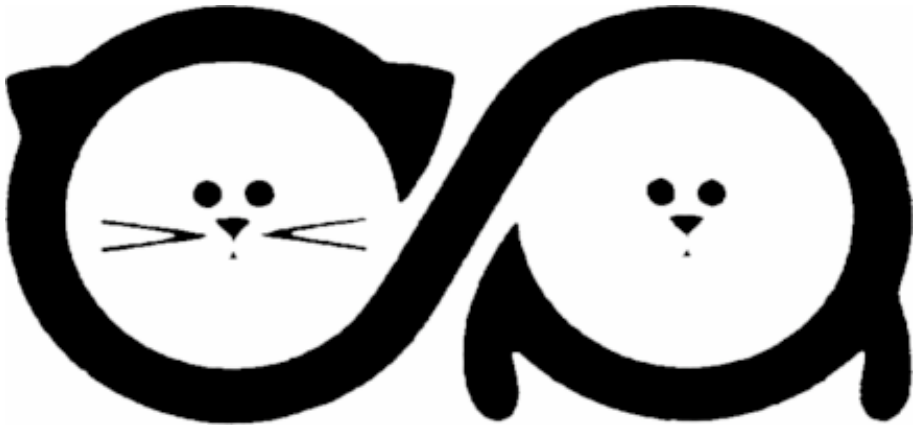
EYEVET SERVICES

Craig Irving-Registered Specialist Veterinary Ophthalmologist

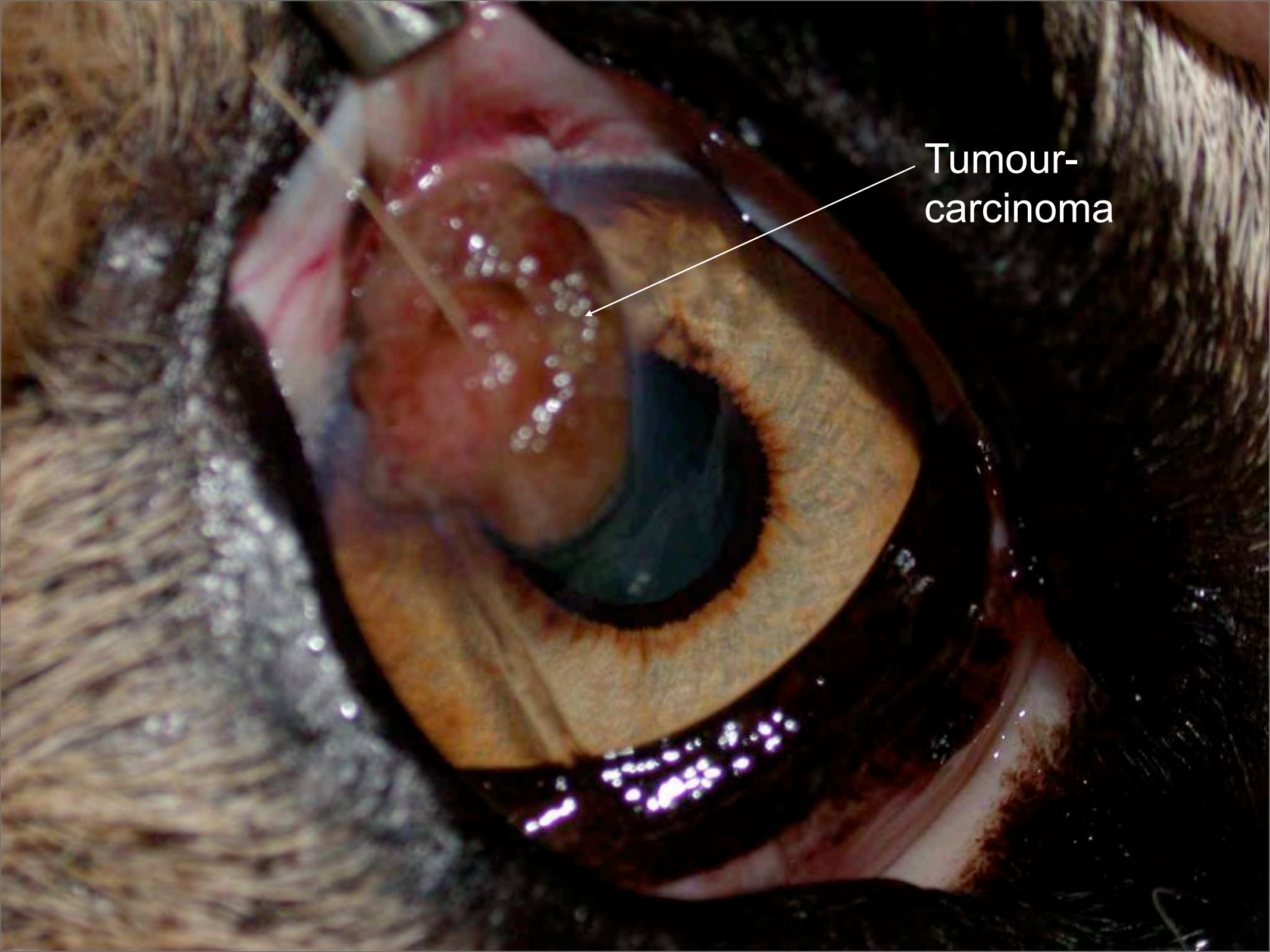


The aim of this presentation is to give you an idea of the drugs presently being used in NZ by practitioners and myself to treat ocular disease. Examples will be shown of the clinical conditions in which they can be used . I hope this will give you some realization that there are some animals out there deserving of our help and that there is a reason for loading all this information on you!

"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."

Typical surgery day!!!


Cheetah at
Wellington Zoo-
removal of corneal tumour


Tumour-
carcinoma


Cheetah –Wellington Zoo
Graft in place -3 months later

Ophthalmic Drugs-principles of therapy

- Routes of administration-many!-relate to position of problem-see slide 9 and 10
- Inflammation improves penetrability
- Frequency related to grunt!!
- Ocular penetrability of drugs varies eg Prednisolone acetate and Chloramphenicol
- Success of treatment depends on owner so keep treatment simple, demonstrate, give instruction notes

Routes of administration

- Topical –conjunctiva, cornea, anterior uvea, lids
- Subconjunctival-cornea, anterior uvea,
- Retrobulbar-posterior segment ,optic nerve,
- Systemic –lids, anterior uvea, posterior segment ,optic nerve,

UVEAL TRACT

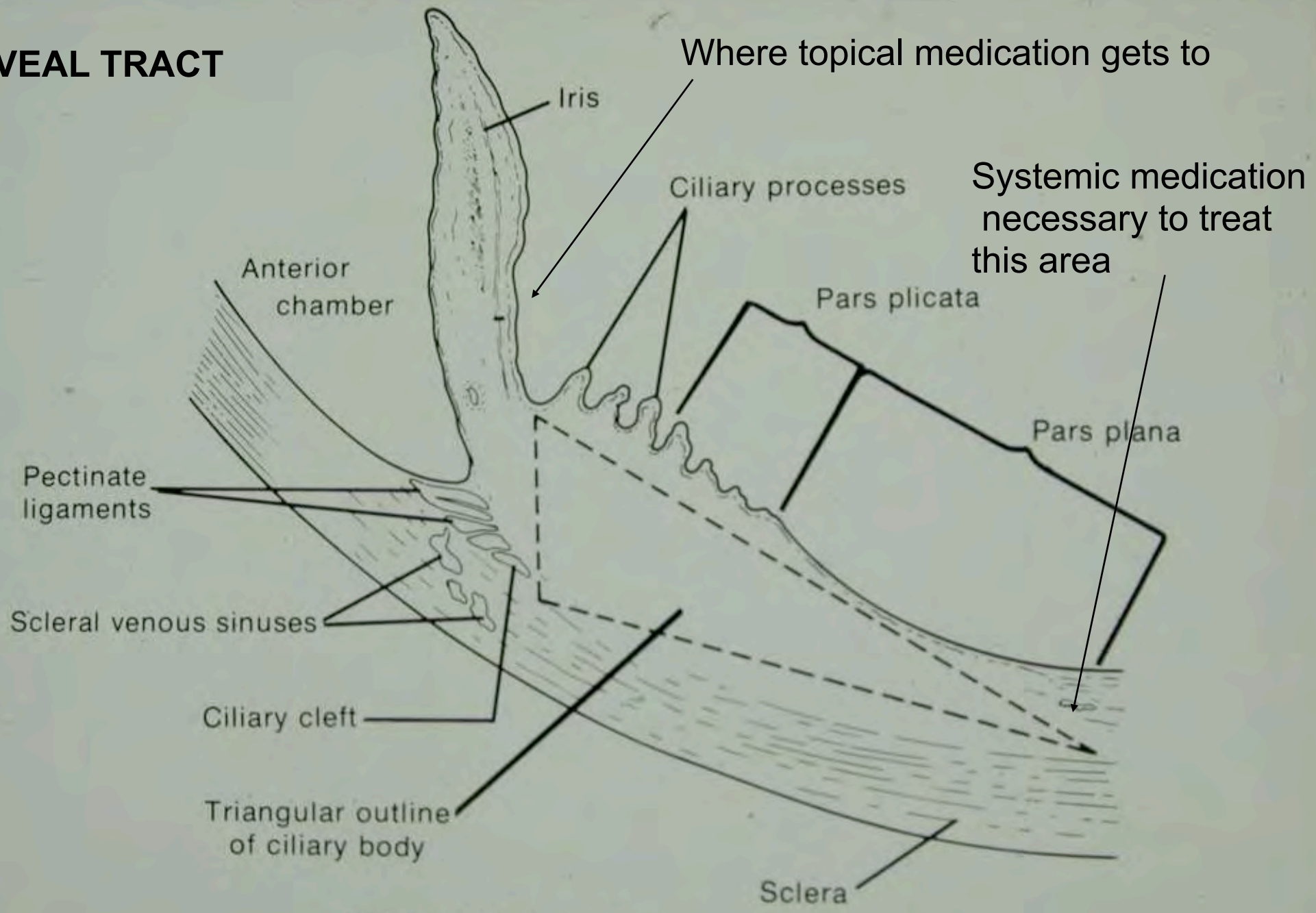
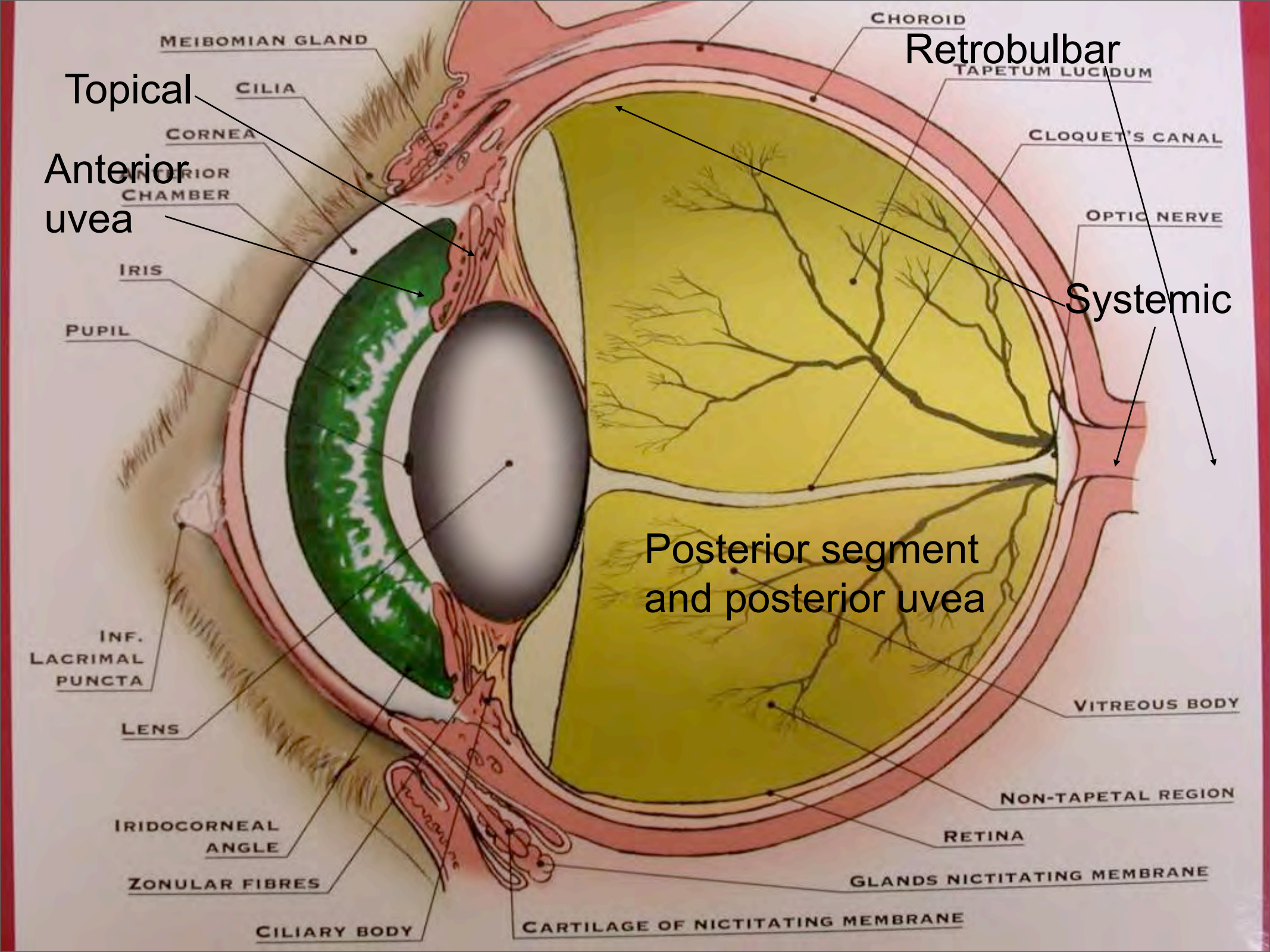


FIGURE 12–11. Parts of the ciliary body.


MEIBOMIAN GLAND
CILIA
CORNEA
ANTERIOR CHAMBER
IRIS
PUPIL
INF. LACRIMAL PUNCTA
LENS
IRIDOCORNEAL ANGLE
ZONULAR FIBRES
CILIARY BODY
CHOROID
TAPETUM LUCIDUM
CLOQUET'S CANAL
OPTIC NERVE
VITREOUS BODY
NON-TAPETAL REGION
RETINA
GLANDS NICTITATING MEMBRANE
CARTILAGE OF NICTITATING MEMBRANE
Topical
Anterior uvea
Retrobulbar
Systemic
Posterior segment and posterior uvea

Ophthalmic drugs –principles of treatment

- Topical treatment is the most common– get minimal systemic absorption
- Topical drugs will be diluted by tears and removed within 5 mins by evaporation and lachrymal system
- Ointment will persist in eye for up to an hour
- Warm ointment tube before use
- Drug effect relates to frequency of administration ie 8 x daily better than 3x if appropriate

Ophthalmic drugs –principles of treatment

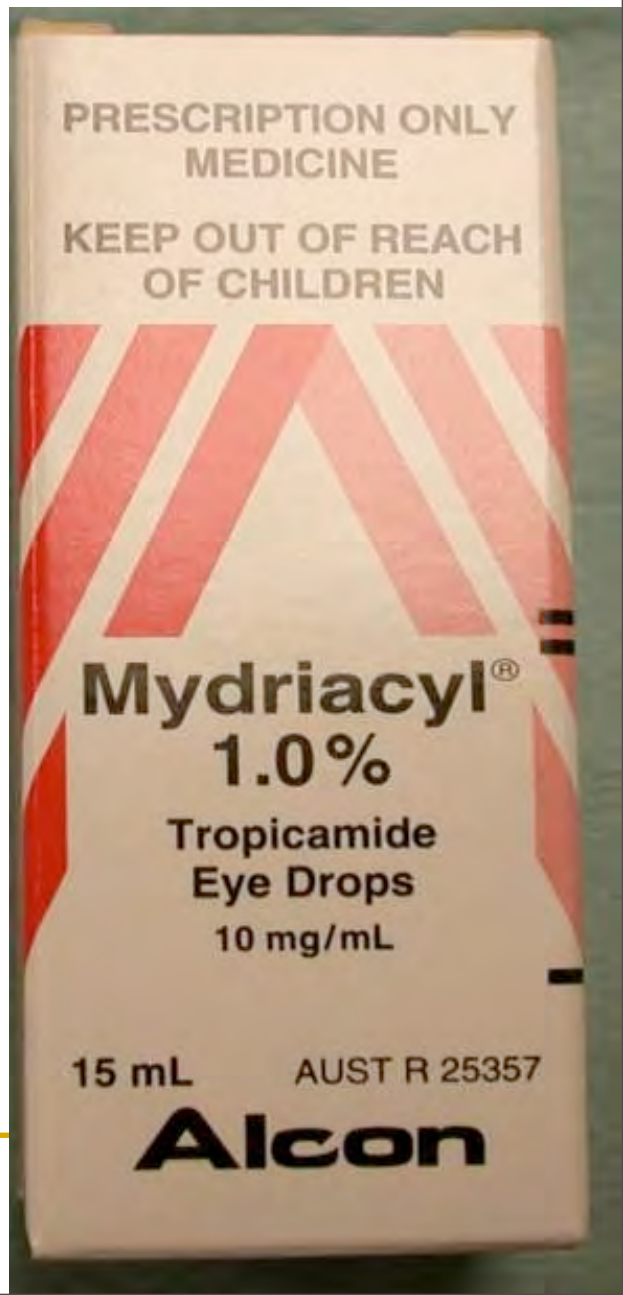
- Firstly remove mucus, crusts and ocular debris before applying medication
- One drop is adequate-15mins between drops
- Demonstrate where the drop is to be put
- Use solutions before ointment
- Try to give a treatment protocol which fits in with owners lifestyle/work commitments

Drugs –administration –sub palpebral lavage system-why use it in the horse?


