

DRY EYE

What is dry eye?

Dry eye is a condition when the eye does not produce enough tears. Another name for dry eye is keratoconjunctivitis sicca – see below.

Let's think about tears and the surface of the eye.

What is the surface of the eye like?

The surface of the eye is wet and shiny because of tears.

The tears are important for three reasons:

COMFORT

Tears coat and wet the cornea, the transparent window at the front of the eye, and help the eyelids to move across the eye during blinking. If there are not enough tears, the eye will feel gritty and uncomfortable.

PROTECTION AND CLEANING.

Tears protect the surface of the eye and remove dust, debris and bacteria during blinking.

VISION

Tears help vision by providing a smooth, transparent layer on the surface of the cornea. If the tears are abnormal, vision may be blurred.

What are the tears made of?

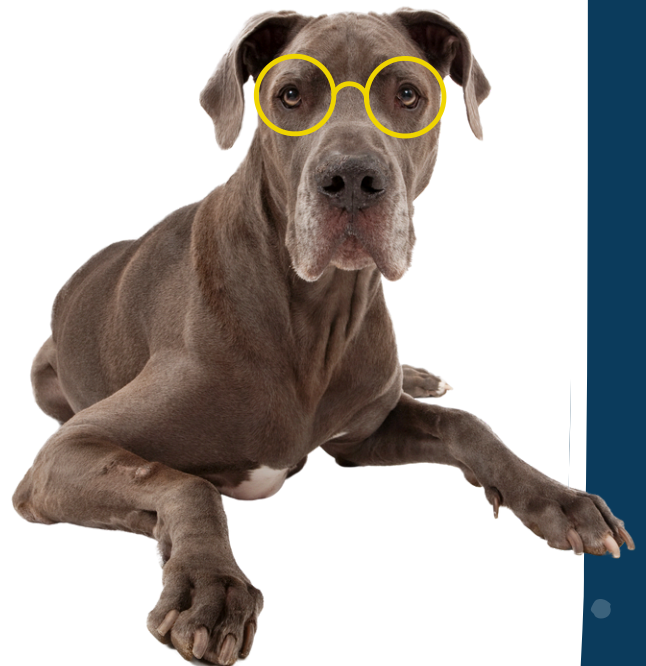
The tears consist of three layers – a watery layer sandwiched between inner and outer layers.

The **watery layer** (the aqueous layer) is the thickest and most important layer and makes up the bulk of the tears.

The **inner layer** is sticky (the mucin layer) and helps to keep the tears on the surface of the eye.

The **outer layer** is oily (the lipid layer) and prevents the tears from evaporating too quickly.

The inner and outer layers come from the conjunctiva (the 'pink' part of the eye and inside the eyelids) and the edges of the eyelids, respectively.



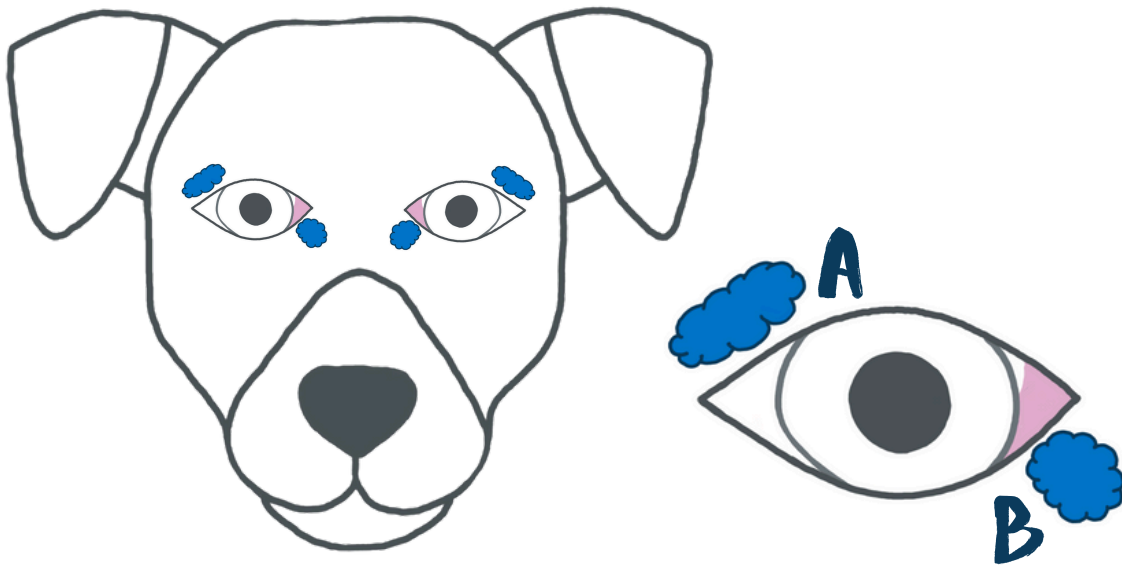
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Where do the tears come from?

