

Wound Dehiscence

BY ERIC D. DONNENFELD, MD; SAMUEL MASKET, MD; ASIM PIRACHA MD;
JASON E. STAHL, MD; AND ERIK L. MERTENS, MD, FEBOPHTH

CASE PRESENTATION

A 23-year-old white male presents for phakic IOL surgery in his left eye. His preoperative refraction is $-19.00 +2.50 \times 77$ (BSCVA = 20/40), and his cycloplegic refraction is $-18.00 +2.00 \times 80$. The anterior chamber depth measures 3.31 mm. The patient's corneal topography is shown in Figure 1.

The surgeon instills topical proparacaine in the patient's left eye while he is seated upright and marks the 3- and 9-o'clock meridians with a sterile marking pen. The ophthalmologist prepares the patient's eyelids with Betadine (The Purdue Frederick Company, Stamford, CT) while he is supine and inserts a lid speculum. Using calipers measuring 6.2 mm, the surgeon delineates the extent of the superior limbal incision centered at 85°. With a 15° blade, he creates two paracenteses straddling the main incision site and then instills a miotic and a viscoelastic agent. Using a crescent blade, the surgeon makes a 6.2-mm-long scleral groove of 50% thickness at the limbus and tunnels forward into clear cornea. He uses a 3.0-mm followed by a 6.0-mm keratome

to enter the anterior chamber and then extends the wound to 6.2 mm. He implants a Verisyse phakic IOL (Advanced Medical Optics, Inc., Santa Ana, CA) and performs enclavation to the iris in the standard fashion. The surgeon closes the incision with three interrupted 10-0 nylon sutures. The patient tolerates the procedure well.

On the first postoperative day, the patient has a UCVA of 20/100. He uses a topical steroid and antibiotics q.i.d. By day 12, his UCVA measures 20/50, and his BCVA is 20/30 with a manifest refraction of $-1.50 +1.25 \times 159$. One month postoperatively, the patient's UCVA is 20/200, and his BCVA measures 20/40 with a manifest refraction of $-2.75 +3.50 \times 130$. Six weeks after surgery, the patient's UCVA is 20/100, and his BCVA measures 20/50 with a manifest refraction of $-4.25 +8.00 \times 3$. The three sutures have loosened and are removed. The ophthalmologist performs a topographic analysis (Figure 2).

How would you proceed?

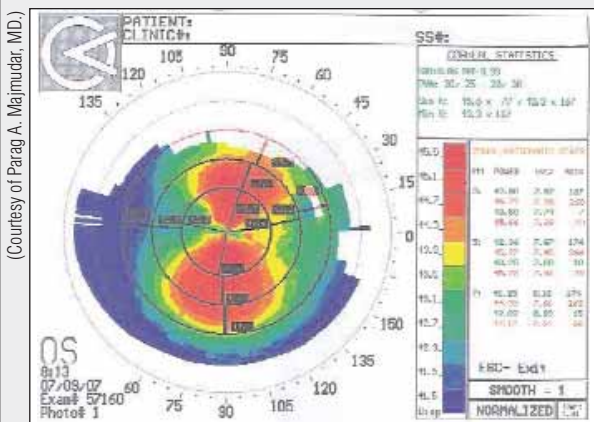


Figure 1. Preoperative corneal topography of the patient's left eye.

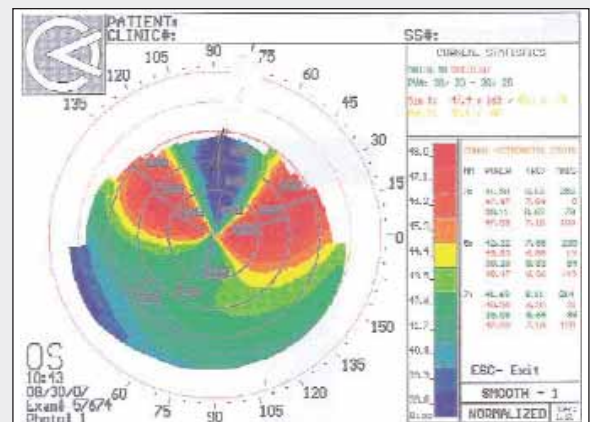


Figure 2. Corneal topography of the same eye 6 weeks after the implantation of a Verisyse phakic IOL.

(Courtesy of Parag A. Majmudar, MD.)

(Courtesy of Parag A. Majmudar, MD.)

