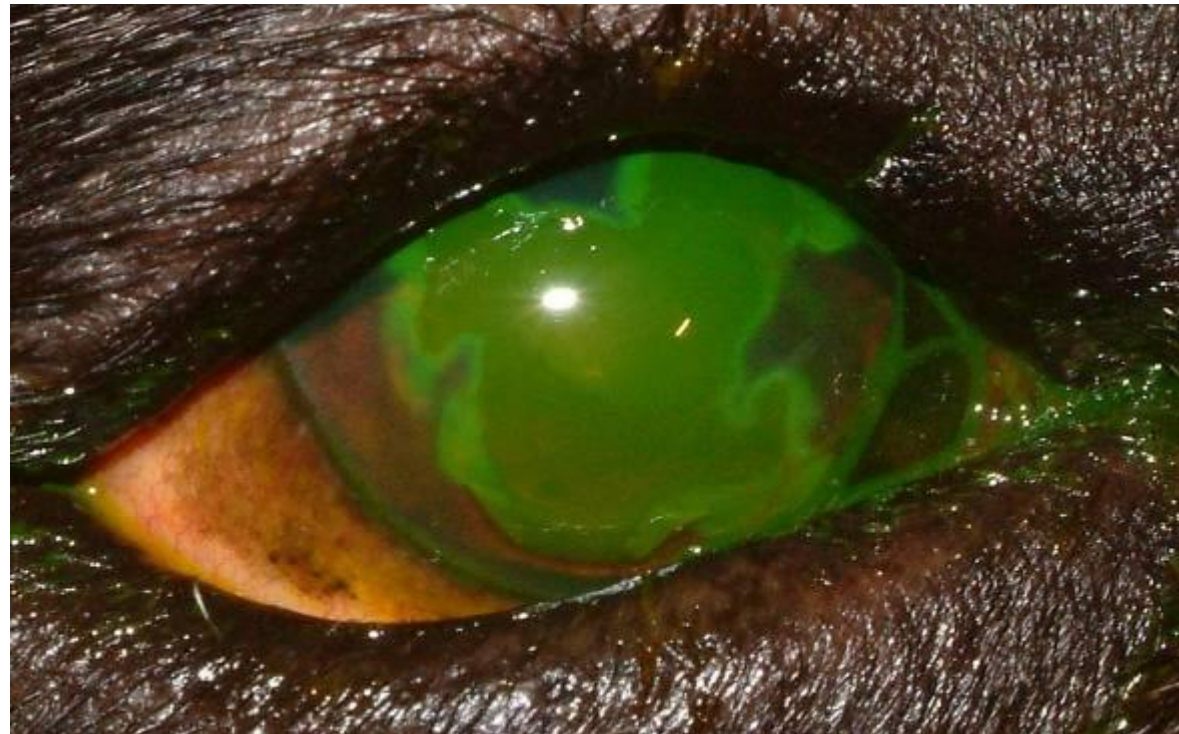
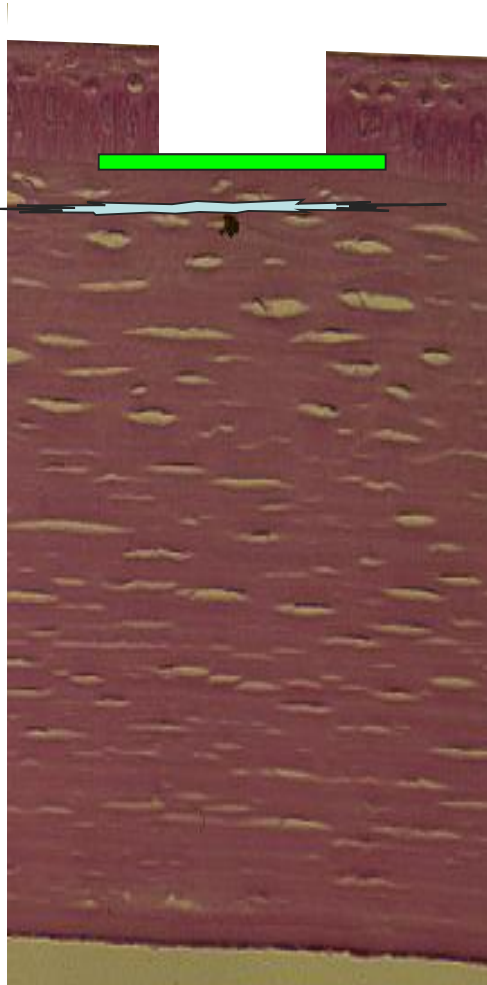


DIAMOND BURR
DEBRIDEMENT



SUPERFICIAL
KERATECTOMY

Indolent ulcers



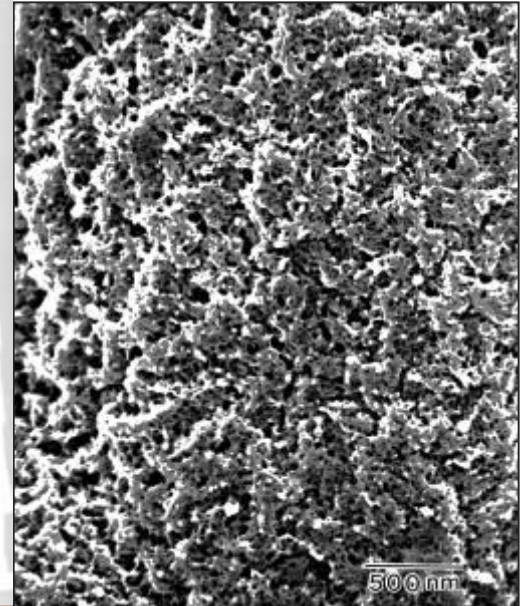
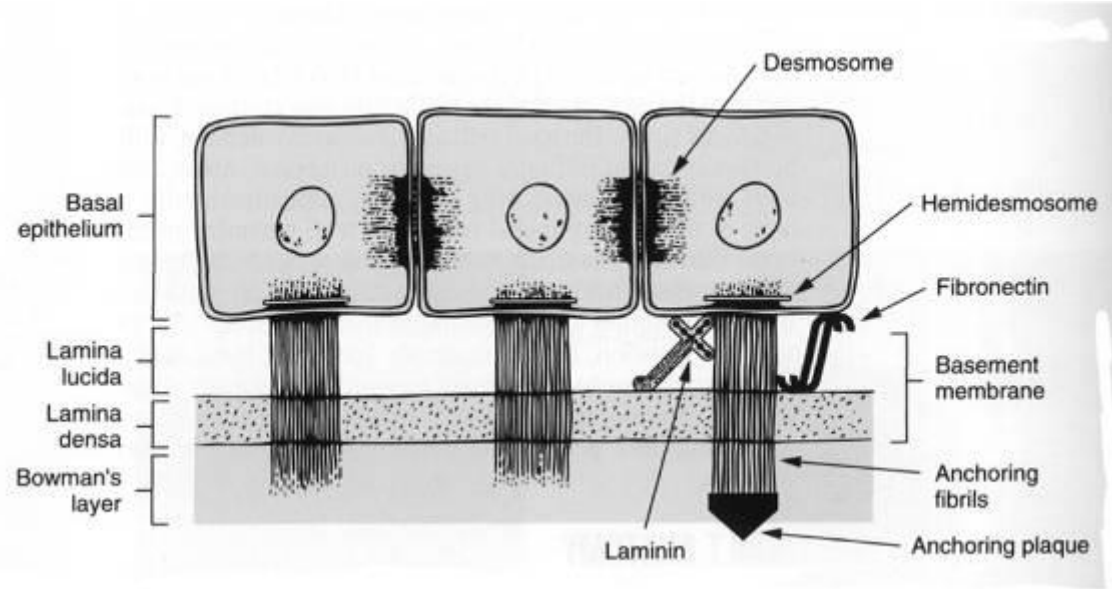
!!!!!!!!!!WARNING!!!!!!!!!!!!!! KNOW WHAT YOU ARE TREATING

