CASE REPORT ASIAN JOURNAL OF MEDICAL SCIENCES

# SANDS of SAHARA: Post-laser *in situ* keratomileusis late-onset diffuse lamellar keratitis following sports injury

**Rajender Singh Chauhan[1], Nidhi Sharma[2]**

*[1]Senior Professor and Head, [2]Senior Resident, Regional Institute of Ophthalmology, Pt B.D. Sharma PGIMS, Rohtak, Haryana, India*

Submission: 25-12-2024 Revision: 16-01-2025 Publication: 01-02-2025

## ABSTRACT

A 27-year-old male presented with decreased vision and pain in his left eye after a boxing injury, 1 year post-LASIK. Examination showed a partially dislocated LASIK flap, leading to diffuse lamellar keratitis (DLK). Surgical realignment and treatment with topical steroids restored his visual acuity to 20/20 within 3 weeks. This case emphasizes the need for prompt intervention and long-term post-operative care for managing late-onset DLK following high-velocity blunt ocular trauma.

**Key words:** Lasik; Flap dislocation; Diffuse lamellar keratitis; Sports injury

**Access this article online**

**Website:** https://ajmsjournal.info/index.php/AJMS/index

**DOI:** 10.71152/ajms.v16i2.4379

**E-ISSN:** 2091-0576

**P-ISSN:** 2467-9100



## INTRODUCTION

The "Sands of Sahara" syndrome, also known as diffuse lamellar keratitis (DLK), is a rare, non-infectious inflammatory complication following laser *in situ* keratomileusis (LASIK) surgery. Its etiological factors remain largely unidentified, and it typically emerges during the early post-operative phase.[1] While some research has documented the occurrence of late-onset DLK after LASIK, these instances are often attributed to specific causes, such as trauma or epithelial defects.[2-4] Notably, epithelial defects in the LASIK flap are significantly correlated with DLK, elevating its incidence from 2% to 56%.[5,6] We present a case of DLK precipitated by traumatic partial flap dislocation 1 year post-LASIK.

## CASE PRESENTATION

A 27-year-old male presented to the emergency department with a sudden decrease in vision and acute pain in his left eye, following trauma while boxing 1 h back. He had undergone uneventful bilateral myopic LASIK surgery a year prior and was not on any topical or systemic medications. Examination revealed an uncorrected visual acuity of 20/20 in the right eye and 20/200 in the left eye. Slit-lamp examination of the left eye showed diffuse conjunctival congestion and a partial dislocation of the temporal aspect of the nasally hinged flap (Figure 1), while the right eye remained unaffected. The temporal one-third of the stromal bed was exposed, with folding of the temporal portion of the flap under the central, non-displaced portion. Under an operating microscope,

**Address for Correspondence:**
Dr. Nidhi Sharma, Senior Resident, Regional Institute of Ophthalmology, Pt B.D. Sharma PGIMS, Rohtak - 124001, Haryana, India.
**Mobile:** +91-9467830718. **E-mail:** nsharma1996.11@gmail.com

the infolded temporal flap segment was carefully separated from the stromal bed using a cannula. Sterile sponges were employed to realign the temporal flap and eliminate any adherent epithelial cells from the undersurface of the flap and stromal bed. The flap was repositioned on the stromal surface using the cannula, followed by extensive irrigation using a balanced salt solution beneath it. A bandage contact lens was applied, and a regimen of prednisolone acetate 1% and moxifloxacin 0.5% was initiated 4 times daily. By the first post-operative day, the left eye's visual acuity improved to 20/40, and while the flap edges were well-aligned, a typical "Sands of Sahara" diffuse dot-like granular haze became apparent at the interface (Figure 2). Consequently, the frequency of topical steroid application was increased to hourly. By day four post-surgery, the lamellar cellular infiltration showed signs of resolution, and notable visual acuity recovery in the patient's left eye, achieving 20/20. Prednisolone acetate was gradually tapered and moxifloxacin was discontinued. After 3 weeks, the patient regained uncorrected 20/20 visual acuity and prednisolone was discontinued.

## DISCUSSION

LASIK flap dislocations occur in approximately 1–2% of cases, often within 24 h post-surgery, typically due to eye rubbing.[7] In contrast, late flap dislocations, occurring more than a week post-surgery, are less prevalent and often linked to high-velocity blunt traumas or minor ocular injuries.[8] DLK affects roughly 0.2–1.8% of LASIK patients, usually manifesting within the first post-operative week, and presents as granular whitish deposits beneath the flap, earning the "Sands of Sahara" nomenclature.[7,9] Triggers for DLK include infections, endotoxins, eyelid secretions, talc from gloves, and sponge debris.[1] The majority of late-onset DLK cases, reported between 1 and 12 months post-operatively, were associated with traumatic or spontaneous epithelial defects. Some research suggests that epithelial injuries can alter corneal metabolism and oxygenation, facilitate inflammatory mediator diffusion from the tear film, or modify limbal vasculature permeability to inflammatory cells.[10,11] Reports of late-onset flap dislocations and lamellar inflammation suggest inadequate adhesion between the flap and stromal bed weeks or months post-LASIK. Prompt and aggressive DLK treatment with topical steroids usually yields favorable visual outcomes with minimal sequelae.[2] Investigations into wound healing after LASIK, using immunohistochemical methods to detect wound-healing glycoproteins, tenascin, and cellular fibronectin, have shown that stromal remodeling occurs mainly at the flap edge.[12] Hence, appropriately positioned shearing forces may cause partial flap dislocation months post-surgery if strong enough to exceed the flap edge's lamellar cohesive forces.

