



Functional Outcome After Implantation of a New Aspheric Trifocal Lens (+/- Torus)

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D. Breyer & H. Kaymak exercise consulting work for the listed companies:

- Alcon
- AMO
- Carl Zeiss Meditec
- Domilens
- Fluoron
- Geuder
- Oculentis
- Revision Optics
- Topcon





- Lisa 839M™ and Lisa 939M™: trifocal IOL +/- torus
 - Lisa 839M™: aspheric, trifocal, Addition +3.33 D & 1.66 D
 - Lisa 939M™: aspheric, trifocal, bitoric, Addition +3.33 D & 1.66 D
- Clinical Study: Comparison of different MIOL (approved by ethic committee)
- Retrospective analysis of:
 - ✧ Subjective refraction
 - ✧ Visual Acuity at distinct distances (mono- und binocular)
 - ✧ Contrast sensitivity (Ginsburg-Box)
 - ✧ Photopsia
 - ✧ Questionnaire



Subjektive Refraktion



Contrast Sensitiviy

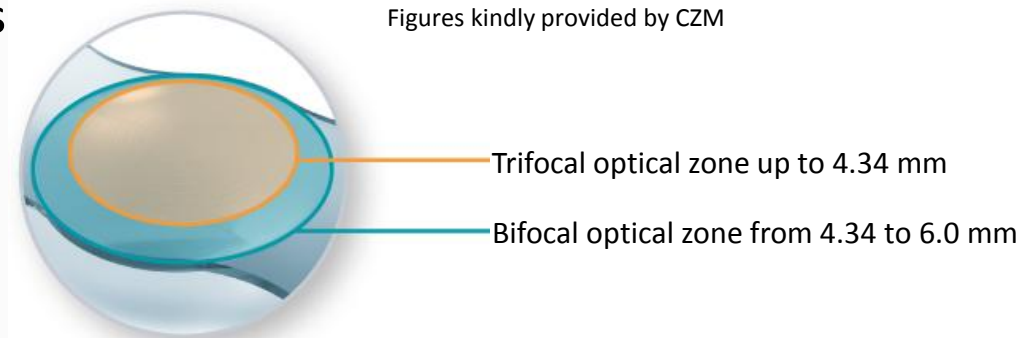
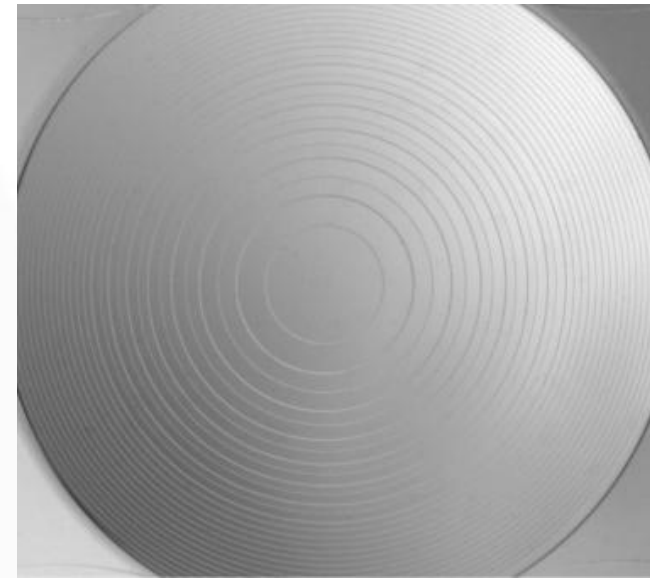


- ⇒ Optical zone of trifocal LISA : multifocal (by diffraction) until radius 4.34 mm, bifocal from 4.34 to 6 mm radius
- ⇒ Aspherical correction
- ⇒ Hydrophobic surface, but hydrophilic core material
- ⇒ Design of LISA multifocal optical zone:

Reduced number of rings

Reduced number of diffractive elements
= reduced light scattering at diffractive
grid?

