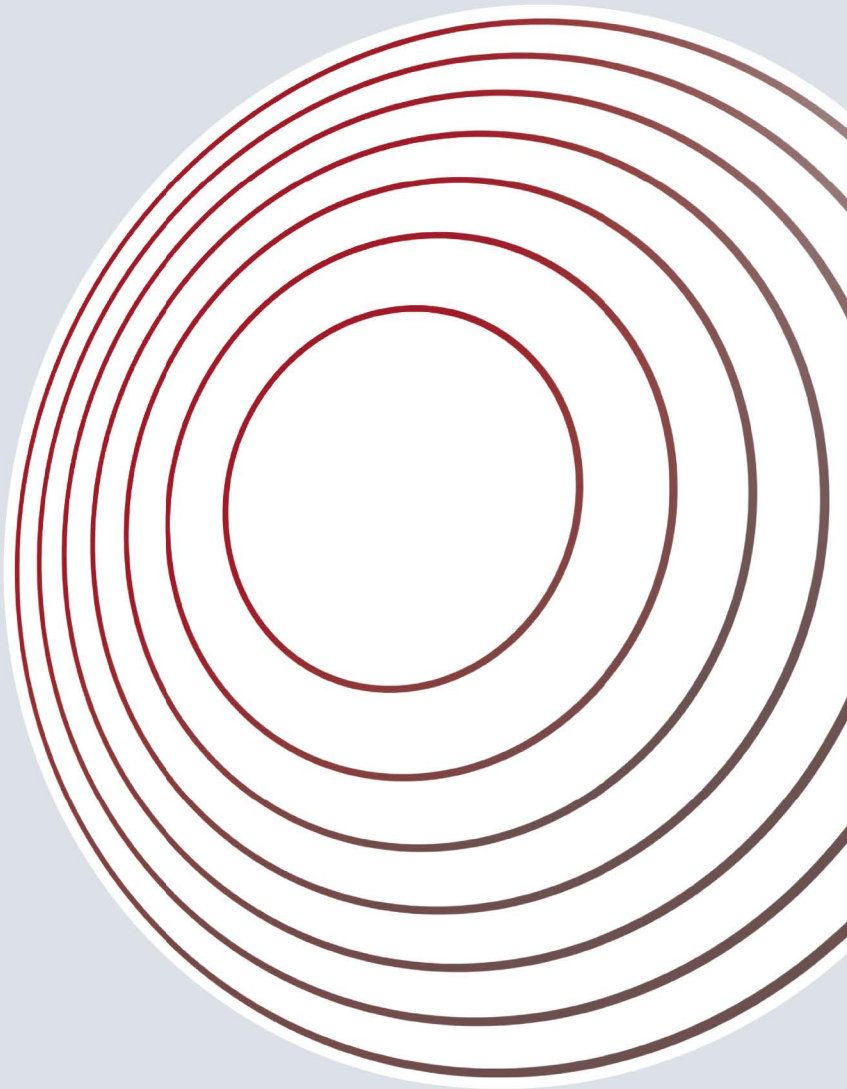
LIBERTY

EPS 2.0 makes the difference



MEDICNTUR

technology upgrade

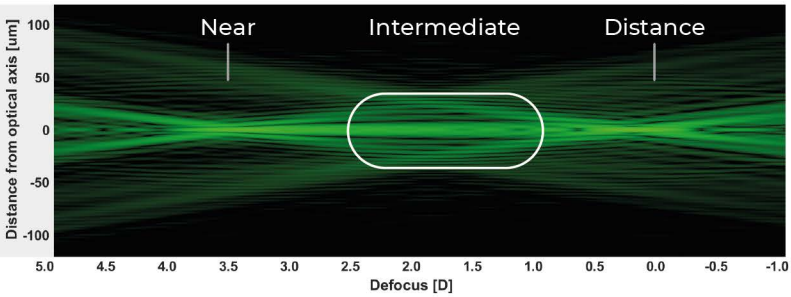
Technology Comparison

Enhanced and more homogenous intermediate light intensity results in better visual quality

