Comparison of Visual Performance and Optical Quality with 2 Multifocal IOLs

Fernando De Bortoli Nogueira

Hospital Oftalmológico de Brasilia HOB, Brazil

Lilian C. Espírito Santo – Wilson T Hida – Mario A. Chaves – Daniela Rezende – Lamartine V. Porfirio – Patrick Tzelikis - Milton Ruiz Alves

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Introduction

- Despite the multifocal intraocular lenses provide a relatively good near and far vision, a limitation of such lenses is the dispersion energy, which leads to the formation of glare, halos and reduction of contrast sensitivity, which compromises the quality of vision.

- In clinical practice, the optical quality can be assessed by measurement of visual acuity with high contrast optotypes. However, the measurement of visual acuity alone does not correspond to physiological functional vision in daily situations.

Purpose

- To evaluate and to compare the visual performance and optical quality between two diffractive multifocal intraocular lenses:
  - Tecnis® three-piece model ZMA00 and
  - AcrySof ReSTOR® one-piece model SN6AD1

Patients and Methods

- Prospective, comparative and nonrandomized study
- 68 eyes of 34 patients.
- The results were compared before surgery and after 180 days.
- Exclusion criteria: any previous eye surgery; any other ocular disease or even systemic diseases that could had reduced visual field or contrast sensitivity; corneal astigmatism greater than 1.00 cylinder diopter.
- Same Surgeon (W.T.H.), phacoemulsification using 2.4 mm near clear cornea incision at the steepest axis.

Patients and Methods

Objective measures pre and post operative:

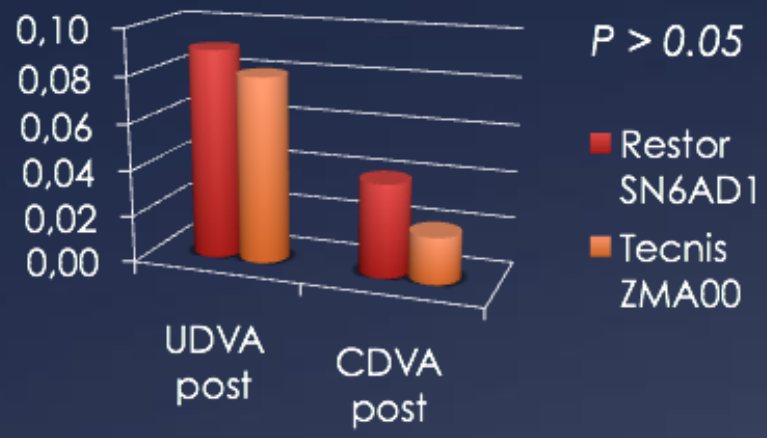
- ✓Refractive error
- ✓uncorrected distance (UDVA) and corrected distance (CDVA), intermediate and near visual acuities (ETDRS testing – 6m, 70cm and 33cm)
- ✓contrast sensitivity under photopic and mesopic conditions (Optec 6500P – Stereo Optical Company)
- ✓Wavefront analysis (OPD – Scan III – Nidek)
- ✓Defocus curve (ETDRS 6m, 0.50 spherical diopters steps, from -5.00 D to +2.50 D).

Subjective evaluation

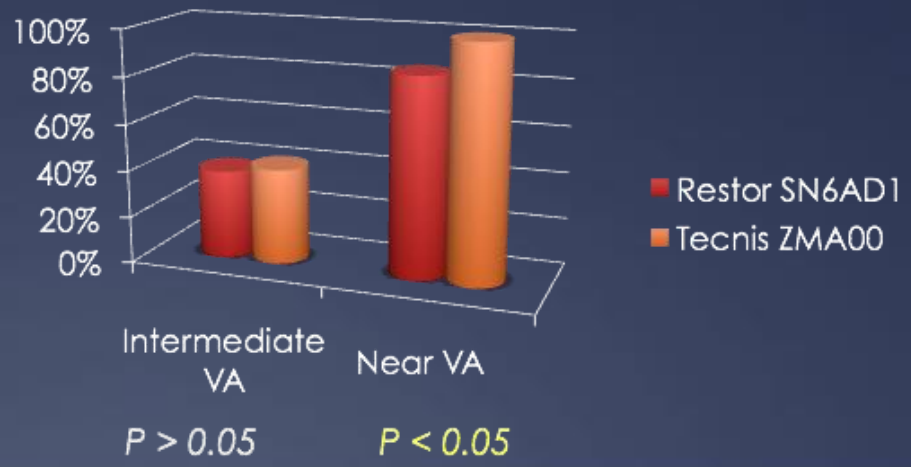
- ✓the "TYPE Questionnaire": visual satisfaction questionnaire

