Refractive

Long-Term Flap Striae Post-LASIK

BY SHAWN KLEIN, MD, AND PARAG A. MAJMUDAR, MD

A 30-year-old white male underwent LASIK by another surgeon in July 1998 with a VISX STAR laser (VISX, Inc., Santa Clara, CA) and a Moria LSK microkeratome (Moria, Antony, France) to correct moderate myopia: -5.50 D sphere OD, -6.00 D sphere OS, and a BCVA of 20/20 OU. His preoperative corneal thicknesses were 548 and 555 µm OD and OS, respectively. The initial LASIK surgery resulted in an overcorrection of both eyes and a central island in his left eye.

In June 1999, the patient's refraction measured +1.25 OD and +1.25 +0.50 X 80 OS, yielding 20/25 BCVA OU. He underwent a LASIK enhancement in his left eye that involved recutting the flap. Postoperatively, the patient complained of visual distortion and polyopia. He had a UCVA of 20/80 and a BCVA of 20/30. Upon slit lamp examination, striae were evident throughout the visual axis. One month after the enhancement procedure, the surgeon lifted and stretched the flap of the patient’s left eye. Three days later, he had to relift and restretch the flap to address recalcitrant striae. The surgeon also employed a hypotonic solution to induce flap swelling. These efforts were unsuccessful.

After 4 months, the surgeon relifted and floated the flap of the patient's left eye. This procedure was partially successful; it reduced the number of images the patient was seeing from five to two. A rigid gas permeable contact lens trial was attempted, but the patient became contact lens intolerant. He then tried soft contact lenses, but they did not alleviate the monocular diplopia. In August 2001, 3 years after his initial procedure, the patient presented to us with the chief complaint of polyopia in his left eye.

HOW WOULD YOU PROCEED?
1. Would you relift and stretch the flap?
2. Perform epithelial debridement?
3. Recommend phototherapeutic keratectomy (PTK)?
4. Relift and suture the flap?
5. Perform either lamellar or penetrating keratoplasty?

SURGICAL COURSE
Because the flap striae had been present for more than 2 years, we felt that simple flap elevation followed by mechanical stretching would not be successful, especially when such a technique had failed earlier. Although epithelial debridement theoretically eliminates the anchor to which striae are bound, in our limited experience, this technique does not completely resolve striae, and it also increases the patient’s risk of diffuse lamellar keratitis. PTK has recently been suggested as a treatment for long-term striae, but it was not a recognized option at the time of this case. In addition, the final refractive error is somewhat uncertain, because PTK can induce a hyperopic shift and irregular astigmatism. Although very successful, lamellar and penetrating keratoplasties were certainly a last resort, because they are fairly invasive.

A flap lift followed by suturing is a relatively noninvasive
technique that may be performed in an office setting with topical anesthesia. Mark Speaker, MD, PhD, and Tal Raviv, MD, both of New York, initially described this procedure for late striae. We employed the technique in order to alleviate this patient's striae.

Upon slit lamp examination, we identified the edge of the deeper flap, which was affected by the striae. We then used a Sinskey hook to disengage the flap edge for 3 clock hours. The patient was then moved to the operating microscope where we lifted the flap by using smooth forceps to tear the epithelium in a controlled manner over the flap edge, similar in effect to a continuous curvilinear capsulorhexis. We identified the gutter and recessed the epithelium at the flap edge toward the limbus. Next, we irrigated the interface and mechanically stretched the flap with two Merocel sponges (Medtronic Ophthalmics, Jacksonville, FL). We then marked the cornea with an eight-incision RK marker (Figure 1).

Next, we placed seven interrupted 10–0 nylon radial sutures, such that each suture passed through the full thickness of the flap and a corresponding depth through the peripheral cornea (Figures 2 through 4). We placed no suture at the hinge. We carefully rotated the knot into the peripheral cornea so that the suture's subsequent removal would not disrupt the flap. For comfort, the patient used an extended-wear therapeutic bandage contact lens for 3 days. He used an antibiotic and steroid for 1 week postoperatively.

**OUTCOME**

After 1 week, the patient reported improvement in his monocular diplopia. No striae were evident upon slit lamp examination (Figure 5).

The timing of suture removal depends on the length of time that striae have been present. In our experience, for striae of less than 1 month's duration, the sutures should remain in place for 1 to 2 weeks. For longer-term striae, as in this case, sutures should stay in place for up to 6 weeks. Certainly, sutures should be removed earlier than planned if they become loose. We removed this patient's sutures after 6 weeks and observed a clear interface without striae upon slit lamp examination. The patient's UCVA of 20/40 improved to a BCVA of 20/20 with -0.50 D sphere. Over the subsequent 2 years of follow-up, the patient has reported stable visual acuity and no monocular diplopia.

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