

Supplement to

Cataract & Refractive Surgery

TODAY

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Redefining Multifocal Refractive Surgery

Developing Clinical
Pearls and Business
Skills for Success With
the Presbyopic Patient

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The Right Correction

Considering today's and tomorrow's options for presbyopic treatment.

In the US, approximately 24% of the population is myopic, 26% is hyperopic, and 50% is emmetropic. In addition, about 40% of the population is presbyopic. Each of these categories requires a different surgical solution, such as a form of laser corneal or lens-based refractive surgery or a combination of the two. The primary issues are the outcomes and efficacy of the various modalities.

MYOPIC PRESBYOPIA

At present, the lack of a reliable algorithm excludes laser vision correction for treating myopic presbyopes, with the possible exception of blended vision or monovision. For these patients, I currently recommend a lens-based refractive system with an accommodating or multifocal IOL. I believe the best candidates for these lenticular options are patients whose myopia is so strong (more than -3.00D) that they cannot remove their glasses and read comfortably, those who need glasses to see at distance as well as to read. Myopic presbyopes in the range of -1.00 to -3.00D, who remove their glasses to read, I believe are good candidates for monovision. For certain myopic presbyopes, it is advisable to use a combination of IOLs for a more customized treatment. For example, a surgeon may implant an accommodating IOL in one eye for good distance and intermediate vision, and then use a multifocal lens in the second eye for better near vision for the patient.

In extreme axial myopes, surgeons considering a clear lens extraction for refractive purposes must be careful about the increased risk of retinal detachment. Male axial myopes seem to be particularly susceptible to this complication, especially those who have any vitreal retinal or lattice degeneration. Personally, I wait for those patients to develop some cataract that reduces the quality of their vision before I recommend a clear lens extraction and IOL implantation.

HYPEROPIC PRESBYOPIA

Presbyopes with low levels of hyperopia have the option of either undergoing a multifocal ablation or receiving an IOL. Although I think we have more to learn about how well multifocal ablations work, based on the work being done so far at VISX, Incorporated (Santa Clara, CA), the

modality seems quite efficacious for hyperopes in the range of +1.00 to +3.00D. I believe its risk/benefit ratio may be quite good for younger presbyopes whose hyperopia is between +1.00 and +3.00D. Most moderate-to-high hyperopic presbyopes, however, would probably benefit more from a lens-based solution. Because they do not have the risk of retinal detachment and often have a narrow angle, removing the crystalline lens may actually make these eyes healthier.

EMMETROPIC PRESBYOPIA

Right now, the best solution I see for emmetropic presbyopes is to create some form of monovision or blended vision, either with an excimer laser or conductive keratoplasty, both of which generate good outcomes and happy patients. It is important to evaluate patients preoperatively to be sure that they will accept the reduction in the quality of their distance vision that accompanies enhanced near vision.

In addition, emmetropic presbyopes may look forward to several exciting new intracorneal lens technologies about to enter FDA clinical trials. I personally believe these types of lenses are the future of emmetropic presbyopic correction. Right now, however, the biometry of lens-based refractive surgery is not accurate enough to generate a high percentage of happy patients, nor is there an effective multifocal ablation pattern for this patient group.



TARGETING PATIENT SATISFACTION

My experience with clinical studies of accommodating and multifocal IOLs has convinced me that patients' satisfaction correlates totally with the quality of the outcome, as defined by distance, intermediate, and near visual acuity with minimal night vision symptoms. All of these technologies work well, but the biometry must be accurate. Also, setting patients' expectations is important to their postoperative satisfaction. Many who undergo lens-based refractive surgery need a laser or a conductive keratoplasty enhancement to achieve their refractive goals, and their acceptance of this possibility before their initial surgery is crucial.

—Richard L. Lindstrom, MD

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Refractive IOLs: Mix and Match

Paying attention to the strengths of the ReZoom, ReSTOR, and CrystaLens may lead you to a combination approach.

BY RICHARD L. LINDSTROM, MD

As more ophthalmologists begin implanting refractive IOLs, I think it's imperative to develop a good understanding of the strengths and weaknesses of each of the lenses. More importantly, I would urge my colleagues to keep an open mind about using combinations of these lenses when necessary to best meet patients' refractive needs.

The bottom line is that no single lens introduced thus far will be ideal for every patient, nor is it necessary for every patient to have the same type of IOL in both eyes to achieve his or her visual goals. For some, the best solution may be a combination of ocular technologies.

THE REFRACTIVE IOL OPTIONS

We now have available two multifocal IOLs: the ReZoom from Advanced Medical Optics, Inc. (AMO; Santa Ana, CA), and the ReStor refractive-diffractive IOL from Alcon Laboratories, Inc. (Fort Worth, TX). Although the outcomes for these two lenses are similar, the optical principles behind them are quite different and give each one unique assets.

THE ReZoom

The ReZoom lens is a zonal aspheric refractive IOL. It directs incoming light across the entire focal plane to provide vision at all distances. In my experience, this lens provides excellent distance vision, functional intermediate vision, and very good reading vision. Its effective add is +2.60D, which is similar to the amount most surgeons would prescribe for reading glasses after lens implantation. It has better distance vision than the ReStor and better near vision than the CrystaLens accommodating IOL (Eyeonics, Inc., Aliso Viejo, CA). Patients may experience some night vision symptoms, but these are significantly less than what practitioners encountered with AMO's first multifocal IOL, the Array. The ReZoom is an excellent lens choice for patients who want to be able to read without glasses, as long as they are willing to accept mild night vision symptoms and mild loss of contrast sensitivity in mesopic conditions.

