

## Epithelial ingrowth following small incision lenticule extraction

Sanjana Srivatsa, Shana Sood<sup>1</sup>

A 27-year-old female patient came for a routine postoperative check-up, with a history of bilateral ReLEx small incision lenticule extraction (SMILE) surgery done 1.5 years back. On examination, epithelial ingrowth was noticed in the left eye at 8–9 o'clock position. Topography showed excess flattening in the area of ingrowth. Anterior Segment OCT showed hyper-reflectivity and was measured to be at a depth of 120 microns from the corneal surface. As the ingrowth appeared non-progressive, with no involvement of the pupillary axis and no visual complaints, no active intervention was done. Nonetheless, treatment options available include mechanical scraping and Nd:YAG laser procedure.

**Key words:** Epithelial ingrowth, manual scraping, Nd:YAG laser, small incision lenticule extraction

Small incision lenticule extraction (SMILE) is one of the most advanced refractive procedure performed worldwide for the correction of myopia and myopic astigmatism. Epithelial ingrowth is a rare postoperative complication encountered in SMILE. It occurs due to the migration of surface epithelial cells through the small incision into the interface, between the cap and the stromal bed. We report a case of an epithelial ingrowth following an uneventful SMILE surgery performed 1.5 years back.

### Case Report

A 27-year-old female patient came for a routine postoperative check-up. Patient had undergone bilateral SMILE surgery for the correction of myopia (-6.00D sphere) 1.5 years back. Surgery was uneventful and patient had uncorrected binocular visual acuity of 20/20. Patient was lost to follow up for more than a year, after which she visited the hospital for routine check-up. On examination it was found that the right eye was normal, while the left eye showed greyish white confluent haze at 8–9 o'clock position in the mid periphery of the anterior stroma

at the margin of the cap cut, suggestive of an epithelial ingrowth which remained stationary even on the subsequent follow up 6 months later [Fig. 1]. The uncorrected visual acuity was 20/20 and 20/30 in the right eye and left eye respectively. The refraction in the left eye showed +0.50 sphere/-3.75 cylinder @180°. There was no further improvement in the visual acuity with refractive correction or with pinhole. Patient did not experience any visual disturbances such as glare/halos/sensitivity to light.

Topography of the right eye showed post myopic ablation pattern with a good central flattening. Left eye showed central flattening along with a localized area of excess flattening corresponding to the site of epithelial ingrowth. ASOCT showed hyper-reflectivity, which was measured to be at a depth of 120 microns from the corneal surface, suggestive of an epithelial ingrowth at the level of interface. As the ingrowth was limited only to the mid-periphery, with no involvement of the visual axis and visual acuity being fairly maintained, no active intervention was done [Figs. 2 and 3].

### Discussion

Small Incision Lenticule Extraction is an alternative to Laser *in situ* keratomileusis (LASIK) for the correction of myopia and myopic astigmatism.<sup>[1]</sup> Epithelial ingrowth is a known complication post LASIK, with an incidence of



**Figure 1:** Epithelial ingrowth post SMILE

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**Cite this article as:** Srivatsa S, Sood S. Epithelial ingrowth following small incision lenticule extraction. Indian J Ophthalmol 2020;68:3062-4.

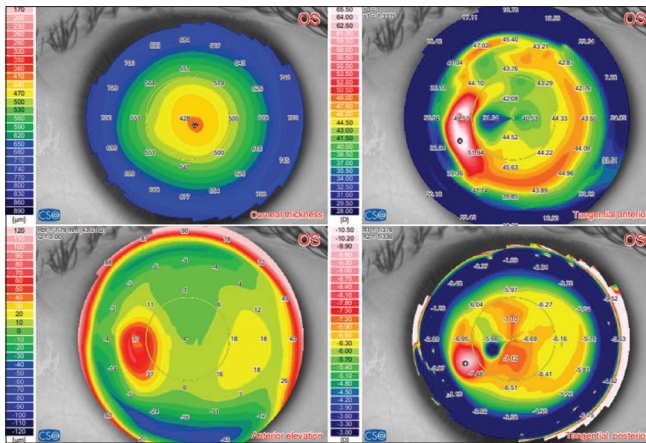
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<b>Quick Response Code:</b>	<b>Website:</b> www.ijo.in
	<b>DOI:</b> 10.4103/ijo.IJO_941_20

