

Dry Eye & Blepharitis

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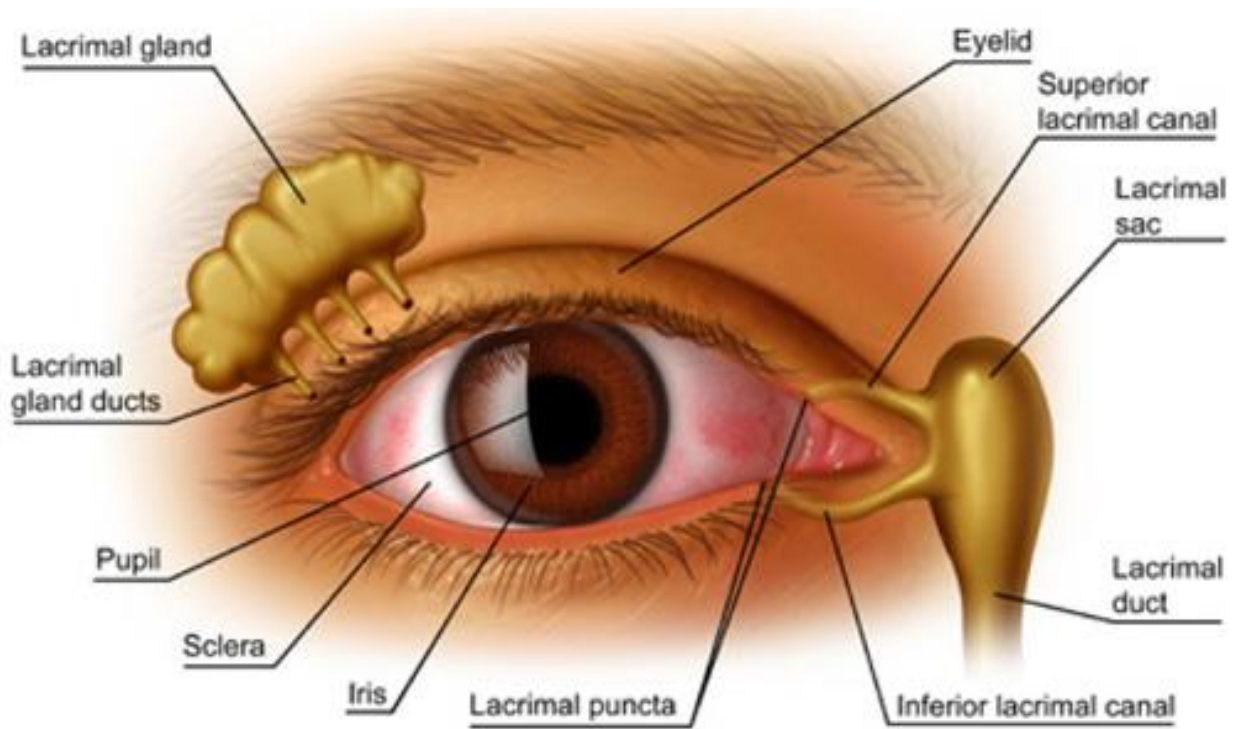


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Dry Eye Syndrome

Dry eye is the result of the eye being improperly hydrated with tears. Dry eye syndrome is a chronic and typically progressive condition. Depending on its cause and severity, it may not be completely curable. But in most cases, dry eyes can be managed successfully, usually resulting in noticeably greater eye comfort, fewer dry eye symptoms, and sometimes sharper vision as well.

Dry eye occurs when the eye does not produce tears properly, or when the tears are not of the correct consistency and evaporate too quickly. In addition, inflammation of the surface of the eye may occur along with dry eye. If left untreated, this condition can lead to pain, ulcers, or scars on the cornea, and some loss of vision. However, permanent loss of vision from dry eye is uncommon. Dry eye can make it more difficult to perform some activities, such as using a computer or reading for an extended period of time, and it can decrease tolerance for dry environments, such as the air inside an airplane.

Other names for dry eye include dry eye syndrome, keratoconjunctivitis sicca (KCS), dysfunctional tear syndrome, lacrimal keratoconjunctivitis, evaporative tear deficiency, aqueous tear deficiency, and LASIK-induced neurotrophic epitheliopathy (LNE).

Often treatment of dry eye has been an exercise of trial and error because the real cause of the symptoms hasn't been determined. Relatively speaking, the diagnosis and treatment of dry eyes is a new practice that is providing relief to millions of people.