THE ReSTOR

The ReStor lens is a combined refractive-diffractive optic. It provides good distance vision and stronger near vision than any of the other options and has an effective add of +3.20D, which may actually be too strong for some patients. None of the incoming light is focused on the intermediate zone, so intermediate vision is relatively weak with this lens, which can make computer use or other intermediate tasks awkward. Like the ReZoom lens, the ReStor has some mild compromises in distance vision. Its optic was designed to become more distance-dominant at night when the pupil dilates, which reduces night vision symptoms slightly, but the downside is that, in a dark restaurant or theater, the patient does not have much near vision.

"The bottom line is that no single lens introduced thus far will be ideal for every patient, nor is it necessary for every patient to have the same type of IOL in both eyes to achieve his or her visual goals."

THE CrystaLens

In addition to the new multifocal lenses, there is also an accommodating IOL, the CrystaLens. This IOL offers excellent distance vision with no measurable loss of contrast sensitivity. Its intermediate vision is also very good, but its near vision is weak compared with the two multifocal alternatives. I think of the CrystaLens as providing a +1.25D add. The typical outcome is J3 or 20/40 at near, which means that many patients will need a supplemental reading add for fine print or prolonged reading. This lens is a suitable choice for the patient who wants good intermediate vision and who does not

mind sometimes wearing glasses for near, as well as for those who cannot or will not accept any compromise in distance vision.

STAGED IMPLANTATION

In select patients, I believe a combination of these IOLs may be the most appropriate choice. It is often taught, but without any real basis in fact, that patients implanted with these new technology lenses must have the same optical system in both eyes. However, over many years of using multifocal/monofocal combinations with the Array lens and now accommodating/multifocal combinations with the above IOLs, my own experience is that patients generally adapt very well to the combination approach, particularly if they have some dissatisfaction following the first procedure.

"I recommend starting with the ReZoom or CrystaLens, because their distance and intermediate vision is better."

A combination approach to vision correction is nothing new. Monovision, although it may utilize the same type of IOL in both eyes, gives patients quite different vision in each eye. In addition, modified monovision with a multifocal contact lens in one eye and a monofocal contact lens in the other is a common practice and one to which many, many patients have happily adapted.

Once it has been established that a patient would benefit from reducing his or her dependence on glasses, then questions about lifestyle, hobbies, and occupation are an important part of determining the best lens choice for that patient.

Depending on the patient's answers and your own personal lens preference, you may opt to start with the ReZoom, ReStor, or CrystaLens. I recommend starting with the ReZoom or CrystaLens, because their distance and intermediate vision is better. If the patient is disappointed with his or her near vision after implanting the first eye, I recommend targeting mild myopia (-0.50 to -1.00D) with the same lens or considering a multifocal IOL with stronger near acuity, such as the ReStor, in the second eye.

With any of the three lenses, most patients—up to

90%—will be happy with their outcome. If that is the case, it makes sense to put the same lens in their second eye. I always wait at least 2 to 4 weeks before implanting the second eye, however, to gauge a patient's response to the first IOL. Although the patient who is experiencing problems may eventually adapt to the new visual system when he or she has it in both eyes, I think that choosing a different implant for the second eye may be the wiser course.

If the patient has a CrystaLens in the first eye and is not happy with the near vision, I would opt to implant a multifocal IOL like the ReZoom in the second eye. The patient will still have good distance vision with stereopsis, excellent intermediate vision, and better near vision than if I had implanted a CrystaLens in the second eye.

Similarly, if I have implanted a multifocal lens in the first eye and if the patient is having difficulty with the night vision symptoms or, in the case of the ReStor, misses the intermediate vision, I might utilize an accommodating lens in the second eye. Doing so would strengthen the intermediate vision and give him or her good distance vision without the night vision symptoms he or she disliked.

ADDITIONAL CONSIDERATIONS

There are also many patients who have received a monofocal IOL implanted in one eye, perhaps for several years, and who are now candidates for cataract surgery in the other eye. I think it is entirely appropriate to offer these patients the potential benefits of spectacle independence with one of the newer multifocal or accommodating lenses for their second eye.

In fact, I think that surgeons must at least mention the option of refractive lenses to their cataract patients now that we have three good refractive IOLs available. For this reason, it behooves most surgeons to learn about all the different options and be able to offer at least one of them. An even better approach is to be prepared to offer a combination of technologies for that slice of the population that can benefit from a staged approach. ★

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Reviewing Design Improvements With the ReZoom IOL

The new ReZoom's optic design provides patients with an improved quality of vision and the likelihood of spectacle independence.

BY R. BRUCE WALLACE III, MD, FACS

Recent design improvements to the ReZoom refractive multifocal lens (Advanced Medical Optics, Inc., Santa Ana, CA) translate to benefits for both surgeons and patients. In my experience, the IOL yields a better quality of vision, especially intermediate vision, which patients use for daily activities such as computer work. Clinically, this three-piece lens offers surgeons more versatility. For example, the power-adjusted ReZoom may be placed in the ciliary sulcus if the posterior capsule is ruptured, thereby saving the procedure.