Visual Acuity

Evaluation of uncorrected visual acuity and best corrected visual acuity postoperatively with both lenses

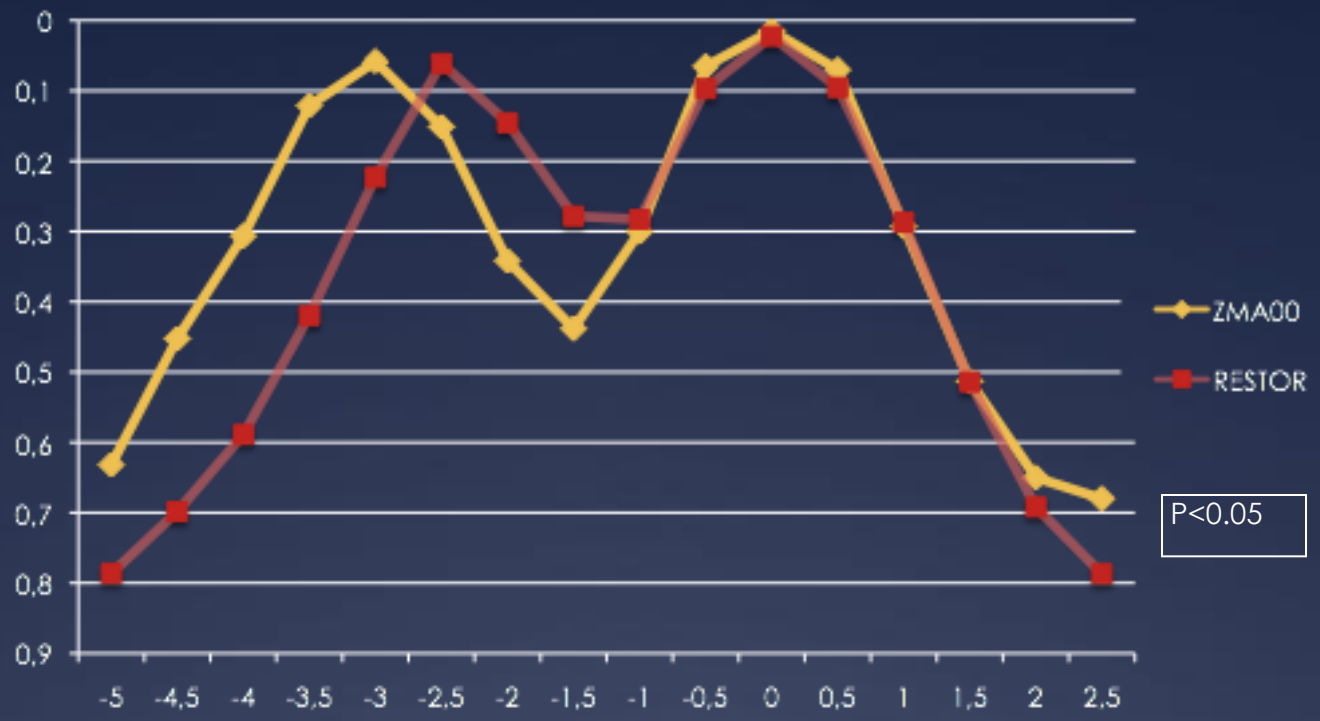


Percentage of patients who achieved J1 or J2 in corrected intermediate and near visual acuity



Tecnis ZMA00 lens showed better near visual acuity, statistically significant compared with the ReStor SN6AD1