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Received: 17-Jul-2020  
Accepted: 24-Oct-2020

Revision: 06-Oct-2020  
Published: 23-Nov-2020

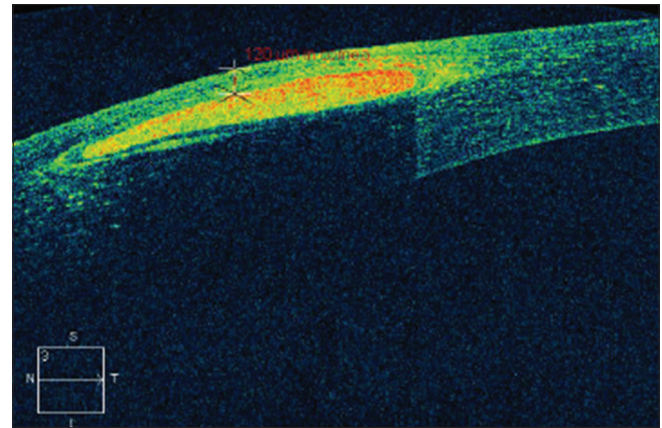


**Figure 2:** Topography of the left eye showing excess flattening in the area of epithelial ingrowth

0.2-12% after primary cases, and only 3% having clinically significant manifestations. Presentation can occur between 15 days-108 months.<sup>[2]</sup> The risk factors for post LASIK epithelial ingrowth (PLEI) include intraoperative epithelial defects, epithelial basement membrane dystrophy, recurrent corneal erosions, flap dislocation, re-treatments, type 1 diabetes mellitus and excess intraoperative manipulation.<sup>[3]</sup> Though not very common, few cases of post SMILE epithelial ingrowth have also been reported earlier.<sup>[4,5]</sup>

Although SMILE is a flapless procedure and differs from LASIK in terms of a smaller size of the incision, similar risk factors can cause epithelial ingrowth in SMILE as well. It occurs due to the migration of epithelial cells through the incision or seeding of cells into the interface at the time of lenticular dissection, more so when there is excess intraoperative manipulation. Not all epithelial ingrowths require intervention. Those which are thin with well-defined margins, located within 2 mm of the cap margin, and not involving the visual axis does not require any treatment. Thicker progressive ingrowth with surrounding stromal changes and those encroaching the pupillary axis requires immediate treatment to prevent loss of best-corrected visual acuity.<sup>[2]</sup>

The treatment options available are manual scraping and Neodymium:Yttrium Aluminum-Garnet (Nd:YAG) laser application.<sup>[6,7]</sup> Manual removal firstly involves creation of a flap. A special programme on Visumax called the CIRCLE software allows converting the SMILE cap into a flap (corresponding to the depth at which the cap was created previously).<sup>[8]</sup> Flap is lifted carefully and the epithelial cells from underneath the flap and the stromal bed are scraped gently.<sup>[4]</sup> Manual scraping with flap creation involves a high rate of recurrence of up to 36%.<sup>[9]</sup> However, the rate of recurrence can be reduced by fibrin glue application to the flap margin.<sup>[3]</sup> Nd:YAG laser has proven to be an easy and effective treatment for epithelial ingrowth. The laser induces a cavitation within the interlamellar space which leads to collateral tissue damage in the area of epithelial nests thus destroying them. It takes about one or more sessions to eliminate the ingrowth completely. The intensity of laser energy used depends on the size of the ingrowth and ranges between 0.3 and 0.6 mJ.<sup>[6]</sup> In re-calcitrant cases, hydrogel ocular sealant application after the flap lift and epithelial scraping reduces the rate of recurrence.<sup>[5]</sup>



**Figure 3:** ASOCT image showing hyper-reflectivity at a depth of 120 microns, suggestive of epithelial ingrowth at the interface

## Conclusion

With an increase in the number of SMILE surgeries performed all over the world, ophthalmologists should be aware of the stage at which intervention is required and regarding the treatment options available to ensure good visual outcomes. However, the risk of ingrowth can be reduced by minimizing the intraoperative manipulation, preventing epithelial defects and avoiding introduction of epithelial cells into the interface during lenticule dissection. In spite of an uneventful surgery if the ingrowth occurs, manual scraping/Nd:YAG laser treatment seems to be effective.

## 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.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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