Recalcitrant Epithelial Ingrowth in Patients With Compromised Eyelid Function

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ABSTRACT

PURPOSE: To report recalcitrant unilateral epithelial ingrowth in two patients with ipsilateral weak eyelid closure.

METHODS: Two patients with weak eyelid closure who underwent simultaneous, uncomplicated LASIK developed unilateral epithelial ingrowth.

RESULTS: Eight months postoperatively, one patient presented with right-sided epithelial ingrowth. One month after removal, more extensive epithelial ingrowth was noted and removed, and the flap gutters were sealed with fibrin adhesive. Epithelial ingrowth recurred 1 week later. The epithelial ingrowth was removed and the flap was secured with concurrent placement of radial 10-0 nylon sutures. No further epithelial ingrowth recurred. In the second patient, epithelial ingrowth was noted in the left eye 4 months postoperatively. Eight months later, the ingrowth was removed with subsequent recurrence in 2 weeks.

CONCLUSIONS: Weak eyelid closure may be a predisposing factor to poor flap adhesion and epithelial ingrowth. Close attention to lid function may be of importance in deciding between LASIK and photorefractive keratectomy, particularly in patients with other risk factors for epithelial ingrowth. [*J Refract Surg.* 2008;24:544-546.]

Epithelial ingrowth is a relatively common complication following LASIK, with an incidence ranging from zero to 20%.[1] Discussion regarding the pathogenesis of this condition continues in the literature. We present two cases of recurrent epithelial ingrowth in patients with weak eyelid closure of different etiologies.

CASE REPORTS

CASE 1

A 51-year-old man presented for refractive surgery consultation with a remote history of right-sided Ramsay Hunt syndrome and Bell's palsy. On examination, mild asymmetry in orbicularlis tone, weaker on the right side, was noted. The patient underwent uneventful bilateral hyperopic LASIK surgery with excimer laser settings of +1.58 +0.75 × 175° in the right eye for distance vision and +3.81 +0.50 × 175° in the left eye for near vision. No evidence of poor flap adherence or prominent gutter was noted in the early postoperative period.

Eight months postoperatively, the patient complained of mild decreased distance vision in the right eye. On examination, a small area of epithelial ingrowth at the 9-o'clock meridian was noted. Tear break-up time was normal, and corneal fluorescein staining revealed no punctate epitheliopathy. The patient opted to have an enhancement on the right eye to improve distance vision with simultaneous removal of epithelial ingrowth from the stromal bed and undersurface of the flap with a Merocel sponge (Medtronic, Jacksonville, Fla).

One month later, the patient reported ghost images in the right eye. Slit-lamp examination and Orbscan (Bausch & Lomb, Salt Lake City, Utah) showed more extensive epithelial ingrowth at the location of the original ingrowth and at the superior hinge/flap junction. The flap was again lifted, and the epithelial ingrowth was removed. Tisseel fibrin adhesive (Baxter Healthcare Corp, Deerfield, Ill) was applied circumferentially to the flap gutter to seal the interface as described previously.[2]

One week later, recurrent epithelial ingrowth was noted at the 9-o'clock position. Orbscan demonstrated further increase in elevation (Fig 1). The flap was lifted, epithelial ingrowth was removed, and radial 10-0 nylon sutures were placed circumferentially across the

