KERATOCONJUNCTIVITIS SICCA

DIAGNOSE AND TREAT DRY EYE

DIAGNOSIS AND TREATMENT OF QUANTITATIVE KERATOCONJUNCTIVITIS SICCA (DRY EYE)

NORMAL TEAR FILM

1- **Lipid layer**
Produced by meibomian (tarsal) 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 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)

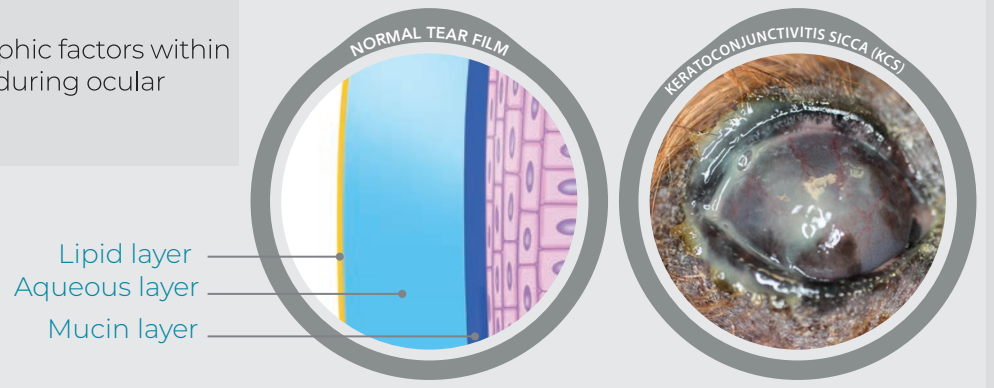
- 'Dry eye' – deficiency of the aqueous layer of the tear film
- Clinical signs – tacky mucopurulent or grey ocular discharge, chemosis, recurrent conjunctivitis, corneal ulceration, corneal vascularization and/or pigmentation, poor purkinje reflections, blepharitis
- Predisposed breeds - West Highland white terrier, Pug, English cocker spaniel, English springer spaniel, English bulldog, Lhasa apso, Toy poodle

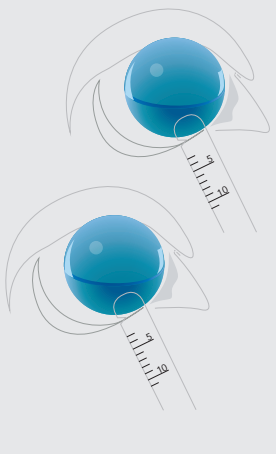
- Diagnosis based on STT-1 reading

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
- Iatrogenic (excision of 3rd eyelid gland)
- Chronic blepharoconjunctivitis
- Irradiation of the gland
- Congenital alacrima
- Dysautonomia

* pre-anesthetic and anesthetic agents may reduce tear production for up to 24 hours[1]. 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[2] (e.g. Carbomer gel PRN during anesthesia and then BID).





SCHIRMER TEAR TEST (STT-1)

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

DOGS

- Normal ≥15mm
- Values ≤15mm are diagnostic for KCS with compatible clinical signs

(Note – consider values ~15mm abnormal if pathology is present that would cause pain and epiphora (eg. corneal ulceration), as a STT much >15 mm/min would be expected if the patient is not affected with KCS

CATS

- Normal STT reading in cats is 9-34mm/minute; however, qualitative tear film disease is more common in this species. Inflammatory occlusion of tear ducts due to FHV-1 is the most common cause of dry eye in cats[3]

BOTH CATS AND DOGS

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

MEDICAL TREATMENT*

1. Topical lacrostimulants (0.2%) – one drop in affected eye(s) BID. 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 but some cases may take up to 6 weeks for maximal response**
2. Ocular lubricants – need to be initiated while tear function is recovering. Apply hyaluronic acid drop 2-3 times daily during the day
3. Topical antibiotics as required (if secondary bacterial conjunctivitis or corneal ulceration). Swabbing eye for bacterial C&S may be indicated as the bacterial flora in the conjunctival sac is often altered in dogs with KCS

*Different topical eye drops should be given at least 5-10 minutes apart; administer drops first and ointments last. Do not given any topical 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 percentage of immunomodulatory medication should be considered. Dry eye disease has both quantitative and qualitative deficiencies; therefore, mucin and aqueous parts of the tear film need support. Thus, crosslinked HA lubrication products should be used as an adjunctive therapy to provide lubrication and help to adhere the tear film to the cornea in all forms of dry eye disease.

STT READING PERSISTENTLY 0MM/MIN AT 4- 6 WEEKS

Severe KCS

If STT reveals a persistent reading of 0mm and clinical signs have not improved despite initial treatment, initiate the following*:

- Start 1-2% topical lacrostimulants
- Continue topical crosslinked HA lubrication
- Use topical antibiotics if required
- Continue judicious cleaning of periocular debris

*Be sure to rule out other non-immune-mediated causes of KCS (see "Causes of KCS")

RECOVERY OF TEAR PRODUCTION AT 6-8 WEEKS

1. Continue lacrostimulants with regular monitoring of STT every 6 months
2. Use of ocular lubricants/ antibiotics as necessary

