

Sir,
Bilateral corneal scarring after LASIK and PRK in a patient with propensity to keloid scar formation

Clinically significant corneal haze is an infrequent complication of refractive laser surgery with an incidence of 1.44% reported in both PRK and LASIK.¹ We report a case of a patient who developed bilateral clinically significant corneal haze due to subepithelial scarring after both PRK and LASIK for the correction of myopia. This patient also had a propensity to keloid scar formation.

Case report

A 33-year-old Caucasian man was referred by his GP with blurred vision and photophobia in both eyes 6 months after having PRK in the right eye and 5 months after having LASIK in the left eye performed by different surgeons. Both operations were performed 1 month apart and both were uneventful, no epithelial problems were reported. Bilateral ocular trauma has been ruled out from the history.

On examination best-corrected visual acuity was 6/9 in both eyes and refraction was OD $-2.00/+0.50 \times 90$ OS $-1.00/+2.00 \times 135$ (preoperatively OD -4.00 D OS -3.50 D). Anterior segment examination revealed bilateral blepharitis and anterior stromal corneal scarring in both eyes (Figure 1). Intraocular pressures and fundal examination were unremarkable. He was noted to be susceptible to keloid scarring, as demonstrated by a scar on his shoulder (Figure 2).

A course of topical steroids gave some visual improvement but this was only temporary. He was given steroid for about 10 weeks in the form of Prednisolone 0.5% drops four times daily for the first 6 weeks and then twice daily for 4 weeks. The patient was offered further surgical intervention but he did not wish to risk any further loss of visual acuity. At his last examination, 13 months post-PRK and 12 months post-LASIK, his best-corrected visual acuity remained 6/9 in both eyes.

Comment

Corneal haze is a late complication of excimer corneal surgery that usually takes the form of a fine reticular subepithelial pattern that can sometimes interfere with vision. Corneal clarity is graded on a scale of 0 to 4+. The haze corresponds to a corneal healing response after PRK or LASIK induced by activation and migration of keratocytes (fibroblasts) and newly synthesized collagen. The haze is usually first noted between 2 and 4 months

postoperatively and gradually fades away by 6–12 months. Severe haze rarely occurs. There are some factors that may be related to increased haze: depth of ablation, laser beam homogeneity, epithelial removal method, corneal dryness during treatment, keratitis sicca, and solar exposure.¹

After LASIK the corneal epithelial cells may lose their characteristic morphological features and eventually degrade in the metabolically 'unusual' environment of the flap interface. Concurrently, a capsule of connective tissue similar to scar tissue forms, separating them from healthy cornea.² A cytokine-mediated interaction between the epithelium and stroma has been suggested as the cause of keratocyte cell migration and scar formation.³ Histologically all hazy corneas show increased numbers of anterior stromal wound healing keratocytes with increased reflectivity of both nuclei and cell bodies.⁴

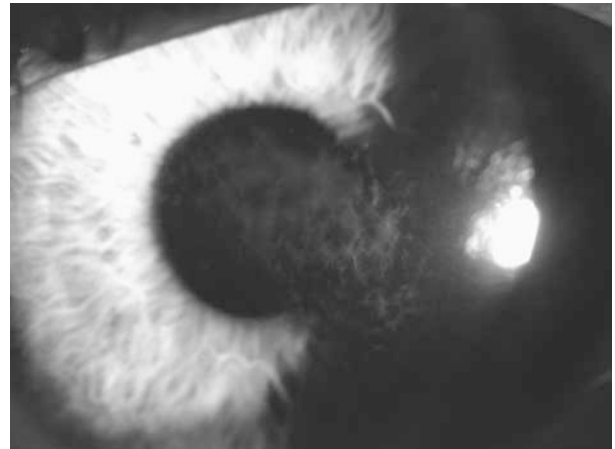


Figure 1 Persistent central corneal subepithelial scarring in the left eye of this subject after LASIK surgery. The right eye had a similar appearance following PRK.



Figure 2 Keloid scarring on the left shoulder of this subject.

A keloid is an overgrowth of dense fibrous tissue that usually develops after healing of a skin injury. The accurate incidence of keloids is largely unknown, but does affect 4–16% of the black population and it is 15 times more common in Blacks population compared to Caucasians. The tissue extends beyond the borders of the original wound, usually does not regress spontaneously, and tends to recur after excision. Though the underlying pathogenic mechanisms are not fully understood, a recent study has shown that there is under expression of apoptosis-related genes in human keloid tissue and decreased apoptotic activity in fibroblasts derived from keloids.⁵ However, this over-exuberant healing process may be similar in susceptible individuals during corneal healing after refractive surgery.

Corneal wound healing is a complex process involving epithelial, keratocyte, and endothelial interactions that are affected by their associations with wound bed matrix and by cytokine availability and activation.⁶

Keloid scar formation may be an indicator for subepithelial scarring after refractive laser surgery and patients should therefore be questioned about it in their preoperative assessment. This has caused concern in the past but there has been no previous evidence to support it. Stimuli that could promote an abnormal wound response in predisposed individuals better to be avoided and a longer period of postoperative steroid drops might be considered.⁷

This case is unusual because similar corneal subepithelial scarring developed in both eyes following different surgical procedures; PRK to the right eye and LASIK to the left eye. This suggests that there could be a systemic cause for this complication, in this case perhaps a propensity to keloid scar formation.

The link between corneal haze after refractive surgeries and the propensity for keloid formation in Caucasians needs to be further investigated by a randomised controlled study.

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Sir, Entrapment of inferior rectus muscle as a complication of sinus balloon expansion for maxillary sinus fracture

Blunt facial or orbital trauma may cause fracture of the orbital or sinus walls. The most common type of orbital fracture is blow out fracture in which the inferior rectus muscle or orbital soft tissues attached to the muscle are entrapped within the orbital floor fracture.¹ In cases of blow out fracture, treatment usually consists of exploring the orbital floor and releasing the entrapped tissue. For additional fractures, different approaches exist that include sinus expansion for compressed sinus fractures.² This technique has been applied also to blow out fractures. Muscle entrapment is a potential complication of sinus expansion by balloon catheterization, although it