

Vaulted Accommodating IOL

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AND AUDREY R. TALLEY ROSTOV, MD

CASE PRESENTATION

A 53-year-old man is referred to you for an evaluation of a vaulted Crystalens (Bausch + Lomb) in his left eye. He underwent uneventful cataract surgery on this eye 4 months ago. He also has a history of retinal detachment repair with a scleral buckle and a peripheral laser procedure in his left eye in 2004. Prior to cataract surgery, his BCVA was $-13.75 +0.75 \times 4 = 20/80$ OS. His right eye is pseudophakic with a well-positioned Crystalens and a UCVA of 20/25+2. The patient states that he has never seen well since the cataract surgery on his left eye, and he expresses unhappiness with his vision in that eye.

On examination, his UCVA is 20/50 OS, and his BCVA is $-0.75 = 20/25+2$ OS. A slit-lamp examination of the patient's left eye reveals a clear cornea, a quiet anterior chamber, and an inferiorly vaulted Crystalens oriented 12 to 6 o'clock (Figure). In addition, the capsulorhexis does not cover the IOL's inferior hinge, and there are multiple vertical striae in the posterior capsule. The remainder of the examination is normal, and optical coherence tomography of the retina shows no macular edema.

How would you proceed?

—Case prepared by Audrey R. Talley Rostov, MD.

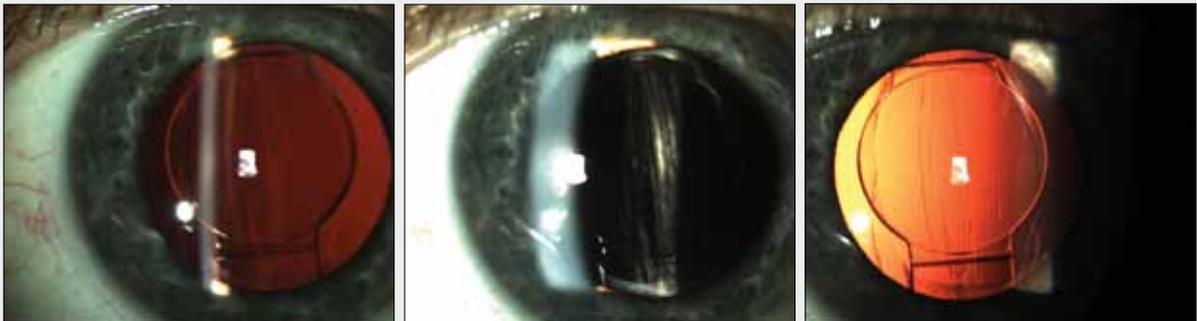


Figure. Vaulted inferior haptic of the Crystalens in the patient's left eye.

GARY FOSTER, MD

The patient has a Z syndrome with inferior vaulting due to contraction of the capsular bag and asymmetric coverage of the haptics/optic. This lack of coverage has been exaggerated by postoperative scarring and retraction of the inferior anterior capsule. The patient expresses dissatisfaction with his vision since surgery. If the vertical striae were present on postoperative day 1, they could indicate a wound leak with early partial vaulting/myopia and a subsequent Z syndrome due to later capsular contraction. If instead the striae developed later, then this is a case of standard Z syndrome.

The figure shows adequate and symmetrical coverage of the optic nasally and temporally. If this was the case at the time of surgery and the IOL had originally been positioned horizontally, the syndrome might have been avoided.

The treatment options are to rotate the IOL horizontally or to perform a selective YAG laser capsulotomy. After 4 months, the polyamide haptics of the lens will likely be firmly scarred to the bag complex, making it difficult to rotate the IOL without damaging the zonules. I would therefore favor a YAG laser approach. I would open the bag peripherally, under the inferior

haptic, with several laser spots (less is more) placed in a horizontal pattern to allow the bag to expand. I would examine the patient a couple of days later in the clinic to see if the syndrome had resolved. If not, then I would perform a small central YAG procedure under the optic but attempt not to connect the central application of laser energy with my previous peripheral YAG opening to decrease the chance of vitreous prolapse.

JOHN A. HOVANESIAN, MD

This patient presents with lens epithelial cell proliferation that appears (by the stress lines) to be generating tension that may be causing the IOL to shift forward slightly. In this case, a YAG laser capsulotomy should improve both the capsular opacity and the tension on the capsule (possibly inducing myopia).

A number of approaches have been advocated for laser capsulotomy in a case like this one. The most successful in my experience has been to use low laser power of 0.75 to 1 mJ to create a central, cruciate capsulotomy. In many cases, this technique will cause a visible dissipation of capsular tension, and the lens may shift slightly posteriorly. After a week or so, it would be appropriate to re-examine the patient again, while being careful to “push plus,” because pseudophakic patients with accommodating IOLs can easily be “overminused” on refraction.

A. JAMES KHODABAKHSH, MD

Z syndromes are an uncommon but unfortunate complication of accommodating lens surgery. I have encountered this complication myself and have treated many referred patients of the same sort over the years. In my opinion, this type of Z syndrome happens with higher frequency in very long and short eyes. Of note in the figure for this case are the large vertical striae in the posterior capsule and that the inferior capsulorhexis is not covering the inferior haptic. The latter reduces anterior support of the IOL and, with fibrosis of the capsular bag, will move the lens forward, causing the Z syndrome.