Symptoms of Dry Eye

There are many signs and symptoms of dry eye, which usually affect both eyes. Since there are many levels of dry eye severity and different route causes of the condition, a patient may experience a range of only a few of these symptoms to all of these symptoms

- Fluctuation in vision
- A stinging, burning or scratchy sensation in your eyes
- Stringy mucus in or around your eyes
- Sensitivity to light
- Eye redness
- A sensation of having something in your eyes
- Difficulty wearing contact lenses
- Difficulty with nighttime driving
- Watery eyes, which is the body's response to the irritation of dry eyes
- Blurred vision or eye fatigue

Causes of Dry Eye

There are three main reasons why your eye may be improperly hydrated with tears:

- 1.) **Decreased tear production** - dry eyes can occur when you're unable to produce enough tears, specifically the water within the tear film. The medical term for this condition is keratoconjunctivitis sicca. Common causes of decreased tear production include:
 - Aging
 - Certain medical conditions, including diabetes, rheumatoid arthritis, lupus, scleroderma, Sjogren's syndrome, thyroid disorders and vitamin A deficiency
 - Certain medications, including antihistamines, decongestants, hormone replacement therapy, antidepressants, and drugs for high blood pressure, acne, birth control and Parkinson's disease
 - Laser eye surgery, though symptoms of dry eyes related to this procedure are usually temporary
 - Tear gland damage from inflammation or radiation
- 2.) **Increased tear evaporation** - Common causes of increased tear evaporation include:
 - Wind, smoke or dry air
 - Blinking less often, which tends to occur when you're concentrating, for example, while reading, driving or working at a computer
 - Eyelid problems, such as out-turning of the lids (ectropion) and in-turning of the lids (entropion)
- 3.) **Imbalance in tear composition** - caused if any of the three layers of tears are imbalanced. The most common imbalance occurs when the tears don't have enough oil composition because of blocked oil glands near the base of the eyelashes (see MGD below).

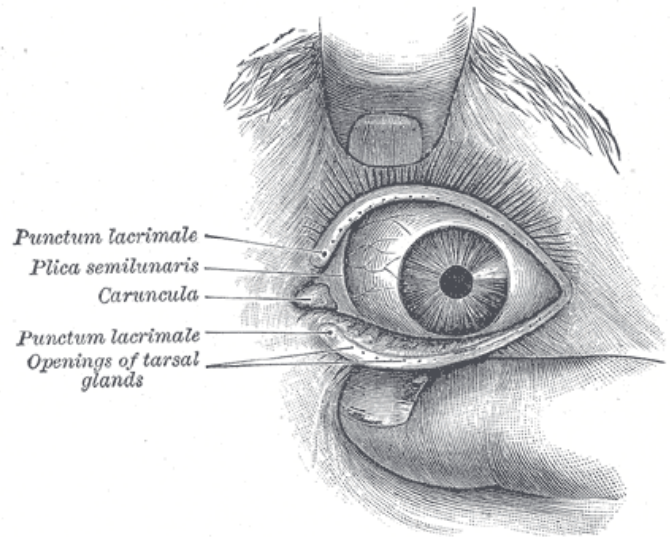
Forms of Dry Eye

Aqueous Dry Eye - occurs when the lacrimal gland does not produce enough of the water component to keep the eyes moist. This results in concentrated tear film (hyperosmolarity) and unstable tear film, leading to a dry ocular surface.

Evaporative Dry Eye / Meibomian Gland Dysfunction (MGD) – the most common form of all dry eye and is caused by blockage of the Meibomian glands that line the lash margin. In the early stages, patients are often asymptomatic, but if left unmanaged, MGD can cause or exacerbate dry eye symptoms and eyelid inflammation. The oil glands become blocked with thickened secretions. Chronically clogged glands eventually become unable to secrete oil which results in permanent changes in the tear film and dry eyes. The limited secretion of oil by these glands leads to quick evaporation of tears. Poor or insufficient oil layer may lead to tears evaporating 4 to 16 times faster than normal.

Meibomian Glands

Meibomian Glands are glands that are arranged vertically within the eyelid near the lashes. They are responsible for the supply of meibum, an oily substance that prevents evaporation of the eye's tear film. There are approximately 50 glands on the upper eyelids and 25 glands on the lower eyelids. The force of an eyelid blink causes oil to be excreted onto the posterior lid margin.



Tear Film Layers

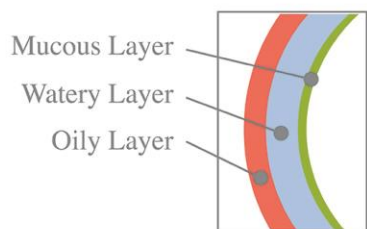
The tear layer is the eye's first defense to the harsh, external environment. It is composed of three layers. Each of these layers has to be balanced properly to provide sufficient comfort and visual quality. Examination of dry eye patients requires a unique understanding of the spatial relations and dimensions of the tear film.

