

# Dislocation of implantable collamer phakic lens after blunt trauma

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## Dear Editor,

Implantable collamer lens (ICL) surgery demonstrates long-term stability and favorable refractive outcome<sup>[1-2]</sup>. An increasing number of individuals across all age groups opt for refraction removal through ICL surgery. Currently, instances of ICL displacement resulting from trauma remain rare, and there are no documented cases of ICL damage due to blunt trauma. Postoperative ICL dislocations were found in 7 eyes (9775 total, equating to 0.072% of ICL implants), averaging 28.6mo (11-82mo)<sup>[3]</sup>. Following an injury, patients often seek emergency medical attention upon losing vision. Urgent surgical intervention is imperative if the ICL comes into contact with the corneal endothelium to prevent subsequent corneal edema and corneal endothelial decompensation. There have been reports of cases in which endothelial injury was observed resulting from dislocation of the ICL, even though the patient's corneal endothelium was essentially intact. Almost all reported cases necessitated surgical intervention to address the dislocation of the ICL<sup>[4-10]</sup>.

## CASE PRESENTATION

A 44-year-old man presented himself at the emergency room

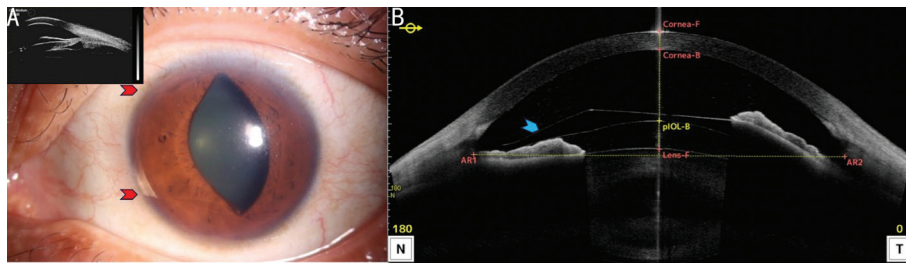
of Joint Shantou International Eye Center (JSIEC) on April 28<sup>th</sup>, 2023, with a loss of vision in his left eye, accompanied by photophobia and pain, after receiving blunt ocular trauma from fist an hour ago. This patient had undergone bilateral ICL implantation for high myopia at another hospital four years before presentation and had no previous complications associated with this surgery. The preoperative and postoperative medical records were not accessible. Systemic medical history was not significant.

Examination of the right eye was unremarkable. The best-corrected visual acuity (BCVA) was 20/2000, and the intraocular pressure (IOP) was 26 mm Hg in his left eye. Anterior segment examination of the left eye revealed that one footplate of the ICL was entrapped in the pupillary upon the nasal side of the iris. The anterior chamber depth was normal and showed 4+ red blood cells and Grade I hyphema. The details of the lens and fundus could not be seen through slit lamp examination because of the opacity of aqueous humor. The B-mode ultrasound examination showed moderate vitreous hemorrhage. The left eye was treated with prednisolone acetate 1% eye drops (Allergan, Irvine, CA, USA) and timolol maleate eye drops (Shandong Bausch&Lomb Freda Pharmaceuticals Co., Ltd., Jinan, China).

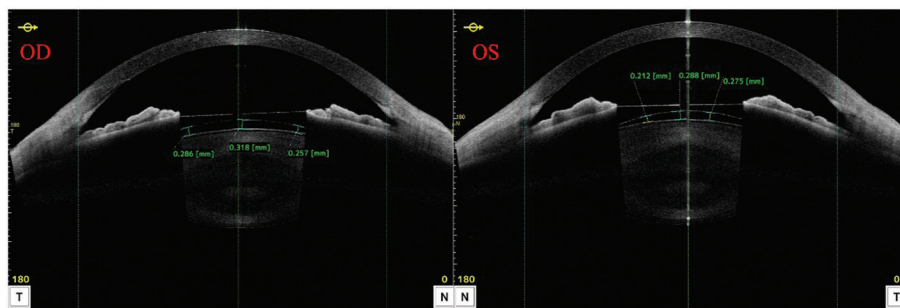
The research received approval from the Institution Research Board at Joint Shantou International Eye Center. The principles of the Declaration of Helsinki were adherence throughout the study. This patient provided a written agreement to share information that might reveal their identity, such as case details and photographs.

As the hyphema and most of the vitreous hemorrhage were absorbed four days after trauma (Figure 1), the BCVA of his left eye was 20/100, and the IOP returned to 15 mm Hg. The cornea was still clear, and no opacity was seen in the crystalline lens. Ultrasound biomicroscopic (UBM) examination of the left eye showed a slight angle recession in the direction of 9 o'clock. The vault measured by anterior segment optical coherence tomography (AS-OCT, CASIA2, TOMEY GmbH, Japan) in his right eye was about 318 μm (Figure 2).