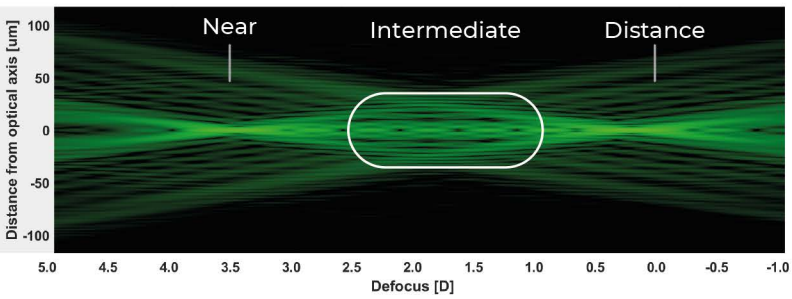
Effective light intensity pattern among the three focal points on PSF (Point Spread Function) Maps in ISO Model Eye.

The lightness on the optical axis correlates with image sharpness and contrast sensitivity at the given distance. Light detected away from the optical axis could be observed as dysphotopsias.

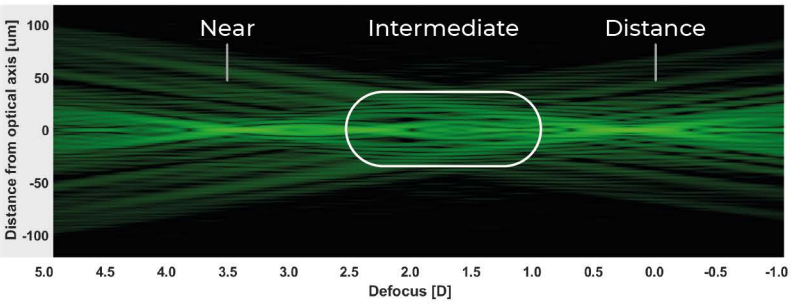
Liberty EPS 2.0



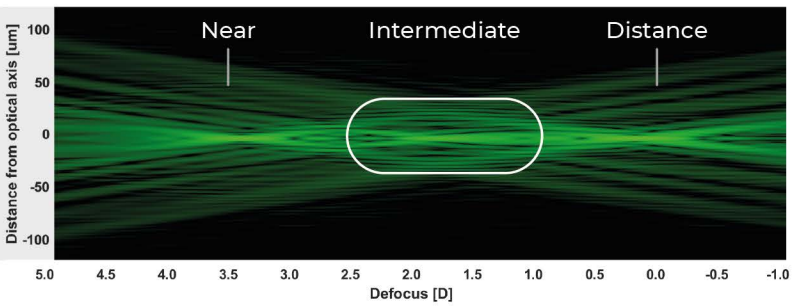
Liberty EPS 1.0

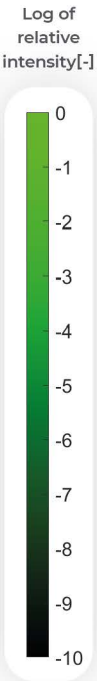


PanOptix



FineVision





EPS 2.0

The figures on this page correspond to simulations in theoretical models based upon lab measurements on actual products. Created by Medicontur Research Department with Zemax OpticStudio (pupil diameter 3 mm, λ= 546 nm) - detailed data on file.