FUNCTION AND DESIGN

The ReZoom refractive multifocal lens has a 6-mm optic and an overall length of 13mm. It features Balanced View Optics Technology, which uses zones proportioned to provide good visual function across a range of focal distances in varying light conditions. The five zones (rings) use all the available light that travels through the optic to provide distance, intermediate, and near visual acuity (Figure 1).

The design of the ReZoom's optic differs from that of the Array multifocal IOL (Advanced Medical Optics, Inc.), in that zones 2 and 3 have been enlarged and zone 4 has been reduced in size. Zones 1, 3, and 5 are distance-dominant, whereas zones 2 and 4 are near-dominant. An aspheric transition between the zones provides balanced intermediate vision. In my experience, this design lessens any noticeable halo effect at night.

The ReZoom's optic is made of hydrophobic acrylic rather than silicone. It has a near power that is similar

to the Array's (3.50D add in the near portion, and 2.57D add at the spectacle plane).

The ReZoom also employs the OptiEdge triple-edge design, where the edge of the optic is round on the anterior side and square on the posterior side. It provides an uninterrupted 360° barrier of protection and is designed to minimize edge glare (Figure 2). The triple-edge design also lessens the chance of reflection off of it than if it were a fully squared edge, which might create more possibility for the deflection of light rays entering the periphery of the eye.

The triple-edge design also has been shown to reduce posterior capsule opacification. One study found that preventing these problems is better than treating them when they occur.

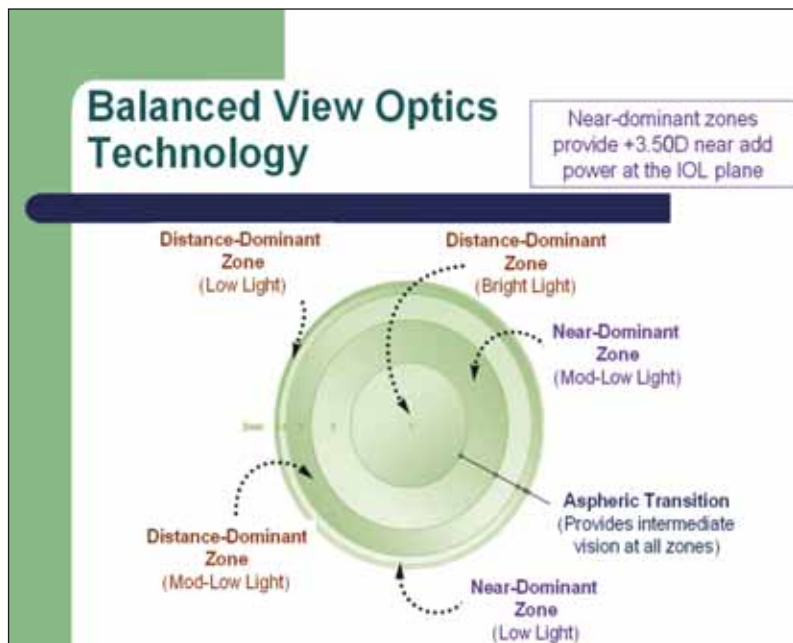


Figure 1. The ReZoom IOL uses all the available light that enters through the optic to provide distance, intermediate, and near acuity.

QUALITY OF VISION

Most of my ReZoom patients report that they experience a noticeable improvement in the quality of their distance vision after surgery. In addition, patients implanted with multifocal lenses, such as the Array and ReZoom, have not reported any noticeable loss of distance BCVA.

In my early experience, patients' near vision with the ReZoom has been quite satisfactory and appears to be better than with the Array. More than 80% of my ReZoom patients stated that they did not use spectacles for any task postoperatively, although in the initial phase, some patients who read avidly benefited from reading glasses from time to time.

Spectacle usage depended on each individual's visual activity. For example, in the FDA studies, spectacle independence was approximately 80% with the ReZoom for all levels of distance, intermediate, and near vision, which is significantly better than the Array's. Some studies are showing even higher numbers. Granted, postoperative UCVA is very much dependent upon factors such as accurate IOL calculations, astigmatism reduction, the quality of the patient's macula, and the type of lens implanted.

The ReZoom lens also works particularly well for intermediate vision, such as computer work and functional tasks such as reading a speedometer. For many patients, intermediate visual function improves with time.

LENS REFRACTION

Patients generally have high expectations when they enter an ophthalmologist's office, often based on the experiences of friends and relatives who have undergone a similar procedure. When I discuss the ReZoom lens with patients, I talk of "spectacle reduction" rather than "total spectacle independence." Therefore, those patients who achieve independence are even more satisfied. It is always better to underpromise and overdeliver.

CASE STUDY

One 64-year-old female patient received the ReZoom multifocal IOL 2 months ago in both eyes and now sees 20/20 bilaterally without glasses. She can read small print (J1) well, although she is still learning how to use the optic's near vision. She can see counter distances as well as her watch without a problem, but she still relies on reading glasses when reading for longer periods of time (a somewhat common situation during the early postoperative stage).

