A complex situation

Two months after undergoing bilateral LASIK in April 1999, Patient A sustained a work-related injury. Hydraulic fluid entered his left eye at high force, causing the LASIK flap to fall off the stromal bed and wrinkle. The original surgeon repaired the flap, but Patient A subsequently developed high intraocular pressure, which was then also managed by the original surgeon. After the accident, however, visual acuity in his left eye remained poor for several years.

In February 2011, Patient A came to my clinic for a second opinion. Distance UCVA in his right and left eyes was 20/25 and 20/160, respectively. The manifest refraction in his left eye was -4.75 +1.00 X 130º, with poor pupil response. Slit-lamp examination revealed a superior hinged flap in both eyes and significant droplets in the interface in the left eye that were likely oil droplets from the hydraulic fluid. Patient A also showed evidence of an anterior subcapsular spoke-like cataract. Lifting the flap and washing out the oil droplets led to a significant improvement in higher-order aberrations.

At his next visit 3 months later, manifest refraction and distance UCVA in the left eye declined to -5.50 -0.25 X 130º and 20/200, respectively. Due to the presence of the traumatic cataract and subjective glare, we discussed options for further treatment, including LASIK enhancement followed by conventional cataract surgery. Instead, we agreed on implantation of the LAL, which allows IOL power adjustment after surgery. In eyes with previous refractive surgery, this feature offers the ability to optimize the refractive result.

Calculation challenges, a solution

Due to the corneal alterations induced by refractive surgery, determining the keratometry (K) value and the effective lens position proved to be difficult in this case. Several strategies and formulas exist for calculating K values in post-LASIK eyes, including the clinical history, Hamed, and Feinz-Mannis methods, which use pre- and post-LASIK measurements to calculate IOL power. In some cases, however, pre-LASIK records are either unavailable or inaccurate. Other methods include contact lens over-refraction, Maloney-Wang, Haigis-L, consensus K, and Shammas; phakic autorefractometry can also be used. Unfortunately, no method is 100% accurate, and the techniques are often inconsistent across patients.

I decided to implant the LAL in Patient A’s left eye because it circumvents the need to precisely predict IOL power before cataract surgery. After the LAL was implanted and the power was adjusted with ultraviolet (UV) light treatments, Patient A achieved a refraction of 0.50 D and a distance UCVA of 20/20. Today, he is one of my happiest patients. After many years of practitioners telling him nothing could be done to improve his vision, he was satisfied with his results with the LAL, including reduced glare.

For two other perspectives on Patient A’s case, see My Surgical Approach on page 41.

A few months after treating Patient A, I attended the 2011 Canadian Ophthalmology Society meeting and listened to Lawrence A. Brierley, MD, of British Columbia, Canada, present multicenter results with the LAL in post-LASIK cataracts.
**MY SURGICAL APPROACH**

Fritz H. Hengerer, MD  
In the case of Patient A, I would have chosen the proper treatment based on corneal opacity, pupil size, and any scars resulting from the accident. In a traumatic case such as this, it is also crucial to assess the stability of the capsular bag to provide a reliable outcome.

My first choice would be a three-piece hydrophobic IOL because it can be implanted in the capsular bag or ciliary sulcus. If I were concerned with capsular bag stability, I would suture the IOL to the sclera using a Cionni Ring (Morcher GmbH); the LAL is not suitable for scleral fixation using sutures.

In eyes with wide pupils, I would recommend implanting partial or complete aniridia rings such as the Morcher SE or SF (Morcher GmbH) to further reduce photic phenomena. These devices can be implanted intraoperatively or after IOL implantation in a secondary procedure.

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Tobias H. Neuhann, MD  
Dr. Rocha used the best available method to enhance Patient A’s vision after cataract surgery. The LAL is currently the only implant that can correct miscalculated IOL power in the postoperative period. In a case like this, it is a challenge to calculate the correct power, and I would use a combination of ray tracing and topography.

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LASIK patients. Of 16 eyes treated at three centers, 75% achieved a refraction within ±0.25 D of intended correction and 94% achieved a refraction within ±0.50 D. Like these multicenter study results, my own experience suggests that the LAL can help post-LASIK patients achieve excellent visual outcomes after cataract surgery.

**DISCUSSION**

Approximately 10% of my cataract patients have previously undergone LASIK. In these instances, implanting the LAL avoids the need to predict IOL power with pinpoint precision and allows me to tweak the lens power after surgery based on the patient’s visual acuity and manifest refraction.

This lens has the potential to shift the focus of refractive predictability from developing more accurate IOL power formulas to customizing lens power postoperatively.

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**TAKE-HOME MESSAGE**

- The clinical history, Hamed, and Feinz-Mannis methods use pre- and post-LASIK measurements to calculate IOL power.
- Other calculations include contact lens over-refraction, Maloney-Wang, Haigis-L, consensus K, and Shammas; phakic autorefractometry can also be used to calculate IOL power.
- Implanting a lens with a power that can be modified following implantation avoids the need to predict IOL power with pinpoint precision.