Reduced Photopsia?





- Disadvantages of previous toric MIOL:
 - Only Dual Focality
 - Halos & Glare = Photic Phenomena
- Advantage Bitoricity:
 - Lens thickness and body volume of bitoric IOLs are reduced if compared to monotoric aspherical IOLs => facilitates improved injection behavior, MICS
 - Ametropia profit from lowered Modular Transfer Function (MTF) and Point Spread Function (PSF)
 - Increased optical zone of the bitoric IOL vs. monotoric IOL => better suited for large pupils while being MICS capable

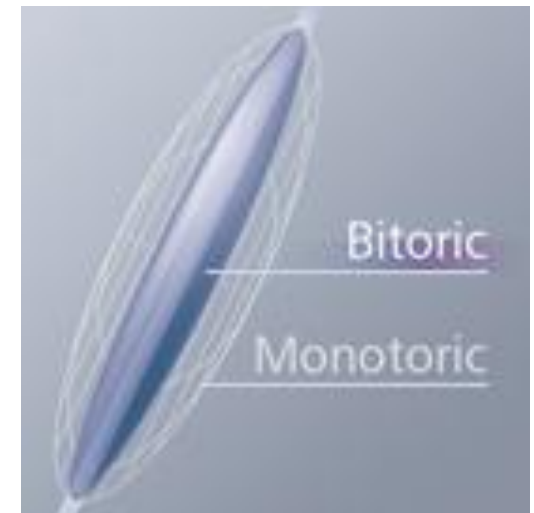
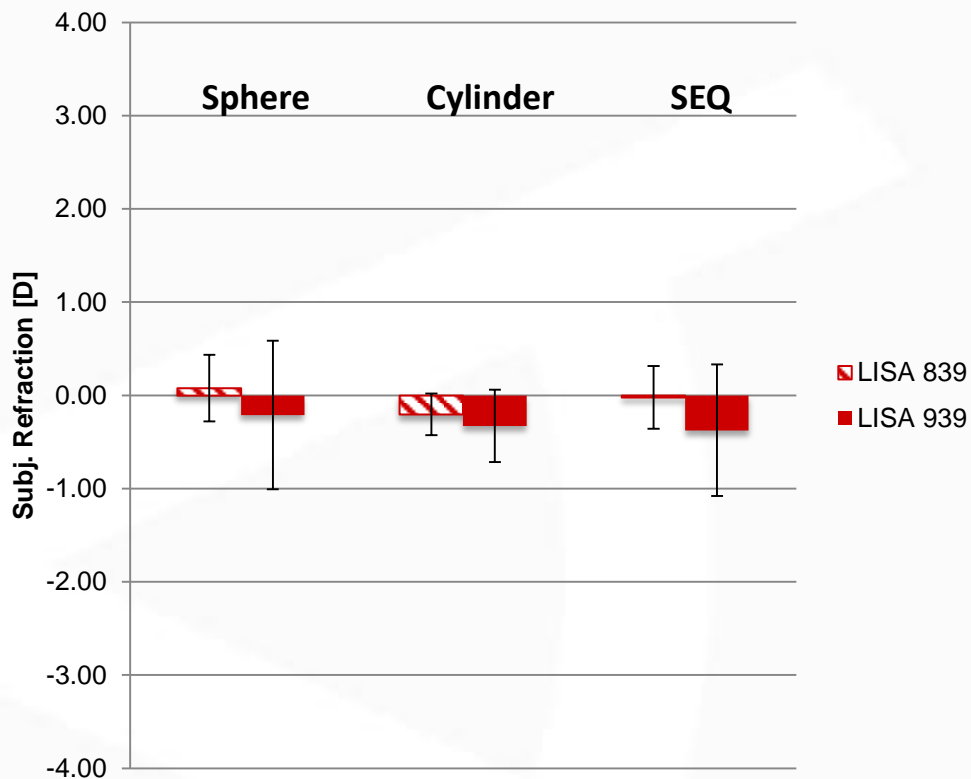