ERIC D. DONNENFELD, MD

This is a classic case of a wound gape/dehiscence, and the topographic finding of flattening adjacent to the wound that is not evident 180° away is pathognomonic. Most important is not to weaken the cornea with additional relaxing incisions to correct the astigmatism, because doing so will create irregular astigmatism and an unstable refraction. When there is minimal reversal of the astigmatic axis, excimer laser ablation may help to resolve the residual refractive error. In this case, however, revision of the wound is definitely indicated. The key to success is to open the wound and carefully scrape away the epithelium that has grown into the incision prior to resuturing the wound with careful attention to apposition of its edges. Postoperatively, the patient should use minimal corticosteroids to promote healing of the wound, and the surgeon should delay removing the sutures for at least 2 months.

SAMUEL MASKET, MD

This case is illustrative of wound dehiscence, because there is a large degree of surgically induced against-the-wound astigmatic change. The patient exhibited roughly 2.00 D of with-the-rule cylinder prior to surgery but 8.00 D of against-the-rule cylinder 6 weeks after surgery, approximately a 10.00 D change. The topographic and refractive changes are pathognomonic for wound dehiscence.

The very thin tissue associated with highly myopic elongated eyes and the need for a large incision with the Verisyse lens may have caused the problem in this case. The complication might have been avoided, however, if the surgeon had used a frown-shaped sclerocorneal tunnel incision, as originally described by Singer.¹ I routinely use this method when implanting the Verisyse IOL and have not had any cases similar to this one. The approach creates a wide area of contact between the roof and floor of the incision, which produces stability and precludes dehiscence (Figure 3).

At this juncture, repairing the wound is mandatory. Findings at the time of surgery would dictate the course, but I would attempt to freshen the wound's margins and to close the defect with alternating sutures of 9-0 virgin silk and 10-0 polyester; the former tend to induce a fibrovascular

healing response, whereas the latter are biologically inert and can remain in place indefinitely. One must be careful not to tie the sutures too tightly in order to avoid "cheese-wiring" with eventually recurrent slippage of the wound. One may use a variety of surgical keratometers when attempting to control suture-induced cylinder.

(Courtesy of Samuel Masket, MD.)

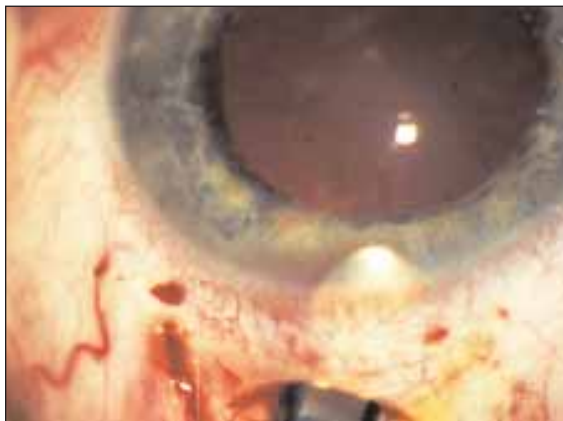


Figure 3. A frown-shaped sclerocorneal tunnel is fashioned with a steel blade and dissected anteriorly into clear cornea. Note the long tunnel, which provides for a stable incision after surgery.

ASIM PIRACHA, MD

In the FDA study, fewer than 2.5% of the 492 eyes implanted with the Verisyse IOL had greater than 2.00 D of surgically induced astigmatism. My results with the lens have been similar. The incision's length is typically 6.2 mm for the 6.0-mm optic and 5.2 mm for the 5.0-mm optic, and its location can be scleral, limbal, or corneal. I prefer a posterior limbal incision with three interrupted 10–0 nylon sutures to close the wound. I place the incision on the steep axis and use an opposite (180° degrees away) limbal relaxing incision if the eye has more than 1.50 D of preexisting refractive cylinder.

In this case, the preoperative refraction showed 2.50 D of cylinder at 85°, and the preoperative corneal cylinder measured 2.30 D at 77°. Topography showed a small amount of irregularity but no signs of ectasia. Six weeks postoperatively, the sutures are loose, and there has been a 10.50 D shift in cylinder from the preoperative measurements. Topography shows significant flattening at the site of the incision.

At this point, I would take the patient back to the OR and revise the wound by placing three to five interrupted 10–0 nylon sutures under keratoscopic guidance with the aim of slightly overcorrecting the astigmatism.

JASON E. STAHL, MD

Patients with extremely high myopia are often excellent candidates for phakic IOL surgery to eliminate or reduce their refractive error. In addition to -18.00 D of myopia, the patient in this case also had 2.00 D of preexisting with-the-rule astigmatism. The surgeon implanted a Verisyse IOL on the steep axis to reduce the patient's myopia and astigmatism. The nylon sutures loosened and were removed 6 weeks postoperatively, resulting in 8.00 D of against-the-rule astigmatism from wound dehiscence.

