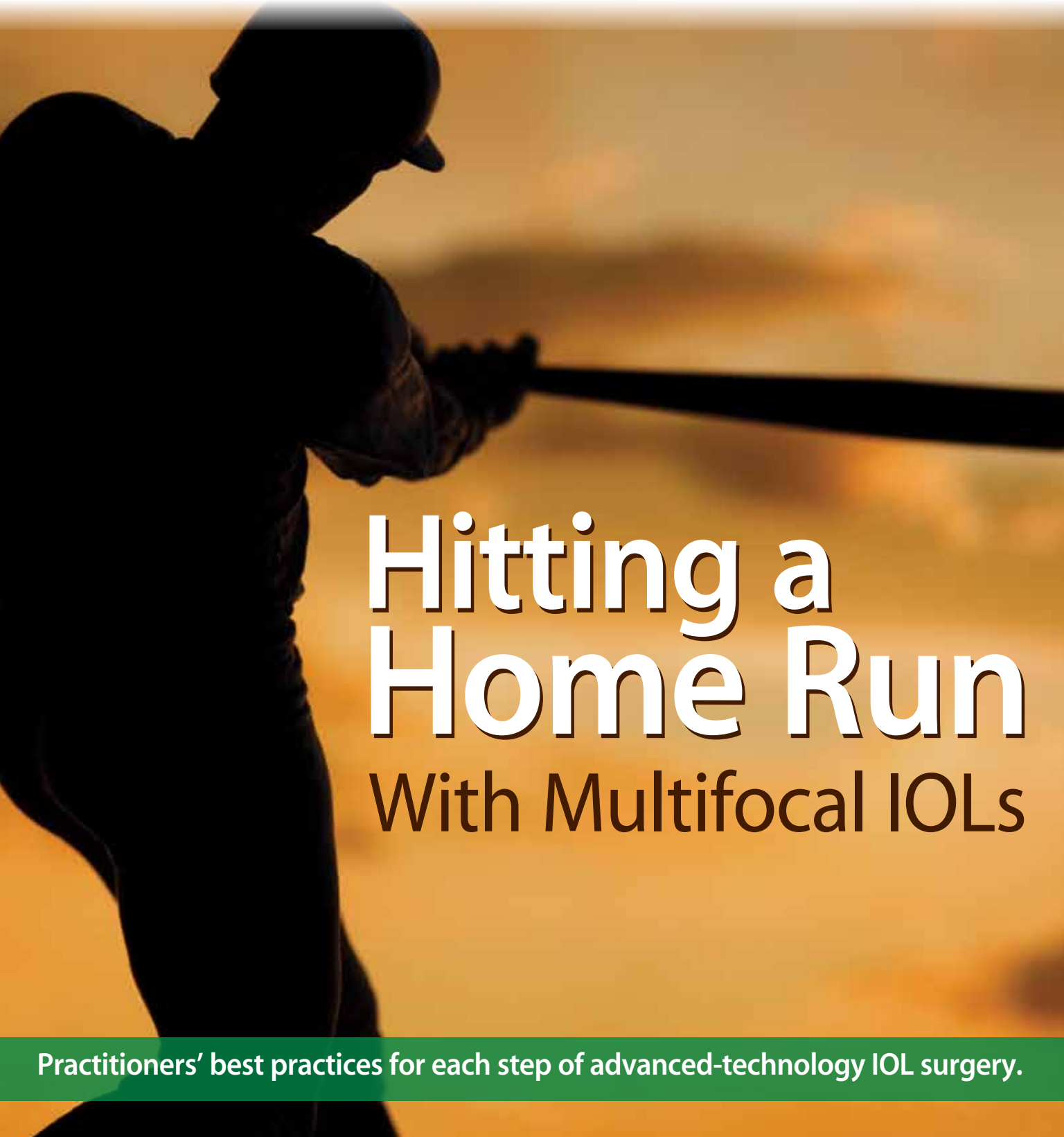
Supplement to

Sponsored by Alcon Laboratories, Inc.

Cataract & Refractive Surgery TODAY

October 2013



Hitting a Home Run

With Multifocal IOLs

Practitioners' best practices for each step of advanced-technology IOL surgery.

Hitting a Home Run
With Multifocal IOLs

Practitioners' best practices for each step of advanced-technology IOL surgery.

Posterior-chamber IOLs, and multifocal technology specifically, continue to show growing adoption among cataract patients and their surgeons because they offer a greater range of vision and freedom from glasses versus standard monofocal IOLs (Figure 1).

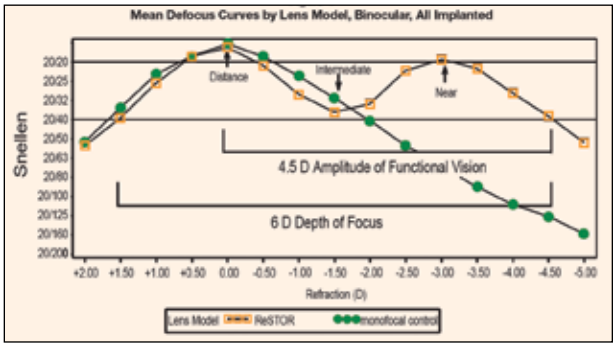


Figure 1. The AcrySof IQ ReSTOR IOL gives patients a 4.50 D amplitude of functional vision (20/40 or better).

The AcrySof IQ ReSTOR IOL +3.0 D (Alcon Laboratories, Inc.) features patented apodized diffractive technology that imparts vision at all distances—near, intermediate, and distance—so that patients do not have to choose where they want the stronger acuity to be focused. In turn, this technology saves physicians and patient counselors from a lengthy interview with multifocal IOL candidates to determine their preferred range of vision (e.g., "What are your hobbies? How much time do you spend at the computer? How often do you drive at night?"). Ideally, neither physicians nor patients want to have to think about these questions; we surgeons simply want an implant that is easy to recommend because it's easy for our patients to live with. The popularity of the AcrySof IQ ReSTOR IOL +3.0 D speaks to its success rate: it has been implanted in more than 900,000 eyes since 2005.[1,2] And now, the AcrySof IQ ReSTOR IOL +3.0 D has an expanded dioptric range, +6.00 to +34.00 D (SN6AD1), to treat even more individuals.

