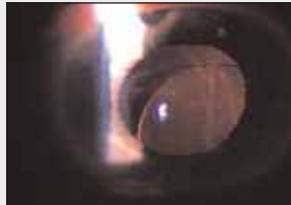


# Posttraumatic Displacement of a PCIOL

BY GARRY P. CONDON, MD; RICHARD S. HOFFMAN, MD; JOHNNY L. GAYTON, MD;  
JAMES A. DAVISON, MD; AND CHI-WAH (RUDY) YUNG, MD

## CASE PRESENTATION

A 54-year-old male presents with a complaint of intermittent halos and blurred vision in his right eye following an automobile accident approximately 1 month ago. He underwent bilateral cataract surgery and IOL implantation several years ago and was previously happy with his vision and symptom free, although the referring ophthalmologist noted some



**Figure 1.** The PCIOL in the patient's right eye is inferiorly displaced after an automobile accident.

mild decentration of the right IOL last year. The examination shows a nicely centered PCIOL in the patient's left eye, whereas the PCIOL in his right eye is in the ciliary sulcus and displaced inferiorly (Figure 1). The central posterior capsule is open, and there is vitreous in the anterior chamber that is not adherent to the wound. The fundus examination is unremarkable.

How would you manage this patient?

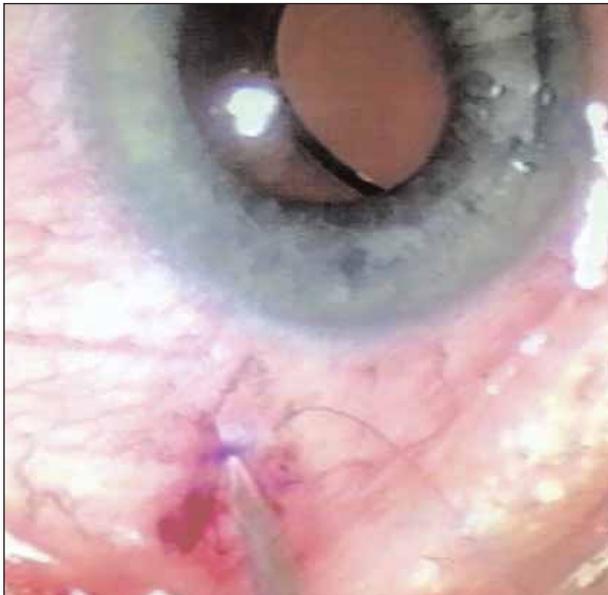
## GARRY P. CONDON, MD

This patient demonstrates subluxation of a PCIOL that has been exacerbated to an intolerable degree by trauma. Although the clinical description states that the IOL is in the ciliary sulcus, I would suggest that both haptics are posterior to the sulcus, based simply on the apparent overall size of the lens. This early-generation PCIOL appears to be a very large, single-piece, all-PMMA, rigid lens with an optic that is at least 7 mm in diameter and has an overall length of 14 mm or more. In Figure 1, the optic appears to be anterior to the residual superior capsule, with both haptics likely extending beyond the pars plicata. Surgical intervention is indicated because of the patient's visual symptoms. Moreover, the acute subluxation and the clinical appearance suggest that the IOL's dislocation will probably progress in the near term.

Surgical options include refixating the IOL to either the iris or sclera or exchanging it for an ACIOL. The main advantage of refixating the original IOL is it avoids a large incision. I usually opt for peripheral iris fixation of subluxated haptic-style PCIOLs by means of some form of modified McCannel suturing. I have found, however, that IOLs of the style in this particular case can be notoriously difficult to fix to the iris due to their size. Furthermore, the temporary capture of the optic within the pupil is often challenging with these IOLs, because the optic is oversized and the long, rigid haptics produce powerful posterior vaulting. Even if capture is achieved, passing the haptic sutures is exceedingly difficult because of how peripherally they must be placed to get beyond the large optic and gain access to the haptics. As a result, I routinely perform scleral suture fixation of the haptics of this type of IOL.

