

# eFocus

Excellence in Co-Managed Care



PACIFIC  
VISION  
INSTITUTE

*Life in Focus*

415.922.9500 • [www.pacificvision.org](http://www.pacificvision.org)

Last month, we held a dinner with the Bay Area optometric community at the San Francisco restaurant, Quince, to discuss the trends, guidelines, and future directions in refractive surgery patient co-management.



## Current guidelines for patient selection – LASIK, PRK, and Lens Surgery

All of us who live and work in the Bay Area take pride in being advanced in many areas – technology, science, medicine, and even coffee. We are and have always been the trendsetters, not the followers. Even though we follow on Twitter, we prefer to be followed. We look at the data, we read scientific articles, we analyze the trends. At Pacific Vision Institute, we take pride in bringing to our patients and the doctors we work with the very best in information, in technology, and in results – and, together, we are always a step ahead. In this issue of eFocus, we present the most-up-to-date guidelines for refractive surgery patient selection. The information is based on the latest data published in peer-reviewed publications and/or presented at the latest scientific meetings.

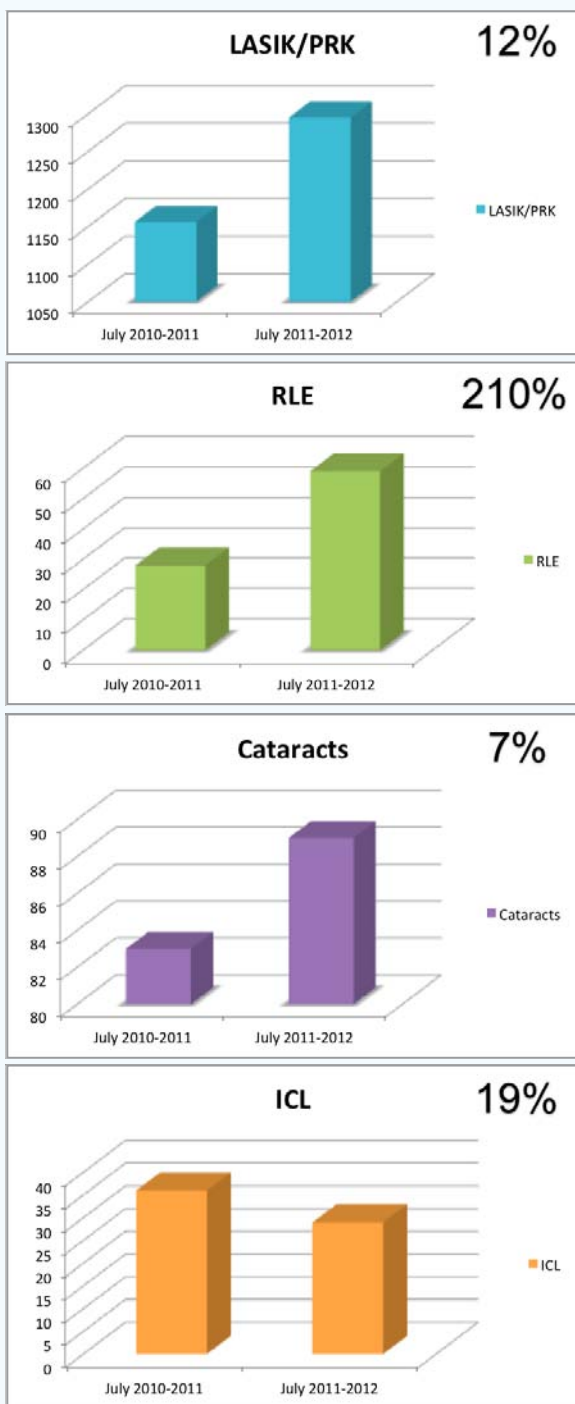
### Current trends in refractive surgery

We analyzed the trends in co-managed refractive surgery patients at PVI in the past 12 months and compared them to those in the prior 12 months. Here are the results:

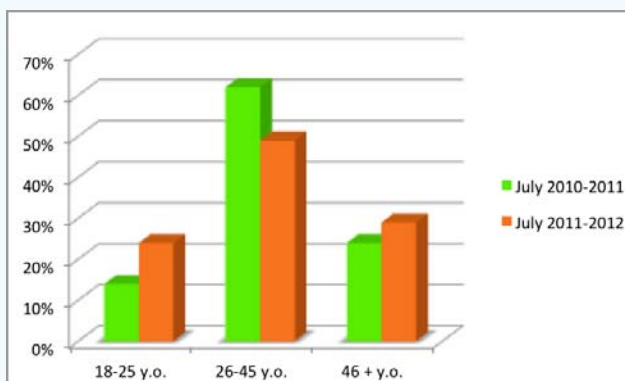
- The number of patients treated with LASIK/PRK increased by 12%
- The number of patients treated with RLE (Refractive Lens Exchange) increased by 210%
- The number of patients treated with cataract surgery increased by 7%
- The number of patients treated with ICL phakic IOL lens implant surgery decreased by 19%
- The % of patients who are found to be non-candidates for refractive surgery decreased from 11% to 6%
- Average refractive errors treated remained unchanged
- The number of patients in the 18-25 y.o. group increased from 14% to 24%. The number of patients in the 46+ y.o. group increased from 24% to 29%

These trends suggest that we are treating more patients and an increasingly wider range of patients –both younger and older and even patients who may not have been considered suitable for refractive surgery in the past. This is largely due to an increasing patient interest in vision correction surgery and the screening and education efforts by their co-managing doctors.

- The co-managing doctors routinely bring up to their patients refractive surgery as one of the approaches to vision correction
- The co-managing doctors educate patients about different refractive surgery procedures. The patients then come to their pre-surgical examination prepared for a treat-



**Figure 1.** Comparison of procedure volumes 2011 vs 2012



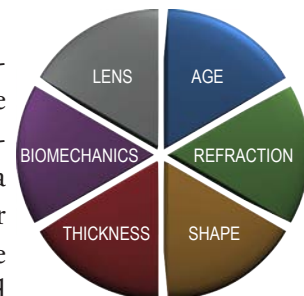
**Figure 2.** Comparison of patient age in 2011 vs. 2012

ment that's best for them, rather than just LASIK

- One area that requires more education is the ICL phakic IOL. Patients are still more likely to undergo laser vision correction or refractive lens exchange than the phakic IOL. With proper education about advantages of this procedure in certain patients, we anticipate an increase in the number of ICL treatments next year

### Six-step guideline to treatment

The co-managing physician diagnoses the patient's refractive error. Then, based on the patient's age, the doctor makes a treatment recommendation. For example, a mild to moderate myope who is between 18 and 45 years old, can be treated with LASIK/PRK or ICL. Refractive Lens Exchange (RLE) would typically not be in the treatment plan for this patient. On the other hand, presbyopes need to know about RLE regardless of their prescription. After the initial diagnosis and treatment recommendation by the co-managing doctor, the patient is referred to the surgery center for pre-surgical exam. Four additional steps are performed at the surgery center – corneal shape assessment, corneal thickness measurement, corneal biomechanics evaluation, and crystalline lens density measurement. The diagnosis is confirmed and the treatment is scheduled.



AGE	PROCEDURE
18 and older	LASIK/PRK
21 to 45	Lens Implant ICL
45 and older	Lens Replacement RLE
Any age	Cataract



REFRACTION	PROCEDURE
-0.5D to -12D SE	LASIK/PRK
+0.5D to +5D SE	LASIK/PRK
0.5D to 5D AST	LASIK/PRK
-3D to -20D SE	Lens Implant ICL
Any	Lens Replacement RLE
Any	Cataract

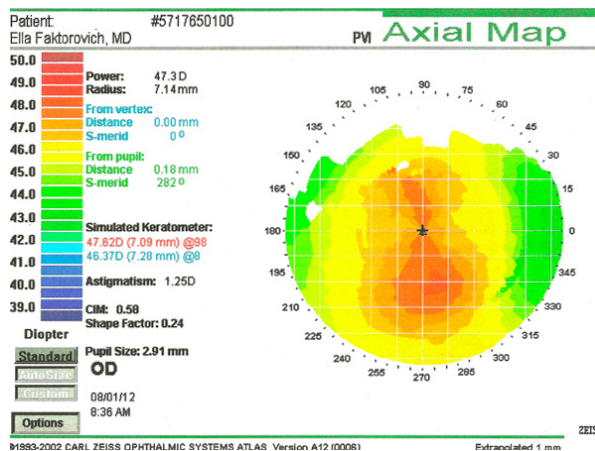


SHAPE	PROCEDURE
<b>TOPOGRAPHY</b>	
Smoothness	LASIK vs. PRK
Symmetry	LASIK vs. PRK
Elevation	LASIK vs. PRK
<b>PENTACAM</b>	
Keratoconus index (KI)	LASIK vs. PRK
Belin-Ambrosio (BA)	LASIK vs. PRK

