A New Lens for the Future of Cataract Surgery

Accommodating.

Aberration Free.

Aspheric.

Supported by Bausch & Lomb
In October 2009, Bausch + Lomb received approval for the newest addition to its line of accommodating intraocular lenses (IOLs), the aspheric optic Crystalens AO. In November, the company began a Field Observation Evaluation involving 35 key surgeons to collect information and data.

Of the 35 surgeons involved in the evaluation, five have been interviewed regarding their experiences with the Crystalens AO, as well as other lenses in the Crystalens portfolio. The following pages will provide you with a look at the details of the Field Observation Evaluation, along with the earliest data on and impressions of this new lens.

Participants

Alan B. Aker, MD, is Co-founder and Medical Director of the Aker Kasten Eye Center. He is also a charter member and past president of the American College of Eye Surgeons.

Uday Devgan, MD, is Director of Devgan Eye in Los Angeles, Beverly Hills and Newport Beach, Calif. He is also Chief of Ophthalmology at Olive View UCLA Medical Center and Associate Clinical Professor at the Jules Stein Eye Institute at the UCLA School of Medicine.

J.E. “Jay” McDonald II, MD, is currently the editor of the ASCRS Cataract and Refractive Internet Forum and is a past president of the American College of Eye Surgeons.

Jay S. Pepose, MD, PhD, is Medical Director of the Pepose Vision Institute and Professor of Clinical Ophthalmology at Washington University School of Medicine.

Jeffrey Whitman, MD, is President of and Chief Surgeon at the Key-Whitman Eye Center. He is also a current Clinical Correspondent for the American Academy of Ophthalmology and a past president of the American College of Eye Surgeons.

The Crystalens Goes Aberration-Free

The Crystalens AO, Alan B. Aker, MD, explains, is based on the very stable and reliable Crystalens Five-O platform. Uday Devgan, MD, describes the Crystalens models: “The Crystalens HD has a small central area of increased curvature on the lens and because of that, it requires a postoperative refractive result within 0.50D of plano to maximize the visual outcomes.” He continues, “The surgeon has to have great accuracy in the lens calculations as well as the correction of any pre-existing astigmatism. For the aspheric Crystalens AO, the power of the lens is uniform from edge to edge, and because it does not have the modification in the center that is present in the Crystalens HD—because it is a uniform power lens—it is relatively forgiving of mild to moderate amounts of decenteration.”

Jay S. Pepose, MD, PhD, adds that, “This is the first aspheric accommodating lens and there are some optical advantages to an aspheric lens in terms of enhanced quality of vision, particularly in patients with large mesopic pupils or those requiring high dioptric powers. An aspheric lens such as the Crystalens AO with zero aberration has exactly uniform power in every point across the optic, making it immune to the effects of decenteration with respect to the visual axis.” He also comments that for some
patients, there may be an advantage in having a lens with zero aberration. In cases where a lens with positive or negative spherical aberration is not well aligned to the visual axis, this may induce higher-order aberrations such as coma or secondary astigmatism. “Coma can distort vision and can lead to patient complaints about ghosting,” he explains. “There is a risk of these aberrations occurring with a lens that contains either positive or negative spherical aberration that is decentered with regard to the visual axis, rather than the geometric center of the pupil.”

According to Dr. Devgan, “If you used the previous Crystalens HD or Crystalens Five-O, this lens will look identical to you, and its delivery in the eye, or insertion at the time of surgery, is going to be the same.” To this point, J.E. “Jay” McDonald II, MD, says, “The surgical technique and everything is exactly the same. You can’t tell unless you get the lens under the light just right and twist it.” In practice for 30 years, he has been using the Crystalens Five-O and the Crystalens HD. “I have been implanting aspheric and using aspheric monovision and aspheric-blended vision for several years,” he says. “I am a real proponent of aspheric lenses, so I was really excited when Bausch + Lomb decided to add an aspheric option to the Crystalens platform.”

Dr. Devgan believes that “Because [the Crystalens AO] has no spherical aberration, or is an aberration-free design, it is a good choice lens to put in eyes that have had prior corneal refractive surgery (post RK or LASIK) to avoid confounding the existing aberrations of the cornea.”

