

EDOF IOL features novel optical design

Unique extended depth of focus lens provides advanced chromatic optics, reduced side effects

By Cheryl Guttman Krader; Reviewed by Florian T. Kretz, MD, and Steven C. Schallhorn, MD

A NEW EXTENDED DEPTH of focus (EDOF) IOL (AT LARA 829MP, Carl Zeiss Meditec) provides excellent results for cataract surgery patients seeking presbyopia correction with good optical performance at the far and intermediate distance ranges and a low incidence of photic phenomena, said Florian T. Kretz, MD.

The lens is “the next generation in EDOF IOL technology, featuring the widest range of focus within the EDOF segment,” said Dr. Kretz, chief executive officer/owner of a private practice and clinic chain in Germany. “Based on early clinical experience, we consider [this EDOF IOL] a useful option for individualizing patient care and a valuable addition for meeting the rising demands of today’s cataract surgery patients for good uncorrected intermediate vision.”

The lens comes preloaded. It has received the CE Mark and was launched at the 2017 European Society of Cataract and Refractive Surgeons meeting. The lens is not yet approved in the United States.

The name, LARA, reflects its “Light Bridge” optical design; Aspheric optics; Reduced visual side effects; and Advanced chromatic optics.

“The [EDOF IOL] has a diffractive design with an optical bridge to continuously extend the range of focus,” said Steven C. Schallhorn, MD, chief medical officer, Carl Zeiss Meditec, Dublin, CA.

“It features an optimized aberration-neutral aspheric design, and it incorporates patented design and manufacturing technology (Smooth Micro Phase) that reduces visual symptoms by minimizing light scattering,” he added.

In addition, chromatic aberration has been optimized for increased contrast sensitivity.

The EDOF lens was designed to provide an excellent balance for patients wishing to reduce dependence on spectacles, while inducing less visual side effects than traditional multifocal IOLs, Dr. Schallhorn noted.

LABORATORY EVALUATION

A randomized, prospective clinical study evaluated visual performance and quality with the EDOF IOL in a virtual setup, in which phakic subjects with healthy eyes viewed through the lens when it was placed into their optical path using a unique testing device (VirtIOL). The defocus curve results obtained with the EDOF IOL were compared with other marketed IOLs.

Dr. Schallhorn said the defocus curves showed greater range of focus



Dr. Schallhorn

with this lens compared with a competitor’s EDOF IOL (data on file).

In a second trial with a similar setup (VirtIOL testing device), subjects had to rate the IOLs according to their visual quality while viewing a night-traffic display [Guthoff RF, et al. *Invest Ophthalmol Vis Sci.* 2017;58:338]. More favorable results were observed with this EDOF IOL compared with a competitive EDOF IOL and a traditional multifocal IOL.

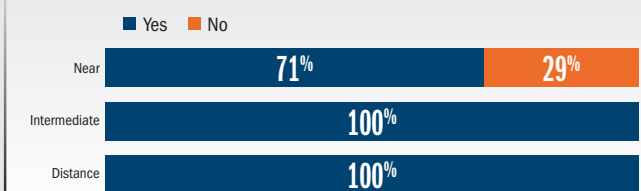
Dr. Kretz and colleagues also conducted a prospective study to evaluate functional results and patient satisfaction after implantation of the EDOF IOL. They analyzed results from 17 eyes of 10 patients (median preoperative SE 0.875 D) that were targeted for emmetropia.

REAL-WORLD OUTCOMES

The study found the refractive outcomes to be excellent. Achieved SE was within 0.75 D of target in all eyes, ± 0.5 D in 88%, ± 0.25 D in 82%, and ± 0.125 D in 53%.

Distance visual acuity results were consistent with the refractive outcomes. Mean monocular logMAR uncorrected and corrected distance visual acuity were both 0, and in binocular testing, mean logMAR uncorrected distance visual acuity was -0.10 .

Did the surgery offer you spectacle independency?



(FIGURE 1) Using the McAlinden quality-of-vision questionnaire, 71% of patients agreed the surgery offered spectacle independency for near. All patients answered that the surgery provided spectacle independency for intermediate and distance.

