



### WHAT IS DRY EYE?

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.

### WHAT ARE TEARS, AND HOW DO THEY RELATE TO DRY EYE?

Tears, made by the lacrimal gland, are necessary for overall eye health and clear vision. Tears bathe the surface of the eye, keeping it moist, and wash away dust and debris. They also help protect the eye from bacterial and other types of infections.

Tears are composed of three major components:

- a) outer, oily, lipid layer produced by the meibomian glands;
- b) middle, watery, lacrimal layer produced by the lacrimal glands; and
- c) inner, mucous or mucin layer produced by goblet cells located within a thin transparent layer over the white part of the eye and covering the inner surface of the eyelids.

Tears are made of proteins (including growth factors), electrolytes, and vitamins that are critical to maintain the health of the eye surface and to prevent infection.

Tears are constantly produced to bathe, nourish, and protect the eye surface. They are also produced in response to emergencies, such as a particle of

dust in the eye, an infection or irritation of the eye, or an onset of strong emotions. When the lacrimal glands fail to produce sufficient tears, dry eye can result.

Any disease process that alters the components of tears can make them unhealthy and result in dry eye.

### WHAT ARE THE TYPES OF DRY EYE?

1. Aqueous tear-deficient dry eye is a disorder in which the lacrimal glands fail to produce enough of the watery component of tears to maintain a healthy eye surface.
2. Evaporative dry eye may result from inflammation of the meibomian glands, also located in the eyelids. These glands make the lipid or oily part of tears that slows evaporation and keeps the tears stable.

Dry eye can be associated with:

- Inflammation of the surface of the eye, the lacrimal gland, or the conjunctiva
- Any disease process that alters the components of the tears
- An increase in the surface of the eye, as in thyroid disease when the eye protrudes forward
- Cosmetic surgery, if the eyelids are opened too widely

### WHAT ARE THE SYMPTOMS OF DRY EYE?

Dry eye symptoms may include any of the following:

- Stinging or burning of the eye
- A sandy or gritty feeling as if something is in the eye
- Episodes of excess tears following very dry eye periods
- A stringy discharge from the eye
- Pain and redness of the eye

- Episodes of blurred vision
- Heavy eyelids
- Inability to cry when emotionally stressed;
- Uncomfortable contact lenses
- Decreased tolerance of reading, working on the computer, or any activity that requires sustained visual attention
- Eye fatigue

*Note: If symptoms of dry eye persist, consult an eye care professional to get an accurate diagnosis of the condition and begin treatment to avoid permanent damage.*

## WHO IS LIKELY TO DEVELOP DRY EYE?

Elderly people frequently experience dryness of the eyes, but dry eye can occur at any age. Nearly five million Americans 50 years of age and older are estimated to have dry eye. Of these, more than three million are women and more than one and a half million are men. Tens of millions more have less severe symptoms. Dry eye is more common after menopause. Women who experience menopause prematurely are more likely to have eye surface damage from dry eye.

## WHAT ARE THE CAUSES OF DRY EYE?

Dry eye can be a temporary or chronic condition:

- Dry eye can be a side effect of some medications, including antihistamines, nasal decongestants, tranquilizers, certain blood pressure medicines, Parkinson’s medications, birth control pills and anti-depressants.
- Skin disease on or around the eyelids can result in dry eye.
- Diseases of the glands in the eyelids, such as meibomian gland dysfunction, can cause dry eye.
- Dry eye can occur in women who are pregnant.
- Women who are on hormone replacement therapy may experience dry eye symptoms. Women taking only estrogen are 70 percent more likely to experience dry eye, whereas those taking estrogen and progesterone have a 30 percent increased risk of developing dry eye.
- Dry eye can also develop after the refractive surgery known as LASIK. These symptoms

generally last three to six months, but may last longer in some cases.

- Dry eye can result from chemical and thermal burns that scar the membrane lining the eyelids and covering the eye.
- Allergies can be associated with dry eye.
- Infrequent blinking, associated with staring at computer or video screens, may also lead to dry eye symptoms.
- Both excessive and insufficient dosages of vitamins can contribute to dry eye.
- Homeopathic remedies may have an adverse impact on a dry eye condition.
- Loss of sensation in the cornea from long-term contact lens wear can lead to dry eye.
- Dry eye can be associated with immune system disorders such as Sjögren’s syndrome, lupus, and rheumatoid arthritis. Sjögren’s leads to inflammation and dryness of the mouth, eyes, and other mucous membranes. It can also affect other organs, including the kidneys, lungs and blood vessels.
- Dry eye can be a symptom of chronic inflammation of the conjunctiva, the membrane lining the eyelid and covering the front part of the eye, or the lacrimal gland. Chronic conjunctivitis can be caused by certain eye diseases, infection, exposure to irritants such as chemical fumes and tobacco smoke, or drafts from air conditioning or heating.
- If the surface area of the eye is increased, as in thyroid disease when the eye protrudes forward or after cosmetic surgery if the eyelids are opened too widely, dry eye can result.
- Dry eye may occur from exposure keratitis, in which the eyelids do not close completely during sleep.

## WHAT CAN I DO TO HELP MYSELF?

- Use artificial tears, gels, gel inserts, and ointments—available over the counter—as the first line of therapy. They offer temporary relief and provide an important replacement of naturally produced tears in patients with aqueous tear deficiency. Avoid artificial tears with preservatives if you need to apply them more than four times a day or preparations with chemicals that cause blood vessels to constrict.