Dr. McDonald says he has been a strong proponent of getting asphericity on the Crystalens for a while. “I am very excited about it and it just makes sense that we use aspheric lenses on every patient, other than those who have had hyperopic LASIK.” Regarding the marriage between the Crystalens platform and the aspheric optic, Dr. Pepose agrees that it made sense.

Seeing that these surgeons all embrace the new aspheric Crystalens, let us take a closer look at how the lens is performing so far.

The Crystalens AO Under the Microscope

The Intent of Bausch + Lomb’s Field Observation Evaluation was to have the surgeons implant 10 lenses each for a total of 300 Implants. The surgeons followed the Crystalens clinical guidelines as outlined in the Crystalens Clinical Pearls. Patients were implanted bilaterally, giving each surgeon five patients to evaluate. Surgeons did not implant the lens in eyes with moderate to high amounts of corneal astigmatism (≥1.50) or in eyes with ocular health issues. The surgeons used an A-constant of 119.1 and targeted the distance eye for plano to -0.25D and the near eye for -0.25D to -0.50D. (The various bar graphs that appear throughout these pages provide a retrospective chart review of the Field Observation Evaluation.*)
first goal is to confirm that the A-constant of the lens on the box is close to what it should be for the average surgeon,” he says. “We also wanted to see the performance of the lens, so we are evaluating uncorrected distance, intermediate and near vision and then best-corrected and we are also evaluating distance-corrected intermediate and near. And also just confirming the proper positioning of the lens with the optic vaulted posteriorly.”

Dr. Pepose has been in practice since 1988 at a large cataract practice that does a lot of premium IOLs.

Dr. Devgan has had experience with “essentially every iteration of the Crystalens that has been FDA approved.” He performs the full spectrum of vision surgery, with the lion’s share of his practice being premium cataract surgery.

Regarding the Crystalens AO, Jeffrey Whitman, MD, of Dallas, Texas says, “Certainly it is the easiest that I have seen of all the Crystalens lenses to target and hit right on what you are shooting for.”

Minor details of the Field Observation Evaluation aside, Dr. Pepose says that although he has not really done any formal contrast testing yet, no version of Crystalens has shown any decrease in contrast compared to a monofocal lens. “And optically,” he says, “this lens should be excellent because it is an aspheric, so if anything, contrast may be even better.” He does not envision any issues with regard to contrast, unlike what one may encounter with some multifocals, where you are splitting light between near and far.

Also commenting on contrast sensitivity with the Crystalens AO, Dr. Aker reports that, “It is good. It is really good. The Crystalens AO is a high-performance monofocal lens and the contrast is exquisite. Because of its aberration-free design, our patients are actually receiving enhanced contrast sensitivity. This is truly the best quality vision we are currently able to provide following cataract surgery.”

Now, here is a look at each individual surgeon’s experience in the evaluation.

Physician Specifics
“The experience so far has been very good,” comments Dr. Pepose. “When we have tested patients, they have good distance vision, good intermediate, excellent near and even with the distance correction in place, you still have good near, so it is clear the lens is functioning quite well.” He says that most patients’ distance-corrected near vision has been around 20/30, even within
one week. “I have been pretty impressed and intermediate vision is even 20/20. It seems like an excellent lens,” he says.

Based on the results he has seen so far, Dr. Whitman says he might start completely with the Crystalens AO first because it is so easy to target and “you are going to get results right off. If you are looking for a little more near, you might want to consider the Crystalens HD down the line, but if you are getting good results binocularly, you may just stay with the Crystalens AO,” he explains.

Dr. Whitman had some of his personal results implanting the Crystalens AO to share. For his 10 eyes (five patients), 80 percent were 20/40 or better monocular uncorrected distance vision at 2 weeks or more and 70 percent were 20/25 or better. He had 100 percent 20/20 or better intermediate, so for intermediate, it is a fantastic lens.” Moreover, monocular and binocular uncorrected near vision for Dr. Whitman’s patients were 100 percent J3 or better.