Of course, adopting premium refractive IOLs such as the AcrySof IQ ReSTOR IOL +3.0 D is only the first step; the second is educating our patients about this elective option. This supplement is filled with top surgeons' best strategies for making patients happy with multifocal implants. These strategies have been born from trial and error over the years as these lenses have gained traction in the marketplace. I invite you to take notes and see if there are any take-home ideas you can implement in your own practices.

—Richard L. Lindstrom, MD

1. Q310 Market Scope Cataract Quarterly Update.
2. Data on file. Alcon Laboratories, Inc.

CONTENTS

The Wind-Up:
Making the Most of the Preoperative Workup

Careful preoperative planning and calculations will prevent postoperative surprises.

BY ROBERT J. CIONNI, MD

Many of the postoperative refractive errors that frustrate surgeons and recipients of advanced-technology IOLs (ATIOLs) can be avoided with a careful preoperative workup. Following are the procedures I follow to optimize patients' outcomes with these implants.

TAKE SEVERAL KERATOMETRIC READINGS

Once we have relayed the advantages of an ATIOL and determined that the patient is an appropriate candidate for this type of lens (i.e., having a healthy cornea, nerve, and macula), the next step is to nail the spherical refractive power, which includes minimizing induced astigmatism. This step requires the use of optical biometry with either the Lenstar LS900 biometer (Haag-Streit AG) or the IOLMaster 500 (Carl Zeiss Meditec, Inc.) to ensure reproducible and precise axial length measurements.

Next, we must determine as best we can the amount of the eye's corneal astigmatism. I recommend obtaining keratometric readings via several different methods, looking for consistency between them, and comparing the findings to the eye's refraction and the past glasses prescriptions. If everything matches up, we can confidently treat the patient based on readings of the anterior corneal curvature. If there are mismatches, however, such as a greater amount of astigmatic correction in the spectacles than the K readings, or a variance in the K readings from machine to machine, then the patient's outcome will be more uncertain.

In the past, we have used only the anterior corneal curvature readings to plan out astigmatic correction. When we see mismatches between the refraction and K measurements, our tendency is to write this discrepancy off to lenticular astigmatism. Often, however, there can be a posterior corneal component to the measurements. Douglas D. Koch, MD, and colleagues have shown that we really should consider the posterior corneal curvature in surgical planning,[1] and new nomograms are being developed for this purpose (*see the sidebar by Douglas D. Koch, MD, on pg. 4*).

I most often rely on the Lenstar LS900 biometer for its accuracy and consistency in determining keratometric magnitude and axis. Still, I use the Atlas topographer (Carl Zeiss Meditec, Inc.) to evaluate the cornea for aberrations, the regularity of the astigmatism, and to compare the measurements obtained with the Lenstar. These devices are extremely useful for identifying corneal irregularities that may preclude the optimal postoperative refraction of ≤ 0.50 D of residual cylinder. Ophthalmologists now generally agree that less than 0.50 D of cylinder enables the best visual results, and thus surgeons who intend to implant multifocal IOLs must be comfortable employing strategies to achieve such outcomes.

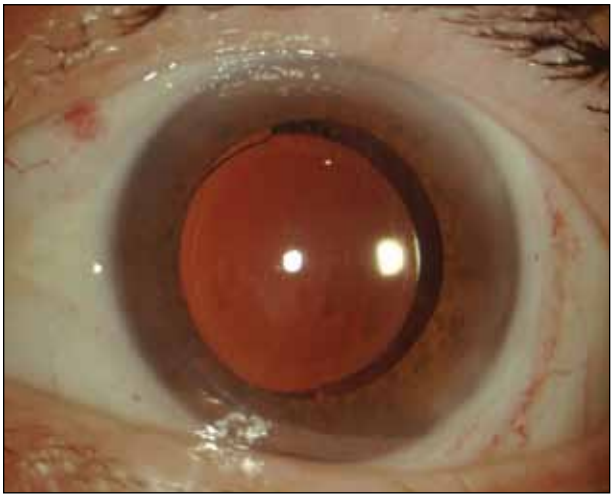


Figure 1. Day-1 postoperative view of an AcrySof IQ ReSTOR +3.0 D IOL implanted under a continuous curvilinear capsulorhexis made with the LenSx laser (Alcon Laboratories, Inc.)

USE NEWER-GENERATION IOL CALCULATION FORMULAS

To help ensure that I nail the spherical power, I always use a newer-generation IOL formula such as the Holladay II (Bellaire Consulting, Inc.). Most of the older-generation formulas use only two variables and, therefore, are not

Getting the Full Picture in IOL Power Selection

BY DOUGLAS D. KOCH, MD

Most devices on the market today for measuring corneal power are sufficiently accurate for normal eyes and standard IOLs. However, most of them measure only the anterior curvature, and they assume that the ratio of the anterior and posterior curvatures is constant. In fact, this assumed ratio varies by the measurement device used, the IOL calculation formula used, and the patient population (e.g., the index of refraction used in devices is 1.332 in Germany vs. 1.3375 in the US).

Recently, my colleagues and I at Cullen Eye Institute in Houston used the Galilei Dual Scheimpflug Analyzer (Ziemer Ophthalmic Systems AG) to record the instantaneous ratio of the anterior/posterior radii of curvature. These ratios are not constant and vary among eyes with virgin corneas and eyes that have undergone myopic and hyperopic LASIK. Even small differences in this ratio produced clinically significant differences in calculated corneal powers.

