

Comparison of visual performance of 2 diffractive trifocal intraocular lenses: a randomised controlled trial

K. Stjepanek, J. Hienert, M. Ruiß, N. Hirnschall, O. Findl

Vienna Institute for Research in Ocular Surgery (VIROS)
Hanusch Krankenhaus, Vienna, Austria

Financial Disclosure

Sponsored Clinical Trials & Unrestricted Grants to Institute (VIROS) in 2020:

- Aerie
- Alcon
- Bausch + Lomb
- Carl Zeiss Meditec AG
- Cristalens
- Croma Pharma
- Heidelberg Engineering
- Johnson & Johnson Vision Care
- Novartis
- Oculentis
- Rayner
- Roche

O. Findl - Scientific Advisor / Member of Scientific Advisory Board:

- Alcon
- Carl Zeiss Meditec AG
- Croma Pharma
- Johnson & Johnson Vision Care
- Merck

Personal financial interest in products:

- None

Trifocal IOLs



Near vision

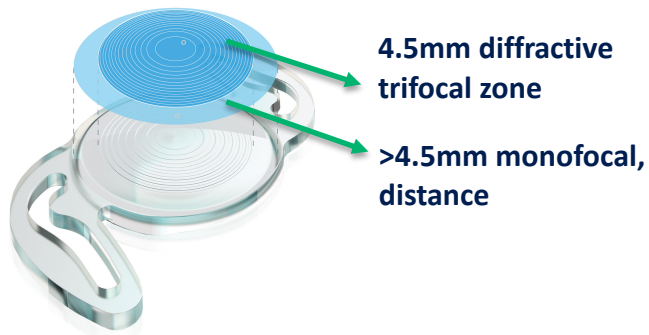


Intermediate vision

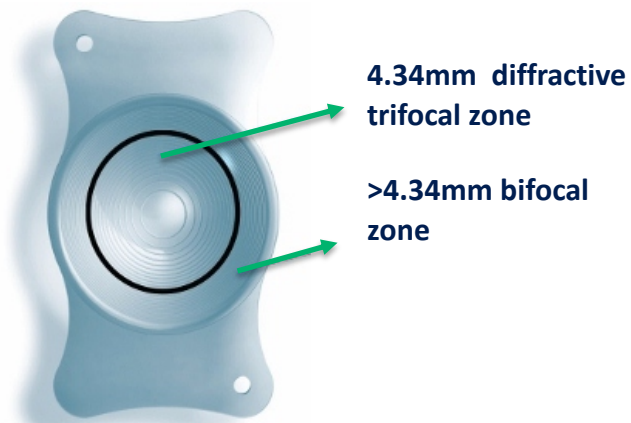


Far vision

Comparison of the two study lenses



RayOne Trifocal



AT LISA tri 839 MP

Study design

- randomized, double-masked trial
- 88 eyes of 44 patients
 - one eye AT LISA tri 839 MP (Zeiss)
 - other eye RayOne Trifocal (Rayner)
 - randomized assignment of IOL

Inclusion criteria

- Senile cataract
- Scheduled cataract surgery for both eyes
- Motivated to be less spectacle dependent
- ≥ 21 years
- Corneal astigmatism ≤ 1.5 D (keratometry, IOL Master)