For this eye, I would use a technique of *ab externo* scleral suture loop fixation, as described by Chan et al.<sup>1</sup> I would create a conjunctival peritomy at the site of a desired fixation point and make a midperipheral corneal paracentesis 180° away. A cohesive viscoelastic would deepen the chamber. Next, I would place a hollow 26-gauge needle through the sclera at the desired fixation site within a shallow circumferential scleral groove 1.5 mm behind the limbus. The tip of the needle would be brought into the pupillary zone. One end of a double-armed, 9-0 polypropylene suture on a long needle would be passed through the clear corneal paracentesis and docked into the tip of the hollow 26-gauge needle. The docked needle and suture would be withdrawn externally from the sclera. I would then pass the 26-gauge needle through the sclera, 1 mm away from the first pass at the other end of the scleral groove, while I used an iris spatula, Sinskey hook, or a microforceps to elevate the malpositioned IOL to the iris plane. The tip of the hollow needle would be passed beneath the haptic and then above the optic to meet with the other end of the polypropylene suture, which would have been placed through the same corneal paracentesis as the first. This needle would be brought out through the sclera as tension was applied to both sides of the suture to

(Courtesy of Richard S. Hoffman, MD.)



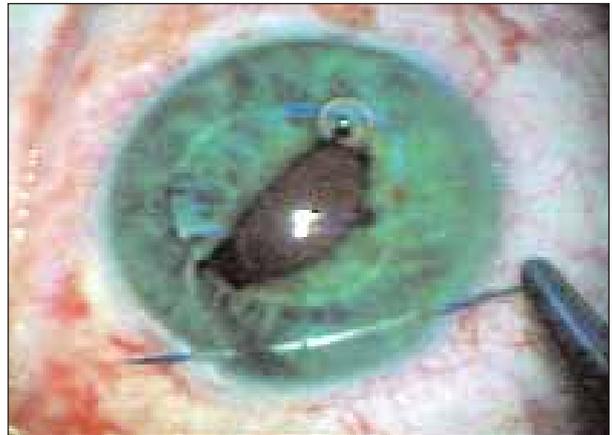
**Figure 2.** The surgeon makes a pars plana incision 3.5 mm posterior to the limbus with a 20-gauge microvitrectomy blade.

secure the haptic. I would rotate the knot into the sclera through the tract made by the hollow needle. Visualization would be dramatically improved with the placement of two nylon iris retractors through peripheral clear cornea in the region of refixation. After securing the other haptic in the same fashion, I would close the conjunctiva. Any prolapsed vitreous would be removed via a limbal or pars plana approach with a vitrectomy using a limbal infusion cannula.

### **RICHARD S. HOFFMAN, MD**

This patient would be best served by a limited vitrectomy and iris fixation of the subluxated IOL. I would approach this case from the temporal location and start with a 1-mm paracentesis at the 7-o'clock position directed toward the angle at 9 o'clock. I would inject a small quantity of unpreserved triamcinolone acetate (0.1 mL triamcinolone 40 mg/mL diluted with 0.9 mL balanced salt solution) into the anterior chamber through the paracentesis in order to stain the vitreous.<sup>2</sup> Injecting a small quantity of a dispersive viscoelastic would protect the endothelium during the prolapse of the lens' optic.

I would perform a small peritomy in the inferotemporal quadrant and create a 20-gauge pars plana incision 3.5 mm posterior to the limbus (Figure 2). Next, I would insert a bare 20-gauge vitrector through the pars plana and perform a limited vitrectomy in order to extract the vitreous from the anterior chamber. A light infusion of balanced salt solution through the paracentesis should prevent hypotony. A 25-gauge system could also be utilized transconjunctivally.



(Courtesy of Richard S. Hoffman, MD.)

**Figure 3.** A 10-0 Prolene suture on a CIF-4 curved needle is placed through the paracentesis, through the iris, underneath the IOL's haptic, and out through clear cornea. Note the peripheral location of the suture's passage.

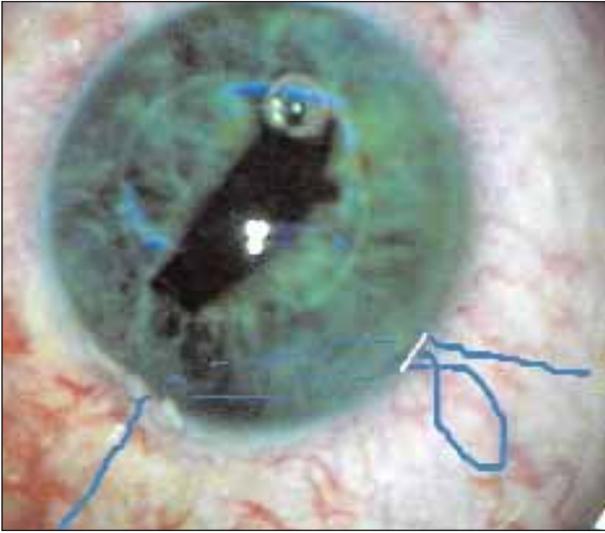
Once I had removed the triamcinolone-stained vitreous from the anterior chamber, I would use the vitrector to prolapse the optic anterior to the iris while leaving the haptics behind the iris plane. An injection of Miochol-E (Novartis Ophthalmics, Inc., Duluth, GA) into the anterior chamber would constrict the pupil behind the optic, thus capturing and centering the lens for fixation.

