ENHANCING PATIENT OUTCOMES WITH LIGHT ADJUSTABLE LENSES


Tips and best practices for optometrists.

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Whether you refer patients to a surgeon who has adopted the Light Adjustable Lens and Light Adjustable Lens Plus (LAL and LAL+; RxSight) technology, encountered a patient by chance after LAL implantation, or are a certified light delivery optometrist, you have undoubtedly observed promising results. As primary eye care providers, optometrists play a critical role not only in patient selection but also in managing outcomes with advanced technology lenses. Thus, it is important to understand the benefits and drawbacks involved, which are covered in this article.

TECHNOLOGY REFRESHER

The LAL is a three-piece silicone IOL with a 6-mm optic. It is equipped with UV-sensitive macromers that enable precise altering of the IOL power upon polymerization with RxSight's proprietary light delivery device (LDD).[1,2] Standard cataract surgery provides inconsistent refractive outcomes (only about 65% of eyes achieve 20/25 UCVA or better),[3] so the ability to fine-tune the LAL postoperatively is advantageous.

The LAL's three unique layers drive its performance. The anterior 50-µm Active Shield protects the lens from unwanted UV exposure during normal activities of daily living following implantation. The middle of the lens contains photosensitive macromers; LDD treatment delivers 365-nm light free of blue light to polymerize the macromers, which diffuse to an area of the lens that is unique to the patient's measured residual refractive error. The posterior surface of the lens contains a strong, 50-µm UV filter to block light that could damage the retina.[4]

The LDD (Figure 1) records the patient's measured refraction and desired target (see *Light Delivery Device User Tips*). The delivery of light is measured and varies in wavelength depending on the amount of movement necessary to reach the target refraction. After each treatment, the shape of the lens shifts over 24 to 48 hours, and the patient is then able to test their vision during the days between adjustment appointments. This allows patients time to adapt to their new vision and assess their daily functioning. If certain tasks are difficult, the doctor and patient meet again and review the possibilities of optimizing the refractive outcome with a second and sometimes third adjustment.

Figure 1. The LDD, which polymerizes the LAL and LAL+.

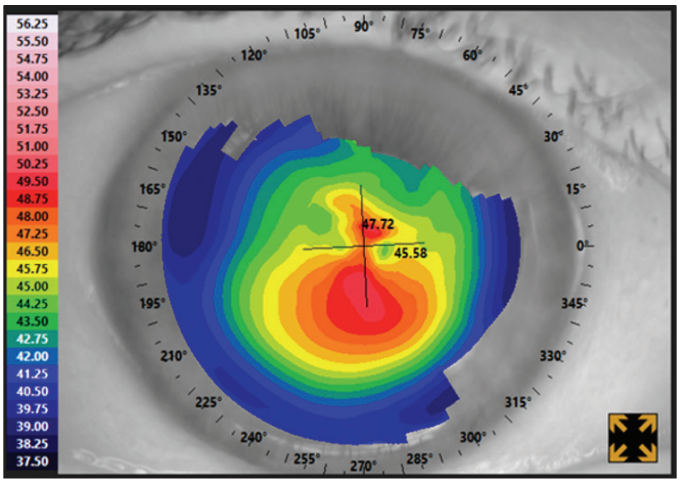

Figure 2. This patient is not a suitable candidate for additional EDOF due to an irregular cornea and aberrations, as evident on topography.

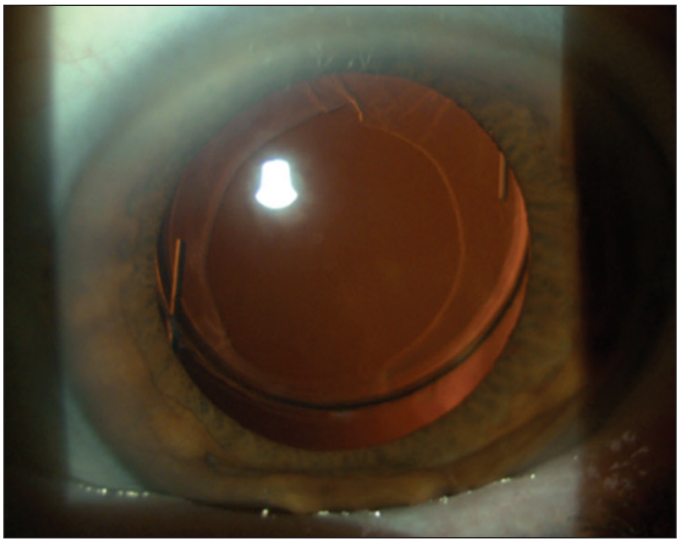

Figure 3. The pupil has been dilated to a diameter that allows visualization of the lens landmarks.