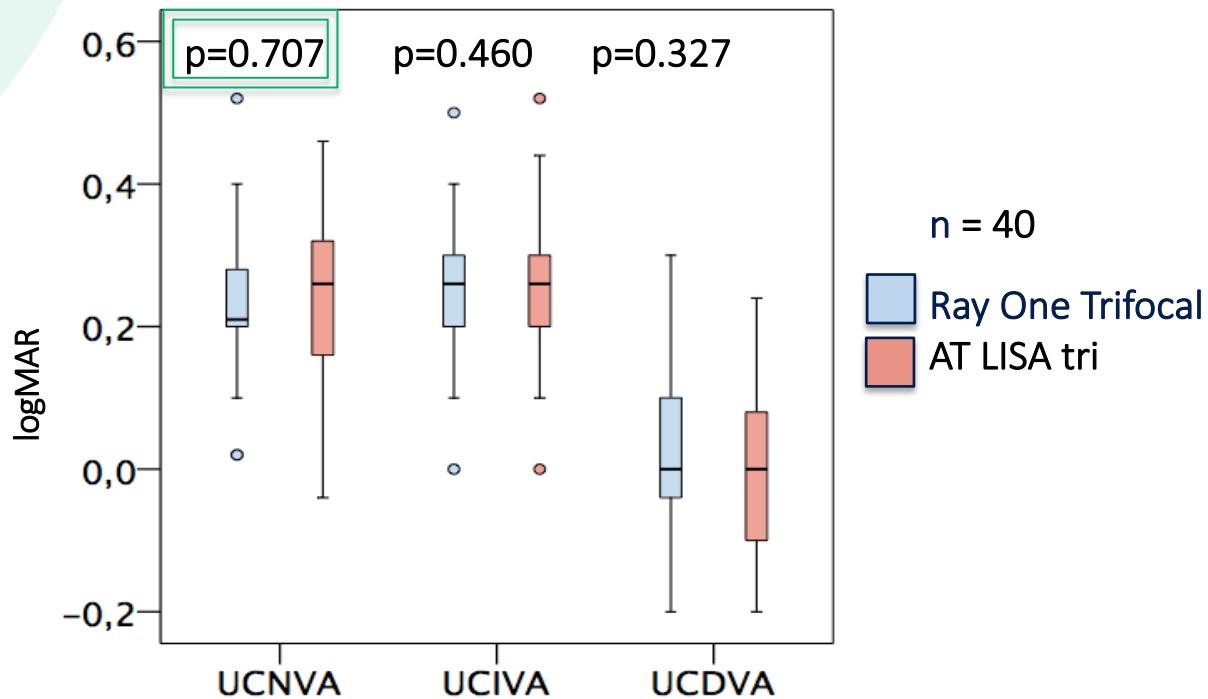
Exclusion criteria

- Pregnancy
- Retinitis pigmentosa, chronic uveitis, amblyopia
- Pupil misalignment > 1 mm
- Previous LASIK / retinal surgery