I would perform iris fixation of the IOL using either a 10-0 or a 9-0 Prolene suture (Ethicon Inc., Somerville, NJ) on a long, curved needle (CIF-4 or CTC-6L; both from Ethicon Inc.). The technique utilizes a Siepser slip-knot that is created outside the eye and pulled intraocularly, resulting in the least amount of iris trauma.<sup>3,4</sup> The haptics should, in this example, be oriented at the 3- and 9-o'clock positions following the optic's prolapse. The long, curved needle would be passed into the inferior paracentesis, through the peripheral iris, underneath the haptic, and out through the iris and clear cornea. It would be important to take as small a bite of iris as possible to prevent the pupil from peaking (Figure 3). The needle would be pulled through the cornea externally.

Visualization of the haptic's location could be facilitated by placing a small quantity of viscoelastic on top of the iris overlying the haptic or by pushing the lens anteriorly by means of a cyclodialysis spatula placed through the pars plana incision. Both maneuvers would tent the iris over the haptic and help delineate the haptic's location.

Sometimes, the pupil does not constrict adequately and there is an absence of capsular support that could result in a complete dislocation of the lens onto the retina if the optic became displaced behind the iris. In such a case, each needle should be placed behind each of the haptics. While the surgeon fixates one haptic, the other is support-

(Courtesy of Richard S. Hoffman, MD.)



**Figure 4.** This view of the Prolene suture's passage after the externalization of the loop was enhanced.

ed by its needle, which remains proximally in the paracentesis and distally in the clear cornea to prevent the posterior movement of the optic and its subsequent dislocation.

I create the Siesper slipknot by placing a Lester hook through the paracentesis and pulling the portion of the Prolene suture located between the iris and the clear corneal exit site out through the paracentesis (Figure 4). I then remove the trailing needle of the double-armed suture and pass the trailing end of the suture through the externalized loop three times. The trailing and leading ends of the Prolene suture are pulled apart, thereby drawing the knot into the anterior chamber and cinching the haptic to the iris. This step is repeated twice using a single pass of the trailing suture through the externalized loop. The sutures are cut at the knot with an intraocular scissors. Next, I direct my attention to the second haptic, which I sew to the iris using the same technique through a second paracentesis strategically located to allow easy access to the haptic.

Once both haptics have been sewn to the iris, the optic is prolapsed posterior to the iris plane, and bimanual I/A can be used through the two paracenteses to remove residual viscoelastic and any blood. A suture for the pars plana incision is usually not needed, and the conjunctival peritomy can be closed with a 9-0 Vicryl suture (Ethicon Inc.). If no vitreous is present in the anterior chamber at the beginning of the case, the optic's prolapse can be accomplished through the limbal paracentesis, thus avoiding the need for the pars plana incision.

### **JOHNNY L. GAYTON, MD**

The fact that this patient had some decentration of the IOL noted 1 year previously indicates a zonular defect

was probably present. The automobile accident likely pushed the implant through the defect and enlarged it. Because the implant no longer blocked the posterior capsular opening, vitreous could enter the anterior chamber. There are now three main issues: (1) vitreous needs to be removed from the anterior chamber; (2) the implant must be prevented from "taking a swim"; and (3) the IOL needs to be fixated in position.

I would perform the surgery with the patient under block or general anesthesia in order to have better control of the eye. I would create a scleral flap at approximately 12 o'clock and then make a slit opening at the limbus at 7:30 o'clock. I would gently fill the anterior chamber with Viscoat (Alcon Laboratories, Inc., Fort Worth, TX) while avoiding putting pressure on the IOL, which might cause it to drop. I would then pass a straight needle on a 10-0 Prolene suture through this opening, under the lens' haptic, and through the bed of the scleral flap. The other arm of the suture would pass through the corneal wound, over the haptic, and through the bed. I would then tie the suture.

