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Dry Eyes

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Introduction

Dry eye syndrome is one of the most common problems treated by eye physicians. It is caused by the lack of tears in the eye.

Healthy eyes are continuously covered with a thin tear film— a film that is necessary to prevents irritation of the nerves of the cornea, the clear front surface of your eye, and allows the eye to maintain clear, comfortable vision.

The tear film protects your eyes and lubricates them. It also reduces the risk of eye infection and, with each blink of your eyelids, helps clear your eyes of any debris. When your eyes become irritated from dust or are bothered by wind, smoke or fumes, extra tears form to help wash away the foreign material.

Decreased production of fluids from your tear glands (lacrimal glands) can destabilize the tear film, allowing it to break down rapidly and creating dry spots on the cornea that cause irritation & diminished vision.

Dry Eye condition is also referred as Kerato-conjunctivitis Sicca.

Applied Anatomy...

The main lacrimal gland, which consists of two portions, produces about 95% of the aqueous component of tears: the *orbital* portion which lies in a fossa on the frontal bone and a smaller *palpebral* portion.

The palpebral portion may be prolapsed by asking the patient to look down and in, while the outer part of the upper lid is elevated and the lateral canthus pulled temporally.

About 5% of the aqueous component of the tears is produced by the accessory larcimal glands of Krause and Wolfring.

Fig.1 Palpebral Portion of Lacrimal Gland

Applied Physiology...

Basic and reflex secretion: Reflex secretion of tears is many hundreds of times greater than basic or resting secretion. The stimulus to reflex secretion appears to be derived from the superficial corneal and conjunctival sensory stimulation, probably as a result of tear break up and dry spot formation. The secretory stimulus to the lachrymal gland is purely parasympathetic with reflex secretion occurring in both eyes following superficial stimulation of one eye. Reflex secretion is reduced by topical corneal and conjunctival anesthesia.

Applied Physiology...

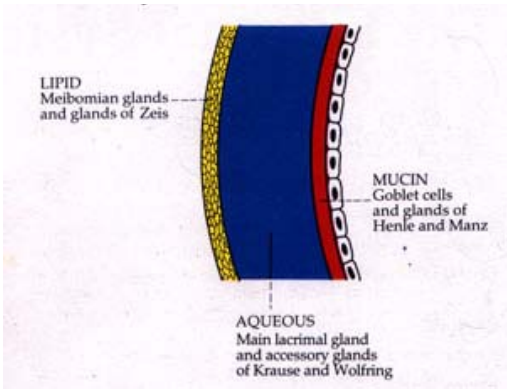

Fig.2 Three layers of precorneal tear film.

Functions of precorneal tear film

The precorneal tear film consists of three layers, each of which has separate functions (*Figure 2...*).

The outer lipid layer

This is secreted by the meibomian glands and has three main functions:

1. To retard the evaporation of the aqueous layer of the tear film.
2. To increase surface tension and thereby assist in the vertical stability of the tear film so that tears do not overflow the lower lid margin.
3. To lubricate the eyelids as they pass over the surface of the globe.

The middle aqueous layer

This is secreted by the main lacrimal gland and the accessory lachrymal glands, and has four main functions:

1. Most importantly, it supplies atmospheric oxygen to the corneal epithelium.
2. It has antibacterial substances, such as lactoferrin and lysozyme. A dry eye is therefore more susceptible to infection than a normal eye.
3. If provides a smooth optical surface by abolishing any minute irregularities of the cornea.
4. It washes away debris from the conjunctiva and cornea.

Keratoconjunctivitis sicca (KCS) is a dry eye due to aqueous tear deficiency.

The inner mucin layer

This is very thin and is secreted by the goblet cells in the conjunctiva and also by the crypts of Henle and glands of Manz. Its main function is to convert the corneal epithelium from a *hydrophobic* to a *hydrophilic* surface *(Figure 3).* An aqueous solution will form a smooth and even layer when dropped onto a hydrophilic surface, whereas when dropped onto a hydrophobic surface the aqueous solution will contract into small droplets (like on a greasy windscreen). In the absence of mucin, the corneal epithelial cells are hydrophobic and therefore cannot be wetted by aqueous tears. Mucin, which is a glycoprotein, becomes adsorbed onto the cell membranes of the epithelial cells and anchored by their microvilli. In this way it converts a hydrophobic surface into a hydrophilic surface and enables the corneal epithelium to be adequately wetted *(Figure 4).*

