



RESIDUAL ASTIGMATISM THRESHOLD AND PATIENT SATISFACTION WITH BIFOCAL, TRIFOCAL AND EDOF IOLS

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PRESBYOPIA CORRECTING IOLS

- Different designs
 - Diffractive, 2 focal points
 - Diffractive, 3 focal points
 - Diffractive, echalette for extended range of vision
 - Asymmetrically refractive
- Designed to provide spectacle independence
 - Plano with no astigmatism



PRESBYOPIA CORRECTING IOLS

When outcome is not plano:

- Decreased uncorrected visual acuity and spectacle independence
- Increased night-vision symptoms

Personal experience indicated that the amount of residual astigmatism does not impact in the same way for different presbyopia correcting IOLs



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Residual Astigmatism Threshold and Patient Satisfaction with Bifocal, Trifocal and Extended Range of Vision Intraocular Lenses (IOLs)

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Abstract

Purpose: To compare the impact of induced astigmatism with four different types of multifocal intraocular lenses (MIOLs). **Methods:** Prospective, comparative, interventional, non-randomized study, including 80 eyes of patients with implantation of four different MIOLs: AcrySof ReSTOR +2.5 D (20 eyes), AcrySof ReSTOR +3.0 D (20 eyes), AcrySof Panoptix (20 eyes) (Alcon Laboratories, Inc., Fort Worth, TX, USA), and Tecnis Symfony Z8300 (Abbott Medical Optics, Santa Ana, USA) (20 eyes). Patients were followed up for 3 months after surgery. Major parameters were uncorrected (UDVA) and corrected (CDVA) distance visual acuity, subjective refraction and patient satisfaction. **Results:** Differences between IOLs with regard to the impact of the cylinder sign and axis on visual acuity and patient satisfaction were not significant. With mild added negative cylinder, AcrySof ReSTOR +2.5 D and Tecnis Symfony IOLs maintained the baseline visual acuity, while it was mildly reduced with AcrySof ReSTOR +3.0 D and Panoptix IOLs. With moderate induced cylinder, the Tecnis Symfony IOL maintained good visual acuity and patient associated satisfaction. Panoptix IOL was the IOL most affected by the induced astigmatism with regard to dissatisfaction and visual acuity. The highest tolerance to the astigmatic distortions and bluriness induced with a -1.50 D cylinder was obtained with the Tecnis Symfony IOL. Tecnis Symfony IOL showed less dissatisfaction and less reduction of visual acuity than the other MIOLs. **Conclusion:** Simulated residual cylinders after the implantation of the Tecnis Symfony IOL, even at 1.50 D, have a less well and less disruptive



PURPOSE OF THE STUDY

To assess the astigmatism threshold for different presbyopia correcting IOLs

- Impact on visual acuity
- Impact on satisfaction



STUDY POPULATION

- 80 eyes of patients who underwent presbyopia correcting IOLs implant, having 1.2 decimal fraction best distance vision (uncorrected or spectacle corrected)
- 20 AcrySof IQ ReSTOR 3.0
- 20 AcrySof IQ ReSTOR 2.5
- 20 Acrysof IQ Panoptix
- 20 Tecnis Symfony



MAIN OUTCOME MEASURES

All measurements were carried out at 4 meters and with phoropter

1. Measurement of residual refractive error (OPD scan III and manifest refraction)
2. Assessment of best spectacle corrected visual acuity (or uncorrected visual acuity when no residual refractive error). 1.2 mandatory
3. Assessment of visual acuity values when adding cylinder lenses with phoropter (minus and plus, always 90° and 180°). No sphere lenses were added
4. Satisfaction tolerance threshold was asked at each assessment value



MAIN OUTCOME MEASURES

Eligibility criterion: 1.2 decimal fraction best spectacle corrected visual acuity

- 0.25 D to 1.50 D lenses were added, (0.25 D increment)
- Both minus and plus values
- Both 90° and 180°
- Satisfaction was subjectively assessed in a scale 0-3 (satisfied to unsatisfied) format