Defocus Curve

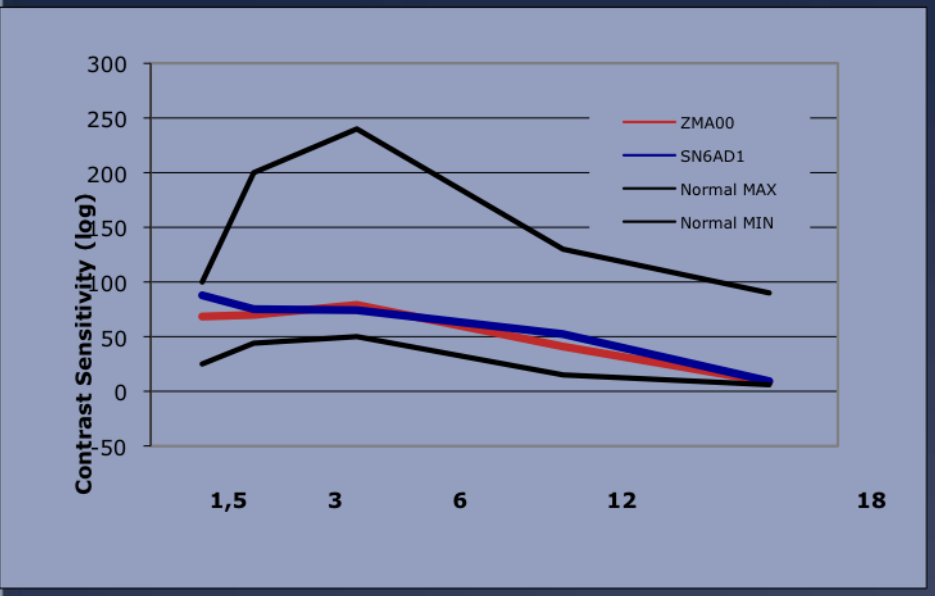


Between -2.50 and -1.50D: ***Restor SN6AD1*** *had better results (P<0.05)* → ***intermediate visual acuity***
Between -5.00 and -3.00D: ***Tecnis ZMA00*** *had better results (p<0.05)* → ***near visual acuity***

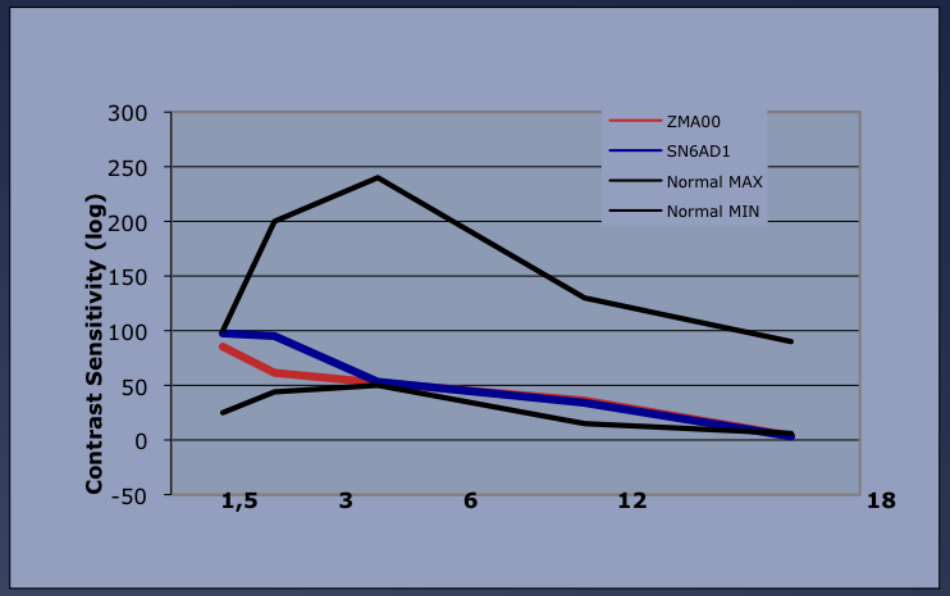
As had been described by several authors! [1,2]

