

One Solution Does *Not* Fit All

Consider the characteristics of the individual patient to select the appropriate presbyopia-correction solution.

BY ROBERT EDWARD ANG, MD

The demand for presbyopia correction is growing in our locale in the Phillipines. Patients undergoing refractive surgery today not only expect a complication-free procedure but also aspire to spectacle independence. Increased awareness through word-of-mouth referrals and marketing efforts has caused a rise in the number of patients undergoing presbyopic LASIK (presby-LASIK) in our hospital, from none 3 years ago to about 30% of our current refractive surgical patient load today. In my cataract practice, approximately 75% of patients choose a presbyopia-correcting IOL.

I believe this trend toward surgical presbyopia correction will continue, in part because our electronic gadgets and devices continue to get smaller as technology improves. Pretty soon, the majority of our activities and transactions will be performed through handheld devices such as mobile phones and tablets. All clinics will have to offer some form of presbyopia-correction strategy or else lose out to the competition. With that said, each patient is unique, and one presbyopia-correction solution does not fit all. We must consider the characteristics of the individual patient to determine which presbyopia treatment to recommend.

Like most surgeons, my first foray into surgical presbyopia treatment was with classical monovision. It was easy to explain the concept of monovision, but it was difficult to do a contact lens trial to demonstrate the result for patients who had never worn contact lenses. Patients were functional, but there was no *wow* effect after surgery. I have slowly veered away from the monovision strategy because it did not captivate the imagination of the patient population I was trying to attract. I still use classical monovision, but only with patients who have used monovision contact lenses for many years.

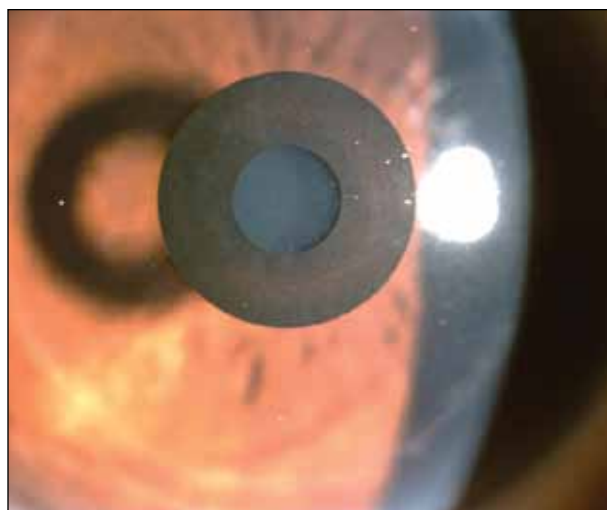


Figure 1. The Kamra corneal inlay.

FOUR PARAMETERS

Technological innovations have since been developed to expand presbyopia treatment options in the cornea and lens. I now use four parameters to determine whether the best presbyopic treatment for a given patient will be cornea- or lens-based: (1) presence of cataract, (2) age, (3) refraction, and (4) patient preference.

If the patient does not have cataracts, then I use age as the primary determinant. For patients above age 60 years, with or without cataractous changes, I recommend lens extraction with presbyopia-correcting IOL implantation. For those between 40 and 55 years of age, I recommend cornea-based presbyopia treatment. Between 55 and 60 years, I explain both options and let the patient select the most appealing option for him or her. The majority in this age range still opts for corneal treatment because it is less invasive.

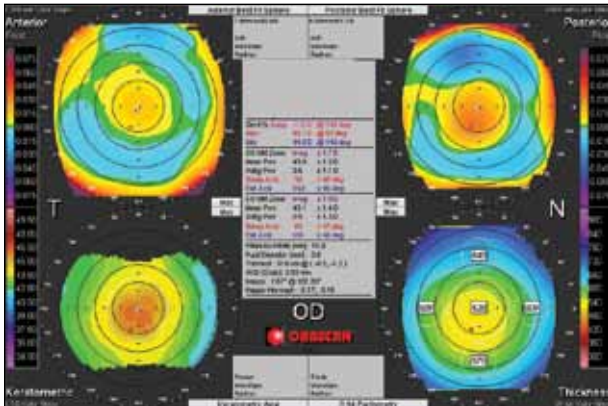


Figure 2. Topography showing central steepening after Supracor LASIK.

CORNEA-BASED APPROACHES

As an investigator for the Kamra corneal inlay (Acufocus, Inc.; Figure 1) for 4 years and Supracor presby-LASIK (Bausch + Lomb Technolas; Figure 2) for 2 years, I have learned a lot about presbyopia treatments in the cornea.

Corneal inlay. I started implanting the Kamra inlay under a deep flap (at least 160 μm), initially using a microkeratome and later a femtosecond laser. The inlay is placed in the nondominant eye of natural emmetropes with spherical equivalents ranging from 0.50 to -0.75 D. The majority of patients achieve J3 near vision, which is good for most reading activities.

