DRY EYE

DIAGNOSIS AND TREATMENT OF KERATOCONJUNCTIVITIS SICCA ('DRY EYE')

NORMAL TEAR FILM

1- **Lipid layer**
Produced by Meibomian Glands of the upper and lower eyelid. Function: prevent evaporation of tear film

2- **Aqueous layer**
Produced by lacrimal gland (70%) and nictitans gland (30%). Function: hydration, antibacterial, nutritional & immune support for the cornea

3- **Mucin layer**
Produced by conjunctival goblet cells. Function: anchor tear film to the cornea, pathogen defence

TEAR FUNCTION

- Provide nutrition to avascular cornea
- Lubrication and hydration
- Flushing of debris
- Antimicrobial, growth and trophic factors within the tear film support healing during ocular disease/injury

Lacrimal tissue innervated by the trigeminal, facial nerve (VII, parasympathetic) and sympathetic nerves.

KERATOCONJUNCTIVITIS SICCA (KCS)

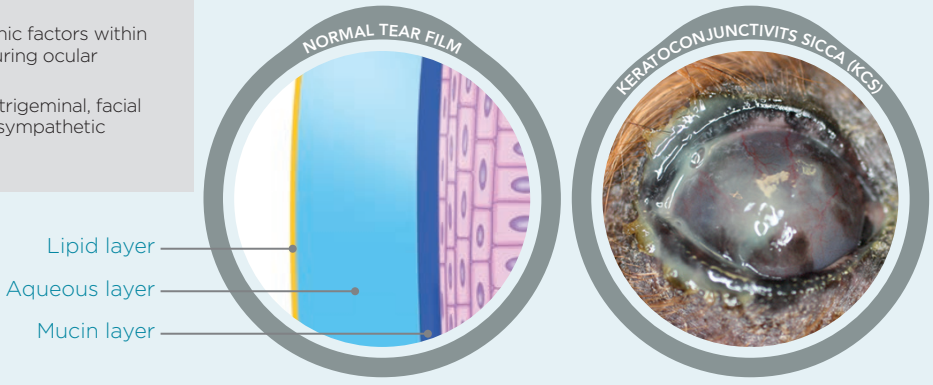
- 'Dry eye' – deficiency in the quantity or quality of tears
- Clinical signs – tacky mucopurulent or grey ocular discharge, chemosis, recurrent conjunctivitis, corneal ulceration, corneal vascularisation and/or pigmentation, poor purkinje reflections, blepharitis
- WHWT, Pug, English Cocker Spaniel, CKCS, English Springer Spaniel, English Bulldog, Lhasa Apso, Toy Poodle predisposed
- Aetiology: Immune mediated (lymphoplasmacytic) destruction of lacrimal tissue in most cases (see adjacent box for other causes)
- Diagnosis: Quantitative KCS: STT-1, Qualitative KCS: TFBUT

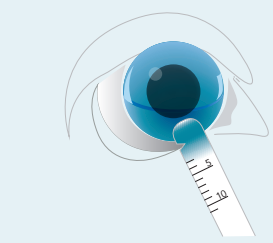
OTHER CAUSES OF KCS:

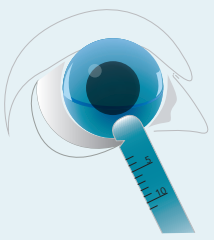
- Neurogenic – lack of parasympathetic innervation to the eye, idiopathic, middle ear disease etc
- Neurotrophic – trigeminal neuropathy +/- facial nerve paralysis
- Drug induced – systemic sulphonamides, systemic/topical atropine, topical/general anaesthetics*, opioids
- Metabolic disease (association with hypothyroidism, diabetes mellitus, hypoadrenocorticism) (via autonomic neuropathy, reduced corneal sensitivity in diabetes mellitus)
- Trauma of gland or its innervation
- Canine distemper virus
- Iatrogenic (excision of 3rd eyelid gland)
- Chronic blepharoconjunctivitis
- Irradiation of the gland
- Congenital alacrima
- Dysautonomia

* pre-anaesthetic and anaesthetic agents may reduce tear production for up to 24 hours[1]. All animals should have their eyes lubricated during anaesthesia and in the recovery period. This should be maintained in susceptible breeds eg brachycephalics for up to 48 hours[2] or longer.