Drop use. “We do not use preop drops on a routine basis unless the patient is at greater-than-normal risk for cystoid macular edema,” says Dr. Aker. His postop drop regimen includes an NSAID, prednisolone 1% and a fluoroquinolone antibiotic. He adds, “With all of our premium IOLS, we use an NSAID and topical steroids for at least eight weeks. This reduces the likelihood of rebound iritis as well as CME in these patients.”

According to Dr. Whitman, he uses drops when implanting the Crystalens AO in the same manner he uses them with all of his other Crystalens patients. “We usually give all patients a little preoperative nonsteroidal (we use nepafenac ophthalmic) and an antibiotic the day or two before surgery and I also like to cycloplege them postop,” he says. “So they are using a little 1% cyclopentolate b.i.d. for the first 10 days to keep the lens in a posterior position. But as far as antibiotic and steroid use, we pretty much do the same thing we usually do, which is use a tapering dose of steroid for eight to 10 weeks postop and an NSAID for the first month to six weeks. (See the sidebar, “Steroid Use and Premium IOLs” below for more detailed information.)

Steroid Use and Premium IOLs

Alan B. Aker, MD

Colleagues occasionally refer patients to me who are having problems with premium IOLs, including torics, multifocals and accommodating lenses. Often, these problems relate to malpositioned or dislocated IOLs. The Crystalens is perhaps the IOL most impacted by capsular issues because of the rare potential for an asymmetric vault. I have never had an asymmetric vault in my own patients with any Crystalens Five-O series lens, but have seen it in patients referred to me. In each of these patients, the common denominator was that steroids were stopped after four weeks, and shortly thereafter, an asymmetric vault was noted.

A short course of steroids is really inviting cystoid macular edema (CME) and all kinds of unwanted capsular issues, such as capsule contraction and asymmetric vaulting. Our current regimen is to have patients use prednisolone 1% q.i.d. for six weeks and then b.i.d. for four weeks. We also use an NSAID along with the topical steroid. This provides protection from rebound iritis, CME, as well as aggressive capsular fibrosis. With steroid responders, we cover the patient with an appropriate topical medication until the steroid course is finished.

A patient paying for a premium IOL does not want to deal with any postop issues. If these occur—even though they occur in routine cataract surgery—the patient feels as though they did not get what they paid for. The advantages of a longer course of steroids should be obvious, even to the casual observer. Doctors who do not currently use this approach should reconsider the benefits. I strongly recommend that, to minimize capsular fibrosis, especially in younger patients, and to minimize the possibility of CME, postop steroids should be used for eight to 10 weeks in all premium IOL patients.
Dr. McDonald uses atropine with his Crystalens patients “at the time of surgery, which should last about seven to 10 days.” Even with some atropine affect, he says they are still getting good near. “We just seem to be consistently a little better in our outcomes if we use it. We put one drop in at the completion of surgery; that’s it.”

**Patient selection.** “If you consider the Crystalens family of lenses,” says Dr. Devgan, “look to the Crystalens AO when dealing with an eye that has had prior corneal surgery, an eye with larger pupils in scotopic conditions or significant corneal aberrations. In an eye that has no prior corneal surgery and has a mild or moderate amount of astigmatism that I know I can accurately correct, then the Crystalens HD may provide a wider range of vision.” He continues, saying, “For an eye that has significant astigmatism and I worry that I may not be able to get them down to 0.50D or less of astigmatism, then the Crystalens AO would be more forgiving of that residual astigmatism.”

Although patients in the age group of cataracts and refractive lensectomy do not generally have large pupils, Dr. McDonald comments that he might exclude any patient who does. He explains, “Basically, we use this with the very same patients who we would implant in the past with a Crystalens or a multifocal lens. Also, our patients had 1.0D or less of astigmatism and although that was a requirement of the evaluation, that would not be a limitation for me.” He says that he would probably implant a patient with up to 1.50D to 2.0D of astigmatism, knowing that he could deal with it inciscionally.

In Dr. Devgan’s opinion, the Crystalens AO might be an appropriate choice particularly in eyes that you may worry would go on to develop macular degeneration or glaucoma later in life because you are maximizing image quality and contrast sensitivity.