**INDOLENT ULCERATION =
DAMAGED BASEMENT MEMBRANE**

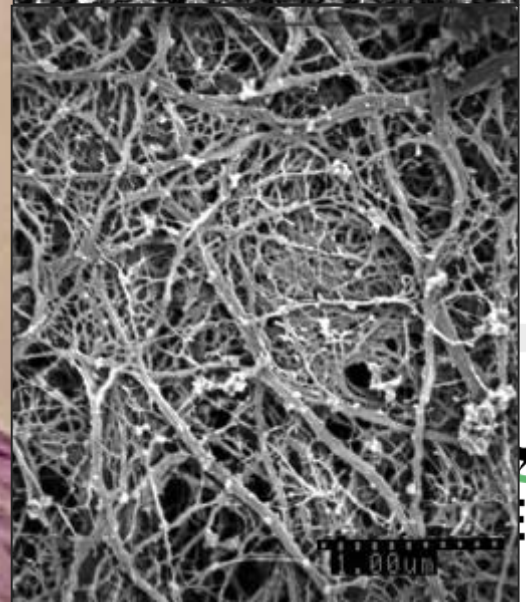
IT IS A SYMPTOM NOT A DIAGNOSIS

Indolent ulcers: Basement membrane abnormality

Normal



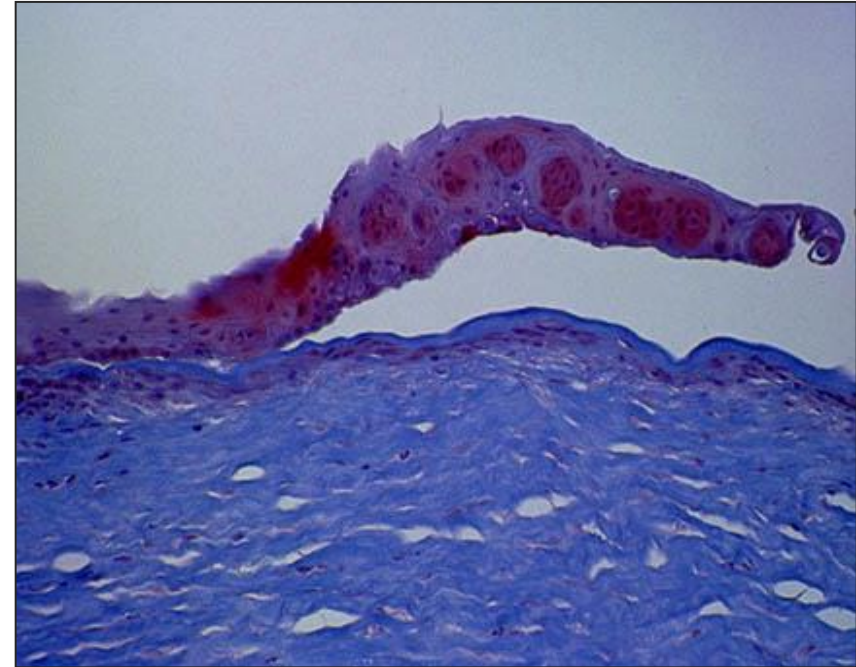
Epithelial non-attachment



Type 1 indolent ulcers – identifiable cause

- Dense anterior stromal membrane forms
- **Mean thickness 20microns**
- Epithelial cells unable to attach

- Always an underlying cause
 1. Metabolic (tear film)
 2. Iatrogenic (drug induced)
 3. Traumatic (chronic



