Comparison of two multifocal IOL types – long-term visual outcomes

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Aim

- To compare the refractive and visual outcomes collected during the first 12 postoperative months after the implantation of two types of different one-piece acrylic diffractive multifocal intraocular lenses (IOL).
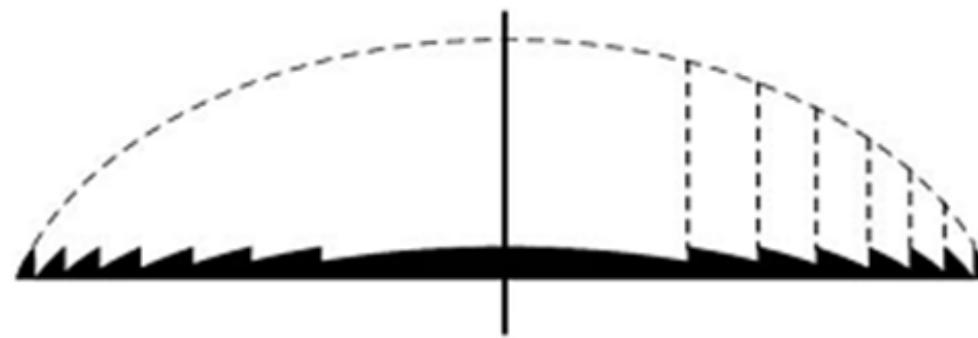
Patients

- Prospective randomised study
- Crystalline lens extraction, 100 eyes of 50 patients
- Indication: partly age-related cataracts, partly refractive lens exchanges (RLE)

- Motivated patients, informed consent
- Exclusion criteria:
  - Any, potencially vision-resctrictive eye diseases
  - Preoperative refraction: more than +/- 6.0D spherical or 1.0D torical
  - Any intraoperative complications

Patients

- Group A: 50 eyes of 25 patients
  - Medicontur Bi-Flex 677MY
  - PAD (Progressive Apodized Diffractive) technology

- Group B: 50 eyes of 25 patients
  - Alcon Acrysof Restor SN6AD1
  - Diffractive multifocal technology

- Randomised study groups

http://www.medicontur.com

http://www.reviewofoptometry.com/

Pre- and postoperative examinations

- Uncorrected and corrected ETDRS LogMAR
  visual acuity (VA)
  - Far (UDVA, CDVA)
  - Intermediate (UIVA, CIVA)
  - Near (UNVA, CNVA)

- Autorefractometry
  - MRK-3100P, Huvitz Co., Gunpo-si Gyeonggi-do, Rep. of Korea
- Manifest refraction

www.intechopen.com

http://www.medwow.com
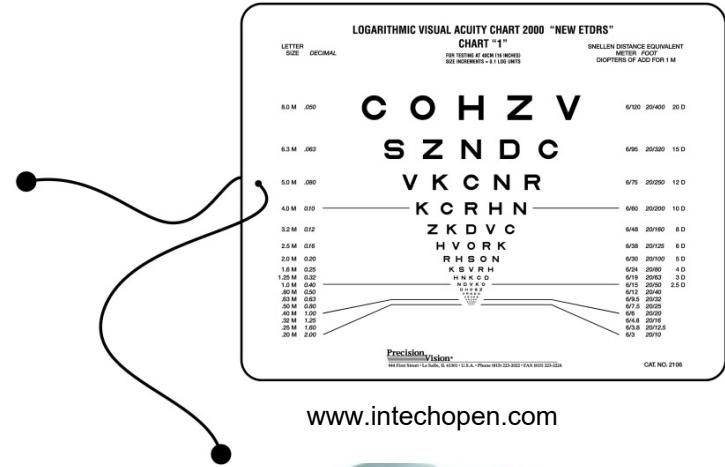
Optical biometry

- IOL planning
  - Lenstar LS900; Haag-Streit AG, Koeniz, Switzerland
  - Multi formula