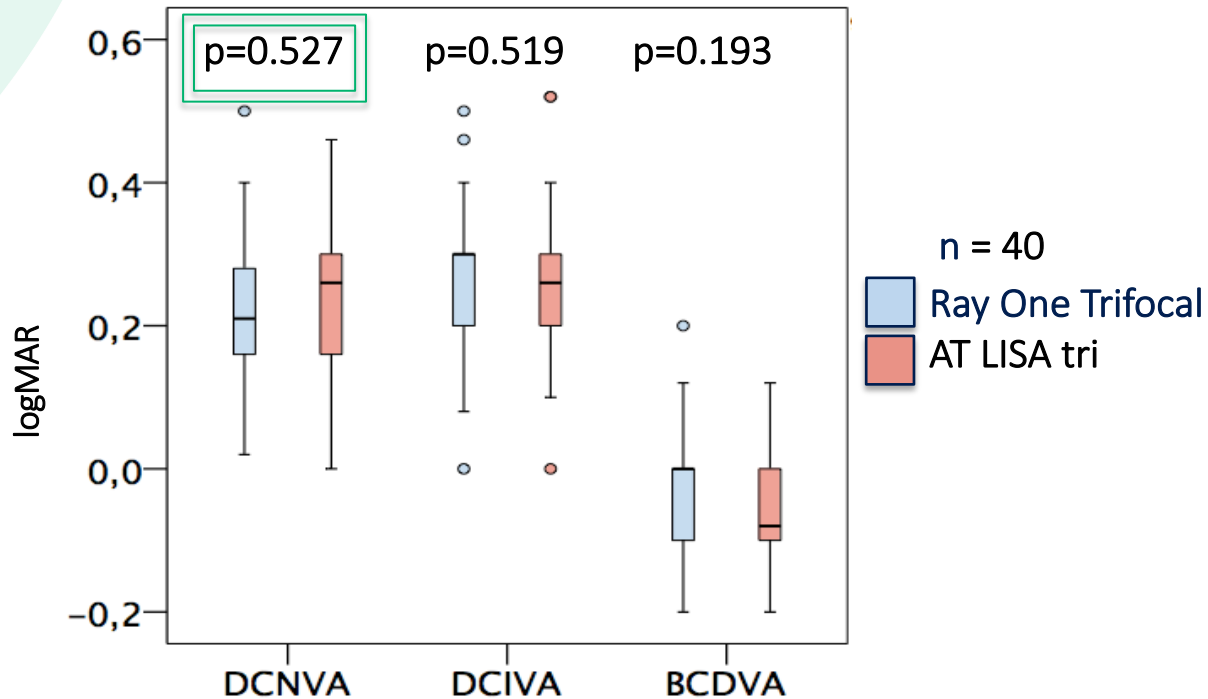
Methods

- **Main outcome**
 - Change of uncorrected near visual acuity (UNVA)
- **Secondary outcome**
 - Uncorrected and best corrected distant visual acuity (UCDVA, BCDVA)
 - Uncorrected and distance corrected intermediate visual acuity (UCIVA, BIVA)
 - Distance corrected near visual acuity (DCNVA)
 - Defocus curve
 - Salzburg reading desk
 - Aston halometer
 - Contrast sensibility in miosis and mydriasis
 - Quality of vision questionnaire

