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Understanding eyelid Inflammation: the intersection of dry eyes, blepharitis and related disorders

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PHYSIOLOGY OF PROTECTING THE EYE SURFACE

Protection of the eye surface is a complex process. It includes preventing foreign matter from getting to the eye, lubricating the eye, hydrating the eye, and keeping it oxygenated. The eyelids protect the eye surface from foreign matter, and the tear system lubricates and hydrates the eye. Understanding the relationship between dry eyes, ocular surface inflammation, and blepharitis are crucial to treating and maintaining ocular surface health and overall comfort.

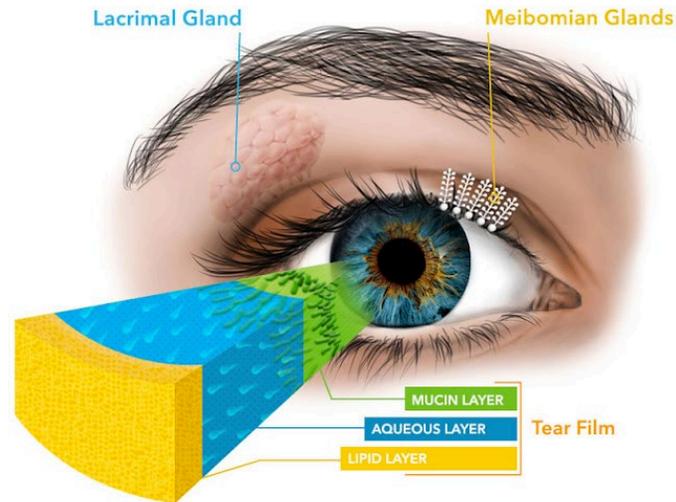
There are 3 components to the “tear film”:

- 1) **Aqueous (water) from the lacrimal glands**, which contains growth factors, nutrients, antibodies and immune cells that support and protect the ocular surface.
- 2) **Mucin from the goblet cells** of the conjunctiva, which serves as a surfactant to allow even distribution of watery tears across the surface of the eye as well as lubrication.
- 3) **Oil from the meibomian glands** of the eyelid margin, which prevents evaporation and provides additional lubrication.



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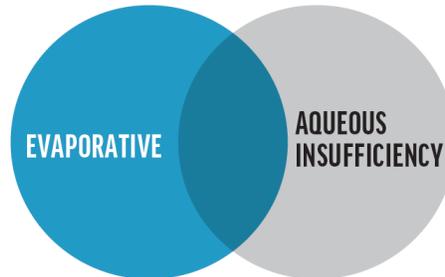
When one of the above components stops working correctly, the eye becomes dry and irritated, leading to redness and inflammation, tear film instability, and irregularity of the ocular surface. Disruption of these components is also the most common cause of tearing (the other main cause of tearing being obstruction of tear drainage). When the eye is irritated or dry, the nerves of the eye surface send a signal to the tear glands to produce extra tears to address the irritation - more tears than the tear drainage system can handle. Think of tearing that occurs when something is in your eye!

The term **“dry eye disease”** can relate to both aqueous deficient and evaporative dry eye. Aqueous deficient dry eye disease refers to dry eye caused by decreased tear production. Evaporative dry eye disease refers to dry eye caused by meibomian gland dysfunction. The signs and symptoms of both affect the entire ocular surface including the tear film, cornea, conjunctiva and eyelids. To complicate things, symptoms of each condition are often the same, and there is much overlap between the two etiologies. Only about 10% of dry eye disease cases are strictly caused by aqueous deficient dry eye, and the remainder is caused by either evaporative or mixed dry eye disease. It is important to understand the leading causes of both types of dry eye disease.



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Aqueous deficient dry eye is caused by decreased secretion of watery tears from the lacrimal gland (think of the 3 components of the tear film), as seen in the cases of aging and drying conditions such as Sjogren’s syndrome, rheumatoid arthritis, radiation to head and neck that destroys lacrimal gland tissue, or a history of ocular scarring disorders. Other factors such as decreased corneal sensation or damage to the cornea caused by refractive or cataract surgery can lead to aqueous deficient dry eye disease. Common treatments of strictly aqueous deficient dry eye disease would include replacement therapy with lubricating eye drops, use of cyclosporine drops such as Restasis or Cequa, Xiidra, biological tear substitutes in the form of autologous tears, or punctual plugs and punctual occlusion.

Evaporative dry eye is more common, and is caused largely by inflammation and plugging of the meibomian glands (oil glands along the lash line), leading to rapid loss of the tear film and irritation from decreased lubrication. This is called “meibomian gland dysfunction,” or “blepharitis.” Evaporative dry eye disease also includes inflammation of the conjunctiva (conjunctivitis), which is often caused by allergies or chronic irritation of the conjunctiva such as in the case of floppy eyelid syndrome, where the ocular surface is begin chafed by the back of your eyelid.

Other causes of dry eyes or similar symptoms:

- Conjunctival chalasis
- Use of brimonidine glaucoma drops or other prostaglandins or prostaglandin analogues (warning: these are also found in most eyelash growth serums such as Revitalash and Latisse)
- Lagophthalmos, in which the eyelids do not close all the way

Each of these problems can result in irritated eyes and go through cycles of excess tearing. Treatment should focus on the cause.



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BLEPHARITIS

Symptoms, posterior vs anterior blepharitis, complications and treatments.

What is “blepharitis”?