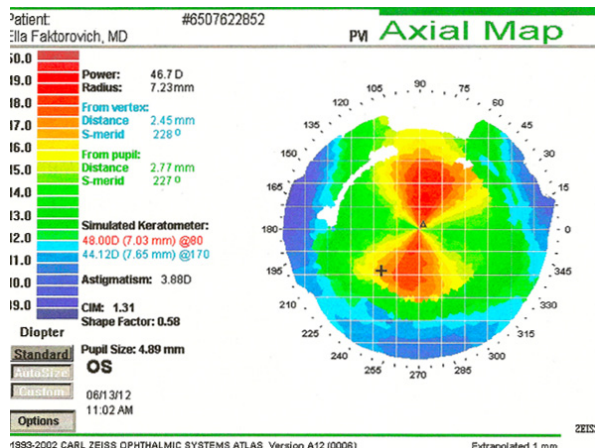


If severe shape abnormalities are detected or any one of the other 5 factors is abnormal, patient is recommended a lens procedure. Phakic IOL is recommended for patients under 45 y.o. RLE is recommended for presbyopes and patients older than 45 y.o.

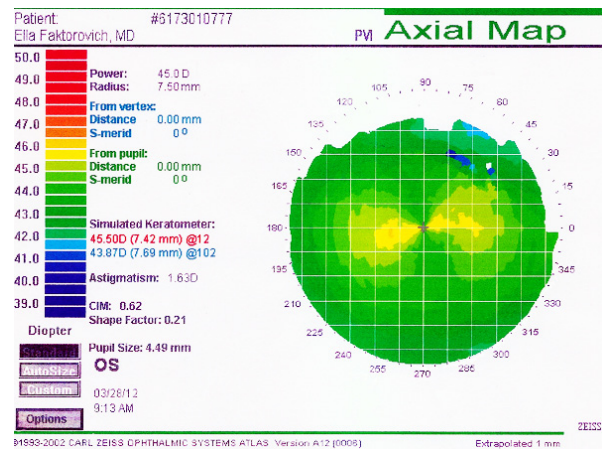
### Examples of LASIK vs. PRK based on corneal shape



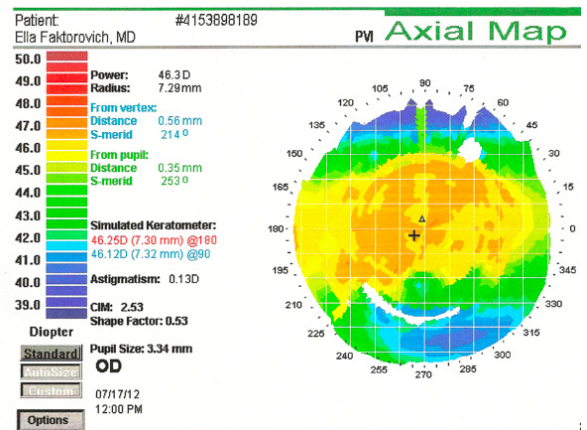
LASIK – symmetric and smooth with the rule (WTR) astigmatism



PRK – abrupt change in elevation between central and peripheral cornea indicates central corneal steepening



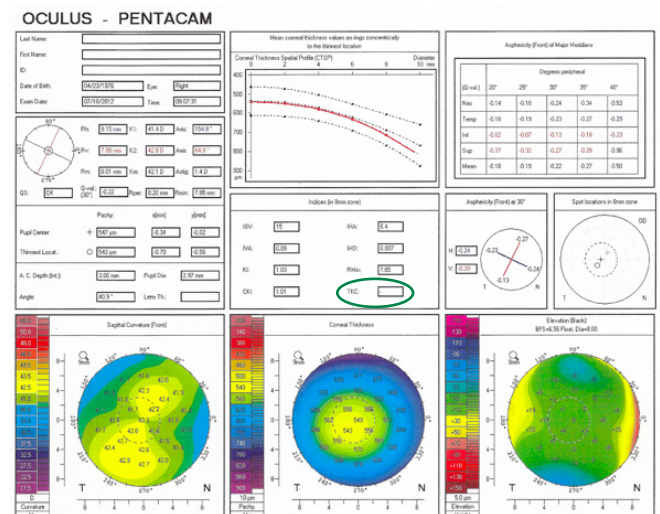
LASIK - symmetric and smooth against the rule (ATR) astigmatism



PRK – irregular topography, abrupt change in elevation between central and peripheral cornea indicates central corneal steepening.