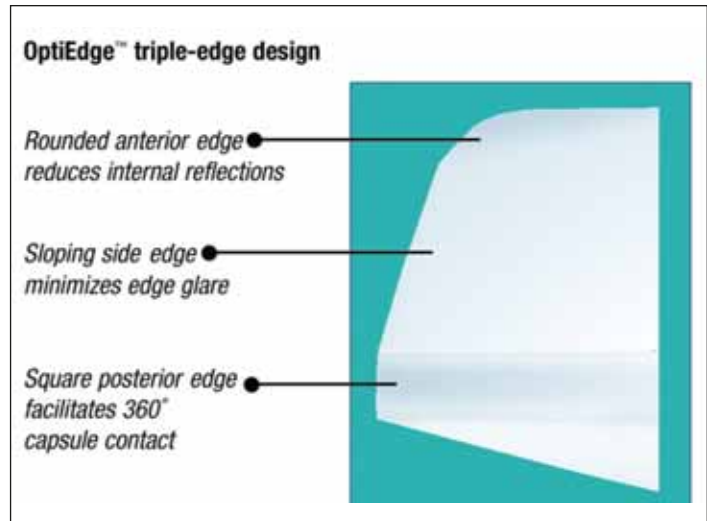


Figure 2. The edge shape of the ReZoom IOL provides uninterrupted 360° barrier protection and is designed to minimize edge glare.

This patient is also dealing with a previous dry eye condition while adjusting to the new lens. Dry eye is usually not an issue for people who receive a monofocal lens, because that type of IOL does not split the light, and therefore any dryness on the surface of the cornea is not typically perceived as a visual problem. However, when the light rays are split (ie, for distance, near, and intermediate viewing), dry eyes can add visual disturbances. Patients with a compromised tear film may notice near vision trouble, because this distant-dominant lens does not allocate the same amount of light transmission for near vision.

This patient has started using artificial tears more frequently, and her near vision has improved.

FUTURE OUTLOOK

My early experience with the ReZoom lens shows that patient satisfaction is high. I believe in the technology and am confident that the majority of my patients will be satisfied with this lens and their resulting vision. I look forward to implanting more ReZoom lenses and reporting the results. ☆

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Achieving Optimal Results With the Presbyopic Patient

This new lens technology is providing patients with excellent unaided vision at near, intermediate, and distance ranges.

BY KERRY K. ASSIL, MD

Ophthalmology is at an exciting point in history. Until now, no reliable refractive procedure existed that provided binocular near, intermediate, and distance acuity in presbyopes. Multifocal lenses, which offer the full spectrum of vision, are becoming a very popular choice for many discerning patients. In my practice, I use the new ReZoom multifocal lens (Advanced Medical Optics, Inc.; Santa Ana, CA), which is enabling some of my patients to attain better than 20/20 visual acuity while maintaining excellent near vision.

I now offer every cataract patient the alternative of receiving this multifocal IOL, and approximately 50% opt for it. Another 20% of my classic refractive surgical patients also receive the ReZoom. With many patients now aware of the availability of multifocal lenses, there is a higher acceptance rate for refractive lens exchange than ever before. Many patients are requesting multifocal implants, especially hyperopic presbyopes, more than 50% of whom opt for these IOLs.

"I now offer every cataract patient the alternative of receiving [the ReZoom] multifocal IOL, and approximately 50% opt for it."

DIALING IN OUTSTANDING ACUITY

Since I began implanting the ReZoom lens in cataract and refractive patients 3 months ago, I have found that they enjoy excellent vision at all distances. So far, I have implanted 150 ReZoom lenses and have found that the typical distance UCVA is 20/20 or better, with the majority also attaining a near UCVA of J3 or better. I even have a subset of patients who are surpassing all expectations with these new lenses, attaining 20/15 distance UCVA and J1 at near in both eyes.

One of these exceptional patients started out as a 4.00D hyperope with slightly steep corneas on whom I was hesitant to perform LASIK. Instead, I decided to perform refractive lens exchange, and I was happy to find that the patient was rewarded with phenomenal vision. On the first postoperative day, the patient achieved 20/15 distance UCVA and was J1+ in the first eye (Table 1). At first, I thought that his results were a fluke, but when I operated on the second eye, I was pleasantly surprised to achieve the same outstanding outcomes.

So far, my patients who are able to achieve these exceptional results have tended to be young with very healthy retinas. They also have almost nonexistent-

TABLE 1. ASSIL-SINSKEY EYE INSTITUTE

Results (n=150)

- More than 90% of patients are spectacle independent for near, intermediate and distance
- Typical UCVA is:
 - 20/20 for distance
 - J3 or better for near
- Some patients are achieving 20/15 UCVA for distance and J1+ for near
- Only 2% of patients experience any postoperative glare or halos

ent residual refractive errors. In these patients, I find almost no symptoms of glare or halos. In fact, I have found that glare and halos are a rare occurrence with the ReZoom overall, affecting only approximately 2% of recipients. Most of these cases involve patients who have a significant amount of residual astigmatism, typically in the range of 1.00D or more. To date, I have not had to explant any ReZoom lenses.

More than 90% of my ReZoom recipients are completely free of glasses for distance, intermediate, and near vision.

ENJOYING SPECTACLE INDEPENDENCE

Although most patients do not have the inherent capacity to reach such exceptional multifocal levels, the majority of my ReZoom patients are completely functional at all distances. My staff and I conduct a patient satisfaction survey at every visit, and we have found that patients' satisfaction levels are on par with those reported by patients who have undergone the highly popular LASIK procedure. More than 90% of my ReZoom recipients are completely free of glasses for distance, intermediate, and near vision. It is very important to refractive patients to be able to carry out all of their life's tasks without the aid of spectacles. For example, if they have to wear glasses to work at the computer, then they fall outside the 90% spectacle-free range and are no longer completely satisfied with the procedure. For these patients, the multifocal option is no longer as attractive.

