

Is Dry Eyes Alarming- An Update

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Abstract: Dry eye syndrome (DES) or keratoconjunctivitis sicca (KCS) is a common disorder of the tear film caused by decreased tear production or increased evaporation and manifests with a wide variety of signs and symptoms. The present review from interpretation of the literature gives detailed information on the causes, diagnostic tests, and medical management of dry eye disease. A number of systems contribute to the physiological integrity of the ocular surface and disruption of system, may or may not produce symptoms. Therefore accurate diagnosis of dry eyes with no or minimal disruption of physiological function is necessary. Due to the wide prevalence and number of factors involved, more sensitive diagnostic techniques and novel therapeutic agents have been developed to provide ocular delivery systems with high therapeutic efficacy. The aim of this review is to provide awareness among the patients, health care professionals, and researchers about diagnosis and treatment of KCS and recent developments and future challenges in management of dry eye disease.

Keywords: Dry eye syndrome, keratoconjunctivitis sicca, tear film

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I. Introduction:

Dry eye is a disorder of the tear film which occurs due to tear deficiency or excessive tear evaporation; it causes damage to the inter-palpebral ocular surface and is associated with a variety of symptoms reflecting ocular discomfort.[1]

Dry eye symptoms may be a manifestation of a systemic disease, therefore timely detection may lead to recognition of a life-threatening condition. Additionally, patients with dry eye are prone to potentially blinding infections, such as bacterial keratitis² and also at an increased risk of complications following common procedures such as laser refractive surgery.

Knowledge of the pathophysiology of dry eye has recently been improved and the condition is now understood to be a multi factorial disease, characterized by inflammation of the ocular surface and reduction in tear production.³ This awareness has led to the development of highly effective therapies.

According to researchers, increased salt concentration in the tears leads to problems with the eye surface and produces most dry eye symptoms. Patients may be able to find relief through the use of eye drops designed to restore proper tear film salt concentration or eye moisturizing drops. The dry eye syndrome in which the eye does not produce enough tears is also known as "Sjögren's Syndrome".

Signs and symptoms:

Dry eye causes a scratchy sensation or the feeling that something is in the eye. Other symptoms include stinging or burning sensation, episodes of excess tearing that follow periods of dryness, discharge, pain, and redness in the eye. People with dry eye may also feel as if their eyelids are heavy and may also experience photophobia, blurred vision[9-11].

Etiology :

Dry eye can occur when basal tear production decreases, tear evaporation increases, or tear composition is imbalanced. Factors that can contribute to dry eye include the following:

- Many systemic medications, such as diuretics, antihistamines, antidepressants, psychotropics, cholesterol lowering agents, beta-blockers and oral contraceptives may also be associated with dry eye.[9-10]
- Postmenopausal women may be the largest at risk group; this is due to a decrease in hormonal levels leading to loss of anti-inflammatory protection and decreased lacrimal secretion.[9]
- Advancing age is a risk factor for declines in tear production. Dry eye is more common in people age 50 years or older.
- Rosacea (an inflammatory skin disease) and blepharitis (an inflammatory eyelid disease) can disrupt the function of the Meibomian glands.

- Autoimmune disorders such as Sjögren’s syndrome, lupus, scleroderma, and rheumatoid arthritis and other disorders such as diabetes, thyroid disorders, and Vitamin A deficiency are associated with dry eye.
- Women are more likely to develop dry eye. Hormonal changes during pregnancy and after menopause have been linked with dry eye. Women also have an increased risk for autoimmune disorders.
- Windy, smoky, or dry environments increase tear evaporation.
- Seasonal allergies can contribute to dry eye.
- Prolonged periods of screen time encourage insufficient blinking.
- Laser eye surgery may cause temporary dry eye symptom.

It is also possible the quality of your tears is not good enough. This can happen in any of the three layers of your tears (water, oil, mucus), as explained in the table below. When there is a problem in any of those areas, your eye can become irritated.

Outer Layer	Middle Layer	Inner Layer
Made up of lipids (oils)	Made up of aqueous substance (water)	Made up of mucus
Stops the tears from evaporating too quickly	Gives your eyes salt and nutrients. Helps to clean your eyes. Provides the ocular tissue with oxygen. Most common cause of dry eye syndrome or keratoconjunctivitis sicca.	Designed to make sure tears are evenly spread across the eye ball. Stabilizes the entire tear film.

