WHAT TO DO IF YOU HAVE DRY EYES...

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Abstract

When your eyes bother you as if you had sand in them, or they burn and cannot tolerate bright light, so you have to blink often, you may have dry eyes.

Most frequently what happens in dry eyes is that the thin film of tears coating the eye surface breaks up prematurely, usually before you have a chance to blink. Your eyes could be itching, or form excess mucus, and your lid edges could become reddish or scaly. There are still tears—dry eye patients can cry. Yet, such patients may secrete fewer tears during the day and the quality of the tears is poor because they do not wet the eye. Both of these problems can be helped by instilling proper tear substitutes.

What drops should you use?

Abstract continued

- ☑ Be sure that the eye drops do not contain toxic preservatives. Specifically, the drops should not contain thimerosal or benzalkonium chloride.
- ☑ Make sure that the eye drops are not too thick, so that they will lubricate the eyelids better.
- ☑ Do not use **hypertonic** eye drops (too much salt) unless your doctor orders them.
- ☑ The eye drops should wet the eye well.
- ☑ Eye drops containing **vitamins A, B_6 and B_{12}** can often help.
- ☑ The newest eye drops contain some lipid and these, for certain dry eyes, can be quite helpful.

Abstract continued

There are also some eye drops containing large molecules at high levels. These can heal the surface of the eye by removing excess water, and healing painful erosions. Here again, it is important that the eye drop must not be thick. A good quality eye drop should be used no more than about 5 to 8 times a day.

One further caution about greasy substances in the eye: do not to use ointments in the eye, even at night. These will make your vision blurry and will make it difficult for the tears or eye drops to completely wet the eye.

Introduction

- ☑ We are going to discuss a little understood eye problem that that can alter your vision and make your life miserable.
- ☑ You will learn the principal cause of this mysterious disease and how to deal with dry eye symptoms from mild to severe.
- ☑ We shall discuss what to do and what not to do in order to improve the condition of the eyes.

When your eyes bother you as if you had sand in them, or they burn and cannot tolerate bright light, so you have to blink often, you may have dry eyes.

What is a dry eye?

What is a dry eye? These words make us think of a process in which water evaporates from the outside, or even from the interior of an object. However, in the eye, the word “dry” means something entirely different. Recognizing this difference helps greatly in the treatment of our dry eye. Unfortunately, we do things to our eye that can worsen the dry eye condition.

Symptoms of dry eye

- ☑ Eyes are irritated. The eyes feel like there is sand, or other foreign body in them.
- ☑ Intensive light is quite bothersome (photophobia).
- ☑ Turbulent air, air conditioning and wind all aggravate the problem.
- ☑ The eye and the lids appear to be red as if they were inflamed (sterile inflammation).
- ☑ Occasionally excess mucus secretion can be seen.

What causes dry eye?

We all know that our eyes have plenty of tears when we cry, or tear due to irritation. Large tear drops flood our eyes and roll down on our cheeks. Still, a person tearing so noticeably can have dry eyes. We also know that the eyes have to be covered completely by a thin layer of aqueous tears even when the lids are closed. In the open eye, there is another, even thinner layer of lipid that coats the aqueous layer. This double layer is what we call the tear film. It is responsible for maintaining clear vision and also assures the well-being of the ocular surface.

What causes dry eye? continued

Why is that? This is so because the outer curvature of the cornea – "the mirror of the soul" – needs an optically smooth surface that covers its whole surface. This is important to form a crystal clear image on the retina. Furthermore, the upper lid, in blinking, moves quickly upward and downward over the the cornea, repeatedly compressing and expanding this lipid layer. The aqueous part of the tear film always exists under the lids in order to lubricate them as they move over the cornea, thereby protecting this delicate structure.

What causes dry eye? continued

- ☑ The eye is covered by a thin tear layer to provide visual acuity and to lubricate the lids.
- ☑ This tear layer is further covered by a much thinner lipid layer.
- ☑ ***In the dry eye, the tear film cannot maintain itself because the tears do not wet the ocular surface well.***
- ☑ The evaporation of water from the tears plays a secondary role, but aggravates the problem.

