

Study Spotlight: ZEISS AT ELANA validated as an effective solution to reduce spectacle dependence



Bilateral implantation of AT ELANA® provides excellent range of visual quality from distance to near in agreement with preclinical optical bench testing.

Seeing beyond

Source



Title
Optical and clinical outcomes of a new diffractive trifocal intraocular lens



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Methodology

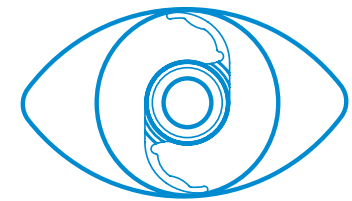
Clinical study

- Retrospective, all surgeries performed by same surgeon
- At 3-month follow-up, evaluation of:
 - Corrected (CVDA) and uncorrected (UDVA) monocular and binocular distance visual acuities, binocular distance-corrected intermediate (DCIVA, 60cm) and near visual acuity (DCNVA, 40cm)
 - Manifest refraction
 - Binocular defocus curve from +2.0 to -5.0D
 - Binocular photopic and mesopic contrast sensitivity
 - Halo and glare assessment (frequency & bothersomeness)

Optical performance

- Modulation transfer function (MTF) at 3.0 and 4.5mm aperture between defocus range of +1.0 to -3.5D in 0.10 D steps
- Through-focus MTF (TF-MTF) at 50 cycles/mm
- TF-MTF area curves normalized according to $1/50 * MTF_a$.

Sample size



AT ELANA 841P

- 80 eyes/40 patients – Mean age: 62.3 years
- when appropriate, 1 or 2 clear corneal incisions for correction of corneal astigmatism between 0.75 and 1.50D
 - Capsular tension ring implanted in all eyes

Results

Optical bench performance

The TF-MTF curve showed peaks at **0.0D, -1.25D and -2.50D** at the spectacle plane corresponding with the IOL plane add powers of AT ELANA (figure 1).

The TF-MTFa curve revealed **optimal optical quality at distance (0.0D)** and **extended range of focus up until -2.75D** at the spectacle plane (figure 2).

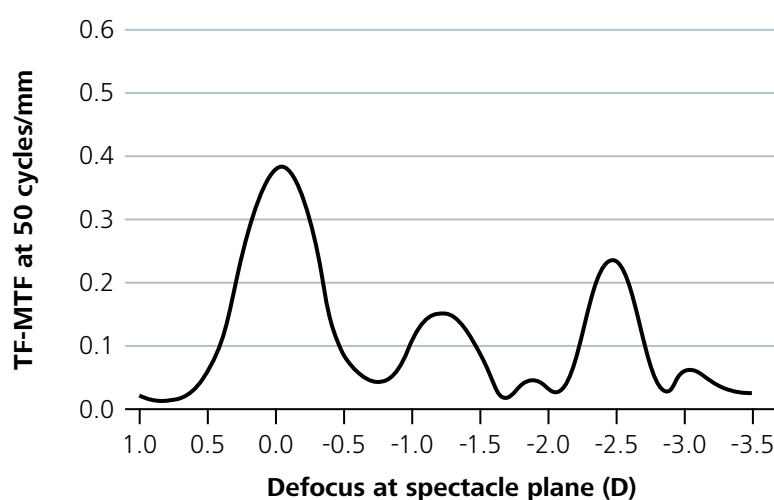


Figure 1: TF-MTF at 50 cycles/mm at 3mm aperture

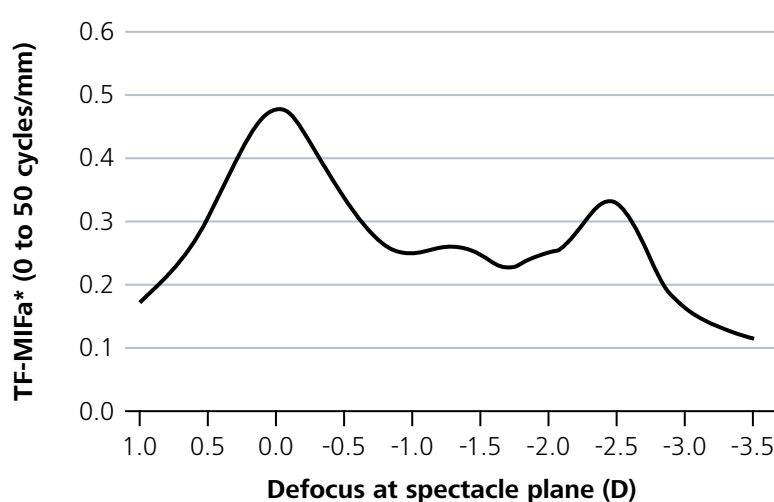


Figure 2: TF-MTF area at 50 cycles/mm at 3mm aperture

Visual acuity and refractive outcomes

Mean binocular distance-corrected visual acuities showed good performance for far, intermediate and near distances (figure 3). Binocularly, all patients achieved CDVA of 0.0 logMAR or better, while almost all patients achieved distance-corrected visual acuity of 0.2 logMAR or better at 60cm and 40cm (figure 4).

