



PVI Healthy Tear Film Program –



available to patients before and after laser and lens surgery and to patients seeking comfort and clarity with other vision correction options

At Pacific Vision Institute, we are offering a comprehensive program to help patients improve their comfort and vision by improving the quality of their tear film. Having worked with many patients before and after their corneal and lens refractive surgery, we have developed a systematic approach to optimizing the tear film. Healthy, stable tear film is the critical component of eye comfort and good vision. We are excited to apply the same rigorous diagnostic and treatment approach to non-surgical patients.

At first, a systematic diagnostic evaluation is performed to uncover the specific cause of such common presenting symptoms as “my eyes feel dry” or “I can’t wear my contact lenses as long as I used to” or “my eyes get tired after staring at computer all day”. Patients often attribute their symptoms to “dry eye.”

Once the cause is uncovered, we institute a step-by-step treatment plan that includes the latest modalities. The patient can then be followed at the office of their primary eye doctor with periodic check ups at PVI or they can be followed at PVI until complete resolution of symptoms and improvement in eye comfort and vision at which point they can return to their primary eye doctor.

This program is available to patients before and after eye surgery, to patients with a diagnosis of dry eye, keratopathy, and allergies, to patients interested in improving contact lens wear time, and to patients who simply want their eyes to feel and see better.

Initial Assessment

• **Chief complaint** – Patient’s description of symptoms can often help narrow the differential diagnosis. Itching, for example, is often associated with allergy rather than dry eyes. Dry eyes, especially due to low tear volume, can aggravate the symptoms of allergy by concentrating allergens and inflammatory cells in the tear film. Allergic conjunctivitis, however, often needs to be treated first. Itching localized to the lateral canthal angle is often due to angular blepharitis, caused by *Moraxella* and it is best treated with Erythromycin ointment, rather than therapy for dry eyes. Time of onset of symptoms and how the symptoms vary throughout the day can be helpful in determining whether the symptoms are due to evaporative dry eye (symptoms worse toward the end of the day), tear deficient dry eye, both, or neither. Gritty feeling on awakening, for example, may be due to epithelial basement membrane dystrophy, rather than dry eye and it needs to be treated differently.

• **Medications** – Many medications have been associated with dry eyes. Stopping them may alleviate the symptoms. In many cases, stopping the medication is not feasible. This means that more aggressive management of tear film needs to be instituted quickly. For example, it may not be possible to stop an anti-histamine that keeps allergic conjunctivitis in check. This patient may need to be



Figure 2. Look for atopic changes in periocular skin to explain patient’s symptoms. Atopy and allergy, rather than dry eyes, may be causing the symptoms.

started on Restasis (Figure 1) right away to increase their tear volume, rather than “wait and see” how they do with artificial tears alone. Punctal occlusion with long-term plugs, rather than dissolvable ones, may need to be performed early in the treatment course. Accutane can cause involuntional changes of meibomian glands and unstable tear film. Rather than simply following these patients along with lubricating drops, an anti-inflammatory topical agent, such as Restasis, for example, might be started early in the Accutane course, to possibly reduce the involuntional changes of the meibomian glands.

• **Medical History** – Ask about history of collagen vascular disease, diabetes, depression, thyroidopathy, allergies. Either the condition itself or the medications taken to treat it can be associated with symptoms of dry eyes.

• **External examination** – Evaluate blink and lid closure. Examine periocular skin to rule out atopy, rather than dry eye as the cause of the symptoms (Figure 2).

• Standard Tests

- **Tear meniscus** - height less than 0.3 mm is abnormal; look for debris and mucus in the tear film using slit beam
- **TBUT** - measure prior to instilling any eyedrops, use fluorescein strip moistened in non-preserved saline to touch inferior palpebral conjunctiva, observe in cobalt blue light; take 3 readings; normal is above 10 seconds
- **Schirmer** - blot tears from the inferior fornix, place strip at temporal 1/3 of the inferior margin. Without anesthetic, basal+reflex secretion is measured and it should be > 15 mm. With anesthetic, basal secretion is measured and it should be >10mm.