- Postoperative follow-up of the biometric parameters

http://haag-streit-usa.com

Surgical technique

- 3 experienced surgeons (ZZsN, AD, TF)
- Same instruments and surgical technique
- Superior incisions (90-100°)
- No intraoperative complications
- In-the-bag implantations
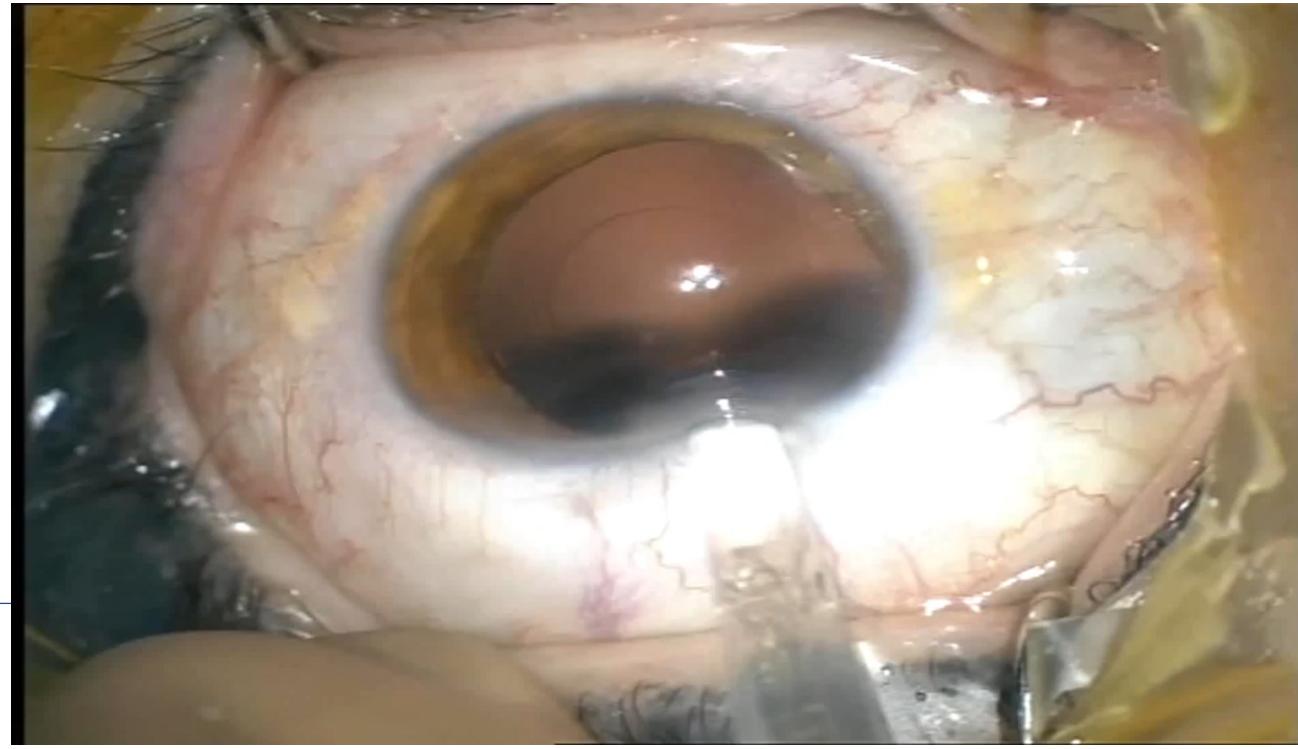
Postoperative examinations

- 1 day, 1 week, 4 weeks
- 3, 6, 12, 24 months
- Digital slitlamp photos in retroillumination, dilated pupil (IOL position)
 - BQ 900® Haag-Streit AG, Koeniz, Switzerland
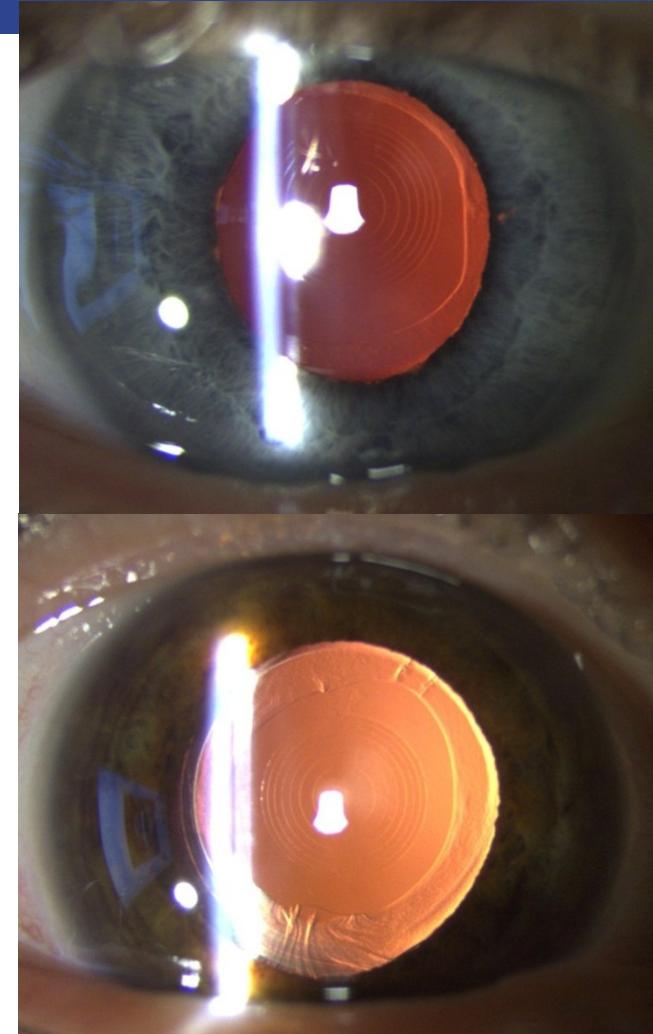
Epidemiological and biometric data

	Group A (MC 677MY)	Group B (Restor)	P*
Number of cases (patients)	50 (25)	50 (25)	
Age (years)	65.0 ± 11.6	67.5 ± 9.4	0.547
Gender (male/female)	15/10	8/17	
Preoperative far visual acuity			
Non-corrected (UDVA, LogMAR)	0.51 ± 0.36	0.57 ± 0.35	0.492
Best corrected (CDVA, LogMAR)	0.14 ± 0.10	0.15 ± 0.20	0.626
Absolute value of preop. SE (diopters)	2.37 ± 1.82	1.88 ± 1.32	0.526
Preop. manifested astigmatism (diopters)	0.34 ± 0.42	0.26 ± 0.39	0.475
Spherical power of IOLs (diopters)	21.19 ± 4.61	22.28 ± 2.02	0.554