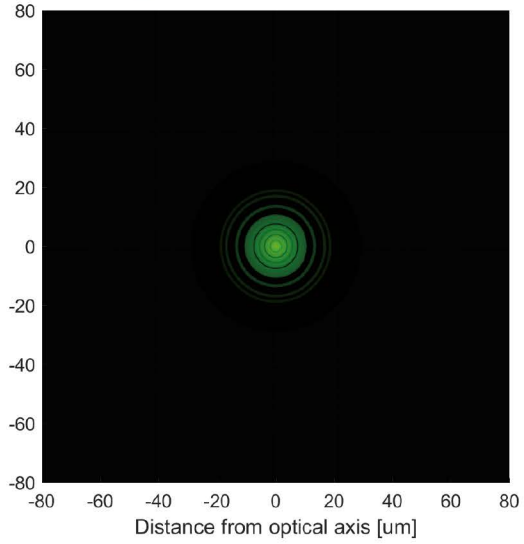
Technology Comparison

Less out of focus light results in less diffractive dysphotopsias

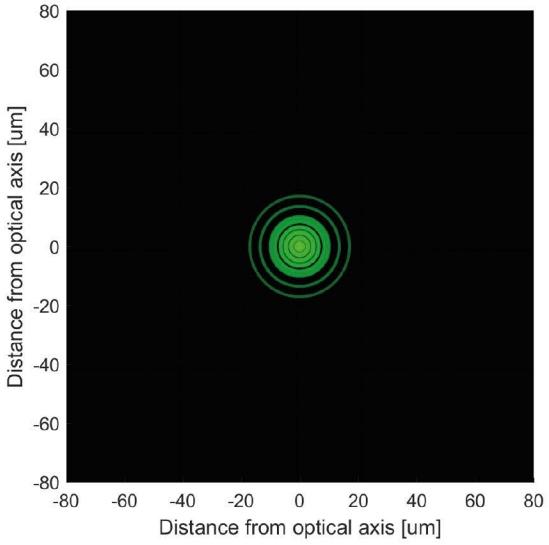
Effective light intensity pattern at the far focal point on front PSF Maps in ISO Model Eye simulated in scotopic conditions.

The lightness on the center correlates with image sharpness and contrast sensitivity at the given distance. Light detected away from the center could be observed as dysphotopsias.