Never ever give up!

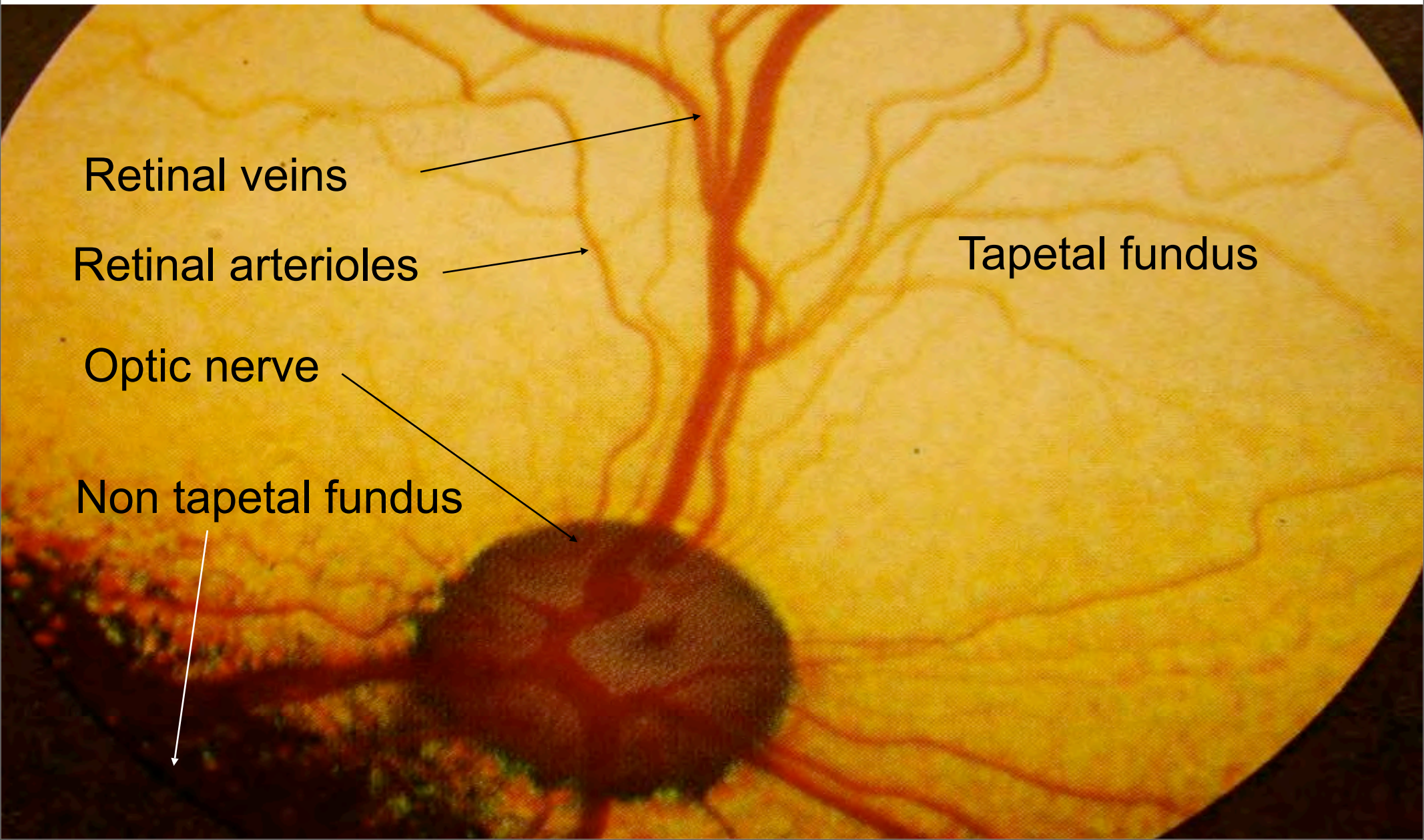
Diagnostic –Mydriacyl 1%-Short Acting Parasympatholytic

- Takes 20 minutes to work
- Effect lasts for four hours
- A mydriatic but not a cycloplegic
- Useful for examining the fundus
- The dilated pupil allows a good view of the lens and retinal area



Indirect ophthalmoscope to examine the fundus of Chispa

Normal fundus of a dog as seen with an ophthalmoscope using a mydriatic



Topical and local anaesthetics

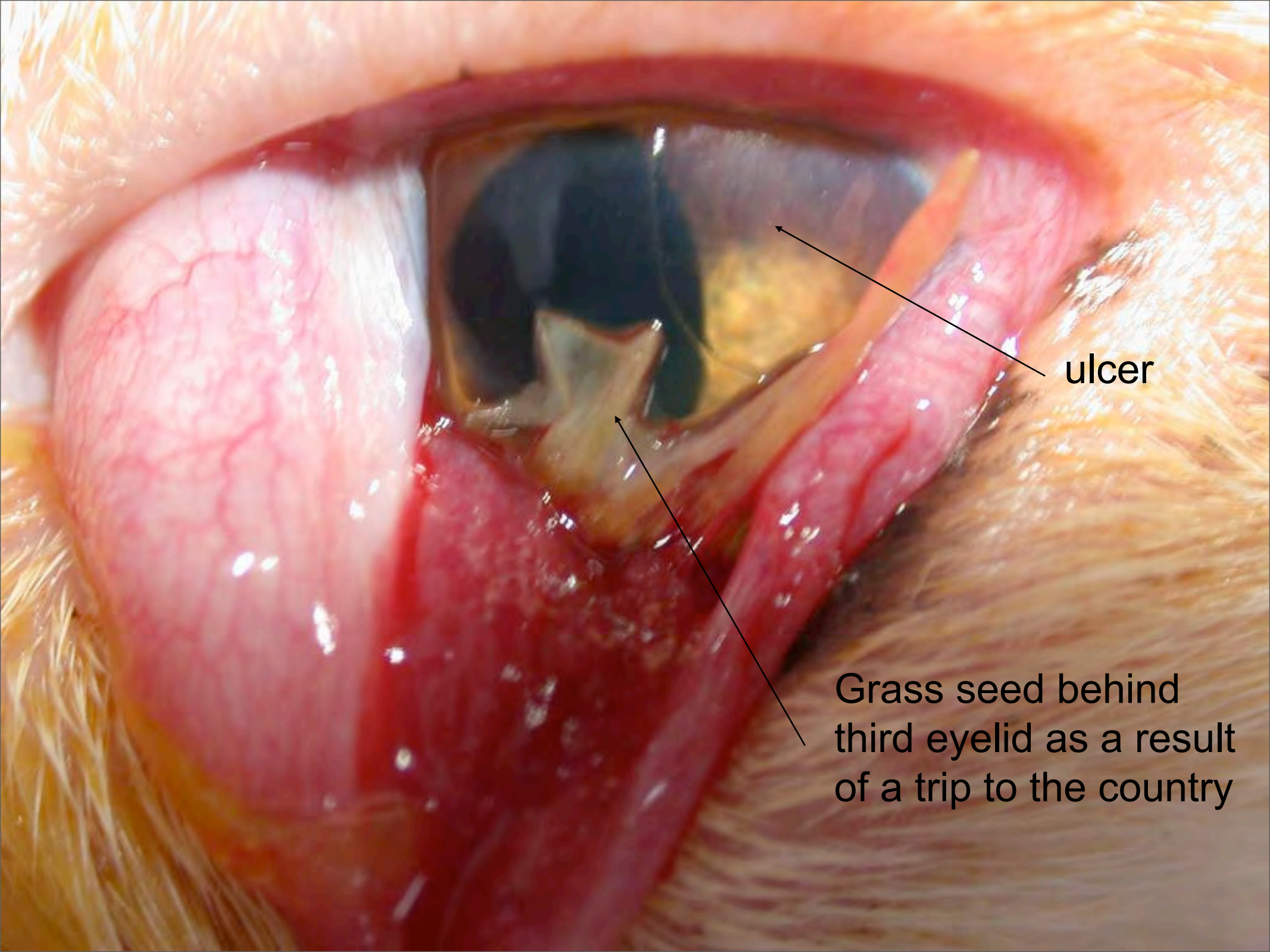
- Allows minor corneal surgery and tissue manipulation. eg. third eyelid.
- For local infiltration and nerve block for eyelid surgery eg. horse
- May use in retrobulbar area for large animal for eye removal
- Retrobulbar infiltration facilitates ocular surgery in deep orbited breeds ie analgesia and exposure

Topical anaesthetics

Apply several drops to the eye then allow 2 minutes for analgesia-use blunt forceps without a rat tooth!!

Once Ophthetic is opened needs to be refrigerated-less economic than minims

Checking behind third eyelid for foreign body after using topical anaesthetic


ulcer
Grass seed behind third eyelid as a result of a trip to the country

Dry Eye

Tears are made up of aqueous, lipid and mucoid portions. For good ocular health and comfort tears are very important.

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Tears are made up of aqueous, lipid and mucoid portions. For good ocular health and comfort tears are very important.


Dry eye -4yo Springer


6yo Cavalier king Charles- Dry Eye
-Schirmer tear test 5mm per 60 seconds,
dull cornea and excessive ocular discharge

For the Canine
Normal >15mm per 60secs
Suspicious 10-15mm per 60secs
Dry <10mm per 60secs

- **Schirmer Tear Test-**
  leave in eye 1minute

Tear replacement substitutes

- Solutions containing hypromellose, methyl cellulose or polyvinyl alcohol- have short contact times
- Need to be used one to two hourly to be effective as lubricant
- Lacrilube ie liquid paraffin – has longer contact time and more effective-one hour
- Viscotears – a carbomer gel – greatly improved contact time therefore reduced frequency to be effective

Tear Replacement Drugs

Ointment

Aqueous drops

Gel

Immunosuppressives

- Cyclosporin–Keratoconjunctivitis sicca=dry eye, pannus and corneal disease
- Most dry eye problems and tear deficiency is due to an immune mediated adenitis of lachrymal glands
- Azathioprine (Imuran)– refractory uveitis
- Tacrolimus– dry eye and pigmentary keratitis

Tear Stimulants-Immunosuppressant

Cyclosporin –lachrimogenics and T Cell inhibitor- for Dry eye and keratitis

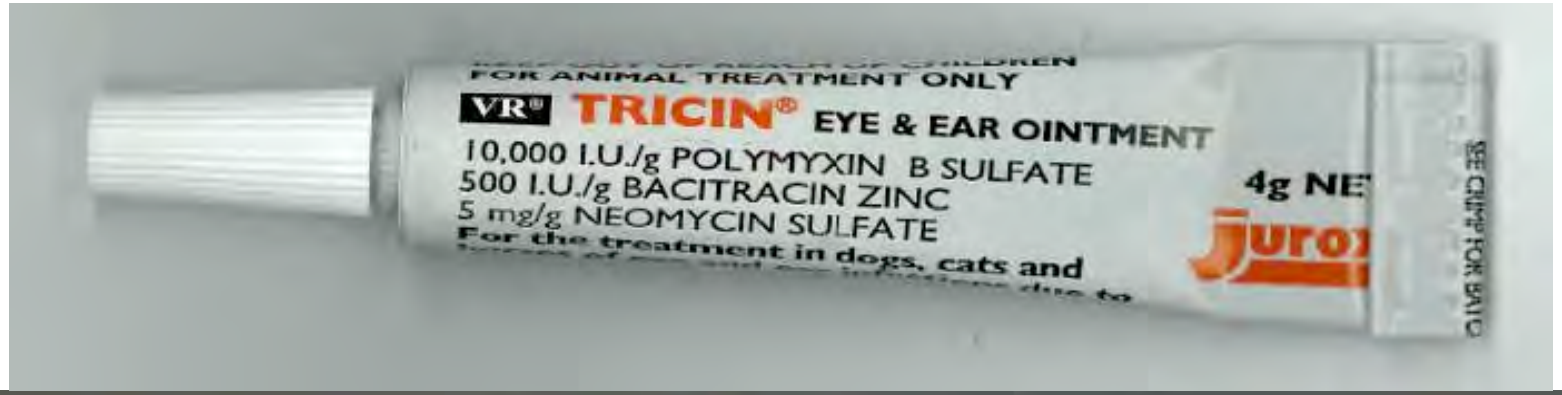
Systemic and topical antibiotics

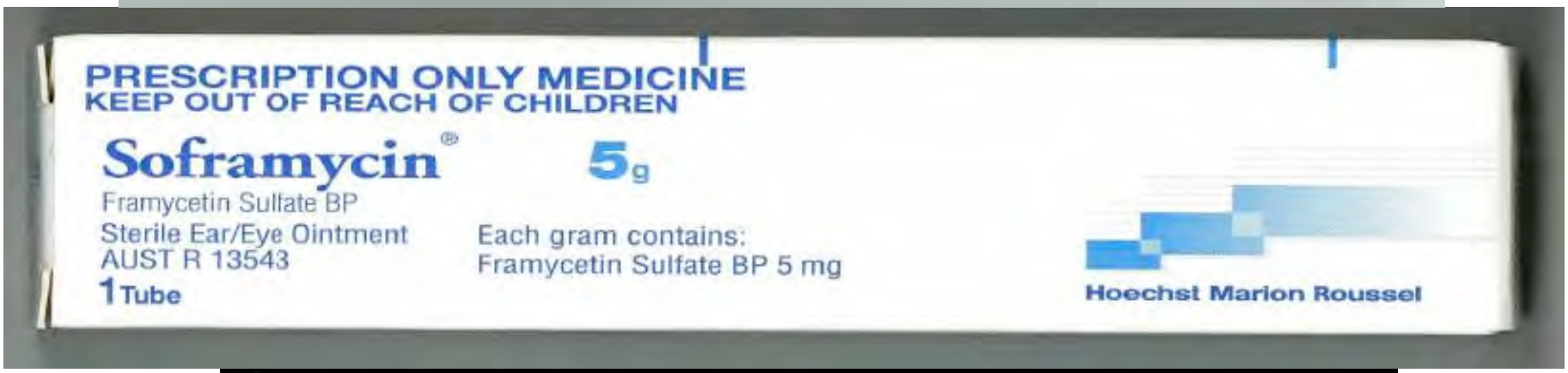
- Useful for infections around the eye e.g. retrobulbar, lids and intraocular infections
- Choice of agent ideally based on culture and sensitivity
- Use of a broad-spectrum agent initially pending diagnostic results
- **Always** use simple agents first to reduce chance of bacterial resistance developing

Topical antibiotics

- Primary bacterial infection in the eye is very rare
- Usually secondary to another problem
- Examples include dry eye (KCS), foreign bodies, viral, Chlamydia, Mycoplasma
- Lid abnormalities-,entropion ,ectropion, trichiasis, lagophthalmous

Topical antibiotic ointments-use for initial therapy 2-4 x daily



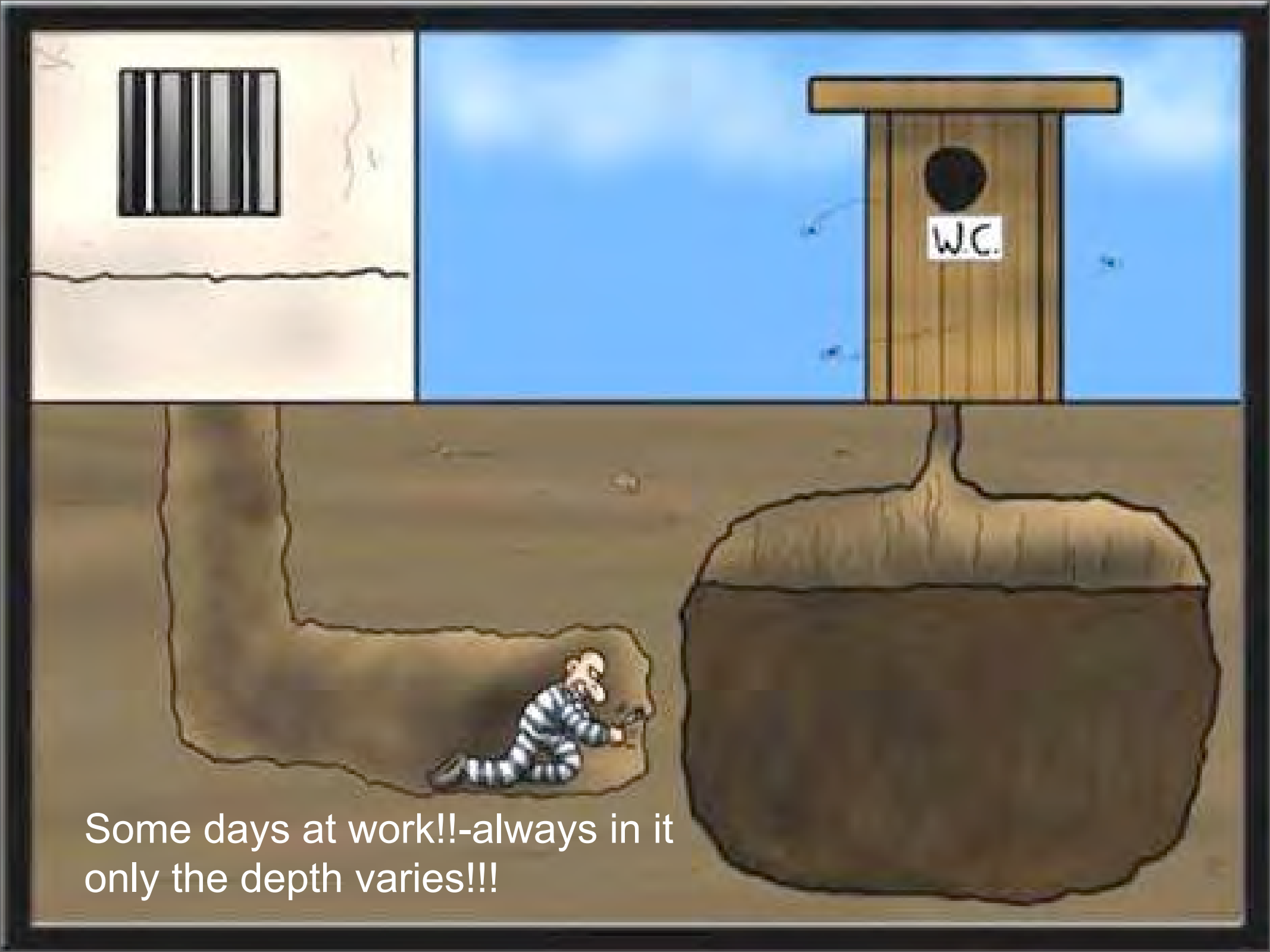


Antibiotic Eye Drops

- Ciloxan-a Fluoro-quinilone has a broad spectrum of activity- may need to use antibiotics 1-2 hourly if an ulcer is progressing rapidly


Male cat –retrobulbar abcess from a cat fight
injury to the upper facial area

Drainage of a retrobulbar abcess-behind last upper molar
-use scalpel to incise mucosa and blunt forceps to explore
–systemic antibiotics to treat


W.C.
Some days at work!!-always in it
only the depth varies!!!