*: Mann-Whitney U test

Non-corrected, monocular far visual acuity (UDVA)

|	Preop.	3rd month	6th month	12th hónap	24th month
BiFlex 677MY	0,51	-0,03	-0,02	0,00	-0,01
Restor SN6AD1	0,57	0,06	0,06	0,07	0,06
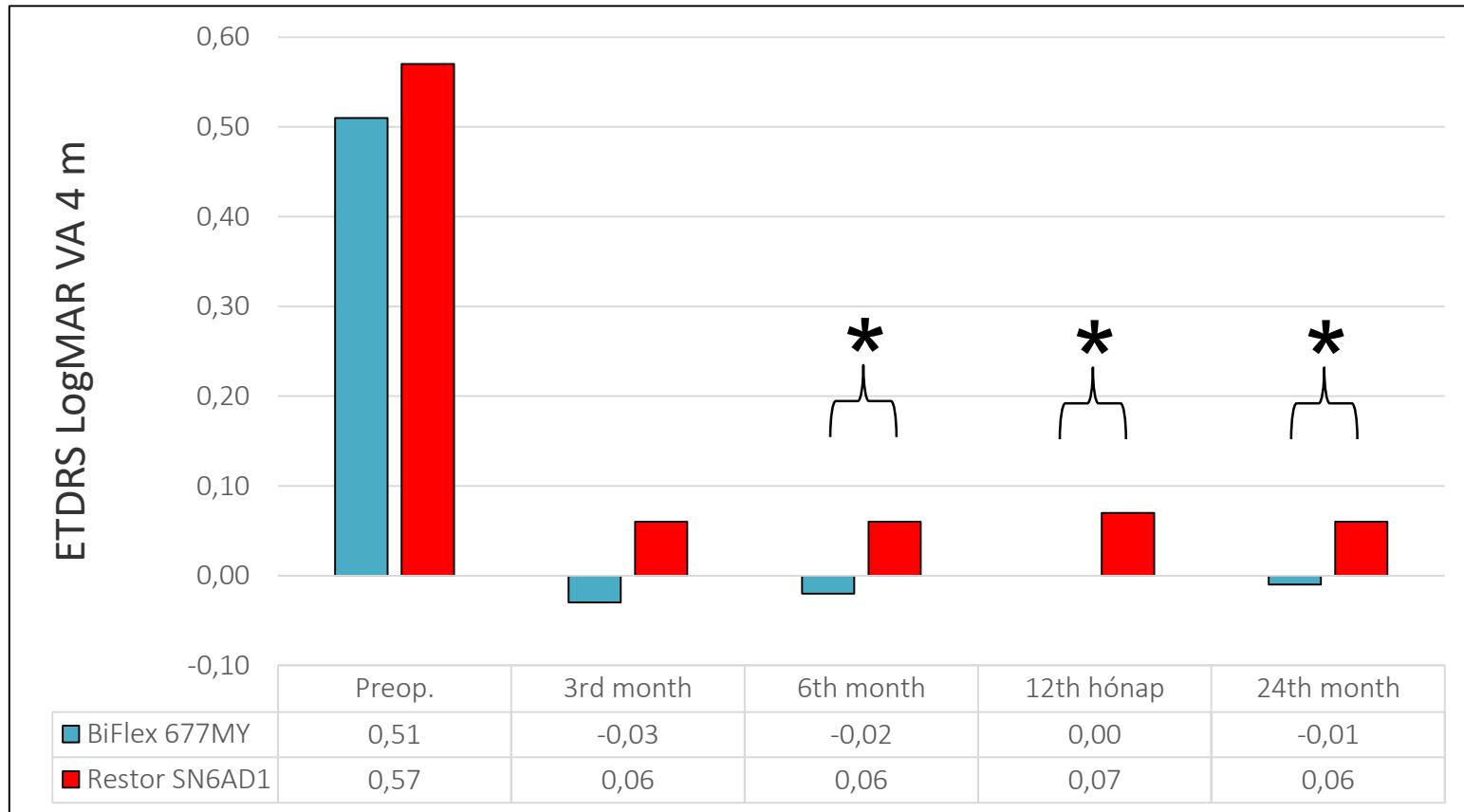
*: Mann-Whitney U test

Non-corrected, monocular intermediate visual acuity (UIVA)

