

Epithelial Ingrowth After LASIK Flap Dehiscence During Vitreoretinal Surgery

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ABSTRACT

The proportion of patients who have undergone laser-assisted in situ keratomileusis (LASIK) surgery among patients admitted to Ophthalmology clinics is increasing day by day. LASIK surgery was applied to the case presented in this study 5 years ago. Later, vitreoretinal surgery was planned due to traumatic retinal detachment and edema of the corneal epithelium was observed during this surgery. During removal of the corneal epithelium, flap dehiscence developed in our patient. After dehiscence, the flap was repositioned without any complications, and this surgery was completed without complications. In the control examinations, while the cornea was transparent, epithelial ingrowth under the flap was detected in the fifth month after this operation. Although the flap was removed and mechanical debridement of epithelial cells was performed, recurrence was observed two weeks later. The lesion site did not threaten the visual axis and did not cause irregular astigmatism. Therefore, no additional surgical intervention was planned, and the area of ingrowth did not spread at one-year follow-up. In conclusion, vitreoretinal surgeons should not forget to question the history of previous refractive surgery and should consider complications such as flap dehiscence and epithelial ingrowth.

Keywords: Epithelial ingrowth, Flap, LASIK, Vitreoretinal surgery.

INTRODUCTION

The number of patients undergoing myopic refractive surgery has been increasing in recent years. Laser-assisted in situ keratomileusis (LASIK) surgery is still one of the most preferred surgical methods for myopia treatment in the world. Today, we encounter patients who have undergone refractive surgery more frequently among patients who apply to Ophthalmology clinics. Most LASIK flaps never heal completely. These patients are at lifetime risk for traumatic dehiscence during surgery.¹ It has been reported that LASIK flap dehiscence can be seen during the vitreoretinal surgery.² When the flap is repositioned, the possible complications of trauma to a LASIK flap are similar to those that can occur during or after the procedure: infection, macro- and microstria, and epithelial ingrowth.³ Epithelial ingrowth is a rare but serious complication. We present a case of epithelial ingrowth after the late LASIK flap dehiscence during vitreoretinal surgery.

CASE REPORT

A 46-year-old male, who had history of bilateral LASIK

surgery five years ago, was admitted to our clinic with decreased vision in his left eye. Best corrected visual acuity was 20/20 in right eye and 20/400 in the left eye. There were clear corneal flaps and slightly prominent corneal flap borders in both eyes. A superotemporal tear and retinal detachment were observed in the left eye. During the vitreoretinal surgery, edematous corneal epithelium was gently debrided to ensure optimal visualization of the fundus. Meanwhile, it was observed that the corneal flap was dehiscence from the cornea. The flap was replaced without any complications, and surgery was completed without further problem. Silicone oil was used as tamponade. A bandage contact lens was wore at the end of the surgery, topical steroids and antibiotics were used for one month. The cornea was clear at control visits but epithelial ingrowth was observed under the flap by slit-lamp five months after surgery. In addition, irregular astigmatism was observed at corneal topography (Figure 1). We planned to remove silicone oil and perform mechanical debridment of the epithelial ingrowth. After five days, in surgery, the flap was detached with a Sinsky

