Clinical Case Report

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# Intermittent pupillary capture of intraocular lens after transscleral fixation in congenital ectopia lentis patient triggered by dark environment

## A case report

Zhirong Wang, MD[a], Qianzhong Cao, MD[a], Guangming Jin, MD[a], Charlotte Aimee Young, BSc[b], Yiyao Wang, MSc[a], Danying Zheng, MSc[a,*]

**Abstract**

**Rationale:** Although transscleral-fixated intraocular lens (IOL) implantation has been the most frequently chosen treatment for patients with inadequate capsule support, the ghost pupillary capture phenomenon did not cause enough attention.

**Patient Concerns:** We present an unusual case withintermittent pupillary capture of intraocular lens.

**Diagnosis:** After 5 minutes staying in the dark environment, the pentacam examination revealed a mild nasal pupillary capture of the IOL.

**Interventions:** A clear observation using the slit-lamp was attempted, and the light shining on the pupil sped up the sliding of the captured IOL.

**Outcomes:** The captured portion of the IOL recovered rapidly accompanied with pupil retraction when the patient was exposed in the light.

**Conclusions:** Pupillary capture of an IOL is an uncommon but potentially serious postoperative complication of transscleral fixation. Many pupillary capture cases may have been overlooked in the past. Physicians should be aware of its potential side effect, recognize its clinical manifestation, and knowledgeable of effective management.

**Abbreviations:** BCVA = best corrected visual acuity, IOL = intraocular lens.

**Keywords:** congenital ectopialentis patient, dark environment, pupillary capture, transscleralfixation

## 1. Introduction

Transscleral-fixated intraocular lens (IOL) implantation has been the most frequently chosen treatment for those with inadequate capsule support,[1] commonly seen in eyes with congenital ectopia lentis,[2] ocular trauma, high myopia,[3] and pseudoexfoliation.[4] Pupillary capture of an IOL is an uncommon but potentially serious postoperative complication of transscleral fixation,[5] with the reported possible causes of capsular capture including asymmetric IOL fixation, synechias, and the anterior position of the uniplanar IOL optic.[6]

Congenital ectopia lentis is a rare disease that is difficult to manage, and while transscleral sutured IOLs are one of the preferred surgical technique for this disease, there are a limited number of studies assessing such IOL placements in pediatric patients. To our knowledge, no cases of intermittent pupillary capture of IOL with transscleral fixation in congenital ectopia lentis patients have yet been reported. We describe a case of intermittent pupillary capture triggered by the screen light of a mobile phone in a dark environment in a congenital ectopia lentis patient with a transscleral sutured IOL.

## 2. Case report

A 6-year-old girl without ophthalmic history presented to our clinic with poor binocular vision in December 2013. The best corrected visual acuity (BCVA) was 2.5/25 with $-9.00/-1.50 \times 107$ in the right eye and 5/25 with $-8.50/-2.00 \times 105$ in the left eye. The slit-lamp examination revealed advanced temporal lens dislocation in the left eye, and only mild temporal lens dislocation in the right eye.

This patient underwent lens extraction combined with endoscopy-assisted transscleral-fixated sutured IOL implantation in the left eye. The distance between the sulcus and cornea limbus was 1.2 mm in the left eye, measured during the surgical procedure, and both haptics were sutured in the sulcus site, as observed using the endoscope.

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*ZW and QC contributed equally to this work.*

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*[a] State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China, [b] Department of Ophthalmology, University of California, San Francisco, CA, USA.*

*[*] Correspondence: Danying Zheng, State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou 510000, China (e-mail: zhengdyy@163.com).*



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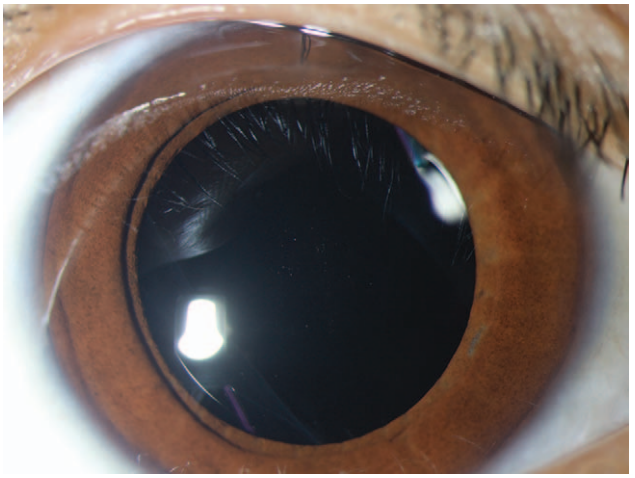

**Figure 1.** Slit-lamp photograph showing the left eye with intraocular lens (IOL) in normal position.

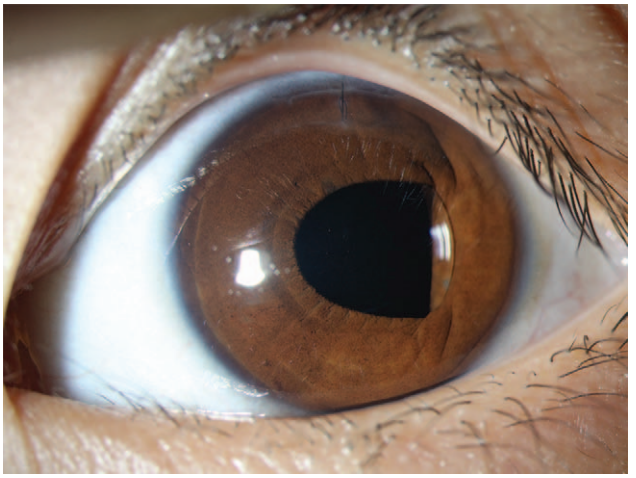

**Figure 3.** Slit-lamp photograph showing the left eye with a mild temporal pupillary capture of intraocular lens (IOL).

