

The shape of a clue

Case Description

We recently examined a 25-year-old woman with complaints of poor visual acuity, glare, and starburst in her left eye (LE). She had previously undergone a microkeratome laser-in-situ keratomileusis (LASIK) procedure 2 months ago for a refractive error of -8.00 Ds/-1.25 Dc × 140 in the right eye (RE) and -8.00 Ds/-1.00 Dc × 30 in the LE. Her unaided distance visual acuity (UDVA) was 20/20 in the RE and 20/125 improving to 20/80 with -1.50 Dc × 170 in the LE. On slit-lamp biomicroscopy, the LASIK flaps in both eyes were well apposed, but she had an anterior to mid-stromal macular corneal scar in the LE located nasally near the margin of the flap hinge [Fig. 1a]. The flap hinge was nasal and appeared to be close to the visual axis [Fig. 1b]. The rest of the anterior segment and posterior segment findings in both the eyes were unremarkable.

What do you think happened?

- Central toxic keratopathy
- Diffuse lamellar keratitis
- LASIK flap hinge ablation
- Interface fluid syndrome.

Findings

Aberrometry showed an increase in the total as well as individual corneal higher-order aberrations in the LE [Fig. 1c]. Anterior segment optical coherence tomography (AS-OCT) of the LE revealed a distorted and discontinuous Bowman's membrane in the area of the scarring with dense hyper-reflectivity in the flap at the nasal margin of the hinge suggestive of a scar. The scar was located anterior to the interface and appeared most prominent on the undersurface of the flap. Besides, the shape of the scar seemed to provide a clue regarding its origin with a straight distal edge and a convex central curved edge [Fig. 1d]. These findings were suggestive of an inadvertent ablation of the flap hinge during laser delivery since the flap hinge seemed to be present within the optic zone. Her distance vision improved to 20/20 with a rigid gas permeable (RGP) contact lens, she was prescribed topical loteprednol etabonate 1% eye drops. When seen next in the clinic 3 months later, her UDVA had improved to 20/25.

Diagnosis: LASIK flap hinge ablation.

Correct Answer: C.

Discussion

A LASIK flap hinge that is close to the optic zone can result from an incomplete LASIK flap or a premature stop on the microkeratome. Before proceeding with the ablation after the flap lift, it is essential to ensure adequate exposure of the stromal bed and be aware of the ablation pattern to be delivered. Adequate exposure is especially crucial when the ablation includes a cylindrical error, where the ablation is beyond the typical circular optic zone. In such cases, it would be essential to protect the undersurface of the flap with a surgical sponge to avoid ablation of the flap stroma, which could lead to hinge ablation and tear. Eyes with high myopic astigmatism, where the undersurface of the flap was protected during the laser ablation have been reported to have better visual outcomes than eyes without such protection.^[1] Ablation of the undersurface of the flap is also known to reduce the best-corrected visual acuity by making the corneal surface irregular and inducing higher-order aberrations.^[2] Visual symptoms can be alleviated by an RGP contact lens, while a topo-guided photorefractive keratectomy (PRK) or a transepithelial phototherapeutic keratectomy (PTK) can be offered to these patients later when the epithelial and stromal remodeling is complete.^[3,4] The characteristic D-shaped scar seen at the hinge in a patient following LASIK is a clue to what might have transpired during the surgical procedure [Fig. 2].

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

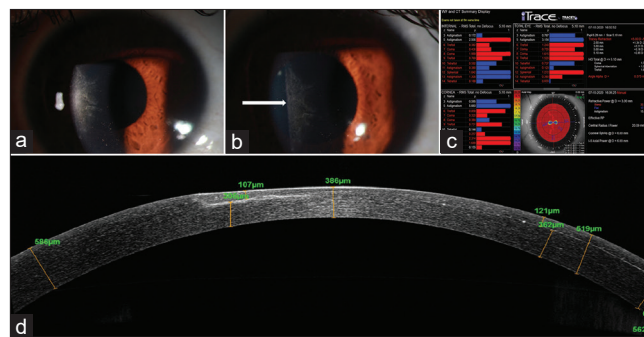


Figure 1: The diffuse slit-lamp image (a and b) showing a macular grade scar in the left eye towards the nasal edge of the flap. The LASIK flap hinge is visible along the visual axis of the patient (white arrowhead in Fig. 1b). The aberrometry showing an increase in the higher-order ocular aberrations (c). The anterior segment optical coherence tomography (AS-OCT) showing an increase in the hyper-reflectivity at the nasal edge of the LASIK flap correlating with the location of the scar (d)

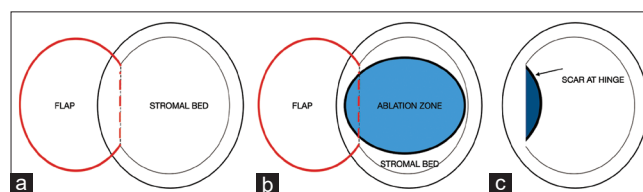


Figure 2: Schematic diagram representing the sequence of events leading to ablation and scarring of a nasal flap hinge. (a) Inadequate stromal bed exposure after the creation of a nasal flap. (b) Ablation zone overlapping outside the exposed stromal bed leading to ablation of the underside of the flap. (c) Resulting shape and location of the scar at the hinge of the flap

Financial support and sponsorship

Hyderabad Eye Research Foundation and Hyderabad Eye Institute, Hyderabad, India.

Conflicts of interest

There are no conflicts of interest.

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Access this article online	
Quick Response Code:	Website: www.ijjo.in
	DOI: 10.4103/0301-4738.301285

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Cite this article as: Singh VM, Vaddavalli PK. The shape of a clue. *Indian J Ophthalmol* 2020;68:2662.