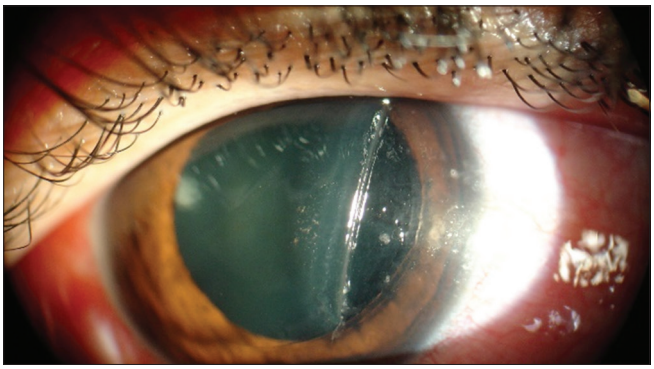

**Figure 1:** Dislocated LASIK flap in left eye

**Figure 2:** "Sands of Sahara" post-flap repositioning

## CONCLUSION

This case highlights the potential for recreational activities to introduce such forces, underscoring the need for caution regarding traumatic flap dislocations due to high-velocity blunt ocular trauma or particular shearing injuries. It is crucial to inform LASIK candidates about this risk and emphasize long-term post-operative follow-up as these late complications can be resolved adequately if diagnosed in a timely fashion.

## REFERENCES


1. Linebarger EJ, Hardten DR and Lindstrom RL. Diffuse lamellar keratitis: Diagnosis and management. J Cataract Refract Surg. 2000;26(7):1072-1077.
   https://doi.org/10.1016/S0886-3350(00)00468-5
2. Jin GJ, Lyle WA and Merkley KH. Late-onset idiopathic diffuse lamellar keratitis after laser *in situ* keratomileusis. J Cataract Refract Surg. 2005;31(2):435-437.
   https://doi.org/10.1016/j.jcrs.2004.05.054
3. Kymionis GD, Diakonis VF, Bouzoukis DI, Lampropoulou I and Pallikaris AI. Idiopathic recurrence of diffuse lamellar keratitis after LASIK. J Refract Surg. 2007;23:720-721.
   https://doi.org/10.3928/1081-597X-20070901-12
4. Randleman JB and Shah RD. LASIK Interface complications: Etiology, management, and outcomes. J Refract Surg. 2012;28(8):575-586.

https://doi.org/10.3928/1081597X-20120722-01

5. Shah MN, Misra M, Wilhelmus KR and Koch DD. Diffuse lamellar keratitis associated with epithelial defects after laser *in situ* keratomileusis. J Cataract Refract Surg. 2000;26(9):1312-1318.
   https://doi.org/10.1016/S0886-3350(00)00570-8
6. Mulhern MG, Naor J and Rootman DS. The role of epithelial defects in intralamellar inflammation after laser *in situ* keratomileusis. Can J Ophthalmol. 2002;37(7):409-415.
   https://doi.org/10.1016/S0008-4182(02)80044-8
7. Lin RT and Maloney RK. Flap complications associated with lamellar refractive surgery. Am J Ophthalmol. 1999; 127(2):129-136.
   https://doi.org/10.1016/S0002-9394(98)00320-1
8. Iskander NG, Peters NT, Anderson Penno E and Gimbel HV. Late traumatic flap dislocation after laser *in situ* keratomileusis. J Cataract Refract Surg. 2001;27(7):1111-1114.
   https://doi.org/10.1016/S0886-3350(01)00752-0
9. Smith RJ and Maloney RK. Diffuse lamellar keratitis. A new syndrome in lamellar refractive surgery. Ophthalmology. 1998;105(9):1721-1726.
   https://doi.org/10.1016/S0161-6420(98)99044-3
10. Haw WW and Manche EE. Late onset diffuse lamellar keratitis associated with an epithelial defect in six eyes. J Refract Surg. 2000;16(6):744-748.
    https://doi.org/10.3928/1081-597X-20001101-11
11. Weisenthal RW. Diffuse lamellar keratitis induced by trauma 6 months after laser *in situ* keratomileusis. J Refract Surg. 2000;16(6):749-751.
    https://doi.org/10.3928/1081-597X-20001101-12
12. Pérez-Santonja JJ, Linna TU, Tervo KM, Sakla HF, Alió y Sanz JL and Tervo TM. Corneal wound healing after laser *in situ* keratomileusis in rabbits. J Refract Surg. 1998;14(6):602-609.
    https://doi.org/10.3928/1081-597X-19981101-06

**Authors' Contributions:**
**RSC**- Concept and design, review of manuscript and treating ophthalmologist; **NS**- Manuscript preparation and revision of manuscript.

**Work attributed to:**
Regional Institute of Ophthalmology, Pt B.D. Sharma PGIMS, Rohtak - 124001, Haryana, India.

**Orcid ID:**
Dr. Rajender Singh Chauhan - https://orcid.org/0000-0003-3882-8965
Dr. Nidhi Sharma - https://orcid.org/0009-0006-8816-0798

**Source of Support:** Nil, **Conflicts of Interest:** None declared.