At 3 months postoperatively, the mean spherical equivalent (SE) was -0.07 ± 0.38 D, with **91% of eyes within ± 0.50 D of SE target refraction**.

VA	Binocular (40 patients)
UDVA/CDVA	$0.01 \pm 0.02 / -0.01 \pm 0.03$
DCIVA (60cm)	0.04 ± 0.11
DCNVA (40cm)	0.03 ± 0.07

Figure 3: Distance-corrected binocular visual acuities at 3 months (logMAR)

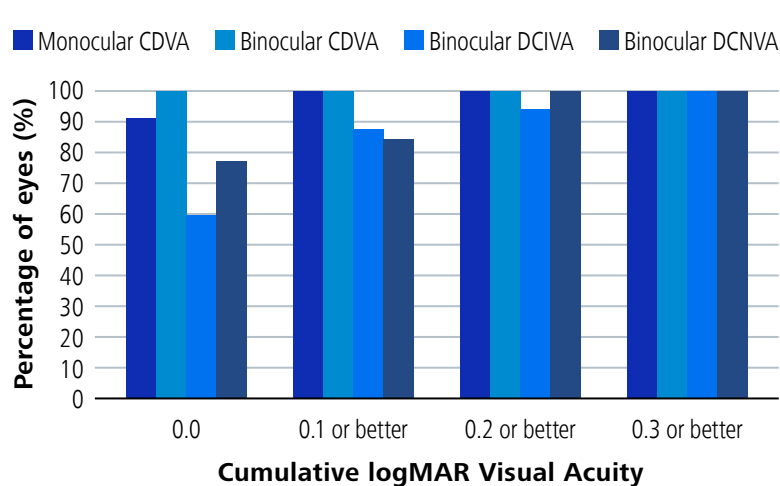


Figure 4: Cumulative monocular and binocular visual acuities at 3 months (logMAR)

Defocus curve performance

The binocular defocus curve measurement included patients with monocular CVDA of 0.0 logMAR. Tested patients had a **mean VA better than 0.1 logMAR from +0.50D to -2.5D**. All patients reached binocular VA of 0.2 logMAR or better at 66, 50 and 40cm (-1.5D, -2.0D and -2.5D) and VA of 0.3 logMAR or better at 33cm (-3.0D).

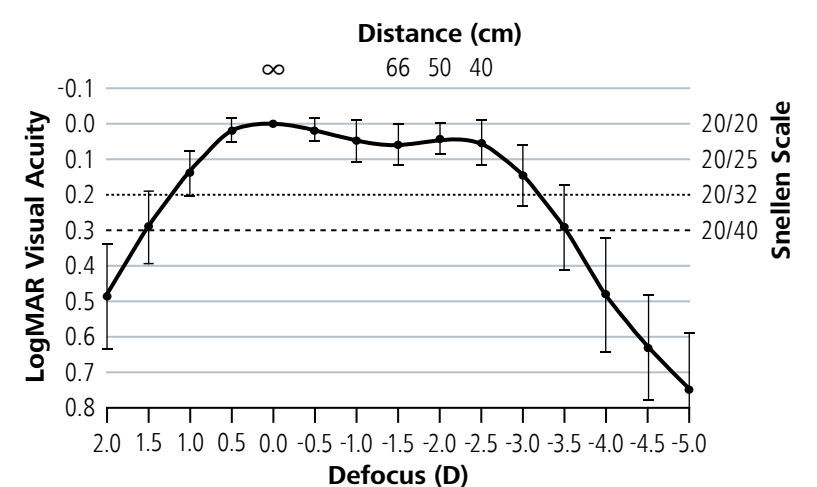


Figure 5: Mean binocular visual acuity (logMAR) with best correction for distance

Contrast sensitivity (CS) and visual symptoms

The CS function under photopic and mesopic conditions at the 3-month visit was **within normal limits**. **85% of patients did not report any visual disturbances**, while the remaining 15% experienced halo. **4 out of 40 patients categorized the halos as moderate** in terms of intensity with a frequency of occurrence "most of the time", while **2 patients** reported them as **slightly bothersome** with a **very rare** frequency.