



## Femtosecond laser assisted capsulotomy in the treatment of capsule contraction case report

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### ABSTRACT

**Purpose:** To present the surgical value of femtosecond laser capsulotomy in the treatment of capsular contraction. **Observations:** The clinical case of a 63-year-old male patient with single eye who, two months after cataract surgery without complications, presented a significant dislocation of the secondary intraocular lens due to a capsule contraction and epithelial metaplasia that covered the lens optics and caused low vision. **Conclusions:** The femtosecond laser-assisted capsulotomy proved to be effective and safe with minimal traction on the zonule and no IOL damage, in this patient with a follow-up of 29 months.

### Introduction

Positioning of intraocular lenses in cataract surgery was optimized with capsulorhexis, and late dislocation is associated with disruptions in the zonule and are only seen 3 months after the surgery with an average of 8.6 years.<sup>7,9</sup>

Other factors have been related to capsule contraction such as characteristics of the intraocular lens, cleaning of the epithelial cells of the anterior capsule to avoid fibrosis and cell proliferation.<sup>10–12</sup>

This is the clinical case of a patient with single eye, with a secondary intraocular lens dislocation due to a capsule contraction associated with pseudoexfoliation, who underwent a femtosecond laser-assisted capsulotomy as a new treatment option for this complication.

### Case report

A 63-year-old male patient came to the clinic for the first time with low vision in both eyes in November 2017. The vision of the right eye was NLP, eye pressure of 42 mm Hg and in the ocular fundus a total atrophy of the optic nerve. His left eye presented a vision of 20/400 (LogMar 1.3), pseudoexfoliation material in the pupillary area, eye pressure 12 mm Hg and nuclear lens opacity, consequently he underwent a smooth laser-assisted cataract surgery in January 2018. Phacodonesis, iridodonesis or zonular abnormalities were not observed in the preoperative and intraoperative evaluation. A hydrophobic acrylic lens (enVista® MX60; Bausch and Lomb Incorporated, Rochester, NY,

USA) was implanted into the 4.9 mm capsulorhexis bag without complications. Refraction at 30 days was +0.75–0.25 × 79 cc vision 20/25 (LogMar 0.1). Two months later, he presented a decrease in vision of 20/200 (LogMar 1.0), superior displacement of the intraocular lens, optic proliferation material in the optic and significant contraction of the anterior capsule and traction of the zonule (Fig. 1).

The options of YAG laser capsulotomy, manual surgery, and femtosecond laser assisted capsulotomy were discussed with the patient. This last option was recommended and surgical planning consisted of performing a new capsulotomy that included the lower edge of the previous one in order to minimize injury to the altered zonule. The parameters of the laser used were similar to the first surgery, energy of 6 μJ, depth of 600 μm and two incisions of 2.2 mm and 1 mm at 110 and 70° that were used to manually cut localized proliferation tissue in the temporal sector with Vannas scissors, during 7–9 hours, where the laser was not effective, and finally performed irrigation and aspiration to clean the proliferation material from the anterior chamber. (Video 1).

Supplementary video related to this article can be found at <https://doi.org/10.1016/j.ajoc.2020.100893>

The use of viscoelastic to protect the surface of the lens<sup>16</sup> has been described; however, in this case, it was not used because we consider that it could generate a higher incidence of tags, and the proliferation material located on the surface of the intraocular lens served as a shield for protection of the intraocular lens, which did not suffer any alteration.

After 29 months of patient follow-up, intraocular lens dislocation has not progressed, his vision remains stable at 20/25 (LogMar 0.1).