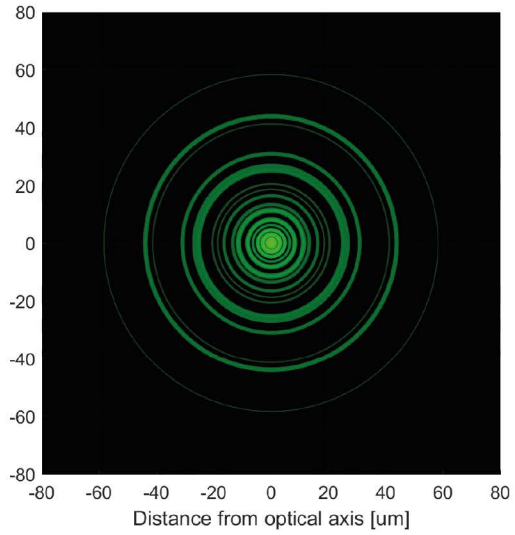
Liberty EPS 2.0



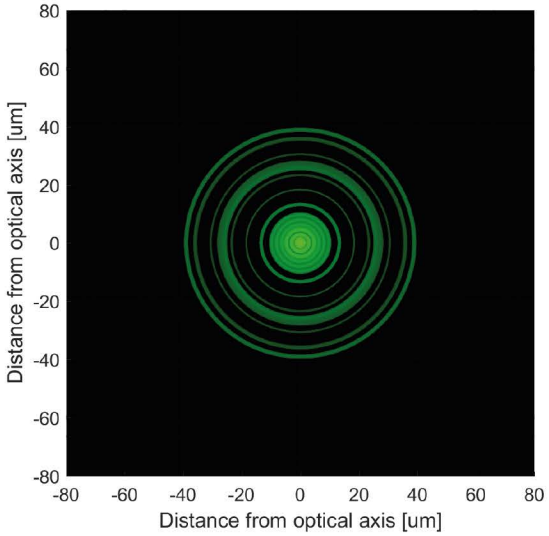
Liberty EPS 1.0

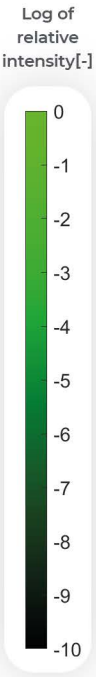


PanOptix



FineVision





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Technology Comparison

Axial MTF in ISO Model Eye: improved intermediate in EPS 2.0

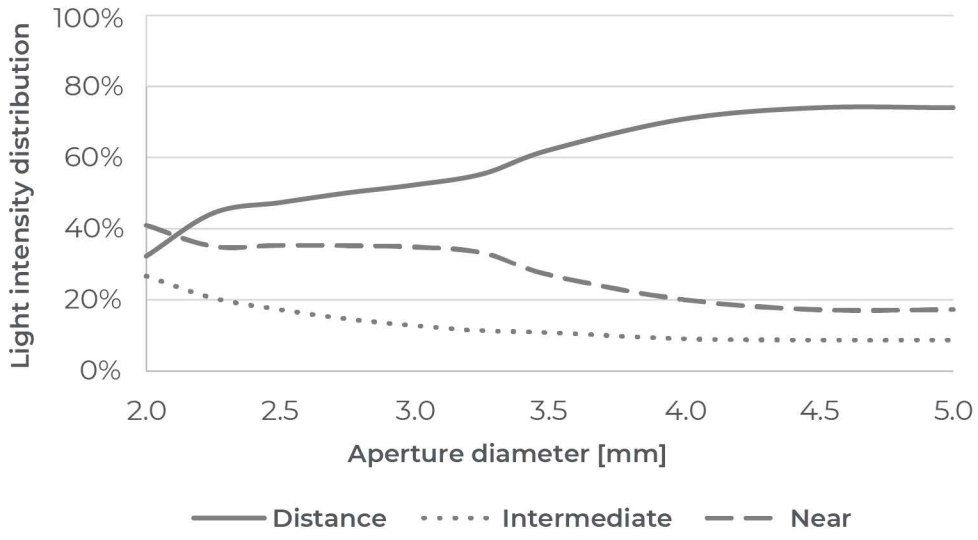
Axial MTF map

Axial Modulation Transfer Function (MTF) maps show the combination of 2D MTF and Through Focus MTF characteristics at a given aperture, providing a **visual representation of the contrast sensitivity distribution** and vision quality at different distances.

The images show MTF intensities (colouring) through different spatial frequencies (y) regarding the defocus power (x). MTF distribution is measured on a 3 mm aperture, the average pupil diameter in photopic conditions.

Compared to the EPS 1.0 technology, **the EPS 2.0 provides a remarkably higher intensity in the intermediate region,** especially at 15 cpd spatial frequency. In comparison with the two main market leaders (PanOptix and FineVision), **EPS 2.0 shows a more homogenous intermediate and more intense near MTF, resulting in superior visual quality at all distances.**

The QR code directs you to a simulation showing the MTF distribution change at ascending aperture widths. The MTF intensity dominance changes with the aperture between distances, as pupil diameter changes in different environments. Near power is more intense in photopic conditions (for reading), while far vision is most dominant in scotopic conditions, enabling the possibility of night driving.

