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eFocus

Excellence in Co-Managed Care

PACIFIC VISION INSTITUTE
Life in Focus

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Pacific Vision Institute Video Workshop in Cataract and Lens Implant Surgery for co-managing doctors was held at Café des Amis in San Francisco. Dr. Neil Friedman, Director of Cataract and Lens Implant Surgery at Pacific Vision Institute presented videos of modern cataract surgery, implantation of ICL phakic IOL, Crystalens, multifocal, and toric IOLs. Videos for approaching challenging cases were presented. Marin workshop was held at Poggio in Sausalito and Peninsula/South Bay workshop will be held in 231 Ellsworth in San Mateo. Doctors earned 2 hours of CE credit for the workshop.

How to diagnose epithelial basement membrane dystrophy (EBMD) during LASIK evaluation

Patients diagnosed with EBMD are best treated with PRK rather than LASIK. LASIK in a patient with EBMD may result in loosening of the epithelium during flap creation or flap lift. An abrasion may be created. Healing is likely to be prolonged. DLK may develop. Some patients may develop epithelial ingrowth. With PRK, on the other hand, flap related complications are avoided. It is, therefore, important to make an effort during the preoperative examination and figure out if EBMD is present.

In some patients, the findings are obvious (**Figure 1**). They have classic signs – maps, epithelial microcysts, fingerprint lines. Some patients may also have classic symptoms of recurrent erosion – pain on awakening, lid "sticking" to the cornea in the morning, multiple corneal abrasions. Patients with obvious signs and symptoms, however, are rare. Most patients with EBMD who present for refractive surgery have few, if any findings. We've compiled a list of symptoms and signs to look for and special examination techniques that can be utilized to rule out even subtle EBMD during preoperative exam

Here is a list of things to ask and look for during exam:

- **Ask every patient if they have eye pain or discomfort on awakening.** Some patients with nocturnal lagophthalmos may have these symptoms but they will rarely describe a sensation of the eye lid "sticking to the eyeball" when they wake up. Patients with EBMD are more likely to use that description. They may also describe having to move their eyes around while the lids are still closed to prevent the eye pain on awakening symptom.
- **Ask every patient if they had several incidents of corneal abrasion.** Many patients with normal corneas may have had one or two incidents. But if they had more than

• NEW FEATURE •

In this issue of eFocus, we are introducing a new feature: a quiz to test your knowledge of managing patients with refractive surgery, cornea, cataract, and lens procedures. The answers are provided at the end of the quiz. Look for the quiz section in every issue of PVI eFocus.

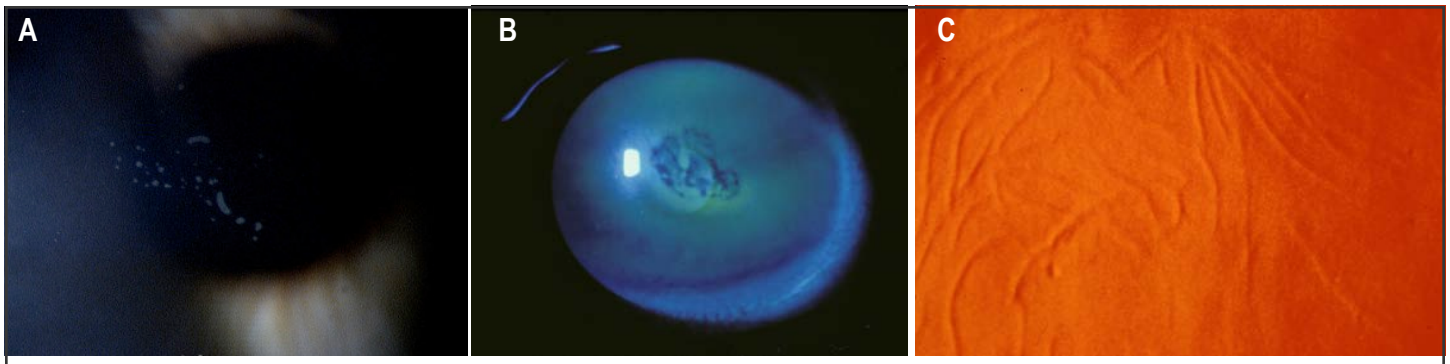


Figure 1. Classic finding of EBMD. A: Microcysts are opacities at the corneal epithelial level. B: Maps are often most visible after fluorescein instillation. C: Retroillumination is an important part of corneal examination – fingerprint lines, among other findings, may be detected.