Prior to treatment, I would have an extensive conversation with the patient. Individuals such as this one tend to have high expectations and need to understand what is taking place in their eyes. I would thoroughly discuss all of the risks, especially the posterior segment complications, of this type of surgery, but I would also explain that the prognosis is excellent.

Before intervening, I would perform dilated gonioscopy to ensure that the haptics are properly located in the equator of the capsular bag. To treat a normally sized eye that develops a Z syndrome, I begin with a YAG capsulotomy, especially under the vaulted hinge, along with postoperative cycloplegia (cyclopentolate 1% t.i.d.). In

my experience, these measures resolve most of the problems in the early postoperative period. This eye is not normal, however, and I would want to preserve the posterior capsule in case I had to perform future procedures, including removal and exchange of the IOL. I would dissect the lens as free as possible and rotate it into position 90° from its current placement so that the haptics were evenly covered by the anterior capsule. I would ensure the posterior vault was adequate and then place a capsular tension ring (CTR; sized white to white +1 mm) in front of the lens. Next, I would clean any remaining lens epithelial cells from the underside of the anterior capsule. At the conclusion of surgery, I would suture the main incision and prescribe cycloplegia for the first postoperative weeks. If the lens remained well positioned during the early postoperative period, I would perform a small YAG capsulotomy to release the striae within the first month.

P. DEE G. STEPHENSON, MD

The scleral buckle and peripheral laser procedure for retinal detachment necessitate a few questions. Was the macula on or off, and were there any macular findings other than no macular edema on optical coherence tomography? The patient's visual acuity is only 20/50, but with a refraction of -0.75 D, it should be at least 20/40. What are his near and intermediate UCVA? The patient says he has not seen well since cataract surgery, but what does that mean to him? Is he bothered by his quality of vision, his near vision, or his distance vision? If macular pathology exists, maybe appropriate counseling is in order before anything else. The scleral buckle has increased this patient's myopia, and he probably has a large capsular bag. Those factors combined with a large circular capsulorhexis are causing the lens to vault forward.

In my opinion, there are two options to consider. My first choice would be to exchange the current IOL for the longer (12-mm) Crystalens AO, place it along the horizontal meridian, and insert a CTR to help fill the bag. This approach should allow the lens to center more posteriorly. If removal or repositioning of the current IOL proved too difficult, however, I would still place a CTR. I would also make sure that no retained cortical material was causing the lens to vault inferiorly. I would then dilate the pupil with atropine for at least 1 week postoperatively and instruct the patient to avoid reading and other near tasks to ensure the lens' position.

ROBERT J. WEINSTOCK, MD

With its flexible accommodative design, the Crystalens can rarely assume an asymmetrically vaulted position

from contractile forces imposed by the capsular bag. After implanting more than 2,000 of these IOLs, I have seen roughly 20 cases of so-called Z syndrome, 10 of which were referrals from other surgeons. In this particular case, both the anterior and posterior capsules appear to be contributing to the forces pushing the superior hinge back and the inferior hinge forward. My approach in this situation almost always involves a YAG laser capsulotomy, possibly followed by PRK. I have only explanted one Crystalens, and I wish I had not done so. In all of the other cases, the patient achieved a satisfactory outcome with no loss of BCVA.

First, I would direct the YAG laser at the striae in the posterior capsule centrally. Next, I would carefully enlarge the posterior capsular opening behind the hinges; too large a posterior opening outside the diameter of the optic to the left and right could lead to anterior vitreous prolapse. Oftentimes, these steps alone can cause the lens to move slightly and restore a full posterior vault to both hinges. If I perceived no movement, I would lower the laser power and make small nicks in the anterior capsule, first over the superior hinge and, if I still saw no movement of the lens, then over the inferior hinge. Next, I would create more nicks in the anterior capsule, especially in areas of white fibrosis and thickening of the anterior capsule. Sometimes, the IOL does not visibly move initially, but 2 weeks thereafter, the problem has lessened or resolved. I usually perform PRK 1 month after the YAG procedure if the eye has residual myopia and astigmatism. Small amounts of astigmatism only with plano spherocylindrical equivalence could be treated with a limbal relaxing incision.

WHAT I DID: AUDREY R. TALLEY ROSTOV, MD

Given the location of the inferior vault and the appearance of the inferior portion of the capsulorhexis that did not cover the inferior hinge, I elected to bring the patient to the OR and to rotate the Crystalens from the 12- to 6-o'clock position to the 3- to 9-o'clock position, with the addition of a CTR to increase stability.

Using topical anesthesia, I created two 1.3-mm incisions with a bimanual diamond blade. I injected an ophthalmic viscosurgical device (OVD) and loosened the IOL from the bag via a combination of sharp dissection and dissection with a Kuglen spatula and OVD with a cannula. Once I had mobilized the lens, I placed a CTR and then rotated the IOL from the 12- to 6-o'clock position into the 3- to 9-o'clock position in the bag. After bimanual I/A to remove the OVD, I closed the incisions with a single 10-0 nylon suture.

On the first postoperative day, the patient had a UCVA of 20/25. Four weeks later, I removed the sutures and performed a central YAG capsulotomy. The patient now has a UCVA of 20/20 OS, and the IOL has remained well positioned, its hinges covered by the capsulorhexis. ■

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