Spotlight on IOL Complications

With 3-D video to help bring complicated cases into perspective at this year's Spotlight on Cataract Surgery Symposium, audience members voted on their preferred management strategies. Here experts review the poll results and add their opinions.

This past October, the ninth annual Spotlight on Cataract Surgery Symposium at the Academy's Joint Meeting was titled Clinical Decision-Making With IOL Complications: You Make the Call. Cochaired by Bruce Wallace, MD, and myself, this four-hour symposium was organized around seven video cases that presented a range of postoperative IOL complications.

As I presented the video cases, I would pause at the point of a management decision or complication. The attendees were then asked to make clinical decisions using their electronic audience response keypads. This was followed by several rapid-fire didactic presentations on topics of relevance to the case. Next, two panel discussants (who had never viewed the case) were asked to make their own management recommendations before the video of the outcome was shown. Following additional audience polling about preferences and practices, the two panelists had the final say.

In all, nearly 40 presenters and panelists spoke about managing unhappy multifocal or accommodating IOL patients, IOL opacities, early and late postoperative IOL subluxation or dislocation, diffuse zonular weakness with intraoperative pseudophakodonesis, malpositioned anterior chamber IOLs and pupil defects.

TRUEVISION

TWO VIEWS. Both 2-D and 3-D videos were shown side by side during the Spotlight on Cataract Surgery Symposium.

Two of the seven videos were presented in high-definition 3-D. For the first time in a major ophthalmology symposium, several thousand attendees donned stereo glasses to view 3-D surgical videos displayed via dual high-intensity projectors on a special 30-foot-high screen, all of which was arranged courtesy of TrueVision.

Douglas Koch, MD, concluded the symposium by delivering the Academy's sixth annual Charles Kelman Lecture, titled The Quest for the Perfect Cataract Operation. The entire symposium with videos and PowerPoint was captured on DVD-ROM. (You may order it at www.learnersdigest.org/aao.)

This *EyeNet* article reports the results of the 32 audience response questions, along with written commentary from symposium speakers and panelists. Because of the anonymous nature of this polling method, the audience opinions are always interesting and were discussed in real time during the symposium by our panelists.

The Academy's Joint Meeting again featured a day-long, continuous series of cataract symposia that constitute Cataract Monday. In the afternoon, the ASCRS–cosponsored video symposium on Cataract Surgical Complications was followed by the Around the World in 80 Minutes international symposium on Innovations in Refractive Surgery.

–David F. Chang, MD
Cataract Spotlight Program Cochairman

Case 1: Unhappy Multifocal IOL Patient

Q1 Based on what you know about their personality, which of these would be the highest-risk multifocal IOL candidate?

- Michael Jordan 21%
- Oprah Winfrey 16%
- Barack Obama 18%
- Al Capone 45%

Roger Steinert I suspect the audience responded to the threat of an unhappy machine gun–toting criminal! The real issue is whether we can predict, in advance, those patients whose visual cortex can neuroadapt to the inherent optical compromises of multifocality. Whether seeing the glass as half full is a predictor of multifocal tolerance remains to be proven.

Q2 This unhappy 57-year-old patient previously had LASIK surgery and is now four months out from having a ReStor IOL implanted in her left eye. Without correction, her visual acuity is 20/100; BCVA is 20/20- with a −1.25 + 1.25 x 180. She complains of poor visual quality. What would you recommend?

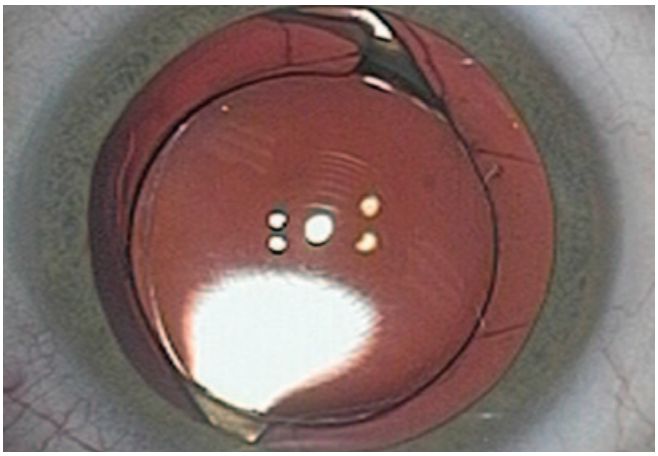
- Reassurance and a longer adaptation period . . . 10%
- Implant a ReStor IOL in the opposite eye 8%
- Laser vision enhancement 45%
- Exchange for a monofocal IOL 21%
- Refer elsewhere for consultation 16%

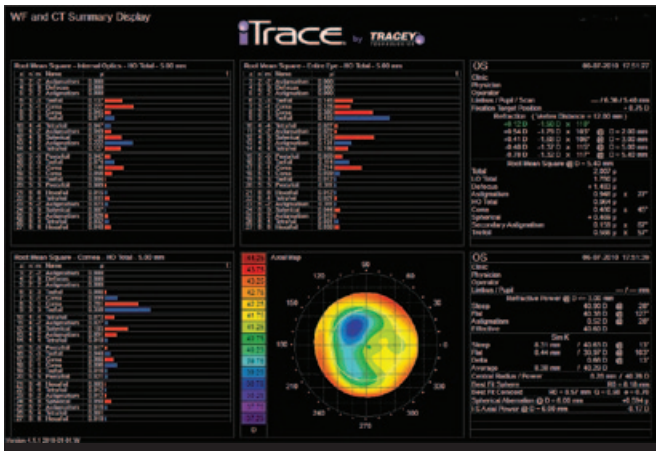
Kendall Donaldson To begin, I am very cautious about using multifocal IOLs in post-keratorefractive patients. These patients often have unrealistic expectations and are seeking to regain their perfect youthful vision. They need to understand the limitations of multifocal IOLs and be willing to accept an increased risk of glare, halos and reduced contrast sensitivity. Moreover, these patients often have a compromised tear film, which could jeopardize the result with a multifocal IOL. In a rare, extremely motivated patient who is willing to accept the possibility of these visual disturbances, a multifocal lens could be considered following a thorough informed consent process.

I would have to agree with the audience response. No amount of reassurance and adaptation will overcome this degree of residual refractive error, particularly the residual astigmatism. I prefer to do PRK for these patients. I encourage them to wait three months following the cataract surgery and I make sure the refraction is stable and the ocular surface is optimized. I then show them with a trial frame—or a contact lens, in some cases—what they could gain with the enhancement. I try to warn patients preoperatively, particularly those with high cylinder, that if they are not happy with their postoperative result, we may be able to use the laser to enhance the quality of their vision. This global statement covers laser vision correction as well as an Nd:YAG capsulotomy. When the laser is discussed in this way, the patient understands that its use is anticipated for some patients and does not view the need for laser as a complication of the surgery.

Jack Holladay The 45 percent who chose laser vision enhancement recognized that the primary complaint is due to the 1.25 D of residual astigmatism. The distance VA of 20/100 would be expected with this astigmatism and the vision at near or intermediate would only be slightly better. Hence, she is unhappy. The laser allows us to treat both sphere and cylinder accurately and adjust the patient to near emmetropia. It is true that a diffractive or refractive multifocal IOL will reduce the contrast by 20 to 30 percent, and that is why 21 percent of the audience chose to exchange the IOL, but this is a secondary problem that will be greatly improved by eliminating the refractive error.

Reassurance and time or implanting a ReStor IOL in the second eye would be unlikely to solve the problem. Correcting the refractive error with the laser is the first step; if the problem persists with a multifocal IOL, then exchange for a monofocal can be performed.





CASE 1. This unhappy patient complains of poor visual quality with her ReStor IOL and has a possible anterior capsular tear. Combined topography and wavefront aberrometry of the right pseudophakic eye show significant higher-order aberrations.

DAVID F. CHANG, MD

Q3 Describe your experience with explanting presbyopia-correcting IOLs:

Yes, multifocal IOL only 13%
Yes, accommodating IOL only 1%
Yes, both multifocal and accommodating IOLs . . . 9%
Use them, but have never explanted them 33%
Don't use these IOLs 44%

Dick Lindstrom It is interesting that, nearly a decade after the launch of multifocal and accommodating IOLs in America, 44 percent of the audience still is not using them. Presuming that these surgeons do cataract surgery, which is true for only 50 percent of ophthalmologists, I find this response disappointing. The lenses available today are all capable of generating high patient satisfaction when the eye achieves a refractive outcome near emmetropia. On the other hand, when significant residual refractive error persists, patient satisfaction and, secondarily, surgeon satisfaction are significantly reduced.