Once a level of comfort is obtained, the patient undergoes two lock-in LDD treatments that polymerize any remaining macromers into the final shape that provides the best vision. All adjustments and lock-in treatments must be spaced apart by a minimum of 3 days, and patients must always wear RxSight UV-protective eyewear until the final lock-in is complete. According to the company, 93% of patients ultimately achieve emmetropia within 0.50 D, and 98% of patients have a postoperative UCVA of 20/25 or better.[5]

PREOPERATIVE PATIENT SELECTION

Candidate Selection

As with any premium IOL, proper patient selection is critical. This process begins in the optometrist's chair. Knowing there will be a significant time commitment following surgery is a paramount point of preoperative counseling. Patients who will be traveling abroad or away from their home after surgery should understand this could affect their plans.

The LAL can be a great choice for almost anyone, but one group in particular that can benefit from the technology is patients with a history of corneal refractive surgery, which can render IOL calculations less reliable.[6,7] Because the LDD can adjust power in increments of 0.25 D after cataract surgery, the LAL is a great option for patients who are at increased risk of a refractive surprise. Other patients who have high expectations and those who go through multiple glasses remakes are also excellent candidates for the LAL. Finally, those who wish to obtain some extended depth of focus (EDOF) might be happier with the nondiffractive optics of the LAL and LAL+ than a diffractive multifocal IOL. Studies have shown that up to 67% of patients experience positive dysphotopsia following cataract surgery, which can be exacerbated by the diffractive optics of a multifocal lens.[8]

Examination

Before surgery, complete a thorough eye examination, including the eyelids, tear film, and cornea.

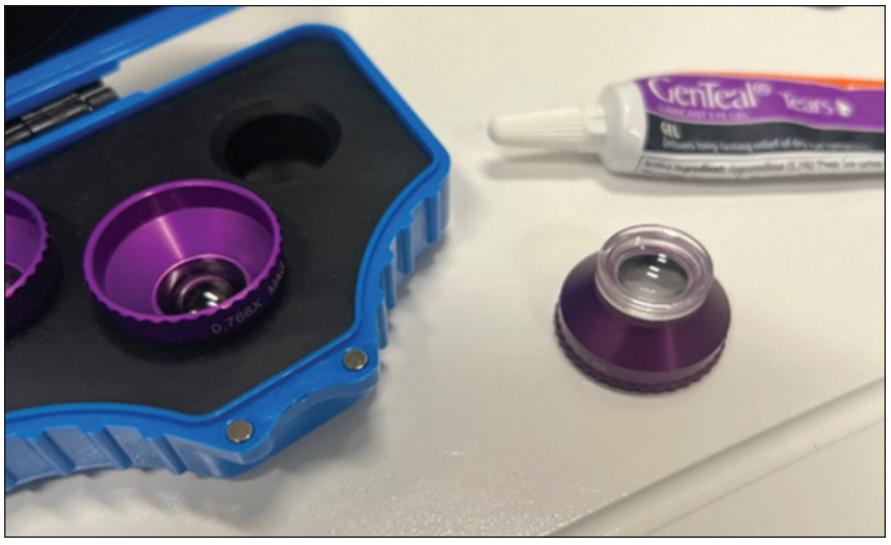

Figure 4. A contact lens is prepared with coupling gel for a light adjustment.

Aggressive dry eye management before the cataract surgery evaluation can pay dividends.[9] Preoperative topography can help guide the discussion of which lenses may be of most benefit for patients and help identify ocular surface disease.

A dilated examination helps identify patients who may be at increased risk of retinal complications. Mild macular degeneration, glaucoma, or diabetic retinopathy often are not contraindications for the LAL. Poor candidates for a premium IOL include patients with a history of retinal vein occlusion or uncontrolled diabetes who are prone to macular edema and those whose BCVA has been reduced by retinal or optic nerve disease. Poor pupillary dilation can make the light adjustment process difficult; an aperture of 6.5 mm is a minimum requirement.

Preoperative Discussion

It is important never to promise an excellent outcome. No IOL can deliver complete freedom from glasses. When discussing any premium IOL and its benefits, advise patients that small prescriptions will be necessary for some visual tasks and the final goal is to lessen—not eliminate—their dependency on glasses. The same is true for the LAL. If you have successfully conveyed this message to patients, they are likely to be much happier with their final outcome.[10]

Explain the additional time requirements of the LAL because it may change the patient's travel plans or disrupt their routine. Most patients complete the adjustment process within 1 month of healing from surgery. In some situations, this amounts to almost 2 months following surgery on the second eye.

LAL OR LAL+?

The patient's visual goals and preexisting qualifiers are important considerations when choosing which LAL to recommend. Some EDOF can be added to a standard LAL implanted in the nondominant eye during light adjustments to correct a range of power between ± 2.00 D of spherical equivalent and from - 0.50 D to - 2.00 D of cylinder.[2] This customized monovision strategy can satisfy most patients.

