

Information for patients

Dry eyes and dry eye disease

For the reasons you will see below the terms **dry eyes** and **dry eye disease** could be placed between inverted commas with perhaps better and more accurate terminology being Ocular Surface Disease. However, as the term **dry eye** sounds less scientific and is in general use it will be used throughout.

What is dry eye disease

Dry eye disease is the term used to describe a cluster of different symptoms that are caused by abnormalities and instability of the tear film (the wetting layer of liquid that covers and protects the outer surfaces of the eye). Dry eye disease is not a single condition but is multifactorial in origin in most patients, and is frequently associated with watering of the eyes – paradoxically, dry eyes are not often dry!

How can a dry eye water?

The simplest way to think about this apparent paradox is to understand that an eye with an abnormal / unstable tear film is not going to be kept wet and feel properly protected. The surface of the eye may therefore be more exposed and become inflamed – this makes the eye feel uncomfortable (sometimes unbearably so) and the eye's response to the stimulation of the surface nerves is to try to produce tears. However, the tears are the problem, they are not normal and do not do the job of protecting the eye that the eye requires (the tears produced do not do the job asked of them). The eye therefore remains uncomfortable and continues to try to produce tears – hence the eye can, and frequently does water.

What causes dry eyes?

There are many factors that contribute to what we term dry eye disease and this contributes significantly as to why treatment can sometimes be difficult.

Age – this is by far the most common reason why someone might complain of dry eye symptoms. There are many factors probably involved including; normal involitional changes to the tear secreting glands, additional contributions from normal age related hormonal changes, eyelid diseases (blepharitis) and normal eyelid microbial colonisations.

Connective tissue / rheumatic / autoimmune diseases – patients with these types of disorder are those that might be genuinely described as having dry eyes – eyes that do not water. This is because these diseases can be associated with significant destruction of the tear producing glands and hence no tears can be produced (including emotional tears). Such patient may also have associated damage to their salivary glands (which are similar to tear glands) having dry mouths and finding swallowing difficult.

Surgery – occasionally surgery or injuries around the face, head and eyelid can damage the nerves or the glands that secrete tears.

Eye drops – the long-term use of eye-drops can on occasion result in damage to the ocular surface and result in tear film abnormalities and instability. The frequent (> 4 times daily), long-term (usually months or years), use of eye-drops with preservatives can sometimes be the problem.

Rare processes – some immunological diseases such as Steven’s Johnson Syndrome, mucous membrane pemphigoid and graft versus host disease can seriously damage the surface layers of the eye, tear production and affect tear stability.

Types of dry eye

You may read about dry eyes as being described as being *aqueous (water) deficient* dry eyes or *evaporative* dry eyes. Essentially the aqueous (water) deficient dry eye is an attempt to draw attention to tear gland damage, and evaporative dry eye to abnormalities of the lipid (fat layer) layer or the wettability of the lining surface of the eye.

These terms may be helpful in terms of thinking about the underlying processes but the reality is that assessment is fraught with difficulty and that it is rarely that simple. Most dry eyes result from a plethora of local ocular surface causations and treatment with aqueous or lipid containing eye-drops, is largely empirical.

Symptoms

The symptoms of dry eye are those related to the ocular surface and include most of those listed for blepharitis with the odd exception:

- burning
- stinging
- grittiness
- red eyes
- soreness
- aching
- watering
- itching
- mucous build-up
- poor vision (often temporarily improved following a blink)
- inability to cry

How is dry eye it treated?

You will not be surprised to learn that a condition with such a multitude of contributory factors often requires a multitude of differing treatments. A multitude of differing treatments suggests that there is no simple treatment and that nothing works perfectly.

Eyelid hygiene – your eyelids are responsible for producing the lipid (fat) layer which covers the front of the tear film. If this layer is of poor quality the tear-film breaks down (and dries) rapidly. Keeping your eyelid margins healthy (as described in the blepharitis information) promotes healthy lipid glands and is time consuming, but crucial. Cleaning your eyelid margins also prevents debris and toxins released from the normal bacteria flora that covers our bodies, from entering the tear film and disturbing it.

Eye-drops – how to choose your eye-drops?

