

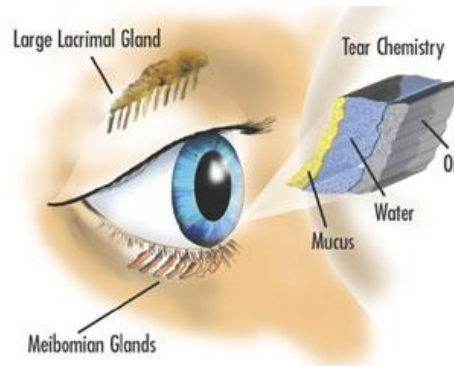


Tear Film Insufficiency **“Dry Eye”**

The tear film bathes and protects the eye, maintaining comfort and minimizing vision fluctuations. If a patient does not produce enough natural tears, or has a poor-quality tear film, tear film insufficiency or “dry eye” results. The natural tear film consists of 3 layers, each playing a vital role. Without a healthy tear film, quality vision would not be possible.

(1) The mucus layer, closest to the cornea is produced by the conjunctiva and helps tears stick and spread evenly over the eye surface.

(2) The watery layer, produced by the lacrimal glands in the lids, cleanses the eye, washing away debris. A poor watery layer leads to a type of “dry eye” called aqueous tear deficiency (ATD).



(3) The meibomian glands produce the outermost oily layer. This layer smooths the tear film and prevents rapid evaporation. An irregular oily layer leads to evaporative dry eye or lipid tear deficiency (LTD), which is commonly associated with meibomian gland dysfunction (MGD)

What are the symptoms of tear film insufficiency or “dry eye”?

There are many symptoms associated with “dry eye” including: stinging, burning, scratchiness, contact lens intolerance, stringy mucus production, irritation, tearing. Patients often complain of blurry vision that fluctuates, worsening in the evening and during activities like reading, watching TV, or computer/phone use. Excess tearing sounds counterintuitive as a symptom of “dry eye;” however, dryness causes irritation, which leads to reflex tearing. These extra reflex tears do not bathe and protect the eye surface like natural tears.

What causes “dry eye”?

-*Age*. Tear production commonly decreases with age.

-*Hormonal changes*. Women tend to have more dryness than men, especially after menopause.

-*Autoimmune diseases* (Sjogren’s syndrome, rheumatoid arthritis, lupus, thyroid disease).

-*Medications* may affect the tear film (antihistamines, pain medications, sleeping pills, anti-depressants, diuretics for blood pressure, beta-blockers for heart or high blood pressure). Please be sure to provide a current and complete medication list.

-If the tear film is not healthy, patients with dry eye may experience eye irritation or toxic effects from eye drops. This is especially true for eye drops with preservatives. Preservative free artificial tears may help.

How is “dry eye” diagnosed? Your doctor will examine the eyes, assessing the tear film in its natural state. Placing a dye drop on the eye helps to evaluate the quality of the tear film and its affect on the ocular surface. If Sjogren’s syndrome is suspected, a special blood test (Sjo™ test) can be performed to help in the diagnosis.

Treating aqueous tear deficiency (ATD)