### Keratoconus Index (KI)

KI (green oval on the map below) is generated by Pentacam. It is a composite of seven different types of corneal shape measurements for each patient. The composite is compared to thousands of measurements in the Pentacam database. If it falls in the normal range, the KI is “negative.” If it falls in the abnormal range, the KI is “positive” which is indicated by red.



## Posterior corneal elevation (“posterior float”) on Belin-Ambrosio (BA): watch out for false positives

The Belin-Ambrosio (BA) program on Pentacam allows careful analysis of anterior and posterior corneal surface. Subtle change in posterior surface may indicate subtle predisposition to corneal thinning. This finding is called “posterior elevation” or “posterior float.” If this finding is real, then PRK, rather than LASIK, may be the best treatment for the patient. The posterior float is also one measurement that is especially prone to false positives. Careful interpretation is, therefore, needed before a patient is recommended PRK. False positive can arise in the following situations:



THICKNESS	PROCEDURE
> 480 microns	LASIK or PRK
440 to 480 microns	PRK or ICL / RLE
< 440 microns	ICL / RLE

A recent multi-center study reported at ASCRS2012 analyzed long-term outcomes of 40,000+ patients who underwent LASIK. The study concluded that patients with thinner corneas, who are otherwise normal, might safely undergo LASIK. Patients with corneas less than 500 microns, whose prescription is under 5D of myopia, and whose corneal shape is normal may be OK for LASIK.



BIOMECHANICS	PROCEDURE
CH and CRF > 9.0	LASIK or PRK
CH and CRF 9.0 to 7.0	PRK or ICL / RLE
CH and CRF < 7.0	ICL / RLE

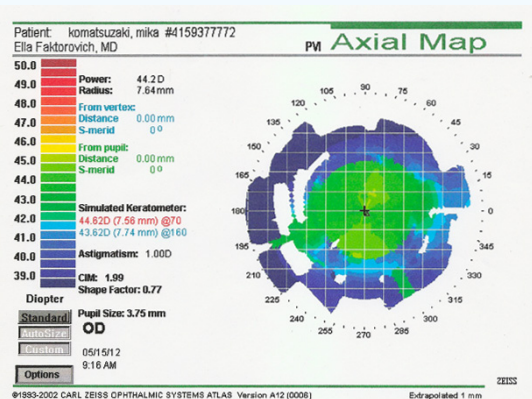
Published data repeatedly confirms that Corneal Hysteresis (CH) and Corneal Resistance Factor (CRF) are important measurements in preoperative work-up. Several studies published recently refined inclusion criteria for LASIK vs. PRK.



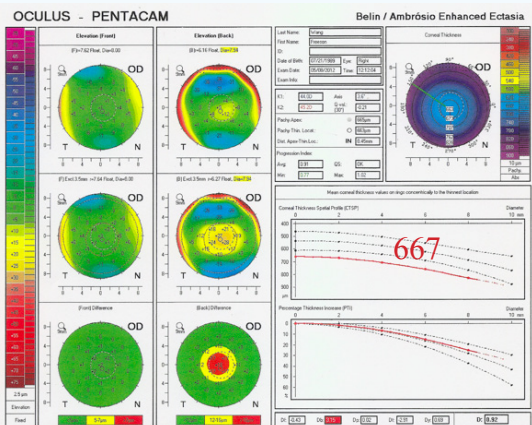
LENS	PROCEDURE
Clear	LASIK / PRK / ICL / RLE
mild changes and high myope	LASIK/PRK
mild changes and mild-moderate myope or hyperope	RLE
moderate changes +	RLE

Crystalline lens assessment has become essential in preoperative workup for all patients. Myopes are likely to develop lens changes early – including vacuoles, oil droplet cataracts, and other subtle changes. Slit lamp appearance may not be enough in assessing the level of lens change. We recommend Lens Densitometry with Pentacam for all patients undergoing refractive surgery.