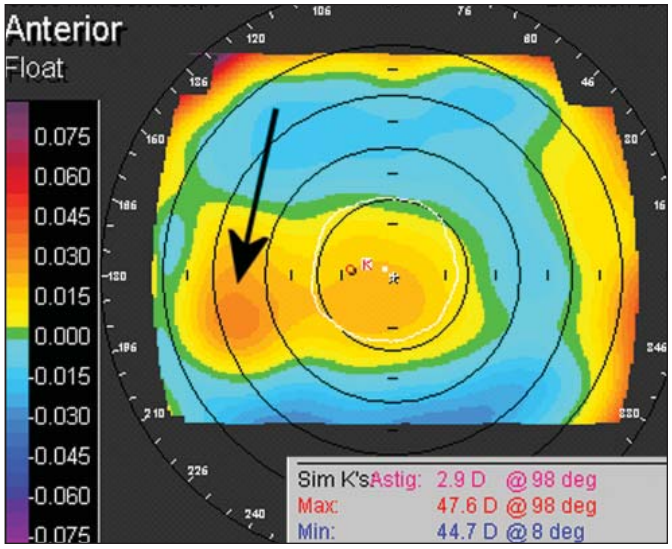

Figure 1. *Case 1.* Elevation map (Orbscan) of the right eye demonstrates an area of elevation (black arrow) and increased astigmatism corresponding to the area of epithelial ingrowth.

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The authors have no proprietary interest in the materials presented herein.

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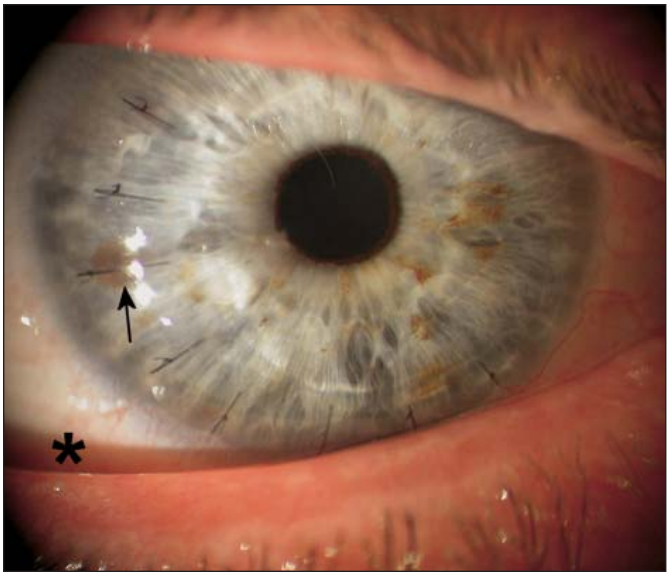

Figure 2. *Case 1.* Interrupted 10-0 nylon sutures (arrow) were used to secure the flap to the stromal bed. Note the poor apposition of the inferior lid margin to the globe (asterisk).

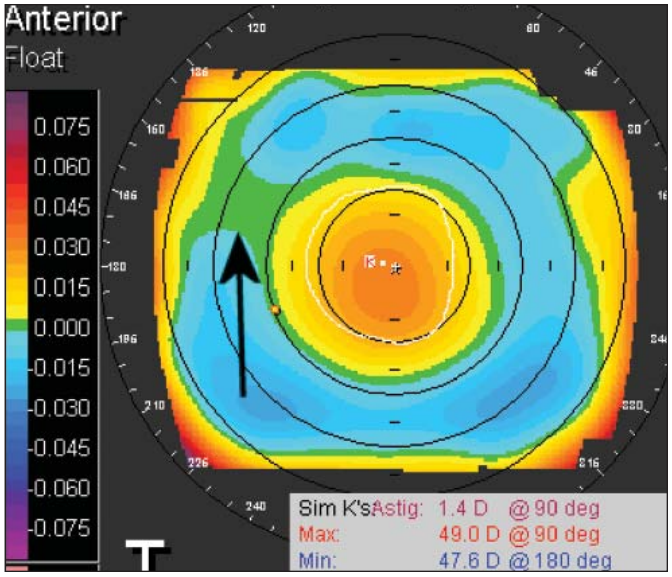

Figure 3. *Case 1.* Elevation map (Orbscan) of the right eye shows decreased elevation (black arrow) and reduced astigmatism after suture removal.

flap gutter (Fig 2). Seven weeks later, the sutures were removed with no signs of epithelial ingrowth on examination or Orbscan (Fig 3). The patient had uncorrected visual acuity (UCVA) of 20/30. Of interest, the left eye, which underwent a significantly higher hyperopic correction, remained free of epithelial ingrowth.

