# KERATOCONJUNCTIVITIS SICCA

### DIAGNOSIS AND TREATMENT OF QUANTITATIVE AND QUALITATIVE KERATOCONJUNCTIVITIS SICCA (DRY EYE)

### **NORMAL TEAR FILM**

#### Lipid layer

- Produced by meibomian (tarsal) glands of the upper and lower eyelid. FUNCTION: Prevent evaporation of tear film
- **Aqueous layer**
- Produced by lacrimal gland (70%) and nictitans gland (30%).

FUNCTION: Hydration, antibacterial, nutritional & immune support for the cornea

#### Mucin laver

Produced by conjunctival goblet cells. FUNCTION: Anchor tear film to the cornea, pathogen defense

#### 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

#### **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 vascularization and/or pigmentation, poor Purkinje reflections, blepharitis
- Predisposed breeds- West Highland White Terrier, Pug, English Cocker Spaniel, English Springer Spaniel, English Bulldog, Lhasa Apso, Toy Poodle
- Etiology: Immune mediated (lymphoplasmacytic) destruction of lacrimal tissue in most case (see adjacent box for other causes)
- Diagnoses:
- Ouantitative KCS: Schirmer Tear Test (STT-1) Qualitative KCS: Tear film break-up time (TFBUT)



#### **CAUSES OF KCS\***

- Immune mediated (lymphoplasmacytic) destruction of lacrimal tissue
- Neurogenic lack of parasympathetic innervation to the eye, idiopathic, middle ear disease, etc.
- Neurotrophic trigeminal neuropathy +/- facial nerve paralysis
- Drug-induced systemic sulfonamides, systemic/topical atropine, topical/general anesthetics\*\*, opioids
- Metabolic disease associated with hypothyroidism, hyperadrenocorticism, and diabetes mellitus
- (reduced corneal sensitivity in diabetes mellitus) Trauma of gland or its innervation
- Canine distemper virus
- latrogenic (excision of 3rd eyelid gland)
- Chronic blepharoconjunctivitis

**TEAR FILM BREAK UP TIME (TFBUT)** 

Apply 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

- Irradiation of the gland
- Concenital alacrima
- Dysautonomia

Dysatch of meant to be an exhaustive list of causes
 "Pre-anesthetic and anesthetic agents may reduce tear production for up to 24 hours'. All animals should have their eyes lubricated during anesthesia and in the recovery period. This should be maintained in susceptible breeds (e.g., brachycephalics with lagophthalmos) for up to 48 hours' (e.g. Eye Lube Pro or similar q30m during anesthesia and then q6-12h PRN).



### Assesses the <u>quantity</u> of tears produced.

Place test strip in lower lateral conjunctival fornix without touching the test end of the strip. Read how many millimeters the tears traveled on the strip in one minute.

SCHIRMER TEAR TEST (STT-1)

DOGS

 Normal: 15mm Values 2 J5mm are diagnostic for KCS with compatible clinical signs.
 Note - Consider values ~15mm abnormal if pathology is present that would

cause pain and epiphora (ex: corneal ulceration), as a STT much >15mm/min would be expected if the patient is not affected with KCS. CATS

Lipid layer Aqueous layer, Mucin layer

Normal: 3-32 mm/minute (mean 17 mm/minute)
Immune mediated KCS is rare in cats. Inflammatory occlusion of tear ducts due to FHV-1 is the most common cause of dry eye in cats<sup>3</sup>

#### BOTH DOGS AND CATS

- Susceptible breeds and animals treated with sulfonamides should have STT performed regularly. Measuring STT is contraindicated when the eve is fragile such as in the
- case of a descemetocele, ruptured cornea, or ruptured sclera.

1. Topical lacrostimulant 2. Ocular lubricants - Apply a high quality lubricant such as

Assesses the <u>quality</u> of the tear film.

evidenced by the appearance of dark spots).

• DOGS normal results are around 20s

• CATS normal results are around 17s ation at do

Ocunovis™ Procare 2-3 times daily. 3.Treat underlying disease impacting conjunctival goblet cells

**MEDICAL TREATMENT** 

or meibomian glands that may impact the mucin or lipid lavers.

STT READING PERSISTENTLY **OMM/MIN AT 4-6 WEEKS** 

Severe KCS

If STT reveals a persistent reading of

improved despite initial treatment.

