



At Pacific Vision Institute, we are excited about the novel approach to optimizing ocular surface with buffered topical anesthetic to deliver outstanding results for patients undergoing PRK. Customized laser algorithms, new generation of AI-driven treatment planning formulas, and fast epithelial recovery reduced healing time by nearly 50%, even in patients with high corrections. Fast healing time and smooth ocular surface led to PRK patients achieving 20/15 and 20/10 vision in half the time it took prior to implementation of the new protocol. We have since shared the protocol with the San Francisco Bay Area optometric community who wished to implement this topical anesthesia protocol during eye exams.

## 5 Things We Are Doing Differently This Year: Update on Refractive Surgery, Cornea, and Ocular Surface Management

In the ever-evolving field of eye care, the majority of what we do is rooted in science and fundamentals. There are many times in our careers, however, that we rely on the “art of medicine” as we care for our patients. This means that if we see a pattern emerge in patients we are treating, we may think “outside the box” and refine our approach to managing these patients. This is what makes patient care interesting and fosters continuous innovation in our incredible field we are so passionate about.

### #1 Buffering and chilling Proparacaine to create flawless ocular surface after LASIK and fast recovery after PRK



Pristine ocular surface is essential to patients enjoying great vision results after refractive surgery. During pandemic, we noticed that nearly twice as many patient as prior to pandemic developed epithelial loosening during LASIK and PRK. SARS-CoV2 virus is known to bind to ACE receptors. These are present on corneal epithelium. We hypothesized that viral-corneal interaction may weaken epithelial adherence and makes ocular surface more vulnerable. After exploring different approaches to strengthen ocular surface, we collaborated with Dr. Brian Will, an ophthalmologist who published protocols on buffering anesthetics to lessen epithelial disruption after their application. The pH of proparacaine is acidic. By buffering it to increase pH to neutral and then chilling it to preserve the anesthetic effect, we found dramatic improvement in epithelial integrity. This resulted in near elimination of epithelial loosening during LASIK and significant improvement in the speed of vision recovery after PRK.

# Clinical News & Views

## PVI protocol for buffering Proparacaine:

1. Proparacaine 0.5% shipped frozen overnight
2. Store in a freezer until ready to use
3. Thaw several bottles at room temperature
4. Remove topper from each bottle
5. Add 15 drops of 0.1N NaOH (Fisher Scientific, Product #SS276-1) to each bottle using transfer pipette (Samco Scientific, pediatric, graduated pipette 5" long, 0.3cc 3ml). This should bring pH in each bottle to 7.0
6. Put a drop from each bottle to pH paper (Fisher Scientific pH paper strips 6-8) to make sure it's pH 7.0
7. Replace dropper back
8. Leave at room temperature for several hours
9. Put in scrubs/shirt/pants pocket for 1-2 hours. Body temperature promotes buffering.
10. Put in freezer.
11. Take out bottle the next day and keep on ice throughout the day to keep cold.



Father-daughter PRK

## #2 Applying anti-inflammatory protocol to successfully manage recurrent corneal erosions.



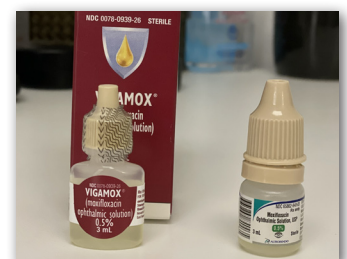
A typical protocol for treating recurrent erosions is Muro drops and/or ointment. Many patients do well with this protocol. There are patients, however, whose symptoms don't respond to Muro. They can be treated surgically with either stromal puncture or PTK but these procedures may not be optimal for some patients. If EBMD is the visual axis, for example, stromal puncture may not be great since there will be scarring. PTK requires an older type of laser utilizing broad laser beam which is not readily available, since most of these lasers were updated to scanning beam lasers. PTK also requires some down time. What prompted us to explore medical alternative to Muro is the following. We had a patient who complained of eye burning whenever she had an episode of recurrent erosion. Burning typically suggests an inflammatory process. We hypothesized that her MGD (very mild) could be playing a part in destabilizing epithelial adherence to Bowman's. In reviewing published, peer-reviewed literature on medical treatment of recurrent erosions, we came across this reference: Wang, L et al. Treatment of recurrent corneal erosion syndrome using the combination of oral doxycycline and topical corticosteroid. Clin Exp Ophthalmol. 2008 Jan-Feb;36(1):8-12. We have since stopped using Muro. This is our current protocol for treating recurrent erosions:

## PVI protocol for managing recurrent corneal erosions:

1. Start Omega-3's 4,000 mg QD and EyeSuvis QID
2. Continue EyeSuvis QID x 2 weeks, then stop and start FML 0.1 QID x 4 weeks
3. If symptoms resolve, decrease FML to BID for another 4 weeks, then stop
4. If symptoms persist, add Doxycycline 50 mg po BID and decrease FML to TID. Continue for 4 weeks. Then, decrease FML to BID for another 4 weeks. Then stop
5. Symptoms should resolve by then
6. If symptoms don't resolve, look at the lids - patients with eczema on the lids or significant rosacea need to be referred to dermatologist for eczema/rosacea treatment.

## #3 Switching to brand name medications when patient doesn't respond to generic ones.

Generic version of a medication is considered equivalent to brand name if it is 80% as effective as the brand name. During surgical procedures we use brand name medications that we purchase specifically to insure 100% performance, especially with antibiotics. Postoperatively, we have observed some patients reporting excessive ocular discomfort and corneal irritation while on Moxifloxacin (a generic version of Vigamox). When we switch the patients to the brand name, Vigamox, the discomfort and corneal irritation resolved immediately. We have also successfully treated marginal keratitis with brand name Pred Forte when patients did not respond to the generic version, Prednisolone Acetate.



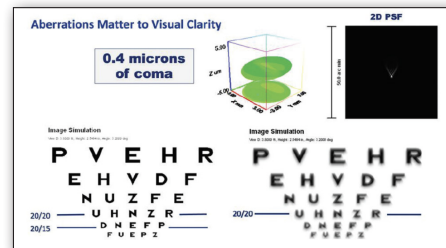
# Clinical News & Views

## #4 Using new AI-driven treatment calculation software for topography-guided LASIK/PRK.

Many improvements have occurred in excimer laser hardware, for example, including eye tracking technology and the capability of creating ultra-precise ablation patterns with more than 100,000 topographic data points. Along with this precision comes an extraordinary amount of data to interpret and convert into the visual results that patients desire, unfortunately requiring time-consuming surgical calculations for each cornea. This challenge, once at the forefront of topography-guided LASIK, is becoming



a distant memory, thanks to artificial intelligence (AI) software, which can provide treatment calculations in a matter of seconds, resulting in some of the best LASIK visual outcomes published to date. The precise measurement of slight elevations and undulations of each cornea is what gives the Contoura Vision system its great potential, but using it on corneas where topographic cylinder does not match the refractive cylinder is challenging because, in these eyes, neither topography nor manifest refraction could fully quantify the total refractive power by itself, and it could take hours to calculate by hand. The Phorides Analytic Engine (Phorides) was created to bridge this gap and assist us in fully harnessing the power of the Contoura Vision technology. In its latest version, the software automated calculation of higher order aberrations' effect on corneal cylinder and power. This automation resulted in more precise treatment planning, enabling us to obtain better than 20/20 vision with greater frequency.



The ability to simultaneously neutralize all sources of astigmatism and corneal irregularities results not only in better visual acuity, but also in better visual quality. Normalizing the topography reduces higher-order aberrations such as coma and trefoil, which in turn lessens blur and shadowing.