Indolent ulcer formation

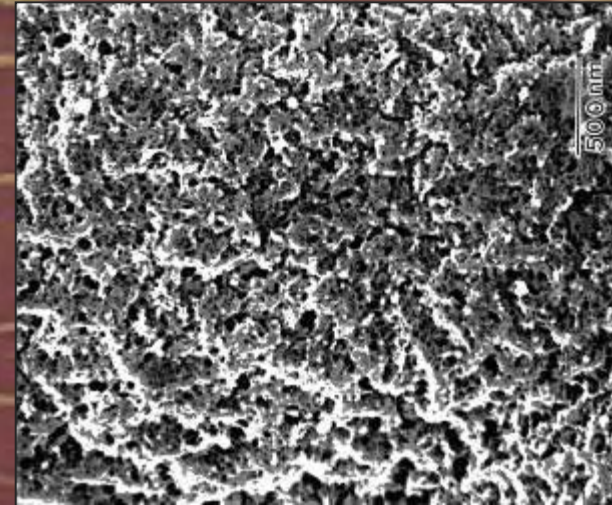
Recurrent or ongoing corneal trauma

Exposure

Entropion

Foreign body

Steroids



Indolent ulcer formation

Recurrent or ongoing corneal trauma

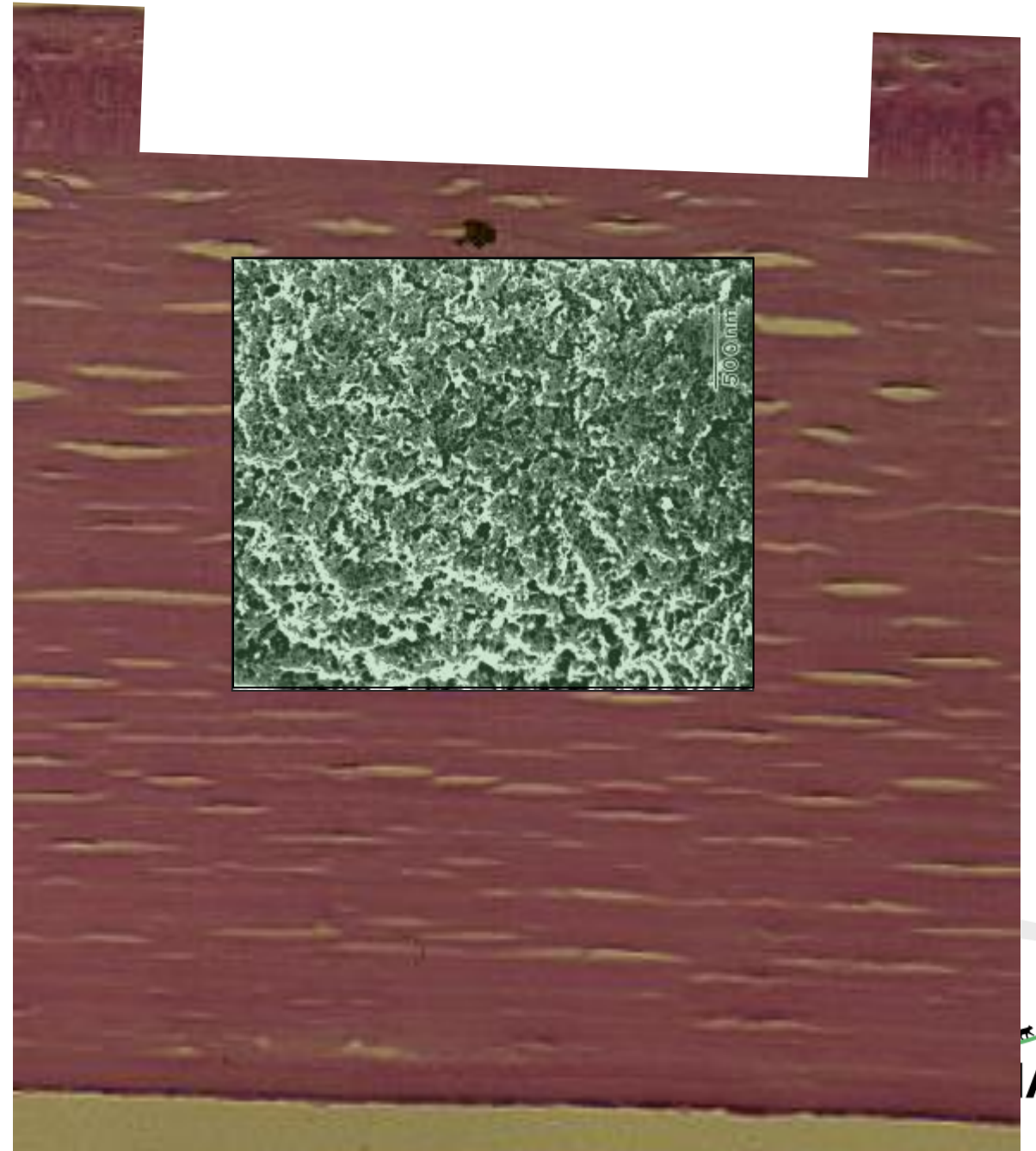
Exposure

Entropion

Foreign body

Steroids

x1



Indolent ulcer formation

Recurrent or ongoing corneal trauma

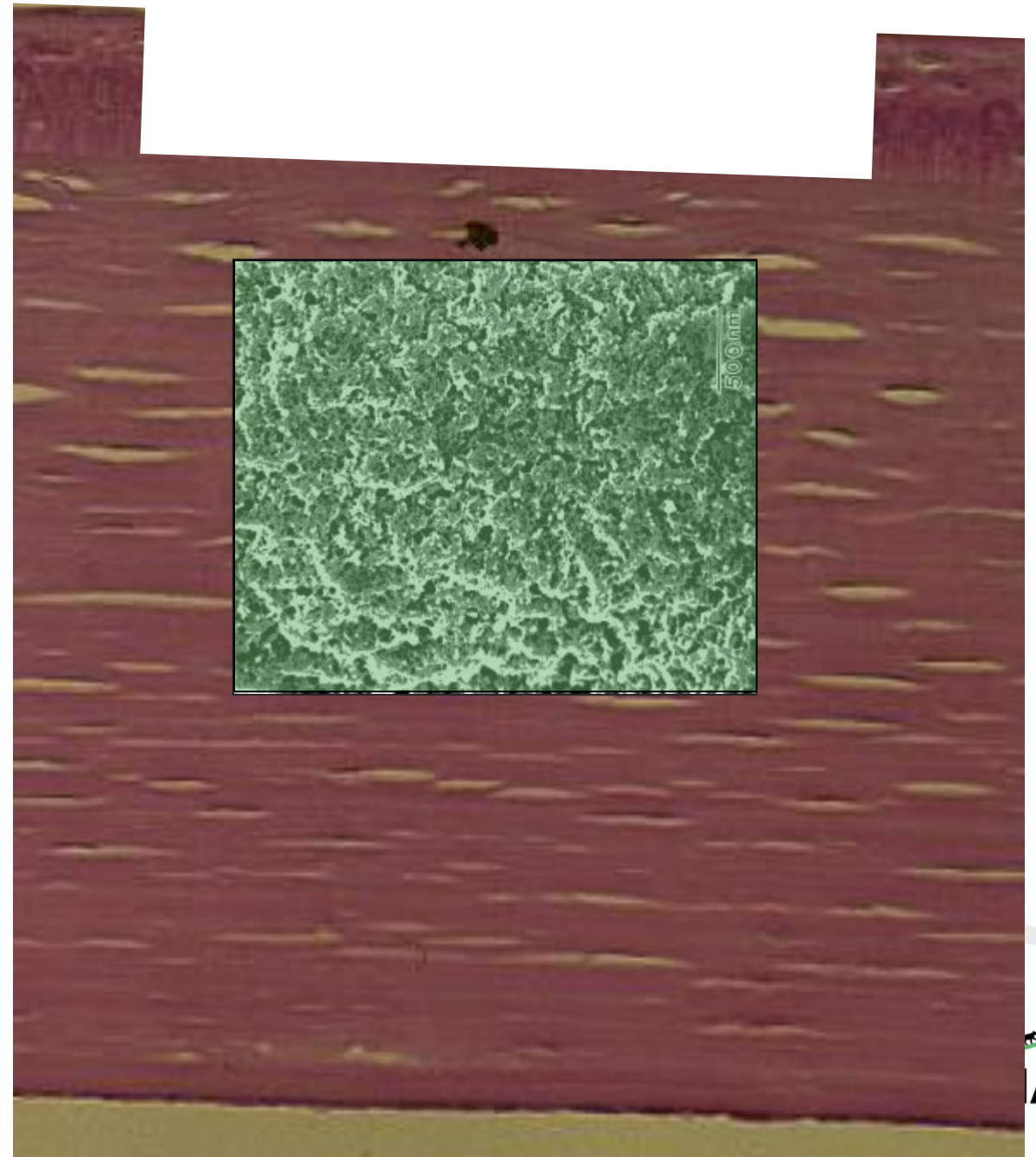
Exposure