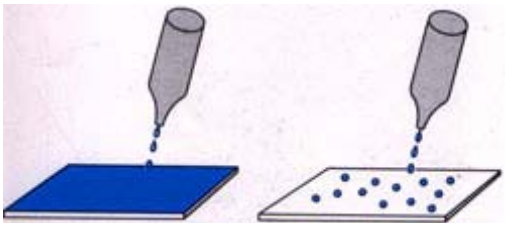

Fig.3 Left: hydrophilic surface;
Right: hydrophobic surface

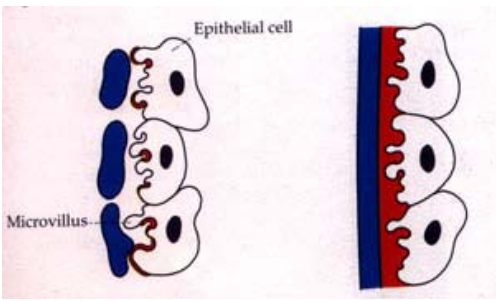

Fig.4 Function of mucin layer.
Left mucin deficiency; right normal

Corneal resurfacing

In addition to adequate amounts of aqueous tears and mucin, three other factors are necessary for effective resurfacing of the cornea by the precorneal tear film.

1. *A normal blink reflex, which will ensure that the mucin is brought from the Inferior conjunctiva,* and rubbed into the corneal epithelium. Patients with facial palsy and lagophthalmos (inability to close eyelids) will therefore develop corneal drying *(Figure 5, left).*

Applied Physiology...

2. *Congruity* between the external ocular surface and the eyelids ensures that the precorneal tear film will be spread evenly over the entire cornea. Limbal lesions such as dellen or dermoids may interfere with the apposition of the lids to the globe and give rise to local areas of drying *(Figure 5, centre).*

3. *Normal epithelium* is necessary for the adsorption of mucin onto its surface cells. Corneal scars, keratinization, and various epitheliopathies will interfere with corneal wetting *(Figure 5, right).*

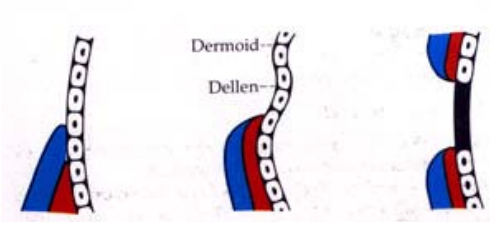

Fig.5 Three causes of inadequate resurfacing of the cornea.

Causes of Dry Eyes

A. **Reduced lacrimal gland secretion**

1. Local disorders

   a. Aplasia, hypoplasia, atrophy, irradiation excision

2. Denervation

   a. Familial dysautonomia (Riley-Day), Adie syndrome, N VII (between lacrimal nucleus and geniculate ganglion), greater superficial petrosal nerve, sphenopalatine ganglion; N V (decreased reflex secretion)

3. Systemic disease

   a. Sjogren disease, connective tissue disorders; lymphoma, sarcoid, leukemia, Waldenstrom macroglobulinemia

4. Medications

   a. Cholinergic blockade (atropine and similar drugs), antihistamines, adrenergic blockers (glaucoma and cardiac medications), analgesics

B. **Abnormal accessory secretors**

1. Conjunctival scarring: trauma (thermal, chemical, radiation, mechanical, surgical), ocular cicatricial pemphigoid, erythema multiforme, trachoma, avitaminosis A

C. **Eyelid abnormalities**

1. Meibomianitis, lagophthalmos, infrequent blinking, exophthalmos

D. **Abnormal ocular surfaces**

1. Pterygium, dellen

E. **Excessive evaporation of tears**

1. Air conditioners, low humidity, excess tear lipids (blepharitis, acne)

Symptoms...

Keratoconjunctivitis sicca is a common symptom complex secondary to an abnormal precorneal tear film. Patients complain of:

- Gritty,
- Sandy,
- Foreign body sensations in the eye or irritation and
- Itching
- Burning sensation in the eyes

All of which are worsened by a hot, dry atmosphere and tobacco smoke. Symptoms may be aggravated by reading or by infrequent or incomplete blinking.

It is ***important*** to point out that patients seldom complain that their eyes are dry, although some may report a lack of emotional tears or a deficient response when peeling onions.

Both eyes usually are affected.

Special Tests...

Vital dye staining

1. *Rose bengal 1%* has an affinity for devitalized epithelial cells and mucus in contrast to fluorescein which remains extra-cellular and which is more useful in showing up epithelial defects. Rose bengal is very useful in detecting even mild cases of kerato-conjunctivitis sicca by staining the interpalpebral conjunctiva in the form of two traingles with their bases at the limbus (*Figure 6*).

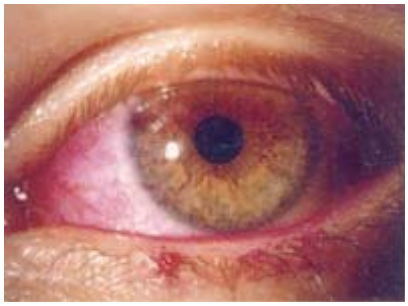

Fig.6 Staining of conjunctiva with rose bengal

Schirmer's test

This test is clinically useful when obvious slitlamp signs of keratoconjunctivitis sicca are not present and yet there is suspicion of inadequate tear production. This test is performed by measuring the amount of wetting of a special filter paper which is 5mm wide and 35mm long.

