

Laser Procedures and Incisional Surgery to Enhance the Results of Cataract Surgery

Correcting residual ametropia after cataract surgery.

BY ERIC D. DONNENFELD, MD

Residual refractive error is the most common reason for unhappiness among my patients after refractive cataract surgery. My first step in these cases is to perform a refraction and topography to look for residual cylinder in addition to myopia, hyperopia, or irregular astigmatism. Of course, pathologic concerns such as dry eye disease, posterior capsular opacification, and cystoid macular edema should also be considered when a patient does not refract to 20/20. This article addresses methods for correcting residual ametropia after cataract surgery with laser vision correction and incisional surgery.

LIMBAL RELAXING INCISIONS

Although all patients benefit from an optimal postsurgical result, those with a presbyopia-correcting IOL are even more sensitive to small refractive errors, and the surgeon must be able to treat them. Any astigmatism greater than 0.50 D in a symptomatic patient should be treated. If a patient is satisfied with his or her postsurgical result but has 0.50 D of residual cylinder, I will offer (with a thorough informed consent) to perform a limbal relaxing incision (LRI), which will usually make him or her even happier. LRIs can be useful in eyes with less than 1.50 D of cylinder; in eyes with more than 1.50 D of cylinder, surface ablation or LASIK provides more accurate results. For eyes with high cylinder, it is reasonable to “debulk” the refractive error with an LRI and then fine-tune the result with the excimer laser.

LASIK AND PRK

Starting With PRK

A common misconception is that refractive cataract surgeons need to learn to perform LASIK. I disagree.

Instead, I recommend that these colleagues start by learning to perform PRK and then eventually LASIK. PRK is less stressful for the surgeon and the patient, and it often produces better results than LASIK. The epithelium becomes less adherent as patients age, so there is less epithelial sloughing and fewer basement membrane problems with PRK than LASIK.

Moreover, with PRK, the surgeon need not learn how to perform customized ablations. In my view, conventional ablations are probably better for 90% of these patients. I believe in wavefront ablations. Nearly all of my routine patients who are undergoing LASIK or PRK receive a customized treatment. When I treat patients after IOL surgery, however, I almost always perform a conventional treatment.

Many anterior segment surgeons can learn PRK in an afternoon by visiting a colleague who performs the procedure regularly. I mark the cornea, scrape off the epithelium for 9 mm, gently wipe the corneal stromal bed with a Weck-Cel sponge (Beaver-Visitec International, Inc.), and then perform the ablation. I apply a bandage contact lens and observe the patient until the epithelium heals and his or her vision improves, which is usually in 4 days. In about 2 months, the patient’s vision is optimized.

Myopic and Hyperopic Postsurgical Results

The skills required for PRK involve surgical planning and postoperative management. If the surgeon is comfortable performing LASIK, which is what I prefer for most patients, I recommend making the flap very small after cataract surgery. The majority of these patients have scotopic pupils of 4 mm or less, and in these eyes, I will make a 7.5- to 8-mm

thin, planar, reverse side-cut flap with a large hinge for residual myopic refractive error, which reduces the risk of postoperative dry eye disease.¹ In patients who have a hyperopic postsurgical result, I may perform PRK or LASIK, but I tend to prefer an IOL exchange or piggyback IOL for these individuals, because hyperopic ablations tend to be slightly less predictable, require a longer healing time, and demand a larger LASIK flap because the ablation zone is larger in a hyperope.

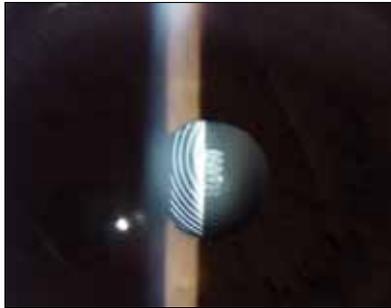


Figure 1. IOL not centered under the pupil before argon laser iridoplasty.

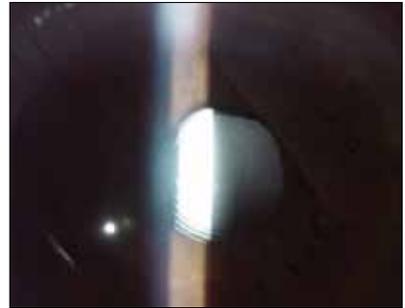


Figure 2. IOL centered under the pupil following argon laser iridoplasty.

Nomograms

Nomograms are not necessary for PRK after the implantation of a multifocal IOL, because the laser treatments are typically 1.00 D or less. Being off by one-tenth of a diopter will not make a difference in the outcome. I aim for +1.00 D, but if I end up with +2.00 D or even plano, the outcome is not affected. Nomogram adjustments for age or humidity are not necessary.

INTRAOCULAR PROCEDURES

After cataract surgery, there are no significant concerns for residual refractive error with a PCIOL. In eyes with ACIOLs that are vaulted or that have shallow anterior chambers, I perform PRK to decrease the risk of the corneal flattening induced during LASIK by the microkeratome or femtosecond laser, which may result in endothelial touch. Often, patients with a residual refractive error after cataract surgery must decide between an IOL exchange, implantation of a piggyback IOL, or a keratorefractive procedure. For those with diminished endothelial cell counts, inflammation of the anterior chamber, glaucoma, or large posterior capsular openings, I recommend PRK or LASIK. Patients without contraindications to an intraocular procedure generally decide how to proceed with the understanding that LASIK will provide a more accurate postoperative result but that an intraocular procedure may be covered by their insurance plan.

CENTRATION OF THE IOL

I assess the centration of the IOL behind the pupil when I am considering performing LASIK or PRK. Oftentimes, the pupil and the center of the capsular bag do not coincide (angle kappa), which means that the lens will appear decentered (Figure 1). Ideally, the IOL should be centered over the pupil and the visual axis so that the laser will not ablate the center of the lens or off the visual axis (Figure 2). I place four spots in the midperipheral iris in the direction that I want to pull the pupil. I perform an iridoplasty using a power of 500 mW and a 500- μ m-diameter spot size for a

duration of 500 milliseconds.² There is no need for a contact lens in this situation. Blue irides may require a little more energy, whereas dark irides may need a little less.

TIME TO TREATMENT

I always attempt to intervene as soon as it is safe for the patient. LRLs can generally be performed as soon as 2 weeks after surgery. Patients who require LASIK or PRK are treated as soon as 1 month after cataract surgery and 4 months after the implantation of a Crystalens (Bausch + Lomb). With the Crystalens, I always perform a posterior capsulotomy before the excimer laser enhancement, because the capsulotomy may change the refractive error.

CONCLUSION

There are many things surgeons can do to improve the visual outcomes of patients after cataract surgery. Attending to residual refractive error is the most common solution, although achieving emmetropia with the primary surgery remains preferable to postoperative treatment. Advanced IOL calculation software, modern biometry, accurate keratometry, and intraoperative aberrometry (ORA System; WaveTec Vision) all help to improve refractive results and patients' satisfaction. With attention to residual refractive error, surgeons can transform the unhappy cataract surgical patient into a happy postoperative patient. ■

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1. Donnenfeld ED, Ehrenhaus M, Solomon R, et al. Effect of hinge width on corneal sensation and dry eye after laser in situ keratomileusis. *J Cataract Refract Surg.* 2004;30:790-797.

2. Solomon R, Barsam A, Voldman A, et al. Argon laser iridoplasty to improve visual function following multifocal intraocular lens implantation. *J Refract Surg.* 2012;28(4):281-283.