My staff and I have found several measures that help maximize the likelihood of spectacle independence with the ReZoom, including modifying any astigmatism with astigmatic keratotomy at the time of the cataract surgery, remaining very cognizant of wound architecture, and performing precise biometry before implanting the lenses. We are very exacting about achieving precise keratometry and axial-length measurements. We also do our best to ensure that any astigmatism of 1.00D or more is simultaneously modified at the time of surgery.

With this approach, our patients have had exceptional outcomes. As a result, I have begun broadening the number of patients to whom I offer the lens. I initially offered the ReZoom only to my presbyopic hyperopes

and my hyperopic cataract patients, but soon discovered that I did not need to restrict it to these groups. Now, it is my lens of choice for all cataract patients who wish to pay the incremental difference from the Medicare rate. It is also my preferred treatment for hyperopic presbyopic noncataractous patients, as well as for presbyopic myopes over the age of 60 who show any yellowing of their crystalline lens, even if it is well short of a cataract.

To help ensure satisfaction in all of our patients, my staff and I do our best to effectively manage their expectations. We begin with discussing the pros and cons of the procedure and then broach the possibility of glare and halos. Although we have received very few complaints about such symptoms, I plant the seed of possibility early anyway, so that in the rare instance that it does occur, the patient is not surprised. I usually tell patients that they can expect to be able to read and drive without glasses, but that they may need a LASIK touchup in order to be able to fully achieve independence from spectacles, or that they may occasionally require spectacles for very fine visual activity. I let patients know that they should expect to have good binocular near and distance vision, with the exception that they might notice halos around lights at night. In most cases, the patient returns saying, "I don't know what you're talking about with the halos." By alerting patients about the potential for such a negative outcome, they are prepared for it and are usually happily surprised when it does not occur.

CLOSING THOUGHTS

As we go forward, I think that within the next 2 years, the category of multifocal and accommodative IOLs will become the largest single category discussed in ophthalmology. This growth will in part be due to the favorable economic climate resulting from the ruling by the Centers for Medicare and Medicaid Services that makes it feasible for many more patients to afford these new presbyopia-correcting lenses. Such expansion will also very much be the result of the new science of multifocal lenses that allows us to provide patients with a full spectrum of excellent vision with lenses such as the ReZoom that at times may even surpass our best expectations. ★

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Evolving into a Refractive Lenticular Practice

Strategies for integrating new lenticular solutions for presbyopes into clinical practice.

BY L. ANDREW WATKINS, MD

With Baby Boomers entering their presbyopic years and others looking to do away with their glasses, the role for multifocal lenses continues to burgeon. Increasingly, all lens surgery is becoming refractive in nature. Cataract patients want independence from spectacles after surgery, as do many patients aged 45 years or older, who have the discretionary income for refractive surgery. For this very large population of Baby Boomers, no technology is more appropriate than the multifocal IOLs, such as the new ReZoom IOL (Advanced Medical Optics, Inc., Santa Ana, CA).

Many middle-aged patients are eager to learn about multifocal options. I find that the key to tapping into this market is to have a plan to help patients become aware of the available choices and each lens' particular properties. For example, with the new ruling by the Centers for Medicare and Medicaid Services, which allows cataract patients with Medicare coverage access

to presbyopia-correcting lenses, I build in time to talk to the patient about his or her options. This discussion includes monofocal lenses, which will offer good distance vision without correction, but which will leave the patient dependent on bifocals or trifocals for near or intermediate vision. However, Medicare will pay for a monovision correction entirely. I then let the patient know all he or she has to gain with multifocal lenses, such as good distance, near, and intermediate acuities, and that the only downside is the extra expense.

HIGHLIGHTING THE BENEFITS OF MULTIFOCAL IOLs

When given the choice, more of my patients than I would have expected have opted for the more expensive, deluxe presbyopia-correcting implant. The selling point, I have found, is helping patients understand what they will be giving up with a monofocal lens. People want to have functional vision at distance, intermediate, and near without glasses. When they

learn that if they choose the older technology, they will still be dependent on glasses for much of their visual needs, they want something better.

Since 1997, I have implanted more than 3,000 Array lenses (Advanced Medical Optics, Inc.) in cataract as well as presbyopic refractive lens exchange patients. I now offer the new ReZoom lens to every patient who is contemplating cataract surgery as well as those who express interest in refractive lens exchange. My staff and I help them decide what they want in terms of postoperative vision. Although this dialogue requires more of our time, I have found it is well worth it. I think that the Array was a wonderful lens that was misunderstood and misapplied by

TABLE 1. CASE EXAMPLES: LAST FOLLOW-UP

Patient	Post-Op Near UCVA	Post-Op Distance UCVA
Veterinarian	J1	20/20
Retired Ophthalmologist*	J2	20/20
Retired Ear, Nose & Throat Doctor	J1	20/20

* This patient presented with a monofocal IOL and received a ReZoom in the fellow eye.

many ophthalmologists. I believe, however, that the ReZoom is a better lens and that we need to take the time to help our patients understand the acuity it can offer them.

EARLY RESULTS

My early results with the ReZoom lens have been extremely promising (Table 1). I have implanted eight lenses, and at 1 week postoperatively, four of the eyes achieved 20/20 with J3 acuity or better. My staff and I expect these results to only improve as we continue to follow these patients. Our experience with the first-generation Array IOL over the past 7 years has shown that patients' postoperative near vision improves with time.