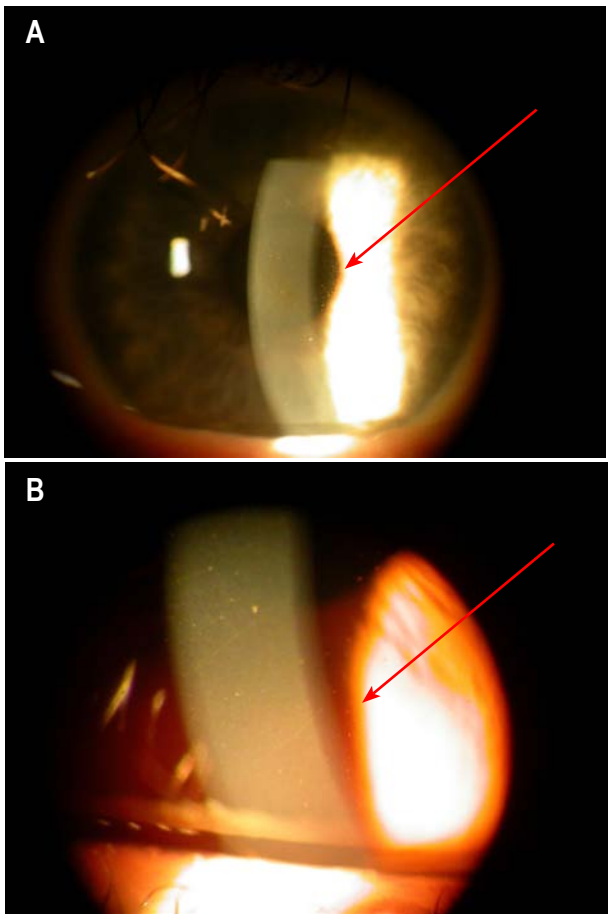


Figure 2. Corneal microcysts of EBMD (A) need to be distinguished from intraepithelial microcysts often associated with contact lens overwear (B). The former are typically larger and more symmetric. They are generally clustered in one area. The latter are typically smaller, may be shaped more irregularly, and may be scattered over a wider corneal area

two, EBMD may be suspected. If they had two in one eye, especially if unassociated with sleeping in contact lenses, for example, or other possible exogenous causes of corneal abrasion, EBMD may be suspected.

- **Look for microcysts on slit lamp examination – use retroillumination and scatter techniques and examine the entire cornea.** Even if a single microcyst is present, it may be a sign of EBMD. Microcysts of EBMD (**Figure 2A**) need to be differentiated from tiny intraepithelial cysts that are associated with contact lens overwear (**Figure 2B**). The latter are typically smaller, scattered, and decrease in quantity once contact lens wear is discontinued
- **Make sure to instill fluorescein and look for map areas with blue light.** Even if cornea appears entirely clear on slit lamp examination with white light, map areas may become visible as areas of negative staining after fluorescein instillation (**Figure 3**).
- **Perform Q-tip test in each of the four corneal quadrants.** In patients with clear corneas but symptoms of possible EBMD, instill topical anesthetic and then press the corneal surface with a Q-tip in each of the four corneal quadrants. Move the q-tip slightly and see whether or not the epithelium moves. This can also be done in patients with corneal findings suspicious for EBMD but not classic EBMD – i.e. tiny intraepithelial cysts, a single microcyst, etc. We recently had a patient in whom a single microcyst was discovered on retroillumination. The patient also complained of occasional pain in that eye, but not on awakening. Corneal exam with fluorescein was normal. But, when a q-tip was gently moved across the cornea in the area of the microcyst, the epithelium loosened. PRK was performed in the patient rather than LASIK.
- **Analyze corneal topography.** Irregular corneal topogra-