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

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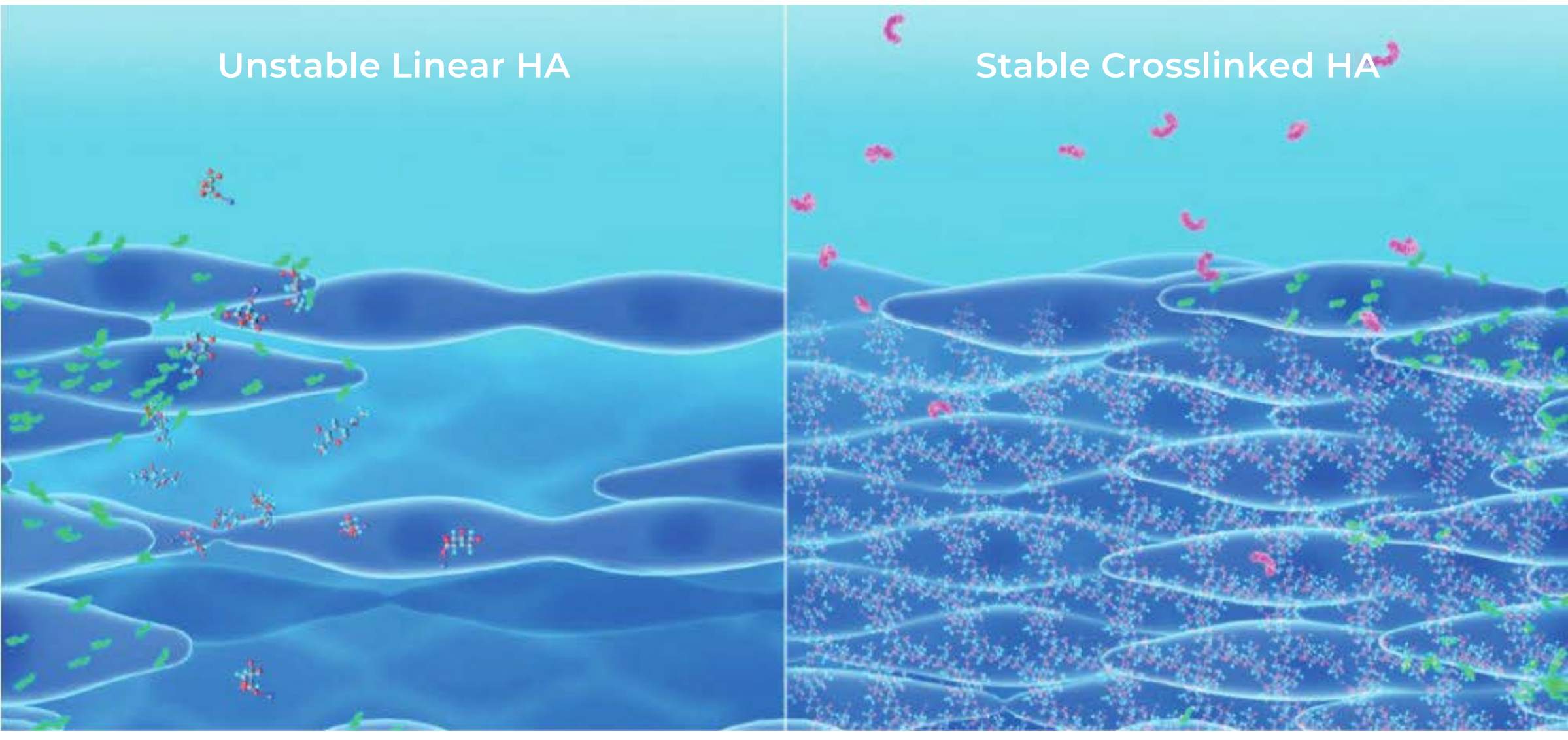
References
1. Herring IP, Pickett JP, Champagne ES et al. Evaluation of aqueous tear production in dogs following general anesthesia. Journal of the American Animal Hospital Association 2000; 36: 427–430
2. BSAVA Manual of Canine and Feline Ophthalmology 3rd Edition. D Gould GJ McLellan 2014 chapter 10 p 171
3. Sebbag et al. 2015 JAVMA 246 (4), 426-435.

CFR-011-A3

An advanced and patented bioengineering technology with highly concentrated crosslinked HA for a long-lasting ocular persistence[1].

WHAT IS BIOHANCE™ AND WHY IS IT IMPORTANT TO OCULAR HYDRATION?

BioHAnce™ is a new bio-engineered, crosslinked hyaluronic acid (HA) that enables linear HA to be arranged into a scaffold. The crosslinking allows HA to be less easily degraded which prolongs its action and stability on the ocular surface.



Crosslinked HA can act as a shield for a weakened ocular surface. Crosslinked HA or BioHAnce™ also provides superior tear film replacement and comfort.

WHY ARE AMINO ACIDS IMPORTANT IN THE OCUNOVIS PROCARE FORMULATION?

The tear film provides nutrition to the eye. The amino acids in Ocunovis™ Procare help to supplement tears when the tear film quality or quantity is impacted.

Multiple studies[1-3] have now supported increased residence time of BioHAnce™. For Ocunovis™ Procare, the residence time has been shown to last 2-5x longer than traditional artificial tears! This is why BioHAnce™ and crosslinked HA is so important to use with your patients!

EYE EXPERTS

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
- A broad range of services, including disease management guidelines and innovative educational experiences.

1. Montiani-Ferreira F, Atzet SK, Fankhauser AD, Behan EK, Haeussler DJ. Fluorometric Evaluation of Crosslinked Vs Linear Hyaluronic Acid Eye Drops.
2. Plummer, CE et al (2022) Evaluation of topically applied cross-linked hyaluronic acid (Remend®) on the ocular surface of clinically healthy dogs. ACVO 2022 Conference poster session.
3. Williams, DL; Mann, BK (2014) Efficacy of a crosslinked hyaluronic acid-based hydrogel as a tear film supplement: a masked controlled study. PLoS ONE 9-6:e99766.