What is the problem—tear quantity or quality?

Most of us are able to secrete sufficient tears to produce and maintain the important aqueous tear layer of the tear film. Evaporation rarely causes drying of the ocular surface, so what is the problem?

In general, it is difficult to cover any type of solid surface, including the ocular surface, with a tear or water layer (which is the major component of the tear) and maintain it continuously and intact. Most solids are not wet well by water. This is why we are using soaps and detergents to wet (and wash) things.

Think of the windshield of your car. If rain could form a fine, even film over the windshield, instead of beading up on the surface, we could readily see well through the glass and would not need to use windshield wipers.

What is the problem—tear quantity or quality? continued

Nevertheless, it is important to emphasize that the lids are not windshield wipers! They do not eliminate the aqueous tear layer. They only compress or expand the lipid layer in the open eye. A stable aqueous tear layer is also necessary to provide sufficient lubrication for the lids, i.e., hydrodynamic lubrication. This is why a continuous and stable aqueous tear layer is needed under the lid as well.

We may conclude that unless the lacrimal film is stable it is incapable of performing its two important functions. Such a discontinuous tear film will result in poor visual acuity and will not protect the ocular surface and will result in irritated and surface damaged eyes.

What is the problem—tear quantity or quality? continued

To summarize:

- ☑ Only a small quantity of tears is needed to form the tear film.
- ☑ It is difficult to maintain a continuous water film over any solid surface, including the ocular surface.
- ☑ If rain would completely wet the windshield of a car (forming a continuous film), there would be no need for windshield wipers.
- ☑ Note that the eyelids do not function as windshield wipers; they do not wipe the tear layer off the ocular surface.
- ☑ ***The main cause of the dry eyes is that the tears are unable to wet the ocular surface completely.***

What causes the tear film to rupture?

- ☑ This thin, continuous film can exist over a solid surface that is hydrophilic (water-loving).
- ☑ An environment rich in lipids makes it difficult to form and maintain a hydrophilic (water attracting) surface.
- ☑ The superficial lipid layer protects the tear film to a certain extent, but can also degrade it by contaminating the corneal surface, thereby making the mucin layer hydrophobic (water repellant).

What causes the tear film to rupture? continued

- ☑ The mucin, contaminated with lipid, forms filaments. The shear forces created by blinking assist in removing these lipid-rich mucous strands to the lower fornix.
- ☑ If the rate of lipid contamination is great and the surface is compromised, the filaments can attach to hydrophobic epithelial cells. This painful condition is known as filamentary keratitis.

What causes the tear film to rupture? continued

What occurs frequently in the dry eye is that the thin tear film ruptures, usually before the person can blink again. The eye becomes irritated, produces excess mucus, and the lid edges may appear red and inflamed. There are tears and these patients are able to shed tears or cry. Some may tear excessively, which can also be harmful, as it leaches the ocular surface of the lacimal surfactant. These patients are able to produce at least some tears during the day, however, the quality of the tear is not sufficient to be able to wet the ocular surface completely.

What causes the tear film to rupture? continued

At the first sign of ocular irritation, many patients turn to artificial tears. Actually, such products, if properly formulated, will be able to ameliorate many symptoms of dry eye. There are eye drops that address the most important deficiencies in the dry eye state and they do, in fact, offer a first line of defense against dry eye.

What kind of artificial tears work best, and why?

- ☑ Artifical tears should improve the wettability of the ocular surface.
- ☑ Artificial tears should contain high levels of inert macro-molecules to allow them to compact even injured epithelium by removing unwanted water from between the cells.
- ☑ Despite this requirement, artificial tears should not be viscous because this would interfere with the hydrodynamic lubrication of the lids.

NOTE: It is not sufficient to instill just water into the eye because dryness or lack of tears is not the principal problem. It is for this reason that punctal occlusion is not the first choice of treatment.

What kind of artificial tears work best, and why? continued

As earlier stated, the formulation must be able to form a continuous film over the ocular surface, including the altered (damaged) area. To lubricate well, it must also have the right range of viscosity. Certain vitamins, such as A and B_{12}, when added to these drops, have shown increased effectiveness in certain types of dry eye.