“Patient selection is extremely important with any premium IOL,” remarks Dr. Aker. “We feel it is essential that the patient have a potential acuity of at least 20/30. The patient is paying a premium for premium vision and poor potential rules out premium vision.” He says that he counsels patients against premium IOLs if they have limited visual potential. Now that we have reviewed the details of the Crystalens AO Field Observation Evaluation and learned about drop use and patient selection, it seems only logical to move on to what can be expected when first getting acquainted with the lens.

**Getting Started with the Crystalens AO**

In a nutshell, Dr. Whitman advises the following: “I think the signal that we are trying to put out to folks and what we are recommending is to pick your first five patients with healthy eyes, good tear film, normal corneas (not a post refractive surgery patient) and maybe lower amounts of astigmatism because you want to get your best feel for the Crystalens AO on pretty normal, standard cataract eyes.” He says, “Watch the outcomes and see if you need to adjust anything, then you can even branch out to higher astigmatism.”

According to Dr. Whitman, his patients are very happy with the Crystalens AO and the close-up vision has been very good. “In fact, I am startled by the results with the AO,” he remarks, “it is clearly giving us better near and intermediate vision than I would have thought.” He continues, saying, “there is something about this lens that is better than expected. Crystalens is usually my choice for post refractive eyes, which are generally younger cataract patients, because I do not want halo and glare like you get with multifocal lenses for those age range patients. And the nice thing is those younger patients dilate more, so an aspheric optic is desirable.” Although he has never been a mixer and matcher, Dr. Whitman states that he may decide with some of the younger patients to bilaterally implant Crystalens AO lenses or at least to implant a Crystalens AO in the distance eye and maybe a Crystalens HD in the non-dominant eye. “We are going to have to see how to play around...
with it. I am kind of excited about the whole thing," he says.

Dr. McDonald adds, "So far, the patients are doing better, faster. Both with their data outcomes as well as with the emotional outcomes. The patients already seem to be a happier, easier managed group and I think that is because they are getting better near and distance than we were with the previous Crystalens models."

On the flip side, "A lot of patient dissatisfaction with any presbyopia-correcting IOL has to do with unmet expectations," says Dr. Aker. To that point, Dr. Devgan explains that with any of these lenses, the key is to appropriately gauge and then set patient expectations.

**Patient Perceptions and Expectations**

Dr. Devgan tells his cataract patients that if they are expecting the Crystalens to give them the vision they had when they were 22 years old, they are going to be disappointed. However, if they are expecting the lens to give them very good distance, superb intermediate and reasonable near (with the caveat that they may need reading glasses for some smaller print), then they will be very satisfied. He explains to them, "We have great man-made body parts, including lens implants, but none are as good as the natural human body parts in young people. The only perfect lens is the crystalline lens in a young person—and there is no fountain of youth."

Dr. McDonald manages the expectations of every cataract patient asking or desiring spectacle independence from the very start. He does this by telling them that even though most people most of the time will not need spectacle help for most of the things they do, that does not mean that they are going to be completely out of glasses; they may still need them for some small up close tasks or driving at night.

Dr. Whitman says he has a very good staff that have been doing this a long time. "We really talk to the cataract patient about what to expect with any of our premium lenses. That if we can get them out of wearing glasses 80 percent to 85 percent of the time, that is a success. That if they get out of wearing glasses 100 percent, that is great, but they should not expect it." He also tells them that they may need to use readers every now and then, such as in dim lighting, but that they should not think of that as failure. "Just realize that all of the other time without glasses is a success," he explains to them.

Dr. Aker tells his cataract patients that they have to be willing to wear glasses sometimes for certain specific tasks, but stresses that they will be able to use their computer and read books, magazines as well as menus and price tags without glasses.

"The Crystalens is providing a really nice wide range of vision," says Dr. Devgan. "Particularly when the eyes are appropriately targeted. So unlike a multifocal lens, where you target both eyes first for the same outcome, with the Crystalens, we have different targets for each eye. We are intentionally using a little bit of mini-monovision."