(e.g. Carbomer gel such as Ocry-gel)







SCHIRMER TEAR TEST (STT-1)

Assesses the quantity of tears produced.

Place test strip in lower lateral conjunctival fornix (without touching test end of strip). Time over 1 minute.

DOGS

- Normal >15mm
- Values <15mm are diagnostic for KCS with compatible clinical signs

(NB – consider values ~15mm abnormal if pathology present that would cause pain and epiphora (e.g. corneal ulceration) - would expect STT reading to be much >15mm/minute in a patient not affected with KCS)

CATS

- Normal STT reading in cats 3-32mm/minute (mean 17mm/minute)
- However, immune mediated KCS is rare in cats. Inflammatory occlusion of tear ducts due to FHV-1 is the most common cause

BOTH DOGS AND CATS

- Susceptible breeds and at-risk animals should have STT performed regularly.
- Contraindications ▶ fragile eye (e.g. descemetocele, rupture to cornea or sclera)

TEAR FILM BREAK UP TIME (TFBUT)

Assesses the quality of the tear film.

Instill one drop of fluorescein onto the cornea and blink the eyelids to spread evenly. Holding the eyelids open, count the seconds until the uniform tear film starts to break up (as evidenced by the appearance of dark spots).

- **DOGS** normal results are around 20s
- **CATS** normal results are around 17s.

(See separate Fluodrop Card from tvm-uk.com)

MEDICAL MANAGEMENT

1. Topical ciclosporin (0.2%) ointment – twice daily. Aim is to reduce the immune mediated lacrimal tissue destruction and stimulate tear production. There is more chance of success if treatment is started early in the disease process. Treatment should increase tear production within 10 days but some cases may take up to 6 weeks for maximal response
2. Ocular lubricant - hyaluronic acid E.g. **Remend® Dry Eye Lubricant Drops** BID-TID. Aim is to provide hydration, lubrication and stabilise the tear film. Consider also a carbomer gel E.g. **Ocry-gel** before bedtime for additional hydration.
3. Topical antibiotics as required (if secondary bacterial conjunctivitis or corneal ulceration). Consider using **OphtaPRIME®** as a pre-treatment to facilitate antibiotic action and to help restore normal flora.
4. Cleaning and flushing of the ocular surface and peri-ocular debris as required E.g. **Ocryl®** initially BID and taper as clinical signs improve – aids patient comfort and ocular hygiene.

N.B. Different topical eye drops should be given at least 5-10 minutes apart, administer drops first and ointments last. Do not clean or apply any topical medication for 30-40 minutes after the application of an ointment.

STT READING PERSISTENTLY <5MM/MIN AT 6- 8 WEEKS

Severe KCS, no tear function left; if:

- Persistent reading of <5mm despite treatment
- Clinical signs persist and have not improved
- Rule out other causes of KCS, then:

1. Change to 1.5-2% topical ciclosporin or tacrolimus
2. Continue topical lubrication as before (consider increasing frequency of application of ocular lubricants)
3. Topical antibiosis as required
4. Cleaning of periocular debris as required
5. Consider seeking advice from an ophthalmologist

RECOVERY OF TEAR PRODUCTION AT 6- 8 WKS

1. Continue topical ciclosporin – may be reduced to SID dosing depending on clinicians judgement
2. Use of ocular lubricants/antibiosis/ocular cleaners as necessary
3. Monitor STT-1 and TFBUT regularly

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- Cross-linked HA that lasts 2-5x longer than traditional HA[3,4]
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CFR-011-A3

Reference: 1. Herring IP, Pickett JP, Champagne ES et al. Evaluation of aqueous tear production in dogs following general anesthesia. Journal of the American Animal Hospital Association 2000; 36: 427–430
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