Highly myopic patients with long axial lengths have less corneoscleral rigidity, which, in this case, resulted in dehiscence of the 6.2-mm superior limbal incision with a severe overcorrection of the preoperative cylinder. Delaying the removal of the sutures for 6 months or more might have prevented the extreme overcorrection. In addition, a scleral tunnel incision is less likely to result in induced astigmatism.

Revision of the wound is required to correct the significant against-the-rule astigmatism. I would open the wound and scrape its edges to remove epithelium and stimulate healing. I would then close the incision with 10–0 Mersilene (polyester; Ethicon Inc., Somerville, NJ) sutures with a target of a small amount of with-the-rule astigmatism.

visit www.crstoday.com for the current issue and complete archives

THE CASE CONTINUED

The patient returns to the OR for revision of the wound. The surgeon reopens the initial 6-mm incision and places five interrupted 11-0 Mersilene sutures with significant tension at the 80° meridian. On the following day, the patient has a UCVA of 20/200 (Figure 4A). Eight days later, the patient's UCVA is 20/25, and his BCVA measures 20/25+2 with a manifest refraction of $-1.75 +1.75 \times 70$ (Figure 4B).

Three weeks after surgical revision, the patient's UCVA is 20/40, and his BCVA is 20/25 with a manifest refraction of $-1.50 +0.75 \times 161$ (Figure 5A). The patient's UCVA is 20/60, and his BCVA is 20/25 with a manifest refraction of $-2.00 +0.75 \times 180$ 2 months after the revision (Figure 5B).

How would you manage the case now?

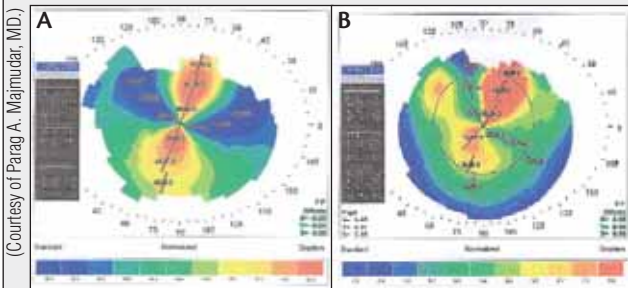


Figure 4. Corneal topography of the same eye after revision of the wound (A) and 8 days later (B).

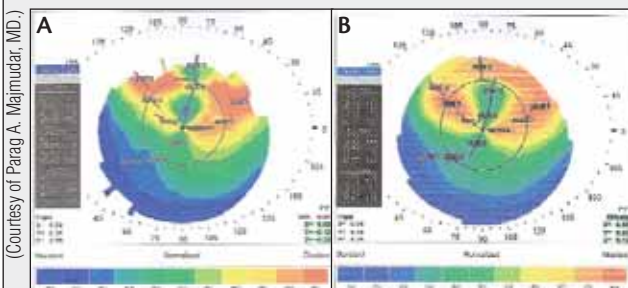


Figure 5. Corneal topography of the same eye 3 weeks (A) and 2 months (B) after revision of the wound.

ERIK L. MERTENS, MD, FEBOPHTH

When implanting a Verisyse IOL, the biggest challenge is always suturing the wound. In this case, closing the 6.2-mm limbal incision with three separate sutures induced with-the-rule astigmatism. I use a scleral incision with the Verisyse lens, because it minimizes induced astigmatism and the closure of the sclera is fairly straightforward.

Unluckily in this case, the sutures loosened, but the surgeon made the right decision to close the wound again with five interrupted sutures.

Postoperatively, the induced with-the-rule astigmatism slowly diminished until only 0.75 D remained 2 months after the wound's revision. Contact lenses or glasses would be an option for treating the residual ametropia, but they may not be the patient's preference. I would recommend against removing the sutures and would suggest surface ablation (PRK, LASEK or epi-LASIK). Although I have performed LASIK on eyes with Verisyse implants, I have always done so at least 3 months postoperatively and after the removal of all sutures. Because the sutures should remain in place in this case and the postoperative course has already been complicated, I do not think it advisable to place a suction ring on the eye. My preference would be PRK with the Amoils brush, because the ablation depth would be limited for this small myopic correction.

ERIC D. DONNENFELD, MD

Two months after the revision, the cylinder has changed from with- to against-the-rule cylinder without the removal of the sutures. This transition suggests that the sutures have loosened or "cheese-wired" or that the wound is melting. I would carefully inspect the incision. If its edges appeared well apposed and seemed to be healing normally, I would inform the patient that, to optimize his refractive result, my first step would be to remove the sutures so that the cornea could return to its normal architecture. In all probability, the eye's against-the-rule cylinder will increase, and the UCVA will worsen. I would follow the patient monthly until refractive stability was achieved (likely 3 months) and then treat the residual refractive error by performing either PRK or LASIK with the flap created by the IntraLase FS laser (Advanced Medical Optics, Inc.). Because the patient is 25 years old, I would aim for a +0.25 D final refraction.