My colleagues and I performed a retrospective case review of 715 corneas of 435 consecutive patients who presented to our clinic as cataract and refractive surgical candidates between January 2008 and March 2011.[1] We used the Galilei Dual Scheimpflug Analyzer (Ziemer Ophthalmic Systems) to evaluate these eyes for the purpose of determining to what degree posterior corneal astigmatism contributes to overall astigmatism, and then to determine the amount of error inherent in algorithms that estimate total corneal astigmatism solely from anterior corneal measurements.

We calculated patients' total corneal astigmatism via ray tracing and simulated keratometry. We used vector analysis to determine the error in estimating total corneal astigmatism from anterior corneal astigmatism only. We found the mean magnitude of posterior corneal astigmatism to be -0.30 D. Measurements based on anterior corneal astigmatism underestimated total corneal astigmatism by 0.22 @ 180 and exceeded 0.50 D in 5% of eyes. Interestingly, the steep corneal meridian was aligned vertically (60° to 120°) for the posterior surface in 86.6% of the eyes. As the patients aged, this meridian did not generally change, whereas the steep meridian of the anterior corneal surface shifted from vertical to horizontal. The magnitudes of anterior and posterior corneal astigmatism only correlated when the steeper anterior axis was vertically aligned.

These findings have major implications for toric IOL power selection. Measurements that rely on anterior measurements only will tend to result in overcorrection of astigmatism in eyes having with-the-rule astigmatism and in undercorrection of eyes having against-the-rule astigmatism.

Douglas D. Koch, MD, is a professor and holds the Allen, Mosbacher, and Law chair in ophthalmology at the Cullen Eye Institute of the Baylor College of Medicine in Houston. He is a consultant for Alcon Laboratories, Inc. Dr. Koch may be reached at (713) 798-6443; dkoch@bcm.tmc.edu.

1. Koch DD. Innovators' Lecture. Corneal Optics for IOL Selection: Cracking the Code. Presented at the Annual Meeting of the American Society of Cataract and Refractive Surgery. April 24, 2012; Chicago, IL.

sensitive enough for all ranges of axial lengths and Ks. The Holladay II and Olsen formulas require the anterior chamber depth and lens thickness (measureable with the Lenstar LS900[2]) in addition to axial length and K readings.

INTRAOPERATIVE STEPS

I prefer to use a femtosecond laser, such as the LenSx (Alcon Laboratories, Inc.), to make the capsulorhexis. In my personal experience, having a more predictable and stable effective lens position (ELP) helps to ensure that the postoperative spherical result is closest to the target refraction (Figure 1). This technology is also ideal for making precise arcuate incisions. ■

Robert J. Cionni, MD, is the medical director of The Eye Institute of Utah in Salt Lake City, and he is an adjunct clinical professor at the Moran Eye Center of the University of Utah in Salt Lake City. He is a consultant to Alcon Laboratories, Inc., and WaveTec Vision and a member of the LenSx Medical Advisory Board. Dr. Cionni may be reached at (801) 266-2283.

1. Koch DD. Corneal optics for IOL selection: cracking the code. Paper presented at: The ASCRS Annual Symposium; The Charles D. Kelman Innovator's Lecture; April 23, 2012; Chicago, IL.

2. Lam S. Comparison of age-derived lens thickness to optically measured lens thickness in IOL power calculation: a clinical study. *J Refract Surg*. 2012;28(2):154-155.

The Pitch:
Thorough Patient Counseling

Don't proceed with surgery until patients' expectations are realistic.

BY CARLOS MANRIQUE DE LARA, MD

When implanted correctly, multifocal IOLs such as the AcrySof IQ ReSTOR IOLs +3.0 D and +4.0 D (Alcon Laboratories, Inc.) are able to provide a range of vision that spans near, far, and everywhere in between (Figure 1).[1] Nevertheless, all these implants have potential visual disturbances that must be discussed with patients prior to surgery so that they are given the chance to accept the risks and are not surprised by them afterward. (I subscribe to the adage, "Before the surgery, it's an explanation; after the surgery, it's an excuse.")

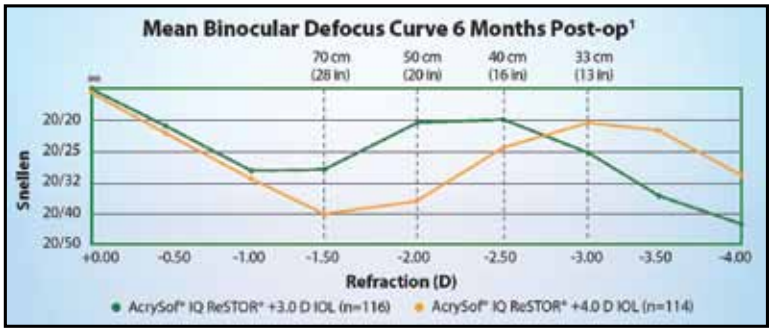


Figure 1. The mean binocular defocus curves for the AcrySof IQ ReSTOR IOL +3.0 and +4.0 D lenses give recipients true visual performance at all distances.

Today's IOL technology is so good that we can give patients a reasonable idea of the quality of vision they can expect postoperatively. Most of the postoperative complaints I have heard from recipients of multifocal IOLs are a result of the surgeon failing to thoroughly describe the benefits and limitations of these implants, so that the patient enters the surgery with unrealistic expectations. This article describes my preoperative counseling practices that help me ensure I am implanting the right lens in the right type of patient and also let me set appropriate expectations for him or her.

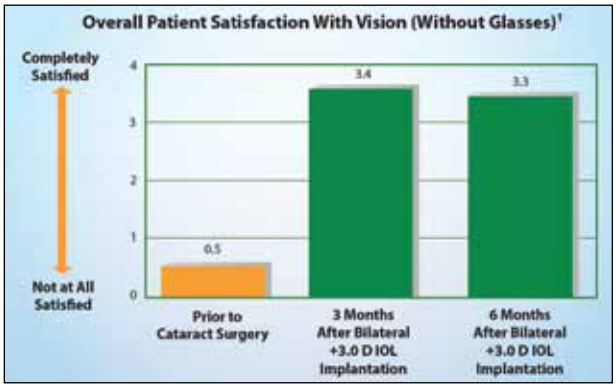


Figure 2. Patients report high overall satisfaction after bilateral implantation of the AcrySof IQ ReSTOR IOL +3.0 D.