Figure kindly provided by CZM

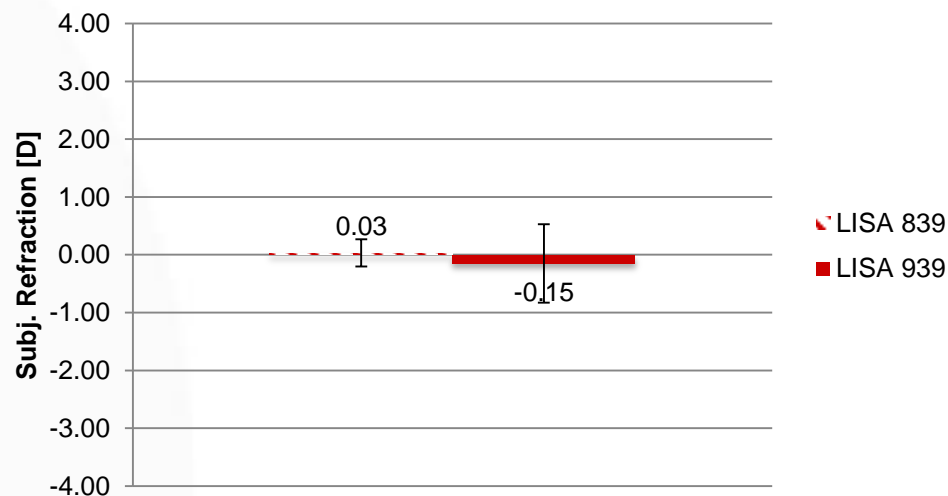


	LISA 839M [®]	LISA 939M [®]
Number of patients	38	21
Age [years]	63 ± 9	57 ± 10
Sphere [Diopters, D]	1.26 ± 2.06	-0.39 ± 3.08
Cylinder [D]	-0.53 ± 0.39	-1.38 ± 0.92
Spherical Equivalent SEQ [D]	1.00 ± 2.13	-0.30 ± 3.15
Refractive Power of IOL implanted [D]	22.0 ± 2.4	20.4 ± 4.0

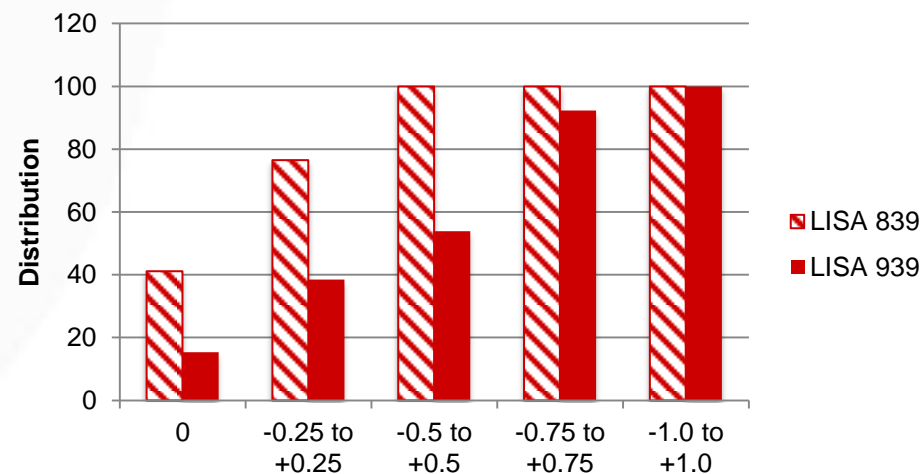
Postoperative Subjective Refraction



Difference SEQ (attempted - achieved)