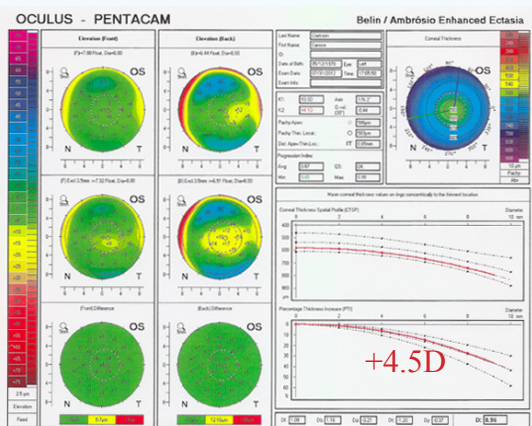
### Posterior float (PF) false +’s



Missing data

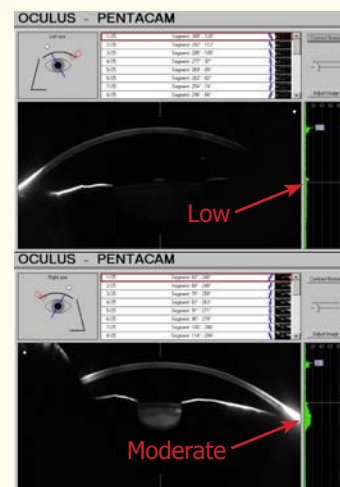


Thick



Hyperope

### Lens densitometry







## QUIZ

1. Patient is a 25-year old software engineer with -2.50D myopia OU. What procedure(s) is the patient a candidate for?
2. Patient is a 19-year old digital artist with -13 D of myopia OU. What procedure(s) is the patient a candidate for?
3. Patient is a 39 y.o. dentist with -8 D of myopia OU. What procedure(s) is the patient a candidate for?
4. Patient is a 50 y.o. chef with +2.5D of hyperopia OU. What procedure(s) is the patient a candidate for?
5. Patient is 35 y.o. -2.00 – 3.50 x 180 OD and -1.75 – 3.75 x 170 OS. What procedure(s) is the patient a candidate for?



## QUIZ ANSWERS

1. LASIK/PRK. Patient's refraction is within the range for LASIK/PRK. The co-managing doctor counsels the patient about LASIK/PRK. In the surgery center, pre-surgical measurements, i.e. corneal shape, thickness, and biomechanics are performed and either LASIK or PRK are scheduled. Patient's refraction is too low for ICL.
2. No surgery at this point. Patient's prescription is too high for LASIK/PRK. ICL is a good procedure for this patient, but it's FDA-approved for patients who are at least 21 y.o. Patient should be able to have ICL once he is 21 y.o.
3. LASIK/PRK and ICL. Patient's refraction is within the range for all three procedures. The co-managing doctor counsels the patient about LASIK/PRK and ICL. In the surgery center, pre-surgical measurements, i.e. corneal shape, thickness, and biomechanics are performed and LASIK, PRK, or ICL are scheduled.
4. LASIK/PRK and RLE. Patient should do well with all three procedures. The co-managing doctor counsels the patient about LASIK/PRK and RLE. In the surgery center, pre-surgical measurements, i.e. corneal shape, thickness, and biomechanics are performed and LASIK, PRK, or RLE are scheduled.
5. LASIK/PRK. Patient's prescription is within the range for correction of both myopia and astigmatism.

## Become a PVI co-managing doctor



We welcome the opportunity to help your patients with refractive surgery, cornea, cataract, and lens implant considerations.

Please call us at [415-922-9500](tel:415-922-9500) to schedule a surgical consultation for your patients.

You can also e-mail us at [comanagement@pacificvision.org](mailto:comanagement@pacificvision.org) if you have any questions.

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

Facebook.com/SightGags



*Eye Abusers Anonymous*

### eFocus Editors:



Ella G. Faktorovich, M.D.  
[ella@pacificvision.org](mailto:ella@pacificvision.org)



Neil J. Friedman, M.D.  
[neil@pacificvision.org](mailto:neil@pacificvision.org)



Scott F. Lee, O.D.  
[drlee@pacificvision.org](mailto:drlee@pacificvision.org)

### Pacific Vision Institute

1 Daniel Burnham Ct.  
San Francisco, CA 94109

(415) 922-9500  
[www.pacificvision.org](http://www.pacificvision.org)