Managing Cataract Patients’ Refractive Expectations

Six areas to emphasize for success.

BY JAMES A. DAVISON, MD, FACS

Cataract patients have always been refractive surgery patients, and those with 20/20 UCVA postoperatively have always been the happiest. It was somewhat embarrassing to accept their praise, because we surgeons knew that we really just got lucky with their results. Patients accepted that astigmatism and variable measurements only allowed a lucky few to see well uncorrected, and they were generally happy to receive a prescription for glasses that provided them with good distance and near vision. Patients and surgeons were happy, because both had their expectations met.

Today’s patients expect 20/20 UCVA after surgery. Those who pay a premium to receive a multifocal or accommodating IOL expect to see well at distance and near without glasses. The tough part is that all of the patients not paying out of pocket for a new-technology IOL also now expect to have a plano result, see at least 20/20 at distance without correction, and only wear reading glasses for near work. Surgeons’ attitudes have likewise changed. Managing these refractive expectations involves six areas.

NO. 1: PATIENT SELECTION

Individuals who do not mind wearing glasses or who will not consider paying a premium are not candidates for a multifocal lens. I also feel that patients who have a lifelong history of glare, minimal nuclear cataract, and lots of complaints are poor candidates, and they may have an increased chance for glare after the implantation of any IOL. I rule out patients who have extraordinary expectations for perfection and who are intolerant of possible imperfection or the need for extra steps toward recovery. I also disqualify patients with any noteworthy compromise of their visual system (eg, significant macular pathology, corneal dystrophy, amblyopia). Patients who previously underwent keratorefractive surgery are not the best candidates for multifocal IOLs. Although they are extremely motivated, achieving a plano result can be difficult, and a keratorefractive enhancement may not be possible. These individuals also may have higher-order aberrations that will diminish their quality of vision even under the best circumstances. Their expectations are usually very high, and they may view multifocal IOLs as the final step in their quest for perfect vision.

Finally, although patients who receive a multifocal IOL unilaterally may be satisfied, those who undergo bilateral implantation always have better results. Special discussion is therefore necessary with the former group.

Figure 1. At 81 years of age, this patient was the oldest in the author’s practice to undergo excimer laser surgery. Seven weeks after receiving an Acrysof Restor IOL, she underwent flap creation with the Intralase FS laser followed by LASIK. The procedure adjusted her final refraction and degree of astigmatism.
I tell patients that no surgical procedure yields perfect results every time and that complications such as infection, hemorrhage, and retinal swelling can occur. The best results for a multifocal IOL were reported in the Acrysof Restor IOLs (Alcon Laboratories, Inc., Fort Worth, TX) FDA trials: 80% of patients never wore glasses; 85% had uncorrected 20/25 and J2 visual acuities; only 25% had at least moderate rings, halos, and glare; and 94% said they were happy and would have the procedure again or recommend it to a relative. Nevertheless, I emphasize the percentage of patients who did not achieve those results and stress that prospective cataract surgery patients could be among that group.

For the Acrysof Restor IOL, I explain that patients may need glasses for intermediate vision, such as for viewing a computer monitor, but that they may also require slight correction for their best possible distance and near vision. With the Rezoom IOL and Crystalens accommodating IOL (Eyeonics, Inc., Aliso Viejo, CA), I explain that patients may need some additional correction to see comfortably at near for long periods of time. I remark that halos and glare have not been a huge problem for my patients with the Acrysof Restor IOL. 

Finally, I note that reducing the residual refractive error is the key to success with all pseudophakic technology, especially multifocal and accommodating IOLs, and that some may require additional refractive surgery in order to achieve good results.

Subjects in the Acrysof Restor IOLs FDA clinical trials had 1.00D of keratometric astigmatism or less. If my cataract patients have significant astigmatism, I impress upon them that their surgery should include concurrent limbal relaxing incisions (LRIs) but that astigmatism can rarely be eliminated. For those reasons, I say, there is approximately a 20% chance of their needing a subsequent refractive procedure.

I also warn patients that they may require an IOL exchange. Of my first 119 Acrysof Restor IOL implants, I had to exchange two, one for positive dysphotopsia and the other...
for blurred BCVA. I explain the concept of cortical adaptation and advise patients that their brain may not adapt quickly to or fully appreciate the new IOL technology.

**NO. 3: BIOMETRY AND CALCULATIONS**

Residual spherical equivalent ametropia reduces the effectiveness of a multifocal IOL, and a refractive error greater than 0.50D is probably going to be significant. One must recognize that optimizing refractive outcomes entails striving for perfection in all components of preoperative measurements and IOL calculations. For my staff and me, the adoption and disciplined, consistent use of biometric technologies and calculation formulae are an ongoing process. We began with what we could best afford and control—contact A-scan, manual keratometry, and two-variable formulae.