Figure 1. Restasis has proved to be the treatment of choice in both tear deficiency and evaporative dry eye. Its anti-inflammatory effect on lacrimal glands leads to increase in tear production and its anti-inflammatory effect on meibomian glands reduces tear evaporation.

- **Fluorescein** - detects disruption of inter-cellular junctions; look at staining patterns; don't forget to look at superior limbus and superior bulbar conjunctiva to rule out SLK.
- **Rose Bengal** - stains epithelium devoid of surface glycoproteins, i.e. mucin; can identify when goblet cells have been devitalized
- **Lissamine Green** – stains devitalized epithelium, especially for SLK detection

• **Slit Lamp Examination** – look for follicles (medicamentosa – especially anti-glaucoma meds and anti-virals; preservatives; cosmetics; molluscum; Chlamydia). Look at superior limbus for subtle signs of SLK (Figure 3). Evert the lid and look for papillae. Look for signs of anterior and posterior blepharitis. Look for signs of epithelial basement membrane dystrophy. Look for keratitis. Recently, we have seen a number of patients with sectoral keratopathy (Figure 4). Their main symptom was decreased vision. The most likely reason for this pattern of keratopathy is probably medicamentosa or toxic keratopathy adversely affecting a sector of limbal stem cells that give rise to a sector of abnormal epithelium.

• **Special Diagnostics** – At PVI, we are using a variety of advanced diagnostics in managing patients with ocular surface considerations. Advanced diagnostics allow for

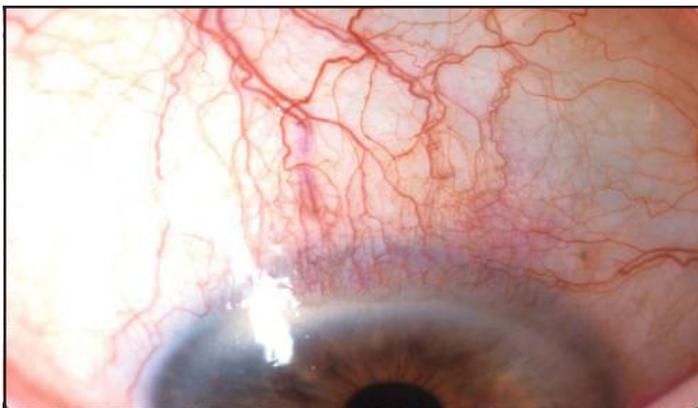


Figure 3. Subtle changes in the superior bulbar conjunctiva may indicate Superior Limbic Keratoconjunctivitis (SLK). Even subtle-appearing SLK can be extremely symptomatic. Increasing the amount and quality of the tear film and discontinuing contact lens wear is the mainstay of treatment.

quantitative assessment of tear film to help solidify the diagnosis and monitor the response to treatment.

- **Osmolality** – in patients with keratoconjunctivitis, osmolality is high, above 310milliosmols/liter
- **Touch Tear MicroAssay** (Figure 5) – allows for in vitro diagnostic measurement of the following proteins in tears:
 - **Lactoferrin.** Lactoferrin is an iron binding pro-

tein secreted directly by the epithelial acinar cells of the lacrimal glands. In patients with dry eyes, lactoferrin levels are lower (<0.9 mg/ml) than in patients with normal tear production (1.4 mg/ml).

- **IgE.** IgE levels are normally low in human tears (<39 ng/ml). In patients with allergic conjunctivi-