Binocular mean logMAR distance-corrected intermediate visual acuity measured at 90, 80, and 60 cm was -0.05, 0.10, and 0.03, respectively. In binocular testing at a reading distance of 40 cm, mean logMAR near visual acuity was 0.30 with distance correction and 0.49 uncorrected.

Compared with previous studies with EDOF IOLs, this novel lens showed the highest values for visual acuity in the intermediate range, according to Dr. Kretz, who is also consultant and research coordinator, International Vision Correction Research Centre Network, University of Heidelberg, Heidelberg, Germany.

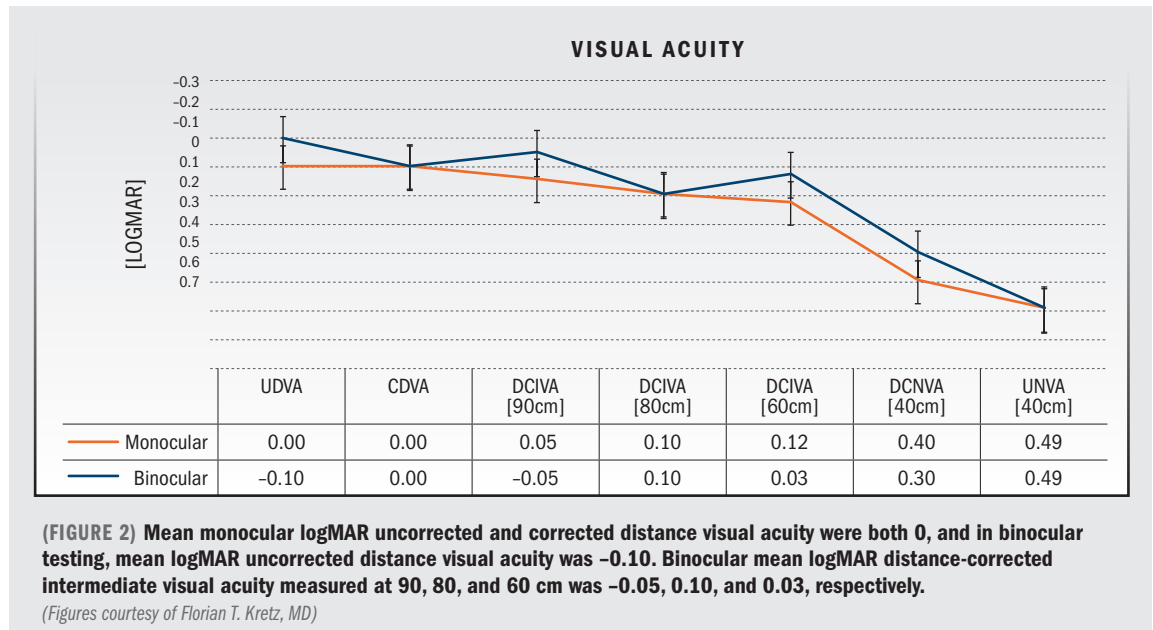


Dr. Kretz

“These visual acuity results for distance and intermediate are exceptional, and in correspondence with them, the monocular and binocular defocus curves showed no dip in the intermediate range,” Dr. Kretz said. “For near, patients still achieve good functional vision, and overall we found high satisfaction with near vision.”

Patient satisfaction for the lens was evaluated using the McAlinden quality-of-vision questionnaire. Results showed that 71% of patients agreed that the surgery offered them spectacle independence for near, and all patients answered that the surgery provided them spectacle independence for intermediate and distance.

About 40% of patients reported never needing glasses for near, and the others were evenly divided between needing reading glasses most of the time or seldom. Eighty-six percent of patients reported never wearing glasses for intermediate or distance, and the remaining minority seldom wore glasses for those distances.



“All of the patients said they would choose the lens again,” Dr. Kretz said.

In testing with a simulated night-vision scene, almost 75% of patients reported experiencing glare, but it was rated as being no more than occasionally. Halo affected 29% of patients occasionally and 14% quite often, while 29% of patients reported occasional starburst.

However, no patient rated their halo as worse than minimal and bother ratings for all three symptoms were consistently no worse than minimal. ■

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