



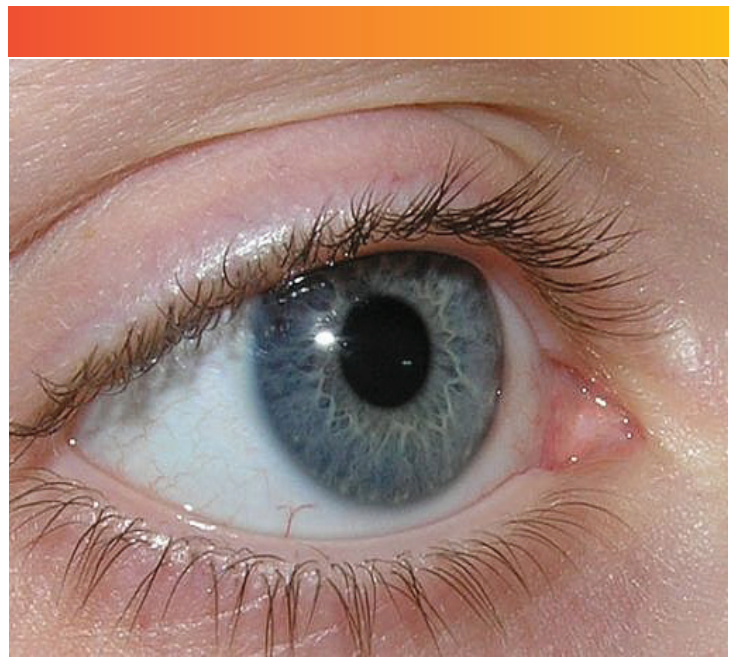
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## Dry Eye Syndrome

One of the hallmarks of healthy eyes is comfort. You shouldn't feel your eyes. If you do feel them stinging, burning or scratching frequently, you may have dry eyes. This article will briefly describe some of the symptoms of this condition and how we go about diagnosing and treating it—to help restore the eyes to everyday comfort.

Your eyes make tears continuously throughout the day. The health of your eyes and clarity of your vision depends on it. There needs to be a thin tear film covering the clear cornea of your eyes, and it needs to stay there even between blinks. Diminished production of tears from your tear glands can destabilize your eyes' tear film, causing dry spots to form on the surface of the eye. Sometimes, an imbalance in the components of tears may also cause dry eyes.

Typically, both eyes are affected. Besides stinging and burning, other symptoms include: increased eye irritation from wind or smoke, tearing, sensitivity to light, tiredness of the eyes after periods of reading,



blurred vision after reading, working on the computer or watching TV, especially at the end of the day, and whitish, stringy mucus in or around your eyes.

Tears are a complex mixture of water, oils, proteins, salts, antibodies and growth factors. Together, these ingredients help make the ocular surface clear and smooth. Most people with dry eyes don't produce sufficient tears to keep their eyes comfortably lubricated. Environmental factors, like traveling on airplanes, eyelid malposition, medications and systemic illnesses can also lead to dry eyes. Other people are deficient in one or more of the essential tear components.

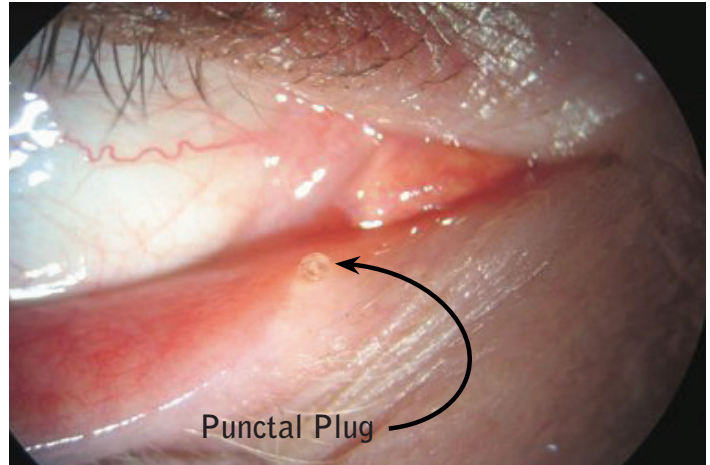
The tear film has three primary layers: mucus, water and oil. Any of these components can have problems and cause the bothersome dry eye symptoms. The mucus layer is the closest to the surface of the eye and allows tears to spread evenly. If the mucus layer has patchy defects in it, a dry spot will form on the cornea beneath it. The middle layer is made of water and salts. Made by the tear glands, it is the thickest layer. Its function is to wash away particles and debris that can irritate the



eyes. If your eye is deficient in this layer, the mucus layer and the oil layer can touch, which causes a stringy discharge. The top layer is the oil layer, which comes from small glands on the edge of the eyelids called meibomian glands. These oils smooth the tear surface and help prevent evaporation of the water layer just beneath the oil layer. If the oil layer is scanty, the water layer evaporates too fast. People whose oil glands are clogged often develop dry eye symptoms. Blepharitis, rosacea and other skin disorders that cause inflammation along the edge of the eyelids where the oil glands drain are most likely to suffer dry eye.

Dry eye symptoms are common, especially in people over 45 because as we age, tear production usually declines. It can affect men and women of any age, but is more common among women, particularly after menopause. Inflammation can damage the tear glands, so can radiation treatment. Medical conditions like diabetes, rheumatoid arthritis, lupus, vitamin A deficiency and Sjogrens syndrome are also linked to dry eye. LASIK and other refractive surgery may cause dry eye, although the symptoms usually diminish over 6 months to a year as corneal nerves recover.

