

# Information for Patients with Dry Eye

## **The Tear Film**

The tear film is a three layered structure. It protects the surface of the eye and creates a smooth optical surface. This helps vision to stay crisp, clear and undistorted.

### **Lipid Layer**

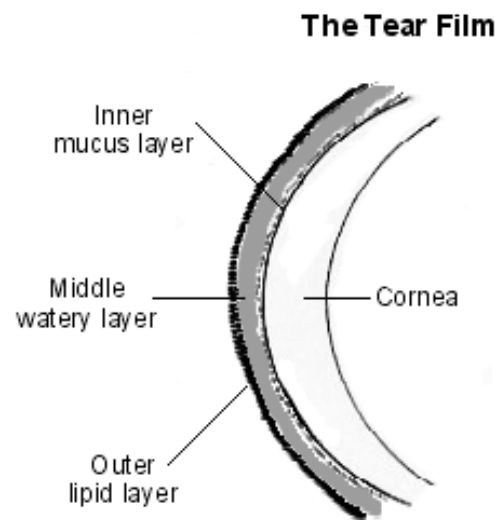
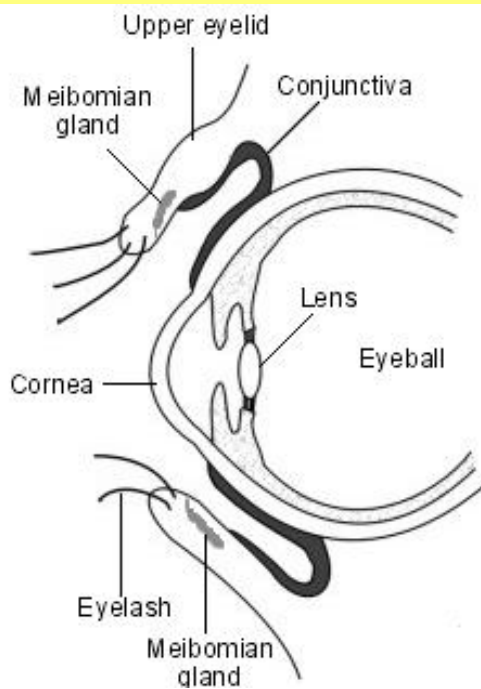
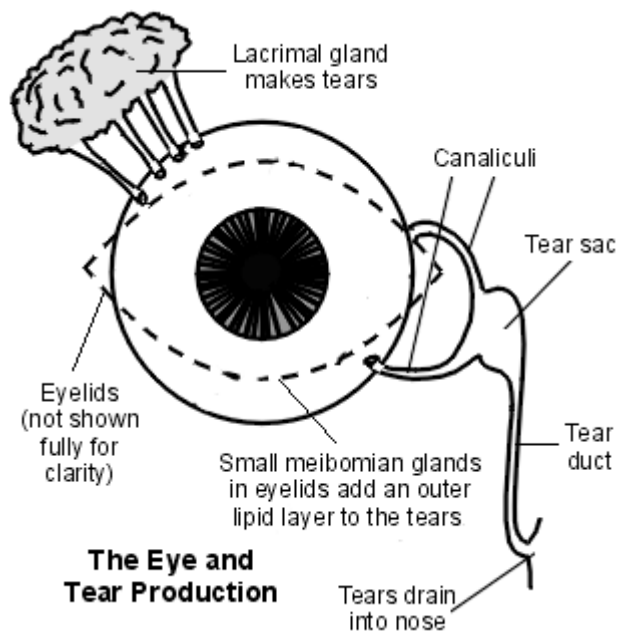
This is composed of oils secreted by the meibomian glands (special glands in the lid margins). This is the outermost layer of the tear film and provides a hydrophobic (waterproof) barrier, which lessens tear evaporation and retains moisture. The lipid layer also protects the eye surface from contamination.

### **Aqueous Layer**

This is the second (middle) layer produced by the lacrimal gland. It is the central component of the tear film and accounts for 98% of the tear volume. It consists mainly of water but also contains other substances such as proteins, which nourishes the eye with natural antibiotics. This layer also washes away irritants, keeping the eye healthy. It helps maintain optimum vision by promoting spreading of the tear film across the cornea.

### **Mucin Layer**

This is the third and innermost layer of the tear film. It anchors the film to the cornea. It is produced from the special (goblet) cells within the conjunctiva. Its key functions are to spread evenly over the corneal surface and adhere to the corneal epithelium.