I have not encountered any corneal melting, which was my main worry with inlays. In less than 10% of cases, the refraction changes in the operated eye, even though we did not ablate the cornea. Exactly why this occurs has not yet been determined. A hyperopic shift in these cases results in reduction of reading vision to J5 or J6 and increased need for reading glasses, and a myopic shift improves the reading vision.

I like the Kamra for three reasons: (1) it is reversible, (2) the pinhole effect is easy to explain to patients and to simulate preoperatively, and (3) even if there is some refractive shift, good distance vision is consistently maintained. However, there are some things I do not like about the Kamra inlay: (1) the cornea must be monitored long-term because it has a foreign body embedded; (2) the inlay must be placed under a thick flap, so simultaneous correction of refractive errors is limited; and (3) it is difficult to predict refractive shifts. Because of regulatory issues in my country, I have not performed LASIK in combination with inlay implantation.

New laser procedures. I have performed a few cases using the Intracor (Bausch + Lomb Technolas) femtosecond laser procedure. This is a clever concept wherein a purely intrastromal treatment causes weakening of the

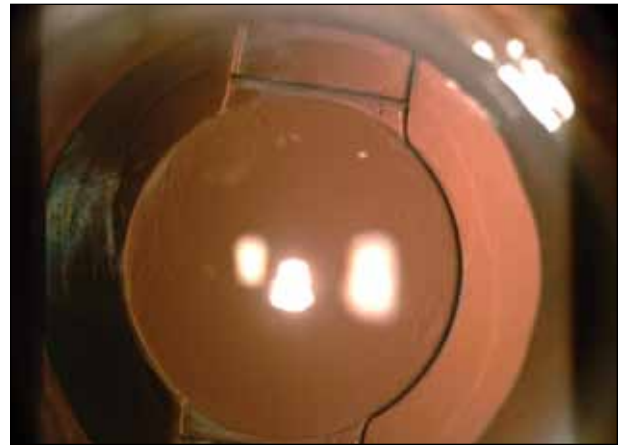


Figure 3. The Crystalens AO accommodating IOL.

central cornea resulting in a localized elevation, thereby increasing negative spherical aberration and depth of focus and inducing a mild myopic shift. My first four patients operated with this technique had near UCVA of J1 or J2 and maintained 20/20 distance vision postoperatively. The patients were happy, but I hesitated to use the procedure further because the treatment cannot be enhanced or reversed if the result is unsatisfactory.

Supracor presby-LASIK was subsequently developed to achieve presbyopia correction similar to Intracor but with several key advantages. As a LASIK-based procedure, Supracor can treat refractive error and presbyopia simultaneously, can be enhanced or adjusted, and has a low incidence of ectasia as long as standard LASIK guidelines are followed. Also, as a type of LASIK, it has high patient awareness, unlike Intracor.

When I adopted Supracor, I found that it gave patients stronger near vision than the inlay. Most patients had a near UCVA of J1 postoperatively. However, because the refractive target with Supracor is -0.50 D, the distance UCVA is usually 20/25 to 20/30 postoperatively.

Preferences. For patients whose refraction in the nondominant eye is 0.00 to -0.75 D, I prefer to implant a Kamra inlay. Because most patients interested in presbyopia treatment are outside of this narrow refractive range, more of my patients currently undergo Supracor LASIK.

In some cases, choices are made based on specific patient preferences or needs. For patients who value reading vision, I perform Supracor in both eyes. For those who need to drive, I have found the best results to come from wavefront-optimized aspheric LASIK for good distance vision in the dominant eye and Supracor in the nondominant eye, regardless of whether the patient was originally myopic or hyperopic. We are currently doing studies to expand the Supracor indications to post-LASIK and pseudophakic presbyopes.



Figure 4. The AcrySof ReStor +3.0 D multifocal IOL.

LENS-BASED SOLUTIONS

I prefer lens-based solutions in a number of situations: (1) for patients older than 60 years with lens changes indicative of cataract, even though BCVA has not yet been affected; (2) for presbyopic patients with manifest refractive error greater than 3.00 D of hyperopia or -6.00 D of myopia; (3) for eyes with computed residual stromal thickness of less than 250 μm after LASIK; (4) and for eyes with an estimated keratometry reading of greater than 48.00 D after Supracor presby-LASIK.

A wide variety of presbyopia-correcting IOLs is available. I continue to use the Crystalens AO accommodating IOL (Bausch + Lomb; Figure 3) and, among multifocal IOLs, I use the AcrySof IQ ReStor +3.0 D (Alcon; Figure 4), the AT.LISA and AT.LISA toric (Carl Zeiss Meditec; Figure 5), the Tecnis Multifocal (Abbott Medical Optics Inc; Figure 6) and the Lentis MPlus (Oculentis GmbH; Figure 7).