- *Artificial tears* (Refresh, Systane, Retaine, etc.). Tear supplements are available over-the-counter, without a prescription. Try different brands to see what feels best in your eyes.
 - Tears in a bottle. This type of tear supplement can be used approximately 4-6 times a day.
 - Preservative free tears in vials. When tears are needed more frequently, it is safer to use these.
 - Gels or ointments. Thicker lubricants stay on the eye longer, may blur, but are more effective.
- *Xiidra, Restasis, Cequa, Clarity-C (Cyclosporine, generic Restasis)*. A prescription medication may be necessary to help your eyes make more natural tears. The drops are used twice a day, can take 2-3 months to take its full effect, and can be very effective. The drop commonly burns, but will improve over time. Refrigerated drops may burn less.
- *Plugs*. Your tears drain out of the eye through small openings (puncta) at the lid margins near the nose, then travel into the nasolacrimal duct to the back of the nose (therefore your nose runs when you cry). By partially blocking the puncta with a small plastic device called a punctal plug, natural and artificial tears remain on the surface longer. If plugs fall out but are temporarily helpful, punctal cautery can be used to more permanently close the puncta, and outpatient office procedure.
- *Steroid eye drops* (Lotemax, Prednisolone, FML, preservative free steroid drops). If more severe and chronic inflammation results, steroid drops may help. Long-term use is not generally recommended, but is sometimes necessary. This requires consistent follow-up to monitor for potential side effects.
- *Blood serum drops* or serum tears. Special lubricating drops can be compounded from your blood. These drops can be very soothing, and can aid in healing an irritated cornea.
- *Nasal spray*. Prescription nasal spray can be used to stimulate tear production. Can cause sneezing and nasal irritation.
- *Bandage contact lens*. If the cornea is very irritated, a special soft contact can be used as a bandage to protect the cornea and allow cells to heal. The use of bandage contact lenses requires concurrent antibiotic drop use and consistent follow-up to monitor for potential side effects.
- *Amniotic membrane*. A healing membrane can be placed on the surface of the eye either with a plastic ring or under a bandage contact lens in cases that are not responsive to other treatments.

Treating lipid tear deficiency, evaporative dry eye & meibomian gland disease (MGD)

- Warm compresses & lid hygiene: Heat helps open inflamed oil glands and loosen debris on lid margins. You may use a heated eye “mask” (rice or gel) or a washcloth soaked in warm water. Place over closed lids for 5 minutes. Follow with lid cleansing. Use scrubs or foams available at the pharmacy:
 - Ocusoft
 - OcuSoft Plus
 - SteriLid
 - Systane scrubs
 - Cliradex
 - Dilute baby shampoo
- Artificial tears (Refresh, Systane, Retaine).
 - Tears in a bottle
 - Preservative free tears in vials
- Omega-3-Fatty Acids (fish oil or flaxseed oil) can be obtained as an over-the-counter supplement. Take approximately 2000mg a day. (Please check with your doctor if you are on blood thinners).
- Steroid eye drops (Lotemax, Zylet, Prednisolone, FML, Tobradex, Alrex, Eysuvis, Inveltys).
- A prescription ophthalmic antibiotic can be used for its good, anti-inflammatory effects (not for its anti-infective properties). Apply inside eye at bedtime. If burning occurs and is not tolerable, rub into lid margins, near base of lashes. □ Azasite □ Bacitracin □ Erythromycin

- An oral antibiotic, Minocycline or Doxycycline, can be used for its good, anti-inflammatory effects (not for its anti-infective properties). Dermatologists commonly use this for treatment of rosacea or acne. (Avoid this class of medication if you are pregnant, may become pregnant, or if you are nursing. Avoid heavy sunlight exposure. Take with a small snack if stomach upset occurs. Please check with your primary doctor or pharmacist before beginning therapy).

Other “dry eye” treatments

- *Environmental modifications* including using a humidifier, decreasing use of fans/heaters/air conditioning directed towards the eyes can help prevent dryness. Patients with sleep apnea often require a CPAP machine, but ensuring a good fit of the nosepiece/mask is crucial to prevent excess air blowing into the eyes at night.
- *Vitamin A* can help “dry eye” caused by diseases that affect mucus membranes (including the conjunctiva). Common examples are Stevens-Johnson syndrome, pemphigoid, and graft-versus-host disease. Vitamin A deficiency, although rare in the United States, may lead to dry eye problems. Supplemental vitamin A (oral or topical) can be used to treat the ocular surface.
- For some patients, the eyelids don’t close completely (from previous eyelid surgeries, Bell’s palsy, or floppy eyelid syndrome) and the eyes get dry overnight. Taping the eyelids closed during sleep and applying ointment at bedtime can help. Occasionally in severe cases a tarsorrhaphy, or procedure to temporarily shut the lids is required to help healing.