“Virtually all presbyopic patients who are 40 years and older spend some time at the computer. If an IOL does not allow them to function at a computer without glasses, it is not addressing all their visual needs.”

One of my patients is a veterinarian whose world is visually demanding. She has experienced wonderful results at 1 week after her second surgery, with 20/20 distance acuity and J1 at near, and she is incredibly happy. Another patient of mine, a retired ophthalmologist, had an old-technology monofocal lens in one eye, and he wanted very much to have a multifocal lens in his cataractous eye. I implanted the ReZoom, and he achieved 20/20 visual acuity at distance and J2 at near by 1 week postoperatively. He is also extremely pleased with his result. I also implanted the lens in the eyes of a retired ear, nose, and throat doctor who has been ebullient about his postoperative vision. He achieved 20/20 distance vision and J1 at near at 8 weeks.

All my patients have also experienced good intermediate vision, which they value greatly. Virtually all presbyopic patients who are 40 years and older spend some time at the computer. If an IOL does not allow them to

function at a computer without glasses, it is not addressing all their visual needs. When it comes to intermediate vision, I believe that the ReZoom will outperform the Restor IOL (Alcon Laboratories, Inc., Fort Worth, TX). The Restor, which is termed a *multifocal lens*, is really a bifocal IOL and does not offer as good intermediate vision as the ReZoom. I think that time will show that the ReZoom is far and away the best of the new lenses available for near, intermediate, and distance acuity.

TRANSITIONING TO THE ReZoom

Ultimately, I believe that the ReZoom will also outperform the Array. The former appears to offer better near vision with less glare and halos. Those who have had success with the Array should find the transition to the ReZoom easy. Surgeons who have had more difficulty with the Array, however, may need to improve upon some things to be successful with the ReZoom.

One key to success with this IOL is excellent biometry so that the postoperative refractive error is as close to plano as possible. It is important to underpromise and overdeliver to the patient regarding postoperative expectations. I never promise a patient that he or she will be free of spectacles after surgery. In fact, I promise that he or she will need glasses for certain activities, even if it is just to read the tiniest print. Otherwise, patients who expect to never need glasses again will be unhappy. It is far better to explain that they will be more independent with a multifocal IOL than with any other modality, but that their vision will not be perfect.

CLOSING THOUGHTS

Overall, I believe that as the global community of ophthalmologists comes to understand the curse of presbyopia and what they are doing to their patients' near and intermediate vision by implanting a monofocal lens, increasingly they will be inclined to provide multifocal lens technology such as the new ReZoom. In the end, this modality will also reward practitioners financially, considering the large Baby Boomer market that is now primed for these remarkable new lenses. ★

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Educating Patients About Multifocal Optics

Being available to discuss their vision helps patients to better understand the new multifocal options and outcomes.

BY KEVIN L. WALTZ, OD, MD

Educating patients about multifocal IOLs helps them better understand the benefits of such a lens. When surgeons make more of an effort to inform patients of their options, more patients chose a premium IOL. The ReZoom IOL (Advanced Medical Optics, Inc., Santa Ana, CA) is a great choice for a premium implant. My experience with this multifocal lens has been excellent; I am surprised at how well it functions at distance, intermediate, and near.

MULTIFOCAL OUTCOMES

I participated in the FDA clinical trial of the Array acrylic IOL (Advanced Medical Optics, Inc.) in 2002. In addition to the acrylic material, this version of the Array incorporated the OptiEdge of the Sensor IOL (Advanced Medical Optics, Inc.). The ReZoom is not an acrylic Array; its optic is different than the Array's. However, my experience in the acrylic Array's clinical trial convinced me that the ReZoom will have a significantly lower rate of YAG capsulotomies than the Array, for the following reasons: (1) the stiffness of the acrylic material discourages the optic's bending when the capsule contracts; and (2) the acrylic material and the OptiEdge design discourage visually significant posterior capsular opacification.

I have implanted 20 ReZoom lenses to date, and my patients have been very satisfied. The distance vision it provides in a typical patient is spectacular, in part because the center 2mm of the lens is a monofocal design. The optic eliminates unwanted visual sensations at distance in the daytime, thus providing a remarkable quality of vision.

The quality of the near image with the ReZoom is not quite as good as its distant image, but still very functional. When patients view objects at near in bright light, the pupil constricts, and the near add is minimized. The patient benefits most from the pseudoaccommodation of the small pupil. When he focuses at near in dim light, such as when reading a menu in a typical restaurant, his distance vision is superimposed on the near image, creating

some loss of contrast acuity. The typical near acuity of the ReZoom lens in my first series of 20 eyes is between J1 and J2 at 1 month postoperatively. Finally, the ReZoom's intermediate vision is sufficient for functional vision, such as computer work.

EDUCATING PATIENTS

It is very difficult to fully educate an uninformed patient of his multifocal IOL options in a single visit (Figure 1). The variety of lens options coupled with issues of cost (with regard to the new reimbursement ruling by the Centers for Medicare and Medicaid Services) make this decision confusing for the patient. Patients who are educated about IOL choices prior to their examination, however, often like the idea of the ReZoom lens and wish to have it implant-



Figure 1. Patient education about multifocal options is one key to success with new multifocal implants.

ed. Presenting visual or written materials to patients at their consultation gives them the opportunity to digest the information and be able to discuss it at their next visit.

“Approximately one out of five of my patients undergoes laser vision correction after implantation of the ReZoom, because I want to reach the target refraction exactly and can do so most precisely with a laser.”