1. *Schirmer test 1* is performed as follows: the filter paper is folded 5mm from one end and inserted between the middle and outer third of the lower lid. The patient is asked to keep the eye open and blink as necessary. After 5 minutes, the filter strip is removed and the amount of wetting from the fold is measured. A normal eye will wet between 10mm and 25mm during that period. Measurements between 5mm and 10mm are considered borderline, and values less than 5mm indicative of impaired secretion, particularly if obtained on consecutive occasions.
2. *Schirmer test 2* measures the reflex tear secretion. It is performed by instilling a topical anesthetic in the eye and irritating the un-anaesthetized ipsilateral nasal mucosa with a cotton swab. The amount of wetting is measured after 2 minutes. Less than 15mm indicates failure of reflex secretion. However, this test is seldom used because reflex secretion is usually intact.

Homoeopathic Treatment

The underlying cause of dry eyes may be an inflammation both in the lacrimal glands and on the surface of the eyes. When the eye is quite irritated from dry eyes, it can over stimulate the nerve fibers that travel from the eye to the lacrimal gland. That over stimulation causes lacrimal gland inflammation, which in turn reduces tear formation even further.

Some people have persistent symptoms and don't respond to artificial tears (most commonly prescribed by Eye Specialists) alone even though their eyes appear fairly normal. This is because the sensory nerves in the cornea are densely packed, so that even small amounts of tear dysfunction can cause irritation.

When dry eyes don't respond to artificial tears alone, some people may worry that they have an autoimmune disease such as Sjogren's syndrome. While many people with autoimmune disease have dry eyes, the large majority of people with dry eyes don't have autoimmune problems.

Selection of Homoeopathic remedy begins with careful selecting of symptoms along with its possible causes. Most of the symptoms of Dry Eye are covered by the following medicines:

1. **Sulphur:** Heat, Burning & itching in eyes. Cutting as from sand. Chronic ophthalmia with much burning & itching. First stage of ulceration of cornea. Oily tears. Parenchymatous Keratitis. Agglutination of lids. Blepharitis. Eczema of lids. **<** after lachrymation, warm room
2. **Pulsatilla:** Dryness, smarting, profuse flow of tears. Paralysis of lids. Eyelids agglutinated, profuse secretion of soft, yellow or white matter. It affects meibomian gland and checks its inflammation. **<** warm room, morning, evening.
3. **Selenium:** It has a specific affinity to lachrymal duct (both sides). Itching vesicles on eyebrows and margins of lids. Falling of eyebrows. Heavy, painful, burning, blood shot with red marks on the eyelids. Discharge of thick yellow secretion especially in the morning. Bluured vision with difficult accommodation. Blepharitis, Dacyrocystitis, Accommodation disorders. **<** Tobacco, alcohol,draft of air, even if it is warm, open air, hot weather.
4. **Euphrasia:** Frequent inclination to blink. Sticky mucous on cornea, must wink to remove it. It affects meibomian gland and checks its inflammation. Ptosis. Chronic sore eyes. < Sunlight, wind, warmth room, evening, light. **>** Winking, wiping eyes.

Homoeopathic Eye drops containing Cineraria Mar Q 1.50 %, Calendula Q, 0 .25 %, Euphrasia Q 1.00 % along with Kali Mur 10x, 0.25 %, Calcarea Flour 10x, 0.25 %, Magnesia Carb 10x,0.25 % Silicea 10x, 0.25 % & Boric Acid, 1.00 %, Sodium methyl hydroxybenzoate B.P 0.10% Isotonic solution of Sodium Chloride base is found very effective as compared to available Tear drops.

Self Care

Like any liquid, tears will evaporate when exposed to air. You can take these simple steps to help slow evaporation:

- **Remember to blink.** Consciously blinking repeatedly helps spread your own tears more evenly.
- **Avoid rubbing your eyes.** You can irritate your eyes further by rubbing them.
- **Avoid air blowing in your eyes.** Don't direct hair dryers, car heaters, air conditioners or fans toward your eyes.
- **Wear glasses on windy days and goggles while swimming.** The wraparound style of glasses may help reduce the effects of the wind.

Self Care

- **Keep your home humidity between 30 percent and 50 percent.** In winter, a humidifier can add moisture to dry indoor air. Some people use specially designed glasses that form a moisture chamber around the eye, creating additional humidity.
- **Take preventive steps.** An ounce of prevention is worth a pound of treatment. Use eye-drops before, rather than after, your eyes become irritated as a result of visually demanding activities.

References

- Clinical Ophthalmology by J. J Kanski
- Ophthalmology principles & concepts by F. W Newell
- Homoeopathic Materia Medica by Robin Murphy.

Warning

Under no circumstances one should take the medicines given above by themselves!

Please consult an Eye Specialist or a qualified homoeopathic physician in case you feel that you are suffering from dry eyes.