Entropion

Foreign body

Steroids

x2



Indolent ulcer formation

Recurrent or ongoing corneal trauma

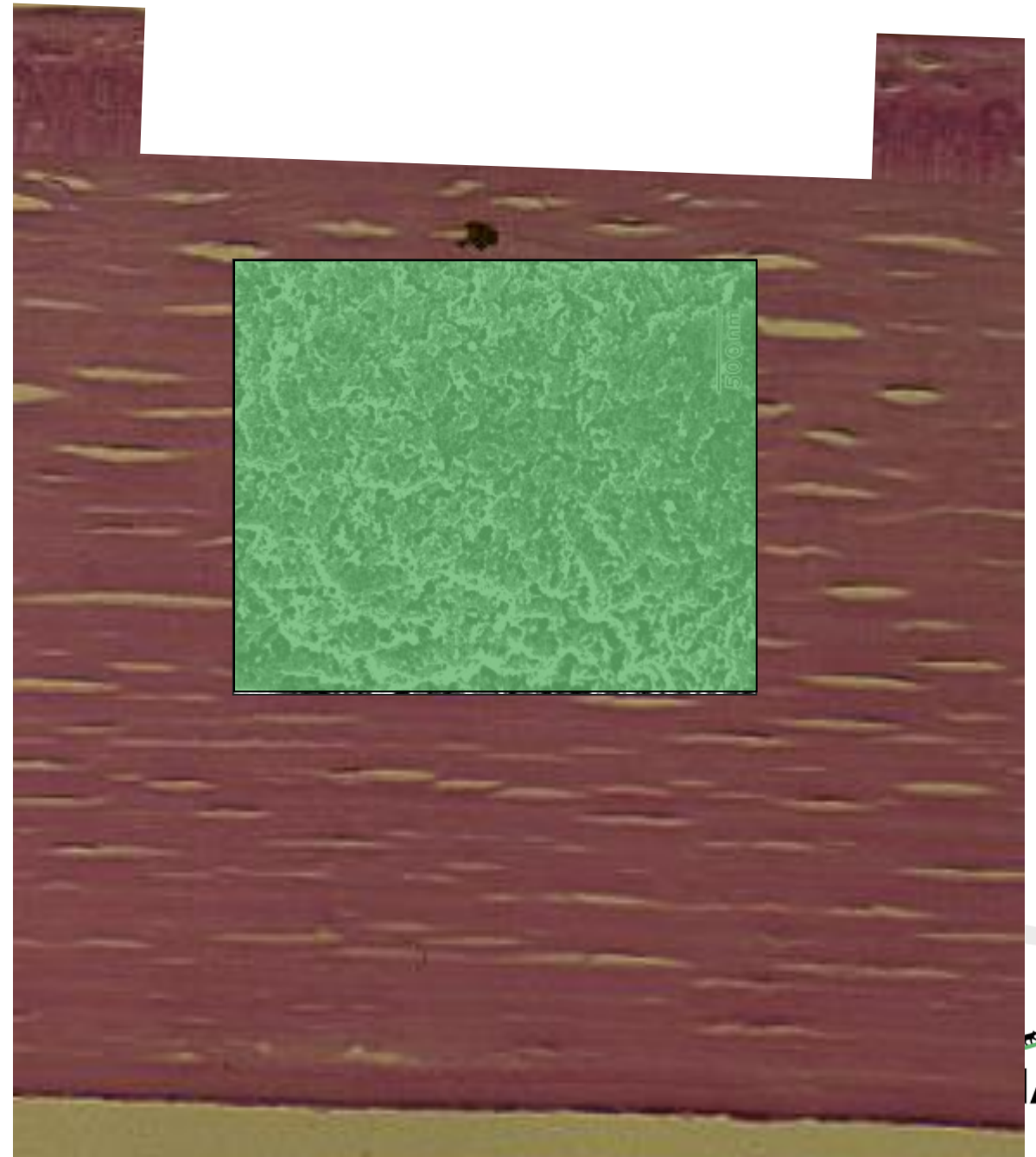
Exposure

Entropion

Foreign body

Steroids

x3



Indolent ulcer formation

Recurrent or ongoing corneal trauma

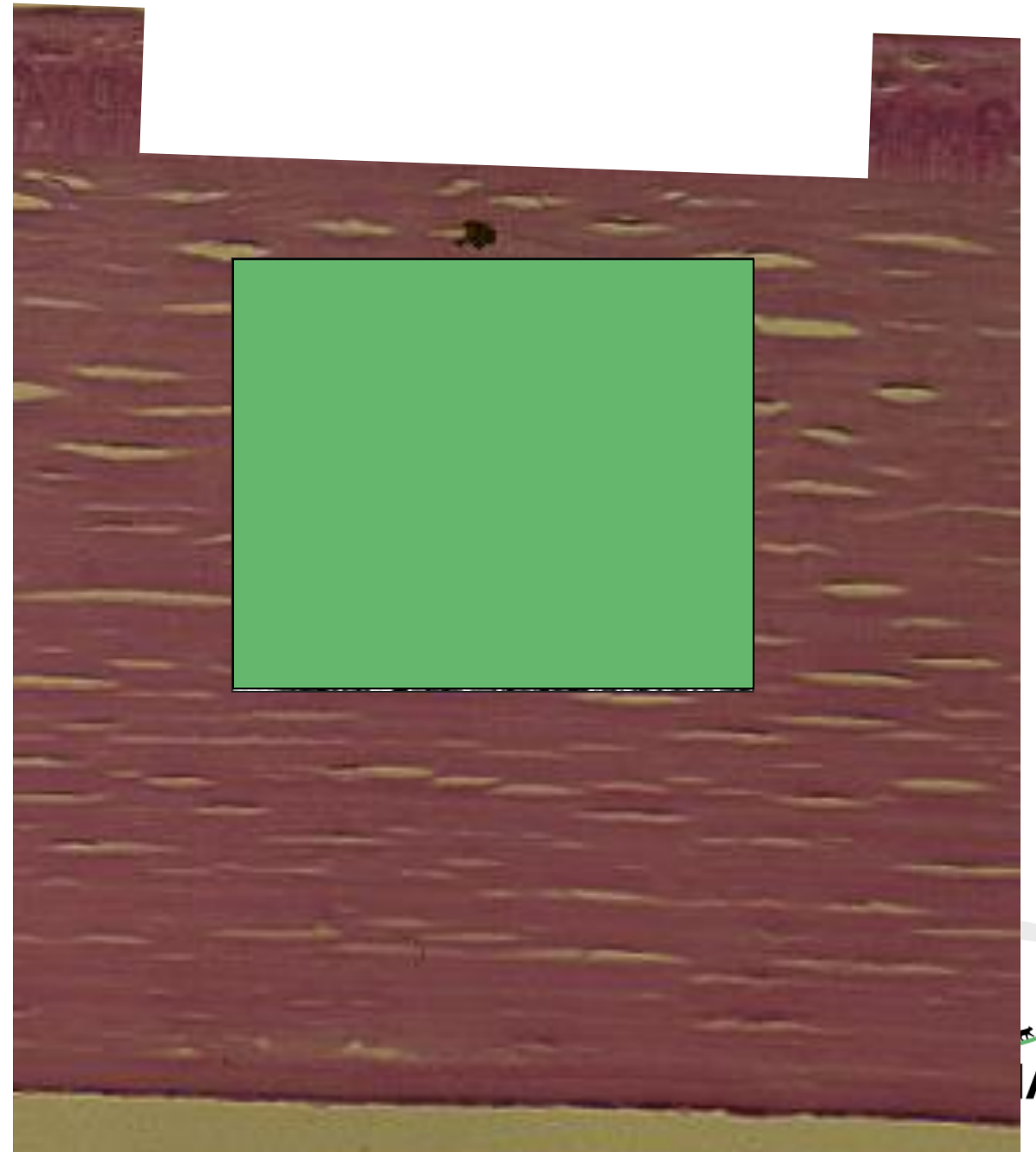
Exposure

Entropion

Foreign body

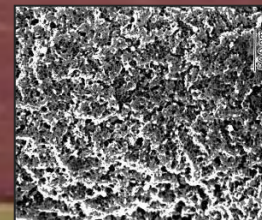
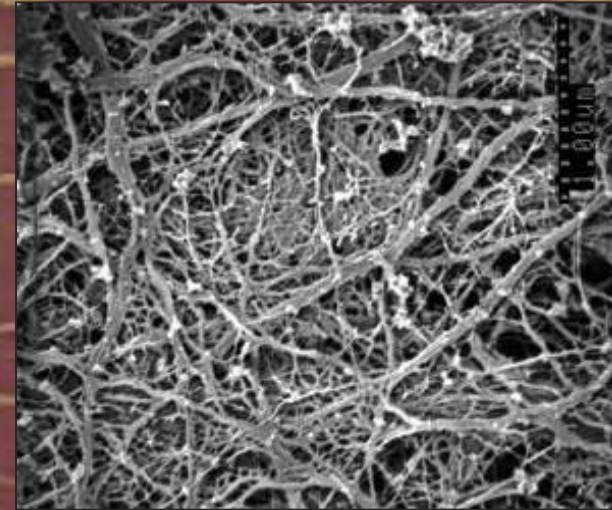
Steroids