SET REASONABLE EXPECTATIONS FOR OUTCOMES

I have had very good success with the diffractive multifocal AcrySof IQ ReSTOR IOLs and use these implants in the majority of my advanced-technology IOL (ATIOL) patients. For myopic eyes, I usually implant the AcrySof IQ ReSTOR IOL + 3.0 D. The most common complaints associated with multifocal IOLs in general are halos around lights at night. So, I am careful to inform candidates that they may see halos around lights if they drive at night and that they may need more lighting for reading. I never hear that patients feel their distance or intermediate vision has been compromised. Generally, I find that most patients believe that the benefits of multifocal IOLs, which I also describe to them (greater range of vision, infrequent need for glasses, etc.), outweigh these possible drawbacks (Figure 2).

I also try to tailor the treatment to suit the patient's needs as much as possible. For example, I make sure to ask multifocal candidates about their lifestyle and routine activities so I can customize my surgical plan to suit them.

PLAN FOR SECONDARY PROCEDURES

A large part of achieving successful outcomes with multifocal IOLs is placing them in the right candidates and also informing patients preoperatively if they will need an additional procedure for, say, significant astigmatism. I still discuss this possibility of a secondary procedure with every multifocal patient, however. I never guarantee perfection. When patients are given the opportunity to make an informed decision, they feel in control, and I think this is one

SUMMARY OF DR. MANRIQUE'S BEST PRACTICES FOR PATIENT COUNSELING

- Inform patients that multifocal IOLs can sometimes impart halos around lights at night and they may need extra lighting for reading.
- Ask about lifestyle and routine activities in order to customize the patient's refraction.
- Discuss the possibility of a secondary procedure.
- Conduct a thorough preoperative workup and take careful biometric measurements.
- Informed consent.
- Preoperative chair time to establish a rapport with the patient and understand his or her goals for surgery.
- Have the patient's chart at time of preoperative evaluation.
- Recommend an implant.
- Allow time for questions.
- Permit patients to bring a friend or family member in the room.

of the primary reasons why my staff and I implant a large number of these IOLs.

PERFORM A THOROUGH PREOPERATIVE WORKUP

I conduct a complete preoperative workup that includes corneal topography, optical coherence tomography, and an endothelial cell count. I use the results of these tests as counseling tools in case I need to tell patients that they have a specific condition that may compromise their surgical result. I also take into consideration other factors that may impact the implantation, such as pupil size, and I look for abnormalities in the cornea, macula, and fovea that may contraindicate a multifocal IOL. If I can detect such problems in advance, then I can increase the patient's chances of surgical success.

TAKE CAREFUL MEASUREMENTS

I use the IOLMaster (Carl Zeiss Meditec, Inc.) and Lenstar LS900 (Haag-Streit AG) to perform axial length measurements on all my cataract patients (I will substitute immersion A-scan on the rare eye I cannot capture). I feel that both give very good readings and are especially helpful for measuring eyes that have undergone previous refractive surgery. With these patients, I am careful to add a caveat to the preoperative discussion: The suggestion that, although I can do my best to adjust the IOL formula to accommodate the original surgery, surgical calculations for these eyes are more challenging.

Again, I make all of these conditions clear in advance of the surgery. I find that patients generally are willing to accept the risks of surgery when they know what to expect. Many people who have had previous LASIK, RK, or any type of refractive surgery understand that they have enjoyed many years of freedom from glasses thanks to their original surgery, and that there are additional risks involved with a second operation. Also, I ask all of my patients to sign an informed consent prior to scheduling surgery that demonstrates that they understand the risks. I use a separate consent for general cataract surgery, implantation of a multifocal IOL, and implantation of a toric IOL. I ask those who have undergone previous refractive surgery to sign a statement documenting that my staff and I have educated them about the risks.

CHAIR TIME

Although it is true that preoperative counseling takes more of the surgeon's time, I feel that it is a necessary part of the premium-level service that comes with implanting ATIOLs. Because I am the one responsible for performing the surgery, I think I should be the one who discusses all the associated details. I believe that having this conversation with my patients myself builds their trust in me. Also, it is easier to manage any postoperative issues if I have established a relationship with the patient already, and he or she feels comfortable expressing his or her concerns.

Furthermore, preoperative counseling does not have to take a significant amount of time. I have my assistants enter all patients' examination information into their chart so that I have it in front of me when I give them my evaluation. Then, it takes me 5 to 10 minutes to describe the patient's particular case and my recommendation for an implant. Most eyes fall within the normal range and are ready for surgery, and then I simply proceed with setting the individual's expectations—describing the possible side effects of surgery with an ATIOL. For those patients whose surgery may be more complex, I allow plenty of time for questions. Once they feel comfortable, we schedule them for surgery.

I will allow patients to bring a friend or family member in the examination room with them if they wish, because I feel that it helps them better process and remember all the details we discuss. Sometimes, individuals are so nervous that they do not remember everything we talk about, and the friend often helps them to make the decision. ■

Carlos Manrique de Lara, MD, is founder and chief medical officer of Manrique Custom Vision, which operates in San Antonio, McAllen-Edinburg, and Woodlands Custom Vision in Woodlands, Texas. He is a paid speaker for Alcon Laboratories, Inc. Dr. Manrique may be reached at (956) 661-9000; cmanriquemd@aol.com.

1. AcrySof ReSTOR IOL Directions for Use. Alcon Laboratories, Inc.; Fort Worth, TX.

Hitting a Home Run:
Implanting ATIOLs in Eyes With Prior Surgery

Don't automatically exclude patients who may still be candidates for a multifocal implant.