	Preop.	3rd month	6th month	12th mont	24th mont
BiFlex 677MY	0,66	0,22	0,23	0,23	0,22
Restor SN6AD1	0,59	0,30	0,29	0,32	0,34
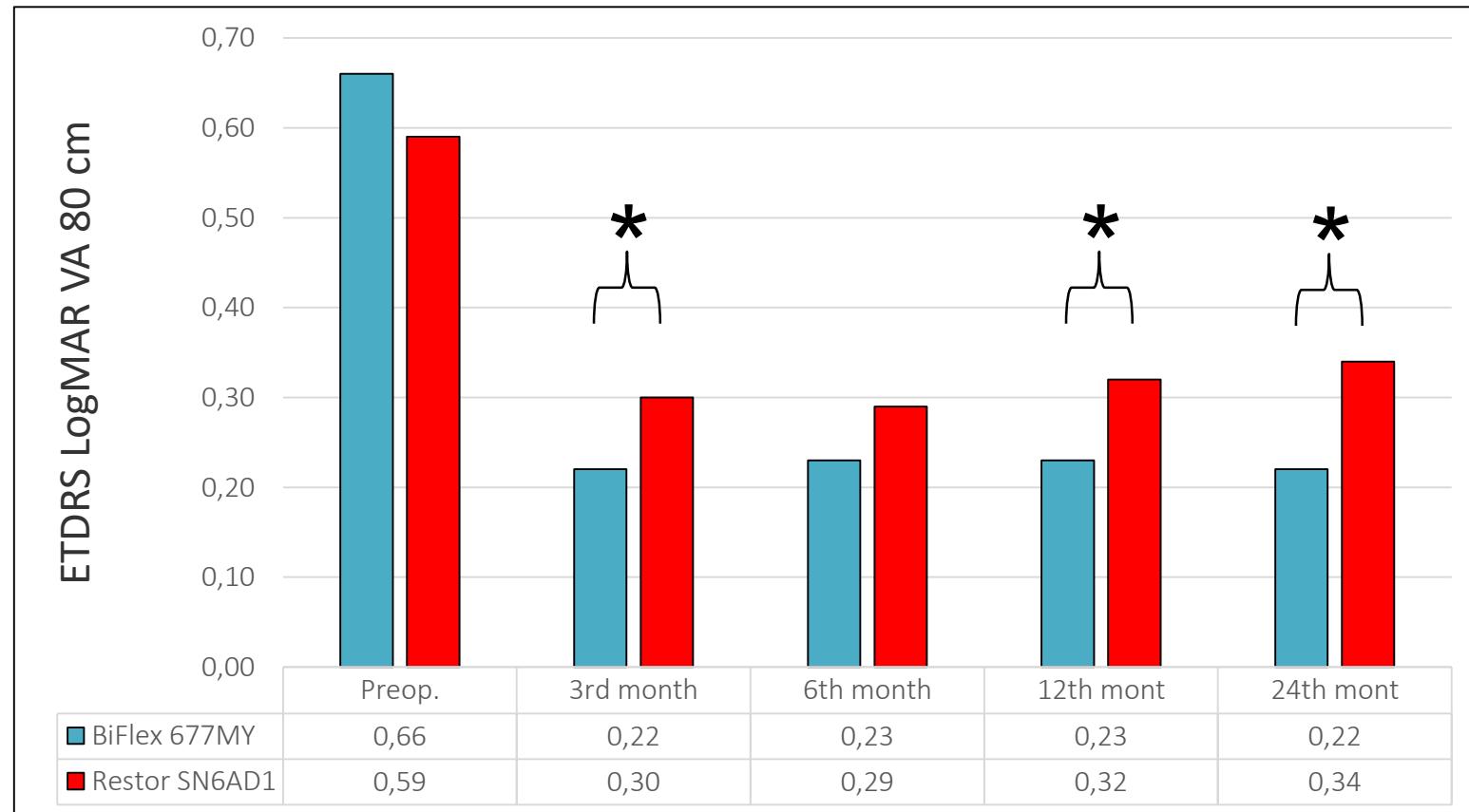
*: Mann-Whitney U test

Non-corrected, monocular near visual acuity (UNVA)

	Preop.	3rd month	6th month	12th mont	24th mont
BiFlex 677MY	0,70	0,14	0,11	0,16	0,13
Restor SN6AD1	0,84	0,19	0,17	0,23	0,21
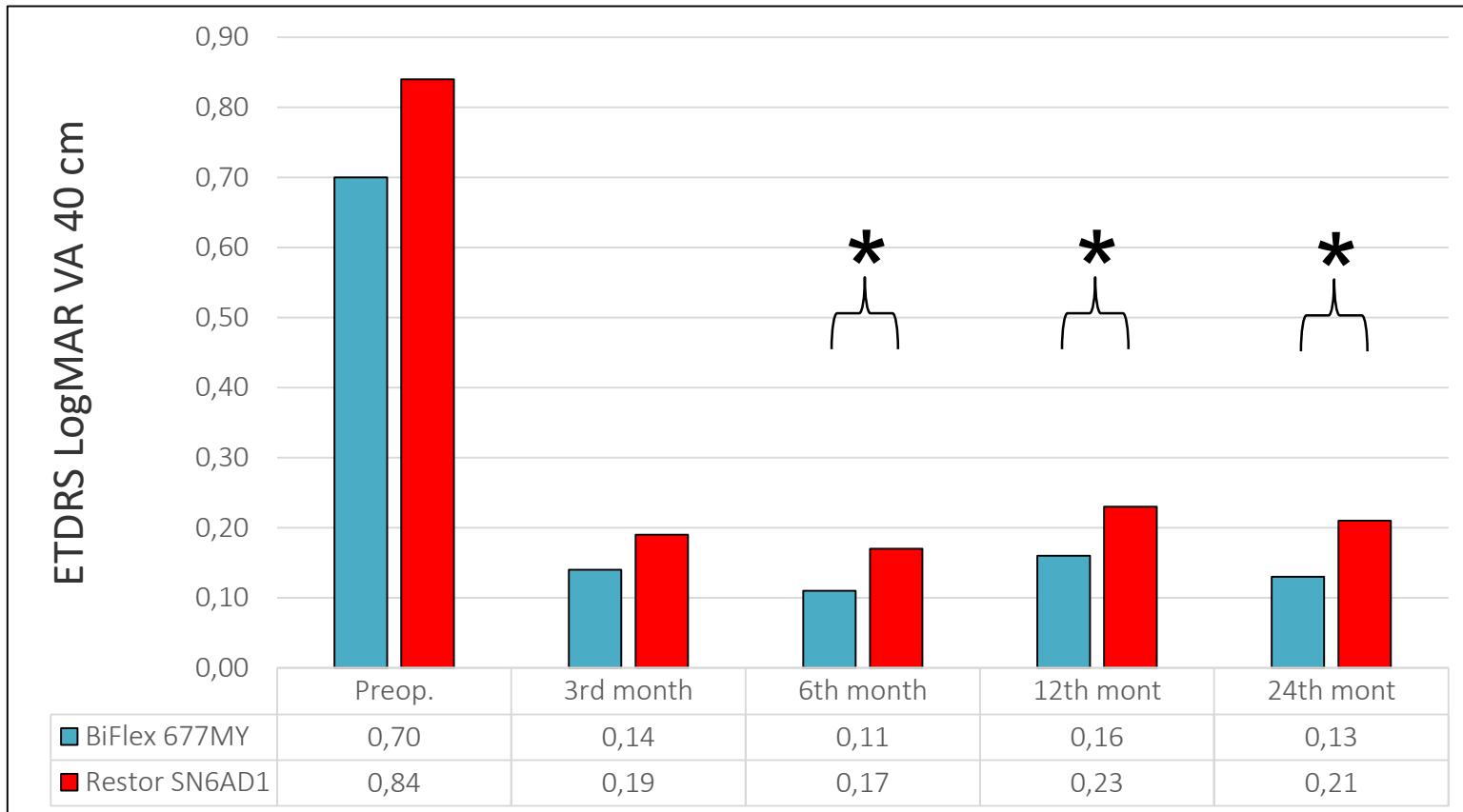
*: Mann-Whitney U test