There is a plethora of artificial eye-drops on the market these days (it’s big business) and it really can be difficult to see the wood for the trees with many very similar components and claims of brand superiorities. The reality is that you just need to try a few and decide what works best for you and what is best for your pocket. There follows some thumbnail guidance but we have no commercial interest in any product or particular component. Having personally used, and continuing to use, some of these products – a big factor in your decisions may be the dispenser design and how easy you find it to instil the eye-drop (no drops in your eye will probably mean no benefit). This 2016

article provides a good review of the difficulties in making comparisons between over-the-counter artificial tears - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5045033>

Ointments – these are thick and “oily” in consistency, they come in a tube, hang around in the eye for quite some time and usually make your vision a bit bleary. They are ideal at night given that your eyes are closed and that their effects may last for several hours.

Eyedrops – these are generally thin and watery but some are more viscous. In general the more watery an eye-drop appears, the shorter any beneficial effects are likely to be and the more frequently you are likely to need to use it.

The following is a list of eye lubricant base ingredients:

- Acetylcysteine – acetylated amino acid - mucolytic
- Carbomers (polyacrylic acid) - synthetic polymer
- Carmellose – carboxymethylcellulose - polysaccharide
- Castor oil – vegetable oil from castor beans
- Glycerol – polyol compound
- Hyaluronate – natural glycosaminoglycan
- Hypromellose – hydroxypropylmethylcellulose – polysaccharide
- Hydroxymethylcellulose - polysaccharide
- Hydroxypropyl guar - polysaccharide
- Liquid Paraffin - refined mineral oil
- Polyvinyl alcohol – synthetic polymer
- Povidone – synthetic polymer
- Propylene glycol – a liquid alcohol
- Saline – 0.9% and 5%
- Serum eye-drops – prepared from the patient’s own blood (specialist use only)
- Soya bean oil - vegetable oil from soya beans

How often – how often you use your eye-drops is up to you. You can use them as often as you like, you cannot overdose on them but if you find that you are using them regularly 4-6 times a day, it might be useful to make sure that they are of a preservative free variety, or at least don’t contain the preservative benzalkonium chloride (BAK) as this can irritate the eye.

Preservative free – there are many different options from many manufacturers. Eye-drops being preservative free means either a more elaborately designed dispenser or single unit doses. The latter are usually small soft plastic vials in a strip that you break off and use.

Steroid eye-drops – occasionally your doctor may suggest using some steroid eyedrops to treat any inflammation that is present. The often make the eye better but they do not address the underlying reasons for the symptoms. These drops are usually of low potency but still need to be used with caution and under medical supervision as they can cause cataract and glaucoma.

Antibiotics – occasionally you may be prescribed an antibiotic orally to try to help with symptoms of dry eye. These are usually from the tetracycline family (or similar) and are thought to have beneficial effects upon the meibomian glands in the eyelid and also upon some enzymes. Usually doses are low but the course of treatment is often protracted (8-12 weeks). People with acne rosacea type disorders are likely to benefit most.

Supplements –interest has centred around the benefits of flaxseed oil but the jury is out on whether supplements are really of any benefit. However, if you feel like taking some and you feel that they help, that is fine.

Contact lenses – occasionally, if the eye can be adequately lubricated with artificial tears, a thin contact lens can be used to protect the injured surface of the eye and make it feel more comfortable. However, wearing a contact lens in the compromised environment created by a dry eye is not without risk and care and diligence are required to make sure that the eye does not develop an infection.

Punctal plugs – these are usually small silicone bungs which can be inserted, usually in the outpatient clinic, into the punctum openings near the inner corner of the eyelids. Under normal circumstances these openings drain tears away from the eye towards the nose where they are either swallowed or absorbed. Blocking the punctums means that any tears or eye-drops instilled into the eye are retained for a longer period and may be more effective. Punctal plugs are self-retaining and usually stay in place for a good time, if not indefinitely. However, they are not suitable for everyone and some people find that they do readily dislodge.

Surgery – it is possible to permanently block the punctums by cauterising them under a local anaesthetic. However, with the advent of silicone punctal plugs this procedure may only be necessary in someone who finds punctal plugs useful but in whom they cannot be reliably be retained.