BY CATHLEEN M. McCABE, MD

One of the most challenging scenarios for ophthalmic surgeons is when a patient who presents for cataract surgery has undergone previous refractive treatments such as LASIK, PRK, or RK. Although many of these individuals are motivated to purchase advanced-technology IOLs (ATIOLs) in order to reduce their spectacle dependence, implanting these types of lenses in surgically altered eyes is, in my experience, more challenging for the surgeon. Nevertheless, the nature of their prior surgery does not necessarily have to limit these patients' choice of implant. Here are the guidelines I follow so that I neither exclude potential candidates from receiving the benefits of ATIOLs nor risk a poor outcome.

CANDIDACY FOR ATIOL PLACEMENT

The greatest challenge for surgeons who want to implant ATIOLs (particularly multifocal lenses) in eyes that have received RK, PRK, or LASIK is determining the correct IOL power to work in concert with the refractive changes from the previous surgery. RK patients who desire freedom from spectacles generally have the most limited choices for IOL implants. Their corneas have a complex shape and higher-order aberrations (HOAs) that preclude them from receiving most multifocal IOLs[1] (*see the sidebar by Warren E. Hill, MD, on pg. 8*).

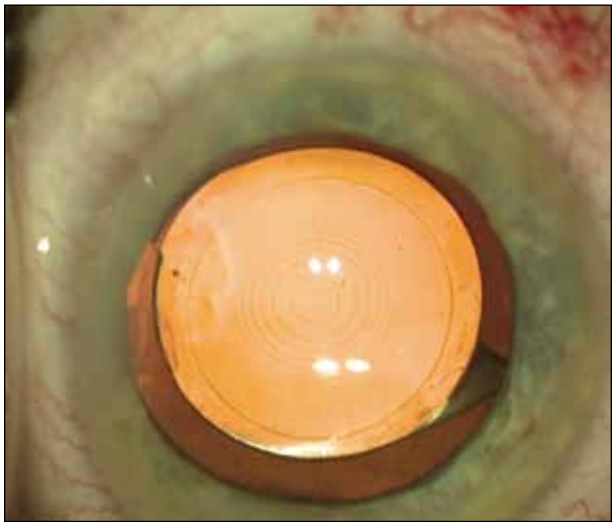


Figure 1. An AcrySof ReSTOR IOL implanted in an eye that had undergone previous LASIK surgery.

> "I have found that low myopic treatments, either surface ablation or LASIK, can still successfully accommodate [a multifocal IOL]."

Although many surgeons think that any prior refractive surgery is a contraindication for implanting a multifocal IOL, I have found that low myopic treatments, either surface ablation or LASIK, can still successfully accommodate this type of lens (Figure 1). In my opinion, some contraindications for placing a multifocal lens, however, are prior hyperopic LASIK, hyperopic PRK, RK, or a high myopic treatment that involved significant flattening of the cornea centrally (because of the likely induction of HOAs).

GET A COMPLETE PICTURE OF THE CORNEAL SHAPE

If individuals who have received prior refractive surgery are interested in reducing their spectacle dependence after cataract surgery, it is critical to completely evaluate their corneal shape (how regular or irregular it is), the corneal thickness, and the presence of HOAs. My staff and I use wavefront analysis and topography (the WaveScan [VISX], the Orbscan [Bausch + Lomb], and the Atlas 9000 Corneal Topography System [Carl Zeiss Meditec, Inc.]) to obtain this information. In general, I evaluate these eyes for any evidence of significant abnormalities in the corneal shape, especially those that may increase in HOAs. Specifically, I look for evidence

Higher-Order Aberrations and Diffractive Multifocal IOLs

BY WARREN E. HILL, MD

Anyone with experience implanting diffractive-optics multifocal IOLs is well aware of how sensitive this technology is to corneal astigmatism. Some surgeons go so far as to aggressively treat as little as 0.50 D of refractive astigmatism to deliver the best visual quality. However, there are other corneal issues that may have an even greater influence on visual quality with this technology—issues that may go unrecognized until after surgery, when the patient is unhappy with his or her vision for no apparent reason.

Apart from the spherical power of the IOL or the presence of residual corneal astigmatism, the cornea may have additional aberrations commonly referred to as *Zernike coefficients*, or generically as *higher-order aberrations*. In optics, whenever the measured value of a Zernike coefficient is significantly increased, visual quality suffers a corresponding reduction in contrast. Since the human visual system is essentially a contrast-sensitivity detection system, a reduction in contrast is synonymous with a reduction in visual quality.

In optics, a general rule of thumb is that if we get something, we give something up. For example, multifocal IOLs trade contrast for two focal points. This is a small compromise, to be sure, but a compromise just the same. The good news is that many patients are happy and willing to accept this compromise, because the obvious advantage of spectacle independence far outweighs the modest reduction in contrast generally. However, there are limits to which a reduction in contrast may be tolerated.

The presence of certain anterior corneal higher-order aberrations has the potential to make the cornea multifocal. That is to say, different refracting areas of the cornea may produce multiple, often overlapping images. Placing a multifocal IOL behind a multifocal cornea typically leads to a significant reduction in contrast. We surgeons are used to measuring regular astigmatism, but certain forms of irregular astigmatism, especially coma, can be equally disruptive to visual quality if it occurs in the presence of a multifocal IOL. The question is, how much coma is too much?

At the 2011 annual meeting of the ASCRS, Ismail Hamza and others presented a paper in which they attempted to quantify the amount of coma that will lead to patients' dissatisfaction when implanted with a multifocal IOL.[1] According to Hamza, eyes with coma values of greater than 0.33 µm and a multifocal IOL are likely to suffer intolerable photic symptoms and be subject to the distinct possibility of IOL exchange.