Absolute value of the manifested spherical equivalent (preop vs 3 and 12 months)

|	Preop far	3rd month far	12th month far	Preop IM	3rd month IM	12th month IM	Preop near	3rd month near	12th month near
BiFlex 677MY	2,37	0,16	0,02	2,80	1,25	1,42	3,30	0,17	0,09
Restor SN6AD1	1,88	0,20	0,12	2,82	1,54	1,54	3,61	0,22	0,15
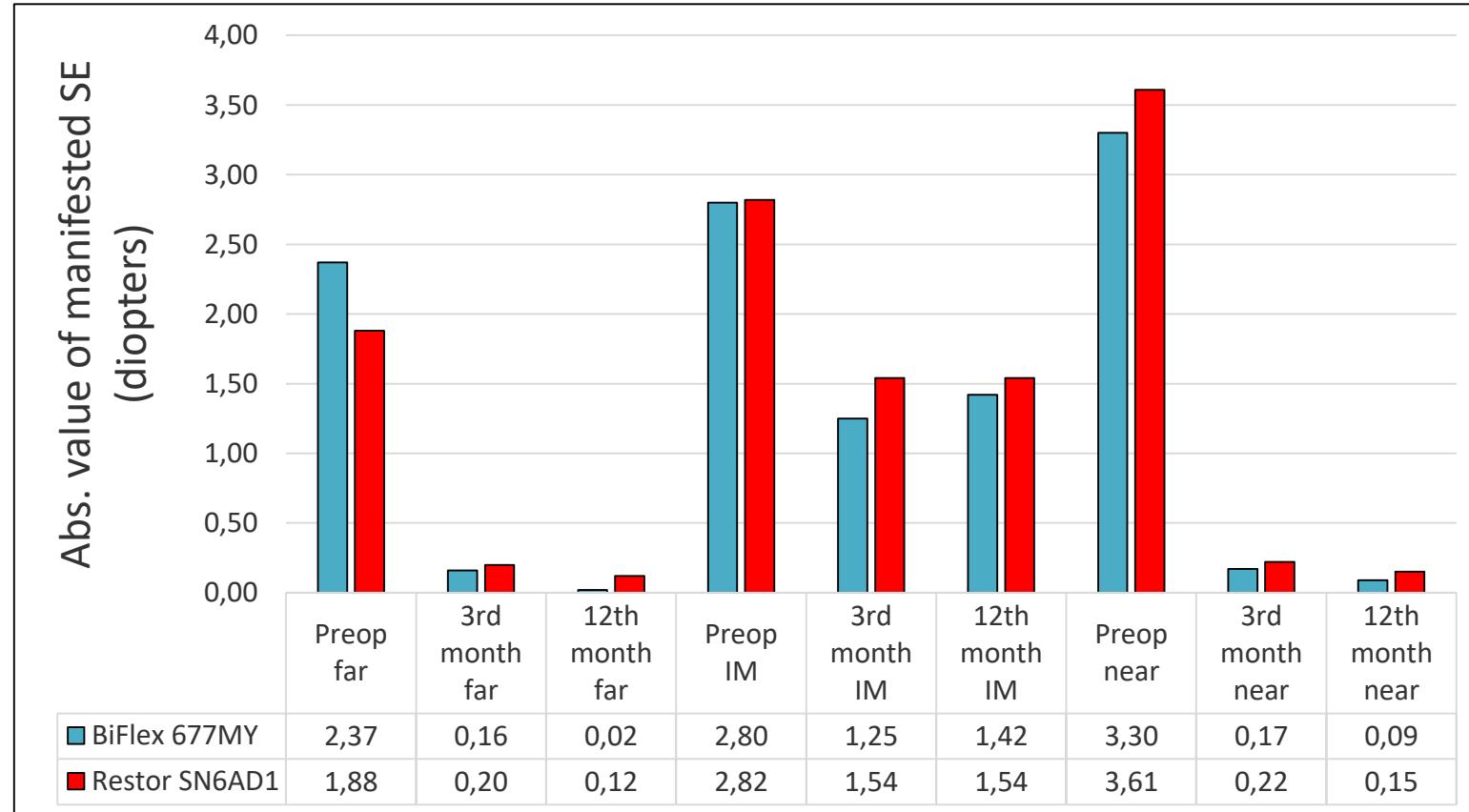
Wilcoxon test: significant change in every distances;
*: Mann-Whitney U test: no difference between groups