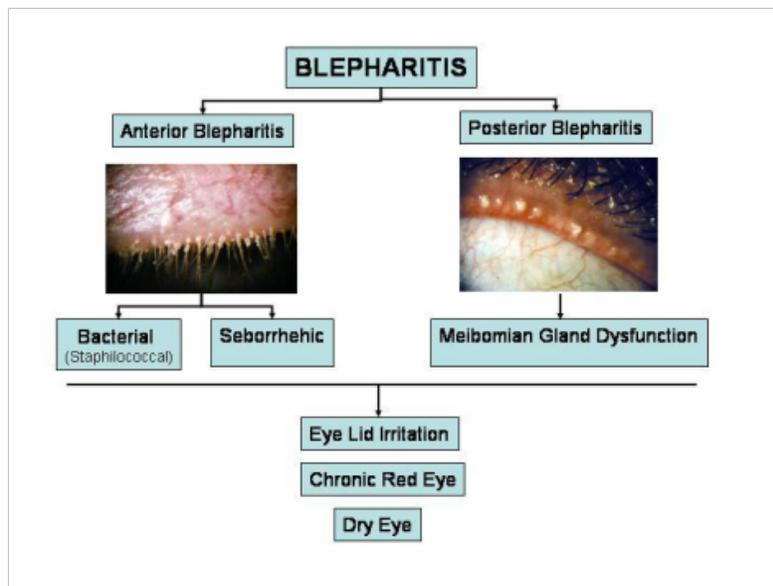
Blepharitis refers to inflammation along the base of the lashes and at the meibomian glands along the lid margin. Blepharitis can be split into two subtypes: anterior and posterior. It is important to note that blepharitis is very common, and oftentimes people are asymptomatic for a very long time while the condition is progressing. Blepharitis is not a curable condition, however treatment aims at alleviating symptoms and preventing progression of the condition.

Common symptoms of blepharitis include:

- Redness
- Tearing
- Itching
- Red or swollen eyelids
- Crusting at the base of eyelashes
- Missing eyelashes
- Light sensitivity
- Burning or gritty sensation to eyes

Complications of blepharitis include:

- Styes (infection within oil gland)
- Chalazia (pocket of inflammation within oil gland)
- Injury to the eye tissue (corneal ulcer) from irritation
- Conjunctivitis
- Scarring of the eyelids or eyelashes that turn inward toward the eye





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Anterior blepharitis:

Anterior blepharitis occurs due to bacteria (staphylococcal) and dandruff of the scalp and eyebrows (seborrheic). These are common skin bacteria and skin conditions, however both can cause inflammation or infection at the base of the lashes. Additionally, allergies or a mite (demodex) infestation can cause anterior blepharitis. Again, demodex are very common and these mites feed on the natural bacteria at the lash lines, but when they are overpopulated, this can cause further inflammation and lead to symptoms of itching, redness and irritation at the lid margins. Oftentimes, anterior blepharitis causes flaky debris and crusting along the lash line, and sometimes it can cause ulcerating sores on the eyelid and lash loss. Maintenance therapy for anterior blepharitis includes proper lid hygiene in the form of regular lid exfoliation with over the counter blepharitis wipes or hypochlorous acid sprays, frequent washing of bedding, limiting makeup use, or prescription ointment applied to the lash lines. Lubricating eye drops can help with symptoms of dry eye and ocular irritation.

Posterior blepharitis:

Posterior blepharitis is what is termed “meibomian gland disease” because this occurs when the meibomian glands along the lid margin become inflamed and oil production (a natural healthy part of the tear film) is disrupted. The oil within the glands either get blocked, or comes out thick and crusty, further irritating the eye and leading to an unstable tear film and quickly evaporating tear film. Over time, the meibomian gland structure changes or dies off, leading to even worsening symptoms including dry eye disease. Meibomian gland dysfunction can be correlated with rosacea, and is sometimes termed “ocular rosacea.” Maintenance therapy should include routine hot compresses followed by lid expression (recommend microwavable moist heat mask such as Bruder mask), lubricating eye drops, omega-3 dietary supplementation, prescription ointment applied at bedtime and oral doxycycline.



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Healthy Meibomian Glands

Healthy meibum is clear and adequate and should be assessed by your eye doctor on an annual basis.



Meibomian Glands With Moderate MGD

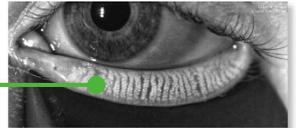
The more severe the blockage of your meibomian glands, the thicker and cloudier the meibum appears.



Meibomian Glands With Severe MGD

Severely blocked glands, if left untreated, can result in decreased meibomian gland functionality.

Normal Gland Structure



Shortened Glands & Gland Loss



Significant Gland Loss



Sometimes, blepharitis and meibomian gland plugging cannot be sufficiently treated using warm compresses and other maintenance therapies. At Kahana Oculoplastic Surgery, we offer in-office thermal pulsation called **iLux** therapy, as well as an exfoliation of the eyelids called **BlephEx**. This is an excellent jumpstart to therapy, and patients typically feel symptomatic relief within 2-4 weeks of treatment. It is best to begin treatment as soon as blepharitis is identified, even if there are minimal symptoms. In cases where the blepharitis is too severe and minimal meibomian glands remain, we offer in-office procedures such as injection with 5-fluorouracil.

CHALAZION vs. STYE



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What are “stye” and “chalazion”?

When meibomian gland plugging leads to a pocket of infection, it is called a “stye”. When the plugging leads to condensing inflammation, it is called a “chalazion.” These are treated with aggressive use of hot compresses, injection of 5-fluorouracil, or a procedure to lance and scrub out the swollen pocket of inflammation. Once this is performed, patients need to continue using hot compresses and eyelid margin scrub to keep the meibomian glands unplugged.

If you suffer from any of these conditions, please call us for an evaluation. We will help identify the cause of your dry eye and treat appropriately.



Chalazion - Meibomium Gland Obstruction



Stye - Hordeolum