In Dr. McDonald's experience with the Crystalens AO, when patients came in for their second eye—and they were only a week to 10 days out from their first eye—they were already getting good distance and near with the first eye. "And when the second eye was implanted, they were even happier," he claims.

Although having happy cataract patients is what you always hope and aim for, those who are unhappy or who have complaints are sometimes unavoidable. The following section addresses how to handle those undesirable situations.

**Coping with Contraindications and Complaints**

Dr. Devgan says that the Crystalens AO is not a lens that you would expect to have any halo or glare because there is no splitting of light. "And because of the way this lens is designed," he adds, "It may be more forgiving..."
with residual refractive error than the Crystalens HD.”

Because the Crystalens AO is not multifocal, says Dr. Whitman, “you almost never see glare and halo. Younger patients who dilate a lot will sometimes get reflection off the edge of the lens, but it is very rare with this lens or any of the other Crystalens models. I have just not had much problem with it.” To further this point, Dr. Aker comments that one of the great advantages of the Crystalens accommodating IOLs has to do with the fact that they are essentially monofocal. “They provide a single point of focus in agreement with how the eye was designed,” he explains. “As a result, we have not experienced any of the issues typically seen with the multifocal IOLs.” He adds that to avoid edge glare, he does not implant the Crystalens in patients with resting pupils larger than 5mm.

“None of the Crystalens lenses (or any accommodating lens) are appropriate choices if you do not have an intact capsular bag,” advises Dr. Devgan. “So at the time of surgery,” he continues, “if there is a rupture in the posterior capsule, this lens cannot be placed in the sulcus. Secondly, if you have broken or loose zonules (advanced pseudo-exfoliation or a traumatic cataract), this is not an appropriate lens either because you are not going to be able to couple the lens to the ciliary muscle.”

Dr. Whitman thinks that the Crystalens AO should not be implanted in irregular corneas or those with irregular astigmatism and issues that would keep you from implanting other premium lenses, whether it be toric, multifocal, etc. “You are not going to make them worse with it,” he explains, “but in the context of underpromise and overdeliver, if you know that their cornea is compromised, then you know you are not going to get the best result when you are done.” However, he adds, if a patient communicates that they know their vision is not going to be great but that they just want to have a better range of vision, then the Crystalens AO might be worth considering. “I also do not use premium lenses in patients with severe retinal problems.” He admits that he would consider using a Crystalens for a patient with a little mild aging change in the retina, mild retinal pigmental epithelial changes in the macula and mild preretinal membranes because it does not decrease contrast sensitivity and the Crystalens AO should be even better. According to Dr. Whitman, “You are not going to make them worse as you might with a multifocal because of light splitting leading to a decrease in contrast sensitivity.”

Revisiting the topic of dysphotopsias, Dr. McDonald says he has not had any complaints about halo or glare so far and he does not see any contraindications for implanting the Crystalens AO that are not the same as those for implanting the Crystalens Five-O or the Crystalens HD. “You need a good capsulorhexis and intact posterior capsule, fit within the bag and realistic patient expectations,” he adds.

Dr. Pepose says he does not really see a downside to this lens. He continues, saying, “You have good distance vision equal to a monofocal and you are getting the added benefit of enhanced intermediate and near. We need to wait for the data to come in from all of the sites, but so far, I think it has been very promising.”

Once we achieve age 60, Dr. McDonald points out, the pupil continues to become smaller and smaller, therefore increasing depth of focus plus really limiting flexibility of any multifocal optic. He says, “This fact really accentuates the advantages of an aspheric non multifocal optic. The Crystalens AO fits this bill.”

From what we have heard, the Crystalens AO has a place in the IOL armamentarium, but in what capacity?

**What’s in the Armamentarium?**

“It will be an important part of the armamentarium,” remarks Dr. Pepose of the Crystalens AO. He says he will use the lens for patients who have had previous hyperopic LASIK and who already have a lot of negative spherical aberration induced by the laser treatment. “For the average patient,” he comments, “I will probably stick with the Crystalens HD because the results have been very good and I have been able to hit the target and have satisfied patients.”
Crystalens, because I just do not want to remove multifocals for quality of vision complaints anymore,” Dr. Aker remarks.