- Wearing glasses or sunglasses that fit close to the face (wrap around shades) or that have side shields can help slow tear evaporation from the eye surfaces. Indoors, an air cleaner to filter dust and other particles helps prevent dry eyes. A humidifier also may help by adding moisture to the air.
- Avoid dry conditions and allow your eyes to rest when performing activities that require you to use your eyes for long periods of time. Instill lubricating eye drops while performing these tasks.

of severe dry eye, short term use of **corticosteroid** eye drops that decrease inflammation is required.

## PUNCTAL PLUGS

This treatment involves placing a very tiny, biocompatible implanted medical device into the tear ducts to block drainage to provide eyes with sufficient tears. The device is smaller than a grain of rice. This treatment is effective in cases of aqueous deficient dry eye or evaporative dry eye.

## HOW IS DRY EYE TREATED?

### GENERAL DRY EYE TREATMENT INFORMATION

Depending on the causes of dry eye, your doctor may use various approaches to relieve the symptoms.

Dry eye can be managed as an ongoing condition. The first priority is to determine if a disease is the underlying cause of the dry eye (such as Sjögren's syndrome or lacrimal and meibomian gland dysfunction). If it is, then the underlying disease needs to be treated.

If dry eye results from taking a medication, your doctor may recommend switching to a medication that does not cause the dry eye side effect.

If contact lens wear is the problem, your eye care practitioner may recommend another type of lens or reducing the number of hours you wear your lenses. In the case of severe dry eye, your eye care professional may advise you not to wear contact lenses at all.

In some patients with dry eye, supplements or dietary sources (such as tuna fish) of omega-3 fatty acids (especially DHA and EPA) may decrease symptoms of irritation. The use and dosage of nutritional supplements and vitamins should be discussed with your primary medical doctor.

### PRESCRIPTION EYE DROPS

**Cyclosporine**, an anti-inflammatory medication, is the only prescription drug available to treat dry eye. It decreases corneal damage, increases basic tear production, and reduces symptoms of dry eye. It may take three to six months of twice-a-day dosages for the medication to work. In some cases

### PUNCTAL CAUTERY

In some cases, a simple surgery, called punctal cautery, is recommended to permanently close the drainage holes. The procedure helps keep the limited volume of tears on the eye for a longer period of time.

### EYELID HYGIENE

Millions of Americans suffer from chronic dry eye symptoms due to overgrowth of microorganisms on their eyelids and lashes. Dr. Nemi is able to counsel patients and prescribe an eyelash and eyelid cleansing product designed for removal of microorganisms and debris that contribute to these symptoms.

### PRESCRIPTION MEDICATIONS

There are many available pharmaceutical drugs to treat dry eye. Each medication has an appropriate use. If you suffer from dry eye, we can prescribe a medication as a next step in treatment in an individual already using artificial tears. These prescription eye drops work to target and reduce inflammation in the eyes while increasing natural tear production.

### AMNIOTIC MEMBRANE GRAFT

Amniotic membrane can be used to treat patients with damaged eye surfaces from long term dry eye that has damaged or eroded the cornea to the point that it cannot heal. This is a highly-specialized surgical procedure performed by Dr. Nemi in

treating corneal ulcers or infections, or to reconstruct the surface of the eye, or to promote healing.

## AUTOLOGOUS SERUM

Autologous means this blood serum comes from your own body. Eye drops created from your own blood serum have been established as being an effective method of treating eye surface conditions and diseases. These eye drops contain diluted concentrations of vitamins and growth factors extracted from your blood to promote a healthy cornea after damage from dry eye. The serum is created from a simple blood draw, after which is it spun in a centrifuge to separate the various blood components. The extracted serum is then diluted by combining it with artificial tears.

## INTENSE PULSED LIGHT

Intense Pulsed Light (IPL) is a light therapy that has long been used in treatment of various skin conditions, such as rosacea, sun damage and acne. Studies have shown that it also helps treat moderate-to-severe chronic dry eye disease and MGD. It works by heating the Meibomian glands and liquifying the oils, reducing the inflammation and redness associated with rosacea and blepharitis, and eliminating harmful bacteria and mites that often live on the eyelids and eyelashes.

## RADIO FREQUENCY THERAPY

Radio frequency Therapy (RF) is a safe and effective in-office treatment for dry eyes. The RF procedure works by gently increasing the temperature in the dermis layer of the skin using electrical current, generating heat and stimulating the production of collagen. This therapy melts the thickened oil secretions, unclogs the meibomian glands, and improves the quality of tear film, while also reducing any surrounding inflammation contributing to dry eye symptoms. It also offers a cosmetic benefit of tightening the eyelid skin and reducing fine lines and wrinkles through its stimulation of collagen production.

## LACRIFILL

Lacrifill is transforming the way dry eye disease is treated. Common among the aging population, post-surgical patients, and contact lens wearers, traditional treatments have often faced a variety of issues and complications. Lacrifill offers an innovative solution to these challenges.

Lacrifill’s composition: Made of crosslinked hyaluronic acid, this canalicular gel provides long-lasting relief. FDA Approved: Safe and effective with a unique formulation.

The Lacrifill procedure is quick and simple, involving a five-minute office visit to place the gel into the lower tear duct using a lacrimal irrigator.

### ADDITIONAL NOTES:

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