Although the presence of other higher-order aberrations such as spherical aberration and trefoil may also negatively impact visual quality, the amount of these aberrations necessary for multifocal IOL intolerance has yet to be quantified. In addition to the many tests that surgeons are already conducting prior to implanting multifocal technology, I recommend obtaining an anterior corneal aberration profile. When patients are unhappy with the quality of their vision, the answer as to why can frequently be found contained within the aberration profile. My staff and I are presently using the Atlas 9000 topographer (Carl Zeiss Meditec, Inc.) for this purpose.

Warren E. Hill, MD, is the medical director of East Valley Ophthalmology in Mesa, Arizona. He is a consultant to Alcon Laboratories, Inc., and Carl Zeiss Meditec, Inc. Dr. Hill may be reached at (480) 981-6111; hill@doctor-hill.com.

1. Hamza I, Aly MG, Hashem KA. Multifocal IOL dissatisfaction in patients with high coma aberrations. Presented at: ASCRS Symposium on Cataract, IOL and Refractive Surgery; March 27, 2011; San Diego, CA.

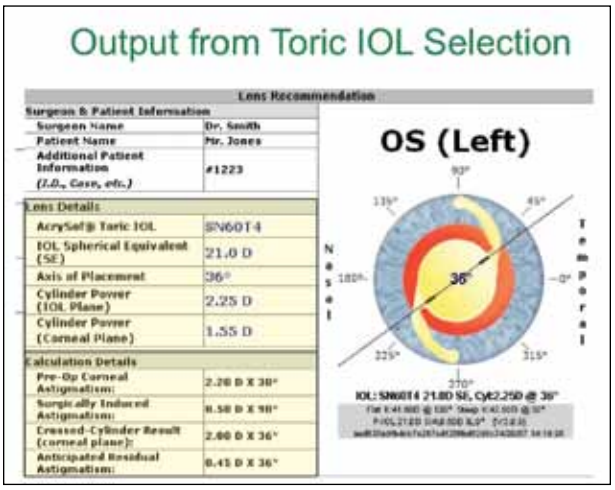


Figure 2. The online AcrySof Toric Calculator, available at www.acrysoftoriccalculator.com, is a useful tool for post-refractive implantations.

of increased total root mean square, HOAs greater than 0.33 µm, or a decentered ablation or posterior elevation corresponding with an atypical corneal thinning. In the publication *Refractive Eyecare*, Ming Wang, MD, presented an interesting discussion of the relationship between the amount of corneal irregularity and the tolerance of different types of IOLs to this irregularity.[2]

An important challenge in performing cataract surgery on any patient after keratorefractive surgery is the potential inaccuracies in lens power calculations. Newer theoretical IOL power calculation formulas, such as the Holladay 2 and Haigis-L, incorporate additional measurements (e.g., anterior chamber depth, lens thickness, horizontal corneal diameter) in order to more accurately predict the effective lens position. Probably the most widely used tool for determining the corneal lens power after refractive surgery is the ASCRS online power calculator available at http://iolcalc.org, which is updated regularly. For AcrySof IOLs, the AcrySof Toric Calculator is quite valuable (Figure 2). I usually compare the recommendations of this website and the Holladay 2 and Haigis-L in order to make a lens power selection.

Another consideration is to be sure that the eye has sufficient corneal thickness to withstand a refractive procedure to fine-tune the postoperative refractive error if necessary. Eyes that have undergone prior refractive surgery are more likely to have some residual refractive error due to the challenges in IOL calculations for their implant power. It is important to discuss with the patient the potential need for an additional procedure in order to achieve the desired refractive result.

AVOID THE TWO EXTREME PITFALLS

In my opinion, the two most common mistakes to avoid with patients who have had prior refractive surgery is implanting a multifocal IOL without thoroughly evaluating the shape or thickness of the cornea, and conversely, excluding patients who have had a small myopic treatment from the benefits of receiving a multifocal lens. The latter patients usually report substantial spectacle independence when implanted with an advanced-technology multifocal lens. By performing a thorough examination and careful IOL calculations, we can confidently expand the ATIOL treatment option to more patients. ■

Cathleen M. McCabe, MD, practices at the Eye Associates in Bradenton, Florida. She is a speaker for Alcon Laboratories, Inc. Dr. McCabe may be reached at (941) 792-2020; cmccabe13@hotmail.com.

1. AcrySof ReSTOR Directions for Use. Alcon Laboratories, Inc., Fort Worth, TX.
2. Wang M. Multifocal IOLs for post-LASIK patients: establishing clinical guidelines for patient selection. Refractive Eyecare. June 2012:16(6). Available at: http://www.wangvisioninstitute.com/forms/RE1606-WangFIN.pdf. Accessed October 8, 2012.

Rounding the Bases:
Managing Postoperative Dissatisfaction

Give ATIOL recipients as much attention postoperatively as before surgery, especially after implanting the first eye.

BY BRET L. FISHER, MD

Candidates for cataract surgery who are attracted to advanced-technology IOLs (ATIOLs), and particularly multifocal IOLs like the AcrySof IQ ReSTOR IOL (Alcon Laboratories, Inc.), are seeking freedom from glasses and contact lenses. Surgeons working with these lenses know that their postoperative success largely depends on (1) a thorough preoperative workup and (2) expectations management so that recipients understand the capabilities of multifocal IOLs. Additionally, experience has taught me that the immediate postoperative period is a critical time during which patients form opinions about the lens' performance and of the level of service they have received at your clinic. To ensure happy patients, it is important to anticipate issues they may have postoperatively and prevent or manage them as effectively as possible. Let's look at the most common reasons for patient dissatisfaction after multifocal IOL implantation.

FIRST-EYE IMPLANTATION

Ophthalmic surgeons know that all diffractive multifocal IOLs such as the AcrySof IQ ReSTOR IOL perform best with bilateral implantation, but this is a point worth repeating to patients. I make sure to reiterate several times to the patient before and after implanting the first eye that he or she should not expect to read or view a computer screen very well until I have implanted the second lens (it is the reading vision, in particular, that benefits from bilateral implantation). The idea is to get patients to postpone judgment about their outcome until after the second surgery. In the interim, ensuring that their first implanted eye is comfortable, providing easy-to-follow postoperative care instructions, and having a staff member available to answer all questions they may have are steps that go a long way toward helping patients feel well cared for.