Corneal Disease

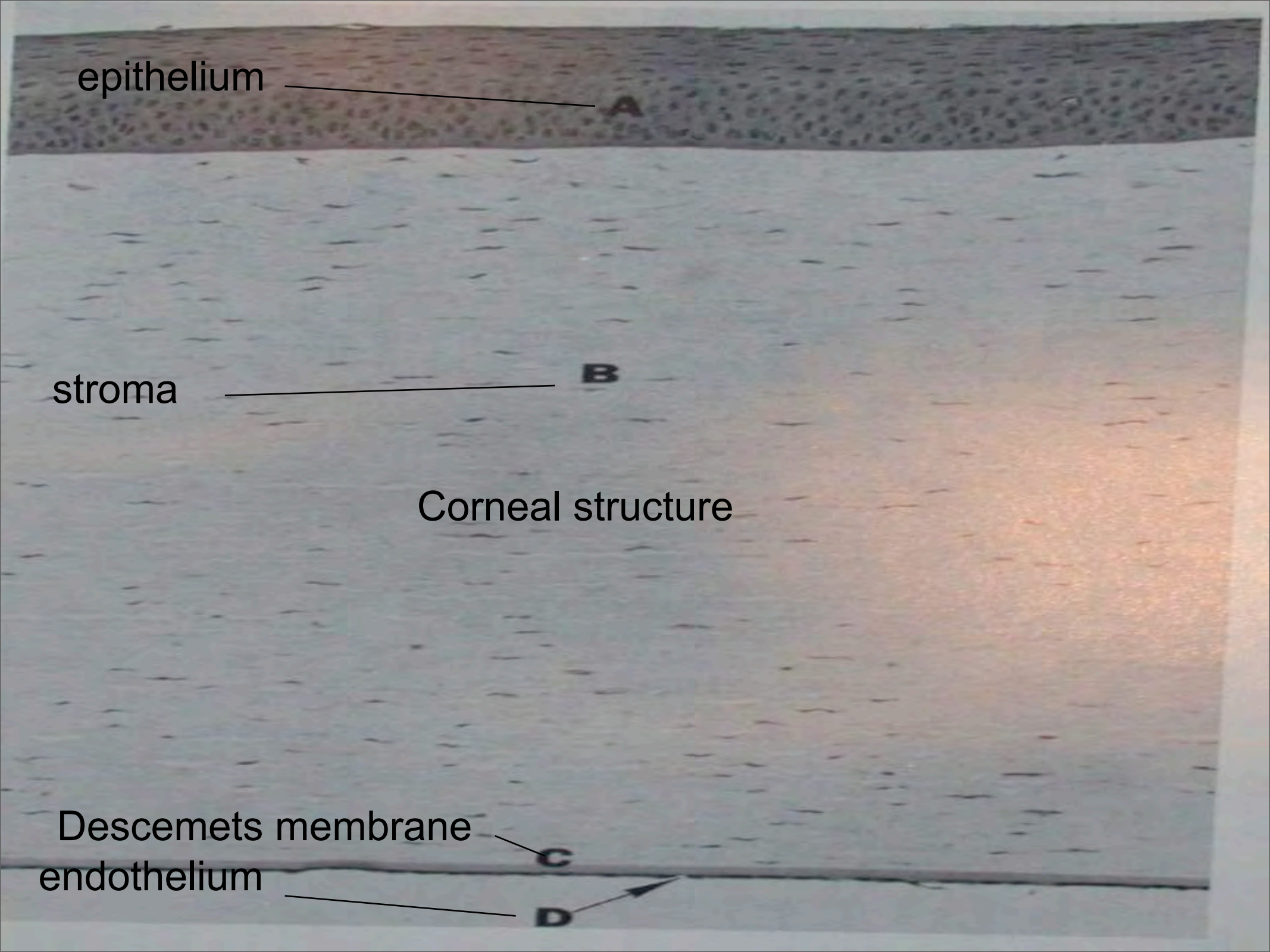
Very common in practice and a multitude of causes. Drug therapy is important but is no substitute for a careful examination of the eye!!

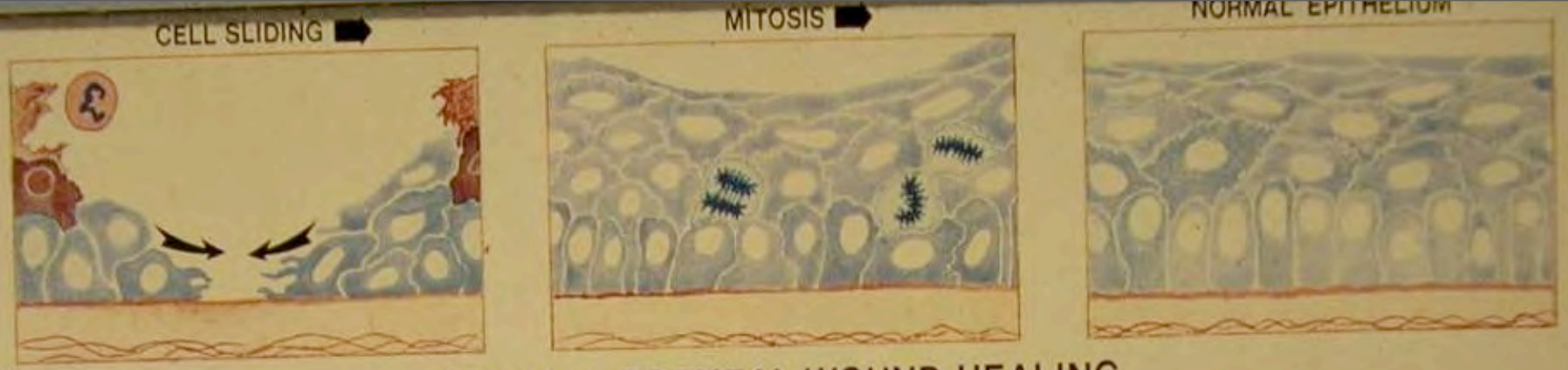
Corneal Disease

Very common in practice and a multitude of causes. Drug therapy is important but is no substitute for a careful examination of the eye!!

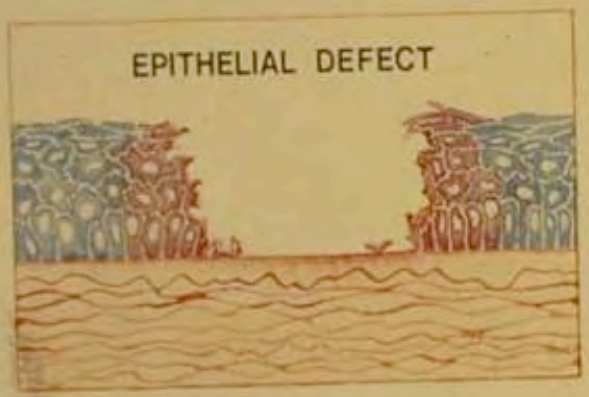
Normal Corneal Healing

- Starts within a few hours of injury
- Process of epithelial migration and mitosis
- Small defects heal in 2-8 days
- Deeper stromal defects heal with scarring and vascular in-growth
- Fluorescein staining useful to monitor
- Steroids may be needed to remove excess vascular infiltration/reduce scarring


epithelium
A
stroma
B
Corneal structure
Descemets membrane
C
endothelium
D



NORMAL CORNEAL WOUND HEALING



PROGRESSION OF CORNEAL ULCERS

Iris prolapse

Bugger!!!

PROGRESSION OF THE COMPLICATED ULCER

Fluorescein

- Water soluble dye-lipophobic,hydrophilic
- Available in strips or minims
- Will stain epithelial defects ie ulcers
- Useful to outline ulcers, check progress of healing and lachrymal duct patency
- Will not stain descemets' membrane
- Watch spillage onto owner-stains!!

Fluorescein –topical stain-lipophobic but hydrophilic

Fluorescein strips-buy in box of 100
-remember it will stain clothing so warn owner especially if they are wearing a white shirt or blouse!


Normal feline eye – epithelium intact – no fluorescein uptake


grass-seed
Foreign body behind third eyelid


Equine –superficial ulcer

Canine – mild blepharospasm and epiphora – suspicious corneal defect

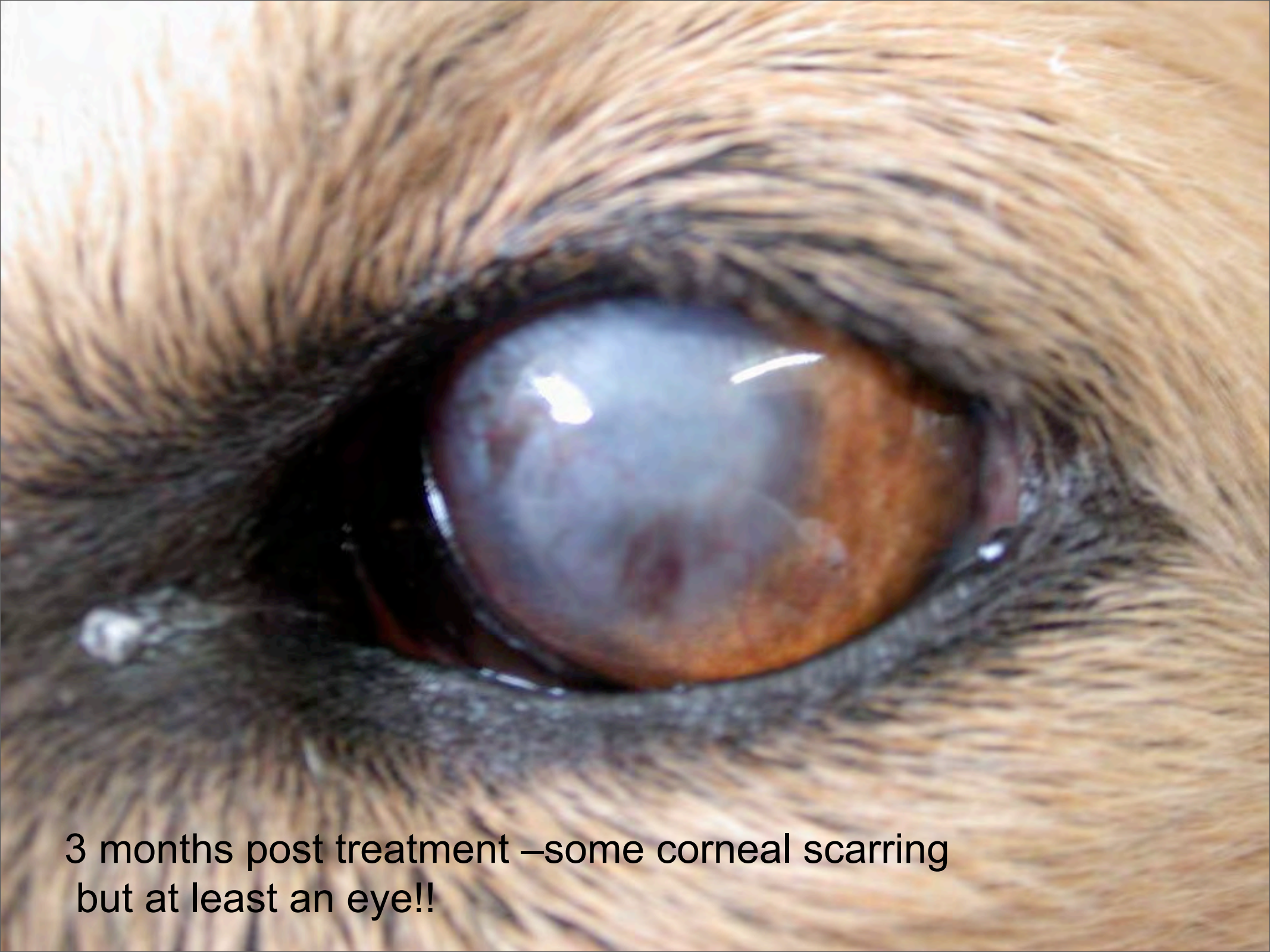

previous slide – application of fluorescein highlights ulcer

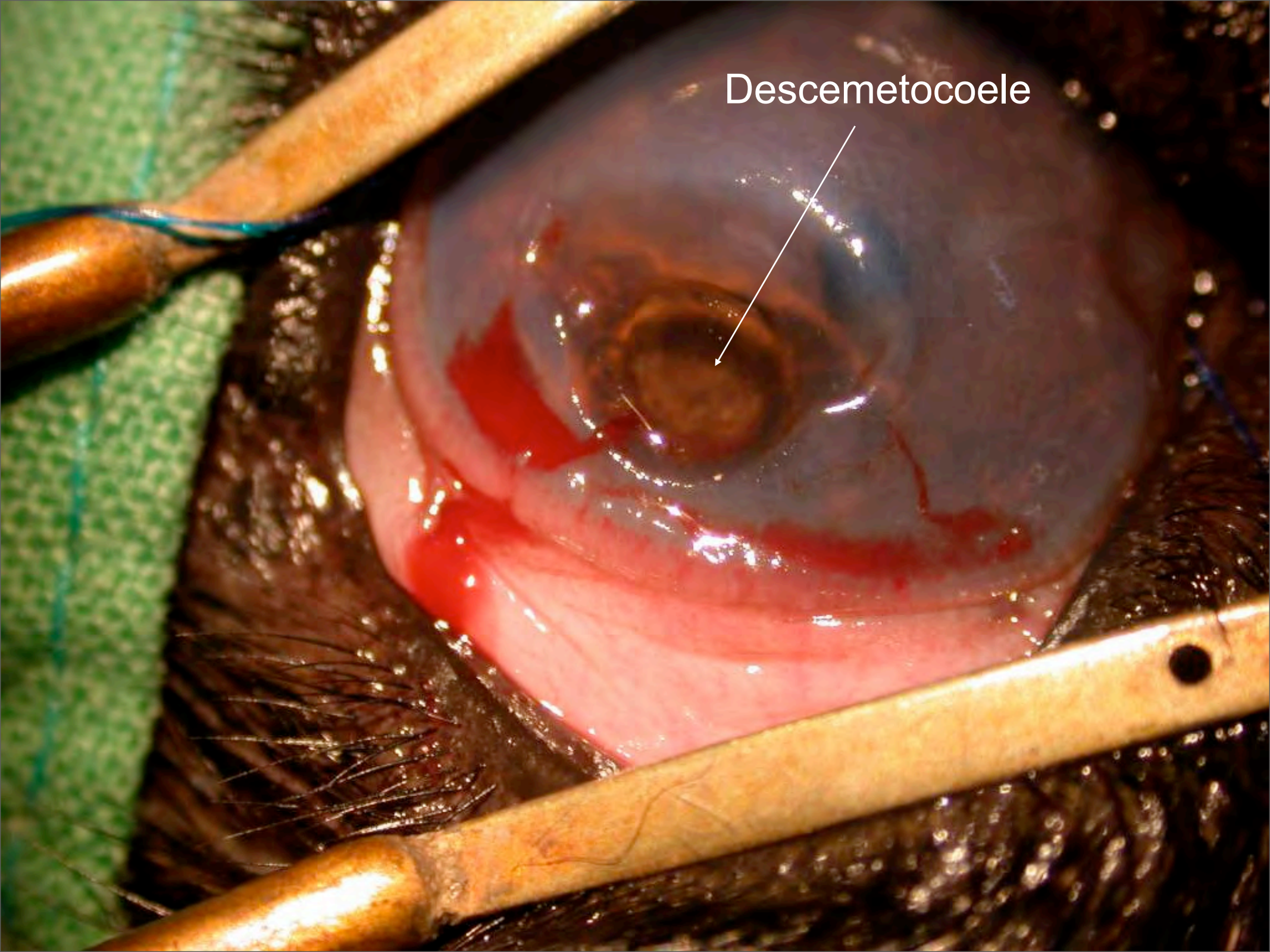
Anticollagenase agents for Melting ulcers

- Autologous serum/whole blood-easy to source –very useful-refrigerate and keep sterile
- K-EDTA-chelating agent to bind Ca
- Heparin (1000 iu /ml) in artificial tears
- Doxycycline
- Antibiotics-fortified if needed
- New agents are being developed eg Galardin and polysulphated glycoaminoglycan
- Use in combination eg serum and EDTA


Melting ulcer-3yo Greyhound


Horse -melting ulcer


3 months post treatment –some corneal scarring
but at least an eye!!


