



# Experience With EDOF Lenses in Clinical Practice

*A forgiving defocus curve and a good range of vision make the new category of IOL an important offering in cataract practices.*

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**E**xtended-depth-of-focus (EDOF) IOLs are used often in my practice. In fact, my team has been involved in several clinical trials of several designs, like the small-aperture IC-8 (AcuFocus), Symphony (Johnson & Johnson Vision), WIOL (Medcem) and the AT LARA (Zeiss).

## LESS DYSPHOTOPSIA

Owing to the EDOF optical concept, the LARA implant was designed to induce less photopic phenomena, dysphotopsia, halos, glare and flare. That appears to be the case. The night vision and dysphotopsia experience for the more than 20 patients in whom I have implanted the LARA are comparable to or maybe minimal more than with Zeiss' monofocal 409 lens (which is based on the same design). The LARA is an aspheric, plate-haptic, hydrophilic acrylic lens with a hydrophobic surface. I believe its lack of a sharp edge is what minimises patients' dysphotopsia issues, too.

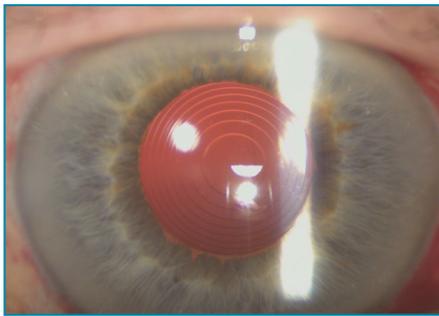


Figure 1. Slit-lamp photo of the At LARA in the eye

The LARA technology is based on a light bridge optical design. This diffractive optical design has far dominant light distribution and two power additions creating an optical bridge effect to extend the range of focus. Another important detail is Zeiss' smooth microphase (SMP) technology, which introduces a diffractive optical design where the optical power is the joint effect of two distinct zones. This type of design allows for a more precise manufacturing process and reduces sharp edges and corners in the surface compared to a conventionally designed IOL. As a consequence, a smaller fraction of the incident light is misdirected, and accordingly, side-effects are minimised.

The implant's aberration-neutral aspheric design and advanced chromatic correction allow for optimised contrast sensitivity. The SMP technology is also applied in the design and manufacturing of Zeiss' AT LISA tri. For AT LARA, it has been adjusted to optimally match the required steps size for the LARA focus additions.

## RANGE OF VISION

In my experience, this EDOF lens provides patients good vision for distance compared to a monofocal, and it adds intermediate and near vision. With bilateral IOL implantation — when the dominant eye is targeted more for emmetropia and the second eye is targeted for slight myopia — the surgeon can move the defocus curve. Because of this forgiveness or flexibility of the defocus curve, the surgeon can provide near vision but also more capabilities for intermediate. The defocus curve plateau is from about +0.50

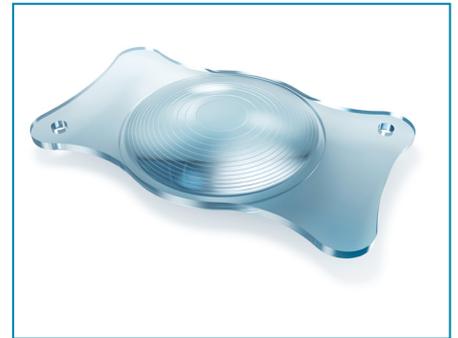


Figure 3. The AT LARA from Zeiss is the next generation of EDOF technology

D to -1.00 D. With bilateral implantation, the target refraction can be adjusted based on the patient's needs, for example, adding more near vision if the patient wanted.

When it comes to bifocal lenses or traditional trifocal lenses, the surgeon must really deliver on the target refraction. This is especially key for those patients who require excellent, clear vision at distance, intermediate, and near, such as a refractive lens exchange candidate. As well, surgeons must educate that trifocal lenses do have dysphotopsia, photopic, and night vision side-effects; this is an unavoidable aspect of this lens design.

Here at the ESCRS, Gerl and colleagues presented a poster evaluating the postoperative functional results and patients' satisfaction after implantation of the AT LARA 809MP! Patients' mean preoperative spherical equivalent was significantly reduced one month after surgery. They said that postoperative binocular visual acuity for distance and intermediate was exceptional with a high satisfaction for near function. Interestingly, binocular defocus curve analysis shows no drawdown in the intermediate range compared to binocular trifocal IOL implantation. This led them to conclude that the new AT LARA IOL offers better results for intermediate visual acuity with less photic phenomena compared to regular trifocal IOLs.

## CONCLUSION

More and more, for vision after cataract surgery, it is important for patients' daily life to see well at computer, tablet and smartphone distance. The near add given by EDOF IOLs is right in that range. Of course, for very specific small print and very low contrast, a certainly low and to-be-determined number of patients will need glasses. Overall, EDOF patients are very satisfied with their range of vision.

*I. Gerl M, Breyer D, Abdassalam S, et al. Evaluation of a novel EDOF trifocal IOL. Poster presented at ESCRS; October 7-11, 2017; Lisbon, Portugal.*

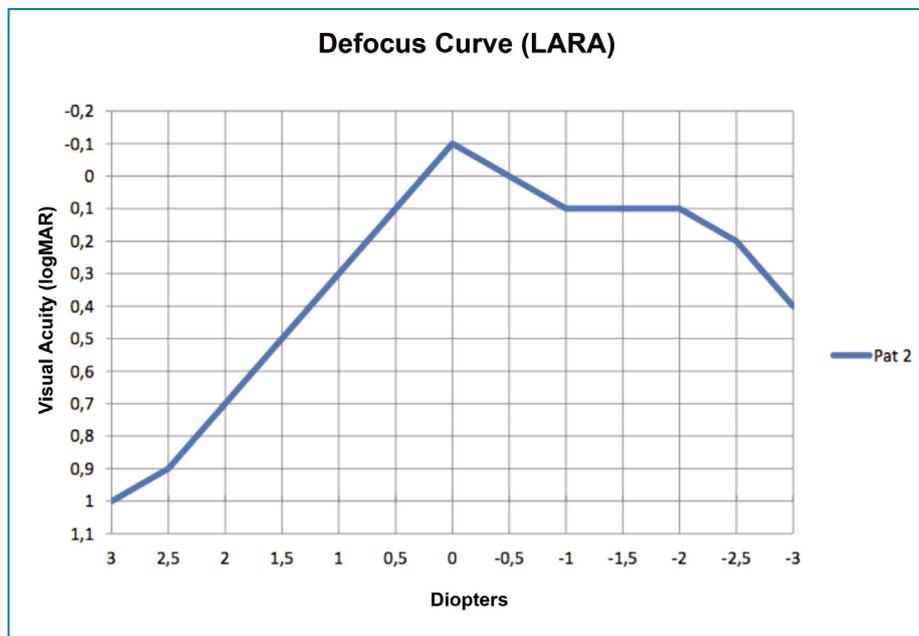


Figure 2. The defocus curve of the lens allows for a larger sweet spot and the ability to provide a more targeted outcome