Oil Layer - The purpose of the oil layer is to maintain tears on the surface of the eye and avoid evaporation. The oil component of the tears is produced by the Meibomian glands that line the perimeter of the eye lash margin. The oil layer is responsible for keeping tears from spilling out of the eye. Good oil quality looks similar to olive oil, but many dry eye sufferers have glands that are clogged with a hardened, waxy substance that doesn't allow for free flow of this elemental substance. This complication leads to evaporative dry eye.

Aqueous (Water) Layer - The aqueous layer makes up the watery layer commonly thought of as tears. It contains water and proteins and is secreted by small glands in the conjunctiva and the larger lacrimal gland. The aqueous layer makes up the majority of the tear volume and is responsible for tear spreading.

Mucous Layer - The mucous layer works as an anchor to hold the tear film to the eye. It coats the cornea and allows even distribution.

TEAR FILM LAYERS:



Cornea

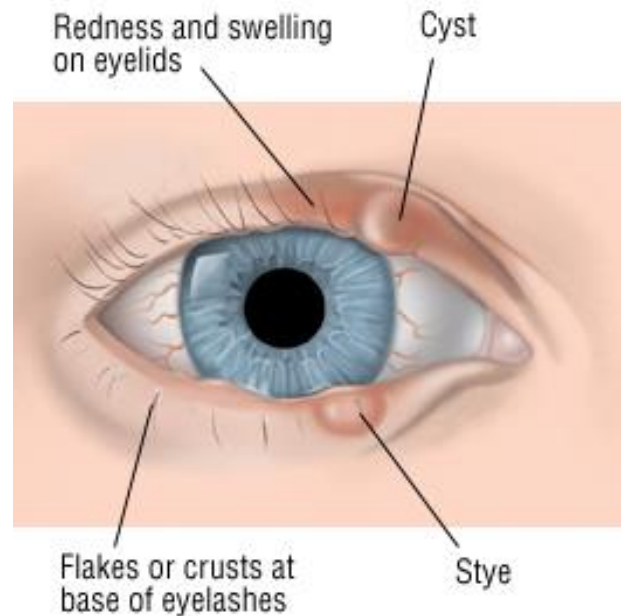
Conjunctiva

Blepharitis

Blepharitis is a common and ongoing condition where the eyelids become inflamed (swollen), with oily particles and bacteria coating the eyelid margin near the base of the eyelashes. This annoying condition causes irritation, itchiness, redness, and stinging or burning of the eyes. While the underlying causes of blepharitis aren't completely understood, it can be associated with a bacterial eye infection, symptoms of dry eyes or certain types of skin conditions such as acne rosacea.

Anterior Blepharitis - affects the outside of the eyelid where your eyelashes are attached. This can be caused by bacterial (or sometimes viral) infection. If left untreated, anterior blepharitis can lead to thickened and inward-turned or outward-turned eyelids and even vision problems from in-turned eyelashes damaging the cornea.

Posterior Blepharitis - a condition that results from a dysfunction of the eye's meibomian glands, thus making this very similar, if not the same as MGD. When meibomian glands become clogged from posterior blepharitis, it can also cause a sty or chalazion to form. Posterior blepharitis also leads to thickened eyelid margins and crusty eyelids. With this type of blepharitis, tears can even look foamy.

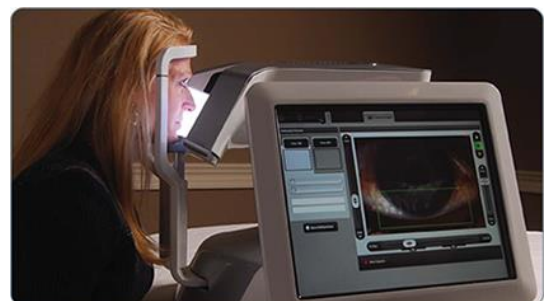


Diagnostic Tools & Tests

Traditionally the treatment for dry eye was a trial and error approach to different over-the-counter and prescription lubricating drops, oral medications and nutritional supplements. While these are still successful treatments for some forms of dry eye, the secret to quick dry eye symptom relief and management is an in-depth diagnostic exam that tests and measures multiple factors to successfully determine the patient's routine cause of dry eye. An accurate diagnosis as to the form and cause of dry eye allows the patient's symptoms to be treated and managed successfully immediately and before the symptoms worsen.

Dry Eye Lifestyle Questionnaire - a series of questions used to determine how a patient's eyes feel on a daily basis.

LipiView – a test that captures live images of the tear film and measures lipid content and quality. The test quantifies the lipid to help determine best treatment. This process is non-invasive and takes about five minutes.



Meibomian Gland Evaluator – a tool used to examine the quantity and quality of lipids being released from the glands.