Descemetocoele

Trauma –Cat Scratch Injury With Cataract Formation-Young Pup

Remember to warn owners who purchase a new pup to be extremely careful if they have a resident cat-close the gap slowly!!!

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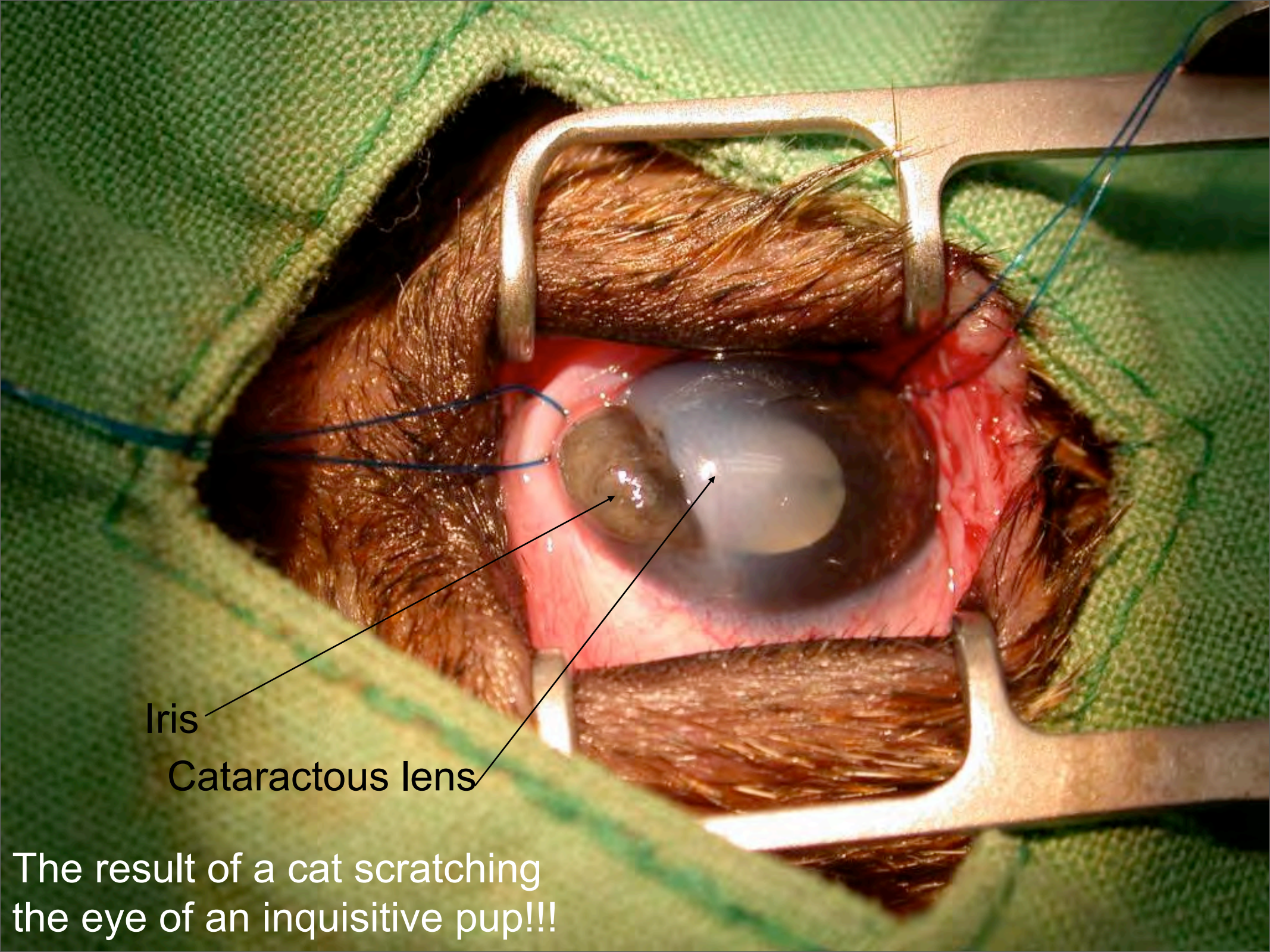
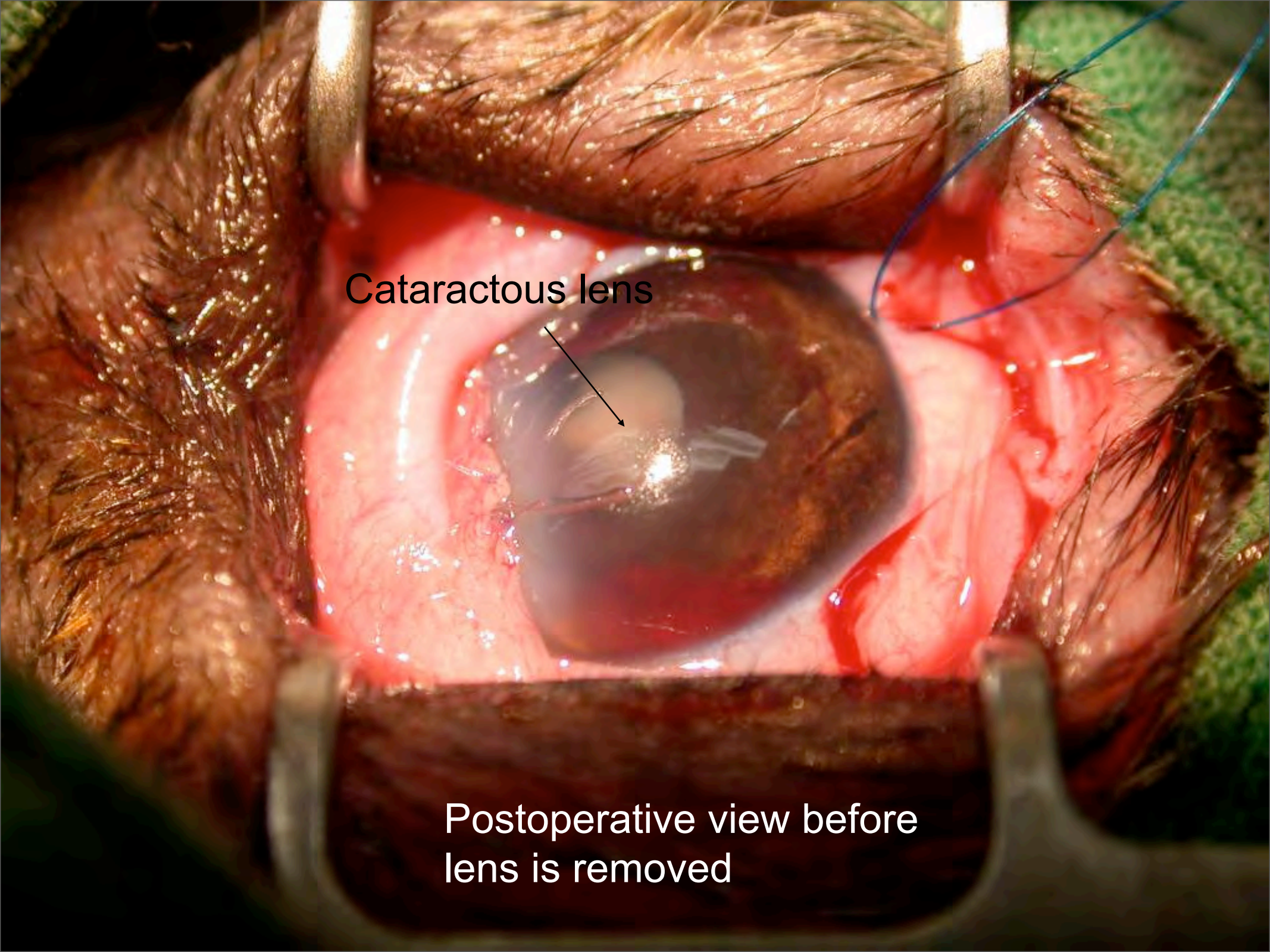


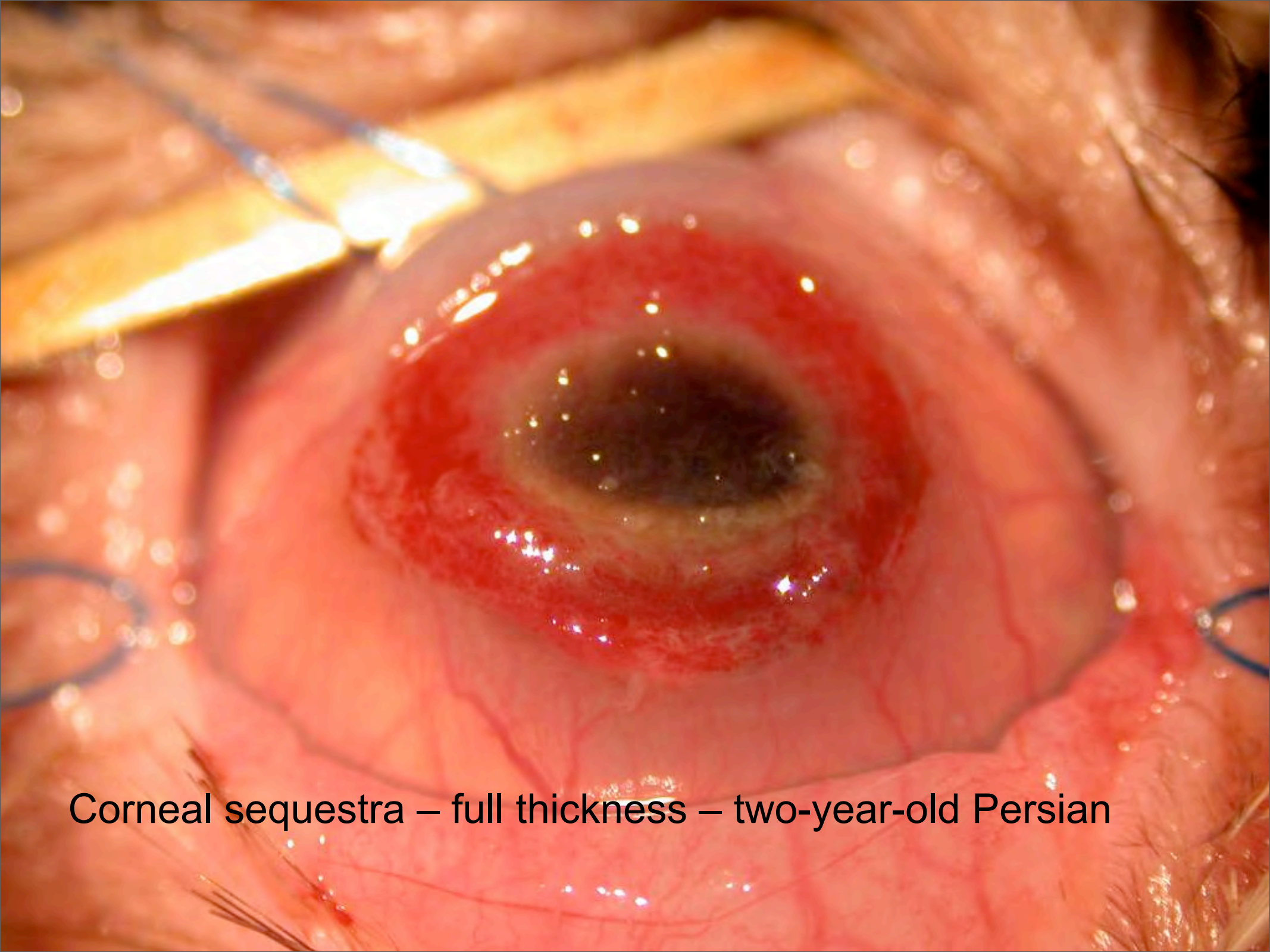
The result of a cat scratching the eye of an inquisitive pup!!!


Cataractous lens
Postoperative view before lens is removed

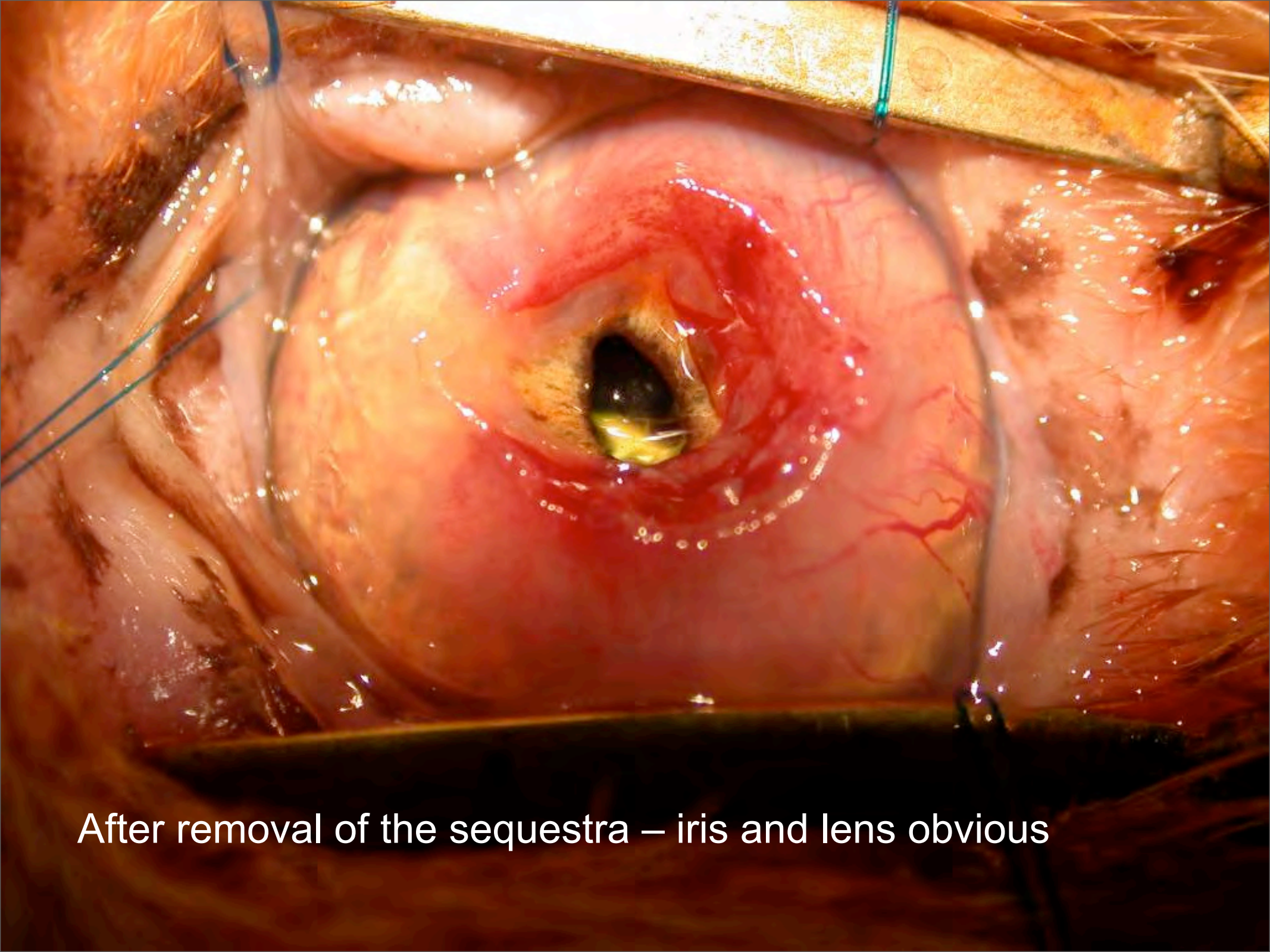
Topical Antiviral Agents-

- Herpes virus the major problem
- Many of the effective ones not available in New Zealand-- expensive
- Are virastatic and need to be used frequently e.g. two to three hourly
- 1% iodine drops can be effective – cheap
- All are ineffective against the carrier state