I believe a major limiting factor in adoption of multifocal and accommodating IOLs is the lack of access to a refractive surgery enhancement strategy. Only about one-third of cataract surgeons are trained in and have access to laser corneal refractive surgery, which remains in my hands the best approach for eliminating residual refractive error. I encourage surgeons who are looking for a low-risk, easy-to-learn enhancement strategy for their practice to investigate transepithelial PRK with a mobile excimer laser unit. In the future, the femtosecond laser will also work well for post-cataract surgery refractive enhancements.

I find it reassuring that of the 56 percent of surgeons using multifocal and accommodating IOLs, 59 percent have never done an IOL explant. When patient selection is appropriate—for example, avoiding patients with preexisting diseases that reduce contrast sensitivity, such as prior RK, advanced glaucoma or significant macular degeneration—I find that lens explants are almost never required. If the eye is in focus with less than 0.5 D of residual defocus or astigmatism, the ocular surface is healthy, the posterior capsule is clear or open, the IOL is centered and not tilted, and the macula and optic nerve are healthy, it is extremely rare to end up with a patient requesting lens explant.

When facing a patient who is considering a lens explant or exchange for a multifocal or accommodating IOL, I always encourage at least a year for neuroadaptation, and I have recently found that RevitalVision training to enhance cognitive processing can rescue patient satisfaction for many. Finally, prior to explants, I always show patients what they will lose by first having them read without correction and then placing a –2.5 D IOL in front of their eye. Most will immediately appreciate the near benefit they will lose if their current IOL is exchanged for a monofocal IOL, and this in-office demonstration has saved me many explants.

Q4 In this unhappy multifocal IOL patient with a possible anterior capsular tear, but complaints of poor visual quality I would:

Strongly discourage IOL exchange because of risks. 41%
Exchange IOL (fold it) 2%
Exchange IOL (cut it) 21%
Exchange IOL (large incision) 12%
Refer elsewhere for IOL exchange 24%

Mark Packer This ReStor IOL looks well-centered and stable, regardless of any capsular complications. The essential understanding here comes from the word "unhappy." The Tracey corneal wavefront does show a relatively high degree of asymmetrical aberrations, which may lend some objective support to this patient's subjective complaints.

However, the complaints would stand on their own merits even if the wavefront were "perfect." I cannot ignore, nor do I wish to minimize, an unhappy patient's complaints or convince her that she should "live with it" based on a colored image of relative photon retardation.

Regardless of patient dissatisfaction, I don't undertake lens exchange lightly, and I fully explain the risks. There is the possibility of winding up with no capsular support, a prolonged suture fixation procedure, an anterior chamber IOL or worse. Nevertheless, if I become convinced that satisfaction cannot be achieved any other way, I will purposefully and optimistically embark on the procedure. I perform viscodissection of the capsular bag from the IOL, initially with a 27- or 30-gauge needle if necessary, followed by hemisection of the lens (using Packer/Chang IOL Cutters and MST Micro-Holding Forceps). I would counsel this patient that a three-piece aspheric monofocal IOL in the bag or sulcus represents the best opportunity for redemption.

Q5 Following successful multifocal IOL explantation, there is a radial anterior capsular tear but an otherwise intact capsular bag. I would implant:

Single-piece acrylic IOL in bag 13%
Single-piece acrylic IOL in sulcus 3%
Three-piece IOL in bag 16%
Three-piece IOL in sulcus. 63%
Would have referred elsewhere 5%

Roger Steinert The issue here is the importance of centration of a multifocal IOL. Studies suggest that multifocal IOLs experience degraded performance at somewhere between 0.3 and 0.7 mm of decentration relative to the pupil. A single anterior capsule rent has the potential of creating a "pea-pod" contracture that pushes the IOL off-center.

One option is sulcus fixation of a three-piece IOL. Sulcus fixation of a one-piece acrylic IOL is contraindicated because the thick haptics may cause uveal irritation and inflammatory complications. An alternative is to place either a one- or a three-piece IOL in the capsular bag and create a second small defect tear in the capsulorhexis edge approximately 180 degrees opposite the original tear.

Watch Case 1 and comment on all the cases at www.eyenetmagazine.org.

Case 2: Cataract Patient Hates Glasses

Q6 In general, what strategy do you most commonly recommend for cataract patients who hate glasses?

Accommodating IOLs in both eyes	7%
Multifocal IOLs in both eyes	33%
Mix different multifocal IOLs	6%
Mix multifocal and accommodating IOLs	2%
Monofocal monovision	36%
Refer elsewhere for surgery	16%

Eric Donnenfeld When cataract patients come into the office and state that they want surgery and hate glasses, that leaves several options, including multifocal IOLs, accommodating IOLs and monofocal monovision. The audience response to what they would recommend supports the efficacy of multifocal IOLs in making patients truly spectacle independent.

The audience voted almost 5:1 in favor of bilateral multifocal IOLs vs. bilateral accommodating IOLs, while monofocal monovision was preferred by 36 percent of the audience, presumably due to the loss of stereopsis and depth perception with true monovision. Finally, the fact that 16 percent of the audience preferred to refer the patient elsewhere speaks to the concern that there is no perfect answer today.

While I personally prefer bilateral implantation of an aspheric multifocal IOL for spectacle independence, monofocal monovision was second place in this survey. In the future, I expect new generations of more effective accommodating IOLs to be the ideal solution.

Stephen Slade First, I would counsel these patients that to expect no glasses might be unrealistic. I would not want them to depend on it. That said, I would try to get an idea of how much they value quality of vision. If they are willing to be flexible with that, have good retinas and no previous surgery, then I would consider multifocals. If not, I would stick to the accommodating IOLs.

Q7 This 72-year-old myopic computer engineer (–5.00/–7.00) has cataracts in both eyes and hates glasses. His left eye is dominant. Which premium IOL strategy would you recommend for this demanding patient?

Accommodating IOLs in both eyes	11%
Diffractive multifocal IOLs in both eyes	10%
Mix different presbyopia-correcting IOLs	4%
Monofocal monovision	24%
Monofocal IOLs in both eyes–leave myopic	21%
Refer elsewhere for surgery	32%

John Doane The audience response for this 72-year-old markedly compulsive computer engineer is what I would expect from the ophthalmic community at large.

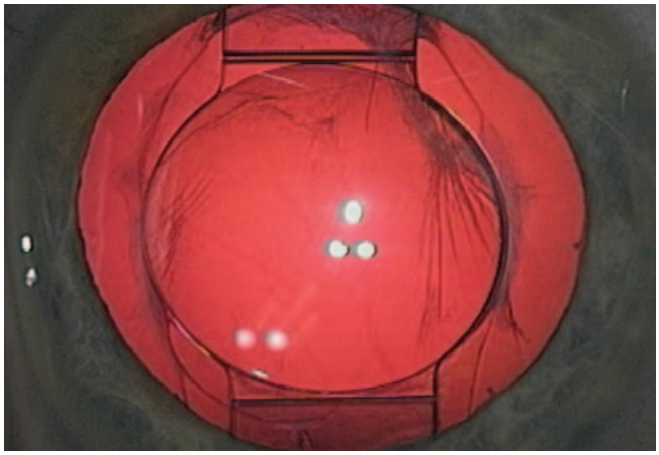
I certainly see why 32 percent of the respondents would refer this patient elsewhere for surgery. As was noted in the preoperative patient survey, the patient mentioned that he has owned or worked with 350 different personal computers in his 50-year-career and that he currently works with 40 personal computers. I would guess that he keenly appreciates unique flaws to each system, which he would clearly and energetically explain to any interested party.

Frankly, I see no winning combination at present that will completely satisfy an individual with this patient's expectations of a) not wanting glasses full time, b) wanting to have the ability to clearly see his golf ball land with no glasses and c) not wanting to experience any unwanted night symptoms such as halos or rings. To achieve this goal, the end refraction would have to be plano sphere and the patient would expect J-1 to J1+ near and 20/20 intermediate vision. The likelihood of achieving this with accommodative or multifocal IOLs or a combination thereof is highly unlikely.

I believe the best approach with a patient of these demands is to massively lower the postoperative expectation for no glasses. Although I would be tempted to recommend monofocal IOLs with monovision target, I suspect he would be displeased while golfing and driving at night. As a result, I would recommend monofocal IOLs targeting either distance or –2.0 in both eyes. In doing so I am telling the patient he will eventually need glasses for something—and that's likely where he will be, regardless of approach.