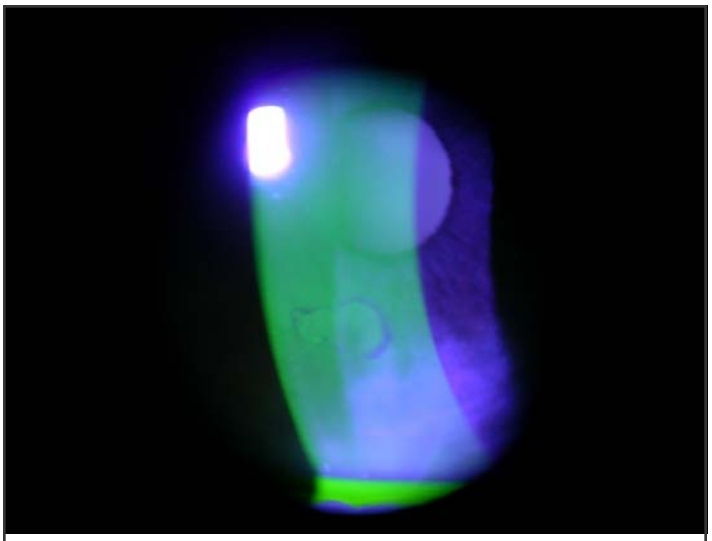


Figure 3. Small map area is seen after fluorescein instillation. The cornea is otherwise clear with white slit lamp light.

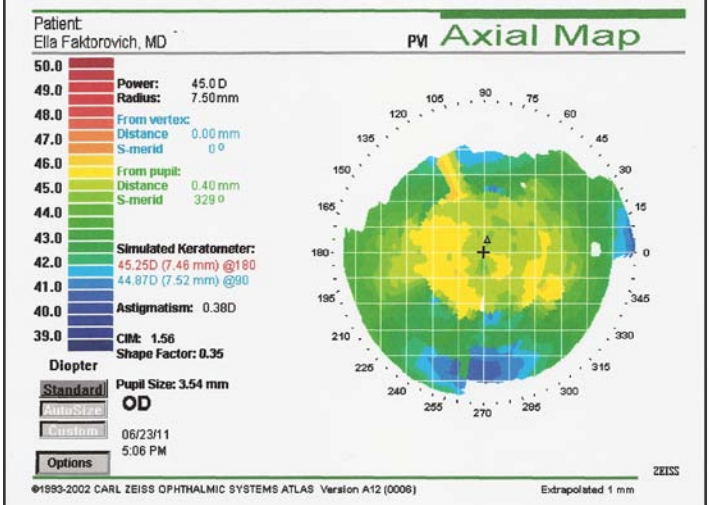


Figure 4. Irregularly irregular topography in an asymptomatic 26 year old patient with normal tear film may be due to EBMD

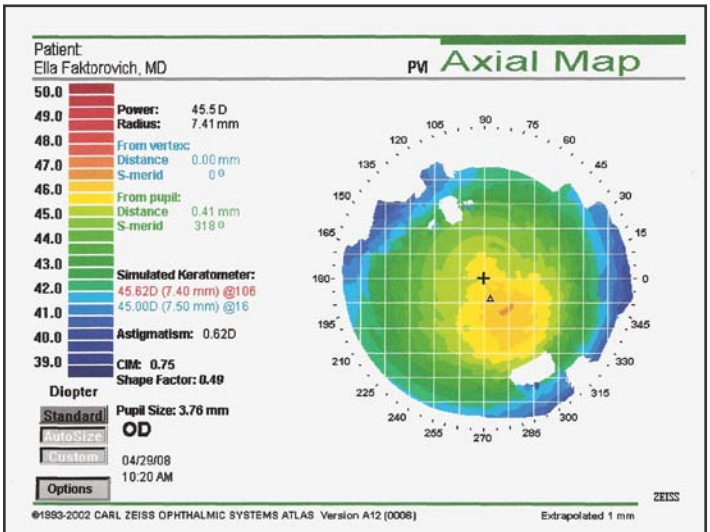


Figure 5. Inferior steepening in an asymptomatic 29 year old patient may be consistent with EBMD. LASIK was performed in this patient. The epithelium loosened over the entire flap during flap lift. Patient eventually healed with 20/20 UCVA OU that remained stable at 3 year follow up.