Defocus curve (decimal, bilateral, 3 months)
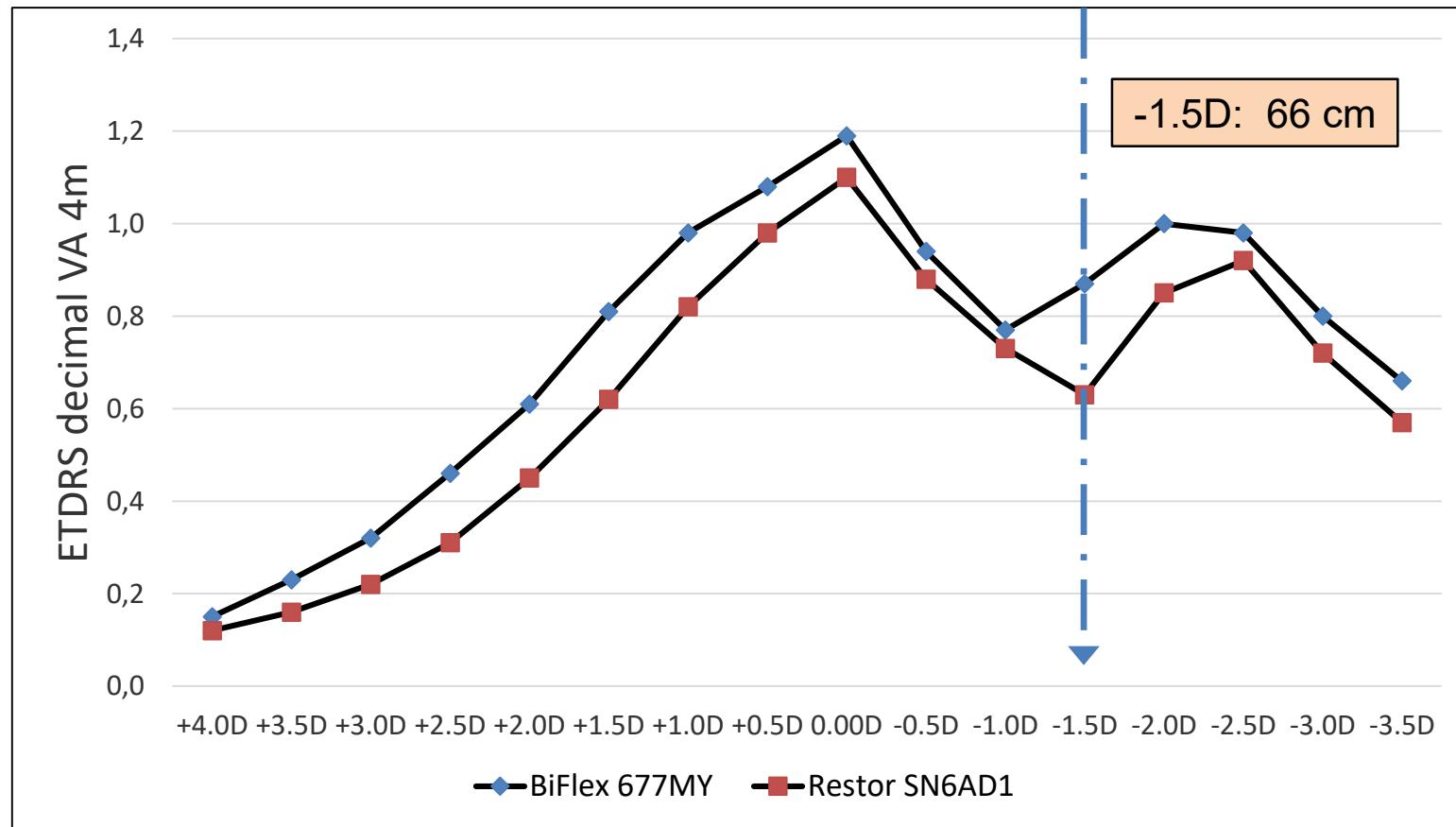
Defocus curve (decimal, bilateral, 12 months)
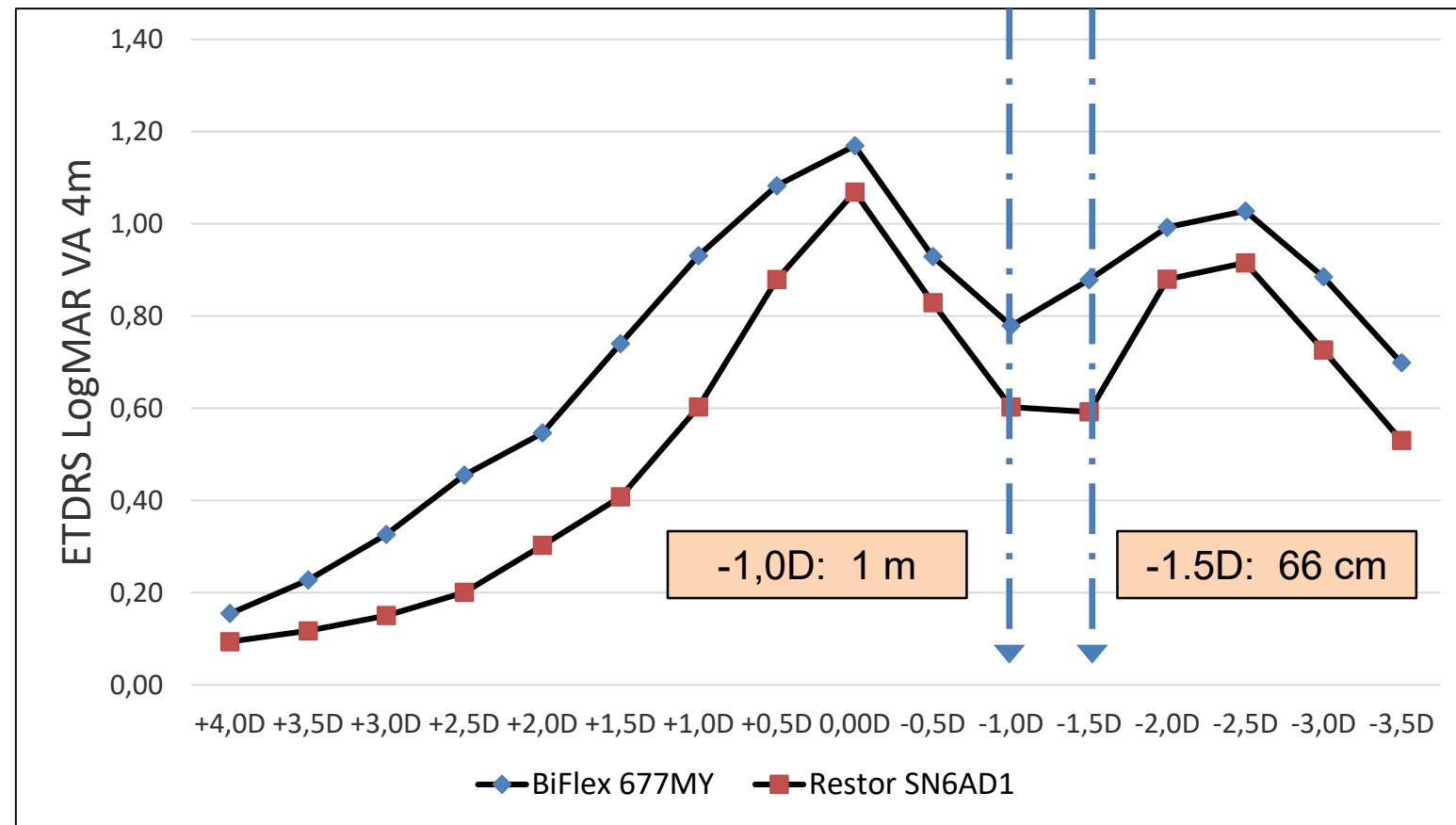
Area under the defocus curve (bilateral, 12 months)