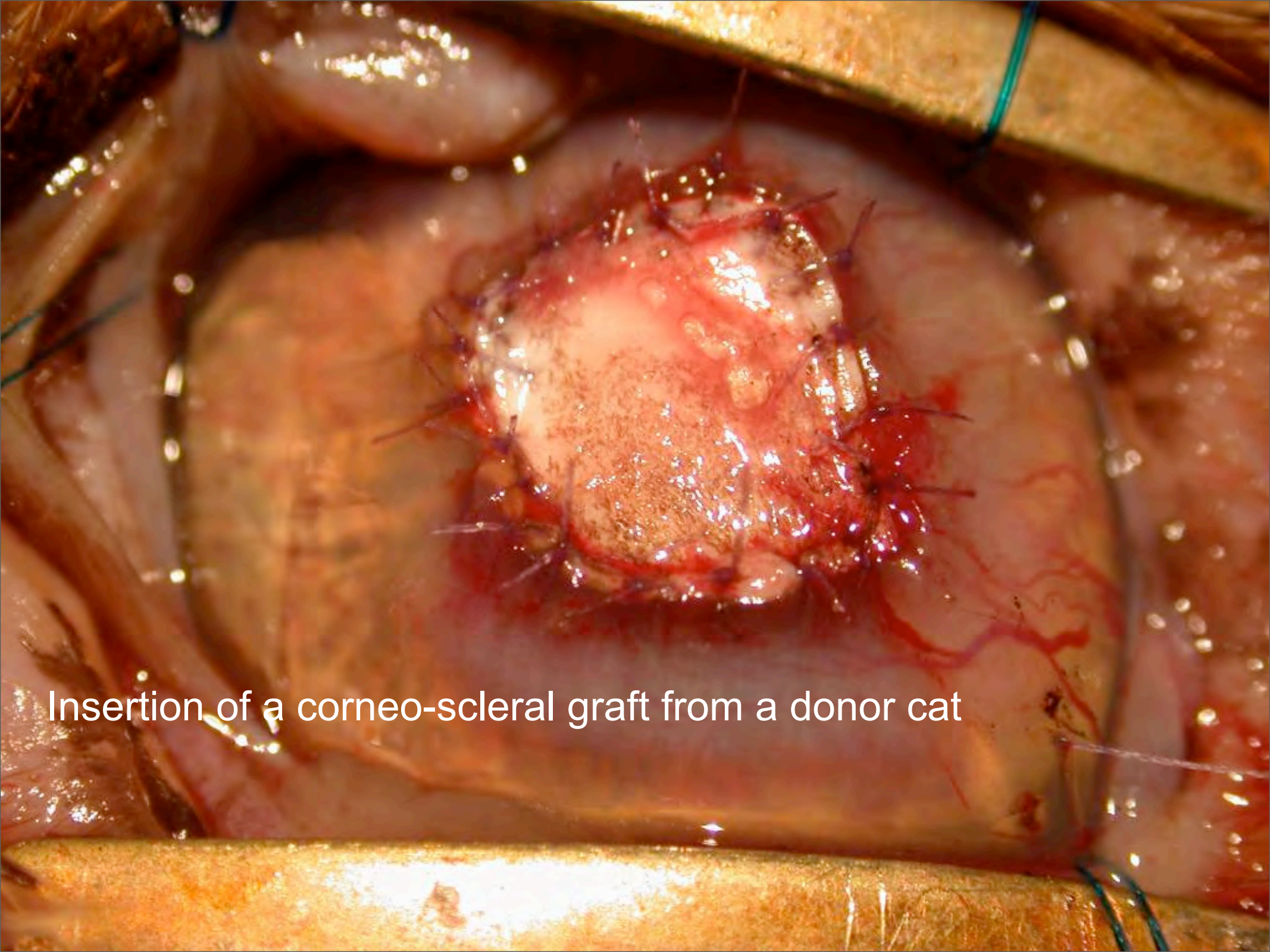

Feline cornea – herpetic ulcer – well defined with fluorescein



Corneal sequestra – full thickness – two-year-old Persian



After removal of the sequestra – iris and lens obvious

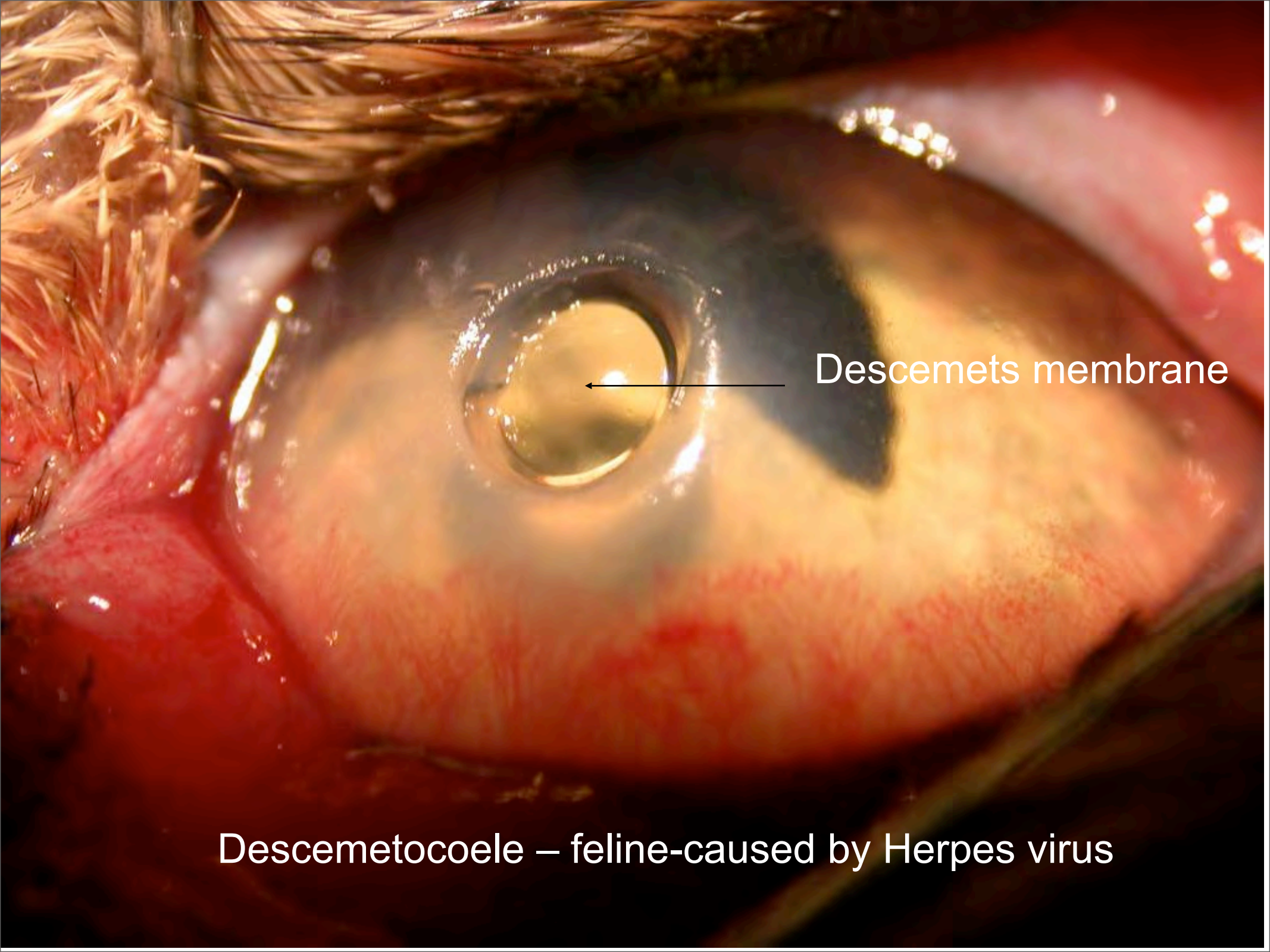


Insertion of a corneo-scleral graft from a donor cat

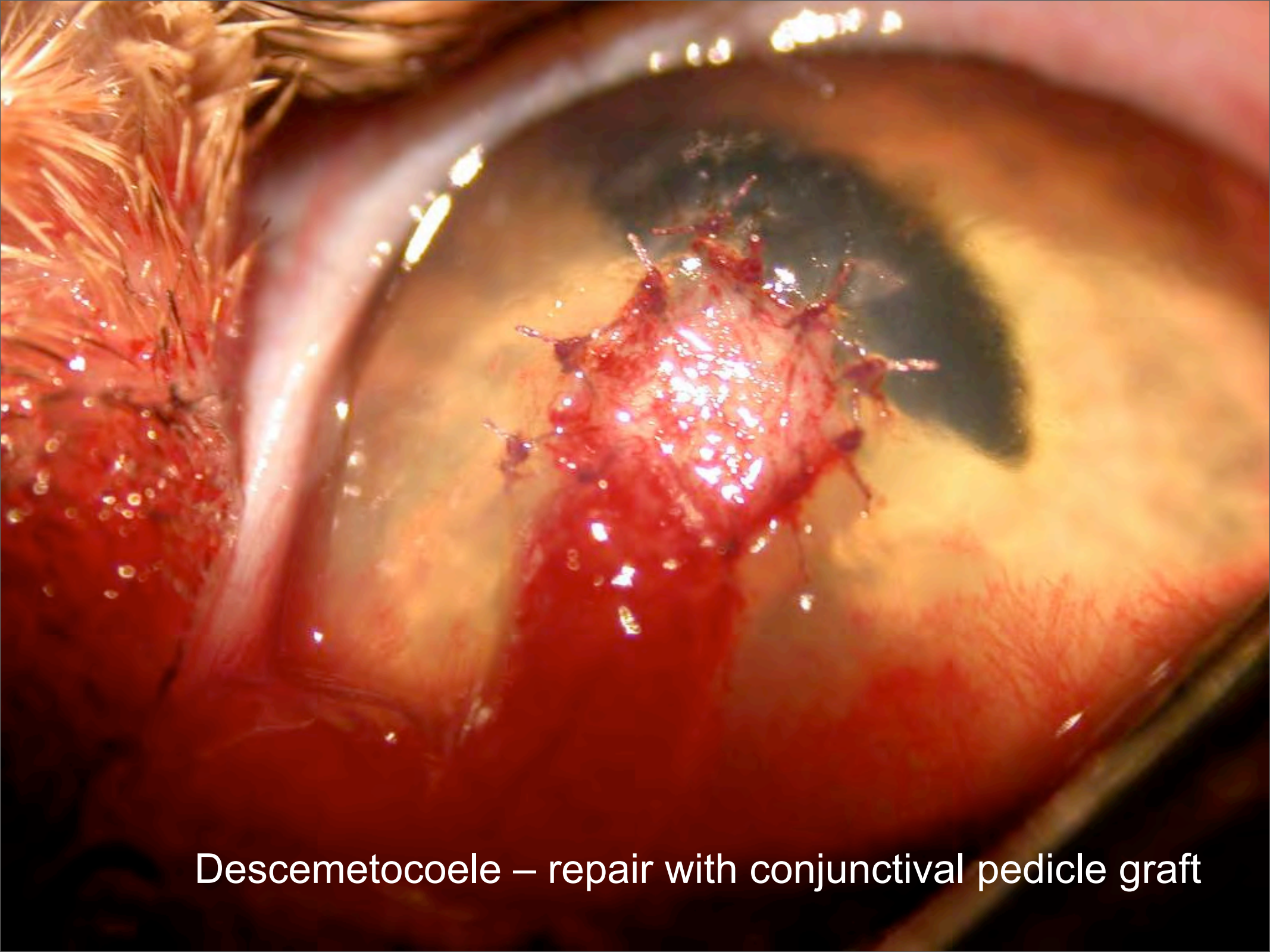
Eye three months after surgery– graft shrinking and eye visual

Descemetocoele

- The consequence of severe/acute corneal ulceration or trauma
- While cornea heals support from a conjunctival graft is necessary
- Leave graft in place for 6-8 weeks
- If a descemetocoele progresses then may get an iris prolapse/eye loss
- TEF not a good treatment-only pending referral



Descemetocoele – feline-caused by Herpes virus



Descemetocoele – repair with conjunctival pedicle graft

Uveitis

Often treatment will be symptomatic as cause will be unknown-involves use of steroids, mydriatic ,cycloplegic and Immunosuppressives

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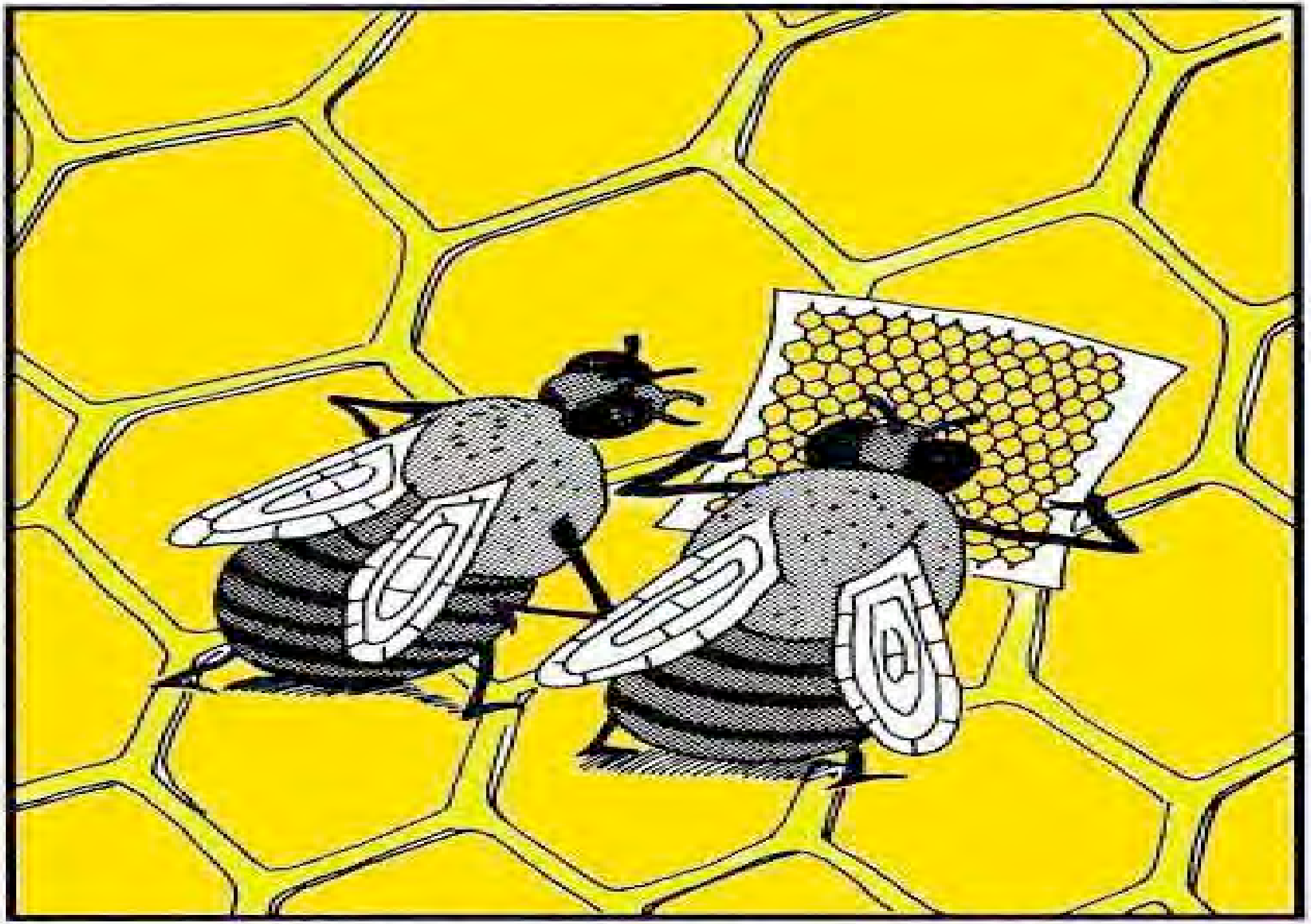
Often treatment will be symptomatic as cause will be unknown-involves use of steroids, mydriatic ,cycloplegic and Immunosuppressives



So, Where are we exactly?

Uveitis

- Uveal tract made up of iris, ciliary body, choroid
- Uveitis is inflammation of all or one of these structures
- Eye function very intolerant to inflammation
- Structures within the eye may be secondarily affected by this process
- Treatment must be aggressive, high dosage, multiple routes

UVEAL TRACT

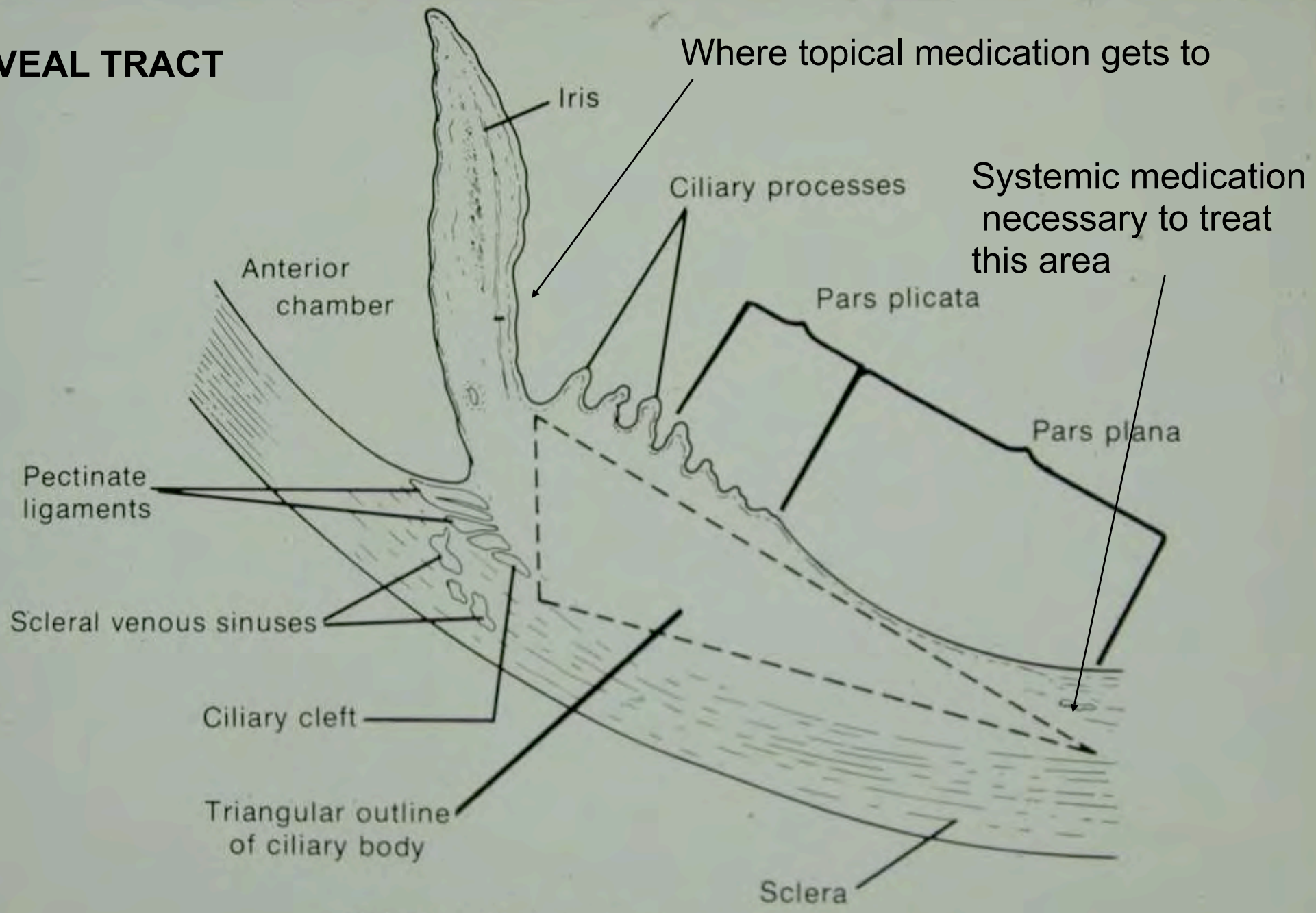


FIGURE 12–11. Parts of the ciliary body.

