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Enhanced Monofocal IOLs: The New Standard of Care

These IOLs have many advantages over monofocal IOLs with an aspheric design.

BY ANDREAS F. BORKENSTEIN, MD



About 34 million cataract surgeries are performed worldwide every year, but only about 10% of the lenses

implanted are premium IOLs.¹ Some cataract surgeons are apprehensive about incorporating premium IOL technology into their armamentarium because of the potential associated side effects such as dysphotopsia (ie, halos and glare), but newer premium lens technologies have been designed to avoid them.

I have experience with a variety of IOLs from different manufacturers and use a large portfolio of lenses in order to provide patients with the best option for their individual needs. Many patients enjoy the advantages associated with multifocal IOLs, but monofocal lenses are the better and safer choice in some cases. Historically in my private practice, we preferred aspheric monofocal lenses and targeted mini-monovision to achieve satisfactory binocular vision for

distance and near vision. Within the past 3 years however, we transitioned first to extended depth of focus (EDOF) IOLs and now to enhanced monofocal IOLs, which I believe are the new standard of care. Here, I share my overall experience with enhanced monofocal IOLs and detail one case in which the benefits of the LENTIS Quantum (L-333; Teleon Surgical) IOL were especially impressive.

BACKGROUND

The LENTIS Quantum bridges the gap between standard aspheric monofocal IOLs and premium refractive EDOF IOLs like the LENTIS Comfort (Teleon Surgical). This enhanced monofocal, aberration-neutral IOL is designed with Q-zone technology, which is a progressive surface profile that provides a smooth, stepless transition between zones to avoid any undesirable visual side effects such as halos and glare. The IOL provides patients with more vision in the intermediate distance (80 cm) compared

with traditional monofocal IOLs but with comparable contrast sensitivity. To achieve better intermediate vision (up to 60 cm), a true EDOF IOL like the LENTIS Comfort or ACUNEX Vario (Teleon Surgical) is recommended.

The LENTIS Quantum with plate haptic design is easy to implant, and it unfolds smoothly, reliably, and consistently (Figure 1). I have had no complications



Figure 1. Schematic of the LENTIS Quantum IOL.

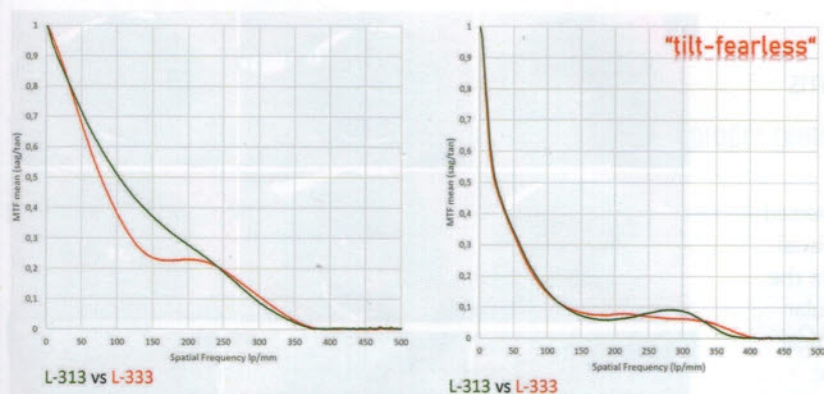


Figure 2. There was no significant difference in the modular transfer function at centration between the monofocal aspheric L-313 (green) and the enhanced monofocal L-333 (red). Even at a tilt of 5° and a large aperture (4.5 mm), the lenses performed similarly (right).

with the implantation or unfolding of the lens, even in challenging cases such as a shallow or flat anterior chamber and intraoperative floppy iris syndrome. Lastly, the lens can be implanted through a 2.2-mm clear corneal incision with the same gentle touch regardless of the IOL power. In my hands, the Viscojet Bio 2.2 Injector (Medcel) works well.

OPTICAL BENCH TESTING

A great variety of lenses are on the market, all with unique advantages and disadvantages. In collaboration with a colleague from another clinic, we conducted optical bench testing to evaluate several innovative and new optic designs in an objective and unbiased manner in order to evaluate how to best choose the ideal IOL for each individual case.²⁻⁴

We recently tested and compared the LENTIS Quantum (L-333) to the monofocal LENTIS design (L-313; Teleon Surgical) and with other standard aspheric monofocal IOLs (publication in press). Figure 2 summarizes our results. In short, the LENTIS Quantum had a very good performance and no degradation compared to the LENTIS monofocal and other standard aspheric monofocal IOLs. Additionally, the innovative Q-zone design of the LENTIS Quantum was forgiving of decentration and tilt. The benefits of the design were most noticeable in measurements with larger apertures, which indicates that the lens is appropriate for younger patients with large pupils.