DRY EYE

Corneal dryness can interfere with the functionality of multifocal optics. Although testing for lid margin disease, tear film dysfunction, meibomian gland dysfunction, and any other condition that causes dry eye is part of a routine preoperative workup, sometimes these conditions can declare themselves after surgery, especially if an individual has borderline dryness. In addition to distorting the optics, ocular surface dryness can make patients' eyes feel tired and uncomfortable, so it is worth optimizing the ocular surface, both before surgery as well as on an ongoing basis after implanting the lens. I use any means appropriate to treat ocular surface dryness, from punctal plugs all the way to cyclosporine. It may also be worthwhile to suggest that patients try dietary omega-3 fatty acid supplements and environmental controls, such as avoiding excessive drying from heating and air conditioning in the early postoperative period, until the corneal surface normalizes.

RESIDUAL REFRACTIVE ERROR

The other most common cause of dissatisfaction among patients who choose multifocal implants is residual refractive error. Missing the spherical equivalent component or failing to correct residual astigmatism can compromise patients' postoperative vision. Because multifocal IOLs are particularly sensitive to residual refractive error, it is crucial to achieve within 0.50 D of the intended correction.

Of course, there is the occasional patient with an ocular condition that eludes the preoperative evaluation and prevents him or her from achieving the expected outcome. Tools such as new-generation optical coherence tomography (I use the Spectralis OCT [Heidelberg Engineering GmbH]) have cut down on the incidence of such surprises by providing a greater range of imaging capability. Also, I find that the Retinal Acuity Meter (AMA Optics Incorporated), which helps to predict

Figure 1. A technician in Dr. Fisher's practice uses the Retinal Acuity Meter on a patient.

postoperative vision, is very helpful in identifying hidden issues (Figure 1). With the additional information these devices provide, we can perform more in-depth workup on questionable eyes and decide the best way to proceed.

COST

The technology of multifocal IOLs such as the AcrySof IQ ReSTOR lens has improved greatly over the years so that current models have a broader sweet spot—a broader range of vision and less risk of postoperative dissatisfaction. With these improvements, the biggest hurdle for most surgeons to adopting these lenses seems to be the out-of-pocket cost to the patient. Surgeons must recognize the incredible value multifocal IOLs provide so that they can confidently illustrate their benefit to candidates. I have seen what a boon it is for recipients of these lenses to be able to see and perform the vast majority of their daily activities without glasses. It is a very valuable service for the right individuals.

To assess cataract patients' candidacy for these implants, my staff and I ask them to fill out a questionnaire to identify their visual goals. If they indicate that they would like to be free from glasses to the greatest extent possible, then, after assessing the health of their eyes, I will recommend the lens I feel is most appropriate for them. Most often, I suggest the AcrySof IQ ReSTOR +3.0 D IOL, because my experience has convinced me that it is the best IOL technology available today to give patients the best chance of freedom from glasses they want.

Also, I believe it is important for patients to understand that receiving a multifocal IOL is a one-time decision that will impact the rest of their lives. It is intended to be a permanent solution to their visual problems. Pointing out this consideration often helps patients make the decision to proceed with the elective option.

POINTERS FOR THE PREOPERATIVE DISCUSSION

I have found that most patients are receptive to the discussion about multifocal IOLs. When we present it in an honest, fair manner that includes both the benefits and the limitations of the technology, most of my patients appreciate having the choice as well as my recommendation. I see the popularity of these lenses in my practice as evidence of their value to patients.

Before I meet with candidates of the AcrySof IQ ReSTOR IOL, they receive a good amount of education about the technology. They watch an educational video that contains simulations of the type of vision they can generally expect from these implants, and they receive ancillary materials that describe the different lens options. These steps are all part of determining their visual goals so that by the time they get to me, they are ready to start thinking about making a decision, and I can recommend an appropriate lens option.

Patient questionnaires to help identify needs and/or expectations are available online. With patients' goals in mind, I next conduct the preoperative examination to determine the health of the eye. When I have all this information, I try to match the IOL technology that I think is best for their eye and for their visual goals, and then I communicate my opinion to them as a recommendation rather than a laundry list of choices. I have learned that patients who are interested in elective lens options are daunted by too much choice, and they also want a personalized experience. Patients want to feel as though their surgeon has assessed their particular visual needs and is making the best choice for them accordingly. I feel confident enough in the current multifocal technology to tell patients that, given the same set of circumstances, this is the lens I would want in my own eyes and in those of my family members. ■

Bret L. Fisher is the medical director of the Eye Center of North Florida in Panama City. He is a consultant for Alcon Laboratories, Inc. Dr. Fisher may be reached at (850) 784-3937; bfisher@eyecarenow.com.

AcrySof® IQ ReSTOR®
Important Safety Information
CAUTION: Federal Law restricts this device to sale by or on the order of a physician.

INDICATIONS: The AcrySof® IQ ReSTOR® Apodized Diffractive Optic Posterior Chamber Intraocular Lens (IOL) is intended for primary implantation for the visual correction of aphakia secondary to cataractous lens in adult patients with and without presbyopia, who desire near, intermediate and distance vision with increasedspectacle independence. This lens is intended to be place in the capsular bag.

WARNINGS: Careful preoperative evaluation and sound clinical judgment should be used by the surgeon to decide the risk/benefit ration before implanting a lens in a patient with any of the conditions described in the Directions for Use Labeling. Some adverse reactions that have been association with the implantation of intraocular lenses are: hypopyon, intraocular infection, acute corneal decompensation, macular edema, papillary block, retinal detachment, and secondary surgical intervention (including but not limited to repositioning, biometry error, visual disturbances or patient dissatisfaction). As a result of the multifocality, some visual effects (halos or radial lines around point sources of light at night) may also be expected due to the superposition of focused and unfocused multiple images. A reduction in contrast sensitivity may also be experienced by some patients especially in low lighting conditions such as driving at night. In order to achieve optimal visual performance with this lens, emmetropia must be targeted. Patients with significant preoperative or expected postoperative astigmatism > 1.0 D may not achieve optimal visual outcomes. Care should be taken to achieve IOL centration, as lens decentration may resuly in a patient experiencing visual disturbances under certain lighting conditions.