Next, I would inspect the vitreous and decide whether to approach it through the limbus or the pars plana. In this case, a limbal approach would probably be easy and would remove the Viscoat as well. Following the vitrectomy, I would inspect the inferior haptic with the endolaser probe (Endo Optiks, Little Silver, NJ) used in endoscopic cyclophotocoagulation. This device provides excellent visualization behind the iris in cases where the lens' position and capsular remnants need to be evaluated. I would position the haptic in the sulcus over a piece of capsule. If there were no capsular support, however, I would suture the inferior haptic to the peripheral iris or the sclera using techniques well described by other surgeons. Next, I would attempt to rotate the knot gently into the suture track and would then suture the scleral flap. This approach would prevent the implant from dropping and give excellent fixation.

### **JAMES A. DAVISON, MD**

I would follow my normal protocol for the history and physical examination. My approach would include an examination of old records and operation reports, taking the patient's history, and performing a complete ocular examination. Assuming there were no other problems (eg, retinal tears, a dramatic angle recession, iridodialysis), I would inform the patient that the amount of the optic's decentration suggests a substantial lack of zonular support from the ciliary body to the peripheral capsular remnant and that, with his young age, this decentration will likely progress until the IOL ceases to function.

After pharmacologically dilating the pupil and per-

forming retrobulbar anesthesia, I would instill enough Viscoat to fill the anterior chamber without deepening it and forcing the IOL posteriorly. My plan would be to place a double McCannel suture. I would use 10-0 Prolene on a straight needle (No. 1713; Ethicon Inc.) to engage the more easily accessed haptic and iris after entering the sclera approximately 1.5 mm posterior to the limbus. I would use a cyclodialysis spatula under the optic to center and hold the IOL in place, but I would be prepared to use a vitreous microforceps (end-grasping forceps, No. 705.43; Alcon Laboratories, Inc.) to grasp the capsule if necessary. Once the first needle had engaged the haptic and iris and it had come out through the opposite limbus, I would place the second needle in a similar fashion through the second haptic parallel with the first. Then, with the IOL held in place by the two needles, I could perform an anterior vitrectomy bimanually. Triamcinolone could be used to confirm the vitrectomy's completeness.

I would refill the anterior chamber to a normal depth with Viscoat. The first needle could then be pulled through and the suture tied. If the IOL's centration were perfect, the second needle could be pulled through and the McCannel process completed there as well. If not, the suture should be replaced by another pass with the straight needle.

I would remove the viscoelastic from the anterior chamber with the I/A unit. I would lower the bottle to 50 cm upon introducing the I/A probe but increase its height to 76 cm during the removal of the viscoelastic. I would check the retina with the indirect ophthalmoscope at the conclusion of surgery.

### **CHI-WAH (RUDY) YUNG, MD**

This patient's history suggests that the IOL was placed in the sulcus and was moving progressively more inferiorly, a displacement worsened by the recent trauma. The fact that there was vitreous in the anterior chamber with an open posterior capsule and the presence of a superior iridectomy suggest that the initial cataract surgery was sufficiently complicated to require the IOL's placement in the sulcus. One reason for an IOL's dislocation is inadequate capsular support. The recent trauma this patient suffered may have further weakened the inferior support.

The management of the dislocated IOL in this case depends on the adequacy of the capsular support and the integrity of the IOL. Both conditions need to be assessed carefully during surgery. Adequate capsular support sometimes allows simple repositioning of the IOL without suture fixation. If the IOL is damaged, it will need to be exchanged. Because the patient's history strongly suggests inadequate inferior capsular support, it seems that fixing the suture to the sclera or iris would be advisable.

Regardless of whether the IOL must be exchanged, I would perform a limited anterior vitrectomy to avoid the incarceration of vitreous anterior to the lens. Using triamcinolone to stain the vitreous would facilitate the visualization of vitreous fibers.