|	Group A (BiFlex 677MY)	Group B (Restor SA6AT1)	Difference (%)	P*
AutC (+4.0D; -3.5D) (whole area)	5.70 ± 0.39 D	4.29 ± 0,33 D	**32.9%**	**<0.001**
AutC (+1.0D; -1.0D) (far vision)	2.02 ± 0.08 D	1.69 ± 0,13 D	19.5%	0.007
AutC (-1.0D; -2.0D) (intermediate vision)	0.88 ± 0.05 D	0.67 ± 0,05 D	**31.3%**	**<0.001**
AutC (-2.0D; -3.0D) (near vision)	0.98 ± 0.55 D	0.86 ± 0,11 D	14.0%	0.021

*: Mann-Whitney U test

Visual Functioning Questionnaires (VFQ)

Visual complaints
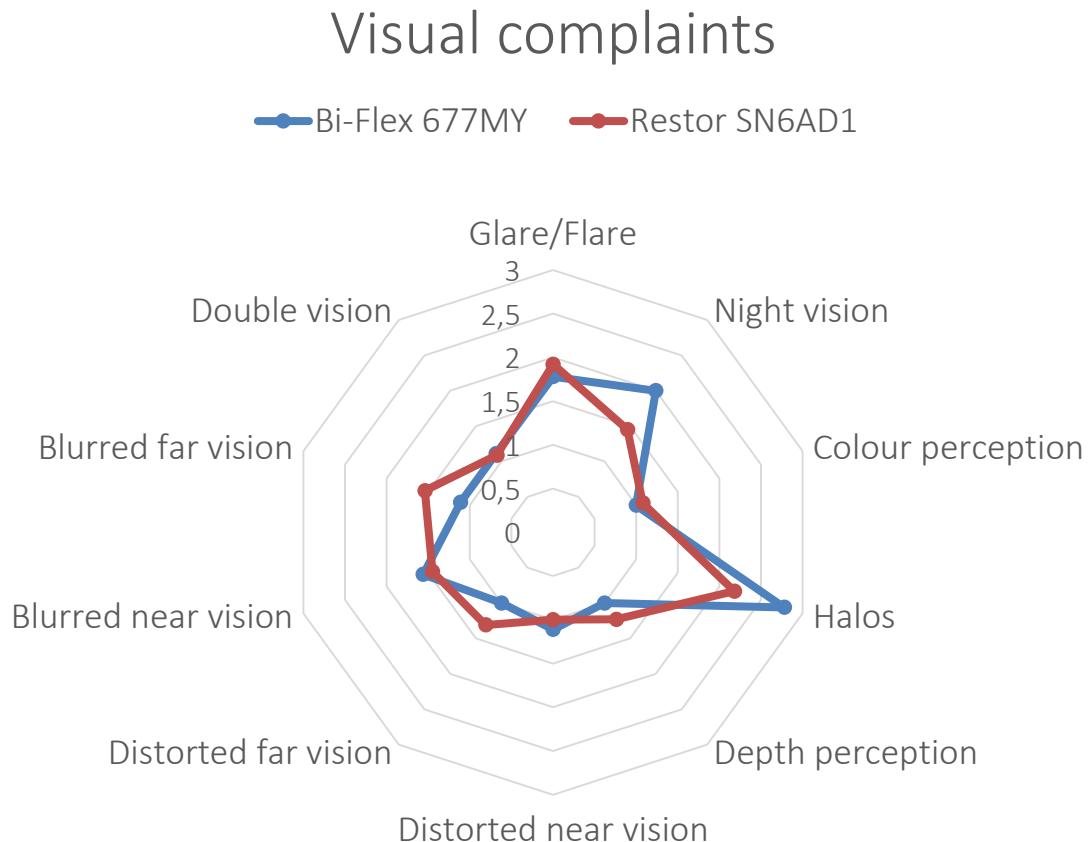
Mann-Whitney U test: no significant difference between the area surrounded by the curves