UVEITIS-Causes

- Infectious agents-eg Virus, Bacteria, Fungi, Parasites, Rikettsia
- Trauma
- Mature cataract
- Systemic disease-eg liver, kidney, uterine
- Neoplasia eg lymphoma
- Immune-mediated
- Unknown –the majority of cases

Uveitis-often symptomatic treatment rather than against a specific causative agent

"For once you didn't call me too late. Now build a fire, see if you can find a horny toad and some buzzard feathers, and get your loudest drum."

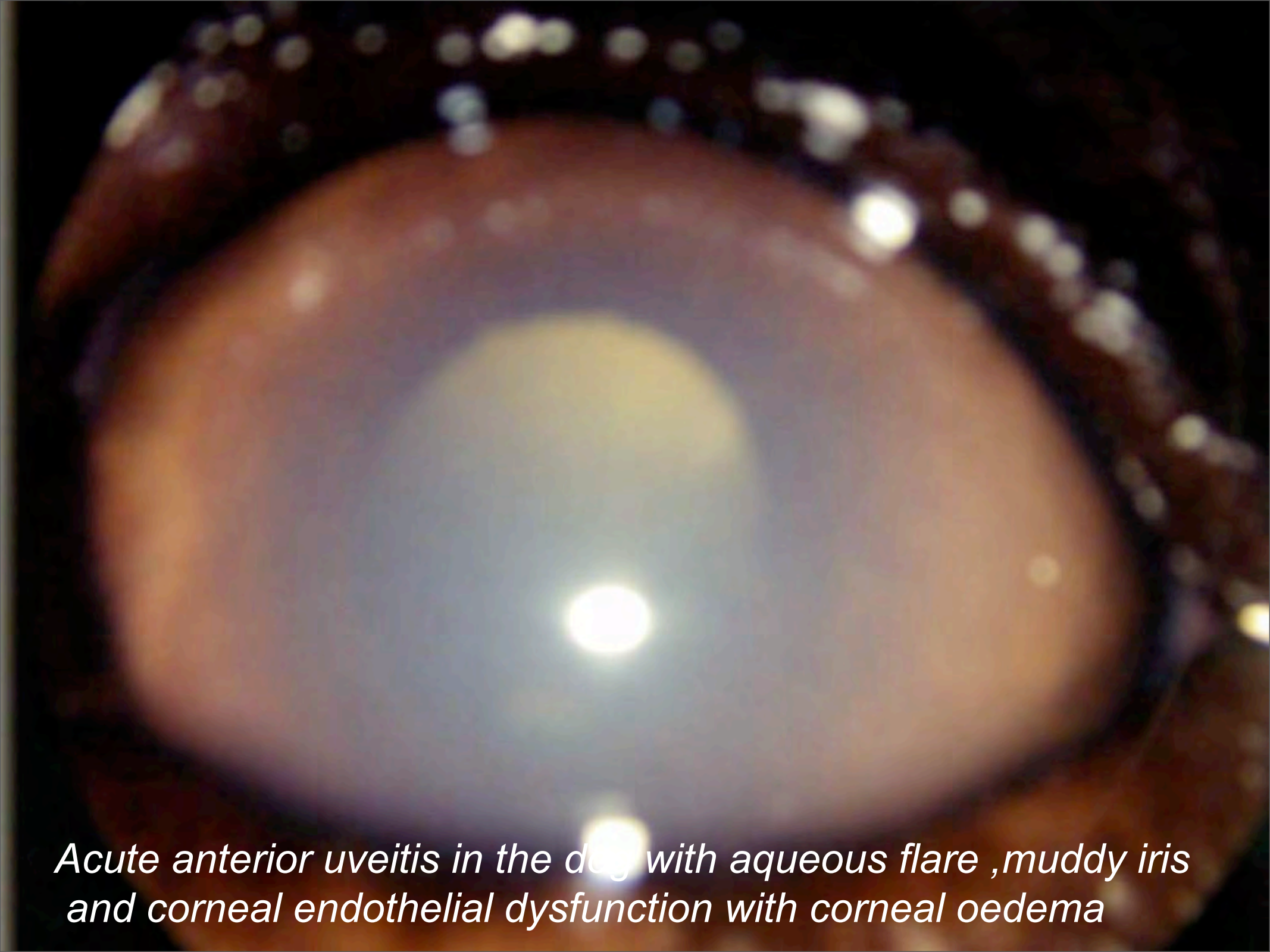
UVEITIS

- Diagnostic tests always appropriate to determine the cause
- Very often the cause may be unknown-treat the symptoms
- Co-existent systemic disease must be ruled out –may be the cause!
- High dosage of immune-suppressing drugs may be used for several weeks
- Some side-effects are acceptable

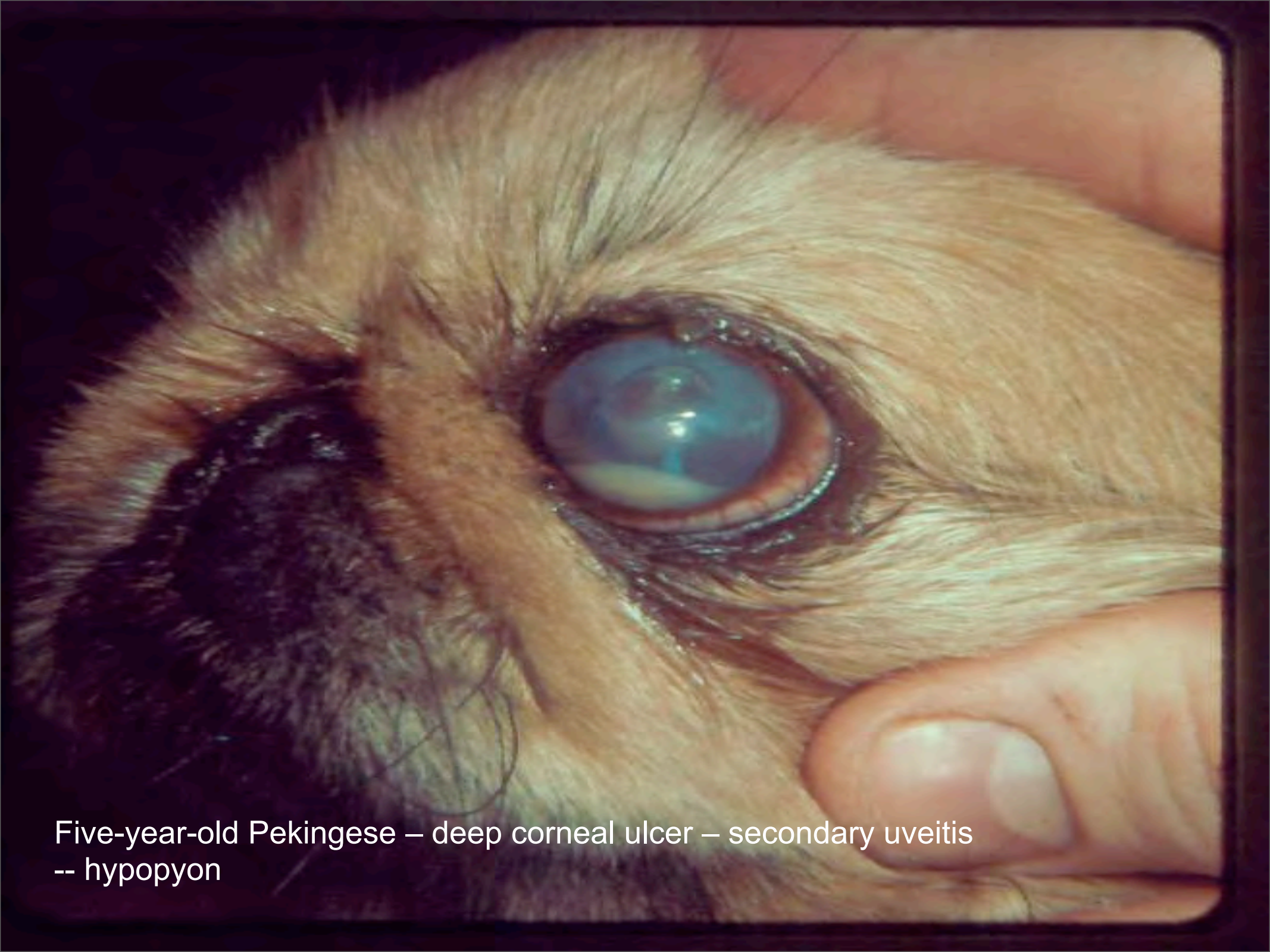

Uveitis – rubeosis of iris, aqueous flare

UVEITIS-Signs

- “Red” eye-especially of the conjunctiva– ciliary flush
- Excess blinking-- blepharospasm
- Excess tearing and painful eye-- epiphora
- Cloudiness of the cornea and within the eye-- flare
- Constriction of the pupil– miosis and anisocoria
- Coloration of the iris-- rubeosis
- Often only one eye affected-hypotony
- there will be a difference in the number\intensity of these clinical signs depending upon whether granulomatous or non-granulomatous

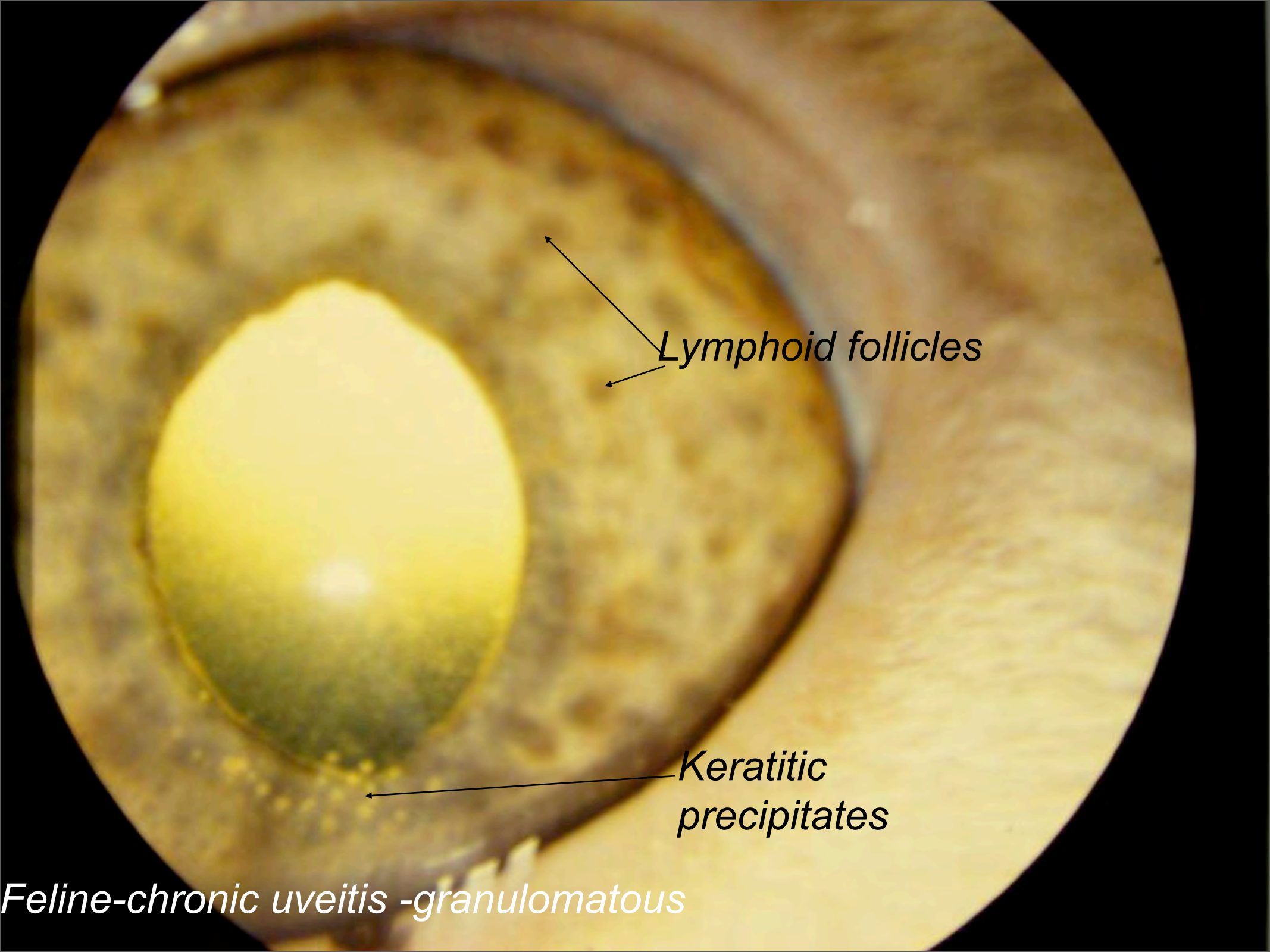


Acute anterior uveitis in the dog with aqueous flare ,muddy iris and corneal endothelial dysfunction with corneal oedema