x4



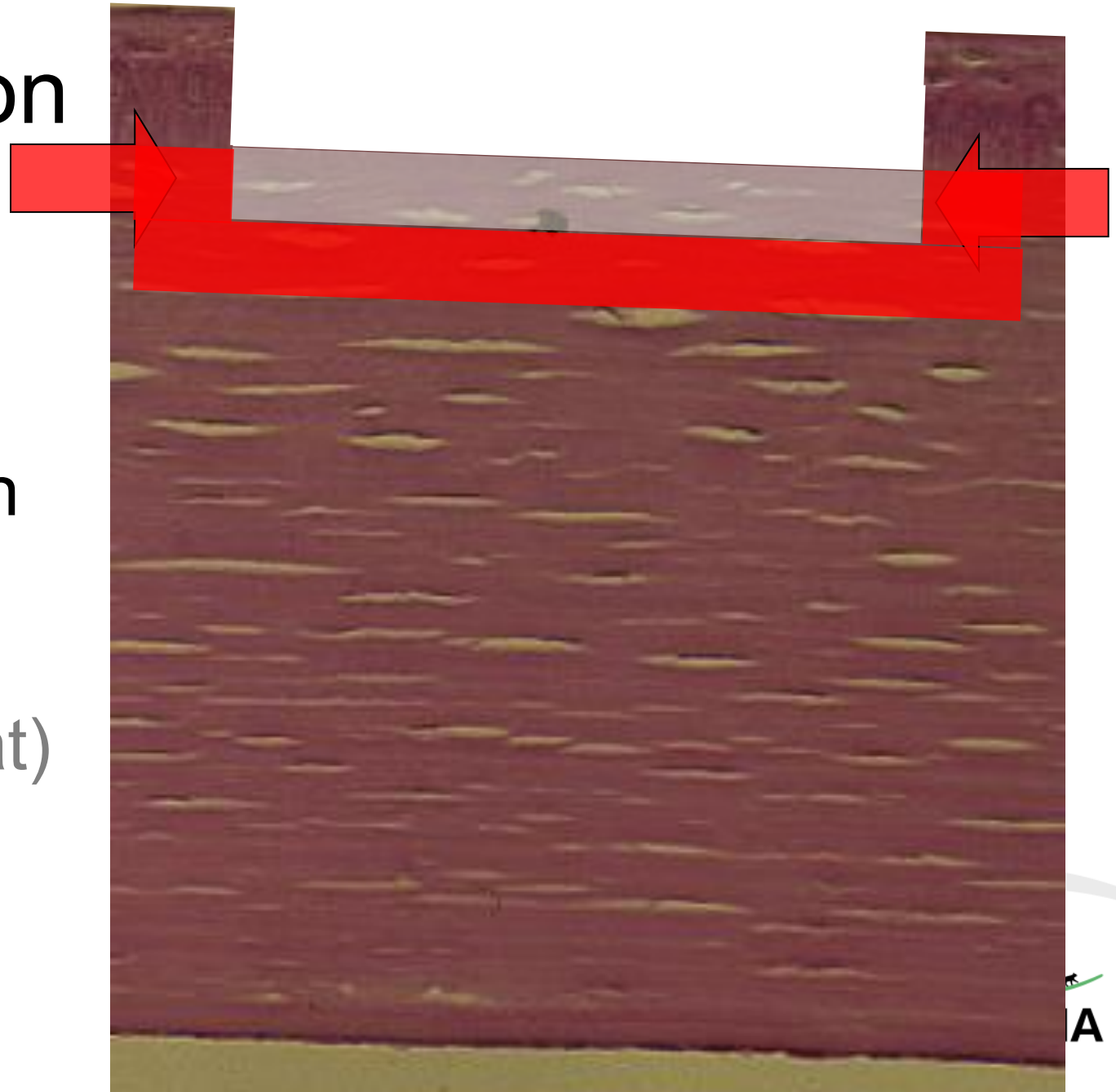
Indolent ulcer formation

1. Loss basement membrane
2. Anterior stromal cell death
3. Formation of hyaline membrane



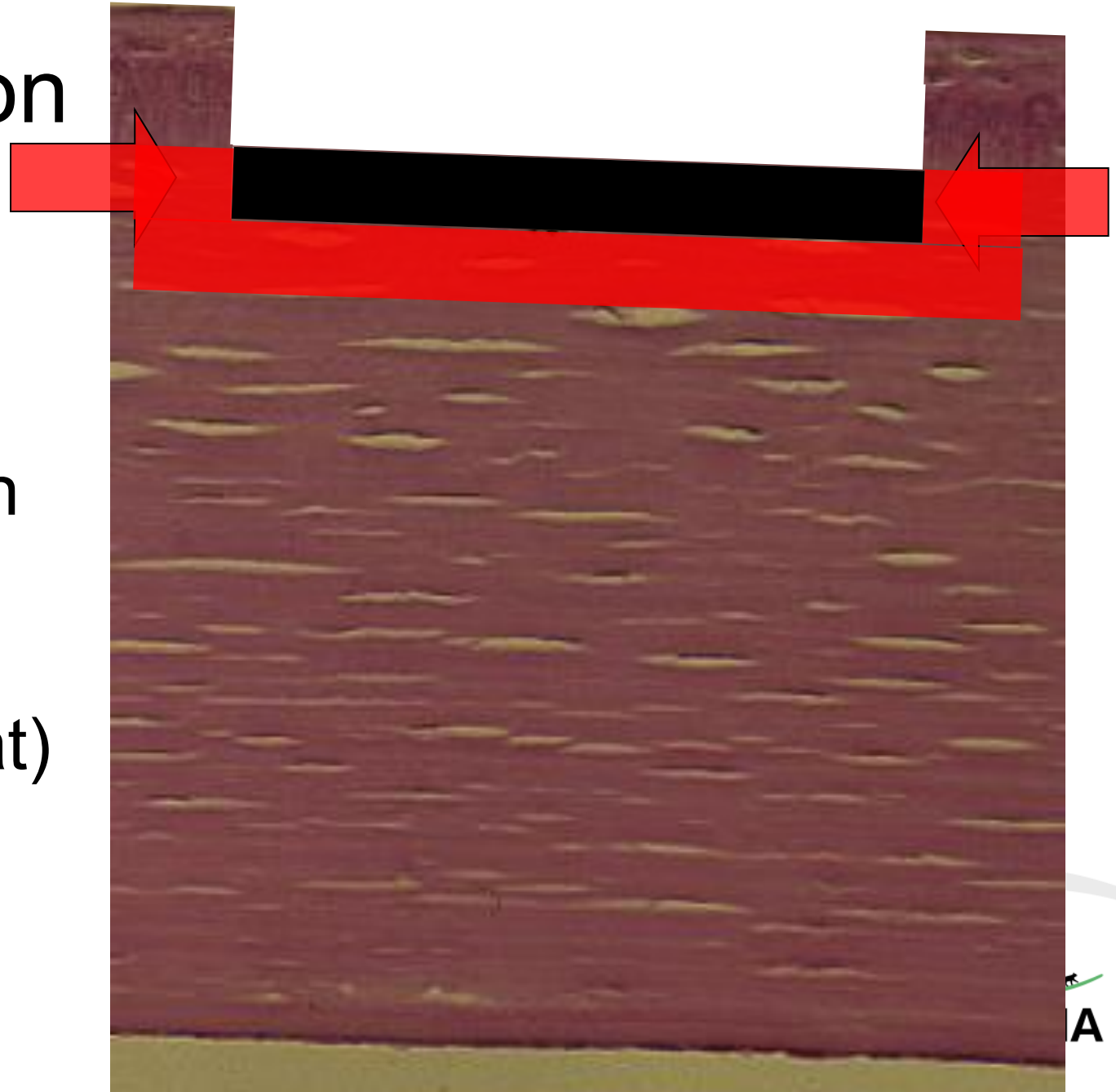
Indolent ulcer formation

- Recurrent or ongoing corneal trauma
- Neovascularisation
- Sequestrum formation (especially the cat)



Indolent ulcer formation

- Recurrent or ongoing corneal trauma
- Neovascularisation
