**CARE Checklist**

**General Considerations:** I ensure that all patient data has been de-identified and the study has been approved by the ethics committee of Daping Hospital.Our author team formal declaration there was no any potential competing interests and the content of the manuscript has not been published, or submitted for publication elsewhere.

**Title**:A Case Report Of Remained Lenticules After SMILE.Remained lenticules is one of the rare complications of SMILE. It happens occasionally, let us focus on the learning curve of surgery.

**Abstract:**  A 28-year-old female patient (right eye: -3.75DS, left eye: -4.00DS) underwent bilateral small incision lenticule extraction. One week after small incision lenticule extraction, her left eye uncorrected distance visual acuity (UDVA) did not reach her preoperative best corrected distance visual acu­ity (BCDVA) as expected. Examination confirmed that corneal stromal lens fragments remained in the left eye. The lens fragments were removed with a second surgery, and the patient's vision was restored to her preoperative BCDVA. The results of this case yield the following suggestions: ① The lens separation method must be gentle and performed in the same plane. ② It is necessary to confirm the integrity of the lens after the lens is removed.

**Key words:** small incision lenticule extraction; remained lenticules; case report

**Introduction:** Small incision lenticule extraction (SMILE) is a myopic astigmatism correction surgery characterized as minimally invasive, flap-free, safe, effective and highly predictable. SMILE, as an innovative femtosecond laser surgery, has low tissue inflammation and apoptosis rates and produces better biomechanical stability of the cornea after surgery.

**Presenting Concerns :** A 28-year-old woman had a history of wearing glasses for 10 years. She occasionally wore contact lenses for 5 years and had stopped wearing them for 2 months. Preoperative examination revealed BCDVA in the OD was -4.00/-0.50×65=20/25 and in the OS was -4.25/-0.50×135=20/25. The intraocular pressure was measured with a corneal biomechanical analyzer (Corvis ST, Oculus Germany) and was 23 mmHg (1 mmHg = 0.133 kpa) in the right eye and 20.5 mmHg in the left eye. For central cornea thickness (CCT), the right eye was 562 µm, and the left eye was 569 eft Cor­neal topography (Orbscan II; Bausch & Lomb, Roches­ter, New York,USA) showed a symmetrical left eye, and the front surface was classified as Type C, with a K1 of 42.10D and a K2 of 42.80D and a -0.70D corneal astigmatism at 52.6° (Figure 1). No obvious abnormalities were observed in the anterior segment from fundus examinations.

**Clinical Findings:** UDVA(20/40) of left eye after the SMIL did not reach BCDVA(20/25) preoperatively.Refractive results of left eye is +2.00×175. Slit lamp examination showed a faint trace of pale lines under the cornea of the left eye.

**Timeline:**

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| --- | --- | --- |
| 2018.01.01 | 2018.01.08 | 2018.02.27 |
| SMILE（binoculus） | remained lenticule（OS） | lenticule fragment removal（OS） |

**Diagnostic Focus and Assessment: (1) diagnostic methods:**Slit lamp,Cor­neal topography,subjective optometry,Anterior segment optical coherence tomography,HE staining; (2**) diagnostic challenges,** the residual substances was in the stroma,we can not ensure its composition directly;**(3) diagnostic reasoning:** According to the history of operation and symptoms after operation, combined with auxiliary examination, the diagnosis is clear. **(4) prognostic characteristics:**The prognosis depends on whether the residues are completely clear.

**Follow-up and Outcomes*.***After 1 year follow-up, the intraocular pressure was stable, visual acuity and refrative results were good, no other discomfort occurred.

**Discussion.**SMILE surgery requires extensive experience with surgical skills and a steep learning curve. Possible intraoperative complications include tearing of the corneal margin or damage to the corneal epithelium at the incision; difficulty in separating the corneal stromal lens; loss of negative pressure; tearing or producing residual tissue of the corneal stroma; irregularity of the corneal stroma lens; the presence of a foreign body under the corneal cap; difficulties with corneal stroma lenses; perforation or dissection of corneal caps; corneal epithelial defects at non-incision sites; generation of opaque air bubbles; and dark areas within the corneal stroma scan area. The postoperative complications include diffuse lamellar keratitis, interlayer effusion, dry eyes, infection, overcorrection, undercorrection and regression of the refractive power. For this patient, the operation was smooth, and a postoperative exam revealed a complete left microlens; however, the patient's irregular astigmatism and poor postoperative UCDVA remained. To trace the fundamental cause, we consulted the video and surgical records of the initial surgery and the medical and nursing staff that participated in this surgery and finally verified the cause for the lens residue. At the time of the surgery, it was the peak of the winter holiday, and the volume of corneal refractive surgeries had doubled. Due to the speed of the surgery, when the surgeons were separating the microlens of the left eye, they failed to observe a slight cocking of the separator, thus resulting in the interlayer separation of the matrix lens causing the incomplete extraction of the lens. (2) Upon completion of the surgery, a visual exam revealed that the lens was round; thus, they assumed that the lens was complete and were confused by the poor outcome. On the basis of this case, SMILE surgeons should consider the following: (1) when conducting lens separations, manipulations should be gentle, the disturbances of the corneal tissues should be minimized, and the separations should be conducted on the same plane; (2) upon removal of the lens, surgeons and nurses should perform a slit lamp examination to carefully observe the integrity of the lens; mere reliance on a visual observation could lead to a poor patient outcome.

**Informed Consent.** We reported this case with patient's consent.