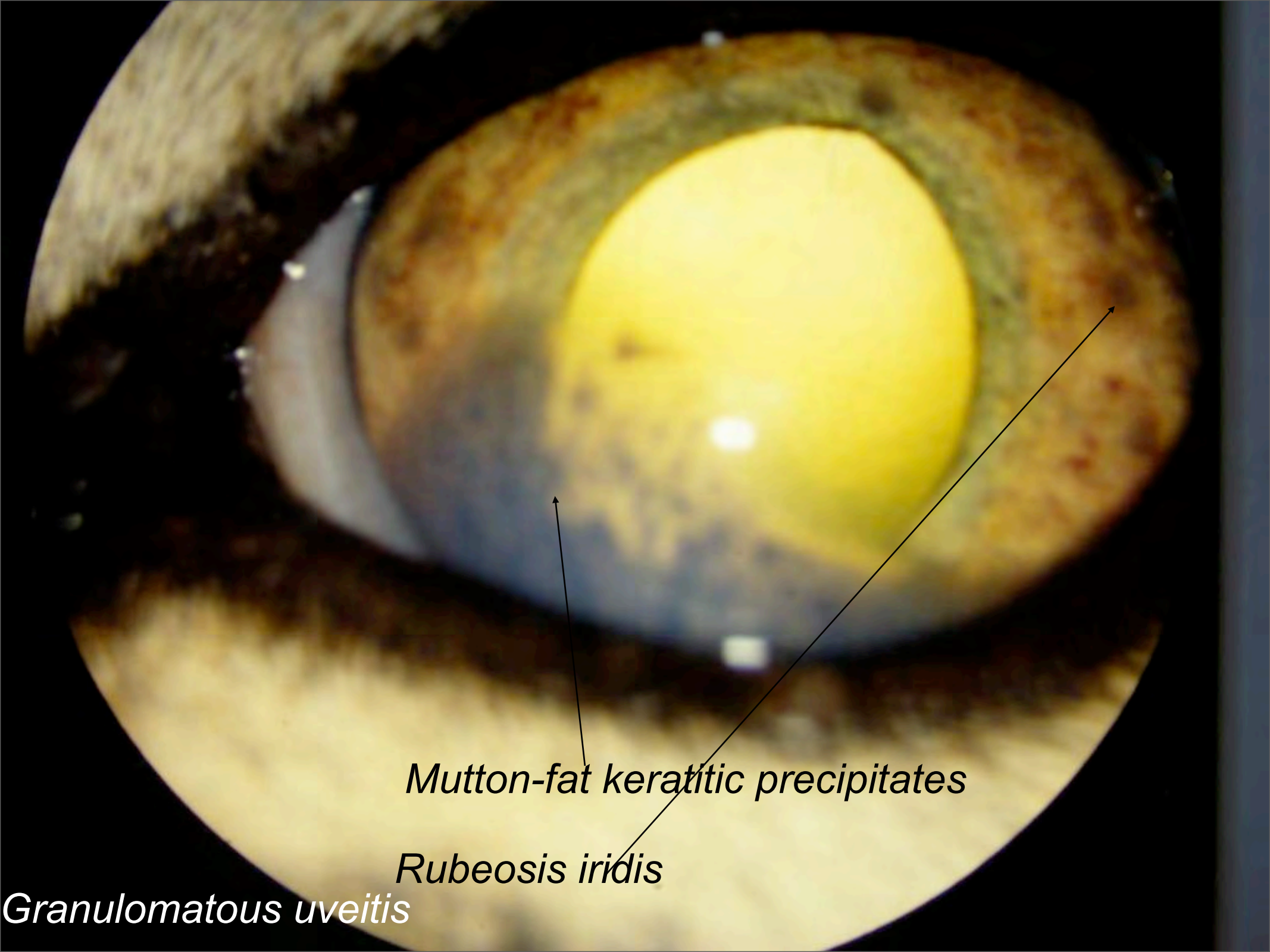


Five-year-old Pekingese – deep corneal ulcer – secondary uveitis
-- hypopyon

Lens-induced uveitis – aged dog with hypermature cataract



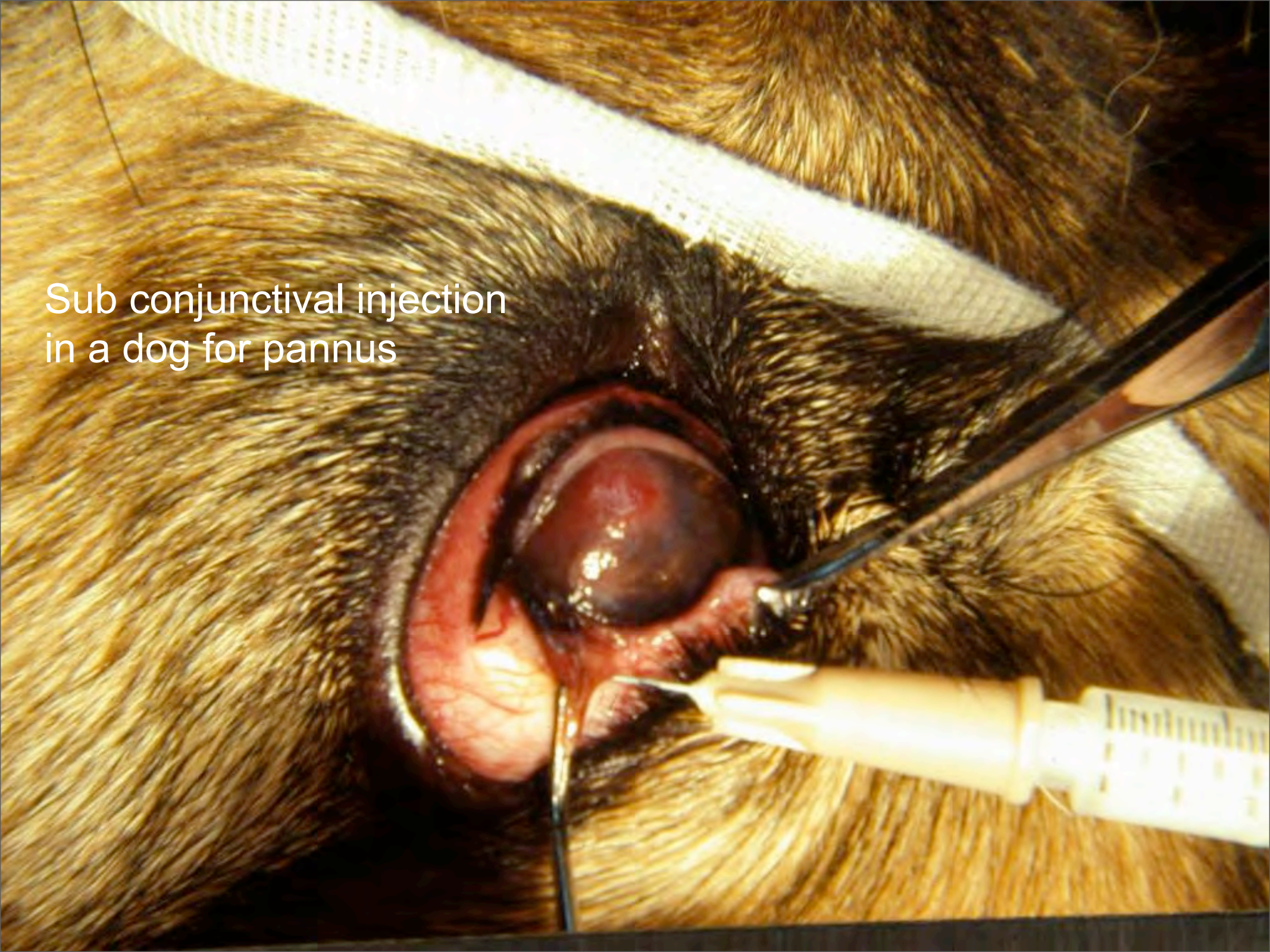
Feline-chronic uveitis -granulomatous



Granulomatous uveitis

Ophthalmic drugs – principles of treatment– subconjunctival injection

- Some drawbacks – pain with injection, granuloma formation, restraint of patient and possibility of intraocular injection!
- Dubious value if have a compliant patient
- Often used in the horse
- Allows slow release and long-term medication without owner interference
- Injection given .5-1ml subconjunctivally


Sub conjunctival injection
in a dog for pannus

Drugs commonly used for subconjunctival injection-mydriatic, antibiotic, steroid

Anti-inflammatory treatment-- steroids

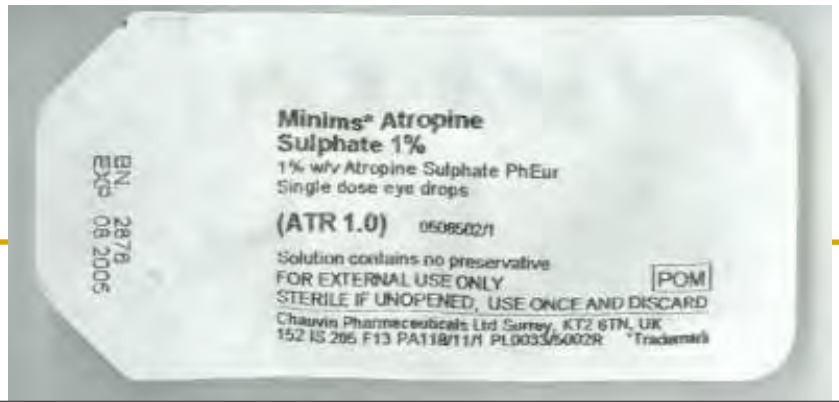
- Used widely both topically and systemically
- Varying ocular penetrability
- Useful in a variety of routes e.g. topical, subconjunctival, systemic
- Contraindicated if any corneal ulceration – may potentiate collagenase effects
- The eye has a poor tolerance to inflammation
- Inflammation equals dysfunction and loss of vision

Anti-inflammatory treatment– nonsteroidals

- Can be used topically and systemically
- Have useful antinflammatory and analgesic effects
- Cannot be used in combination with steroids
- Good application in large animals e.g. Flunixin, Ketoprofen, Phenylbutazone
- Small animals – e.g.Carprofen, Meloxicam, Previcox

Atropine-Parasympatholytic

- Eye drops-use 2-4 x daily then once daily
- useful for uveitis-a cycloplegic, mydriatic, stabilises blood aqueous barrier.
- Has a bitter taste



Topical Antinflammatory Drops-common component is cortisone

Non –steroidal antinflammatory drops and tablets

- Are more expensive than steroid based drops
- Do not use in presence of ulcers
- Have antinflamm and analgesic
- proerties

AntinflammatoryTablets-Steroids-use at immunosuppressive doses eg 2mg/kg

Corticosteroids –can be used sub-conjunctivally or systemically

24hr

6days

2-3 weeks

2-3 weeks

Have a variable length of time in eye 24hr to 2-3 weeks

Glaucoma

An increase in pressure within the eye incompatible with normal ocular function and vision retention, There are a large number of causes from genetic to trauma.

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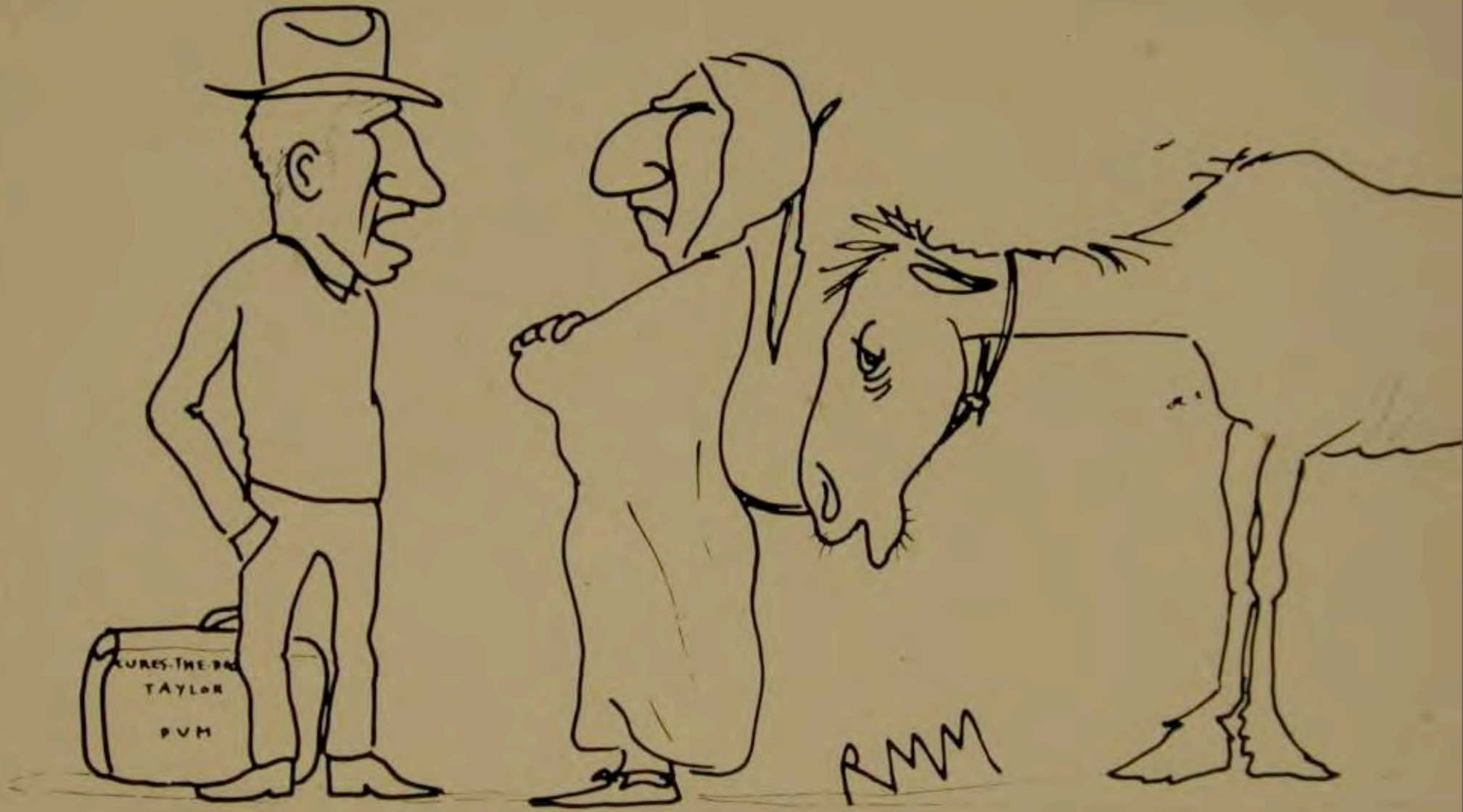
An increase in pressure within the eye incompatible with normal ocular function and vision retention, There are a large number of causes from genetic to trauma.

The present state of knowledge!!



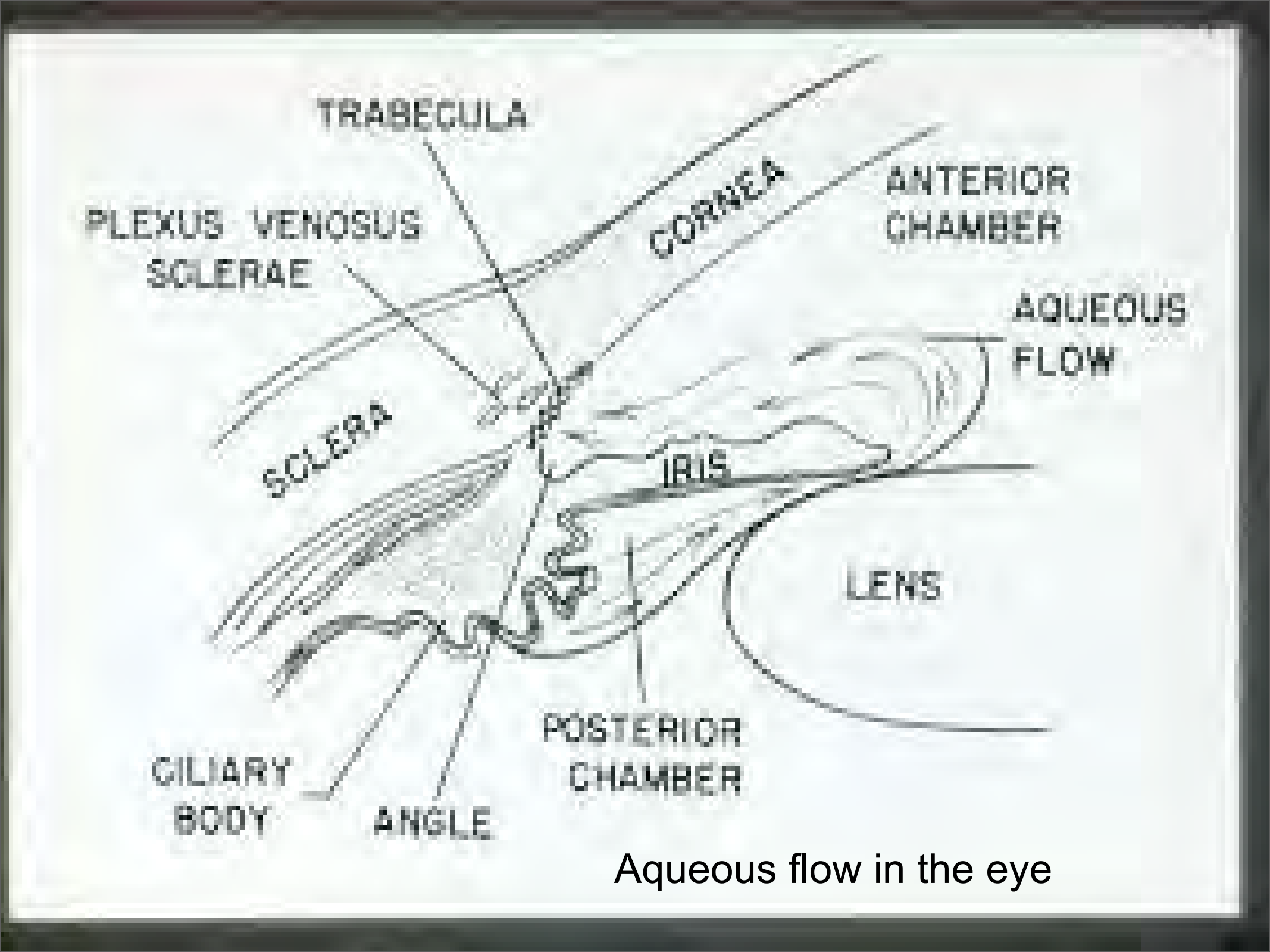
"For once you didn't call me too late. Now build a fire, see if you can find a horny toad and some buzzard feathers, and get your loudest drum."

Glaucoma

- An increase in intra-ocular pressure-normal canine15-25mm Hg
- Aqueous production > exit-blockage-rate of production relatively constant
- This is incompatible with normal eye health and vision quickly lost -permanent
- An important cause of blindness in the dog and lesser extent cat
- There is severe pain

Aqueous Production

- The aqueous is the water-like fluid in the eye
- Supplies nutrients to the lens and cornea
- Produced by the ciliary body
- Flows from the posterior to the anterior chamber
- Exits at the irido-corneal angle or via uveo-scleral route



Aqueous flow in the eye

Tonopen-for measuring intra ocular pressure

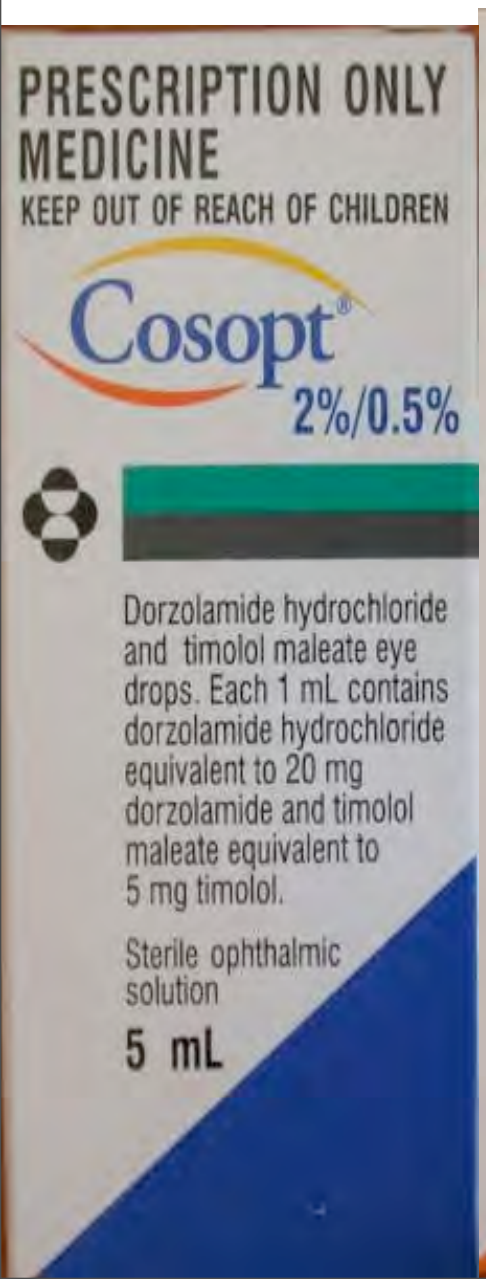
Instrument for
measuring pressure
In the eye