If a patient prioritizes crisp near vision, bilateral implantation of an LAL+ can be considered. This lens comes with added negative spherical aberration, which broadens the defocus curve at near and improves reading vision.[11] Some surgeons implant an LAL+ in the nondominant eye and the standard LAL in the dominant eye to provide EDOF that requires less modification in the adjustment process. Both strategies can provide improved near vision with limited halos and dysphotopsias.[12]

Patients who have a history of hyperopic LASIK or PRK and those with irregular corneas may not be suitable candidates for additional EDOF (Figure 2). In these situations, implanting an LAL+ or inducing additional EDOF in a traditional LAL could create other higher-order aberrations.[13]

ADJUSTMENT PROCESS

The first adjustment of the LAL occurs at least 17 days after implantation. At the first visit, review the patient's visual goals. Their BCVA

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LIGHT DELIVERY DEVICE USER TIPS

Follow these tips to achieve optimal results when using the Light Delivery Device with the Light Adjustable Lens or Light Adjustable Lens Plus (all products from RxSight):

- Ensure proper pupillary dilation. Try to visualize two haptics and 3 clock hours of the optic edge. Decentered treatment may induce unwanted aberrations.
- Watch for unwanted debris in the lens interface or air bubbles that may impede proper light delivery.
- Be aware that shadowing from the contact lens angle and corneal tension lines/striae from imbalanced pressure can also affect light delivery and may produce unwanted outcomes (Figure).
- Avoid prolonged treatment decentration to limit inaccurate correction. The Light Delivery Device has an alignment assist to ensure centralized light delivery.
- Allow patients ample time to test drive their vision at the intended target before the next adjustment. Although 3 days between treatments is the minimum time necessary, some patients may require 1 to 2 weeks.

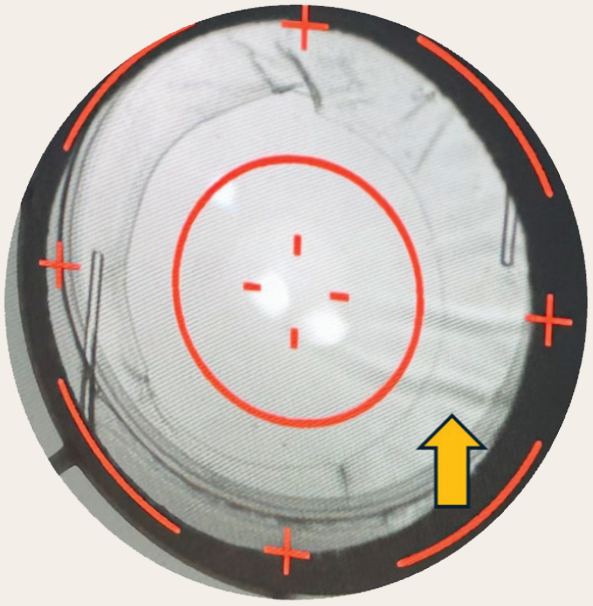

Figure. Shadowing from corneal tension lines (yellow arrow) can result in inconsistent light delivery and, consequently, unwanted outcomes.

- Repeat the refraction if it does not make sense before performing the adjustment. Remember that no treatment is a treatment.

should be 20/20 (if there is no history of retinal involvement or other contributors such as amblyopia). If the refraction does not align with pre- and postoperative keratometry values or the patient cannot achieve 20/20 BCVA, the first adjustment should be postponed, and a manifest refraction should be repeated to confirm refractive stability. Factors that can influence this are central ocular dryness and incomplete healing, which may include residual edema at the surgical site. Recheck the patient 1 week following any intervention to address the ocular surface. If the refraction is repeatable and the patient's BCVA is 20/20 at the follow-up appointment, the first adjustment may proceed.

If a refraction obtained during the treatment process does not match expectations, recheck it for stability. In a sense, no treatment is a treatment. Discussing this with patients early can limit frustration and impatience with the process. The corneal surface must be healthy for precise outcomes. If postoperative dryness or punctate keratitis becomes a problem, take the time to treat. Another common development during the adjustment process is early posterior capsular haze. Because the optic of the lens is silicone, opacity can develop earlier than expected and can be addressed with a laser capsulotomy before light adjustments are performed. If the patient cannot achieve 20/20 BCVA, evaluate the retina with OCT to rule out postoperative cystoid macular edema and other contributors.

The duration of each adjustment can vary in length (30-120 seconds) depending on the change of focus required. Once the eyes are dilated to a diameter allowing visualization of the lens landmarks (ie, two haptic positions and 3 clock hours of optic edge; Figure 3). After confirming the treated eye is dilated and properly anesthetized, a specially designed contact lens is placed with coupling gel to allow delivery of the UV light (Figure 4). The LDD presents a green target for patient fixation throughout the treatment. Light is delivered with a pedal, and treatment can be

discontinued if fixation is poor or air bubbles affect the interface owing to gel placement. Once the adjustment is complete, remind the patient to wear RxSight-approved UV protection and continue lubrication between adjustments or lock-ins.

REFERRAL RELATIONSHIPS

The LAL provides a unique opportunity for eye care providers—referring optometrists, adjusting optometrists, and surgeons—to work together to ensure exceptional patient outcomes. Wherever you fit into this circle of care for the LAL, understanding its properties and the patient journey is key to providing the best eye care available. ■

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