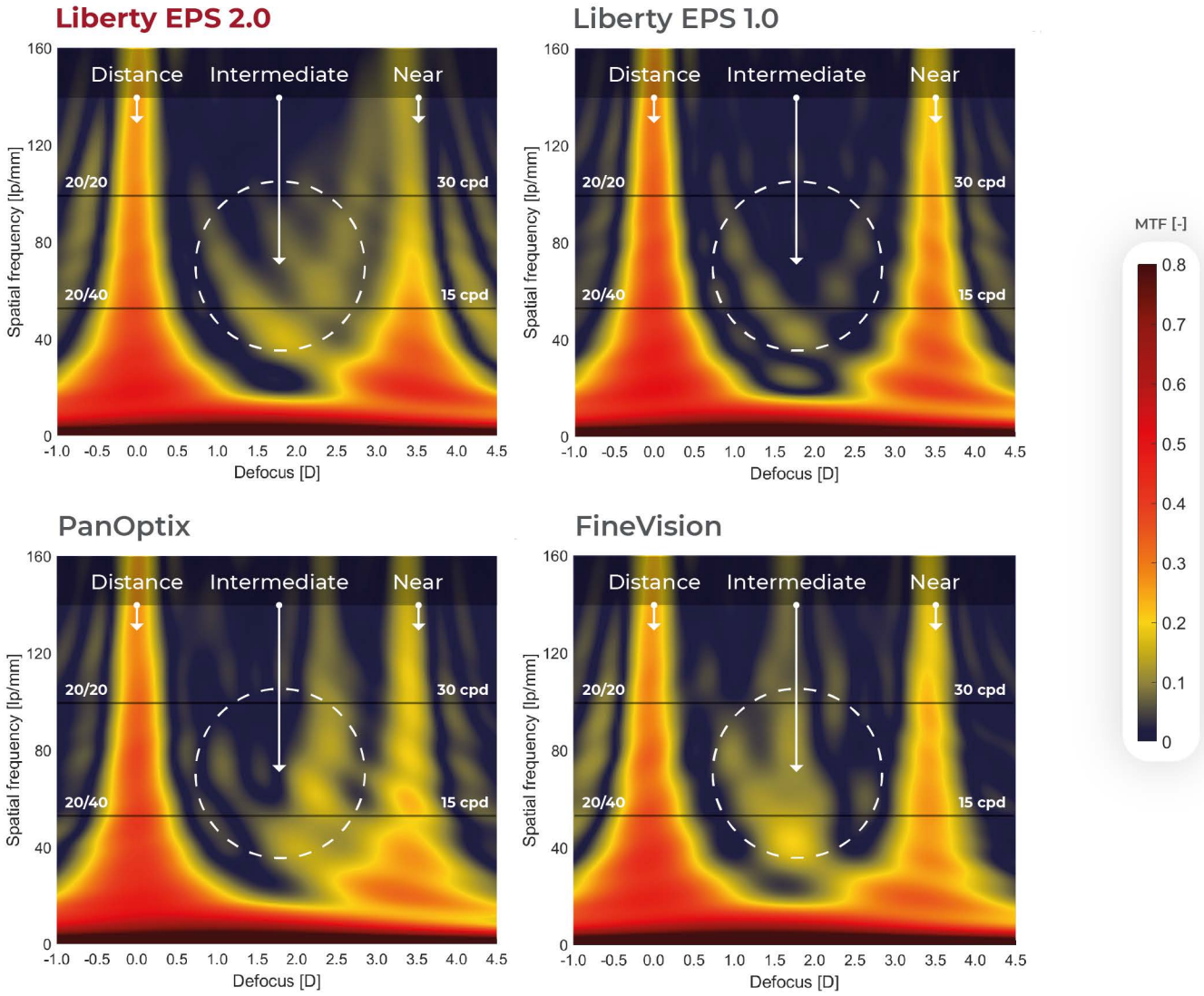


The light intensity measurements support the MTF simulation: as the aperture changes, the light distribution among the focal points changes accordingly.

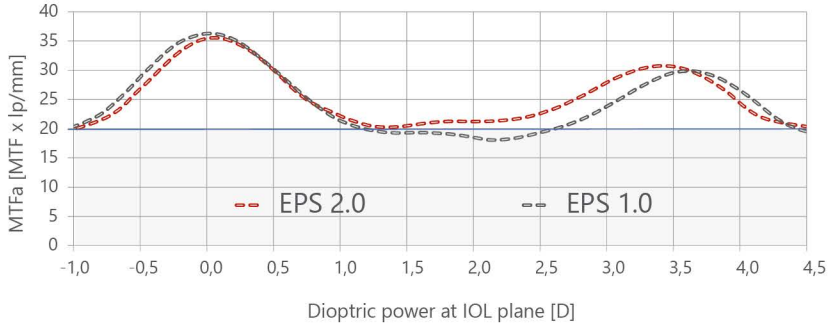
Technology Comparison

Extended effective MTF region with higher MTF values in the intermediate range results in higher contrast sensitivity and better visual acuity

Axial MTF in ISO Model Eye: improved intermediate in EPS 2.0.



MTFa @ISO I. model eye, 0-50 lp/mm, 3 mm aperture



EPS 2.0

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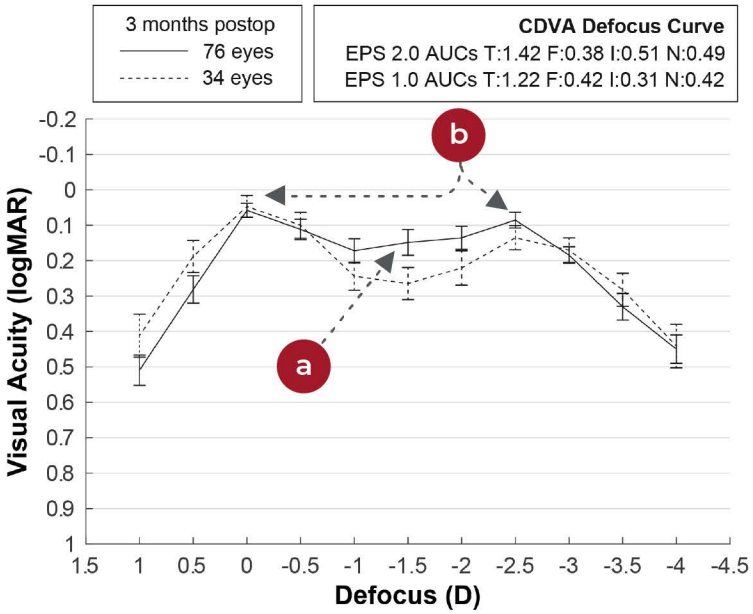
Clinical Outcomes