My staff and I are in the process of creating written material on our refractive options for all cataract surgery patients who visit our practice. The material explains each choice and its benefits and gives a breakdown of costs.

Some patients who have previously researched their surgical options or who have been referred by someone are even more motivated to choose the ReZoom lens. These individuals are much more prepared to sign up for surgery and pay the additional fee for the multifocal technology.

REFINING EXPECTATIONS

Surgeons must not oversell multifocal IOLs. I tell patients that it can make them much less dependent on their glasses. Although the majority of patients will become totally independent of their glasses, I am careful not to promise this outcome. Then, if they do achieve spectacle independence, they are thrilled.

With the ReZoom lens, patients often need reading glasses immediately after surgery, because they are not used to multifocal vision at near. Initially, it is very common for them to request low-powered reading glasses of approximately +1.00D, even if they can read without them, because the low-power add makes reading easier and faster.

MULTISTEP PROCESS

As a surgeon, I want to ensure that patients achieve their best refractive outcome. When using a multifocal IOL, this means leaving the eye plano or close to it with no cylinder. To this end, both physicians and patients must recognize that such excellent visual acuity may be a multistep process. Approximately one out of five of my

patients undergoes laser vision correction after implantation of the ReZoom, because I want to reach the target refraction exactly and can do so most precisely with a laser.

DEALING WITH OUTCOMES

Because implanting multifocal lenses such as the ReZoom is more complicated than traditional cataract surgery, surgeons should have a plan in place to deal with all possible outcomes. For example, even if 90% of patients are likely to not need reading glasses postoperatively, I still have all patients sign a consent form that states that they may need to wear glasses or contact lenses, because I have to be able to deal with the 10% who are not spectacle independent or who have other ocular issues. Surgeons will need a variety of supporting options such as the following in order to provide premium IOLs of all types.

- Laser vision correction needs to be available as an enhancement. The service should be prearranged and included in the fee of the ReZoom procedure. If you choose not to do the procedure, have a partner or a sub-contracted surgeon available to do it. This should not be handled last-minute or in an emergency situation.
- Corneal relaxing incisions should be available at the time of the initial surgery.
- The surgeon and staff should be prepared talk to the patient at length about his vision before and after surgery.

The monofocal IOL in the Array and ReSTOR (Alcon Laboratories, Inc., Fort Worth, TX) clinical trials showed that 2% to 3% of patients experienced severe visual symptoms at night. Any clinical trial involves good surgeons performing skilled surgery on ideal patients. Outcomes are not likely to be any better in the real world.

In the case of the ReZoom implant, the patient is paying for the service, not just the lens. In most cases, patients do not enter a practice and request a particular lens; instead, they present wishing to be as free of their glasses as possible. As such, they want the ability to talk with the surgeon about imperfections in their vision. The surgeon needs to accept that those imperfections exist and support the patient emotionally. Patients may never reclaim the vision of a normal 20-year-old eye, but we surgeons can certainly give them better vision than what they have. Be ready to talk to them. ★

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WaveScan-Guided Hyperopic Multifocal Ablations

Preliminary results from the clinical trial show promise for hyperopic presbyopes.

BY COLMAN KRAFF, MD

Hyperopic presbyopic laser vision correction with the Star S4 excimer laser (VISX, Incorporated, Santa Clara, CA) is currently undergoing feasibility studies with the FDA and is available internationally. Mine is one of two clinics involved in this study. I have treated 10 patients with the procedure and am in the process of recruiting 10 more. My co-investigators and I currently have 3-month data on five patients.

STUDY PARAMETERS

The parameters of the trial are to correct 1.25 to 1.50D of presbyopia using the patented VISX multifocal ablation profile with the company's Variable Spot Scanning technology. The system is designed to induce a subtle change in the ablation shape of the subject's wavefront map. Patients' dominant eyes receive a CustomVue hyperopic treatment targeted for emmetropia, and their nondominant eyes receive a CustomVue hyperopic treatment combined with the investigational VISX presbyopic shape. The treatment includes iris registration (see sidebar). We steepen the central zone to provide near vision and target the peripheral zone for distance. The combined effect produces an aspheric curve that expands patients' depth of focus.

Although we counsel the patients to have realistic expectations about their outcomes, so far, those in this trial have been very happy. There is a very high level of patient satisfaction, and the treatment has worked particularly well in those with low-to-moderate hyper-

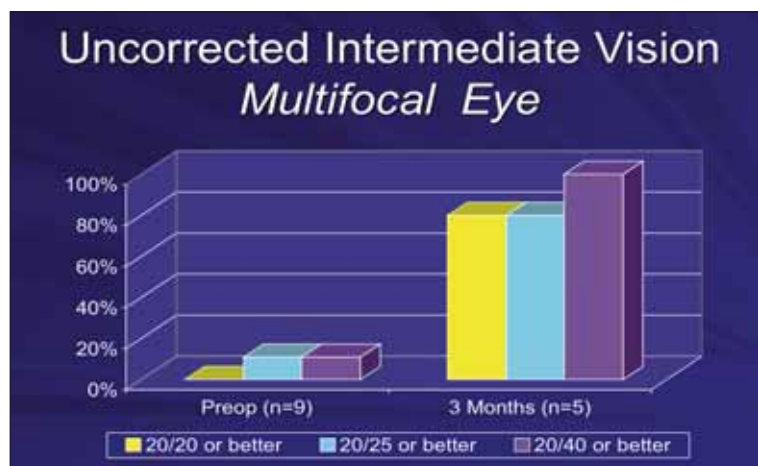


Figure 1. Preoperatively, no subjects had 20/20 (or better) uncorrected intermediate vision, compared to 80% with 20/20 (or better) at 3 months postoperatively.