Q8 This demanding Crystalens patient has developed a "Z syndrome" at four months postoperatively. His BCVA is 20/40- (distorted) with –3.25 + 1.00 x 30. What would you recommend given that he hopes to keep the Crystalens?

Observe–change glasses prescription	18%
Nd:YAG posterior capsule	39%
Insert capsular tension ring (CTR), rotate IOL	8%
Exchange IOL–monofocal IOL	9%
Exchange IOL–multifocal IOL	2%
Refer elsewhere for management	24%



CASE 2. This image shows Crystalens Z syndrome.

DAVID F. CHANG, MD

Jay Pepose A "Z syndrome" deformation is seen in this Crystalens, where one footplate hinge is flexed anteriorly toward the cornea and the other is flexed posteriorly, resulting in optic tilt, loss of best spectacle corrected vision, capsular striae and noncorneal astigmatism. Effective treatment is specific to the specific etiology of the Z syndrome, which includes capsular contraction syndrome, a large asymmetric capsulorhexis, one or both haptics pinched on the capsule and not extending the fornix, or one haptic in and one out of the bag.

Capsular contraction syndrome usually starts with good vision, appropriate IOL position and minimal refractive error and is amenable to early Nd:YAG treatment. YAG first under the width of the anteriorly vaulted haptic in a wide oval pattern, then under the center of the optic and finally beneath the posteriorly vaulted haptic, as needed, without connecting the capsulotomies or extending beyond the edge of the optic. The YAG treatment should also release any fibrous bands in an effort to restore the equatorial dimensions of the capsular bag when the IOL was properly positioned at the end of surgery.

In contrast, Z syndromes caused by haptics pinched on the capsule with loops proximal to the fornix, one haptic in and one out of the bag, or a large, asymmetric, errant rhexis extending well beyond the hinges generally require surgical intervention in the operating room, such as IOL repositioning or rotation with possible CTR placement or IOL exchange. These maneuvers are more risky if the capsular bag has been opened. Careful slit-lamp examination, including gonioscopy, can help determine the specific cause of the Z syndrome and the appropriate treatment plan.

Q9 After exchanging the Crystalens for a monofocal IOL, the right eye is 20/40- without correction, and his BCVA is 20/25 with −1.75 + 0.75 x 30. This unhappy patient is now requesting a multifocal IOL in order to improve his uncorrected reading ability. What now?

- Exchange for a multifocal IOL 6%
- Reassess for the possibility of an exchange after longer adaptation 10%
- Try soft contact lenses, then laser vision correction. 11%
- Reading glasses—no more surgery. 34%
- Refer to my worst enemy 29%
- Become a medical ophthalmologist 9%

Eric Donnenfeld This patient has already had cataract surgery and a complex IOL exchange. Now the patient wants the surgeon to enter the eye a third time for a second IOL exchange to a multifocal lens. While referring this patient to your "worst enemy" is always a viable option, the most common answer was no more surgery. There are times when the surgeon has to give the patient some tough love and do what is best for the patient and not what he or she requests. As Hippocrates once said, "Do no harm"—and this is one of those times when Hippocrates, and the audience, are correct.

Q10 What do you routinely communicate about presbyopia-correcting IOL options for your cataract patients?

- Always mention the option (I do implant) 30%
- Always mention the option (even though I do not implant). 11%
- Discuss with selected patients (I do implant) . . . 29%
- Discuss with selected patients (even though I do not implant). 18%
- Usually don't mention 12%

Bill Trattler Interestingly, only 59 percent of the audience members implant presbyopia-correcting IOLs. This could reflect the fact that some are not cataract surgeons. However, more likely, it reflects the fact that a good percentage of cataract surgeons are still on the sidelines with regard to these IOLs.

In my practice, seven of the nine surgeons who perform cataract surgery implant presbyopia-correcting IOLs. I believe this reflects the fact that these IOLs are very effective—and that they still require a surgeon to commit extra work, attention to detail and patient chair time.

The poll also reveals the fact that there is an even split among cataract surgeons who provide presbyopic IOLs on whether they mention these lenses to all patients, or only to patients who are good candidates for the technology. In my practice, if a patient clearly is not eligible for a presbyopic IOL—such as a patient with advanced macular degeneration, diabetic retinopathy or keratoconus—I do not necessarily mention this technology. Obviously one could briefly mention these IOLs, but often I find that I would rather spend the time and focus on explaining the specific challenges and postoperative care that will be required to maximize a particular patient's visual results.

Case 3: IOL Opacities

Q11 What is the main cause of the pseudophakic temporal crescent/shadow?

- Temporal clear corneal incisional swelling. 23%
- Large pupil. 13%
- Capsulorhexis 21%
- IOL refractive index 23%
- Increased iris-optic distance 20%

Sam Masket The nearly equal distribution of audience replies is very telling, as clinicians have been in the dark about the cause of the temporal shadow. Bob Osher suggested that edema around the temporal cataract incision is possibly causal in the early period after surgery. However, negative dysphotopsia has been reported with superiorly placed cataract incisions, yet never following corneal surgery, such as RK, AK and penetrating keratoplasty. This casts doubt on the corneal cataract incision as causal. Recent investigations—in conjunction with Nicole Fram in our practice—utilizing ultrasound biomicroscopy for symptomatic pa-

tients, suggest that the anterior capsulorhexis/IOL interface may be the inciting cause and that patients may be relieved of their symptoms when the edge of the anterior capsule is covered by the IOL. This may be accomplished by implanting a secondary piggyback IOL, by replacing a capsule bag-fixated implant for one in the ciliary sulcus or by capturing the IOL optic in the sulcus while placing the haptics in the capsule bag, a procedure known as reverse optic capture.

Q12 Are visible acrylic IOL glistenings visually significant?

- Yes, they probably affect contrast and glare sensitivity. . . . 20%
- Yes, but it is uncommon. . . . 26%
- No . . . 28%
- Not sure . . . 19%
- Don't use these IOLs . . . 8%

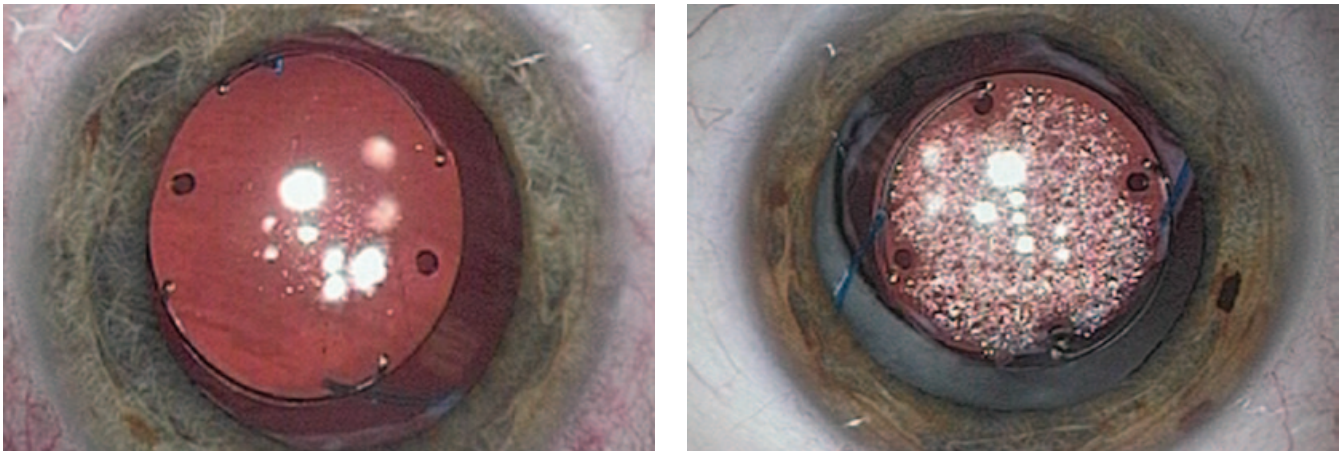
Graham Barrett The audience response is varied. Many do believe that acrylic IOL glistenings are potentially visually significant, and 20 percent believe that they affect contrast and glare. In my experience the instance of glistenings in acrylic IOLs is not uncommon, but in the majority of cases they do not appear to compromise vision. In some cases, however, the amount of glistenings can be extensive. In these instances a more sophisticated analysis of image quality is likely to confirm scatter and reduced contrast. There have been case reports of individuals with severe glistenings who have had an IOL exchange performed with subsequent improvement in visual quality.