The study was designed to evaluate the modulation transfer function, Strehl and wavefront measurements, and defocus curves at different aperture sizes (3.0 and 4.5 mm). The study is ongoing, but current results confirm that the behavior of the LENTIS Quantum is very tolerant of decentration and tilt. This is unlike diffractive multifocal and trifocal IOLs, where the quality of vision degrades in direct correlation to the amount of any misalignment.

CLINICAL CASES AND PATIENT SELECTION

Optical bench analysis is important, but patient satisfaction counts most in the end. In my early experience with the Eyhance

(Johnson & Johnson Vision), LENTIS Quantum, and other enhanced monofocal IOLs, I was very selective with patients and only used them in healthy eyes with no additional ocular pathology because I was concerned about possible side effects.

After a short learning curve, I expanded my inclusion criteria to include eyes with coexisting conditions such as glaucoma and macular disorders—depending on the patient's individual needs and the results of their preoperative examination—because it was apparent that the lens is tolerant, much like standard monofocal lenses.

Again, there is no single IOL that works for all patients. I have found, however, that most patients are good candidates for an enhanced monofocal IOL like the LENTIS Quantum. In addition to standard preoperative diagnostics like biometry, corneal topography, and wavefront measurements, I am also sure to ask about their occupation, hobbies, and typical working distances to help me select the best IOL for their lifestyle and visual needs.

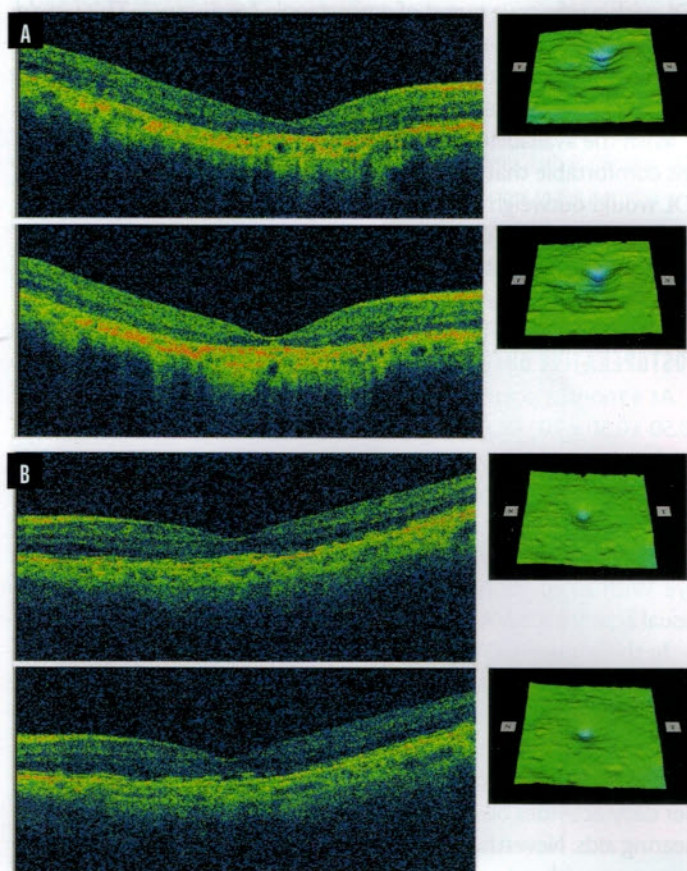


Figure 3. OCT and fundus photographs of the patient's right eye preoperatively and 4 months postoperatively (A) and of the patient's left eye preoperatively and 4 months postoperatively (B).

CASE PRESENTATION

The following case demonstrates the versatility of the LENTIS Quantum in challenging cases.

An 84-year-old woman with mature cataracts in both eyes presented for a cataract evaluation. Her refraction was $-1.25 +0.50 \times 135^\circ$ OD and $-1.50 +0.75 \times 140^\circ$ OS. Her uncorrected distance visual acuity (UDVA) and best corrected distance visual acuity (BDVA) in the right eye was 0.1 and 0.3, respectively. In the left eye, it was 0.05 and 0.2 respectively. Dry age-related macular degeneration was noticeable on macular OCT, and geographical atrophy was also noticeable but in a relatively small area. The central scotoma was noticeable when testing monocularly.