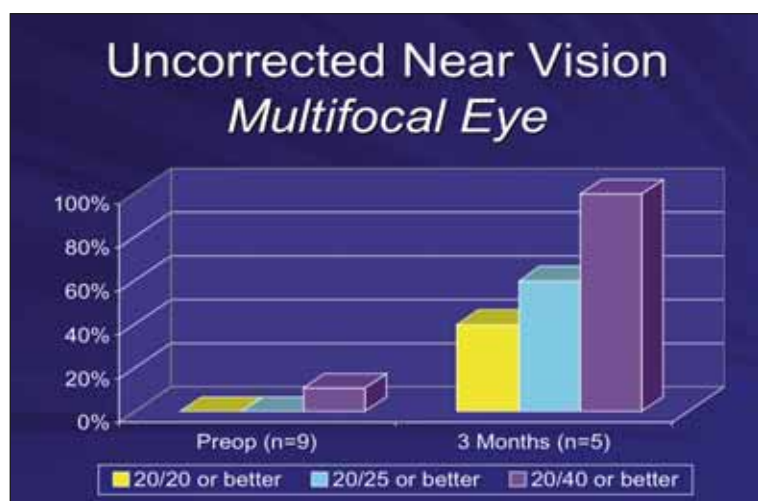


Figure 2. Preoperatively, 11% (one patient) of subjects had uncorrected near vision of 20/40 (or better), compared to 100% with 20/40 (or better) at 3 months.

IRIS REGISTRATION AND MULTIFOCAL ABLATIONS

Iris registration is important in multifocal ablations because the accuracy of the procedure depends on positioning the treatment's shape in accordance with the pupil centroid. If the treatment is misaligned and the eye is cyclorotated, iris registration compensates for the change and thus ensures an optimal ablation.

The Star S4 IR system (VISX, Incorporated, Santa Clara, CA) incorporates two types of automated registration: cyclorotational compensation and pupil centroid shift compensation. Both features are particularly important for multifocal ablations, because they work in concert to deliver the needed treatment shape in the correct location. Without either of them, the correction would not be as accurate. In the WaveScan aberrometry system (VISX, Incorporated), iris registration identifies unique aspects or landmarks of the iris' anatomy and records their locations. When the patient lies beneath the Star S4 IR laser, the system recognizes these markings and then compares its own image of the eye with that from the WaveScan. The laser rotates the treatment to the appropriate position based on the WaveScan image. Because the center of the pupil can change location relative to the outer iris boundary depending on whether the pupil is dilated or constricted, the IR system identifies and aligns the pupil centroid that it sees with what the WaveScan marked. In other words, if the location of the center of the pupil is different underneath the laser from where the WaveScan identified, the laser system will move the treatment to the WaveScan's location.

In short, the alignment of the treatment is much more precise using iris registration compared with manually positioning the head. Ensuring that the treatment is in the appropriate position should produce a better result.

opia with a limited amount of astigmatism. The patients in the trial are between 41 and 54 years old, and 67% of them are male.

THREE-MONTH RESULTS

Preoperatively, the patients' nondominant eyes (which received the multifocal ablations) had on average $1.67 \pm 0.47D$ (+1.00 to 2.50D) of sphere and $0.19D \pm 0.17$ (0 to 0.50D) of cylinder. By 3 months, all of these five eyes had 20/20 uncorrected distance vision, 80% had 20/20 uncorrected intermediate vision (Figure 1), and 100% of the eyes had 20/40 or better uncorrected near vision (Figure 2).

Perhaps more important are the binocular results. Preoperatively, no patient had binocular uncorrected distance vision of 20/20 or better, whereas all five achieved this target by 3 months postoperatively. Uncorrected binocular intermediate vision was less than 20/25 in all subjects preoperatively, but 80% achieved 20/16 or better by 3 months. The near vision results were similar: preoperatively, only one patient had uncorrected binocular acuity of 20/40 or better, compared with all of the patients by 3 months postoperatively.

Also importantly, no eyes, receiving multifocal or CustomVue, lost BSCVA at distance, intermediate, or near by 3 months (five subjects).

DISCUSSION

As enrollment and follow-up for this trial continue, I am cautiously optimistic about the ability of WaveScan-

Guided Hyperopic Multifocal Ablation to serve the presbyopic hyperopic population, although the results of the clinical trials are too preliminary to draw any firm conclusions. I will say, however, that its shape is good and should only improve with continued use. Assuming that this procedure continues to show consistently good results, I think that some day it might benefit patients between the ages of 45 and 55 who have 0.50D to possibly 3.00D of hyperopia. Also, this type of treatment may offer certain advantages over lenticular correction, such as being less invasive, which many risk-averse patients will likely appreciate. Hyperopic laser vision correction would also be more cost effective for patients than lenticular surgery, because it would not require a surgery center or a phaco machine. For the surgeon, its technique is the same as LASIK's, but with different software. In general, hyperopic laser vision correction may be a viable option for patients who have low levels of hyperopia, a clear crystalline lens, and very little astigmatism, as an alternative to their glasses or readers. However, patient selection with this procedure will be very important. ★

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