phy can be caused by a number of different underlying issues. One of the problems may be EBMD. Topographic patterns of EBMD may include – irregularly irregular topography (**Figure** 4) and inferior steepening (**Figure** 5). Patients with these findings are probably best treated with PRK rather than LASIK.

Laser vision correction of residual refractive error after ICL phakic IOL: what to expect

We recently analyzed our outcomes of laser vision correction (LVC) in patients with residual refractive error after ICL phakic IOL. Since current ICLs correct only myopia, patients with preoperative astigmatism may have some residual postoperative astigmatism. Should these patients wait for toric ICL or should they have a bioptics procedure? Bioptics is a combination of ICL to correct myopia + LVC to correct astigmatism.

We analyzed our data in patients who underwent ICL procedures over the past three years. Mean preoperative myopic spherical equivalent was -11.02 +/- 2.29 D. The range was -7.00 D to -15.88 D. Seventy percent of patients had preoperative cylinder less than 2.00 D. These patients were satisfied with their post-ICL vision and did not require an enhancement. Patients with more than 2.00 D pre-ICL cylinder opted for laser vision correction enhancement after ICL. In this patient group, mean astigmatism was 3.04 +/- 0.92 D. The range was 2.00 D to 5.00 D. Following laser vision correct of the residual refractive error, mean spherical equivalent was -0.22 +/- 0.17 (range plano to -0.50D). Mean astigmatism was 0.25 +/- 0.29 D (range plano to 0.75D). Uncorrected visual acuity of 20/20 or better was in 90% of these patients. The results are quite remarkable considering that patients started off with myopia of up to -15D and astigmatism of up to 5D.

The results of the postoperative outcomes analysis in patients who underwent ICL at PVI followed by LASIK indicate that the combination of procedures is extremely effective in eliminating refractive error and resulting in 20/20 or better uncorrected vision.

Workup for cataract and lens implant patients

The main indication for cataract surgery is when a person's visual function no longer meets his or her needs. For these patients, cataract extraction will provide improved vision and better quality of life. Snellen visual acuity is a common way of assessing visual acuity. However, it is just a small part of evaluating patient's overall visual function. Patients with 20/20 Snellen acuity may be quite impaired by what they describe as blurry, decreased, or poor vision. We, therefore, need to utilize a variety of tests to accurately diagnose the patient. We also need to obtain a detailed history from patients about how their visual symptoms affect their daily activities and hobbies.

VISUAL ACUITY is tested monocularly with high contrast (i.e., black letters on a white background). While this is the standard method of assessing vision, it is artificial and not representative of real world conditions. **CONTRAST SENSITIVITY** testing is more realistic but less commonly measured. Contrast sensitivity evaluates the ability to differentiate between an object and its background using low contrast letters or sine-wave gratings with different spatial frequencies. Whenever visual acuity is decreased, so is contrast sensitivity, but sometimes contrast sensitivity can be affected significantly more than visual acuity. Therefore, to better assess a patient's visual function, contrast sensitivity should be tested.

Another helpful measurement is **GLARE TESTING**. This

is often performed with a brightness acuity test (BAT) to simulate glare from a light source, but can also be performed by holding a light off axis while the patient reads the eye chart. Patients with cataracts may have good distance visual acuity in a dim room, but experience a significant reduction in acuity from a bright light. This is the characteristic situation with a central posterior subcapsular cataract that scatters light and blocks the entrance pupil when the pupil constricts.

In our office, we also utilized the **PENTACAM**, which has a unique feature that quantifies the density of the crystalline lens and maps the result so that cataracts can be objectively graded.

