

## EYEVET SERVICES

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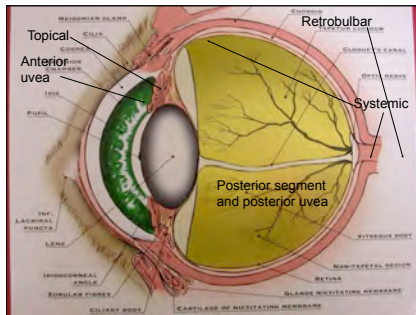
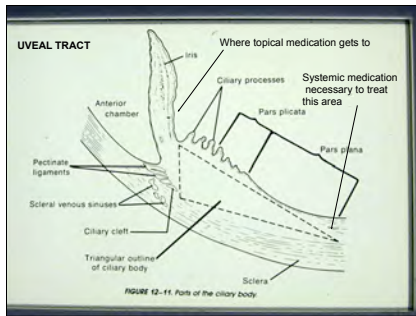
The aim of this presentation is to give you an idea of the drugs presently being used in NZ by practitioners and myself to treat ocular disease. Examples will be shown of the clinical conditions in which they can be used. I hope this will give you some realization that there are some animals out there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

### 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,



### 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?



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

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 Ophthalmic is opened needs to be refrigerated-less economic than minims

## Dry Eye

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

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 –lachimogenics 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

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### Antibiotic Eye Drops

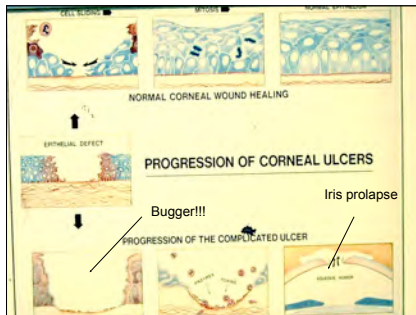
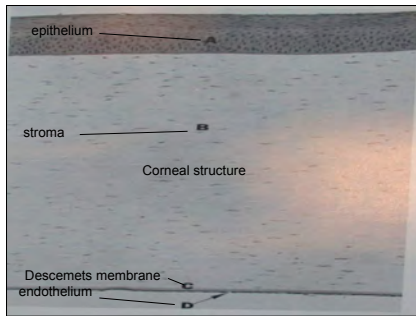
- Ciloxan-a Fluoroquinolone has a broad spectrum of activity-may need to use antibiotics 1-2 hourly if an ulcer is progressing rapidly
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### Corneal Disease

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
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## 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 Descemet's 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!

### 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

### 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!!!

### 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

### 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

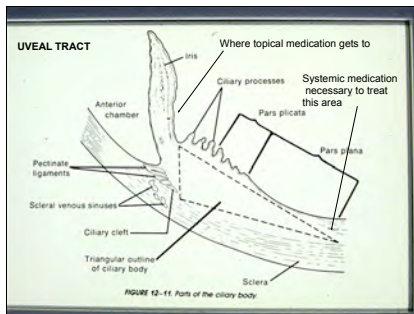


## Uveitis

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

## 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



## UVEITIS-Causes

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

## 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-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

## 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

Drugs commonly used for subconjunctival injection-mydriatic, antibiotic, steroid (short or long acting)

### 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
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### 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
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### 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
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### Topical Antinflammatory Drops-common component is cortisone

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Non –steroidal antiinflammatory drops and tablets

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

Antiinflammatory Tablets-Steroids-use at immunosuppressive doses eg 2mg/kg

Corticosteroids –can be used sub-conjunctivally or systemically

24h                      6days                      2-3 weeks                      2-3 weeks

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

## Glaucoma

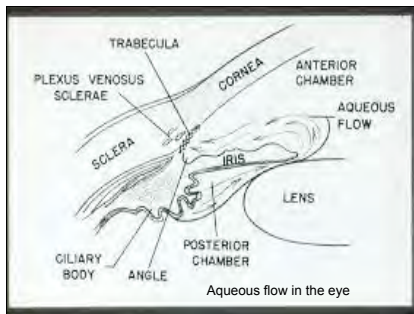
An increase in pressure within the eye incompatible with normal ocular function and vision retention, There are a large number of causes from genetic to trauma.

## Glaucoma

- An increase in intra-ocular pressure-normal canine 15-25mm 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



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.

## 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