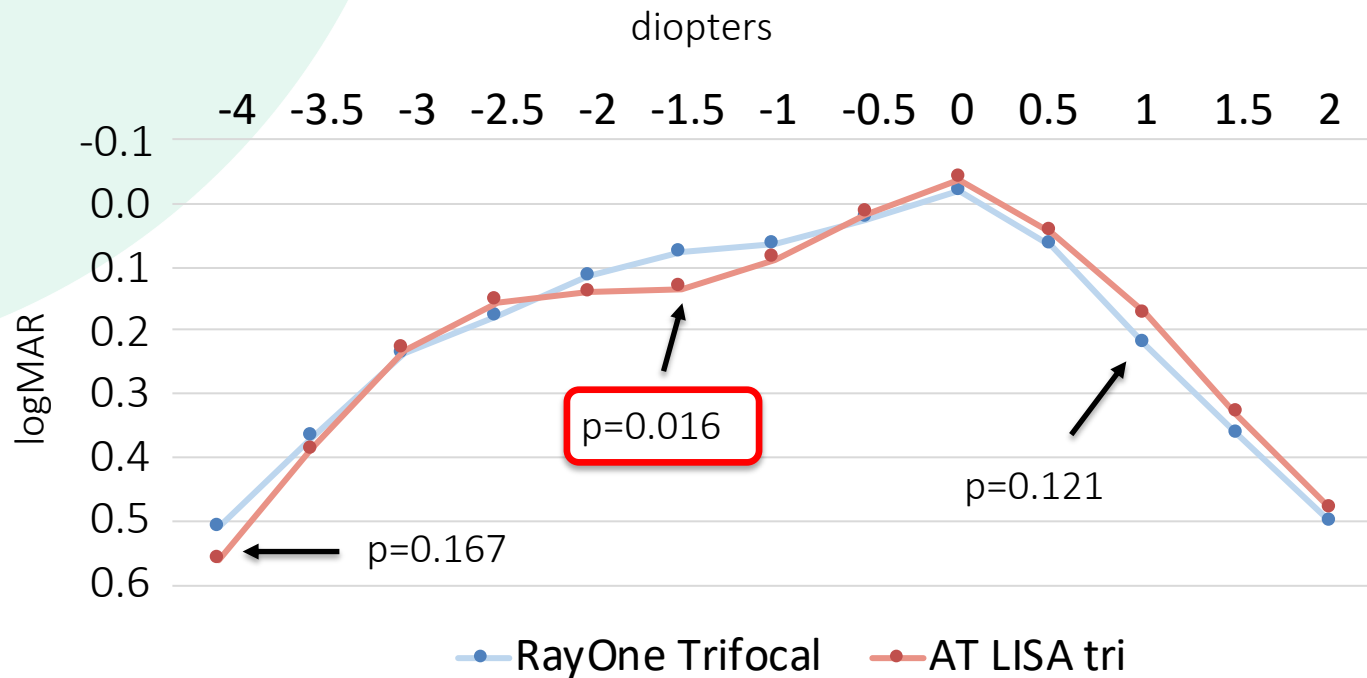
Uncorrected VA



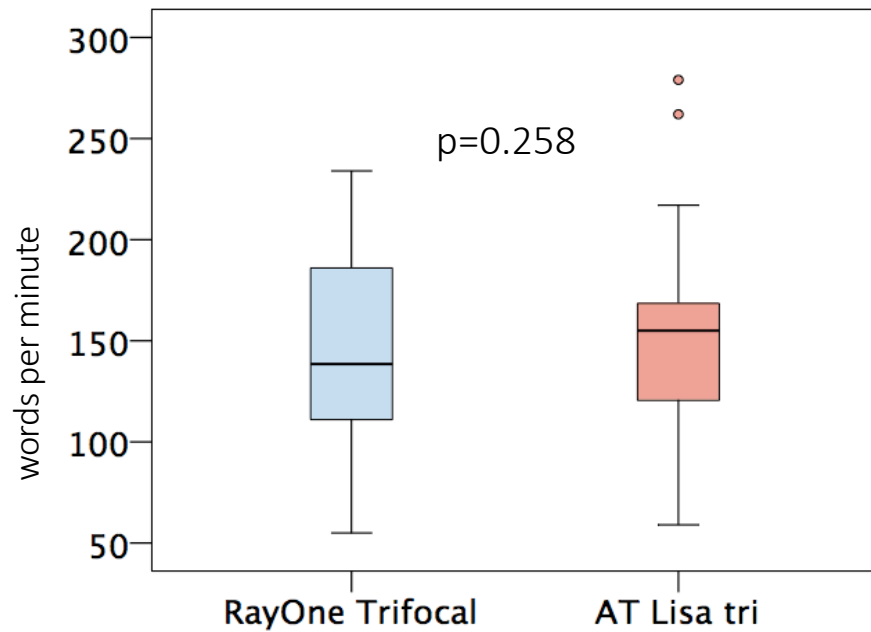
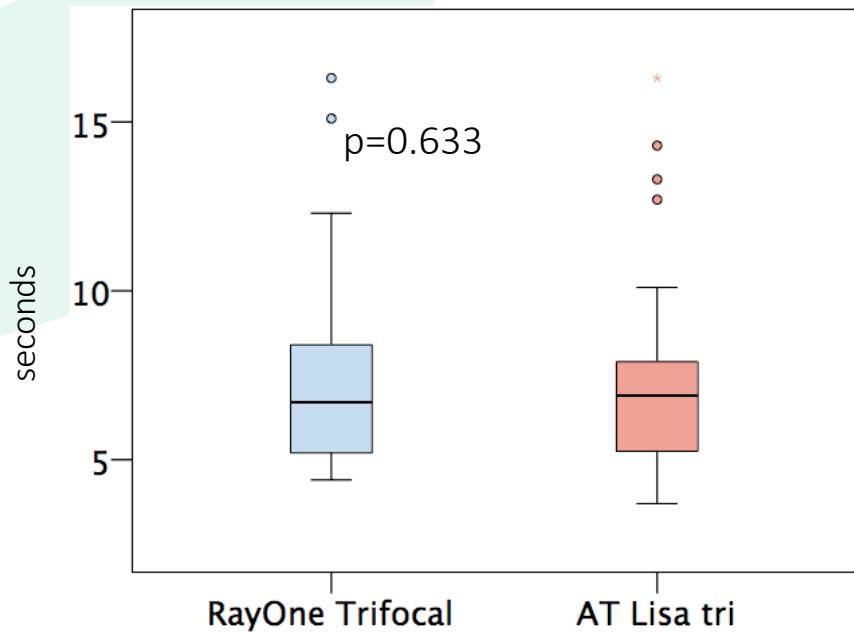
Distance corrected VA