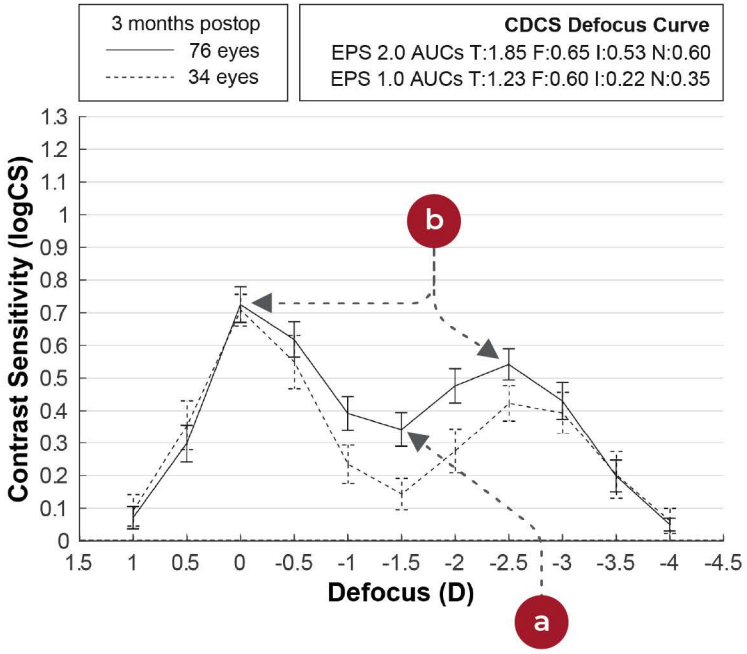
Confirm improved visual performance

Binocular visual acuity and contrast sensitivity defocus curves confirm **excellent visual acuity and visual quality** throughout the entire defocus range. [1]

EPS 2.0 Intermediate vision improved significantly compared to the previous technology without compromising distance and near vision. [1]



a Improved Intermediate Vision in the range from -1 to -2 D



b Provides Excellent Visual Performance without any loss in far and near vision

Both defocus curves were obtained 3 months postoperatively under photopic light conditions (85 cd/m2).

1. Fernández J. EPS – Pushing the limits in shifting the wavefront. Presented during the Faco Elche congress in 2022, Elche, Alicante, Spain.

Measurements were performed using the Qvision Multifocal Lens Analyzer. *(Fernández, J. et al. Fast Measure of Visual Acuity and Contrast Sensitivity Defocus Curves with an iPad Application. Open Ophthalmol J 13, 15–22 (2019).*

Clinical Measurements:

Low LDI (Light Distortion Index) values: high quality vision

The subjective perception of light distortion is an indicator of visual quality. The lower the light distortion index (LDI), the better the visual quality is.

The Liberty IOLs have lower LDI values compared to other multifocal IOLs on the market. The improved EPS 2.0 models' LDI is even lower than a monofocal lens.

Author	Year	IOL	LDI	
Short term			**Monocular (%)**	**Binocular (%)**
Brito P et al. [2]	2015	Tecnis ZCB00 **(Monofocal)**	24	15
		AT Lisa 839M (Tri)	47	29
		AT Lisa 909MP (Bi-Tor)	54	40
Alió et al. [3]	2018	AcrySof IQ Panoptix	37	24
Oliveira RF et al. [4]	2018	FineVision	33	23
Escandón García et al. [5]	2018	FineVision		29
		AcrySof IQ Panoptix		26
		Tecnis Symfony		35
Vargas V et al. [6]	2020	MPlus +1.5 / +3.0 D	21 / 27	
Fernández et al (Publication pending)	**3 month** **12 month**	**Liberty EPS 2.0 (640PM)**	**14 ± 7** **15 ± 8**	**13 ± 8**