All IOL biomaterials have, at some stage of development, been associated with issues of clarity, including yellowing with silicone materials, calcification with hydrophilic acrylics, snowflake degeneration with PMMA and glistenings with hydrophobic acrylics. Some of these cases relate to issues with polymer processing; others have been associated with a particular type of packaging. Fortunately, attention to these issues has reduced the frequency of these problems. Hopefully, improvements in biomaterials will similarly reduce the incidence of glistenings in the future.

Q13 What is the likely cause of the opacities in these PMMA IOLs implanted in 1985?

- Glistenings (polishing compound/packaging). . . 10%
- UV light . . . 2%
- YAG pitting . . . 16%
- Crystalline deposits (e.g., calcium). . . . 31%
- Not sure . . . 41%

Liliana Werner Although glistenings can be observed with any IOL biomaterial, with PMMA lenses manufactured in the 1980s we should always think about a condition called snowflake degeneration. This is a slowly progressive opacification of PMMA lenses, occurring sometimes 10 years or more after implantation. Snowflake degeneration has been observed in three-piece PMMA lenses implanted between the early 1980s and the mid-1990s, which were generally manufactured by injection molding. The explanted lenses we analyzed in our laboratory had intra-optic spherical lesions, which were interpreted as foci of degenerated PMMA material clustered in the central zone and midperipheral portion of the optic. These lesions are related to the manufacturing procedures used at that time, and they appear under the influence of long-term UV exposure. This led to the hypothesis that the central optic was exposed to UV light over an extended period, whereas the peripheral optic may be protected by the iris. Therefore, snowflake lesions are generally not observed in the optic periphery, they generally involve the anterior third of the optic substance, and they are "dry" lesions and do not disappear when the lens is in the dry state. Surface or intra-optic calcified deposits have been generally associated with certain hydrophilic acrylic lenses; they have also been observed on the posterior optic surface of silicone lenses in eyes with asteroid hyalosis. PMMA and hydrophobic acrylic lenses are generally not associated with calcification.



DAVID F. CHANG, MD

CASE 3. The right and left eyes of a 53-year-old woman with PMMA IOLs implanted in 1985.

Q14 With a BCVA of 20/20 and nonspecific complaints of "bothersome glare" in this 53-year-old woman, would you remove this IOL with these opacities without knowing how the IOL looked 10 years ago?

- No–observe 60%
- Yes–I would exchange 18%
- Yes–but I would refer her elsewhere for surgery . . 5%
- Not sure–refer for second opinion 18%

Steve Lane IOL exchange for a patient with nonspecific complaints of "bothersome glare" and BCVA of 20/20 is a difficult decision. Complications that can occur during surgery, especially when an IOL has been in place for 10 years, as well as the uncertainty that all symptoms will be relieved with maintenance of BCVA gives one pause as the risks vs. benefits are weighed.

It is for this reason that 60 percent of respondents recommended against IOL exchange despite the obvious deposits in the IOL. A history of a decrease in acuity or quality of vision—i.e., new symptoms of glare—would be helpful in encouraging a surgeon that an IOL exchange is not only reasonable but prudent.

Case 4: Sunset IOL Subluxation

Q15 How would you manage this case of sulcus IOL subluxation in a 69-year-old man who complains of glare and has a BCVA of 20/25? There is some vitreous prolapse through a central Nd:YAG capsulotomy.

- Observe 6%
- Reposition (rotate) IOL 18%
- Suture fixate subluxated IOL 40%
- Exchange longer/larger PCIOL. 15%
- Exchange ACIOL 16%
- Refer elsewhere for surgery 4%

Lisa Arbisser Standard three-piece IOLs measure 12.5 mm haptic to haptic; they are inappropriate for unsutured sulcus fixation unless the optic is captured through an intact CCC due to the risk of eventual subluxation. This may unfortunately follow Nd:YAG capsulotomy and is further complicated by vitreous prolapse.

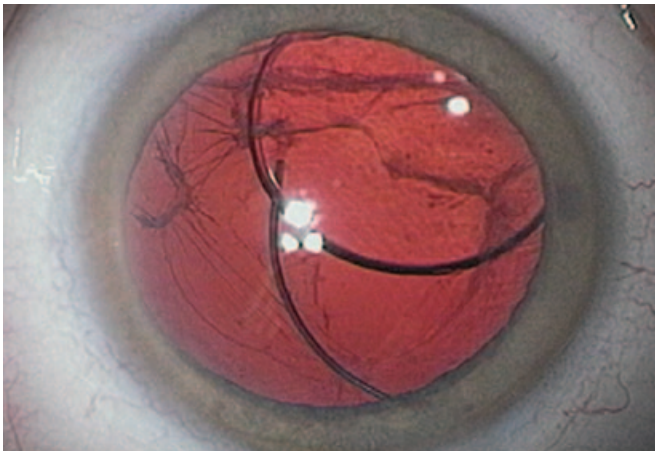
This patient requires a centered lens, and most of the audience recognizes the need for surgery. Following peribulbar block, a paracentesis facilitates dilute Triesence (triamcinolone; 1:10 with BSS) to identify prolapsed vitreous. This is followed by dispersive ophthalmic viscosurgical device to stabilize the lens, protect the endothelium and compartmentalize the vitreous over the PC opening. If vitreous persists anterior to the PC, perform a central limited anterior vitrectomy through a PPI to remove as little vitreous as necessary.

Ideally, I would enlarge the PC opening in a continuous fashion by tangentially cutting with intraocular scissors and spiral tearing an adequate opening, allowing optic capture through the fused membrane to center the IOL securely. A vitrector rhexis could also be attempted. If this proves impossible, I would raise the optic through the pupil while adding Miochol E (acetylcholine) to capture it, allowing iris fixation through paracentesis incisions with modified locking Siepser knots.

Rosa Braga-Mele This is an interesting case, as the lens is obviously subluxated but the visual acuity is still relatively good. I feel that observing this IOL is a choice. However, the patient is symptomatic and the situation likely will get worse in the future. Repositioning this IOL will likely result in iris chafing and re-dislocation, as the IOL optic and overall diameter are too small to fit successfully in the sulcus. Something more definitive needs to be done.

It is very remarkable to see that 40 percent of the audience would feel comfortable suture fixating this IOL, hopefully after performing a vitrectomy to remove any remaining vitreous from the AC. This is a good, stable long-term choice. I am also in agreement with an exchange for a longer PCIOL, which should have a rounded anterior edge to minimize iris chafing, with either optic fixation in the capsulorhexis, if possible, or suture fixation as well.

If a good anterior or posterior vitrectomy is performed, then a longer/larger IOL should sit quite well in the sulcus. Exchange for an ACIOL would not be my first choice, but it is a reasonable alternative if one does not have the ability to get a larger PCIOL or have the ability to suture fixate the IOL, particularly if the patient is older and has normal corneal/anterior segment anatomy. Referral to another ophthalmologist in the area who often deals with IOL suturing or exchange is another reasonable choice if one does not feel comfortable handling the case.



CASE 4. A subluxated PCIOL in the ciliary sulcus. There is vitreous prolapse through a central Nd:YAG capsulotomy.

DAVID F. CHANG, MD

Q16 If you intervene, how and when would you perform the anterior vitrectomy?

Remove IOL, then perform vitrectomy 11%
Perform vitrectomy, then exchange IOL 17%
Limbal vitrectomy, then reposition/suture IOL . . . 33%
Pars plana vitrectomy, then reposition/suture IOL . . 27%
Refer elsewhere for surgery 11%

Keith Warren This case of vitreous prolapse and lens dislocation can be effectively managed from either a limbal or pars plana approach.

As a retina surgeon, I would prefer a pars plana approach because it provides easy access to the vitreous behind the lens without concerns of further prolapse into the anterior chamber. Most important, it should relieve any traction in the posterior segment by displacement of the vitreous posteriorly. The retina surgeon must also be sure to carefully attend to the vitreous in the anterior chamber, in particular vitreous adherent to the lens implant. However, a pars plana vitrectomy carries a slightly higher risk of retinal detachment and demands an understanding of the vitreoretinal interface and careful examination of the pars plana following the procedure.

A limbal approach directly addresses the vitreous loss in the anterior chamber and allows the surgeon to address vitreous incarcerated around the IOL. The use of an adjuvant, like triamcinolone, allows for excellent visualization and complete removal of the vitreous by either technique. While an anterior approach does not always completely relieve posterior traction, it carries a lower risk of retinal complications and is usually adequate to allow for lens repositioning and to reduce the risk of glaucoma and cystoid macula edema.