Furthermore, some drops contain large molecules at high concentration without elevating their viscosity. In the dry eye, the lids receive insufficient lubrication. Lid motion creates a drag that can injure the surface epithelium. The tissue becomes leaky and water-logged. Since the large molecules cannot pass through even injured, leaky epithelium, they are able to remove excess intercellular water from the tissue, pack down the cells, increase the integrity of the tissue, and thus, by increasing adhesiveness, eliminate painful epithelial erosions.

What must be avoided in the treatment of dry eye?

An artificial tear should not be used more often than 5-8 times a day. This is important because using any eye drops too frequently (more than once every hour) will further damage the ocular surface, interfering with its wetting.

Ocular ointments consisting of nonpolar lipids will considerably decrease the wettability of the eye surface, even if used only at night. It is best to avoid the use of such ointments, since they interfere with vision and make it difficult for the tears or artificial tears to wet the ocular surface. If your lids do not close completely at night, there are other, less harmful methods (goggles, Saran wrap seals, masks, etc.) to protect the eye from evaporation.

Managing dry eye

- ☑ Do not use eye drops more often than one drop per hour. They leach the ocular surface and can cause chemical keratitis.
- ☑ Do not use viscous (thick) eye drops because they will interfere with the proper lubrication of the eye lids.
- ☑ Ointments impede the spreading of tears. They should be avoided even at night.
- ☑ Eliminate blinking abnormalities such as infrequent blinking, incomplete blinking and not keeping the eye lids closed during sleep.

One further piece of advice on blinking: To be effective, a blink must be frequent and complete. Watching television, or staring at a computer monitor can make one blink less frequently, causing his/her tear film to be unstable, resulting in red, irritated eyes.

The truth about preservatives

- ☑ Artificial tears should not contain toxic preservatives such as thimerosal or benzalkonium chloride.
- ☑ Eliminating all preservatives will not make an artificial tear efficacious.
- ☑ There are preservatives that can even improve the tolerance of the eye drop by the eyes.

Artificial tear formulations should not contain toxic preservatives such as thimerosal or benzalkonium chloride. Nevertheless, the lack of preservatives does not make an eye drop efficacious!

Basically, artificial tears, whether preserved or unpreserved, should be able to wet the ocular surface completely and should lubricate the eyelids well.

Summary

- ☑ Choose your artificial tear carefully. It must wet the eye surface.
- ☑ High concentration of inert polymers can be beneficial, especially in the case of injured epithelium, provided the formulation is not viscous.
- ☑ Omit the use of highly viscous (thick) artificial tears or gels, as they interfere with the mechanism of lid lubrication.
- ☑ Avoid the use of ointments.
- ☑ Do not use eye drops preserved with toxic preservatives.
- ☑ Correct any existing abnormalities in blinking.

Vision Surgery Rehab Network, NFP

The Vision Surgery Rehab Network, NFP, (VSRN) is a not-for-profit, patient advocacy organization comprised entirely of volunteers committed to making a difference. VSRN's purpose is fourfold:

- increase understanding and awareness of causes of vision surgery complications;
- facilitate optical, medical and/or surgical rehabilitation of chronic visual, physical and/or psychological effects of vision surgery complications;
- promote development of effective non-surgical and surgical means to reduce or eliminate complications; and
- advise patients, eye care practitioners and surgical instrument and device manufacturers of contraindications of various vision surgeries.

VSRN's primary focus is rehabilitation of complications from the various types of vision surgeries, from vision correction to cataract and corneal transplant surgeries, among others. Working with a dedicated, caring core of individuals and organizations, VSRN hopes to establish a wide network of resources that will fulfill our purpose and bring hope and help to those living with vision surgery complications.

The scope of our activities will address, in addition to rehabilitation, the need for true informed consent for elective vision surgeries, prevention of complications, and public awareness of the broad impact of vision surgery complications in all areas of patients' lives.

For information about how to contribute to the success of the VSRN, e-mail info@visionsurgeryrehab.org.

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