MAIN OUTCOME MEASURES - EXAMPLE

Residual refractive error +0.25 sphere, -0.50 D cyl x 180°

1. BSCVA (+0.25 D sphere, -0.50 D cyl x 180°)= 1.2 (decimal fraction)
 2. Add -0.25 up to -1.50 D cyl x 90° and record visual acuity
 3. Add -0.25 up to -1.50 D cyl x 180° and record visual acuity
 4. Add +0.25 up to +1.50 D cyl x 90° and record visual acuity
 5. Add +0.25 up to +1.50 D cyl x 180° and record visual acuity
- For each added value, satisfaction was asked

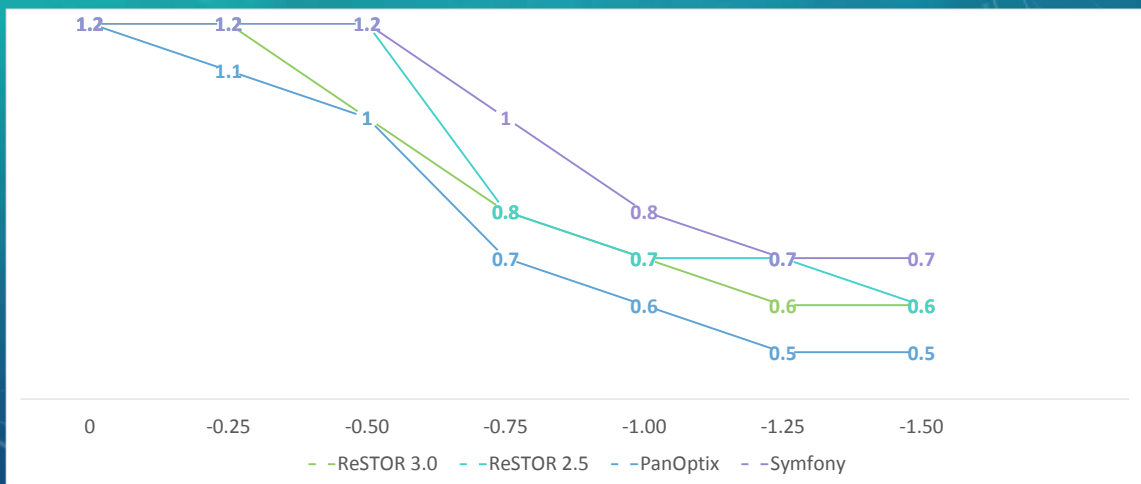


RESULTS

- No differences for astigmatism axis orientation for both minus and plus add
- Data collected as median values and range



MEDIAN VISUAL ACUITY BEHAVIOUR





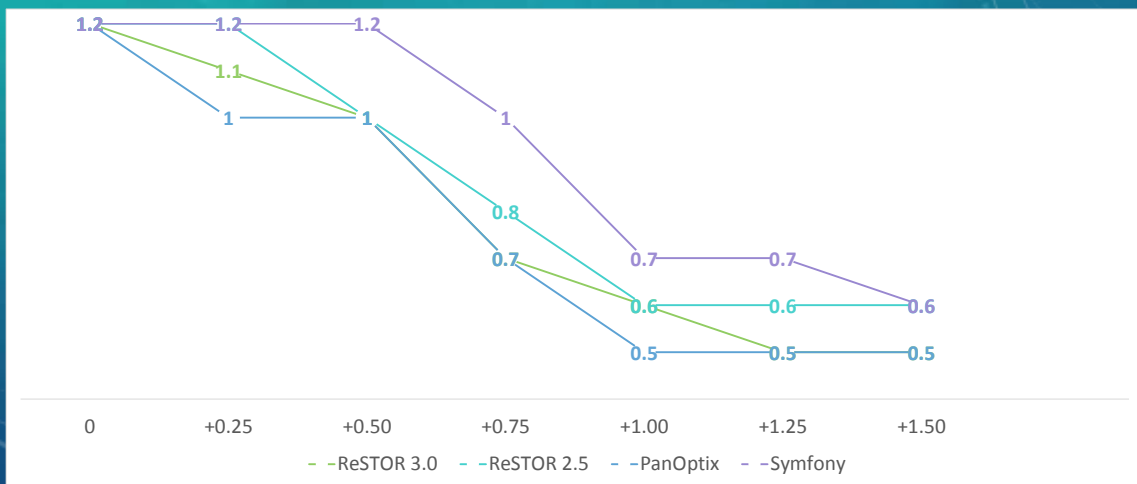
SATISFACTION SCORE MEDIAN VALUE (VA RANGE)