Q17 With a large nasal zonular dialysis and a central Nd:YAG opening after removing the original IOL, I would implant:

Three-piece IOL in sulcus. 25%
Three-piece IOL in sulcus and iris suture 14%
Three-piece IOL in sulcus and scleral fixate 17%
ACIOL 42%
Would have referred elsewhere 2%

Kevin Miller There was no majority opinion here, but the greatest percentage would implant an ACIOL. This is what I would probably do, but my decision would depend on the extent of zonular dialysis ascertained at the time of IOL exchange surgery.

Some would place a three-piece IOL in the sulcus, and smaller percentages would suture a three-piece lens to the iris or sclera. All are reasonable options with varying degrees of hazard and difficulty. Sulcus IOL implantation is the easiest option and is associated with the smallest incision size—if the sulcus can support the lens. Suture fixation might be uncomfortable for the patient if surgery is done under topical anesthesia.

If the extent of zonular dialysis is underestimated, the 25 percent of surgeons choosing the first option might find the three-piece sulcus IOL they just implanted sitting on the retina a day or two after surgery!

SIXTH ANNUAL KELMAN LECTURE. After his Kelman Lecture, titled The Quest for the Perfect Cataract Operation, Dr. Koch (center) receives the Kelman Award from the symposium co-chairmen, Dr. Wallace (left) and Dr. Chang (right).

Q18 How do you perform triamcinolone staining of the vitreous?

Use Triesence 20%
Mix from preserved triamcinolone 25%
Never tried, but I would consider trying 53%
Never tried, and I wouldn't do it 3%

Robert Cionni The audience poll showed that 45 percent are already using either preserved Kenalog or Triescence and nearly everyone else plans to use it when needed in the future.

Scott Burk and his colleagues introduced triamcinolone injection into the anterior chamber for vitreous identification in 2003.[1] His method utilized preserved Kenalog; he removed the preservative via multiple washings with BSS through a Millipore filter. Although the triamcinolone does not actually "stain" the vitreous, its granules become trapped in the vitreous, allowing the surgeon to better visualize any vitreous that has prolapsed anteriorly so that it can be properly managed. The only downside to the preserved triamcinolone is the time needed to purify the Kenalog granules.

More recently, Alcon brought us Triescence, a nonpreserved triamcinolone granule suspension that requires no purification before injection. Triescence works well yet is quite thick if used straight from the vial and therefore tends to obscure visualization of the anterior segment structures. If Triescence is diluted 1:3 with BSS, the mixture is just as effective and visualization is improved. An added benefit to using triamcinolone is that some always remains in the eye after the vitrectomy and thus helps minimize postoperative inflammation.

1 *J Cataract Refract Surg* 2003;29:645–651.

OSCAR EINZIG

Case 5: Photophobia With ACIOLs

Q19 **How do you most commonly manage a symptomatic iris defect?**

- Sunglasses only 4%
- Use painted contact lens 13%
- Iris cerclage (suturing) 38%
- Artificial iris implant 13%
- Refer patient 31%

Mike Snyder The audience responses reasonably reflect current available technology and skill sets. As iris defect management is uncommon, nearly a third of surgeons chose to refer such problems to a colleague with special interest in the area.

Iris suturing techniques were appropriately well represented, as cerclage and Siepser-type sutures can repair many defects. It is encouraging that so many surgeons have taken the time and effort to add these skills to their repertoire.

The smaller number of respondents suggesting sunglasses only or painted contact lenses accurately reflects the limited success and limited tolerability of these modalities. Given that there are no FDA-approved prosthetic devices, the fact that 13 percent of surgeons selected this option is encouraging in that it reflects forward thinking. Those who might select such a device but who do not have infrastructure to manage the FDA compassionate-use exemption process would need to refer these cases out to avail their patients of these options, perhaps shifting some responses from this category to referral, strictly because of logistics.

With the upcoming launch of an FDA trial for the custom-made flexible iris prosthesis, we anticipate that, once approved, this treatment option will be a more widely used tool in the ophthalmic surgeon's arsenal.

Q20 **How would you manage this 55-year-old man? His BCVA is 20/20 in his right eye, but he is complaining of glare and photophobia one month following phaco and posterior capsular rupture for a traumatic cataract (with traumatic mydriasis). Part of the nasal haptic is behind the iris, part of the temporal haptic is caught in the incision and this pupil is not dilated.**

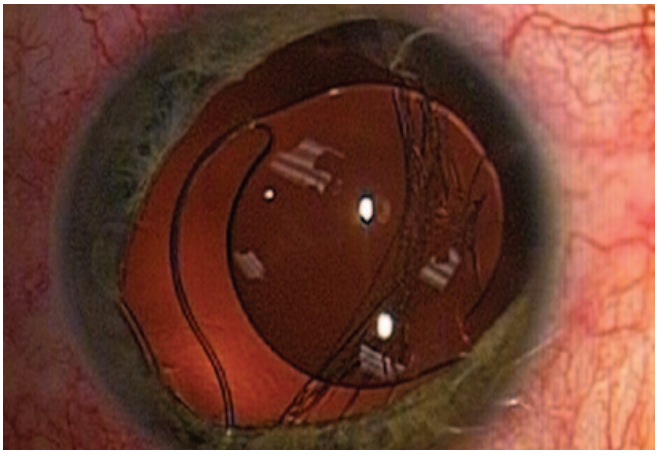
- Observe to see if he adapts to the glare 27%
- Exchange for another ACIOL 8%
- Exchange for a PCIOL 15%
- Exchange for an artificial iris IOL 21%
- Refer the patient 30%

Nick Mamalis It is interesting to see that 27 percent of the respondents recommended observation for this patient. This is not a good solution to the problem, as the patient was found to have the temporal IOL haptic caught in the incision and the nasal portion of the haptic is behind the iris. Even though the patient's vision is 20/20, there is significant risk of problems from the ACIOL associated with the patient's traumatic mydriasis, which is likely causing the symptoms of glare and photophobia. Potential problems may develop with this implant with the possibility of anterior chamber inflammation or even uveitis-glaucoma-hyphema syndrome with associated corneal overcompensation and edema.

It is comforting to see that only 8 percent of the respondents state that the patient should undergo an ACIOL exchange, as this would not solve the patient's current problems related to the history of a traumatic cataract with the associated traumatic mydriasis and posterior capsule rupture at the time of surgery. The option of exchanging the IOL with an artificial iris IOL was chosen by 21 percent of the respondents, and an additional 15 percent of the respondents opted for exchanging this IOL for a posterior chamber IOL. Although not stated in the question, it is presumed that this would be a PCIOL with some form of ciliary sulcus fixation.

An important factor that was not addressed by the question is the need to repair the traumatic mydriasis at the time of the IOL exchange in order to help decrease the patient's symptoms of glare and photophobia if some form of artifical iris IOL is not used. Referring the patient to someone with expertise in handling these complicated cases is a very reasonable choice, as the audience response indicates.

Frank Price This patient has two significant problems. The first is the malpositioned IOL—which, if not treated, will lead to corneal decompensation. Typically, when an ACIOL has one haptic dislocated posteriorly, the other one rotates anteriorly toward the cornea. The second issue is the fixed and dilated pupil, which causes problems with glare and light sensitivity. One solution is to use an Ophtec Model 311 artificial iris implant. The anterior chamber lens can be removed and replaced with this new PCIOL suture fixated to the sclera. The lens comes in three colors—light brown,



CASE 5. This 55-year-old man with traumatic mydriasis is one month out from phaco and posterior capsular rupture for a traumatic cataract.

DAVID F. CHANG, MD

blue and green. The downside is that a 10-mm incision is needed to place this PMMA lens, which has a 9-mm opaque central "optic" and a 3-mm clear area for the actual optic.

Another option would be to place two implants, one a standard PCIOL suture fixated to the sclera, and the second a Human Optics artificial iris implant, which is custom painted to match the other eye. The iris implant would have to be suture fixated to either the iris or sclera as there is not sufficient capsular support apparent in this eye. The downside to either of the artificial iris implants is that they are expensive, are not covered by insurance and require either a compassionate exemption or an investigational study, both of which require IRB approval.

In this case, the most likely choice for me would be to remove the ACIOL, do a pars plana vitrectomy, suture fixate a PCIOL to the sclera—usually an Alcon CR70BU—and then repair the iris with sutures to create a pupil between 3 and 4 mm in diameter. The iris can be closed with a series of sutures utilizing Siepser slipknots or by a purse string suture with multiple bites going around the edge of the current pupillary margin. Typically with blunt trauma, the pupillary sphincter is broken, but the iris tissue is still intact. In cases where large portions of iris tissue are missing secondary to excision/extrusion or where there are large areas of dialysis with disinsertion of the iris, then using one of the two artificial iris implants can be the most effective means of correcting the iris defect.