Sometimes, poor blinking is the culprit in dry eye syndrome. The normal blink varies according to what you're doing, but the usual rate is about once every 7-10 seconds. As you blink, you spread a thin film of tears across your eyes. If



If your blink rate decreases, as can happen in Parkinson's disease or after a stroke, severe dry eye symptoms can result. If the lids have anatomical abnormalities, like in-turning or excessive laxity, the tear film may not be spread evenly and cause dry eye symptoms. Medications commonly cause dry eye symptoms, too. In our practice, antihistamines and decongestants are most common causes, followed by certain high blood pressure medications (diuretics, and angiotensin-converting enzyme (ACE) inhibitors), anti-depressants, oral contraceptive pills and acne medications. Some people may be comfortable at home in the San Francisco Bay Area but have uncomfortable symptoms when traveling to where the environment is hot and dry. Sun, wind, high altitude, and the dry air in passenger airplanes can exacerbate symptoms or make them noticeable for the first time. Activities that demand intense visual concentration, like driving, reading and working at a computer, will reduce your blink rate and allow symptomatic dry spots to develop on the cornea.

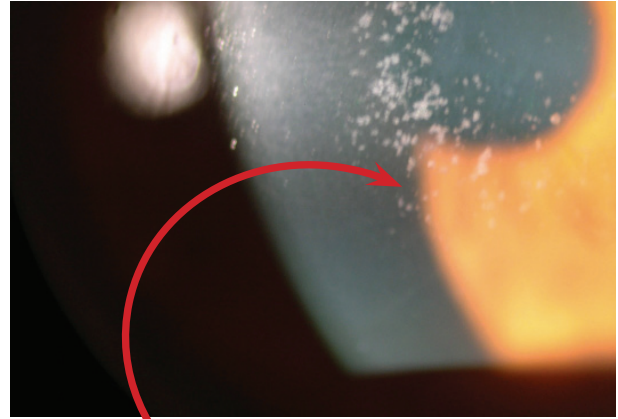
If you have bothersome symptoms, we'll test the quantity and the quality of your tears with a few simple techniques. In Schirmer testing, we'll place strips of cali-



brated filter paper in between your eyelids to soak up the tears you make for a period of five minutes. We'll test the quality of tears by measuring how long it takes the tear film to break down under the slit lamp microscope.

Sometimes, people may have dry eyes but find themselves tearing—with tears literally streaming onto their cheeks. How can this be? It turns out there are two types of tear production. Basic tears are "everyday" tears that are produced at a steady rate to keep your eyes lubricated. Reflex tears are "crying" tears, produced in response to pain, eye irritation and emotions. Reflex tears are more watery, and contain less mucus and oils. When a person's eyes are irritated from dryness, the lacrimal glands flood their eyes with watery tears that overwhelm the tear drainage system and spill out onto the face. But because these tears are so watery, they don't help the dryness much. Fortunately, most people with dry eye don't develop complications that threaten vision. Severe cases are rare, but without treatment can lead to inflammation, scarring and blinding infection.

Our goal in treating your dry eye is to keep your eyes moist. We often recommend over-the-counter artificial tears, with different viscosity depending on the findings of our examination. Some of the eyedrops contain chemical preservatives and can only be used 4-6 times a day. If more frequent use is necessary, we'll suggest a preservative-free eyedrop, which can be used as often as needed. For more severe cases, a lubricating ointment can be help



Superficial Punctate Keratopathy from Dry Eye

ful, especially at bedtime, when the blur from the ointment is least bothersome. We may suggest methods to keep your own tears around longer. We can close off a tear duct with tiny silicone plugs. This lasts for several months and conserves your natural tears and any artificial tears you've added. If this is successful to reduce your dry eye symptoms, we can permanently close the tear duct opening with thermal cautery. If an eyelid problem or incomplete blink contributes to dry eye, eyelid surgery may help correct it.

Blepharitis is treated with warm compresses, careful lid cleansing and occasionally a short course of oral antibiotics. Supplements of fish oil or flaxseed oil, both rich in omega-3 fatty acids, have been shown to help some people with dry eye. Topical cyclosporine drops (brand name Restasis) have been approved by the Food and Drug Administration (FDA) for chronic dry eyes. The medication treats inflammation on the eye surface and increases the production of healthy tears. Sometimes, a short course of steroid eyedrops can help reduce ocular inflammation and improve tear quality.



### Steps you can take yourself to reduce your dry eye symptoms:

Use eyedrops before your eyes get irritated, not after. Instead of waiting for the symptoms to start before using your artificial tears, put them in by the clock, so as to prevent the symptoms from occurring. For example, if your eyes consistently get scratchy and irritated after lunch, try putting in lubricating eye drops at noon and every hour or two after that until dinnertime. Then you'll avoid the uncomfortable symptoms entirely.

Wear sunglasses on windy days and swim with goggles. Wraparound glasses can help to protect your eyes from wind blowing from the side. Custom fitted moisture-chamber glasses are even more effective to reduce evaporative tear loss. They are important adjuncts to lubricants for people with severe dry eye.

Avoid rubbing your eyes. Irritation and redness are made worse by rubbing.

Avoid blowing air. Try to keep hair blow dryers, fans, air conditioners and car heaters from blowing in your eyes—they cause quick tear evaporation.

Increase your blink rate. Especially when working up close (reading, working on computer), remember to blink more to spread out tears across your eyes. Closing your eyes for a few seconds every ten minutes can extend the time you can comfortably read, as can taking rest breaks every half hour to look out the window, walk to the water fountain, or make a phone call.

Increase the humidity in the room. By adding moisture to dry indoor air, the tear evaporation rate goes down. Using a humidifier can help, especially in winter.

Avoid smoke. Cigarette smoke and other irritants in the air will make dry eye symptoms worse.

Dry eyes can be a frustrating and chronic problem. With careful diagnosis and persistent treatment, most patients can regain comfortable, clear vision.