Although the technicians with whom I work are very experienced with contact A-scan and manual keratometry, manual methods of measurement require higher degrees of human skill and are therefore subject to higher mean absolute error, even when perfectly calibrated. Multiple clinics and the use of numerous technicians and machines can further increase the variability. With these manual methods and two-variable formulae, my patients have an average residual spherical equivalent refractive error of +0.04 ±0.42D. This standard deviation means that 32% of the time, the residual refractive error will be beyond that range.

We have committed to reducing that standard deviation through the following actions. First, we have converted to immersion A-scans for all patients and have ordered six IOLMasters (Carl Zeiss Meditec Inc., Dublin, CA) for our main clinics, which should improve the consistency of our measurements. Additionally, we are scheduling trials of other technologies for automated keratometry.

Historically, we have used the third-generation, two-variable SRK-T formula for eyes of average length and the Hoffer Q for shorter eyes. We are converting to the Holladay 2, a multiple-variable formula that includes the axial length, keratometry, anterior chamber depth, lens' thickness, vertex distance, white-to-white measurement, and manifest refraction.

We are hoping that making this financial and scientific investment in these technologies and formulae will improve our refractive results.

**NO. 4: SURGICAL EXCELLENCE**

The standard, temporal, clear corneal 2.8-mm incision should induce no more than approximately 0.25D of with-the-rule astigmatism overall. The IOLs optic should be perfectly centered and overlapped 360° by 0.25 to 0.40mm of anterior capsule to ensure the consistent positioning of the lens and prevent posterior capsular opacification.

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**TABLE 1. RATES AND DEMOGRAPHICS OF ENHANCEMENTS**

<table>
<thead>
<tr>
<th>ASTIGMATISM</th>
<th>1.00D OR LESS</th>
<th>MORE THAN 1.00D</th>
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<tbody>
<tr>
<td></td>
<td><strong>No LRI</strong></td>
<td><strong>LRI</strong></td>
</tr>
<tr>
<td>Cases</td>
<td>90</td>
<td>19</td>
</tr>
<tr>
<td>Enhanced</td>
<td>1 (LASIK)</td>
<td>4 (1 LASIK, 3 PRK)</td>
</tr>
<tr>
<td>Percentage</td>
<td>1%</td>
<td>21%</td>
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These statistics refer to the six of 119 cases that required secondary keratorefractive intervention after the implantation of an Acrysof Restor IOL.
NO. 5: RESIDUAL REFRACTIVE ERROR

Residual refractive cylinder reduces the effectiveness of the optical system, and greater than 0.75D will probably be significant. Preoperative keratometric astigmatism is useful, although imperfect, predictor of postoperative pseudophakic refractive cylinder. Patients with greater than 1.00D of keratometric astigmatism will usually require LRIs, which, in my hands, are effective in up to 80% of cases (Table 1). Six (5%) of my first 119 cases with the Acrysof Restor IOL required subsequent corneal refractive enhancements. Only 1% of those cases with ≤ 1.00D of preoperative keratometric astigmatism required an enhancement versus 17% of those with > 1.00D.

I was wary of performing LASIK with femtosecond flap creation (Intralase FS laser; Intralase Corp., Irvine, CA) at 7 weeks after surgery that included LRIs, so I opted for PRK in my first three eyes receiving an Acrysof Restor IOL. I have since performed the Intralase/LASIK procedure in two such patients without incident and will use this approach in the future (Figure 1). For preoperative keratometric astigmatism of greater than 2.50D, a biopics approach makes sense.

NO. 6: COMMITMENT AND REASSURANCE

Almost all patients will be very happy with their final surgical outcome. Some may need to wear glasses occasionally or undergo a refractive enhancement procedure. Others may require an IOL exchange if they cannot function adequately with their new multifocal vision system. It may take months for them to experience significant cortical adaptation. Throughout this process and during those many days, surgeons and their staffs should reassure patients that they are committed to achieving a satisfactory visual outcome. Some patients will not wait months for improvement. Two of my patients waited only 2 months after undergoing implantation of the Acrysof Restor IOL before I had to exchange the lens for a monofocal IOL. These patients could not see well and refused to proceed with surgery on their second eye. One suffered significant positive dysphoria, which was only partially improved by the IOL exchange. The other had blurry BCVA at distance and near that the IOL exchange resolved. These patients required numerous surgical visits and additional surgery but were ultimately very satisfied with my staff and me because of our commitment and the guidance, reassurance, and treatment they received to get them to the best possible vision they could recover.

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