## #5 Cross-linking keratoconus suspects prior to topography-guided PRK.

Accurate diagnosis is essential to determine what refractive surgery procedure patient is best suited for. We have seen patients in consultation with mild myopia whose corneas were either too thin or too uneven for LASIK. PRK was recommended to these patients. But, can these patients have PRK safely? Do they have forme fruste keratoconus? Are they at risk for corneal ectasia even after PRK? To answer these questions, we perform 4 corneal diagnostic tests - topography, tomography, wide field epithelial thickness mapping, and ocular response analysis. We then use our new AI-driven software to combine data from multiple diagnostic modalities to assess patient's risk for keratoconus. Typically, if more than two tests are abnormal (even mildly so), the patient, most likely has forme fruste keratoconus. If these patients want to pursue laser vision correction, corneal cross linking needs to be performed prior to their PRK to strengthen their corneas. (32 y.o. accountant, -2.50D/-2.50-0.50x84; Brian Rosa) ■

# News @ PVI



Pacific Vision Institute is named Best LASIK Eye Surgeon in 2023



Dr. Faktorovich participated in the *Forefront Refractive Surgery Course* in London, UK. Advances in SMILE and other novel femtosecond laser refractive surgery applications were presented



*Eye World* interviewed physicians from Pacific Vision Institute on the relationship between COVID and recurrent erosions as well as PVI approach to intraoperative corneal surface optimization with novel anesthetic formulation.



A systematic review "Topical Analgesics for Acute Corneal Pain", co-authored by physicians at PVI was published in *Journal of Cataract and Refractive Surgery*



<https://pubmed.ncbi.nlm.nih.gov/37232414/>





**PACIFIC  
VISION  
INSTITUTE**

*Eye Doctors Choice*

This month, Pacific Vision Institute celebrates a quarter of a century anniversary since opening its doors in San Francisco and establishing PVI Optometric Co-Management Network for the Bay Area optometric community. Pacific Vision Institute has been dedicated to co-managed patient care since its inception, believing that it is in the best interest of the patient to have the benefit of an optometrist and an ophthalmologist included in the process before, during, and after eye surgery. Pacific Vision Institute focuses solely on surgical treatments while partnering with PVI-affiliated optometrists to deliver primary eye care and optical solutions to patients. Over the years, PVI has been dedicated to providing popular high-level continuing education programs to support eye doctors and ensure the most advanced level of care for patients. From the first Symposium to the first workshop, PVI is passionate about hands-on learning and skill transfer. The Institute was one of the first in the Bay Area to co-manage LASIK, keratoconus, cataracts, and other vision correction procedures, and, today, it continues its commitment to the success of the San Francisco Bay Area optometric community. As one young optometrist and a new practice owner (shout out to Dr. Diana Pham at Olive + Spex, Oakland) said recently: "Let's continue to thrive together!"



2nd Annual Cornea Symposium  
at the Four Seasons Hotel in San Francisco



OD LASIK workshop 2004



Dr. Faktorovich & Dr. Pham  
in Dr. Pham's new practice

eFocus  
**Refractive Advisor**



**Q: My patient is breastfeeding. When can she have LASIK?**

**A:** We typically recommend patients wait three months after delivery to have LASIK. We make sure that sphere and cylinder are within 0.5D of pre-pregnancy prescription. Breast-feeding patients are advised to feed the baby with pumped milk or formula on the day of patient's procedure. This allows the patient to take lorazepam just prior to their procedure. The patient can resume breastfeeding the day after their procedure. We also recommend patients occlude their punctae while instilling postoperative antibiotic and steroid drops. The drops and the method of instillation have been vetted and approved by pediatricians. We encourage patients to communicate with their individual pediatricians to confirm that the drops are ok. To-date, we have performed LASIK on hundreds of breast-feeding women with excellent outcomes. ■



**OPTOMETRIC CONTINUING  
EDUCATION**

**November 2nd: New Perspectives on Keratoconus**

**management Dinner CE Presentation** - Guest Speaker Melissa Barnett, OD - diagnosing disease early (asymmetry, oblique axis, change by 0.5D), 4 reasons why don't see more patients for CXL.

**Ongoing:** Live Surgery Observation for OD Staff (includes breakfast) - please contact us at [comanagement@pacificvision.org](mailto:comanagement@pacificvision.org) to schedule the date and time for your staff to attend and learn.

**Ongoing:** Lunch-and-Learn Education for OD Staff at your office (includes lunch provided by Pacific Vision Institute) - please contact us at [comanagement@pacificvision.org](mailto:comanagement@pacificvision.org) to schedule the date and time for this fun and educational event for your office staff



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