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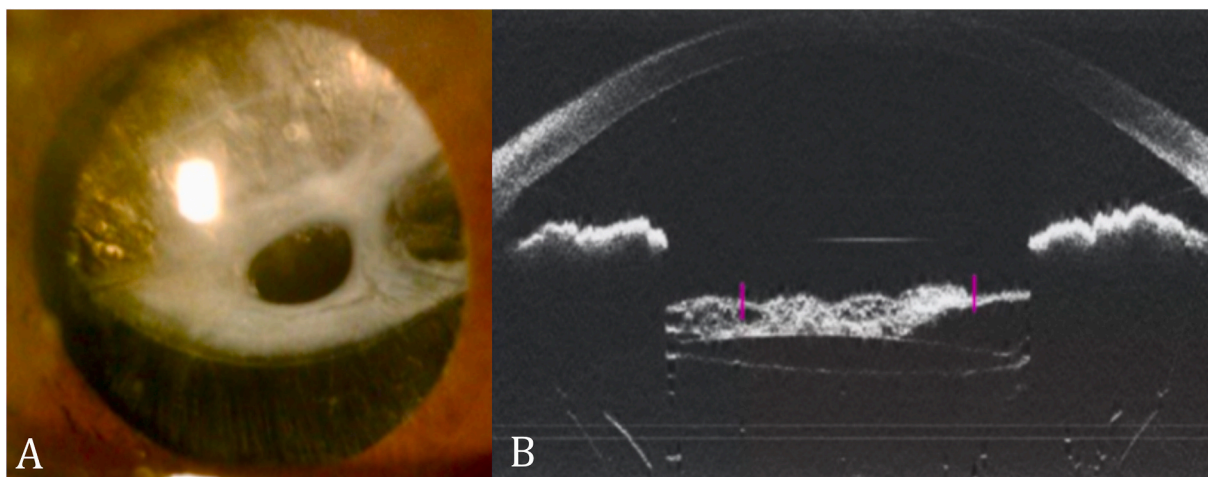
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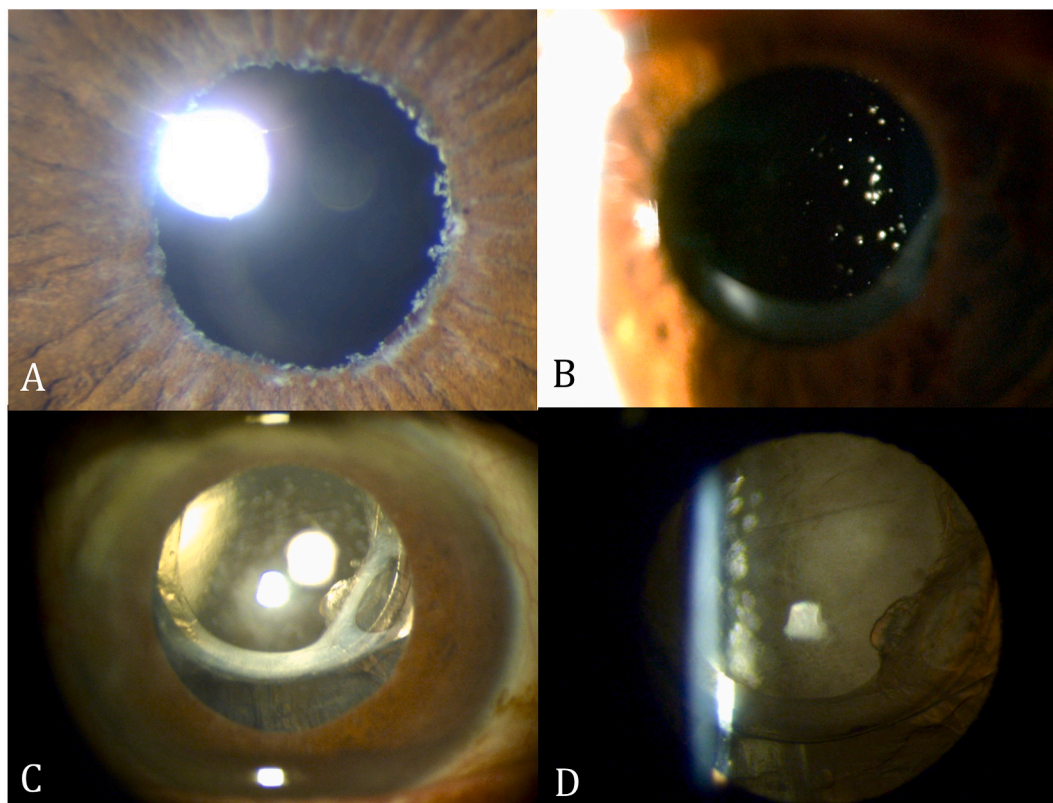
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**Fig. 1.** A) Important capsular contraction with a phimosis of the capsulotomy, epithelial metaplasia, superior displacement of the intraocular lens and zonule with obvious traction. B) Optical coherence tomography shown epithelial methaplasia associated with IOL displacement.



**Fig. 2.** A) Presence of pseudoexfoliation material in the pupil margin B) Asteroid hyalosis and regular capsulotomy assisted with femtosecond C-D) 24th month follow-up postoperative, regular capsulotomy, IOL displacement with no progression.

A slight proliferation in the nasal sector was observed; intraocular lens optics did not suffer any alteration (Fig. 2).

**Discussion**

The stability of the zonule can be compromised in patients with pseudoexfoliation which causes a dislocation of the intraocular lens and significantly compromises on vision. In our patient, this alteration was identified 2 months after the operation when the patient returned to the clinic with a complaint of low vision. Intraocular lens dislocation has been reported several years after treatment.<sup>13</sup> Capsule contraction is

related to two factors that have been described in different publications, anterior capsule fibrosis and contracture and zonular instability, determining intraocular lens dislocation, despite a correct bag implantation. Some prevention measures and modifications in the surgical technique in these cases that have been suggested are cleaning of the epithelial cells, larger size of the capsulorhexis, intraocular lens with less flexible haptic, use of the capsular support ring, though there is no consensus thereon.<sup>7,11,12</sup>

Pseudoexfoliation is frequently associated with intraoperative miosis and zonular fragility that limit the cleaning of the epithelial cells of the anterior capsule. Positioning of the intraocular lens is favored when the

optic is at 360° in the capsular bag. A larger size of the capsulorhexis could facilitate that a part of the optics of the intraocular lens remains outside the capsular bag and thus facilitating its dislocation.

In the treatment of capsule contraction, different techniques have been described, such as the use of a vitrector, capsule shears, Nd: YAG laser and the use of femtosecond laser.<sup>14–17</sup> In this case report, we opted the use of femtosecond laser as a new option for treatment, and it was used in order to achieve a precise cut over the original opening of the capsulotomy displaced on the inferior and to avoid further compromising the zonule. The femtosecond laser allowed a less invasive treatment with less injury to the zonule. The patient's zonulopathy could be affected to a greater degree with the use of YAG laser associated with an inflammatory condition and compromising lens optics. Video 2 shows the effectiveness of the laser and the evenness achieved mainly in that area, without subsequent changes in the position of the intraocular lens after 29 months of follow-up in a patient with single eye. The significant epithelial metaplasia observed on the optics of an intraocular lens caused a significant decrease in vision and could be easily removed since the stability of the intraocular lens was not affected after performing femtosecond laser-assisted capsulotomy.

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#### Patient consent

Written informed consent was obtained from patients for publication of these case reports and any accompanying images.

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#### Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

#### Declaration of competing interest

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