SAMUEL MASKET, MD

The topographic and astigmatic results of the wound's revision demonstrate short-term success, as the findings at 3 weeks and 2 months following the reoperation are quite similar and clinically satisfactory, save for a moderate refractive error. Nevertheless, I deem it prudent to wait an additional 4 to 6 months before considering further surgery to reduce the residual optical error. Assuming long-term stability (minimum 6 months), I would recommend laser vision correction alone, perhaps topographically driven, because incisional procedures might have unpredictable results

in this case. At that time, the decision to perform surface ablation or to create a flap would be based on corneal thickness, the tear film's characteristics, and corneal epithelial integrity, among other factors.

ASIM PIRACHA, MD

The patient in this case underwent appropriate management in the OR, and he did well after the wound's revision. His refractive cylinder was reduced from 8.00 to 0.75 D. During the following 2 months, however, the patient's UCVA worsened from 20/25 to 20/60 OS, and a slight myopic shift occurred. The most recent topography demonstrates irregular astigmatism with central against-the-rule astigmatism and superior with-the-rule astigmatism.

At this point, I would conservatively remove any overly tight sutures (one to two) to reduce the irregular astigmatism, and I would encourage the patient to return to the clinic monthly for repeated refractions and topography until the wound completely stabilized. The best enhancement procedure would be laser vision correction; surface ablation would be the safest approach, but LASIK would also be an option. If the irregular astigmatism were reducing the patient's BCVA, I would perform a wavefront-guided treatment. Otherwise, I would proceed with a wavefront-optimized treatment (WaveLight, Inc., Sterling, VA).

JASON E. STAHL, MD

Revising the wound with new sutures corrected the induced astigmatism. Because the Mersilene sutures will likely last longer than the nylon originally used, the wound should heal more tightly, thus preventing wound dehiscence and significant cylindrical overcorrection. I would leave the Mersilene sutures in place as long as possible. Six months after revising the wound, when the refraction should be stable, I would discuss with the patient bioptics using laser vision correction (LASIK or PRK) to treat his remaining myopia and astigmatism. ■

Section editor Karl G. Stonecipher, MD, is Director of Refractive Surgery at TLC in Greensboro, North Carolina. Parag A. Majmudar, MD, is Associate Professor, Cornea Service, Rush University Medical Center, Chicago Cornea Consultants, Ltd. Stephen Coleman, MD, is Director of Coleman Vision in Albuquerque, New Mexico. They may be reached at (847) 882-5900; pamajmudar@chicagocornea.com.

Eric D. Donnerfeld, MD, is a partner in Ophthalmic Consultants of Long Island in Rockville Centre, New York, and he is a trustee of Dartmouth Medical School in Hanover, New Hampshire. He is a



consultant to Alcon Laboratories, Inc., Advanced Medical Optics, Inc., and Bausch & Lomb Dr. Donnenfeld may be reached at (516) 766-2519; eddoph@aol.com.

Samuel Masket, MD, is in private practice in Century City, California, and is Clinical Professor of Ophthalmology at the UCLA Geffen School of Medicine, Jules Stein Eye Institute, Los Angeles. Dr. Masket has received grant/research support from, is on the speakers' bureau of, and is a consultant to Alcon Laboratories, Inc. He is a consultant to Visiogen, Inc.; Power Vision, Inc.; and Othera Pharmaceuticals Inc. He is on the speakers' bureau of Allergan, Inc., and Bausch & Lomb. Dr. Masket may be reached at (310) 229-1220; avcmasket@aol.com.



Erik L. Mertens, MD, FEBOphth, is Medical Director of the Antwerp Eye Center in Belgium. He is a consultant to STAAR Surgical Company, Bausch & Lomb, and Moria, and he has received travel support from Alcon Laboratories, Inc. Dr. Mertens may be reached at e.mertens@zien.be.



Asim Piracha, MD, is Medical Director of the John-Kenyon American Eye Institute in Louisville, Kentucky, New Albany, Indiana, and Jeffersonville, Indiana. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Piracha may be reached at (800) 342-5393; asimp@mac.com.



Jason E. Stahl, MD, is in private practice at Durrie Vision in Overland Park, Kansas, and he is Assistant Clinical Professor for the Department of Ophthalmology at Kansas University Medical Center in Kansas City. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Stahl may be reached at (913) 491-3330; jstahl@durrievision.com.



1. Singer JA. Frown incision for minimizing induced astigmatism after small incision cataract surgery with rigid optic intraocular lens implantation. *J Cataract Refract Surg.* 1991;17(suppl):677-688.