

Traumatic Cataract and Mydriasis

These cases can pose the challenges of surgical preservation of the capsule and long-term fixation of the IOL.

BY DAVID F. CHANG, MD

A 68-year-old physician had suffered a bungee cord injury to his right eye 8 months prior to surgery. He had symptoms of bothersome glare and photophobia due to a traumatic mydriasis that left him with a pupil permanently dilated to 7 mm in diameter. Because a progressive cataract had impaired his vision to a level of 20/50, he elected to undergo cataract surgery. There was no preoperative phacodonesis.

As this case illustrates, traumatic cataracts challenge surgeons to diagnose and manage intraoperative zonulopathy, optimize the IOL's long-term fixation and centration, and consider or repair concomitant iris defects.

CATARACT SURGERY

The presence of a traumatic mydriasis is invariably associated with traumatic zonulopathy. In the absence of preoperative phacodonesis, however, the extent of zonular weakness cannot be known until the initiation of surgery. Because of the higher risk of capsular rupture, I employ a retrobulbar or peribulbar anesthetic block in these cases. The capsulorhexis step provides the first opportunity to assess zonular integrity. The peripheral anterior capsule is normally immobile but will demonstrate "pseudoelasticity" by seemingly stretching as the capsular flap is pulled. This is not true capsular elasticity but rather a lack of zonular immobilization. In this particular case, there was significant movement of the entire lens as the cystotome first perforated the anterior capsule. This mobility immediately indicated the presence of severe and diffuse zonular weakness, which significantly increased the risk of a radial anterior capsular tear. Because capsular retractors and a capsular tension ring (CTR) require a capsulorhexis, I intentionally made the capsulotomy's diameter slightly smaller to improve the odds that I would be able to achieve a continuous curvilinear capsulotomy (CCC).

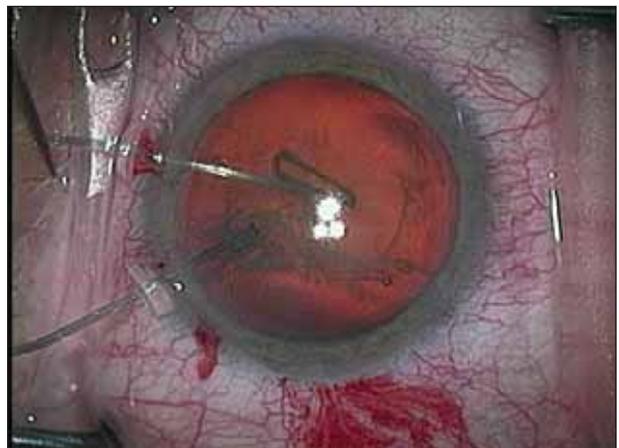


Figure 1. The placement of two MST capsular retractors.

Next, I inserted capsular retractors through limbal stab incisions. Although iris hooks can be used, capsular retractors are longer and provide better equatorial support to the capsular bag despite the presence of a small-diameter CCC (Figure 1). MicroSurgical Technology's (MST; Redmond, WA) disposable nylon capsular retractors are a new alternative to the Mackool Capsule Support System (Duckworth & Kent Ltd., Hertfordshire, United Kingdom; distributed in the United States by FCI Ophthalmics, Inc., Marshfield Hills, MA). Instead of a set of five retractors with the Mackool system, MST's instruments are packaged three to a container. In contrast to a CTR, capsular retractors anchor the capsular bag to the sclera and provide it with rotational stability and anterior-posterior support. Furthermore, they avoid trapping equatorial cortex in the way that CTRs do.

Inserting the phaco tip with irrigation displaces the nucleus posteriorly, so I verified that the retractors were not so taut that they tented the edge of the CCC. It is important to loosen the offending retractors if this is

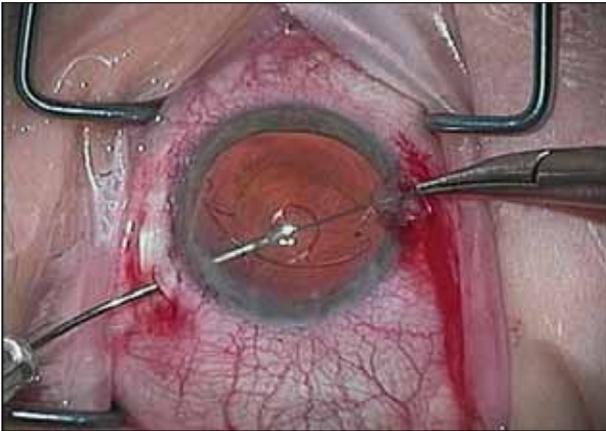


Figure 2. To suture a CTS to the sclera, the surgeon used a 25-gauge guide needle to externalize the polypropylene needle through the base of a half-thickness scleral groove.

the case so that the capsular rim does not tear during phacoemulsification. For traumatic cataracts, I prefer horizontal phaco chop because instruments' centrally directed mechanical forces minimize any displacement of the nucleus. One should anticipate that the lack of centrifugal stretching will cause unusual laxity in the posterior capsule, which will tend to "trampoline" toward the phaco tip. Using a smaller-diameter, 20-gauge phaco tip reduces the risk of inadvertently aspirating the peripheral or posterior capsule. In addition, reinflating the capsular bag with a dispersive ophthalmic viscosurgical device helps to restrain the lax posterior capsule as the final fragments and epinucleus are aspirated.