CASE 2

A 38-year-old woman with a history of left orbital floor fracture and plate fixation 3 years prior presented for refractive surgery consultation. Results of examination were normal except for slightly weaker eyelid closure on the left. The patient underwent uncomplicated bilateral LASIK with laser settings of $-4.53\ -0.27 \times 40°$ in the right eye and $-4.33\ -0.88 \times 120°$ in the left eye. No evidence of poor flap adherence or prominent gutter was noted in the early postoperative period.

Four months later, the patient presented with uncorrected visual acuity of $20/25^{-2}$ in the right eye and 20/25 in the left eye. Spherical equivalent refraction was $-1.00\ +0.75 \times 75°$ in the right eye and $-0.75\ +0.75 \times 80°$ in the left eye. A 2.5×0.5-mm foci of epithelial ingrowth was noted at the inferior aspect of the nasal flap hinge in the left eye. Fluorescein staining revealed no punctuate epitheliopathy, and tear breakup time was normal. The patient was asymptomatic and happy with her vision.

One year later, the patient complained of a foreign-body sensation, and examination revealed the epithelial ingrowth had increased in size. The flap was lifted, and the epithelial ingrowth was removed from the stromal bed and undersurface of the flap. Two weeks later, the epithelial ingrowth had recurred at the same location, measuring 3×1 mm. The patient remained asymptomatic, and the epithelial ingrowth was stable at 3-month follow-up with UCVA of $20/25^{-3}$ and refractive error of plano $+1.00 \times 98°$. Because there was no evidence of progression or flap melting, the epithelial ingrowth was not removed. The right eye, having undergone a nearly identical excimer laser treatment, remained free of epithelial ingrowth.

DISCUSSION

Epithelial ingrowth is a relatively common complication following LASIK. Risk factors for epithelial ingrowth include poor flap adhesion, flap misalignment, epithelial tags at bed margins on enhancement, spillover of laser ablation onto bed margins, hyperopic ablations, and flap buttonhole.[1,3] Although many of these risk factors are preventable by recognition and meticulous attention from the surgeon, knowledge of an eye's risk of poor flap adhesion may not be available a priori. The use of a bandage contact lens following epithelial ingrowth removal remains controversial in terms of its efficacy in reducing recurrence. Bandage contact lenses were not used after retreatment in either of our cases, as supported by a recent study.[4]

These cases suggest one factor predisposing to poor flap adherence and subsequent epithelial ingrowth may be weak eyelid closure. Flap adherence following repositioning is believed to occur quickly as the result of endothelial cell pump function. However, we hypothesize closure of the potential space for epithelial cells to enter under the flap may require continued

massage from orbicularis mediated lid closure for some time in the postoperative period. Indeed, these cases present recalcitrant, recurrent epithelial ingrowth occurring on the side with weaker eyelid closure, one from weak orbicularis tone associated with previous Bell's palsy and the other from previous floor fracture and orbital surgery.

The right eye in case 1 had the additional risk factor of an enhancement surgery. There are several studies suggesting the rate of epithelial ingrowth is higher after flap lifting enhancement surgery.[5,6] However, a study of 3786 eyes found the incidence of epithelial ingrowth was not statistically different between primary and enhancement LASIK.[7] Furthermore, the epithelial ingrowth in case 1 initially was noted prior to enhancement. The literature also suggests higher hyperopic corrections are a risk factor for epithelial ingrowth due to a larger exposed gutter from flap-stromal bed mismatch.[8] In case 1, however, primary epithelial ingrowth occurred in the eye with the much lower hyperopic correction, whereas no epithelial ingrowth was noted in the contralateral eye that had a higher hyperopic correction. This finding seems to implicate another mechanism for ingrowth besides flap-bed mismatch.

These cases of recurrent epithelial ingrowth suggest compromised eyelid closure may be a predisposing factor to poor flap adhesion and subsequent epithelial ingrowth, presumably by allowing an epithelial fistula to develop in the immediate postoperative period from insufficient closure of the potential space between the flap and the bed. Close attention to lid function may be of importance in deciding between LASIK and photorefractive keratectomy, particularly in patients with other risk factors for epithelial ingrowth.

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