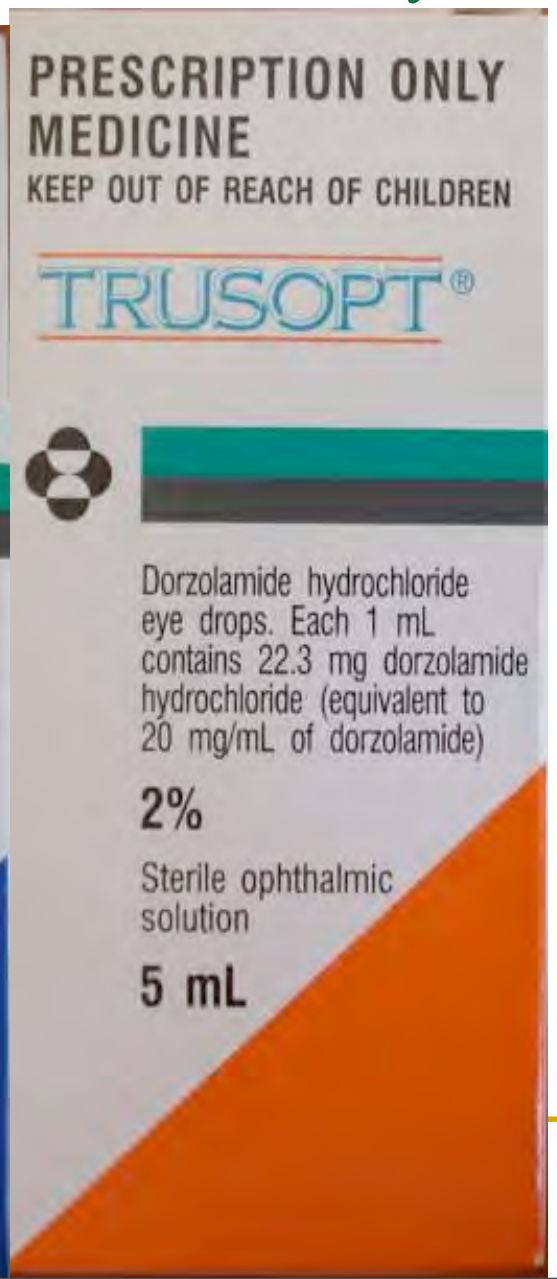
Schiotz tonometer


Episcleral congestion
Corneal edema
Acute congestive glaucoma-very painful

Acute glaucoma – episcleral congestion, corneal oedema, fixed dilated pupil

Glaucoma –Topical Treatments-miotics and carbonic anhydrase inhibitors





Glaucoma – drug treatment

- Systemic carbonic anhydrase inhibitors superseded by topical now – less side effects
- Trusopt – use three times daily – will reduce aqueous production by 40%
- Prostaglandins e.g. Xalatan – improves uveoscleral outflow ie unconventional route without affecting aqueous production
- Don’t use if uveitis present-risk of adhesions between iris and lens

Cataracts

A large number of causes for cataract formation from trauma, genetic to diabetes. Surgical removal restores very good vision
Preoperatively and during surgery, mydriatics are used to facilitate lens removal.

Cataracts

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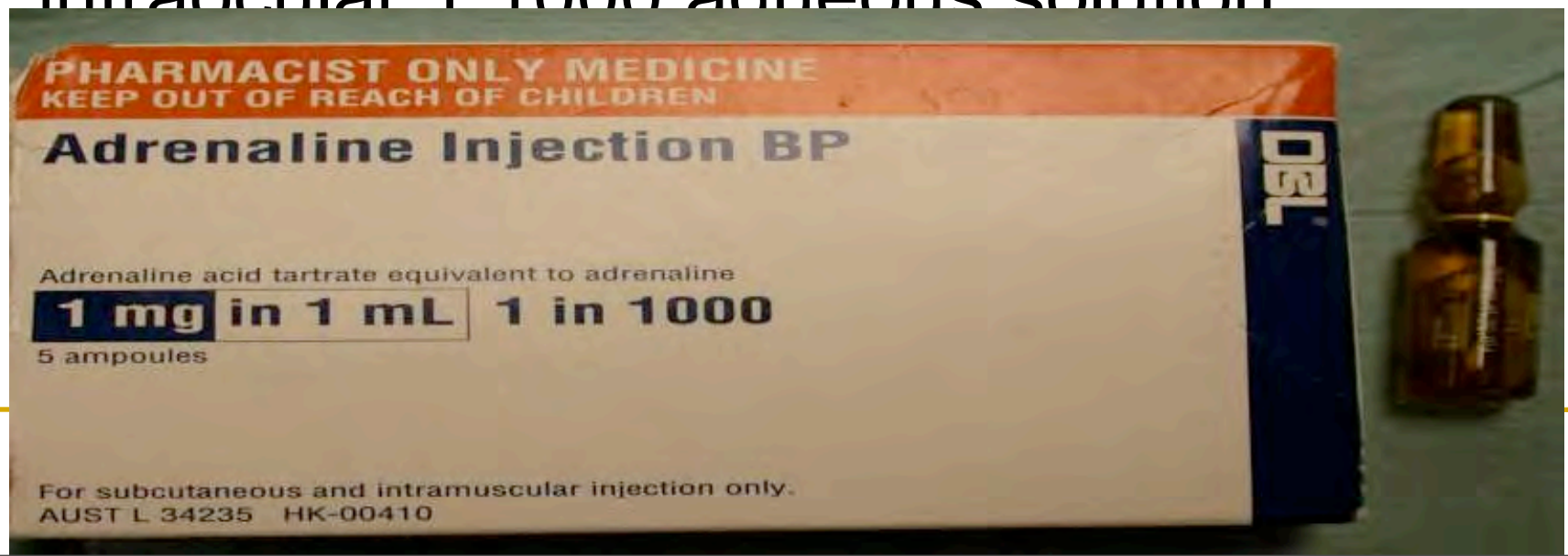
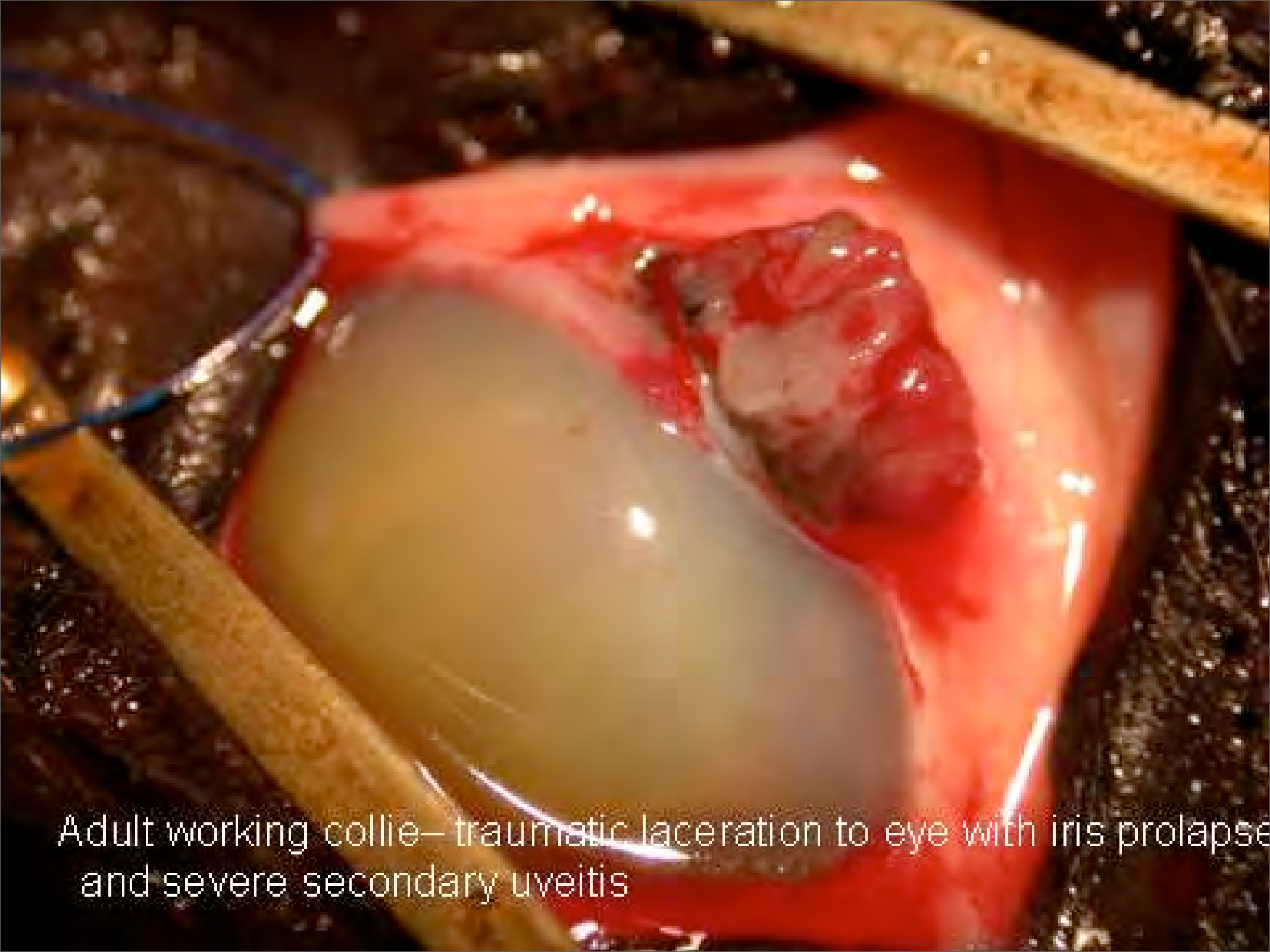
Diabetic cataracts in a
6yo Terrier
Pre-
operative
view


Post operative
view

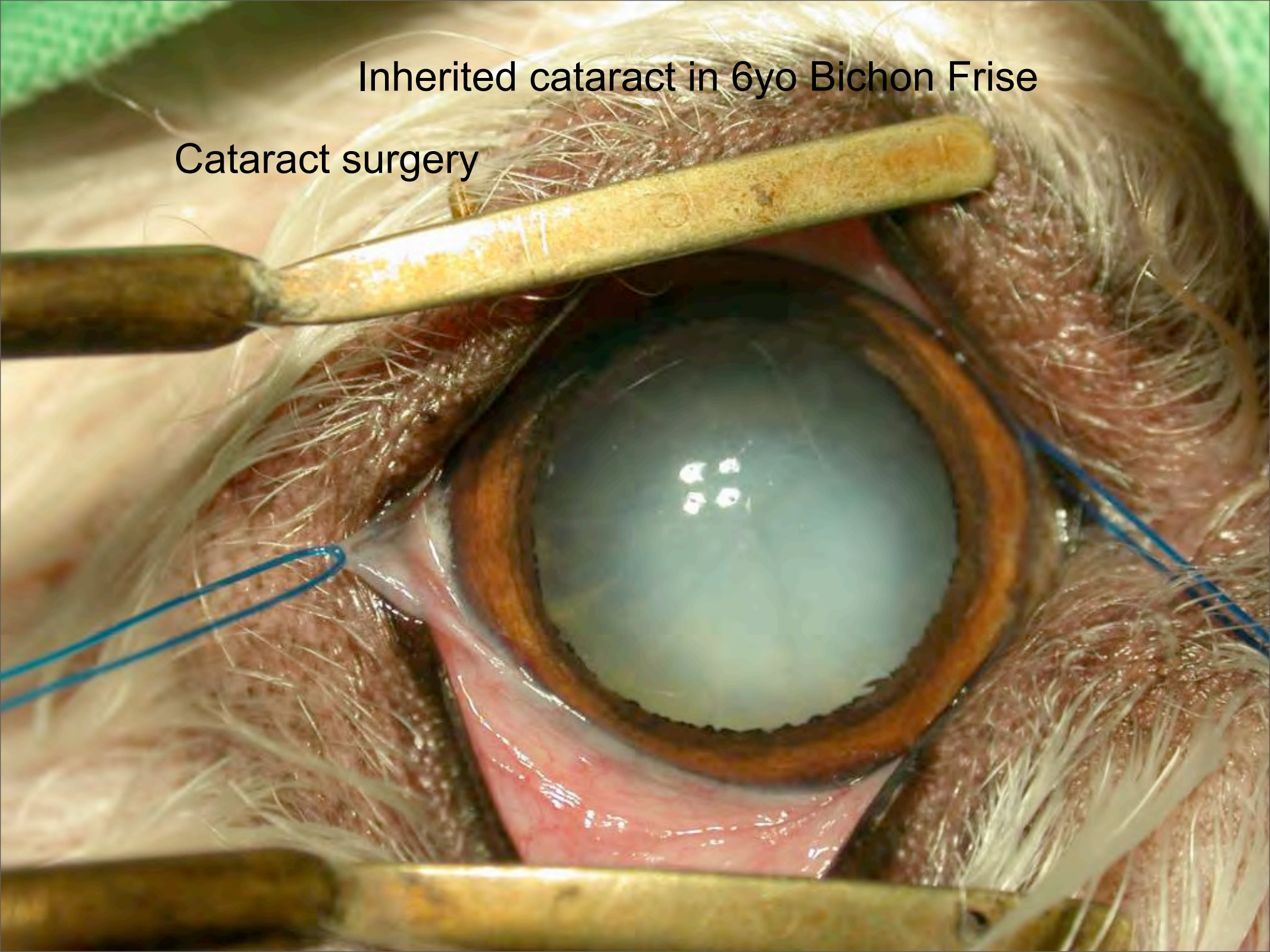
Sympathomimetic -- Adrenaline

- Useful for intraocular surgery
- Vasoconstrictor and dilates pupil-a sympathomimetic
- A mydriatic ie dilator of the pupil
- Used as 10% Neosynephrine drops and intraocular 1:1000 aqueous solution

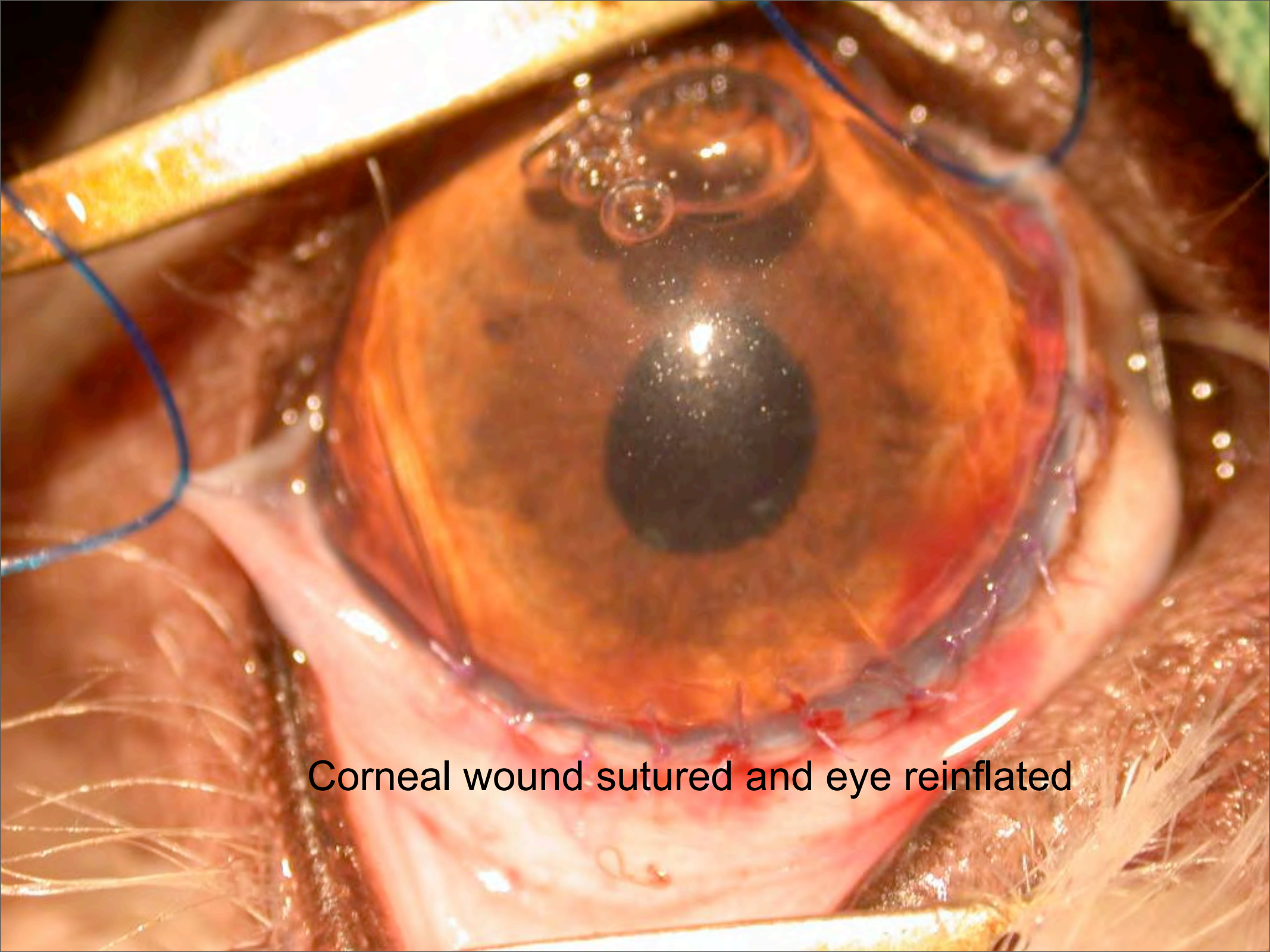



Adult working collie– traumatic laceration to eye with iris prolapse
and severe secondary uveitis


Adrenaline into eye to
dilate pupil and reduce haemorrhage
Adult working Collie of previous slide


Inherited cataract in 6yo Bichon Frise
Cataract surgery


Lens removed –note size!!


Corneal wound sutured and eye reinflated

"Whoa! Is that a needle, Doc? 'Cause Zack don't *like* needles."


The end –I hope you found this interesting!!