The bulk of the tears, the watery or aqueous part, comes from two tear glands.

The **lacrimal gland (A)** sits beneath the upper eyelid and the **third eyelid gland (B)** sits at the bottom of the third eyelid (dogs and cats have an extra 'third eyelid' to help protect the eye).

These two glands are very important because they produce the important watery layer.



What does keratoconjunctivitis sicca mean?

Kerato - means cornea, the clear window at the front of the eye

Conjunctivitis - means that the pink part of the eye is inflamed (pink, irritated)

Sicca - means dry, like desiccated coconut!

So, **keratoconjunctivitis sicca** describes dryness of the surface of the eye.

Which patients are predisposed to dry eye?

Any patient can develop dry eye but the following breeds are predisposed: Cavalier King Charles Spaniel, Bulldog, Lhasa Apso, ShihTzu, West Highland White Terrier and Pugs.

What causes dry eye?

The most common and important cause of dry eye is when the immune system attacks the tear glands, making them work less effectively and produce less tears. This is called 'immune-mediated dry eye'. We do not know why the immune system starts to do this. This attack goes on all the time, 24-7-365. One part of treatment for dry eye is a drug that controls this 'attack' by working on the immune system. It is important to start this drug early, when there is still some healthy tear glands left to respond. If treatment is started late, the treatment may not work.



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There are several other causes of dry eye - two common ones are described below.

CONGENITAL DRY EYE

This is when one or more of the tear glands is missing at birth. It usually affects one eye only, and is most common in small breeds, e.g. Yorkshire terriers. Unfortunately, treatment is not usually successful in these patients. Your ophthalmologist will discuss this with you in more detail.

NEUROGENIC DRY EYE

This is when the nerve that controls the tear glands to the eye stops working. The same nerve also keeps the nose wet. So, the typical presentation is a sudden onset of a severe dry eye and a dry nose, all on one side (this is not the same as the dry crusty appearance of the nose that is common in breeds such as Boxers). It typically affects middle-aged dogs and cross-breeds but any breed can be affected. Causes include idiopathic disease (no cause found, the most common), hormone disease (e.g. diabetes mellitus, hypothyroid disease), ear disease (with/without recognised signs of ear disease) and head trauma. Some patients need advanced imaging (CT or MRI scan), and long courses of oral medications. The prognosis for recovery is fair – approximately 50% of dogs will improve within 3-4 months - it is important to start treatment early.

Your ophthalmologist will discuss the options with you.

What are the signs of dry eye?

The signs vary, depending on how mild or severe the dry eye is.

The main signs are discomfort, discharge, conjunctivitis, corneal ulcers and reduced vision.

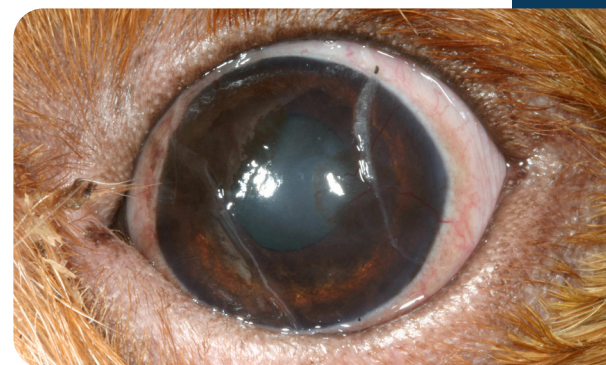
Early or mild dry eye appears as mild discomfort or irritation, which is shown by rubbing, blinking more, and closing the eye(s) more than normal (which looks like the eye is squinting).

A dry eye has a thick, sticky, creamy discharge that tends to sticks to the surface of the eye and along the eyelids. The surface of the eye looks dull, not shiny and wet as normal. The pink of the eye (the conjunctiva) looks red and swollen.

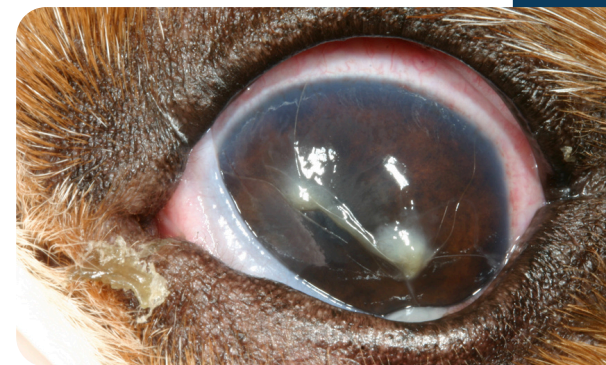
In severe or chronic dry eye, the cornea starts to get scarred because of a brown-black layer of pigment that forms on the surface of the eye. This is like painting the window at the front of the eye black!