Visual Functioning Questionnaires (VFQ)

Visual functions
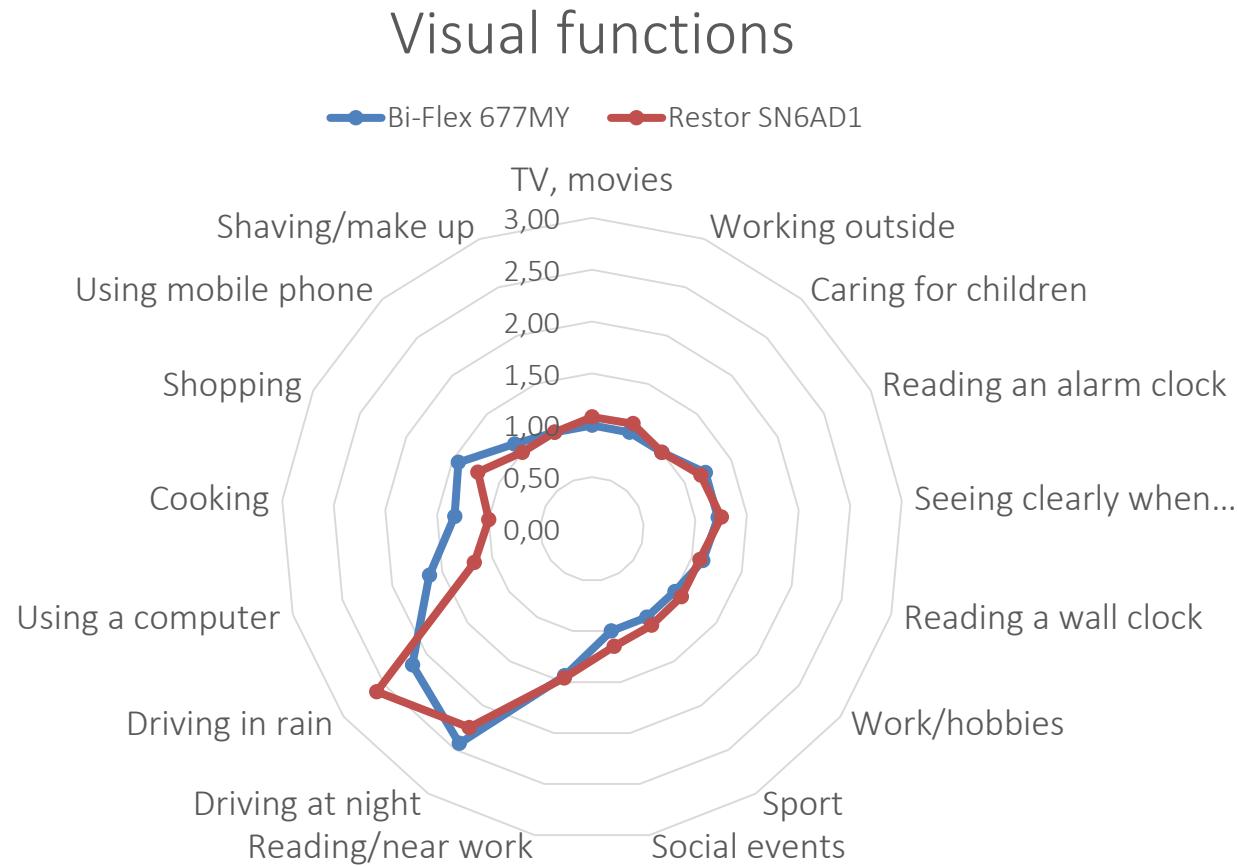
Mann-Whitney U test: no significant difference between the area surrounded by the curves

Conclusion

- Multifocal IOL implantation is a well-predictable method and efficient on the long term for the cataract surgery of patients who wish to achieve spectacle independence.

- Similarly good near VA was found during the follow-up of both IOL types.

- In Group A, superior uncorrected vision and better depth of focus was found 12 and 24 months after the surgery, compared to the patients in Group B.

Conclusion

- For this reason, the Medicontur 677MY may be recommended for the patients for whom it is important to achieve:
  – Stable visual rehabilitation on the long term

  – Excellent far and near visual acuity

  – Good intermediate vision for different work distances

  – E.g. younger cataract or refractive patients, computer or tablet users

Thanks for your kind attention!