Q21 In the absence of capsular support, how do you generally suture fixate a PCIOL?

Prefer iris suturing 21%
Prefer scleral suturing 41%
Prefer glue plus scleral tunnel to fixate the haptics to the sclera 5%
Would refer elsewhere 33%

Rich Hoffman I find it interesting that one-third of ophthalmologists either do not feel comfortable fixating PCIOLs or do not feel it is worth their time. I personally like the challenge of iris fixation and scleral fixation of PCIOLs, but I am many times torn between the decision of performing the quick and easy secondary implant as an ACIOL, or the more tedious time-consuming PCIOL procedure, which has a better postop appearance.

Many secondary PCIOL implantations occur in eyes that have undergone a prior pars plana vitrectomy/lensectomy for dropped lenticular fragments. In these eyes, I tend to lean toward scleral fixation of the PCIOL in order to avoid the possibility of IOL dislocation onto the retina during the procedure as might occur with iris fixation of a secondary IOL in a vitrectomized eye.

When the IOL is already present in the eye but is subluxed, iris fixation tends to be a simpler technique for recentration. If the IOL is present within the capsular bag and both are subluxed, such as occurs in eyes with pseudoexfoliation, scleral fixation of the IOL haptics—sutures passing through the capsule—tends to be simpler than attempting fixation of the IOL and capsular bag to the iris.

It is of interest that 5 percent of the audience responded that they currently prefer gluing the haptics within dissected scleral tunnels. This technique is relatively new and requires somewhat challenging manipulations, but I look forward to seeing what the long-term results of this technique are in regard to scleral and/or conjunctival erosion, either internally or externally.

Jack Singer If I needed to implant a PCIOL in the absence of capsular support, I would suture it to the iris. With the IOL optic captured anterior to the constricted pupil, the loops are sutured to the mid-peripheral iris using a McCannel suture method with 10-0 polypropylene suture on a long needle. Then the sutures are tied using the Siepser sliding slip-knot technique. After the loops are sutured to the posterior surface of the iris, the IOL optic is then pushed posterior to the pupil. David Chang published a complete description of this technique in 2004.[1]

In addition, Ike Ahmed showed that the IOL power of such iris suture–fixated PCIOLs does not have to be adjusted from the power selected for capsular bag fixation. This indicates that the IOL optic assumes a more posterior position when the loops are sutured to the iris vs. when the loops are sutured to the sclera.

If the patient had floppy iris syndrome, iris atrophy or any other iris pathology that would adversely affect the support of an iris sutured PCIOL, I would implant an ACIOL. In my 25 years of experience, properly positioned and sized single-piece PMMA ACIOLs with open flexible loops have performed very well.

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1 *J Cataract Refract Surg* 2004;30(6):1170–1176.

Q22 Describe your personal experience with artificial iris devices/implants:

Have used them 20%
Have referred patients for implantation of these devices. 24%
Haven't used them, but I would use them or refer patients if they were FDA-approved 46%
I'd be unlikely to recommend them even if the FDA approved them 10%

Bob Osher It has been very exciting to see the field of iris reconstruction evolve in the United States. I was present when Kenneth Rosenthal showed the first artificial iris surgery in America in 1996. With German surgeon Volker Raush at his side, Dr. Rosenthal implanted a multi-finned device into the capsular bag in a patient with iridocorneal endothelial syndrome. The audience was in awe. Shortly thereafter, I implanted the first full-size prosthetic iris device containing an optic as well as the first sector device. These black, brittle devices were extremely successful in eliminating intolerable glare in patients with either congenital aniridia or traumatic iris loss.

The first dedicated "iris reconstruction team" was at the Cincinnati Eye Institute consisting of Drs. Scott Burk, Mike

Snyder, Bob Cionni and myself. While we were extremely encouraged by our results, it was obvious that flexible implants and different color options would be required, and these features are now available from several companies.

There is no question that the prosthetic iris device plays an important role in iris reconstruction. There also is no doubt that these cases can be very difficult and challenging. Imagine what the surgeon feels when he intends to implant a prosthetic iris device and the fragile aniridic anterior capsule tears! But the greatest remaining challenge is regulatory, since we still do not have FDA approval 14 years later. How can a company possibly recover its investment when so few patients are candidates?

Still, the majority of anterior segment surgeons are capable of successfully utilizing these devices, and our profession should continue to push for FDA approval because the surgical outcomes are no less than dramatic to those patients with incapacitating glare.

Case 6: Late IOL Dislocation

Q23 How would you manage this partially subluxated, scleral sutured PMMA IOL with a broken Prolene suture in this 78-year-old man with a BCVA of 20/100?

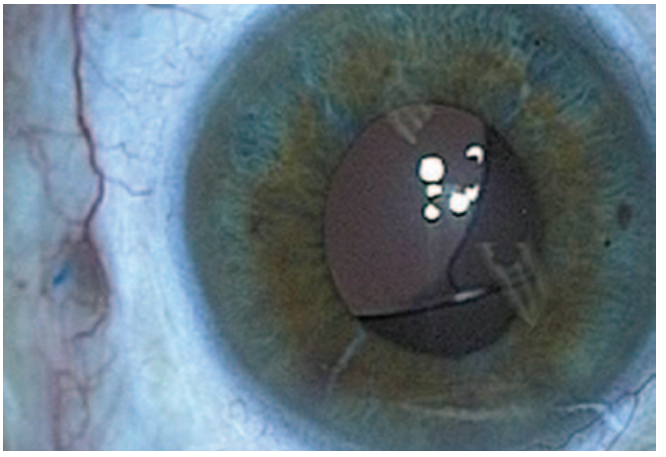
- Re-suture the haptic. 46%
- Exchange with an ACIOL 17%
- Exchange with a PCIOL (iris suture) 10%
- Exchange with a PCIOL (scleral fixated). 8%
- Refer to an anterior segment surgeon 10%
- Refer to a posterior segment surgeon 8%

Walter Stark I agree with the audience decision to re-suture the haptic. First, we need to know why the Prolene suture broke. Most likely it was put through an eyelet on the haptic of the IOL. These eyelets have holes that are drilled with sharp edges. With slight movement of the IOL, sutures that are placed through eyelets will be cut by the sharp edge of the hole in four to eight years. The suture should have been tied around the IOL haptic and not placed through the eyelet or hole in the haptic. 10-0 Prolene does not biodegrade causing suture breakage.[1]

This subluxed IOL can be sutured by several techniques in a closed-eye fashion. A technique we have described[2] would work well by placing double-armed CIF-4 needles with 10-0 Prolene suture about 1 mm posterior to the limbus under a scleral flap. One needle would go temporal and one would go nasal to the subluxed haptic, then through the cornea. At that point, a small limbal incision is made, both suture loops are pulled anterior to the haptic out through the wound, the suture end is tied and the loops then can be pulled back into the anterior chamber, securing the haptic to the sclera. It is likely the same problem will happen to the other side, and a similar suturing technique can be applied.

An alternative technique would be to obtain pupillary capture of the optic of the IOL, cut the one remaining scleral suture and then perform suture of the haptics to the peripheral iris using 10-0 Prolene suture on CTC or CIF-4 needles.[3] The entire surgical procedure could be performed using multiple small incisions in a closed-eye technique. This would avoid opening the eye 6 or 7 mm to remove the PMMA posterior chamber lens.

1 Parekh, P. et al. *Ophthalmology* 2007;114:232–237.



CASE 6. A partially subluxated, scleral sutured PMMA IOL with a broken Prolene suture.

2 Hindman, H. et al. *Arch Ophthalmol* 2008;126:1567–1570.
3 Stutzman, R. D. and W. J. Stark. *J Cataract Refract Surg* 2003;29:1658–1662.

Q24 Once the patient is supine on the OR table three weeks later, it becomes apparent that the IOL has dislocated much farther posteriorly. What now?

- Abort surgery and refer him to a vitreoretinal specialist. 59%
- Attempt limbal IOL removal (using the posterior-assisted levitation technique) . . . 12%
- I'm comfortable with a posterior segment surgical approach to retrieve this IOL 11%
- Implant ACIOL and leave the posteriorly dislocated PCIOL behind 7%
- Would have referred elsewhere 11%

William Mieler Late dislocation of PCIOLs occurs due to a variety of factors, though the leading causes are weakened zonules occurring during the original cataract surgery, PXE syndrome and preexisting glaucoma. The cumulative incidence is approximately 1 percent over a 10-year time frame, with a mean time to dislocation ranging between 3.2 and 8.5 years.