Dr. Whitman sums up his thoughts on his armamentarium, saying “If close-up needlepoint is a patient’s favorite thing to do all day and night, I might go with the Tecnis Multifocal IOL (Abbott Medical Optics), but for the average Joe out there who drives and uses a computer, it is clear to me that the Crystalens—any model of the Crystalens—has the best intermediate vision out there.”

He adds that, “In general, the best lens—whether it be a multifocal, a Crystalens, a monofocal or a toric—is going to depend on each individual patient (their eye measurements, their expectations, eye anatomy or pathology).” Dr. Devgan recommends that surgeons “prepare for the future by learning to use all of the available IOLs.”

What does the future hold for these lenses? Our five surgeons will share their thoughts, but first they have some tips for successfully incorporating the Crystalens AO into your armamentarium.

**Crystalens Pearls and Predictions**

“I think it is important with all of the Crystalens models to make sure you clean the capsule well,” advises Dr. Whitman. “And that means really good aspiration of the cortex. I recommend using the Whitman Shepherd Double-Ended Capsule Polisher (Bausch + Lomb Storz Ophthalmic Instruments), which helps get those cells off of the underside of the anterior capsule. With the moveable accommodating lens, you really do not want fibrosis in the capsule, as it could change the position and limit the movement of the lens.”

His other pearl is that a good full six to 10 weeks of steroids seems to reduce fibrosis “so that you get the results you want every time.”

Dr. Devgan emphasizes that with any Crystalens, it is important to rotate the lens to ensure that it is completely within the capsular bag. “If you cannot rotate the lens,” he says, “chances are, one of the haptics is not in the capsular bag and that will become a problem later.” He also says to make sure that the incision is absolutely water tight at the end of the case. He explains, “If the incision leaks—just a little bit, the anterior segment of the eye will deflate just slightly, and the lens will shift forward. This will give you a ‘myopic surprise’ in terms of outcome and will diminish the accommodative amplitude that you will see.”

Dr. McDonald says that when beginning any new technology, the pearls are to have good surgical technique, a good capsular bag, a clean bag and positive expectations. He echoes Dr. Devgan’s comment about rotating the lens to ensure that the haptics are in the bag. “I do have another
hint,” he adds. “Aim a little bit myopic; go back to mini-monovision like we did in the Crystalens Five-O and I think you end up with more satisfied patients.”

Dr. Pepose’s pearl has to do with patients. He says, “You may want to consider what each patient does. For example, in situations where someone is predominantly in a dark environment with a mesopic pupil (driving at night professionally, x-ray technicians), aspheric optics might play a more important role.” According to him, it is a bit of a game where you have to try to match the lens to each patient’s vocation(s) and avocation(s). Elaborating on the topic, he says, “I do think in selecting patients, you have to explain to them that there is no lens yet that is as good as our natural lens. The natural lens does certain things that no current man-made lens can do.” He continues, saying, “Ninety percent of it is explaining to patients that this is the best technology we have today and it is better than anything we have had in the past, but it may not be

### CrystaLens Details and Designs

A closer look at the existing CrystaLens accommodating lens models.

With the recent launch of the Bausch + Lomb CrystaLens AO intraocular lens, surgeons now have a choice of three CrystaLens accommodating lens models. All three lens models use the same general lens platform (5-mm optic body, rectangular hinged haptics and posterior square edge) and Crystalsert insertion system. The only difference between the three CrystaLens lens models is the optical design. The CrystaLens Five-O lens has spherical anterior and posterior surfaces, so it has positive inherent spherical aberation. The CrystaLens HD lens has a modified anterior surface that is designed to asymmetrically extend depth of field. Like the Bausch + Lomb SofPort AO and Akreos AO monofocal lenses, the new CrystaLens AO lens has prolate aspheric anterior and posterior surfaces and is designed to be free of spherical aberation.