PRECAUTIONS: Do not resterilize. Do not store over 45°C. Use only sterile irrigating solutions such as BSS® or BSS PLUS® Sterile Intraocular Irrigating Solution.

Clinical studies with AcrySof® ReSTOR® IOL indicated that posterior capsule opacification (PCO), when present, developed earlier into clinically significant PCO. Studies have shown that color vision discrimination is not adversely affected in individuals with the AcrySof® Natural IOL and normal color vision. The effect on vision of the AcrySof® Natural IOL in subjects with hereditary color vision defects and acquired color vision defects secondary to ocular disease (e.g. glaucoma, diabetic retinopathy, chronic uveitis, and other retinal or optical nerve diseases) has not been studied. The long-term effects of filtering blue light and the clinical efficacy of that filtering on the retina have not been conclusively established.

ATTENTION: Reference the Physician Labeling/Directions for Use for a complete listing of indications, warnings, and precautions.

LenSx® Laser Important Safety Information

CAUTION: United States Federal Law restricts this device to sale and use by or on the order of a physician or licensed eye care practitioner.

INDICATIONS: The LenSx® Laser is indicated for use in patients undergoing cataract surgery for removal of the crystalline lens. Intended uses in cataract surgery include anterior capsulotomy, phacofragmentation, and the creation of single plane and multi-plane arc cuts/incisions in the cornea, each of which may be performed either individually or consecutively during the same procedure.

RESTRICTIONS:
- Patients must be able to lie flat and motionless in a supine position.
- Patient must be able to understand and give an informed consent.
- Patients must be able to tolerate local or topical anesthesia.
- Patients with elevated IOP should use topical steroids only under close medical supervision.

CONTRAINDICATIONS:
- Corneal disease that precludes applanation of the cornea or transmission of laser light at 1030 nm wavelength
- Descemetocele with impending corneal rupture
- Presence of blood or other material in the anterior chamber
- Poorly dilating pupil, such that the iris is not peripheral to the intended diameter for the capsulotomy
- Conditions which would cause inadequate clearance between the intended capsulotomy depth and the endothelium (applicable to capsulotomy only)
- Previous corneal incisions that might provide a potential space into which the gas produced by the procedure can escape
- Corneal thickness requirements that are beyond the range of the system
- Corneal opacity that would interfere with the laser beam
- Hypotony or the presence of a corneal implant
- Residual, recurrent, active ocular or eyelid disease, including any corneal abnormality (for example, recurrent corneal erosion, severe basement membrane disease)
- History of lens or zonular instability
- Any contraindication to cataract or keratoplasty
- This device is not intended for use in pediatric surgery.

WARNINGS: The LenSx® Laser System should only be operated by a physician trained in its use.
The LenSx® Laser delivery system employs one sterile disposable LenSx® Laser Patient Interface consisting of an applanation lens and suction ring. The Patient Interface is intended for single use only. The disposables used in conjunction with ALCON® instrument products constitute a complete surgical system. Use of disposables other than those manufactured by Alcon may affect system performance and create potential hazards.
The physician should base patient selection criteria on professional experience, published literature, and educational courses. Adult patients should be scheduled to undergo cataract extraction.

PRECAUTIONS:
- Do not use cell phones or pagers of any kind in the same room as the LenSx® Laser.
- Discard used Patient Interfaces as medical waste.

AEs/COMPLICATIONS:
- Capsulotomy, phacofragmentation, or cut or incision decentration
- Incomplete or interrupted capsulotomy, fragmentation, or corneal incision procedure
- Capsular tear
- Corneal abrasion or defect
- Pain
- Infection
- Bleeding
- Damage to intraocular structures
- Anterior chamber fluid leakage, anterior chamber collapse
- Elevated pressure to the eye

ATTENTION: Refer to the LenSx® Laser Operator's Manual for a complete listing of indications, warnings and precautions.

LENSTAR LS 900®* Important Safety Information
CAUTION: Federal (USA) law restricts this device to sale by, or on the order of, a physician.

INDICATIONS: The LENSTAR LS 900®* is a non-invasive, non-contact OLCR (optical low-coherence reflectometry) biometer used for obtaining ocular measurements and performing calculations to assist in the determination of the appropriate power and type of IOL (intraocular lens) for implantation after removal of the natural crystalline lens following cataract removal. The LENSTAR LS 900® measures:
- Axial eye length
- Corneal thickness
- Anterior chamber depth
- Aqueous depth
- Lens thickness
- Radii of curvature of flat and steep meridian
- Axis of the flat meridian
- White to white distance
- Pupil diameter

WARNINGS: Measurements can be carried out with dilated or undilated pupils. The A-scan (axial eye length, corneal thickness, anterior chamber depth and lens thickness), keratometry and white-to-white distance measurement are not influenced by dilatation status. Dilatation status, however, does have a bearing on pupillometry.

The light from this instrument may be dangerous. The risk of eye damage increases with the irradiation period.

PRECAUTIONS: Users should check measurement readings for plausibility. This includes the verification of the A-scan and the cursors. The operator should also take into account the type (e.g., posterior subcapsular cataract) and density of the cataract when evaluating plausibility.

For best results, patients should keep the eye as wide open as possible during measurements. Blinking is permitted, but should be kept to a minimum.

ATTENTION: Reference the Instructions for Use for a complete listing of indications, warnings, and precautions.

*LENSTAR® is a registered trademark of Haag-Streit.

Alcon
a Novartis company

Cataract & Refractive Surgery TODAY