If the lens or lens complex is in the vitreous cavity, it is best to refer to a vitreoretinal specialist—rarely is the dis-

DAVID F. CHANG, MD

located lens left in place and a second lens inserted into the eye. A variety of surgical techniques are available for lens retrieval, including forceps or snare retrieval, which can be aided by the use of perfluorocarbon liquids and/or viscoelastics. Once the lens has been retrieved, it can be sutured in place with a number of internal or external suturing techniques, or it can be exchanged for an alternative style of lens. Comparative studies are very limited in terms of visual and anatomic outcomes. A variety of complications may occur, including uveitis, CME and a 4 to 10 percent incidence of retinal detachment.

Q25 Lacking any capsular support and with a traumatic mydriasis, what would you implant after the posteriorly dislocated PMMA IOL is removed?

- ACIOL 27%
- Sutured PCIOL 13%
- Pupil cerclage and an ACIOL. 10%
- Pupil cerclage and a sutured PCIOL. 22%
- Artificial iris PCIOL (scleral fixated) 11%
- Would have referred. 17%

Elizabeth Davis In this case, if one does not address the traumatic mydriasis with either pupil cerclage or an artificial iris, the patient may experience significant postoperative photophobia and glare. Certainly a colored contact lens could be worn if that were the case or corneal tattooing could be done as well. I have used both with success.

However, if one wishes to address both the dilated pupil and IOL replacement at the same time, then one of the remaining options is best. An artificial iris can work well. However, using one requires IRB approval, which can delay repair for several months. This may not be acceptable to the patient. Furthermore, a good iris color match is not always possible, and this can be disappointing to the cosmetically sensitive patient.

Pupil cerclage can be performed either after a PCIOL is sutured into position or before an ACIOL is placed. Either is acceptable and primarily depends upon the details of the case, including overall patient health and age, corneal endothelial status, presence of systemic anticoagulation, visual potential and surgeon experience and comfort level.

Q26 Absent capsular support, are you comfortable with suturing a PCIOL?

- No, so I usually implant ACIOLs 36%
- No, so I refer to another surgeon to suture fixate a PCIOL. 5%
- Yes, I prefer or will try glue/haptic tunnels 16%
- Yes, I prefer iris suturing PCIOLs 23%
- Yes, I prefer scleral suturing PCIOLs 20%

Amar Agarwal The audience has done a good assessment of the question and answered it very well.

In my opinion, though, I would prefer in such cases to fix the PCIOL with the glued IOL technique. In this approach, intrascleral tunnels are made, the haptic is tucked and the whole system is then stuck down with fibrin tissue glue, such as Tiessel.[1]

If one is implanting a secondary IOL and capsules are not present, a three-piece foldable IOL can be implanted using the glued IOL technique. This technique can be used with any IOL except single-piece foldable IOLs, as one needs something firm to tuck in. Moreover, subluxated IOLs need not be explanted, and the same IOL can be refixed in the eye, which is both less traumatic and quicker.

We have done more than 1,000 such cases with a maximum three-year follow-up. A major advantage of this technique is that the IOL is firmly fixed, unlike a sutured IOL, which can move like a hammock. This in turn can lead to pseudophakodonesis and endophthalmodonesis.

1 Kumar, D. A. et al. *Eye* 2010;24:1143–1148.

ANOTHER DIMENSION. Audience members don special glasses to view the 3-D video cases.

TRUEVISION

Case 7: IOLs and Weak Zonules

Q27 Which monofocal IOL do you most often use in eyes with PXE where the zonules appear to be relatively normal—that is, no CTR is needed?

- One-piece acrylic IOL in bag 61%
- Three-piece acrylic IOL in bag 17%
- Three-piece silicone IOL in bag 10%
- Three-piece IOL in sulcus. 11%
- ACIOL 1%

Randy Olson Under these circumstances, the response is not surprising in that most audience members use the lens that they most commonly might use—that is, a one-piece acrylic. It turns out that a three-piece acrylic would probably be a better option in that there is definitely less capsular contraction and less force on the zonules with these IOLs.

Silicone IOLs have generally been frowned upon—only 10 percent of the audience would have used a three-piece silicone—due to capsular contraction concerns. However, some of the latest silicone lenses have not shown a tendency for unusual anterior capsular reaction, so this choice, while a bit more controversial, probably would be just as effective as a three-piece acrylic IOL.

Although there were those who would put CTRs in all cases of PXE syndrome, it is a common clinical occurrence to see cases with no hint of any zonular problem. These patients generally do so well it is hard to criticize any of the specific responses in this survey.

Obviously, as we gain more experience with younger patients with PXE and as IOL/bag dislocation becomes increasingly common, we may reconsider the issue. However, at this time, it would appear a three-piece acrylic IOL in the capsular bag probably has the best long-term possibility of minimizing the stress on the zonules.

Q28 After initiating the capsulorhexis, you discover that the zonules are very loose. What do you do next?

- Implant a CTR, followed by phaco 48%
- Implant a Henderson CTR, followed by phaco . . 10%
- Implant capsule (or iris) retractors, followed by phaco 8%
- Implant capsule retractors and a CTR, followed by phaco 25%
- Convert to a manual ECCE. 10%

Howard Fine After initiating the capsulorhexis and finding very loose zonules, I would be inclined to implant capsular retractors as well as a CTR and then follow up with phacoemulsification.

Capsular retractors give us absolute fixation during the phacoemulsification procedure; the CTR also facilitates phacoemulsification because it transmits any focal force on the capsule to the entire zonular apparatus, rather than just to the adjacent zonules. The main advantage of having the CTR in place is that if the zonular problem is progressive and the IOL starts to decenter postoperatively, you can suture the CTR to the ciliary sulcus in the most convenient meridian without having to be governed by where the haptics are, which may be underlying a glaucoma filtering bleb or some other undesirable or inaccessible meridian.

Q29 In a PXE case with extremely weak zonules but preservation of the capsular bag, what method of PCIOL fixation would you most commonly use?

- In bag, no CTR 16%
- In bag, with CTR. 62%
- In bag, with Cionni ring or capsular tension segment (CTS) 8%
- In sulcus, no suture fixation of haptics 13%
- In sulcus, with suture fixation of haptics 3%

Alan Crandall We know that patients with PXE, even those without obvious zonular weakness, are still at risk for late spontaneous dislocation. Thus, in a case where the zonules are already compromised, we should assume that the IOL bag complex is likely to dislocate. Therefore, answer No. 1 is out.

We also know that a standard CTR does not protect from dislocation; therefore, answer No. 2 also is unstable. The fourth answer hopes that adhesions will form with the sulcus and haptics, but the zonules are not addressed by this technique.

I prefer No. 3, using a 9-0 Prolene suture and fixation with either a CTS or a Cionni modified CTR with sulcus placement and suture fixation as a back-up plan.

Q30 After implanting a CTR and the three-piece acrylic IOL in the bag, jiggling the eye causes obvious pseudophakodonesis. Now what?

- Leave alone and observe 31%
- Leave IOL in bag, but attempt to scleral suture fixate the haptics 9%
- Insert a Cionni ring or a CTS for scleral suture fixation of the intracapsular device 31%
- Move IOL and haptics to the ciliary sulcus (no suture). 17%
- Move IOL and haptics to the ciliary sulcus (and suture fixate). 9%
- Replace with ACIOL 3%

Q31 After moving the three-piece IOL to the ciliary sulcus, would you jiggle the eye again?

- Yes, it is wise to test for pseudophakodonesis . . 59%
- No, I'm already too far behind schedule to discover more problems. 2%
- No, but we'd like to see what would happen if you do it 39%

Ike Ahmed A CTR was an appropriate step in managing this case of diffuse zonular weakness. The presence of pseudophakodonesis alone, without overt decentration, found intraoperatively at the conclusion of the case does not necessarily correlate to its presence postoperatively. Is this patient at risk for postoperative decentration? Perhaps. The presence of a progressive condition like PXE would make me more concerned, but I think the pros and cons of doing further manipulation is outweighed by the likelihood that this IOL will be stable—and by the fact that one can return relatively easily postoperatively, if necessary, to suture fixate the IOL/bag/CTR complex to the sclera.

Remember that ciliary sulcus placement of an IOL also requires the presence of intact zonules, and in my opinion, having seen many cases like this, is not a guarantee that the IOL will remain centered.