## **Dry eye symptoms**

- Gritty, sandy, aching or burning eyes
- Persistent irritation
- Sensation of foreign bodies in the eye
- Short term blurred vision
- Watery, runny eyes
- Contact lens intolerance, especially at the end of the day
- Light sensitivity
- Pain and soreness
- Redness of eyes
- Repeated infections (conjunctivitis) and stickiness with discharge

## **What is dry eye or watering eye?**

During blinking, tears form a film which coats, protects and nourishes the eye surface. When the tear volume is reduced or the tear film is unstable, eyes can feel gritty, scratchy and irritated.

Dry eyes can be caused by any factor that interferes with normal functioning of the tear film.

- Excessive evaporation
- Poor tear production
- Unstable tear film

Sometimes, a person with a dry eye will have excess tears running down the cheeks, which may seem confusing. This happens when the eye isn't getting enough lubrication. The eye sends a distress signal through the nervous system for more lubrication. In response, the eye is flooded with tears to try to compensate for the underlying dryness. However, these tears are mostly water and do not have the lubricating qualities or the rich composition of normal tears. They will wash debris away, but they will not coat the eye surface properly. If any part of the lacrimal functional unit is affected, the whole system can break down, resulting in one of two outcomes, or possibly both: The quantity of tears is affected - the body does not produce enough. The quality of tears is affected - the tears evaporate before the body has a chance to replace them.

### **Main Factors Contributing to Dry Eye**

Ageing - Dry eyes increase with age. Increasing age is associated with abnormal lipid production, which can give rise to evaporative dry eye. Two to three times more women than men are affected.

Environmental factors - Climate and other environmental factors in modern living such as air conditioning, central heating, air travel, pollution and outdoor life factors such as wind, heat and sun can change the atmosphere and have a role in dry eye.

Systemic Diseases - Patients suffering from Rheumatoid arthritis, Parkinson's disease, diabetes and other auto immune diseases have dry eyes.

Eye diseases affecting the meibomian gland and eyelid conditions (Bell's palsy, Ectropion, Entropion), Ophthalmic shingles, can contribute to tear film instability and cause dry eye.

Medications - The side effects of many therapeutic treatments like anti-histamines, Beta blockers, Diuretics, HRT, Anti-depressants and some sleeping pills, include dry eyes.

Low blink rate - Blinking spreads tears over the surface of the eye and interference with this as during reading, computer use, watching television can result in dry eye.

Contact lens wear - Contact lens physically interferes with the tear film and rubs against the conjunctiva under the eyelids.

Eye surgery - Particularly Refractive Surgery (laser correction for short sightedness).

### **How Are Dry Eyes Treated?**

Though dry eyes cannot be cured, there are a number of steps that can be taken to treat them. Treatments for dry eyes may include:

### **Artificial tear drops and ointments.**

The use of artificial teardrops is the primary treatment for dry eye. Artificial teardrops are available over the counter. No one drop works for everyone, so you might have to experiment to find the drop that works for you. If you have chronic dry eye, it is important to use the drops even when your eyes feel fine, to keep them lubricated. If your eyes dry out while you sleep, you can use a thicker lubricant, such as an ointment/gel at night.

### **Temporary punctal occlusion.**

Sometimes it is necessary to close the ducts that drain tears out of the eye. This may be done temporarily with a plug that can be removed or will dissolve over a few weeks. It is inserted into the tear drain of the lower eyelid to determine whether permanent plugs can provide an adequate supply of tears.

### **Permanent punctal occlusion.**

If temporary plugging of the tear drains works well, then longer-lasting plugs may be used. This will hold tears around the eyes to improve lubrication. The plugs can be removed. Rarely, the plugs may come out spontaneously or migrate down the tear drain. Many patients find that the plugs improve comfort and reduce the need for artificial tears.

### **Contact lens wearers**

You should not wear contact lenses whilst using many types of eye drops. Check with your doctor or pharmacist. It is often the preservative in the drops that may cause problems. Some types of drops are available without preservative, which are suitable for contact lens wearers.

### **Other medications**

Other medications, including topical steroids and cyclosporin, may also be beneficial in some cases.

### **Surgery**

Obstructions within the lacrimal drainage channels will often require an operation called a dacryocystorhinostomy or DCR for short.

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