Of the various techniques for scleral suture fixation, my preference is to use a CTC-6 cutting needle with a 10-0 Prolene suture. Alternately, a slightly bent STC-6 straight needle (Ethicon, Inc.) with a 10-0 Prolene suture can be used. The needle is introduced through the base of a partial-thickness scleral flap prepared perpendicular to the superior haptic, approximately 1.0 to 1.5 mm posterior to the limbus. The scleral flap helps to decrease the incidence of eroded sutures and reduce the risk of endophthalmitis. The needle is then advanced under the superior haptic and out through a preplaced paracentesis site 180° opposite to the first entrance site. I use an irrigating cannula to dock the needle's tip. The needle is then removed, turned around, and passed through the same paracentesis site. It is passed over the haptic and through sclera, 1 to 2 mm lateral to the original point of entry, to form a loop of Prolene suture around the superior haptic. After positioning the IOL, I sew the suture into the bed of the sclera and suture down the scleral flap. I perform a similar maneuver on the inferior haptic. The visualization of the inferior haptic can be difficult, and the use of iris hooks can be helpful.

My choice for this case, however, especially if it is necessary to exchange the IOL, is iris suture fixation to the haptic, such as with a modified McCannel suture. I would try to position the haptics horizontally at the 3- and 9-o'clock positions with a temporal approach. I would make a small paracentesis site at the 9-o'clock position. If no exchange were necessary, I would prolapse the IOL into the anterior chamber using a Kuglen hook and capture the optic in front of the iris. A cat's eye appearance of the pupil indicates the optic's successful capture.

A CTC-6 cutting needle with a 10-0 Prolene suture would then be used to puncture the cornea and would be passed through the iris, under the nasal haptic, where it could be seen tenting up the iris. The needle then would be brought up underneath the haptic, through the iris, and through the cornea to complete the capture of the haptic at the midperipheral location. I would grasp and draw out each arm of the suture through the previously placed paracentesis. I would then tie the suture and cut it close to the knot. I would suture the temporal haptic in a similar fashion. Gently prolapsing the optic behind the iris would complete the maneuver. The IOL would now be fixed to the iris.

If it were necessary to exchange the IOL, my choice would be a three-piece acrylic implant such as the MA60AC (Alcon Laboratories, Inc.). The original IOL

could be explanted through a temporal incision sized according to the type of lens. The new implant could then be inserted through the same incision. I would unfold the implant so that the optic was captured in front of the iris, with its haptics oriented horizontally relative to the patient's position. The haptics could then be sutured in a fashion similar to my earlier description. ■

Section Editors Robert J. Cionni, MD; Michael E. Snyder, MD; and Robert H. Osher, MD, are cataract specialists at the Cincinnati Eye Institute in Ohio. They may be reached at (513) 984-5133; rcionni@cincinnatieye.com.

Garry P. Condon, MD, is Clinical Associate Professor for the Department of Ophthalmology at Allegheny General Hospital in Pittsburgh. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Condon may be reached at (412) 359-6298; garlinda@usaor.net.



James A. Davison MD, is President of the Wolfe Eye Clinic in Marshalltown, Iowa. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Davison may be reached at (641) 754-6200 ext. 1025; jdavison@wolfeclinic.com.



Johnny L. Gayton, MD, is in private practice at Eyesight Associates in Warner Robins, Georgia. He is a member of the speaker's bureau for Alcon Laboratories, Inc. Dr. Gayton may be reached at (478) 923-5872; jlgayton@aol.com.



Richard S. Hoffman, MD, is Clinical Associate Professor of Ophthalmology at the Casey Eye Institute, Oregon Health & Science University, and he is in private practice at Drs. Fine, Hoffman, & Packer in Eugene, Oregon. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Hoffman may be reached at (541) 687-2110; rshoffman@finemd.com.



Chi-Wah (Rudy) Yung, MD, is Associate Professor of Ophthalmology at the Indiana University School of Medicine in Indianapolis. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Yung may be reached at (317) 630-6795; ryung@iupui.edu.



1. Chan CC, Crandall AS, Ahmed II. Ab externo scleral suture loop fixation for posterior chamber intraocular lens decentration: clinical results. *J Cataract Refract Surg.* 2006;32:121-128.
2. Burke SE, Da Mata AP, Snyder ME, et al. Visualizing vitreous using Kenalog suspension. *J Cataract Refract Surg.* 2003;29:645-651.
3. Chang DF. Siepser sliplinknot for McCannel iris-suture fixation of subluxated intraocular lenses. *J Cataract Refract Surg.* 2004;30:1170-1176.
4. Siepser SB. The closed chamber slipping suture technique for iris repair. *Ann Ophthalmol.* 1994;26:71-72.