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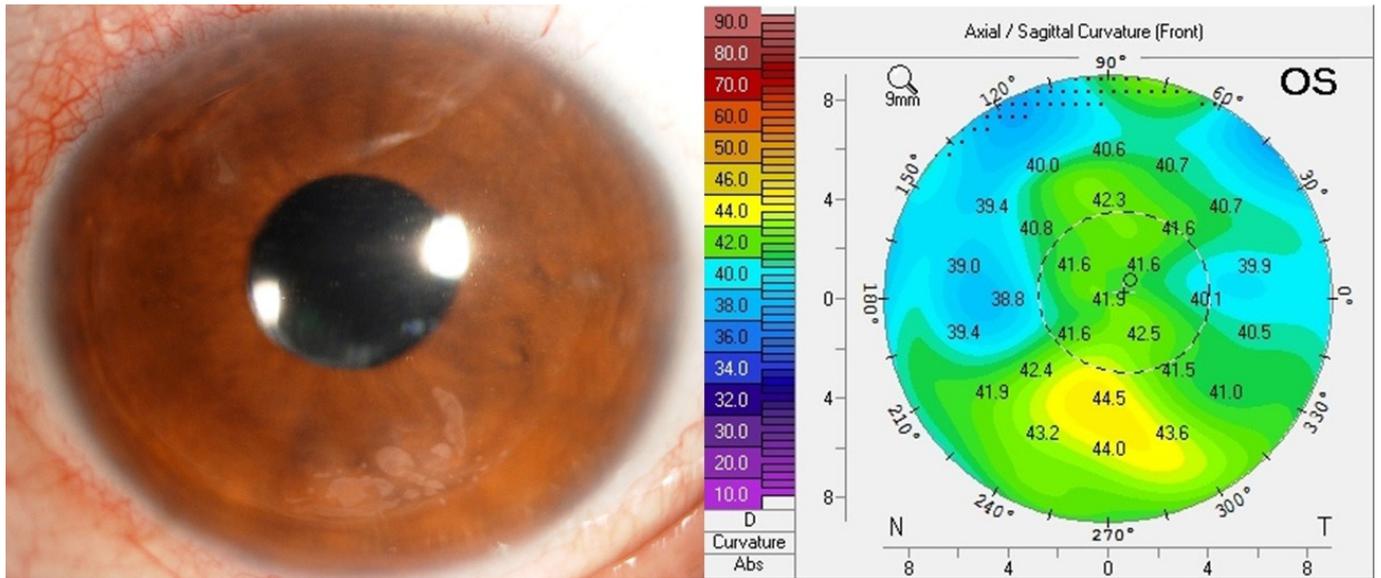


Figure 1: Anterior segment photography and topographic irregular astigmatism of the epithelial ingrowth before mechanical debridement of epithelial cells.

hook totally, mechanical debridement of epithelial cells was performed with a spatula on both the corneal stroma and the underside of the flap. The flap was carefully repositioned using profuse irrigation with cold balanced salt solution, the loose epithelium covering ingrowth area was scraped. After gentle smoothing with a moistened sponge, the flap was found to be in appropriate position and no sutures were used. A bandage contact lens was placed to ensure flap adherence and promote epithelial healing without ingrowth into the interface. Postoperatively, topical prednisolone acetate and moxifloxacin drops were instilled at five times a day. Preservative-free artificial tears were used hourly. The flap was clear, well positioned and the entire cornea was clear with no recurrence of the epithelial ingrowth at control visits. But a recurrence was observed

two weeks later. However, ingrowth was not threatening the visual axis and didn't induce irregular astigmatism (Figure 2). BCVA was 20/50 in the left eye. Therefore, no additional surgery was performed, and epithelial ingrowth had not spread at one year follow-up.

DISCUSSION

The time required to consider a corneal flap stable after LASIK is still not clear.⁴ Studies on rabbits indicate that lamellar wound healing occurs only at the flap edge, leaving the central optical zone clear.⁵ Similar results have been reported in human eyes, where the corneal stromal bed surface and undersurface of the corneal flap were found to be free from cellular response or collagenase activity.⁶ This has been the proposed mechanism for the transparency of