Distribution of SEQ



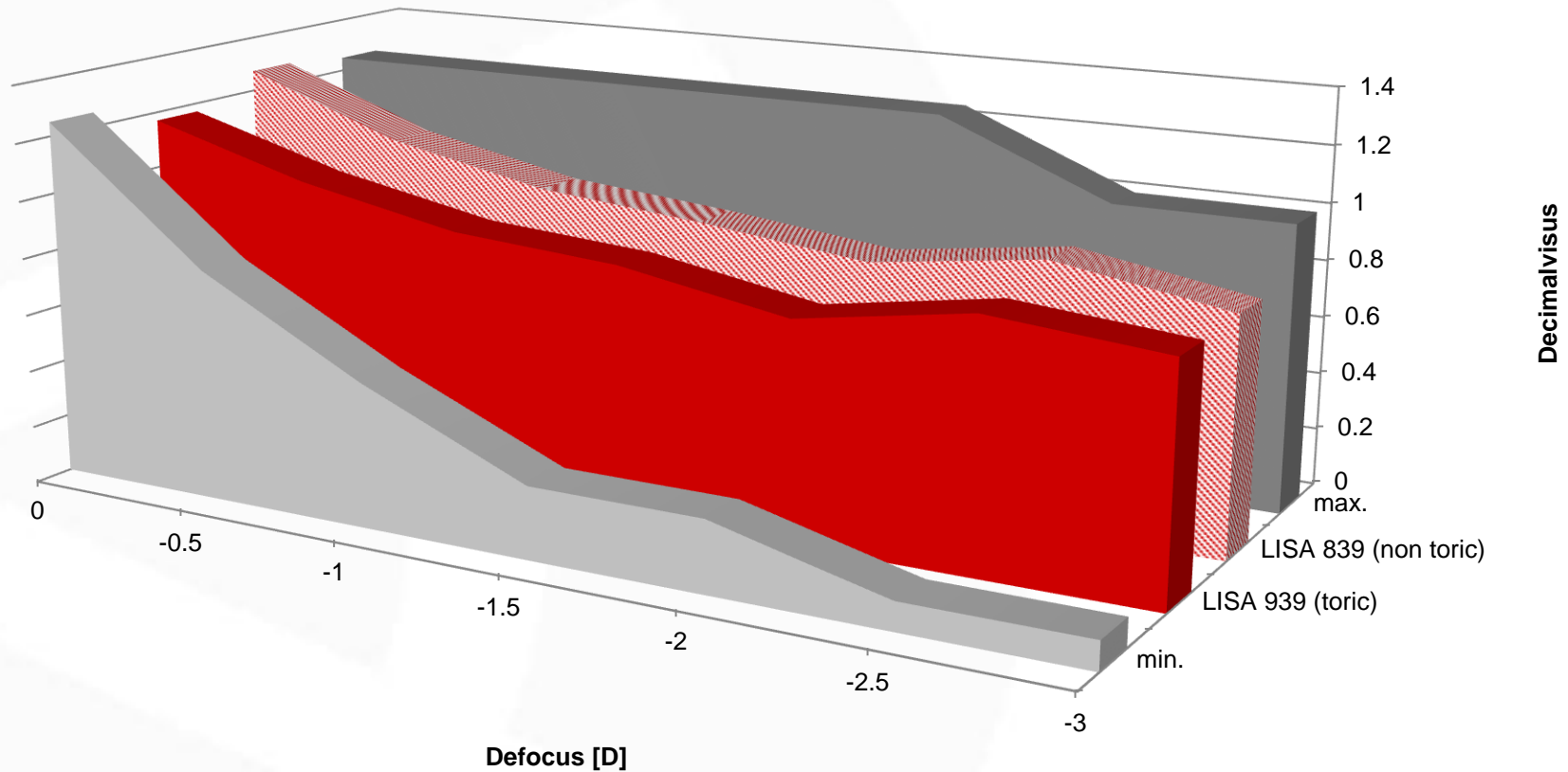
⇒ Refraction results very close to emmetropia

⇒ **Frieling-Reus EH**, (J. C. *Refract Surg.* 2013;39:1485-93): SEQ outcome of bifocal (previous generation) AT.LISA909® -0.13 ± 0.33 D (26 eyes)