The patient returned for a follow-up visit 3 months after surgery with no complaints of blurred vision or ocular pain. The intraocular pressure was 13 mmHg in the left eye, with a refraction of $-0.50/-3.00 \times 175$ with BCVA of 25/50. The slit-lamp examination showed the anterior segment of the left eye was normal (Fig. 1). However, while the patient remained in a dark room awaiting the Pentacam (OCULUS Optikgeräte GmbH, Germany) examination, she used her mobile phone for about 5 minutes. When the Pentacam examination was performed, the image revealed a mild nasal pupillary capture of the IOL (Fig. 2). A clear observation using the slit-lamp was attempted, but upon examination, the captured portion of the IOL rapidly slid backwards to the backside of the iris accompanied with pupil retraction, as the light shining on the pupil sped up the sliding of the IOL (Fig. 3). The patient did not report feeling any discomfort during her time in the dark room, except for the occasional blurred vision. One percent pilocarpine and pranoprofen eye drops were prescribed to her, to be applied 2 times daily for a month.

When the patient presented for the follow-up visit in January 2015, no discomfort was reported. The BCVA was 40/50 with $+0.50/-1.50 \times 5$ in the left eye, and the intraocular pressure was 13.4 mmHg in the left eye. The slit-lamp examination showed slight iridodonesis in an otherwise normal anterior segment. After staying in the dark room, a mild nasal capture of IOL was triggered again in the left eye and detected by the Pentacam examination. At the final visit in February 2016, the refraction result was $-2.25 \times 170$ with BCVA of 50/50 in the left eye. No ghost pupillary capture was detected at this final follow-up.

Ethical approval for this study was obtained from the Ethics Committee of the Zhongshan Ophthalmic Center, and the conduction of the work followed the tenets Declaration of Helsinki. Written informed consent was obtained from this patient.

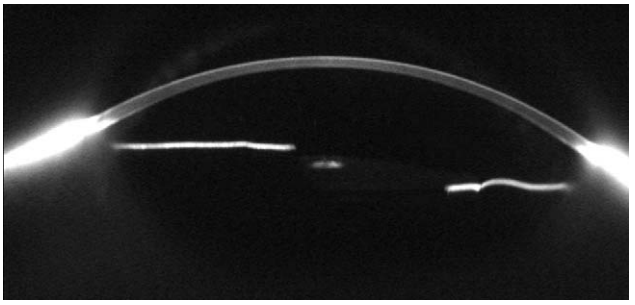

**Figure 2.** The Scheimpflug image showing the left eye with pupillary capture after 5 minutes in the dark environment.

## 3. Discussion

This is the first report describing intermittent pupillary capture induced by a dark environment in a congenital ectopia lentis patient. This case is remarkable because it indicates that many pupillary capture cases may have been overlooked in the past, and the true incidence of postoperational pupillary capture of transscleral sutured IOL may be higher than that reported. Although postoperational pupillary capture of IOL has been reported before, most of them were noted as postoperational complications associated with inflammation, ocular trauma, formation of iridocapsular adhesions, or inflamed or traumatized iris tissue.[7,8] However, the case we present here is a mild and occult pupillary capture of the IOL in a pediatric ectopia lentis patient in which no adhesions and inflammation were seen. What is more fascinating is the quick disappearance of the pupillary capture after exposure to light after being in a dark environment, making this particular kind of latent pupillary capture of IOL elusive during regular examination.

Our observation indicates that dark environments that promote pupil dilation may contribute to this latent pupillary capture of IOL in patients that have undergone transscleral fixation. The possible reason lies in that the dysplasia iris, especially in pediatric eyes, is easily subjected to the forces of the aqueous humor flow, resulting in the forward or backward collapse that normal iris tissue does not experience when the pressure between the anterior chamber and posterior chamber changes.

This latent pupillary capture not only affects visual quality but also damages the anterior ocular tissue. In our study, many postoperative patients complained of experiencing blurred vision as they used their mobile devices at night before going to sleep.

The slit-lamp examination revealed a normal IOL location when they presented at our clinic, but now we deduced that the blurred vision may have been caused by misalignment of the captured IOL. As descried by Korynta et al,[9] more than 5° tilt or more than 1 mm decentration of IOL would cause detectable myopic shift and oblique astigmatism. In addition, repeated contact between the edge of the IOL and the nearby iris tissue would cause prolonged inflammation which could develop into iritis, iris atrophy, or iris pigment dispersion syndrome.[8] Moreover, this kind of posterior IOL capture could develop into total pupillary capture under certain conditions.

Our study suggests that pupillary capture of IOL with transscleral fixation should be paid sufficient attention and further studies are needed to evaluate whether it is in fact safer to position the haptics posterior to the ciliary sulcus in patients with congenital ectopia lentis. In addition, a dark room provocative test should be performed at the follow-up visit in order to detect an intermittent IOL capture. In our study, a dark room provocative test with a duration of 5 minutes was conducted to fully dilate the pupil in a natural setting, and instead of using a flashlight to observe the pupil, we recommend the Pentacam, as its light source has little effect on pupil size and is therefore a reliable tool to detect or "catch" the presence of this latent pupillary capture before the pupil-dilated retinal examination at each follow-up visit. It is recommended that miotic agents are used as postoperative medication in the event of pupillary capture.

In conclusion, we investigated and described an interesting phenomenon – the ghost pupillary capture of IOL with transscleral fixation in a congenital ectopia lentis patient. However, more research is needed to further understand the mechanisms and potential preventative methods of this complication.

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