NO PERFECT IOL

To obtain objective data comparing presbyopia-correcting IOLs, we performed a prospective, randomized, subject-masked study comparing bilaterally implanted Crystalens, ReStor +3.0 D, and Tecnis Multifocal IOLs, and

TAKE-HOME MESSAGE

- Consider four parameters to determine whether the best presbyopic treatment for a given patient will be cornea- or lens-based: (1) presence of cataract, (2) age, (3) refraction, and (4) patient preference.
- Exchanging the natural lens with a presbyopia-correcting IOL is a permanent solution, but it is not risk-free.
- A crucial factor for success in presbyopia treatment is consistent targeting of refractive outcomes.



Figure 5. The AT.LISA toric IOL.



Figure 6. Tecnis Multifocal IOL.

our results have been submitted for publication. We found that patients achieved good distance UCVA with all three lenses. The Crystalens was superior for intermediate vision, and the ReStor and Tecnis were better for near vision. Patients with the ReStor and Tecnis IOLs reported starburst and halos significantly more often, and their contrast sensitivity was worse at lower spatial frequencies than in patients with the Crystalens.

I counsel patients preoperatively myself so I can emphasize that there is no perfect presbyopia-correcting IOL at this time. I explain that each type has its own strengths and weaknesses. For patients who drive or who indicate that they do not want to experience glare and halos, I suggest the Crystalens. But I counsel that they have to expect the downside that they will likely still need reading glasses. For patients whose priority is near vision and spectacle independence but who accept that there will be photic phenomena even when they drive, a multifocal IOL is my recommendation. I prefer to use the AT.LISA because my patients have been satisfied with its 3.75 D add.

Lately I have started trying trifocal IOLs, but I am still waiting to observe whether there will be a significant increase in patient satisfaction and acceptance before I shift to this model completely.

MAKING IT WORK

Currently 30% of my patients choose bilateral Crystalens, and 60% choose a bilateral multifocal IOL. About 10% of patients, after the first eye is operated, express complaints about the downsides of the lens, even though we had extensive discussions preoperatively. In this category, the Crystalens patient will likely complain about wanting more near vision, and the multifocal IOL patient will complain of fogging or general blurriness of distance vision, probably due to decreased contrast sensitivity and glare at night.



Figure 7. The Lentis Mplus IOL.

Fortunately, the weakness of one is the strength of another. On many occasions, I have used a mix-and-match strategy as a remedial mechanism in patients seeking presbyopia correction. It would have been ideal to plan to implant a monofocal accommodating IOL in the dominant eye and a multifocal IOL in the nondominant eye, but this cannot always be done because I operate on the blurrier eye first, regardless of dominance, and I follow the wishes of the patient regarding which lens is selected. Nevertheless, most patients end up satisfied with their overall vision after this trouble-shooting measure, and, so far, no one has requested explantation of the lens from their first eye.

LESSONS LEARNED

Over the past 5 years that I have used presbyopia-correcting IOLs, I have had only one explantation. This was with a multifocal IOL. I distinctly remember the patient's remarks to me. He said, "Doctor, I know you explained

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to me that there will be glare, halos, and decreased vision at night, and I said yes. But I never thought it would be so disturbing that I could not drive. Can we remove this lens?" This has taught me a valuable lesson: Multifocal IOLs—while they are reliable for good near vision, achieve spectacle independence in most cases, and are almost maintenance-free—still have drawbacks that not all patients can tolerate. Unfortunately, there is no way to simulate these problems preoperatively.

I have learned many other lessons on the subject of presbyopia correction during these years. So far, no solution is perfect, and all options entail compromises. Having a choice of treatments on the cornea and lens is essential because it gives the patient more flexibility in selecting what fits his or her lifestyle and risk tolerance. During counseling, I manage expectations by making patients discuss the under-performance and side effects they can live with rather than concentrating only on the benefits they would like to achieve.

Exchanging the natural lens with a presbyopia-correcting IOL is a permanent solution; however, it is not risk-free, and these IOLs are not without drawbacks. I therefore explore cornea-based solutions first because I prefer to use the less-invasive treatment and I have available a laser-based treatment—Supracor—that has provided reliable outcomes.

A crucial factor for success in presbyopia treatment is consistent targeting of refractive outcomes. A mildly myopic outcome of -0.50 D is ideal for Supracor presby-LASIK, the Kamra inlay, and the Crystalens, whereas multifocal IOLs must be plano for best visual outcomes.

For the future, I hope to see a solution that entails no compromise. This may come in the form of an eyedrop that can prevent the stiffening and clouding of the natural lens, or it may come as a fully flexible accommodating IOL that induces no capsular opacity. In the meantime, let us learn from the evolving science of presbyopia correction and continue to find ways to make our patients happy. ■

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