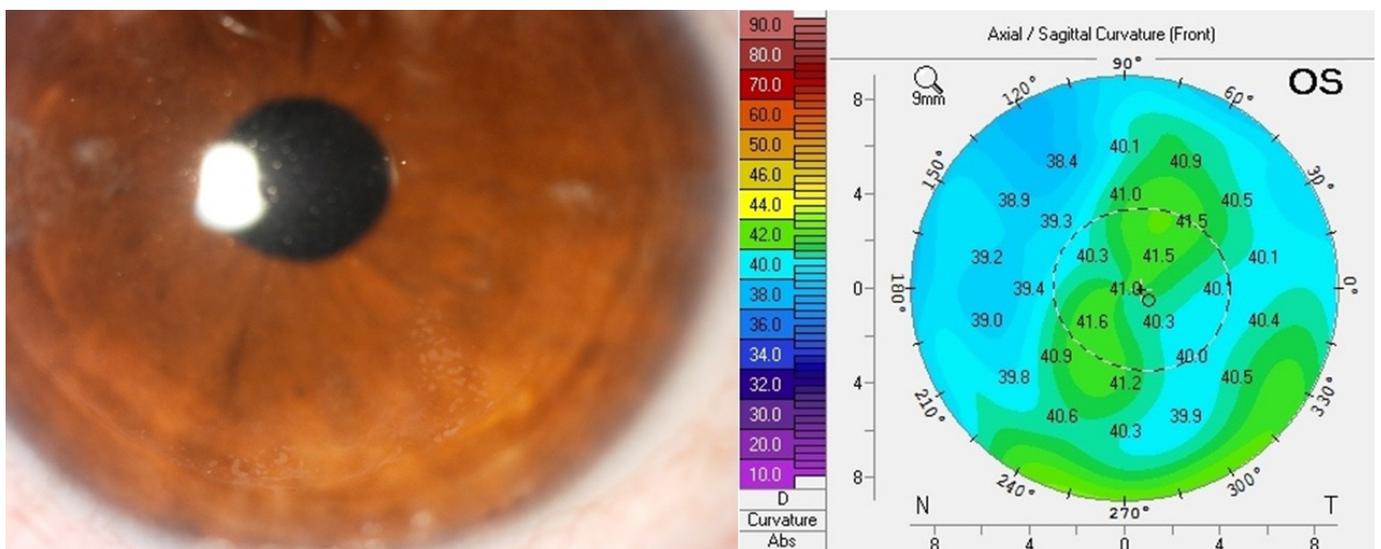


Figure 2: Anterior segment photography and topography imaging after epithelial debridement.

the treated cornea, as well as for permanently weakening the cornea after LASIK.⁷ This pattern of wound healing allows easy flap removing, which predisposes the cornea to flap displacement.

The longest period reported between LASIK surgery, traumatic flap dehiscence and epithelial ingrowth is 14 years after LASIK surgery.⁸ The occurrence of flap displacement 14 years after refractive surgery suggests that the corneal flap may be susceptible to dislocation indefinitely after LASIK. There have been reports of LASIK flap complications (dehisced flaps, resulting in striae, epithelial ingrowth) during vitreoretinal surgery.^{2,9,10}

Epithelial ingrowth is defined as a growth and migration of corneal or conjunctival epithelial cells to an interface after corneal lamellar surgery such as LASIK. There are two types of epithelial ingrowth.¹¹ First; grey or white small spots or lines at the periphery within 2.0 mm of the peripheral edge of the flap. Second, elevated white or gray colonies, sheets, cysts, pearl-like islands or elevated strands, with delineated borders or without them, adopting a more diffuse form which is more aggressive. Epithelial ingrowth usually occurs within the interface outside the visual axis and does not progress. The slit lamp photograph can help to monitoring the progress. Anterior segment optical coherence tomography and Scheimpflug imaging are helpful in determining and monitoring the extent of epithelial growth. However, in a small group of patients, ingrowth can threaten the visual axis and decrease vision due to scarring, irregular astigmatism, and even flap necrosis.¹²

YAG laser has been suggested by Alio as a relatively new technique in the treatment of epithelial ingrowth. It's a very easy technique that can be performed by all ophthalmologists who are not familiar with LASIK flap manipulations.¹³

Mechanical removal of epithelial ingrowth is actually a very challenging, risky and difficult treatment which can get worse with inappropriate surgical approach in inexperienced hands.¹⁴ The hinge position of the LASIK flap must be known if epithelial scraping had been needed in all ocular surgeries. The technical debridement must be performed at the opposite direction of the hinge in order to prevent unnecessary flap complications that can be avoided easily. Alcohol-assisted epithelial debridement is another technique that will decrease the risk of flap complications and dehiscence in ocular surgeries. Because of the high recurrence rates reported after surgical debridement, these patients require close follow-up after treatment.