Contrast Sensitivity

Photopic conditions



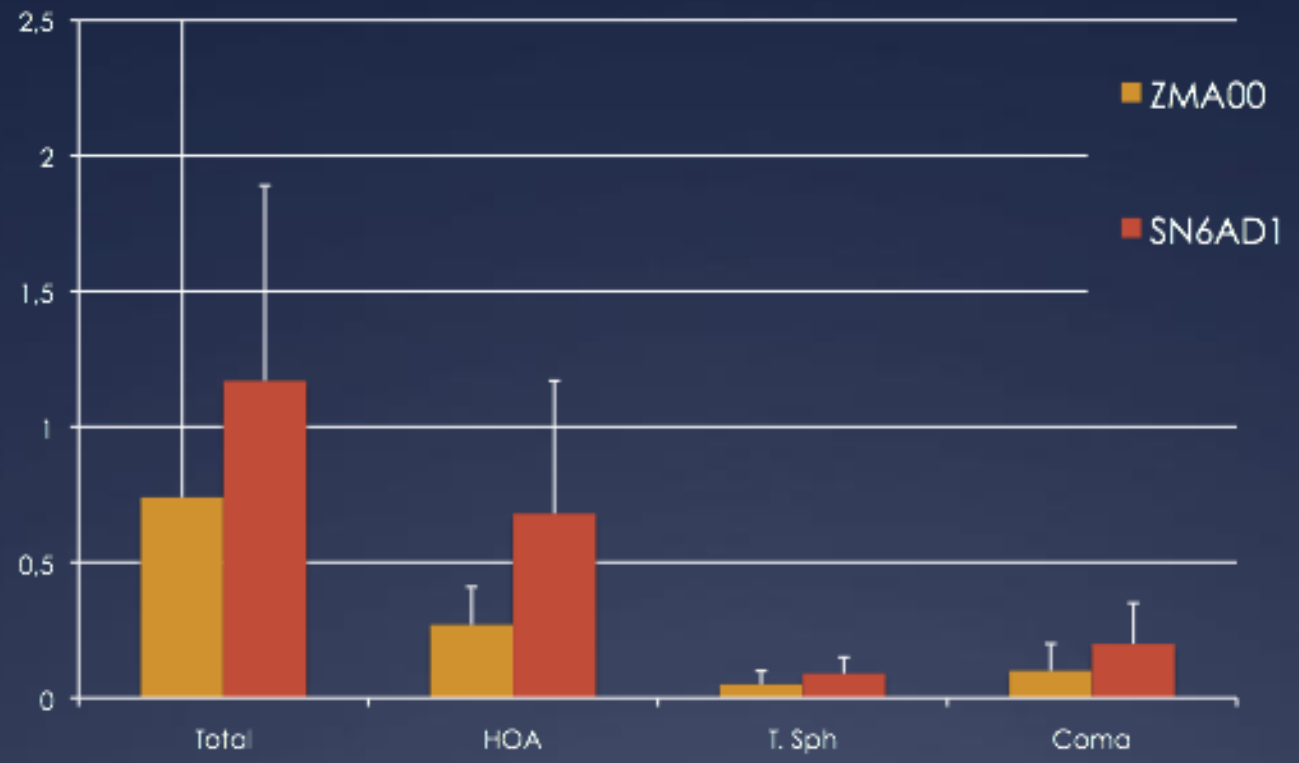
Mesopic conditions



No statistically significant difference *between the two lenses in any of the spatial frequencies (p > 0.05) .*

Unlike some studies which demonstrate that contrast sensitivity under photopic conditions was statistically reduced by Restor SN6AD1 [3]

Wavefront Analysis



Tecnis ZMA00 *was superior in all the variables, however, only in the* ***coma*** *variable statistically significant difference (p <0.05) was observed.*

"TYPE Questionnaire"

	Tecnis ZMA00	ReStor SN6AD1	P value
N	15	17	
Distance VA	8,46 ± 1,5	7,94± 1,9	>0,05
Satisfied	n=15 (100%)	n=16 (94%)	>0,05
Unsatisfied	n=0	n=1 (6%)	>0,05
Intermediate VA	8,13 ± 1,88	8,00± 1,98	>0,05
Satisfied	n=15 (100%)	n=17 (100%)	>0,05
Unsatisfied	n=0	n=0	>0,05
Near VA	8,00 ± 2,00	7,88± 2,32	>0,05
Satisfied	n=14 (93%)	n=16 (94%)	>0,05
Unsatisfied	n=1 (7%)	n=1 (6%)	>0,05
Surgery*	7,93± 2,27	5,52 ± 4,12	>0,05
Satisfied	n=13 (86%)	n=14 (82%)	>0,05
Unsatisfied	n=2 (14%)	n=3 (18%)	>0,05
Spectacles **	5,53± 4,9	6,29± 4,66	>0,05
Satisfied	n=10 (66%)	n=11 (64%)	>0,05
Unsatisfied	n=5 (34%)	n=6 (36%)	>0,05
Recommend***	7,60 ± 3,1	7,64± 3,52	>0,05
Satisfied	n=12 (80%)	n=14 (82%)	>0,05
Unsatisfied	n=3 (20%)	n=3 (18%)	>0,05
Glare			
Yes	n=5 (34%)	n=6 (36%)	>0,05
No	n=10 (66%)	n=11 (64%)	>0,05
Halos			
Yes	n=5 (34%)	n=6 (53%)	>0,05
No	n=10 (66%)	n=11 (64%)	>0,05

* " Would you do this surgery again?

** "Would you undergo another surgery only to be independent of glasses?"

*** "Would you recommend this surgery to close friends or family?"

Although the results of the Tecnis group ZMA00 appear to be slightly better, the subjective assessment offered by the questionnaire showed ***no statistically significant difference in any of the questions answered*** *(p> 0.05).*

Conclusion

- Both studied intraocular lenses promoted excellent near, intermediary and distance postoperative visual acuity.
- Comparing, Tecnis ZMA00 IOL provided better uncorrected near vision and Restor SN6AD1 better intermediary vision viewed by Defocus Curve.
- However, these factors do not affect the degree of patient satisfaction when comparing the two multifocal IOLs.

References

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