Diagnosis:

Osmolarity Testing

There are various osmolarity instruments, which can test anything such as cell culture media, milk, bilirubin, urine, plasma, blood, serum and more. Osmolarity testing can be used to test the quality of tears in three different ways.

1. Freezing point depression. This method has been used for around 50 years. It is beneficial because only a tiny amount of tear is required and it is one of the most accurate testing methods. However, it can only be performed in specialized laboratories.
2. Vapor pressure. This is a very simple method of measuring the osmolarity of tears. As a result, it is generally a preferred method for many ophthalmologists. They insert a sample of tear into a chamber to measure at which point dew starts to form. It is a quick and reliable method, but quite a large tear sample is required in order to perform it. Unfortunately, most people with dry eye syndrome do not have enough tear fluid for this particular test. It is classed as a secondary diagnostic test because of this.
3. Electrical impedance. This measures the ionic content in the tear fluid. Only a relatively small sample of tear fluid is needed in order to perform this test. A handheld device is used by a clinician to collect some of the tear, which is then placed on a microchip for testing in a stationary reader. Interestingly, this test is believed to be as effective as the freezing point depression, and many clinicians are now using it. It is a quick and easy to administer test and can be reimbursed under Medicare, which makes it even more popular. However, the instrument that is needed for this test is very expensive, resulting in few ophthalmologists investing in it.

Schirmer’s Test

The Schirmer’s test is the most commonly used test to determine whether or not dry eye syndrome is present. A patient will first be given some numbing drops, so that they don’t react to the presence of eye strips. These drops may cause some stinging or irritation, however. Once they work, an ophthalmologist pulls the patient’s bottom eyelid down, placing a strip of paper beneath it. Patients then have to close their eyes, without squeezing, keeping them closed for around five minutes. They may not touch their eyes during this period. The strips are then removed and the amount of moisture is measured. If insufficient moisture is present, dry eye syndrome can be diagnosed.

Red Thread Test

The red thread test is very similar to the Schirmer's test. The only difference is that, rather than using a paper strip, a red thread is used underneath the eye. This can be more beneficial to people who have a fear of having something inserted in the eye, or who have small lower eyelids, for instance.

TBUT Test

Tear film stability can also be assessed with the fluorescein tear break-up time test (TBUT). This measures the interval in seconds between a complete blink and the first appearance of a dry spot or discontinuity in the precorneal film. Patients with TBUT less than 3 seconds are classified with clinical dry eye. If there is aqueous deficiency, the tear meniscus will appear to be thin, less than 1 mm in height.

Management:

Treatment aims to keep the eyes well lubricated, but the approach depends on the underlying cause. Three ways of keeping the eyes lubricated are:

- Making the most of natural tears
- Using artificial tears or eye drops
- Reducing tear drainage

Medications for patients with chronic dry eyes include cyclosporine eye drops, or Restasis. Cyclosporine reduces eye-surface inflammation and triggers increased production of tears. Patients should not use this drug if they have an eye infection or a history of herpes viral infection of the eye.

Steroid drops may help reduce inflammation if symptoms remain severe, even after the frequent use of eyedrops. In more severe cases, tear ducts, which drain away the tears, may be deliberately blocked, partially or completely, to conserve tears. Silicone plugs can be placed in the tear ducts to block them. This helps keep both natural and artificial tears on the eyes for longer.

The tissues of the drainage area can be shrink by using a heated wire in a minor operation known as thermal cautery.

A Boston Scleral Lens is a contact lens that rests on the sclera, can be used. It creates a fluid-filled layer over the cornea, preventing it from drying out.

Salivary gland transplantation is a surgical procedure that is occasionally considered in persistent and severe cases that have not responded to other treatments. Some of the salivary glands are removed from the lower lip and grafted, or placed into the side of the eyes. The saliva they produce becomes a substitute for tears.

II. Conclusion:

The overarching complexity of the dry eye disease makes it challenging to diagnose and manage accurately. With development of objective tests with precise diagnostic value and minimal disruption of physiological function, accurate diagnosis of disease is possible. Recent knowledge about causes, symptoms, and diagnostic tests of KCS provides better opportunities for improving medical management. Development of new potential drugs and different colloidal delivery systems definitely provides a ray of hope for more effective treatment of this widely prevalent and debilitating disease.

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Conflict Of Interest :

The author (editor) declares no conflict of interest, financial or otherwise.

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