

Late Traumatic Dislocation of the Flap

BY DAVID J. TANZER, MD; MARGUERITE B. McDONALD, MD; UDAY DEVGAN, MD;
AND STEVEN M. SILVERSTEIN, MD

CASE PRESENTATION

A 45-year-old male presents to your office following ocular trauma to his left eye. His past ocular history is significant for an uneventful bilateral LASIK procedure 3 months ago. His nondominant right eye was targeted for -0.50 D. His preoperative refractions were -3.50 +1.50 X 162 = 20/20 OD and -3.75 +1.75 X 23 = 20/20 OS. One month postoperatively, an examination revealed a UCVA of 20/15 OU with a manifest refraction of -0.25 D sphere OD and plano sphere OS.

Five days prior to presentation, the patient reported that he stuck himself in the eye with a copper wire. He noted mild discomfort following the trauma. He presents with lateral visual distortion in his left eye but no ocular discomfort. His UCVA is 20/20 OD and 20/15 OS. His manifest refraction is -0.50 D = 20/15 OD and -0.5 +0.5 X 63 = 20/15 OS. A slit-lamp examination reveals lateral striae in his left eye (Figure 1). There is minimal distortion to the computed topography (Figures 1 and 2). The patient requests treatment.

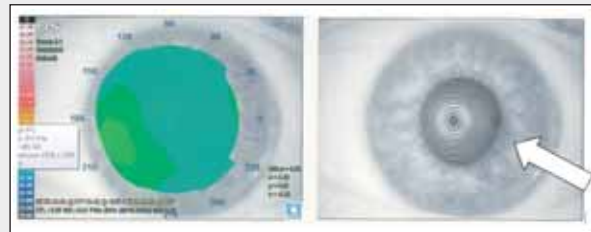


Figure 1. Topography with the Magellan Mapper (Nidek, Inc., Fremont, CA) shows minimal distortion, but striae are apparent on the lateral inferior half of the flap (arrow).

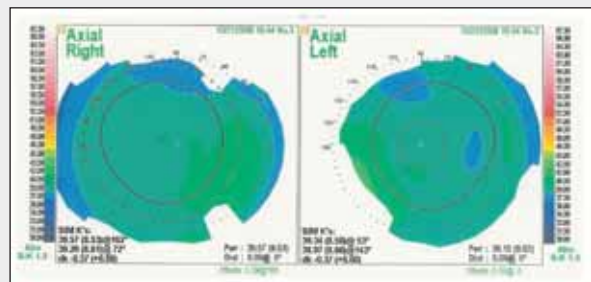


Figure 2. Topography with the Nidek OPD Scan (Nidek, Inc.) shows mild flattening at the site of the flap irregularities as seen by slit-lamp examination.

DAVID J. TANZER, MD

This patient requires a complete ophthalmic evaluation, including a dilated fundoscopic examination to ensure that the injury is limited to the cornea.

Fortunately, the UCVA in the patient's left eye remains at 20/15, although the injury appears to have affected his manifest refraction. This effect may be due to a slipped flap or simply epithelial disruption. Either the patient was looking slightly to the left, or there is a mild positive angle Kappa. Regardless, the temporal aspect of the topography appears to be normal and unaffected by the trauma. The Placido rings, however, are slightly disrupted inferotemporally.

The evaluation should include fluorescein staining of the cornea. A distinction needs to be made between macrostriae, microstriae, and simple epithelial disruption (ie, an abrasion). A grossly displaced flap with macrostriae will exhibit an enlarged gutter peripheral to the area of trauma and requires urgent intervention. Microstriae will present with "negative" staining over the striae as the areas where the flap has been disrupted rise above the fluorescein pool. This phenomenon is best seen in retroillumination. Microstriae or epithelial disruption, especially in the setting of excellent UCVA, should probably be monitored for improvement over time.

If intervention is eventually required due to a compro-

mised quality of vision, the patient should be counseled as to the risks of epithelial ingrowth, infection, diffuse lamellar keratitis (DLK), and delayed visual recovery.

My technique for refloating the flap in this setting would include first debriding the epithelium over the area of microstriae and then lifting the entire flap. Next, I would refloat the flap using 50% hypotonic saline solution to slightly swell the tissue and unlock the striae. I would then reposition the flap. Finally, I would cover the cornea with a high-Dk soft bandage contact lens (I prefer the Acuvue Oasys [Johnson & Johnson Vision Care, Inc., Jacksonville, FL]). This patient will need a short course of frequent topical steroids as prophylaxis against DLK, a known complication of epithelial disruption over a LASIK flap. He should use topical antibiotics as well until the bandage lens is removed.

Flaps created with a femtosecond laser that have more vertically oriented (and now reverse-bevel) side cuts are clearly less prone to displacement and are favored by refractive surgeons who perform LASIK in the US military.

MARGUERITE B. McDONALD, MD

I would fix the striae, because they bother the patient (lateral visual distortion). I would lift the flap, scrape for the epithelium that has no doubt crept in (checking the inferior surface of the flap as well as the bed), and replace the flap on the bed. Then, I would administer a few drops of sterile water for 5 seconds on top of a centrally created epithelial defect that is large enough to encompass the area of striae without extending to the very edge of the flap. The sterile water should “shock” the striae out of the flap. I would also briefly rinse the flap interface with sterile water. I would aspirate the water very quickly (an aspirating speculum is useful in this situation) so as to save the limbal epithelial cells and the rest of the epithelium from unnecessary exposure. The rationale for using sterile water in this fashion was described by Glyce and Russell.¹

Next, I would use Weck-Cel sponges (Medtronic ENT, Jacksonville, FL) and a flap iron such as the Pineda model (AE-2844; ASICO LLC, Westmont, IL) to stroke away the striae as much as possible. I would then reposition and secure the flap with fairly tight 10-0 nylon sutures. Lastly, I would place a bandage contact lens on the eye.