I feel strongly that the capsular bag is the best place for an IOL; if needed, suture fixation should be considered, either intra- or postoperatively.

Q32 Which of these devices does your OR currently have?

- Standard CTR only 56%
- Standard CTR and Henderson CTR 4%
- CTR and either capsular retractors (e.g., Mackool) or Ahmed CTS. 17%
- All of the above 8%
- None of the above 15%

Bonnie Henderson The most surprising part of this response is that 15 percent of the audience does not have any type of CTR or capsule stabilizing system. Zonular compromise occurs both naturally and iatrogenically. The prevalence of PXE alone, which is only one cause of zonular dysfunction, has been reported to be as high as 23 percent depending on the geographic location. CTRs, regardless of type, and capsule hooks are invaluable adjuncts for all anterior segment surgeons. Handling situations in which there is zonular dysfunction requires not only knowledge of the proper surgical techniques but also the proper tools.

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Financial interests are designated by C, E, L, O, P or S:

C = CONSULTANT/ADVISOR **O = EQUITY OWNER**
E = EMPLOYEE **P = PATENTS/ROYALTY**
L = LECTURE FEES **S = GRANT SUPPORT**

DR. AGARWAL: Abbott Medical Optics, Bausch + Lomb, Staar Surgical, C; Dr. Agarwal's Pharma, O; Slack, Thieme Medical Publishers, P. **DR. AHMED:** Endo Optiks, Transcend Medical, C; Alcon, Allergan, Carl Zeiss Meditec, Ivantis, Merck, Pfizer, C L S; AqueSys, Clarity, Glaukos, iScience, C S; Abbott Medical Optics, New World Medical, L; Optonol, S. **DR. ARBISSER:** Alcon, L; See Life Clearly Foundation, S. **DR. BARRETT:** Bausch + Lomb, C. **DR. BRAGA-MELE:** Abbott Medical Optics, Alcon, Bausch + Lomb, C L. **DR. CHANG:** Abbott Medical Optics, Alcon, Hoya, LensAR, Transcend Medical, C; Calhoun Vision, C O; Eyemaginations, C P; Ista Pharmaceuticals, C S; Allergan, L; Revital Vision, O; Slack, P. **DR. CIONNI:** Alcon, C L; Morcher GmbH, P. **DR. CRANDALL:** Asico, eSinomed, Glaucoma Today, iScience, Journal of Cataract and Refractive Surgery, Mastel Surgical, Omeros, Vimetrics, C; Alcon, C L; Allergan, Ocular Surgery News, L. **DR. DAVIS:** Abbott Medical Optics, Bausch + Lomb, Inspire Pharmaceuticals, Ista Pharmaceuticals, C; Refractec, O; Allergan, S. **DR. DOANE:** LenSx, C; Bausch + Lomb, L O S; Revision Optics, O S; Calhoun Vision, Carl Zeiss Meditec, iTherapeutix, S. **DR. DONALDSON:** None. **DR. DONNENFELD:** AqueSys, Cataract and Refractive Surgery Today, Eyemaginations, Glaukos, LenSx, Odyssey, Pfizer, QLT Phototherapeutics, Sirion, WaveTec, C; Abbott Medical Optics, Advanced Vision Research, Alcon, Allergan, Bausch + Lomb, C L S; TrueVision, C O; Inspire Pharmaceuticals, C P; TLC Laser Eye Centers, L O. **DR. FINE:** Abbott Medical Optics, C; Bausch + Lomb, L. **DR. HENDERSON:** Alcon, Ista Pharmaceuticals, C; Inspire Pharmaceuticals, L. **DR. HOFFMAN:** None. **DR. HOLLADAY:** Abbott Medical Optics, AcuFocus, Allergan, Carl Zeiss, Nidek, Oculus, WaveTec, C. **DR. KOCH:** Abbott Medical Optics, NuLens, C; Alcon, C L; Calhoun Vision, Optimedica, O; OptiVue, S. **DR. LANE:** Visiogen, WaveTec, C; Alcon, Bausch + Lomb, VisionCare Ophthalmic Technologies, C L; Optimedica, C O; Eyemaginations, Patient Education Concepts, C S; Allergan, L. **DR. LINDSTROM:** Abbott Medical Optics, Alcon, Hoya Surgical Optics, LenSx, Lumineyes, Ocular Surgery News, Ocular Therapeutix, Omeros, Revital Vision, Versant, C; AcuFocus, Advanced Refractive Technologies, Biosyntrx, Bradley Scott Inc., Calhoun Vision, Clarity Ophthalmics, Clear Sight, CoDa Therapeutics, EBV Partners, EGG Basket Ventures, Encore, Envision, Eyemaginations, Foresight Venture Fund, Fziomed, Glaukos, High Performance Optics, Improve Your Vision, LensAR, Life Guard Health, Minnesota Eye Consultants, NuLens, Ocular Optics, Omega Eye Health, Pixel Optics, Refractec, Rxvp, Schroder Life Science Venture Fund–Sight Path, Surgijet/Visijet, TearLabs, TLC Laser Center, 3D Vision Systems, Tracey Technologies, Transcend, TrueVision, Vision Solutions Technologies, C O; Qwest, C O P; Bausch + Lomb, C P; Confluence Acquisition Partners, Healthcare Transaction Services, Heaven Fund, Revision Optics, Viradax, O. **DR. MAMALIS:** Medennium, C; Abbott Medical Optics, C S; ARC Laser, Aaren Scientific, Alcon, Allergan, Bausch + Lomb, Calhoun Vision, MBI, S. **DR. MASKET:** Ocular Therapeutics, OptiMedica, Othera Pharmaceuticals, PowerVision, Visiogen, C; Alcon, C L S; Allergan, Bausch + Lomb, Haag-Streit, Carl Zeiss Meditec, L. **DR. MIELER:** Alcon, Allergan, Genentech, C. **DR. MILLER:** Alcon, L. **DR. OLSON:** BD Medical–Ophthalmic Systems, C; Abbott Medical Optics, Allergan, C L. **DR. OSHER:** Abbott Medical Optics, Alcon, Bausch + Lomb, BD Medical–Ophthalmic Systems, Carl Zeiss Meditec, Clarity, Haag-Streit, SMI, TrueVision, C; Video Journal of Cataract & Refractive Surgery, O. **DR. PACKER:** Abbott Medical Optics, Advanced Vision Science, Bausch + Lomb, Carl Zeiss, Celgene, Corinthian Trading, Ista Pharmaceuticals, Rayner Intraocular Lenses, C; LensAR, Transcend Medical, TrueVision Systems, WaveTec Vision Systems, C O; General Electric, Haag-Streit, L; Surgiview, O. **DR. PEPOSE:** Abbott Medical Optics, C; Bausch + Lomb, C L O S; AcuFocus, O S. **DR. PRICE:** Addition Technology, Alcon, Inspire Pharmaceuticals, Ista Pharmaceuticals, Lux Biosciences, Solx, C; Abbott Medical Optics, Allergan, Ophtec, C L; Angiotech, Moria, L; Calhoun Vision, Revital Vision, TearLab, O. **DR. SINGER:** Bausch + Lomb, C L; Eyeonics, O. **DR. SLADE:** Cataract and Refractive Surgery Today, NuLens, Omega Eye Health, Revision Optics, C; Abbott Medical Optics, Technolas, C L; Alcon, C L O; LenSx, C O; Bausch + Lomb, L. **DR. SNYDER:** Dr. Schmidt Intraocularlinsen, C; Alcon, C L; Haag-Streit, L; iTherapeutix, S. **DR. STARK:** LuxBiosciences, S. **DR. STEINERT:** LenSx, Revision Optics, C; Abbott Medical Optics, C P S; Rhein Medical, P. **DR. TRATTLER:** Aton Pharma, C; Abbott Medical Optics, Allergan, Inspire Pharmaceuticals, Sirion, C L S; Wavetec, C S; CXL-USA, E; asklasikdocs.com, O; Glaukos, Ista Pharmaceuticals, Lenstec, QLT Phototherapeutics, Rapid Pathogen Screenings, S. **DR. WALLACE:** Allergan, Bausch + Lomb, LensAR, C; Abbott Medical Optics, L. **DR. WARREN:** Alcon, Dorc International, C L. **DR. WERNER:** Powervision, Visiogen, C; Abbott Medical Optics, C S; Aaren Scientific, Advanced Vision Science, Alcon, Bausch + Lomb, Calhoun Vision, Medennium, Rayner Intraocular Lenses, S.