In addition to her ocular condition, the patient mentioned that she was experiencing some dizziness. She was also having increased difficulty wearing glasses due to the positioning of her hearing aids and mentioned a few recent injuries she sustained because she could not see properly without her glasses. The patient was therefore very interested in spectacle independence postoperatively.

In the past, I would never have tried to use a premium (ie, multifocal/trifocal) IOL in this specific case due to the macular pathology but would have rather implanted an aspheric monofocal IOL with a refractive target of emmetropia for distance. This would have, however, required the patient to wear glasses for near and intermediate vision tasks. If she chose not to wear them, her risk for falls and other accidents at home would remain high.

With the availability of the LENTIS Quantum, however, I felt comfortable that the benefits of an enhanced monofocal IOL would outweigh the risks, and after patient counseling we decided to proceed with this option (Figures 3 and 4). I explained to the patient that she should achieve improved distance and intermediate without sacrificing her near acuity.

POSTOPERATIVE OUTCOME

At 4 months postoperatively, the patient's refraction was $-0.50 +0.50 \times 20^\circ$ OD and $-0.25 +0.50 \times 85^\circ$ OS. When testing visual acuity, the scotoma was sometimes noticed but with some eye movements not bothering her. The UDVA was 0.8, BDVA was 0.9, uncorrected near visual acuity (UNVA) at 40 cm was 0.5, and uncorrected intermediate visual acuity (UIVA) was 0.63 in the right eye. With an addition of 1.50 D, the patient's best corrected near visual acuity (BCNVA) was 0.63.

In the left eye, UDVA was 0.63, BDVA was 0.8, and UNVA at 40 cm was 0.4. With the addition of 1.50 D, the patient's BCNVA improved to 0.5, and UIVA at 80 cm was 0.63. She had no complaints of dysphotopsia.

The patient does not wear the 1.50 D corrective glasses for her daily activities because of the difficulties it presents with her hearing aids. Nevertheless, she is extremely happy with her visual outcomes without spectacle correction. She can get around her house without any glasses, and there has been no progression of her macular degeneration through 4 months of follow-up.

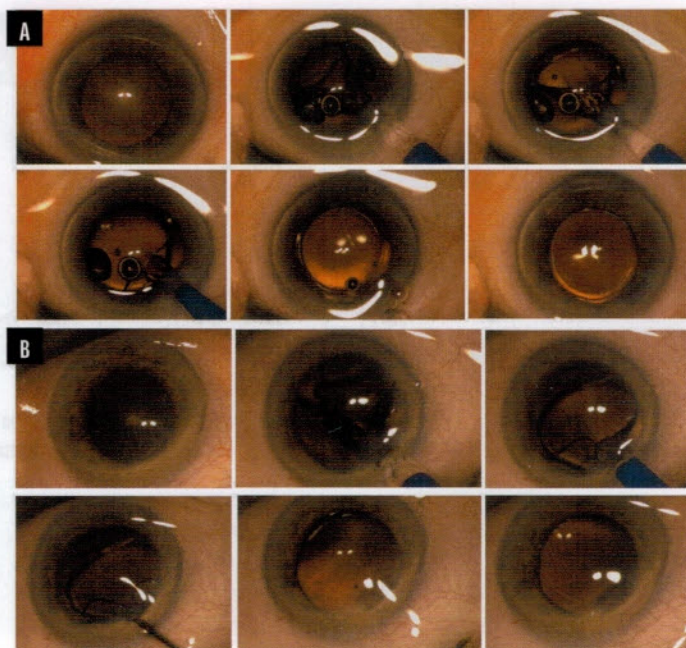


Figure 4. The IOL is inserted into and unfolds within the capsular bag of the patient's right eye without any additional instrumentation (A) and left eye with a spatula to position the trailing haptic and center the IOL in the bag (B).

It should be noted that enhanced monofocal IOLs are not only advantageous for typical cases in which spectacle independence is desired, but they are especially useful in patients with medical concerns because they can vastly improve their overall quality and prevent falls, as shown in this example.

CONCLUSION

The case presented here demonstrates how the LENTIS Quantum can provide patients with very good intermediate visual acuity up to 80 cm without glasses. The case also highlights the broad range of indications for the lens, including those with other ocular pathologies.

In conclusion, the LENTIS Quantum can be implanted not only in normal eyes but also special and challenging cases as well. Additionally, in some cases the lens is well suited for mixing and matching opportunities with other EDOF or multifocal IOLs. The LENTIS Quantum is the newest standard of care in my basic IOL portfolio because it achieves excellent postoperative results and, most importantly, patients are happy after surgery. ■

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