Bimanual I/A instrumentation provides several advantages in the setting of weak zonules. The ability to alternate between two aspirating ports improves access to the subincisional area, and it allows more of the cortex to be removed while the aspirating port is facing away from the posterior capsule. Without a constraining infusion sleeve, I am better able to reach across to the opposite equatorial quadrants where the aspirating port can be safely buried within cortex before vacuum builds. This lessens the risk of aspirating the pliant peripheral or posterior capsule. Finally, in the presence of a zonular dialysis, the ability to dissociate the irrigating and aspirating tips can help to avoid fluid misdirection syndrome.

Posterior capsular folds can be snagged and torn by the leading tip of a CTR during its insertion. It is therefore important to ensure full expansion of the capsular bag prior to the ring's injection. Leaving the capsular retractors in place counters the lateral decentering forces of the CTR as it is injected. To avoid traumatizing the paracentesis sites, I first removed the silicone stop before extracting the disposable MST capsular retractors via the phaco incision.

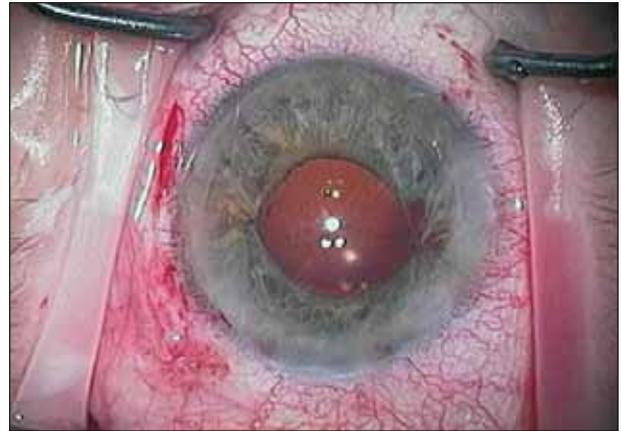


Figure 3. The reconstructed pupil after two interrupted 10-0 polypropylene sutures.

IMPLANTATION OF THE IOL

One must assess and consider the capsular bag's long-term stability for intracapsular fixation of the IOL. In this case, the tendency for the superior pole of the capsular bag to tip posteriorly indicated a need to further support the bag in this quadrant with an Ahmed Capsular Tension Segment (CTS; Morcher GmbH, Stuttgart, Germany; distributed in the United States by FCI Ophthalmics, Inc.). I made a half-thickness scleral groove approximately 1.5 mm posterior to the limbus at the desired site for a scleral suture. (I thread a double-armed 10-0 or 9-0 Prolene suture [Ethicon, Inc., Somerville, NJ] through the CTS's eyelet prior to inserting and maneuvering it into the capsular bag.) Because the scleral suture site had to be located in the superotemporal quadrant in this eye, I first externalized each needle through a paracentesis site located directly across from the CTS's eyelet. A No. 25 disposable guide needle was introduced ab externo through the base of the half-thickness scleral groove. After its blind passage through the ciliary sulcus, between the iris and the anterior capsule, and into the pupillary space, the Prolene needle was docked into its lumen so that it could be brought back out through the scleral groove (Figure 2). The second needle was similarly externalized and then guided out through the scleral groove, such that it exited approximately 1 mm away from the first needle. I carefully avoided tying the knot so tightly that it peaked or distorted the CCC's edge.

Although intracapsular IOL fixation would have been an option in this case, I felt that implanting a sufficiently long three-piece IOL in the sulcus conferred a lower risk of delayed bag-IOL dislocation in the future. The STAAR Elastimide lens (model AQ2010V; STAAR Surgical Company, Monrovia, CA) is the only foldable three-piece IOL with an overall length of 13.5 mm. The posterior vault-

“To repair a traumatic mydriasis, I prefer to perform iris suture cerclage when all of the iris tissue is present.”

ing of its haptics and the rounded anterior edge of its optic lessen the risk of posterior chafing of the iris. This IOL also has very low spherical aberrations, should there be any postoperative decentration. In my opinion, placing the haptics in the sulcus should transmit some of the lateral IOL forces directly to the ciliary body during ocular saccades, thereby reducing cumulative zonular strain over time. To optimize its centration, I captured the optic in the capsulorhexis.

REPAIR OF THE IRIS DEFECT

To repair a traumatic mydriasis, I prefer to perform iris suture cerclage when all of the iris tissue is present. In lieu of vermiform suture imbrication of the entire pupillary margin, I have achieved excellent cosmetic and functional

results by placing two interrupted 10-0 Prolene sutures in the pupillary margin directly opposite to each other. These are placed with a McCannell technique so that the two ends of the suture are externalized through paracentesis incisions. In this case, I used the MST microforceps to grasp two consecutive and generous bites of iris tissue that were approximately 2 to 3 clock hours apart from each other. I tied a Siepser sliding slip knot so that the newly knotted pupillary margin was not displaced or tented up. This step is important because of the propensity of the iris to tear when it is placed on stretch. Positioning two interrupted 10-0 Prolene sutures in this way invariably results in a rounded pupil (Figure 3). ■

A video of this case is available at <http://eyetube.net/?v=spige>.



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