Minus values	-0.25 D	-0.50 D	-0.75 D	-1.00 D	-1.25 D	-1.50 D
ReSTOR 3.0	1.2 (1.1-1.2)	1.0 (0.9-1.2)	0.8 (0.7-1.0)	0.7 (0.6-0.7)	0.6 (0.6)	0.6 (0.5-0.6)
ReSTOR 2.5	1.2 (1.2)	1.2 (1.0-1.2)	0.8 (0.7-1.0)	0.7 (0.7)	0.7 (0.6-0.7)	0.6 (0.5-0.7)
PanOptix	1.1 (1.1-1.2)	1.0 (0.9-1.0)	0.7 (0.7-0.8)	0.6 (0.5-0.7)	0.5 (0.5-0.6)	0.5 (0.4-0.5)
Symfony	1.2 (1.2)	1.2 (1.2)	1.0 (0.8-1.0)	0.8 (0.7-0.9)	0.7 (0.6-0.8)	0.7 (0.6-0.7)

Satisfied → → Unsatisfied



MEDIAN VISUAL ACUITY BEHAVIOUR





SATISFACTION SCORE MEDIAN VALUE (VA RANGE)

Plus values	+0.25 D	+0.50 D	+0.75 D	+1.00 D	+1.25 D	+1.50 D
ReSTOR 3.0	1.1 (1.1-1.2)	1.0 (0.9-1.2)	0.7 (0.7-0.9)	0.6 (0.6-0.7)	0.5 (0.5-0.6)	0.5 (0.4-0.5)
ReSTOR 2.5	1.2 (1.2)	1.0 (1.0-1.2)	0.8 (0.7-1.0)	0.6 (0.6-0.7)	0.6 (0.5-0.6)	0.6 (0.5-0.6)
PanOptix	1.0 (1.0-1.2)	1.0 (0.9-1.0)	0.7 (0.6-0.8)	0.5 (0.5-0.7)	0.5 (0.5-0.6)	0.5 (0.4-0.5)
Symfony	1.2 (1.2)	1.2 (1.2)	1.0 (0.8-1.0)	0.7 (0.7-0.9)	0.7 (0.6-0.8)	0.6 (0.6-0.7)

Satisfied
→
→
Unsatisfied



COMMENTS ON RESULTS

- No differences between 180° and 90° when adding cylinder
- All tested multifocal IOLs seem to provide good visual acuity when adding cylinder up to 0.50 D (both minus and plus values)
- When adding cylinder values greater than 0.50 D, plus add seems to have greater impact on visual acuity than minus add
- Satisfaction scores drop significantly for add cylinder values greater than 1.00 D



COMMENTS ON RESULTS

- The EDOF IOL (Symfony) seems to be the least sensitive to add cylinder, both as regards visual acuity and satisfaction scores.
Threshold level 1.00 D
- The two bifocal IOLs behaviour is very similar, with the ReSTOR 2.5 being slightly less sensitive to add cylinder than the ReSTOR 3.0.
Threshold level 0.75 D
- The trifocal IOL (PanOptix) seems to be the most sensitive to add cylinder, both as regards visual acuity and satisfaction scores.
Threshold level 0.50 D



CONCLUSIONS FROM THE PRESENT STUDY

- Different multifocal IOLs play differently
- 0.75 D induced cylinder is the threshold value starting with the vision is compromised and patients are unsatisfied
- Residual astigmatism need to be 0.50 D or lower for best performances and highest patients satisfaction