Other tests may need to be performed to assess the visual potential in a cataract patient with coexisting ocular pathology or to rule out macular or optic nerve pathology when the cataract interferes with a clear view of the posterior pole. **PINHOLE VISION** is a fast and easy way to obtain a minimum level of the patient's visual potential after cataract surgery. The **POTENTIAL ACUITY METER** (PAM) test projects an eye chart directly onto the retina through lens opacities and is also useful in estimating how much the cataract is contributing to the patient's visual loss. **COLOR VISION** can be used to assess the optic nerve and macula. Color vision testing is a sensitive indicator of optic nerve function and can be tested quickly with Ishihara pseudoisochromatic or Hardy-Rand-Ritter plates. In addition, gross macular function can be evaluated with red perception by asking the patient to identify the color of a red eye drop cap. **OPTICAL COHERENCE TOMOGRAPHY** (OCT, **Figure 6**) is probably the most helpful test for diagnosing macular pathology, especially subtle findings and when an advanced IOL implant is being considered. **VISUAL FIELD TESTING** is also helpful since it will identify scotomas from suspected retinal or optic nerve pathology. The presence of generalized depression in an otherwise normal field test is characteristic of a significant cataract. Finally, we should not forget the basics: **PUPIL TESTING** is performed in all patients with decreased vision because the presence of a relative afferent pupillary defect indicates optic nerve or widespread retinal dysfunction.

Therefore, although we usually diagnose a visually significant cataract from the patient's symptoms, the Snellen acuity, and the presence of a cataract on slit-lamp examination, there are a variety of other tests that need to be considered. These are particularly helpful when the visual acuity is better than expected, the acuity does not correlate with the severity of the patient's visual complaints, or there is other ocular pathology that may be contributing to the reduced vision.

At Pacific Vision Institute, the standard workup for all cataract and lens implant patients includes:

- Detailed history of visual function/performance
- Visual acuity with attention to manifest and cycloplegic refractions, pinhole vision, glare testing, and contrast sensitivity when applicable.
- Careful anterior segment evaluation with attention to the cornea for any pathology (i.e., dry eye, map-dot-fingerprint dystrophy, and cornea guttate changes)
- Grading of the crystalline lens (degree of nuclear sclerosis, cortical spoking and vacuoles, and posterior subcapsular changes)
- Detailed fundus exam with attention to the optic nerve, macula, and peripheral retina.
- Advanced testing
  - Corneal topography with placedo disk topographer
  - Visante anterior segment OCT
  - Pentacam
  - Posterior segment OCT with the Stratus
  - Biometry with the IOLMaster (**Figure** 7)

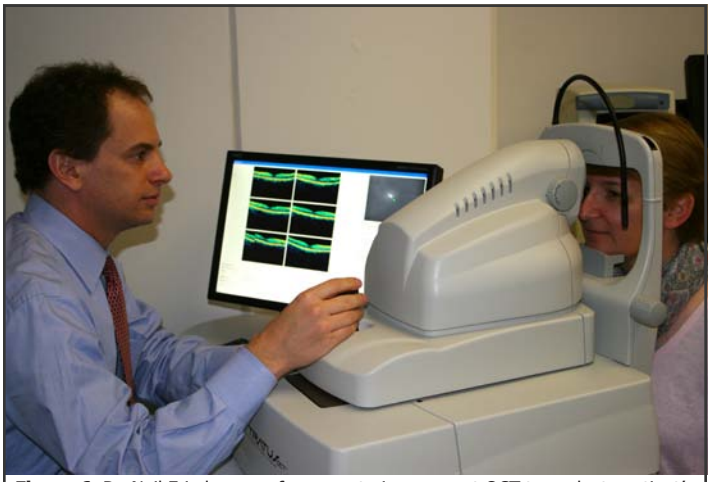


Figure 6. Dr. Neil Friedman performs posterior segment OCT to evaluate patient's macula.