The light-transmission analyser is a useful tool in the postoperative evaluation of the quality of vision conferred by multifocal IOLs. The software calculates the distortion index (DI) as the ratio of the area of points missed by the subject and the total area explored and is expressed as a percentage. The deviation of the obtained polygonal shape from the best-fit circle fit is called the best-fit circle irregularity (BFCI).[1-2]

Size & Shape Parameters

Light Distortion/Disturbance Index - *LDI [%]*

Best Fit Circle Radius BFC_{Radius} *[%]*

Regularity Parameters

LD Irregularity $BFC_{Irregularity}$ *[mm]*

$SD\ LD_{Irregularity}$ $BFC_{Irreg.SD}$ *[mm]*

2. Brito P et al. J Cataract Refract Surg. 2015;41(3):613–22
3. Alió J et al. Eur J Ophthalmol. 2018;28(4):419–24
4. Oliveira RF et al.. EJO. 2018:1-8
5. Escandón-García S et al. J Ophthalmol. 2018;2018
6. Vargas V et al.. J Refract Surg. 2020;36(12):796-803

EPS 2.0

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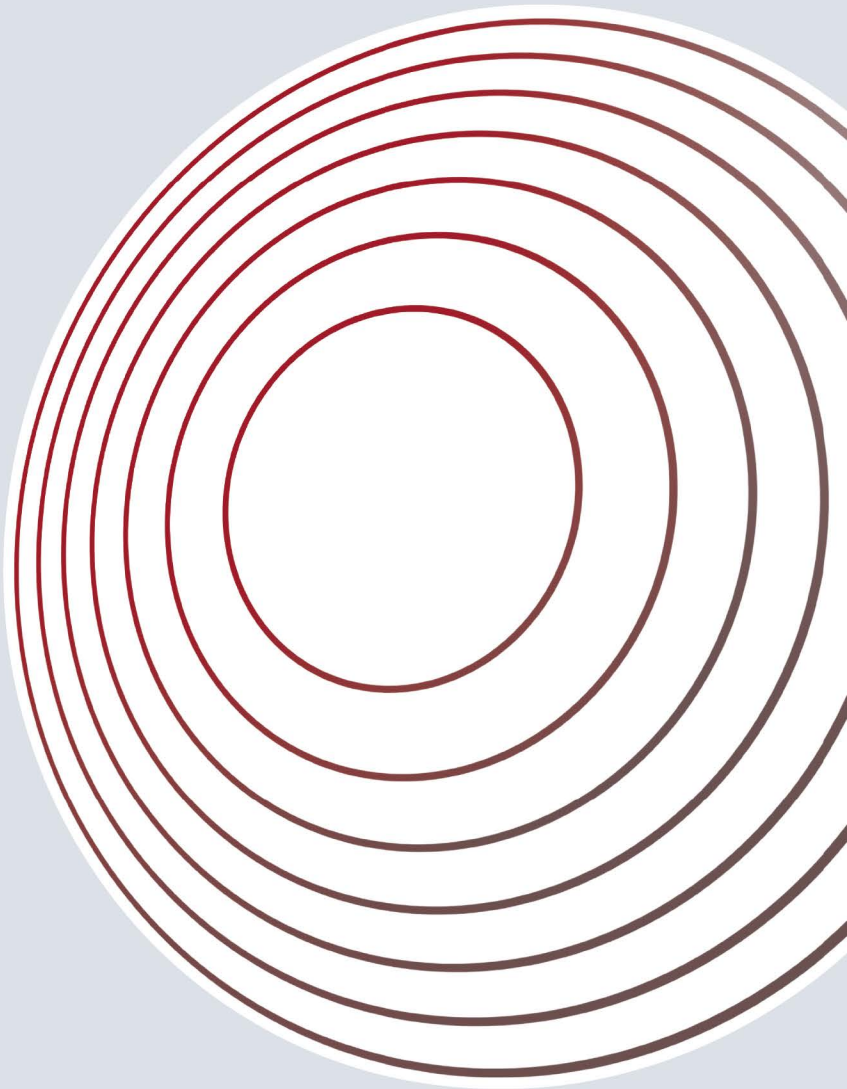

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