A dry eye is more susceptible to infections and corneal ulcers. The ulcers can be serious and sometimes need urgent surgery.

Almost any eye medication will help dry eye in the short term because all drops and gels lubricate the eye. If your pet improves on treatment and then the signs come back – it may be dry eye!



Mild dry eye



Moderate dry eye



Severe dry eye



DRY EYE

Does dry eye affect one or both eyes?

Immune-mediated dry eye, the most common type, affects both eyes. It may be more severe in one eye.

Congenital dry eye usually only affects one eye.

Neurogenic dry eye usually only affects one eye.

How is dry eye diagnosed?

A Schirmer tear test (STT) measures the water part of the tears. This involves placing a small paper strip into the lower eyelid, to measure the tears over one minute.



The strip measures the wetting in mm/minute. Most dogs tolerate this very well and if necessary we can reduce the time of the test.

It is an important test to make the diagnosis and to monitor if the response to treatment.

- Normal tear production is 15-25mm/minute
- Dry eye is diagnosed when the tear production is < 10mm/minute
- Repeat testing may be needed if the tear production is 10-15mm/minute

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How is dry eye treated?

Dry eye is treated medically. Surgery is only considered in a very small number of patients who have not responded to everything else (see below).

Dry eye treatment consists of different steps. Please don't be put off by the list of drugs! In general, the level of treatment is high/higher at the beginning, until the signs improve, and then the treatment is reduced to maintenance treatment for life.

A) TREATMENT TO CONTROL THE IMMUNE SYSTEM

The most important part of the treatment plan is to use a drug that slows down the immune system attack on the tear glands. These treatments should be started early and will be continued for life in most cases. These drugs are NOT lubricants!

There are currently two options:

Cyclosporine (Optimmune) This is licensed for use in dogs, comes in a small tube, and is applied twice daily.

Tacrolimus This is not licensed. It comes as eye drops and also as a skin cream (Protopic) that can be used in the eye. At The Ralph, we make up eye drops in-house at different strengths, ranging from 0.02 to 1% eye drops. Most dogs are started on 0.02-0.03% eye drops twice daily. This is usually applied twice daily.



B) TREATMENT TO LUBRICATE THE EYES

There are literally hundreds of different eye lubricants on the market. Some are for animals, most are for people. The lubricants that are for people can be used for animals as well. Lubricants are used to replace the tears – this may be a temporary treatment until the cyclosporine or tacrolimus has started to work, or may be for life.

Lubricants are available as drops, gels or creams (cream is an ointment). There are pros and cons for each. Drops tend to be easier to apply but may not last so long in the eye. Creams /ointments may be harder to apply and can make the eye area greasy, but last much longer.

At The Ralph, we tend to use the following lubricants but it does change:

- Drops: HyloForte, Hycosan Intense, Hycosan Dual, Clinitas Soothe, Hypromellose 0.3%
- Gels: Viscotears
- Ointment: Hylonight, Xailin, Hycosan Night

We may follow this type of plan:

- First thing in the morning – an eye drop to help flush away the discharge that has built up overnight
- During the day – regular eye drops or gels
- Last thing at night - an ointment to last longer overnight

Your ophthalmologist will advise what regimen best suits your dog.

We can also provide a separate information leaflet on Eye Medications that explains how to apply treatment, with photos and tips.



DRY EYE

Scan the QR code or click the link to download our monthly medication chart.



<https://bit.ly/3UNwCA2>

Can dry eye be cured?

No, most pets will need lifelong treatment and monitoring. This can be done at The Ralph, at your own vet clinic, or a combination between the two. A vet can only continue to prescribe treatment if your pet is 'under our care', i.e. your pet will need to be checked at regular intervals. The frequency of the intervals is advised by the vet.

Can dry eye be treated with an operation?

There are two surgical options for dry eye but they are only considered in a very small number of patients.

A **parotid duct transposition (PDT)** is an operation that moves the salivary duct (tube) from the mouth to the eye. So, saliva keeps the eye wet!

This has been done for many years but is infrequently performed nowadays because of the success of cyclosporine and tacrolimus (explained above). It is only considered in patients who have severe dry eye and those who have not responded to anything else (so-called 'medically refractive patients'). It can be very successful but careful patient selection is essential – it is not a 'quick fix'.

Cyclosporine implants. The use of cyclosporine ointment (Optimmune) as the mainstay of treatment for dry eye has been explained above. This involves twice daily application to both eyes in most patients. It is possible to surgically place a cyclosporine implant under the eyelids to provide a slow release of the drug, to avoid the application of the ointment to the eyes. This is considered for patients who do not tolerate eye treatment at all, or with great difficulty. The implants are placed under a general