- Sequestrum formation (especially the cat)



Type 2: Spontaneous Indolent ulceration (SCCED)

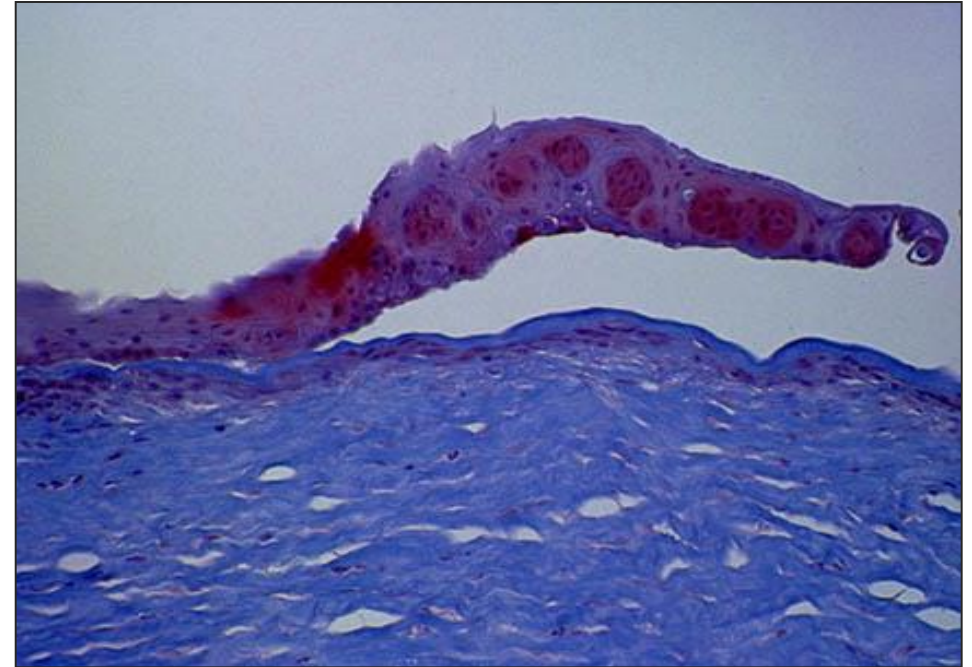
Spontaneous Chronic Corneal Epithelial Defect aka
“Boxer Ulcer”

1. Dense anterior stromal membrane forms
2. Epithelial cells unable to attach
3. No associated metabolic (tear film), iatrogenic or physical trauma.

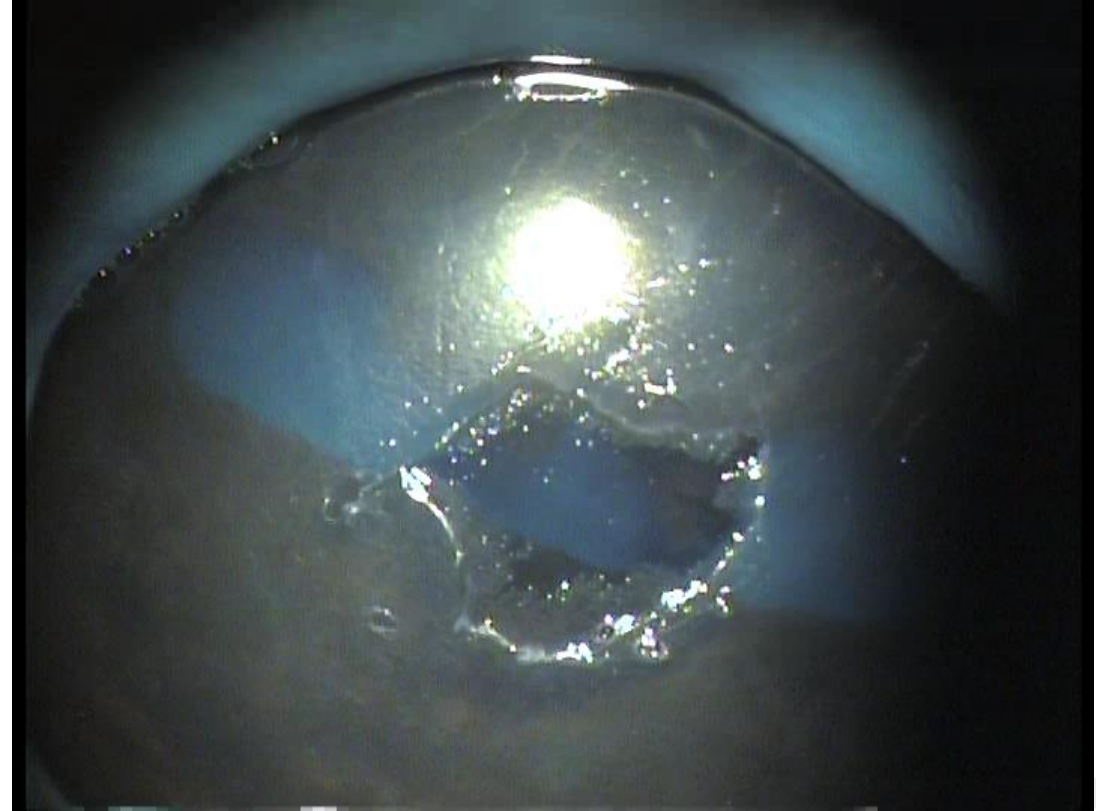
Idiopathic – presumed inherited (Boxer) but seen in all breeds

