Update on Dry Eye Disease 2017

What is it?

Dry eye is a chronic problem that causes symptoms of eye discomfort: especially sensitivity to light, irritation, burning, and frequent blinking. Sometimes there are even "overflow tears" with watery eyes when the body tries to compensate for the dryness. In bad cases, vision can be blurry or disturbed, and permanent damage to the front surface of the eye can occur. Dry eye is very common and gradually becomes more noticeable as we age. The arid mountain climate in Colorado can be hard on the eyes and symptoms may be worse here than in humid, low altitude places. Similar symptoms can be noticed with "pink eye" conjunctivitis, sunburn, allergies, and eyelid infections but these are usually short-term and temporary.

Modern thinking among doctors considers most dry eye to be a loss of homeostasis or balance for the normal protective mechanism of the eye, so that there is usually an imbalance of the salt water, oils, mucus, and proteins that make up the tears. Sometimes the symptoms are made worse by eyelids that don't blink effectively or by activities that involved prolonged staring, such as computer or video game use.

What is happening?

There are multiple related issues that often occur simultaneously that together cause the symptoms people experience:

- Tear film instability = tears that evaporate or "bead up" too fast
- Hyperosmolarity = too much saltiness of the tears
- Ocular surface inflammation = low grade inflammation of the front surface of the eyes that makes them more susceptible to minor injury
- Damage to the surface = unhealthy or missing cells
- Corneal nerve hypersensitivity = nerves that provide feeling to the eye that are "turned up" too high
- Poor eyelid tone with inefficient blinking to spread the tears evenly over the eyes

In addition, over time, some people with develop behavioral and psychological issues around the chronic irritation of their eyes including pain sensitization, anxiety, and depression.

What causes these things to happen?

Aging is probably the single most important contributing factor for most people. As we age, we can develop:

- Tear production deficiency
- Mucin deficiency – mucin is the coating agent that keeps the tears evenly spread out on the eye – without enough mucin, the tears start to "bead up" like water on a freshly waxed car
- Meibomian Gland Disease (MGD) – a chronic, slow loss of the glands that make oils for the tears. Oils keep the tears from evaporating and lubricate blinking. MGD is worse in people with a common adult form of acne, known as rosacea
- Conjunctivochalasis is a chronic, slow loss of integrity of the white part of the eye that allows the surface layers to fold and bunch up, interfering with the spread of tears and causing redness and irritation
- Floppy Eyelid Syndrome (FES) is a chronic, slow loss of strength in the tendons and tissues of the eyelid
- Eyelid Retraction – usually drooping of the lower eyelid that exposes too much of the eye to air, allowing it to dry out easily. Although this is most commonly related to aging, scar tissue from cosmetic eyelid surgery, trauma, or thyroid disease can also cause retraction
- Eyelid ectropion – a condition in which the lower eyelid rolls away from the eye exposing it to the air
- Eyelid entropion – a condition in which the lower eyelid rolls toward the eye so that the eyelashes are always rubbing the eye

But other things can also contribute to dry eyes including:

- Toxicity from cosmetics and/or medications (eye-drops, such as prostaglandins for glaucoma, and oral drugs such as antihistamines) and/or pollution or smoking
- Chronic infection of the eyelashes with bacteria or mites
- Low humidity and increase in altitude
- Autoimmune diseases such as Sjogren's syndrome

- Paralysis of blinking from Bell's palsy and other types of facial neuropathy

What tests can help sort out the problems?

A careful eye exam by an ophthalmologist or optometrist who specializes in dry eye will disclose the majority of the problems above. The exam may include special tests such as:

- Slit lamp biomicroscopy exam with stains to measure corneal injury
- Matrix metalloproteinase-9 (Inflammadry test) to measure inflammation
- Tear osmolarity to measure salt and mineral concentration
- Meibography to measure oil gland disease and damage
- Confocal microscopy to measure corneal nerve density

What can be done to alleviate the symptoms and improve eye health?

For some people, mild dry eye disease may be easily improved with just one possible treatment, such as artificial tears. For others with severe dry eye and multiple causative factors such as oil gland disease and damage to the cornea, consultation with a specialist may lead to many medically necessary simultaneous treatments including:

- Non-preserved artificial tears (can be used indefinitely)
- Night-time eye ointments
- Steroid eye-drops (can only be used short-term)
- Serum tears (made from the person's own blood)
- Punctal plugs (to reduce the flow of tears away from the eye into the nose)
- Eyelid warm compresses and massage
- Omega-3 fatty acids taken orally as a nutritional supplement
- Restasis (cyclosporine 0.05%) twice daily
- Xidra (lifitegrast 5%) twice daily
- Doxycycline oral capsules 50-100 mg once or twice a day
- Lipiflow thermal pulsation and massage to the eyelid oil glands
- Intense pulsed light to the eyelid oil glands
- Meibomian (oil gland) surgical probing
- Reconstructive eyelid surgery
- Scleral contact lenses

- True-Tear intranasal electrical stimulator
- Amniotic membrane transplantation (not helpful in controlled trials but can be anecdotally useful)
- Protective glasses/sunglasses, home humidifiers, etc.

Dr. Fante and his team can help with a small group of these tests and treatments, primarily focused on surgery of the eyelids. Instead, most of the others can be performed or arranged by your local eye doctor.