Consider starting a higher concentration of topical lacrostimulants (such as 1-2%)
 Continue topical crosslinked HA lubrication as

before (consider increasing frequency of application of ocular lubricants)

3.Continue judicious cleaning of periocular

4.Consider seeking advice from an ophthalmologist Be sure to rule out other non-immune mediated causes of KCS see "Causes of KCS")

0mm and clinical signs have not

initiate the following\*:

# **MEDICAL TREATMENT\***

- 1. Topical lacrostimulants (0.2%) Remove debris with suitable nonirritating solutions. Apply a ¼ inch strip of ointment to the affected eye(s) every 12 hours. Aim is to reverse the immune-mediated lacrimal tissue destruction. Therefore, there is more chance of success if treatment is started early in the disease process. Treatment should increase tear production within 10 days
- should be started while tear production is recovering. Apply 1-2 drops 2-3 times daily.
- 3. Topical antibiotics are required, If secondary bacterial conjunctivitis or corneal ulceration is present, topical antibiotic therapy should be started. Swabbing the eye for cytology and/or bacterial C&S may be indicated as the bacterial flora in the conjunctival sac is often altered in dogs with KCS.

\*Topical eye medications should be given at least 5 minutes apart; administer drops first and ointments last. Do not given any opthalmic medication for 30-40 minutes after the application of an ointment. \*\*If no improvement is seen after 6 weeks of treatment with lacrostimulants; a higher concentration of lacrostimulant/immunomodulatory should be considered. On yeav disease may involve both a lack of tear quantity and quality, so both mucin and aqueous layers need support. Crosslinked hyaluronic acid lubricants do this by providing hydration and promoting tear film stability/adhesion due to the mucinomimetic properties of HA, making them a useful adjunct therapy for all types of dry even disease. drv eve dis



**RECOVERY OF TEAR** 

- 1. Continue lacrostimulants with regular monitoring of STT every 6 months
- 2. Use of ocular lubricants, such as Ocunovis™ Procare and
- ocular cleaners as necessarv 3. Monitor STT-1 and TFBUT regularly

DÔMES PHARMA

### Learn why all ocular lubricants are not the same on the next page.

#### domespharma.us/learnmore

debris

References 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 2. BSAVA Manual of Canine and Feline Ophthalmology 3rd Edition. D Gould GJ McLellan 2014 chapter 10 p 171

but some cases may take up to 6 weeks for maximal response\*. 2. Ocular lubricants- A high quality lubricant such as Ocunovis™ Procare



An advanced and patented technology with highly concentrated crosslinked hyaluronic acid for long-lasting lubrication<sup>1</sup>

## WHAT IS BIOHANCE™?

BioHAnce<sup>™</sup> is crosslinked hyaluronic acid (HA) that has been shown to stabilize the tear film<sup>2</sup>, provide long lasting lubrication<sup>1</sup>, and accelerate healing (vs linear HA)<sup>3</sup>. Crosslinked HA can act as a shield for weakened ocular surfaces. BioHAnce<sup>™</sup> also provides superior tear film replacement and comfort compared to linear HA<sup>4</sup>.

## WHY ARE AMINO ACIDS IMPORTANT?

The tear film provides nutrition to the eye. The amino acids in Ocunovis<sup>™</sup> Procare help to support the cornea when the tear film quality or quantity is impacted.





"I routinely prescribe my canine and feline patients with topical cross-linked hyaluronic acid (Ocunovis / Oculenis) to lubricate and soothe the ocular surface, reduce tear film instability from dry eye disease, corneal ulceration, viral/bacterial infections, and more. The cross-linked technology behind these lubricants is remarkable, benefiting our patients care by improving precorneal contact time and the overall health of the ocular surface."

– Dr Lionel Sebbag, DVM, PHD, DACVO



"I choose Ocunovis Procare for quantitative and qualitative dry eye disease in dogs and cats. It is proven to have longer corneal contact time than linear hyaluronic acid products and can be given less frequently, which improves client compliance." – **Dr. Caroline Betbeze, DVM, MS, DACVO** 



As an international reference in ophthalmology, Dômes Pharma is committed to providing veterinarians, nurses, and pet owners with:

- An extensive range of innovative ophthalmic products, from daily care and prevention to diagnostics and therapeutics
  Our teams' scientific and technical expertise
- Our teams scientific and technical expertise
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- A broad range of services, including disease management guidelines and innovative educational experiences.

J. Grego, Andressa Lopes, et al. "Comparative Fluorophotometric Evaluation of the Ocular Surface Retention Time of Cross-Linked and Linear Hyaluronic Acid Ocular Eye Drops on Healthy Dogs - Veterinary Research Communications." Springer Link, Springer , 30 Sept. 2024 2. Plummer, C.E., Martins, B.C., Bolch, C., Martinez, P. S., Carbia, B. E. (2022, October). Evaluation of Topically Applied Cross-linked Hyaluronic Acid on the Ocular Surface of Clinically Healthy Dogs [Poster presentation]. ACVO Conference, Palm Springs, CA 3. Williams DL, Wirostko BM. Topical Cross-Linked HA-Based Hydrogel Accelerates Closure of Corneal Epithelial Defects and Repair of Stromal Ulceration in Companion Animals. Invest Ophthalmol Vis Sci. 2017;58:4616–4622. DOI:10.1167/iovs.1 20848.