Besides the usual postoperative medications, I would have the patient use a topical steroid every hour while awake for 3 days to prevent DLK before tapering the dosage. I would warn him that his vision will be very poor until at least 1 week after the sutures come out (which will occur in 1 to 3 weeks).

In my experience, this aggressive approach works well. In spite of the best informed consent, patients do not really understand what we are doing when we take them back to the OR, but they understand when the surgery has failed

and recognize that the doctor must try again. I try to avoid this outcome at all costs.

UDAY DEVGAN, MD

This patient had a beautiful result from his original LASIK procedure but then suffered corneal trauma a few months later. Although his vision is good right now, further sequelae such as epithelial ingrowth or keratitis could develop from this injury, which could lead to a decrease in visual acuity.

The patient already has clinically evident issues from the injury, including flap striae and corneal flattening at the meridian of the trauma. Treatment would include lifting the flap, carefully scraping the bed and underside of the flap to remove any epithelial cells, irrigating the interface, and then repositioning the flap. As with any relifting of the flap, care must be taken to avoid epithelial tags in close proximity to the flap's edge, because they can lead to epithelial ingrowth. Placing a bandage contact lens after the procedure will aid with initial epithelial healing during the first 24 hours.

Because the patient's epithelium has healed, he has no discomfort. Since the visual axis was not directly affected, his vision remains good. The patient could choose to wait and see if his vision worsens prior to opting for the surgical intervention of repositioning the flap. An ounce of prevention is worth a pound of treatment, however, and I would recommend to the patient that his flap be repositioned sooner rather than later.

STEVEN M. SILVERSTEIN, MD

At first glance, I am tempted to observe, not intervene. This case, however, is a classic example of benefiting from experience and recognizing the subjective and objective risks that arise when no action is taken. It is important in such circumstances not to be guided by the patient's excellent visual acuity, because it is visual distortion 5 days after the traumatic injury that has brought him to the office for an evaluation. Topography confirms the slit-lamp findings, which correlate with the patient's subjective symptoms.

I recommend refloating and suturing the flap, having the patient wear a bandage contact lens for 1 day, and removing the sutures in 1 week. The sutures and the bandage lens will lessen the likelihood of epithelial ingrowth under the flap. The sutures themselves will iron out and stabilize the striae as well as quickly eliminate the resultant aberrations responsible for his perceived distortion.

The patient must be informed that his vision will be notably worse (typically 20/80 to 20/200) due to the tight sutures but that he will experience an immediate improvement in his vision once the sutures are removed. Whether the dislocation (mild or severe) of a flap occurs early or late in the postoperative period, I find that the procedure just described always reduces or eliminates the patient's symp-

toms. Moreover, if the sutures are removed early (1 week), they should have little or no impact on the (stable) refraction. Another important point is that I have seen half a dozen patients over the years who, as in this case, have minimally traumatized their flap (even 3 years after LASIK) and developed DLK as a result. Sometimes, it was the symptoms caused by the DLK that precipitated their emergent clinical visit, rather than a change in their vision. I find that refloating and suturing a dislocated flap as soon as possible dramatically reduces the incidence of traumatically induced DLK. ■

Section editor Karl G. Stonecipher, MD, is the director of Refractive Surgery at TLC in Greensboro, North Carolina. Parag A. Majmudar, MD, is an associate professor, Cornea Service, Rush University Medical Center, Chicago Cornea Consultants, Ltd. Stephen Coleman, MD, is the director of Coleman Vision in Albuquerque, New Mexico. They may be reached at (336) 288-8523; stonenc@aol.com.

Uday Devgan, MD, is a partner in the Maloney Vision Institute in Los Angeles, chief of ophthalmology at the Olive View UCLA Medical Center, and an associate clinical professor at the UCLA School of Medicine. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Devgan may be reached at (310) 208-3937; devgan@ucla.edu.



Marguerite B. McDonald, MD, is a cornea/refractive specialist with the Ophthalmic Consultants of Long Island in New York, a clinical professor of ophthalmology at the NYU School of Medicine in New York, and an adjunct clinical professor of ophthalmology at the Tulane University Health Sciences Center in New Orleans. She acknowledged no financial interest in the products or companies mentioned herein. Dr. McDonald may be reached at (516) 593-7709; margueritemcdmd@aol.com.



Steven M. Silverstein, MD, is the president of Silverstein Eye Centers in Kansas City, Missouri, and he is an assistant clinical professor of ophthalmology at the University of Missouri School of Medicine and the University Health Sciences, both in Kansas City. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Silverstein may be reached at (816) 358-3600; ssilverstein@silversteineyecenters.com.



David J. Tanzer, MD, is a captain in the US Navy Medical Corps, and he is the director of the US Navy Refractive Surgery Program. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Tanzer may be reached at (619) 532-6702; david.tanzer@med.navy.mil.



1. Klyce SD, Russell SR: Numerical solution of coupled transport equations applied to corneal hydration dynamics. *J Physiol.* 1979;292:107-134.