Figure 7. Dr. Neil Friedman performs biometry with IOL master to determine IOL power

QUIZ

1. The best procedure for a 26 year old -13D myope with 570 micron central corneal thickness and normal corneal topography is
   a) LASIK
   b) PRK
   c) Phakic IOL
   d) Refractive Lens Exchange
   e) All of the above
   f) None of the above

2. The best procedure for a 30 year old -4D myope with 480 micron central corneal thickness and normal corneal topography is
   a) LASIK
   b) PRK
   c) Phakic IOL
   d) Refractive Lens Exchange
   e) All of the above
   f) None of the above

3. The Crystalens is what type of IOL:
   a) Monofocal
   b) Toric
   c) Accommodating
   d) Multifocal

QUIZ ANSWERS

1. C – Phakic IOL. Even though central corneal thickness is adequate for laser vision correction, the myopia is too high. Upper limit for LVC is up to -12D for LASIK and up to -10D for PRK in patients with normal corneal topographies

2. B – PRK. In patients with corneal thickness under 500 microns, PRK rather than LASIK is typically recommended. When corneal thickness is only slightly below 500 microns, myopia is low, and topography is completely normal, LASIK may be considered. ICL is approved for correction of myopia starting at -3D. At -4D, however, and normal topography, the patient will do very well with PRK. If topography was irregular in this -4D myope, ICL could have been a better option.

3. C – Accomodating. The Crystalens is designed with plate haptics that are connected to the central round optic by hinges that allow the lens to flex and move with accommodation.

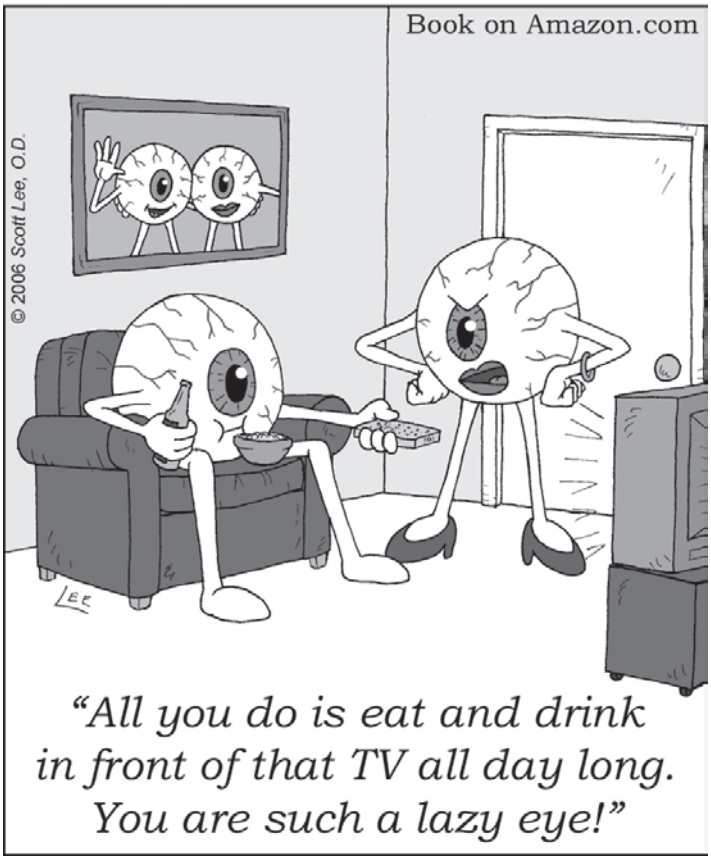
Patient Comanagement Program

Join Pacific Vision Institute's Patient Comanagement Program!
EMAIL: comanagement@pacificvision.org
for more information

Pacific Vision Institute Optometric CE Program

08/23/11	Dry Eye Lecture -- San Francisco, CA
08/25/11	Video Workshop in Cataract and Lens Implant Surgery -- 231 Ellsworth, San Mateo, CA (2 hrs CE)
10/12/11	PVI Grand Rounds (4 hour CE)

Sight Gags *by Scott Lee, O.D.*



"All you do is eat and drink in front of that TV all day long. You are such a lazy eye!"

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