A diagnosis of exclusion – be cautious of a diagnosis of SCCED in **any** breed – particularly the FB*

(*20% incidence serious keratitis post DBD)



The non-healing ulcer: Debridement



!!!!!!!!!!WARNING!!!!!!!!!!!!!! KNOW WHAT YOU ARE TREATING

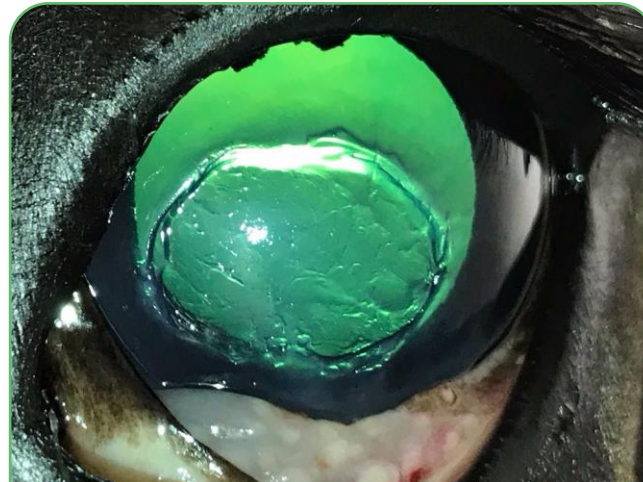
**INDOLENT ULCERATION =
DAMAGED BASEMENT MEMBRANE**

IT IS A SYMPTOM NOT A DIAGNOSIS

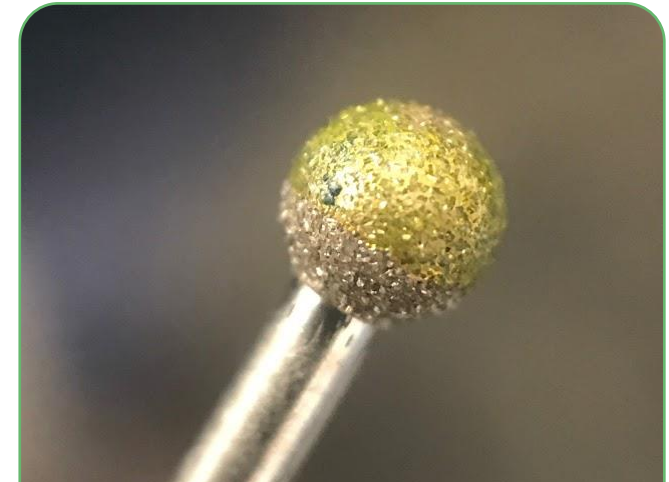
The non-healing ulcer: “new” tools



Punctate
keratotomy



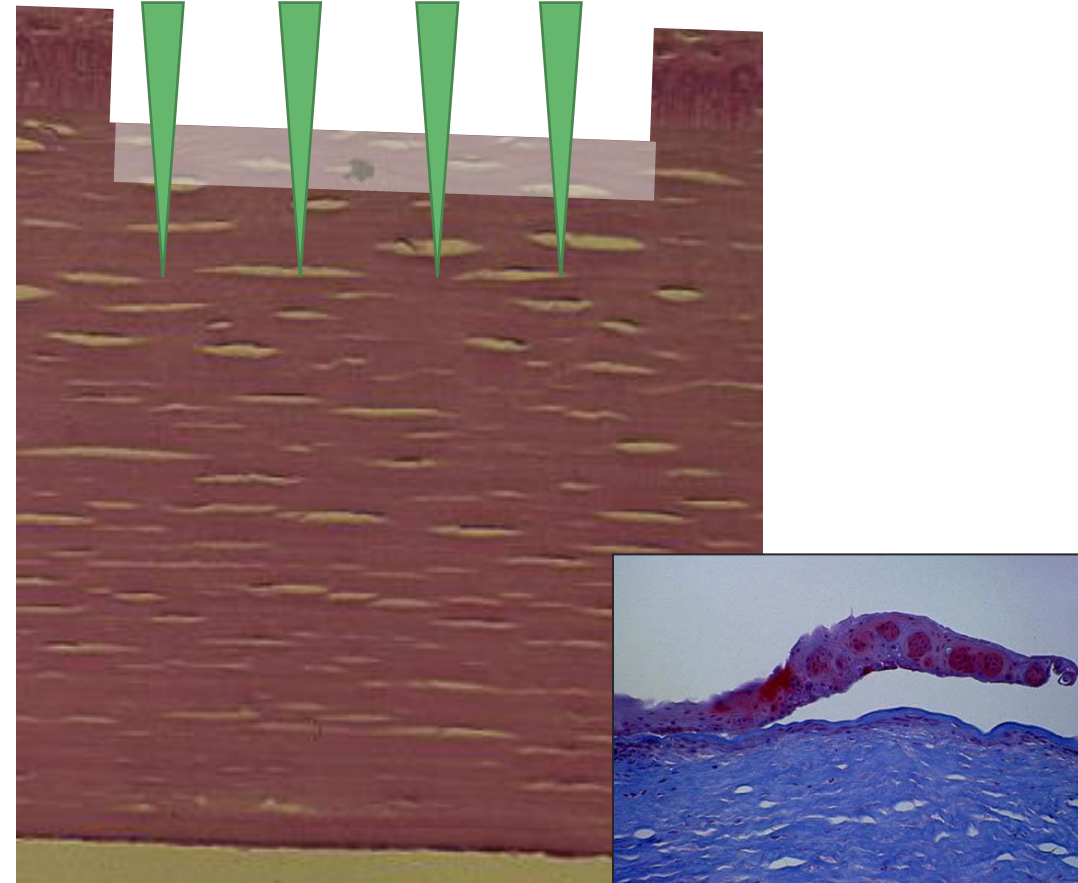
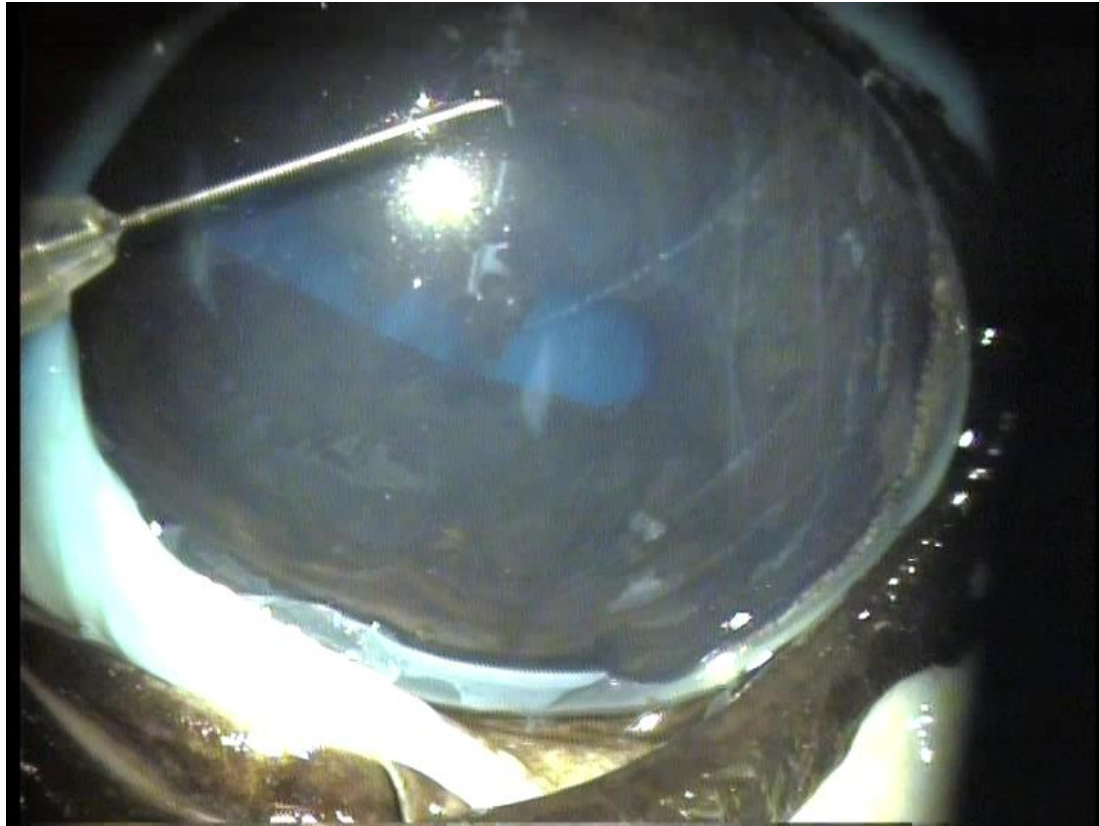
Superficial
keratectomy