Adjunctive treatments such as ethanol, mitomycin, phototherapeutic keratectomy can also be applied. Among these treatments, ethanol application is the most easily

available. It would be better if we used ethanol in this case. The use of subconjunctival triamcinolone may offer additional and simple treatment for post-LASIK epithelial ingrowth, especially in recurrent cases.¹² There are cases that fibrin tissue glue or nylon sutures were used to fix the flap, in the literature. Although suturing the flap edge can increase flap adhesion, it can raise astigmatism and create flap striae.¹² Bandage contact lens application after debridement has been widely reported.⁸

Although these adjunctive treatments can increase the effectiveness of surgical debridement, they may cause new complications or recurrence. If epithelial cells spread to the anterior segment structures in a sheet-like fashion, the prognosis is worse and surgical treatment is more difficult. In this case, mechanical cleaning was performed to correct irregular astigmatism caused by epithelial ingrowth, but relapse was observed after a short time. Despite the recurrence, the patient had good vision and had no irregular astigmatism. So we did no additional treatment. By increasing prevalence of LASIK surgery, vitreoretinal surgeons will encounter flaps more frequently. Unfortunately most patients forget to inform us about previous laser interventions and LASIK flaps can easily be overlooked in slit-lamp examinations in a case with retinal detachment.

In conclusion, this patient did not give us information about his previous LASIK procedure before vitreoretinal surgery. Vitreoretinal surgeons should consider the previous refractive surgery history and be careful of LASIK complications such as flap dehiscence, epithelial ingrowth. We needed epithelial debridement during vitreoretinal surgery and did it. We reposition the flap but epithelial ingrowth was occurred. We treated ingrowth with cold BSS irrigation and mechanical removal of epithelium but it has relapsed. Corneal epithelial debridement should be avoided as much as possible. If necessary, debridement should be done carefully starting from the center of the cornea.

REFERENCES

1. Randleman JB, Hewitt SM, Song CD. Corneal and conjunctival changes after posterior segment surgery. *Ophthalmol Clin North Am* 2004;17:513-20.
2. Kuo IC, O'Brien TP, Haller JA, et al. Complications of sequential keratorefractive and vitreoretinal surgery. *J Cataract Refract Surg* 2006;32:2146-8.
3. Estopinal CB, Mian SI. LASIK flap: postoperative complications. *Int Ophthalmol Clin* 2016;56:67-81.
4. Vesaluoma M, Pérez-Santonja J, Petroll WM, et al. Corneal stromal changes induced by myopic LASIK. *Invest Ophthalmol Vis Sci* 2000;41:369-76.

5. Perez-Santonja JJ, Linna TU, Tervo KM, et al. Corneal wound healing after laser in situ keratomileusis in rabbits. *J Refract Surg.* 1998;14:602–9.
6. Rumelt S, Cohen I, Skandarani P, et al. Ultrastructure of the lamellar wound after laser in situ keratomileusis in human eye. *J Cataract Refract Surg.* 2001;27:1323–7.
7. Pereira Cda R, Narvaez J, King JA, et al. Late-onset traumatic dislocation with central tissue loss of laser in situ keratomileusis flap. *Cornea.* 2006 Oct;25:1107-10.
8. Holt DG, Sikder S, Mifflin MD. Surgical management of traumatic LASIK flap dislocation with macrostriae and epithelial ingrowth 14 years postoperatively. *J Cataract Refract Surg* 2012;38:357-61.
9. Sakurai E, Okuda M, Nozaki M, et al. Late-onset laser in situ keratomileusis (LASIK) flap dehiscence during retinal detachment surgery. *Am J Ophthalmol* 2002;134:265-6.
10. Tosi GM, Tilanus MA, Eggink C, et al. Flap displacement during vitrectomy 24 months after laser in situ keratomileusis. *Retina* 2005;25:1101-3.
11. Tamayo G, Castell C, Vargas P. Epithelial ingrowth. In: Alio J, Azar D eds. *Management of complications in refractive surgery.* Springer:2018:117-22.
12. Rapuano CJ. Management of epithelial ingrowth after laser in situ keratomileusis on a tertiary care cornea service. *Cornea* 2010;29:307-13.
13. Alió Del Barrio JL, Hanna R, Canto-Cerdan M, et al. Laser flap enhancement 5 to 9 years and 10 or more years after laser in situ keratomileusis: Safety and efficacy. *J Cataract Refract Surg.* 2019 Oct;45:1463-9.
14. Walker MB, Wilson SE. Incidence and prevention of epithelial growth within the interface after laser in situ keratomileusis. *Cornea* 2000;19:170-3.