Tear Osmolarity – a tool that measures the salt concentration of your tears to understand the stability of the tear film.

RPS InflammADry – a tool that measures the level of MMP-9 in your tears to determine levels of inflammation present.

Schirmer's Test – a test using paper strips to determine whether or not the eye produces enough tears to keep it moist.



Dry Eye Treatments

After all diagnostic tests are completed a physician that specializes in dry eye can look at the results to determine the precise cause, form and severity of the patient's dry eye in order to pick the right treatment plan. Treatment for patients with dry eye varies significantly from patient to patient. Some plans include only one of the options below, while others require the patient to commit to a plethora of treatment solutions.

While surgical procedures involving the cornea or lacrimal system may be required for severe conditions related to dry eye, there are really only two main categories of treatment for the dry eye symptoms themselves; in-clinic procedures and retail/prescription solutions.

1.) In-clinic Procedures

Punctal Plugs/Cautery – this is the process of clogging one of the small openings (puncta) of the tear drainage ducts that are located in the inner corner of the upper and lower eyelids. After these openings have been plugged, tears can no longer drain away from the eye through these ducts. In this way the tear film stays intact longer on the surface of the eye, relieving dry eye symptoms. This can be accomplished by cauterizing the puncta or plugging it with a small, sterile device. This is a quick and easy procedure that can be done right in clinic.

LipiFlow - an automated procedure designed to treat the root cause of Evaporative Dry Eye, blocked Meibomian glands. Opening and clearing these blocked glands can allow them to resume natural production of lipids needed for a healthy tear film. The patented activator fits onto the eye and also over the eyelids and applies precisely controlled heat to the lids to soften hardened meibum. At the same time, the LipiFlow system applies pulsed pressure to the eyelids to open and express clogged meibomian glands, thereby restoring the correct balance of oils in the tear film to relieve dry eye syndrome.



Lipiflow treatment takes approximately 12 minutes per eye. In a clinical study of the effectiveness of the procedure, most patients (76 percent) reported improvement of their dry eye symptoms within two weeks, and patients also showed improvement in the quality and quantity of meibomian gland secretions and the duration of time their tear film remained on the eye before evaporating. In some cases, however, it can take a few months for improvements to become apparent. Typically, the beneficial effects of the LipiFlow procedure last one to three years or longer.

BlephEx - a painless procedure using a hand held device to very precisely and carefully remove scurf and debris and exfoliate eyelids for patients suffering from blepharitis.

2.) Retail & Prescription Solutions

Nutritional Supplements – almost all treatment plans incorporate nutritional supplements as part of a holistic dry eye relief plan. Studies have found that supplements containing omega-3 fatty acids can decrease dry eye symptoms. Good sources of omega-3s include cold-water fish such as salmon, sardines, herring and cod. Omega-3 supplements can be found in a pill form that must be taken daily. Most patients do not see symptom relief until 90 days of compliant use.

Artificial Tears - or mild cases of dry eyes caused by computer use, reading, schoolwork and other situational causes, the best dry eye treatment may simply be frequent use of artificial tears or other lubricating eye drops. There are many brands of artificial tears that are available without a prescription. The challenge with using artificial tears is not lack of product availability — it's the confusing number of brands and formulations available to choose from. Artificial tears and other over-the-counter lubricating eye drops are available in a wide variety of ingredients and viscosity and certain kinds of dry eye symptoms will be relieved differently based on these factors.

Restasis – a prescription eye drop that does more than simply lubricate the surface of your eye. It includes an agent that reduces inflammation associated with dry eye syndrome and helps your body produce more natural tears to keep your eyes moist, comfortable and healthy. It's important to know, however, that the therapeutic effect of Restasis is not immediate. You must use the drops daily for a minimum of 90 days to experience the full benefits of this dry eye treatment.

Steroid Eye Drops - Over the past several years, doctors have discovered the importance of inflammation as a cause of dry eyes. Inflammation frequently causes the redness and burning associated with dry eye disease; but in many cases, it may be present without any visible signs or symptoms at all. Artificial tears usually do not adequately address these inflammatory changes and your doctor may recommend steroid eye drops to better manage the underlying inflammation associated with dry eyes. Steroid eye drops are generally used short-term to quickly manage symptoms. They are often used in conjunction with artificial tears and Restasis, as a complement to these more long-term treatment strategies.

Warm Compresses – An alternative way to help open clogged meibomian glands to treat dry eyes is to simply apply warm compresses to the closed eyelids to soften the hardened meibum. Unfortunately, for warm compresses to work well, some researchers say you have to use a compress that can maintain a temperature of 108 degrees Fahrenheit for more than 10 minutes, and the compresses have to be applied for this length of time at least twice a day.

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