MIOL-Capacity: Area Under Defocus Curve Between -3.0 and 0.0 D

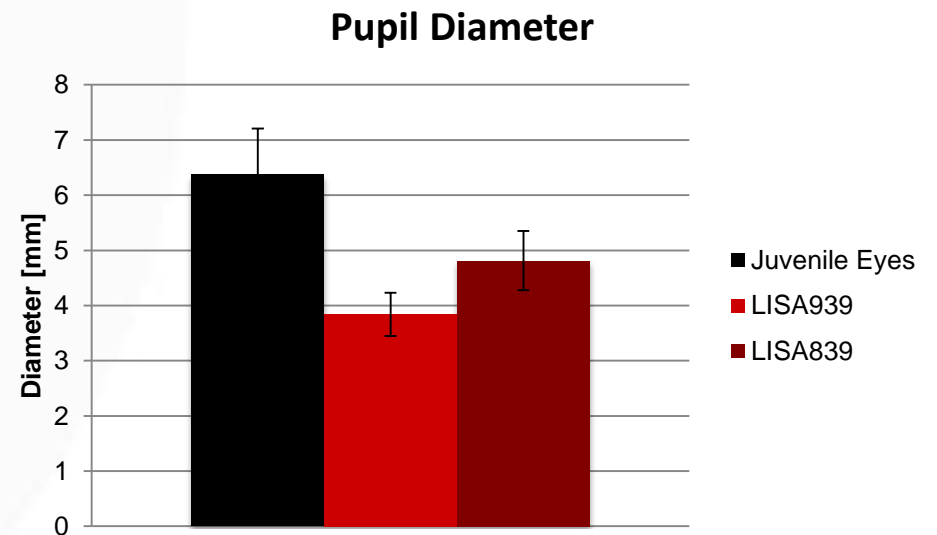
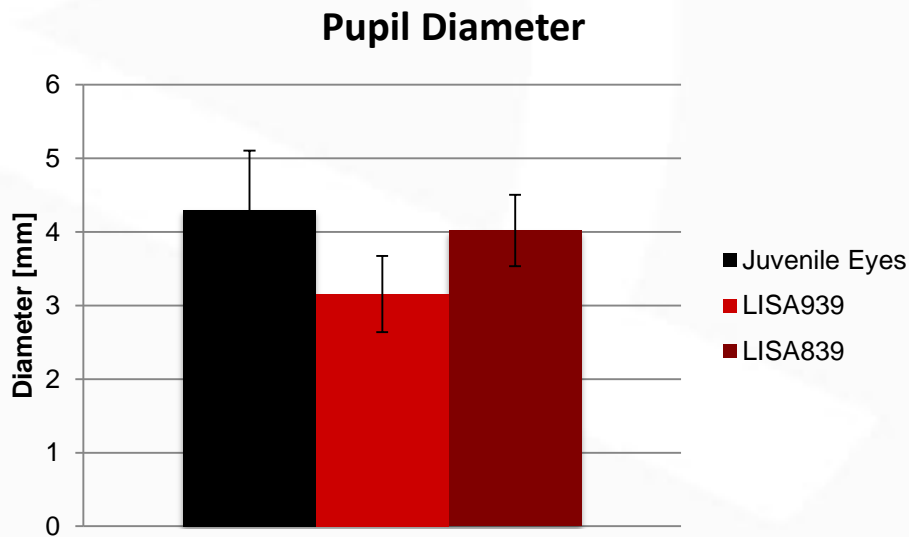
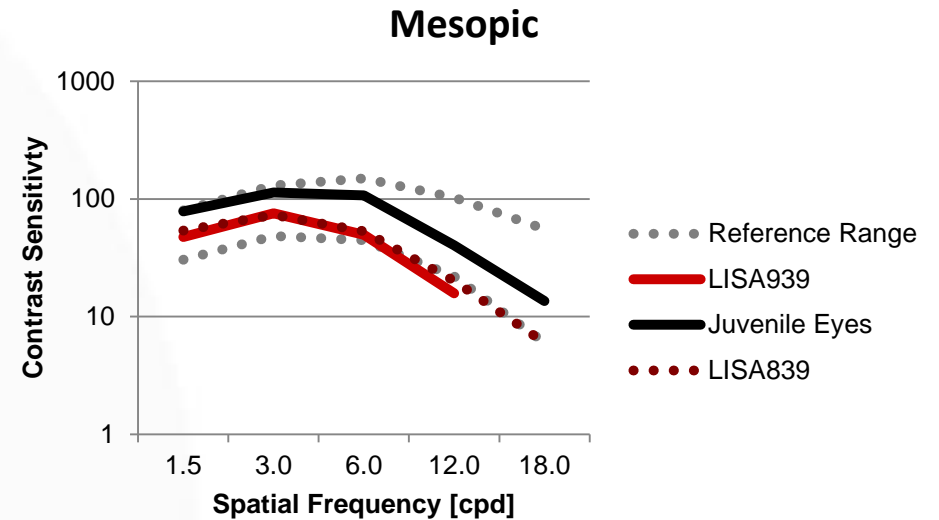
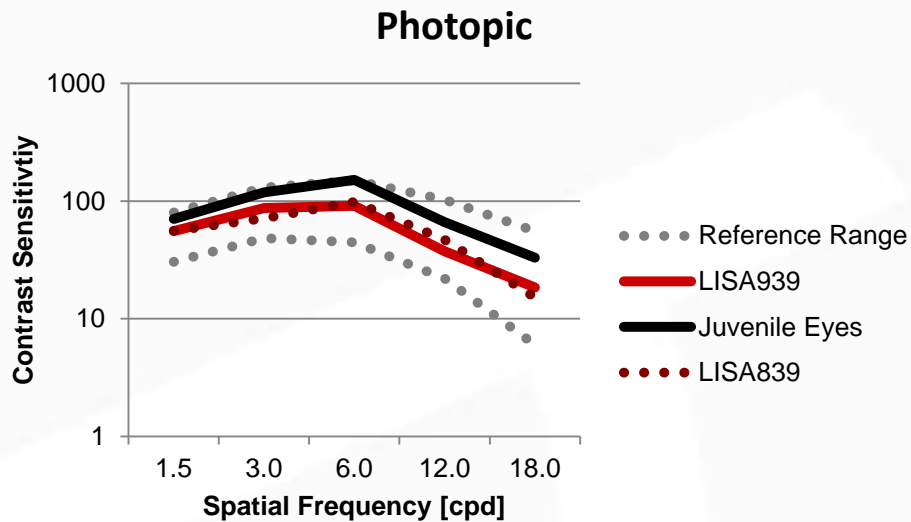


LISAtri-Defocus compared to Min.-&Max.Defocus



	Monofocal IOL	LISA839®	LISA939®
% of Phakic Eyes	46 %	82 %	77 %

Contrast Sensitivity With Ginsburgbox: Both Trifocal LISA-Sisters



=> Mesopic Contrast Sensitivity Seems To Depend On Not Only The Pupil Diameter

- Halos are reported in over 90 % of our patients, but concordantly not disturbing after a few months
- Halos are mostly recognized as a tripllett of fine but discrete rings(Typ T2), no starburst after 3 months

Simulation: 3 months postop. LISA 939®



Simulation: 3 months postop. LISA 839®





General experiences

Patients report a high contentment:

- Reading and intermediate distance
- Vision quality over a large distance range
- Daily routine is mostly independence of glasses

Individual experiences

- Excellent intermediate vision: PC based job is unproblematic without glasses over entire working day
- Conducting vehicles under mesopic conditions is not a problem, instrument panel and far distance can be seen without glasses
- Even instruction manuals or product information can be read without problems