Because the typical cornea has positive spherical aberation, an eye with a CrystaLens AO lens would have less positive ocular spherical aberation than an eye with a CrystaLens Five-O lens. The benefits of reducing ocular spherical aberation include improvements in retinal image quality, contrast sensitivity and visual acuity, and these benefits have been clinically established. Further benefit of an aberration-free aspheric design is that lens decentration does not induce other aberations, specifically defocus, astigmatism and coma, whereas a spherical lens with positive spherical aberation or an aspheric lens with negative spherical aberation does.

A potential downside of eliminating spherical aberation is diminished depth of field. This is especially concerning for any presbyopia-correcting lens, as it may decrease a lens’s tolerance to residual refractive errors and may degrade near vision performance. Compared to spherical lenses, diminished depth of field has been observed in eyes with aspheric lenses with negative spherical aberation. Because the CrystaLens AO lens has zero spherical aberation, it doesn’t correct corneal spherical aberation. Therefore, eyes implanted with the CrystaLens AO lens should have an average of +0.28 μm of ocular spherical aberation over a 6-mm pupil, which is the average amount of corneal spherical aberation. A typical mid-power spherical lens adds about +0.18 μm of spherical aberation over a 6-mm pupil, so eyes with a spherical lens should have an average of +0.46 μm of ocular spherical aberation. A loss in depth of field compared to spherical lenses has not been observed with other aberation-free aspheric lenses.

There is a trade-off between degrading retinal image quality and enlarging depth of field that occurs when increasing ocular spherical aberation. Further, there is a point of diminishing return above which adding more spherical aberation doesn’t meaningfully improve depth of field, yet significantly reduces retinal image quality. This point of diminishing return occurs around +0.3 μm, which is very close to the average amount of corneal spherical aberation. For these reasons, it is believed the aberration-free CrystaLens AO lens will not compromise depth of field compared to the CrystaLens Five-O lens.

As for Dr. McDonald, he says the Crystalens AO is going to be his first lens of choice for premium channel. “It is early to draw conclusions about the Crystalens AO, but we have been very favorably impressed with our results so far,” says Dr. Aker. To conclude this monograph, we will get some final thoughts from our surgeons.

**Final Comments**

Dr. McDonald asserts that the Crystalens AO is now his first lens of choice for premium channel, adding that, “It allows us to stay in monofocality and yet provides a platform for spectacle independence and uses the optic advantage of asphericity.”

According to Dr. Aker, the Crystalens AO will be a welcome new addition to the Crystalens HD and the Crystalens Five-O. “The reading, intermediate and distance vision of Crystalens AO patients rivals our best results with both the Crystalens Five-O and the Crystalens HD,” he comments. Says Dr. McDonald, “Patients already much earlier and more enthusiastically comment about their distance and near vision.” Furthermore, he believes that they seem to have the A-constant pretty well nailed down and has so far seen no variability.

“Seeing the good results we are going to get, I would be happy to use this on high myopes, lower myopes, higher hyperopes, astigmats, etc. and certainly on post-refractive surgery patients because I think having lower spherical aberration on them is going to be a real plus,” remarks Dr. Whitman. “I have not found a lens that does intermediate any better than the Crystalens. For the emerging technologies out there, it is my favorite lens,” he says.

“I believe the future is in accommodating lenses,” says Dr. Pepose. Most of his Crystalens AO patients have had near vision around 20/30 (even best-corrected at distance and even within one week). “So I have been pretty impressed, actually. It seems like an excellent lens,” he finishes.

Dr. Aker’s parting words and advice to colleagues pertain to any premium IOL. “When a surgeon implants a premium IOL and fails to finish his work, everyone involved loses. Unhappy patients often reflect unfinished work. This can result from improper preop counseling or postop residual refractive error. If the surgeon and his team miss the target of emmetropia or leave more than 0.50D of residual astigmatism, patients will be unhappy. Not finishing the work hurts everyone. Consider the importance of the premium channel IOLs in the context of what has been happening in ophthalmology for the past 25 years. As they continue to ratchet down reimbursement, the premium channel is a precious gift that enables us to retain some working margins in our practices. It is imperative that we protect the premium channel by ensuring our patients get the best result we can deliver. Seize the initiative and proactively set realistic expectations. Pursue emmetropia and surgical perfection. And remember: Finish the work!”