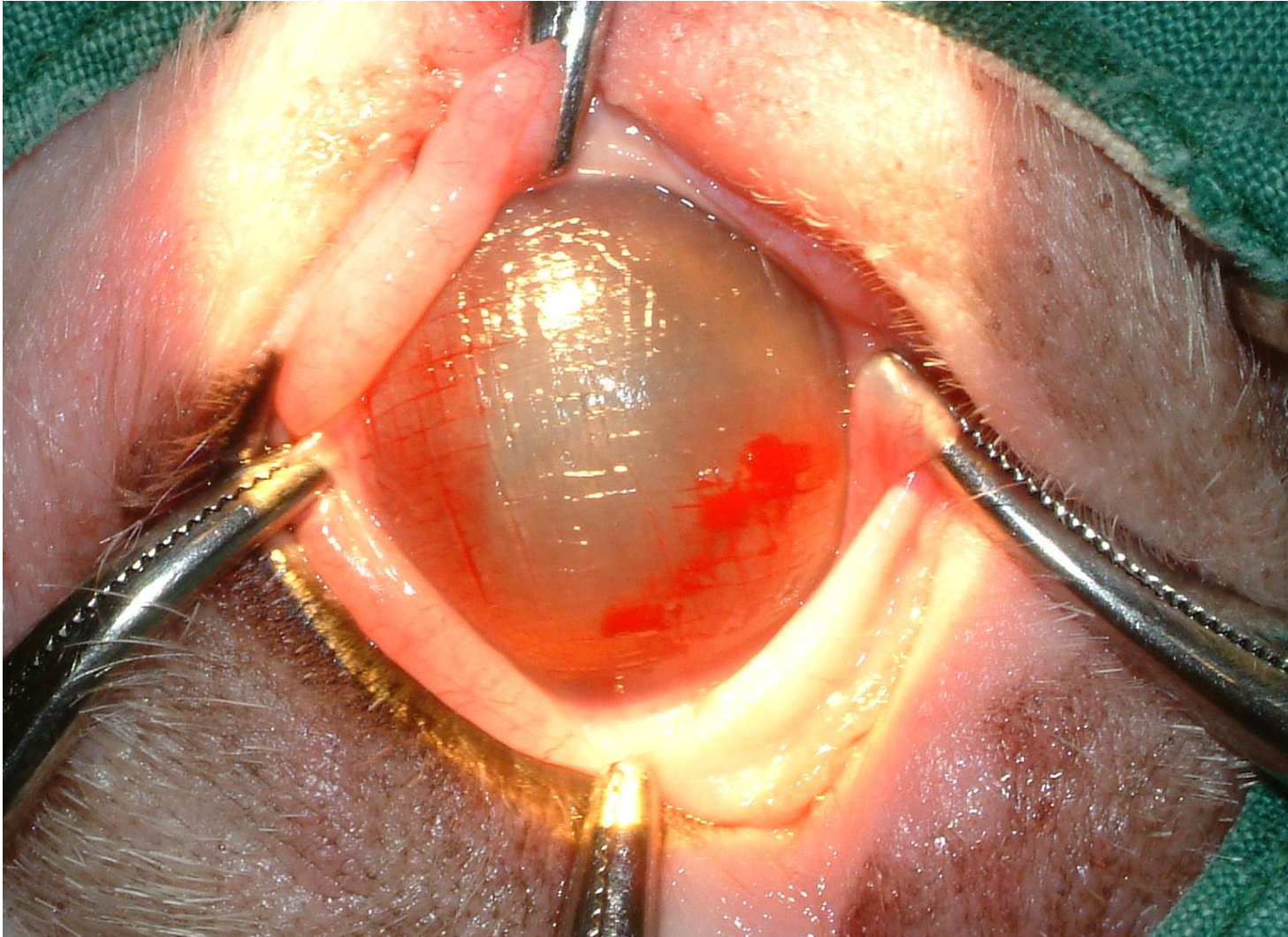
Diamond burr
debridement

IVC EVIDENSIA

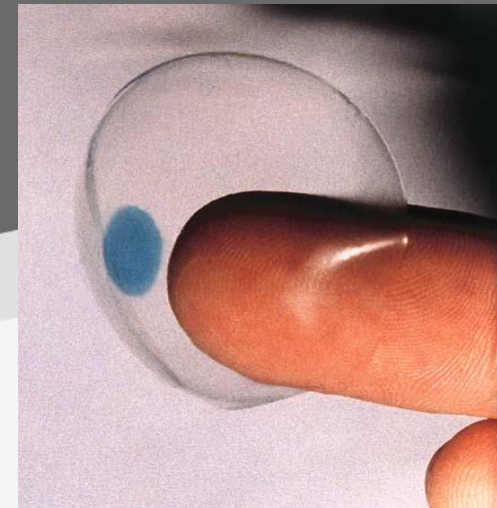
APK: ant punctate keratotomy



MAGK: Microsurgical Anterior Grid Keratotomy



Bandage contact lenses



IVC EVIDENSIA

Bandage contact lenses

Why?

- Analgesia
- Protects cornea
- ? Stabilises tear film
- ? Medication depot

How?

- Bespoke lenses best retention
- Curvature
- Diameter – limbus to limbus ?

- Human lenses an alternative