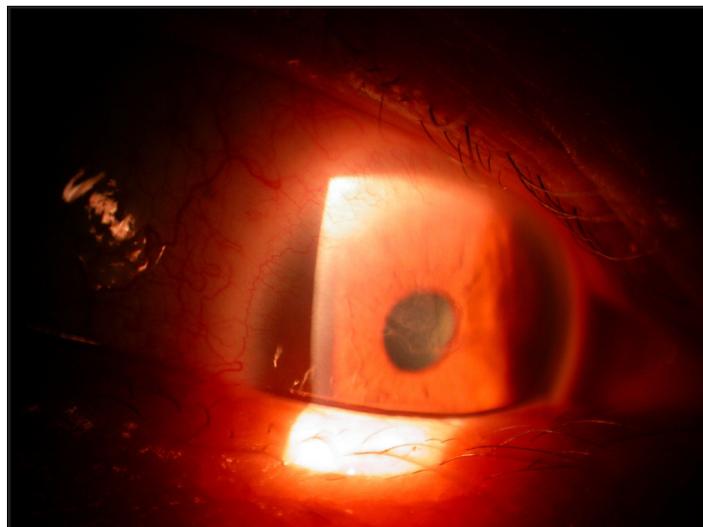


Figure 4. Sectoral keratopathy. Treatment involves discontinuing contact lenses and all topical medications and using preservative-free lubricating drops frequently. Patients should be counseled that the cornea may take months to clear and it may take a while for the vision to improve.

tis and vernal conjunctivitis, IgE levels are elevated (204 ng/ml and 341 ng/ml, respectively). In patients with bacterial and viral conjunctivitis, IgE levels can also be mildly elevated at 57 ng/ml.

- **Impression Cytology** – allows us to determine goblet cell density, squamous metaplasia, and keratinization

Differential diagnosis

History, examination, and tests aim to differentiate between the following conditions:

- Dry Eye – evaporative vs. tear deficiency vs. both
- Allergic conjunctivitis
- Bacterial conjunctivitis
- Viral conjunctivitis
- Blepharitis – anterior vs. posterior vs. both
- Epithelial Basement Membrane Dystrophy
- Herpes virus
- Medicamentosa/Toxic keratoconjunctivitis
- Superior Limbic Keratoconjunctivitis
- Sectoral keratopathy
- Keratitis

Treatment

Treatment is tailored to diagnosis. Here are examples of treatment protocols

• Evaporative Dry Eye

- Restasis BID + Doxycycline 50-100 mg po BID + warm compresses and lid scrubs QD + lower computer monitor + humidifier at work. Once symptoms improve, stop Doxycycline and start Hydroeyes supplements BID.

• Tear Deficiency Dry Eye

- Restasis BID + punctal occlusion with either silicone plugs or Smart Plug + tear supplements

• Evaporative + Tear Deficiency Dry Eye

- Restasis BID + Doxycycline 50-100 mg po BID + warm compresses and lid scrubs QD + lower com-



Figure 5. Touch Tear MicroAssay allows us to measure the levels of specific proteins in tears, assisting in diagnosis and management of patients with ocular surface conditions and helping differentiate dry eyes from allergies

puter monitor + humidifier at work + tear supplements. Once tear break up time improves, perform punctal occlusion with either silicone plugs or Smart Plug and replace Doxycycline with Hydroeyes

• Epithelial Basement Membrane Dystrophy

- Muro ointment at night and Muro drops QID during the day

• Sectoral Keratopathy

- Stop contact lenses and all drops other than preservative-free lubricating drops, such as Refresh Plus and Celluvisc. Use these every hour

• Allergic conjunctivitis

- First line treatment = anti-histamine/mast cell stabilizer (Patanol, Pataday, Elestat, Optivar, Zaditor)
- More severe/symptomatic cases = steroid for 1-2

weeks (Alrex, Lotemax, FML)

- Concomitantly with the above medications, use preservative-free artificial tears and Restasis BID to reduce inflammation, increase tear production (will dilute and wash away allergens), and possibly to modulate inflammatory cascade. ■

Calendar of PVI Grand Rounds

By invitation only:

- 10/22/08 Refractive Surgery
- 11/20/08 Presbyopic IOL update
- 12/11/08 PVI Holiday Dinner
(Practice Management Pearls)
- 01/22/09 Glaucoma
- 02/26/09 Binocular vision
- 04/23/09 8th Annual San Francisco Cornea, Cataract, and Refractive Surgery Symposium

Sight Gags by Scott Lee, O.D.

Book on Amazon.com



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