The patient was anxious about the vision loss of his left eye and faced difficulties in determining the treatment option because of the absence of a medical history of his ICL



**Figure 1** The ophthalmic examination of the left eye four days after trauma A: Slit lamp photograph of the anterior segment, with the corresponding UBM image displayed in the upper left corner. The red arrow indicates ICL impactation at the anterior angle on the nasal side. B: An AS-OCT image with the blue arrow marking the position of the ICL. UBM: Ultrasound biomicroscopy; ICL: Implantable collamer lens; AS-OCT: Anterior segment optical coherence tomography; AR: Angle recess.



**Figure 2** Bilateral AS-OCT images revealed a vault of 318  $\mu\text{m}$  in the right eye and 288  $\mu\text{m}$  in the left eye one week post-surgery AS-OCT: Anterior segment optical coherence tomography.

implantation surgery and lack of experience in correcting traumatic dislocation of an ICL, as he had consulted several refractive surgeons before presentation to our clinic. Based on a comprehensive examination of bilateral eyes, the patient was subsequently offered surgical intervention to reposition the dislocated ICL and fully understood the procedures' risks.

One week after trauma, the dislocation and pupillary capture of the ICL was surgically corrected to a horizontal position under topical anesthesia. On the following day, the ICL was in place with a clear cornea. The uncorrected visual acuity was 8/40, and the IOP was 15 mm Hg in the left eye. The vault measured in his left eye was 288  $\mu\text{m}$ , measured similarly to his right eye (Figure 2). According to the 1-month follow-up, the patient's ICL location was stable, and the vault did not change significantly.

## DISCUSSION

Reports of ICL dislocation resulting from trauma are relatively rare<sup>[4]</sup>. Patients often seek emergency medical attention due to loss of vision following injury. In almost all reported cases, the patients underwent ICL repositioning surgery<sup>[4-10]</sup>. On presentation, the patient underwent surgical management to reposition the ICL. Comprehensive examinations of the anterior chamber and vitreous cavity indicated the integrities of both the zonule fibers and the capsule, suggesting removal of the ICL may not be necessary<sup>[11]</sup>. The reset direction was thrown horizontally rather than in another direction because of the non-astigmatic design of the ICL and the intact zonules.

Replacement with a new ICL was not scheduled since no evidence of ICL damage was observed.

To date, only one case of ICL dislocation into the vitreous cavity due to spontaneous zonules rupture has been reported, which results in an explant of the dislocated ICL<sup>[11]</sup>. It is imperative that prior to conducting such a surgical procedure, careful examination of the zonule fibers around the lens of the affected eye should be performed, with particular attention given to the zonules at the ICL implantation site. The horizontal zonules remained intact in the instance at hand, and the ICL was non-astigmatic. Thus, the ICL will be repositioned horizontally, aligning with our standard practice of placing it within the  $\pm 15^\circ$  horizontal range. Preoperative data of the initial ICL implantation in both eyes is essential for designing the repositioning surgery and estimating the ICL vault after repositioning. However, the perioperative medical history of the initial surgery may not be available at presentation. Thus, the current ICL vault of the patient's uninjured eye should be fully considered. As the sulcus-to-sulcus (STS) distance in the vertical direction was always more extensive than that of the horizontal direction<sup>[9]</sup>, and careful considerations should be taken for the estimated ICL vault after repositioning the dislocated ICL to a vertical position when considering pot-damaged zonules at the horizontal. In particular, the direction of ICL repositioning and implantation should be adjusted regarding the patient's uninjured eye to prevent further complications arising from excessive or low vault post-surgery.

Careful consideration of repositioning the axis of astigmatism and the need for ICL replacement are required when the dislocated ICL lens is designed to correct astigmatism<sup>[9]</sup>.

In the case of trauma-induced ICL dislocation with pupil capture, we hypothesize that the mechanism of injury involves the compression and deformation of the eyeball by blunt trauma, given the incredibly soft nature of the ICL lens. The lens's footplate moves towards aqueous humor extrusion and then prolapses into the anterior chamber angle. The chamber angle recedes due to the torn ciliary body's circular muscle and longitudinal muscle caused by blunt force. The literature has reported that the risk of ICL dislocation is more significant when the pupil is dilated at night<sup>[9]</sup>. In our case, the incident occurred at approximately 5 p.m., and the dilated pupil is not believed to be a significant concern at this time<sup>[12]</sup>. The timing of the trauma may be attributed to chance. We hypothesized that the increased excitability of the sympathetic nerve and the dilated pupil in the stress state at the time of injury might be the possible causes of the dislocation of the ICL into the anterior chamber of the eye.

In conclusion, we present a rare case of ICL dislocation following blunt trauma, which can lead to long-term complications. Prompt identification of dislocation is crucial to prevent complications. A thorough examination is necessary to diagnose dislocation, preventing issues such as endothelial damage and corneal decompensation. Repositioning and implantation of the ICL should be adjusted based on the patient's uninjured eye to avoid further complications.

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**Conflicts of Interest:** Zhong X, None; Li T, None; Du YL, None; Zhang MZ, None.

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