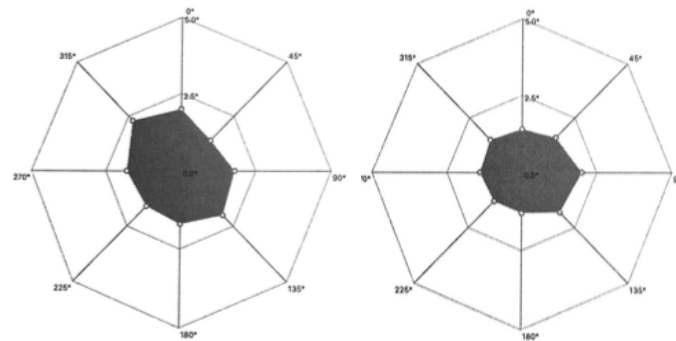
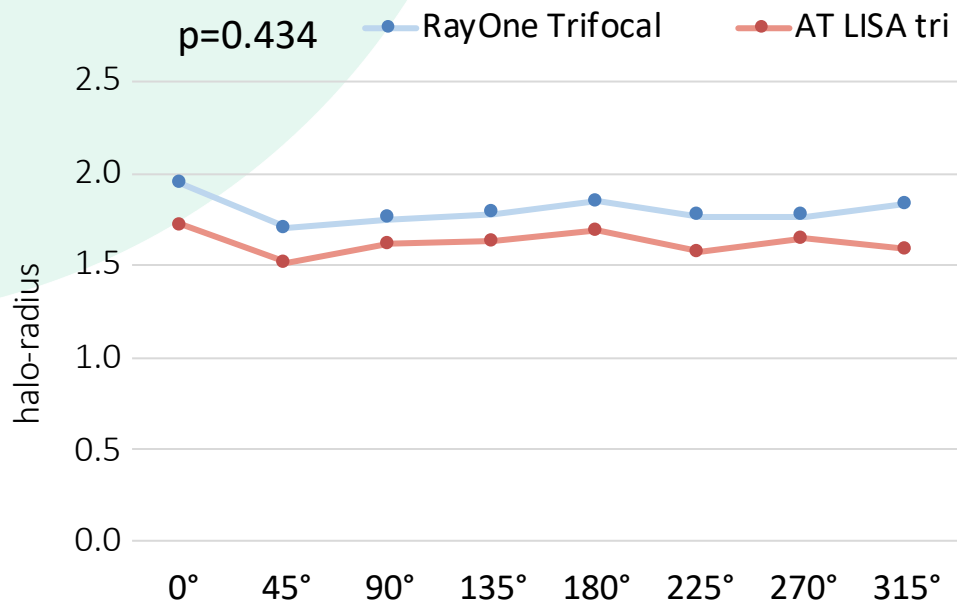
Defocus curve



Salzburg Reading Desk



Aston Halometer



| Angle(°) | Radii(DOV°) |
|----------|-------------|
| 0.00 | 2.00 |
| 45.00 | 1.40 |
| 90.00 | 1.80 |
| 135.00 | 2.00 |
| 180.00 | 1.70 |
| 225.00 | 1.60 |
| 270.00 | 1.80 |
| 315.00 | 2.30 |

| Angle(°) | Radii(DOV°) |
|----------|-------------|
| 0.00 | 1.40 |
| 45.00 | 1.60 |
| 90.00 | 2.00 |
| 135.00 | 1.80 |
| 180.00 | 1.30 |
| 225.00 | 1.30 |
| 270.00 | 1.40 |
| 315.00 | 1.50 |

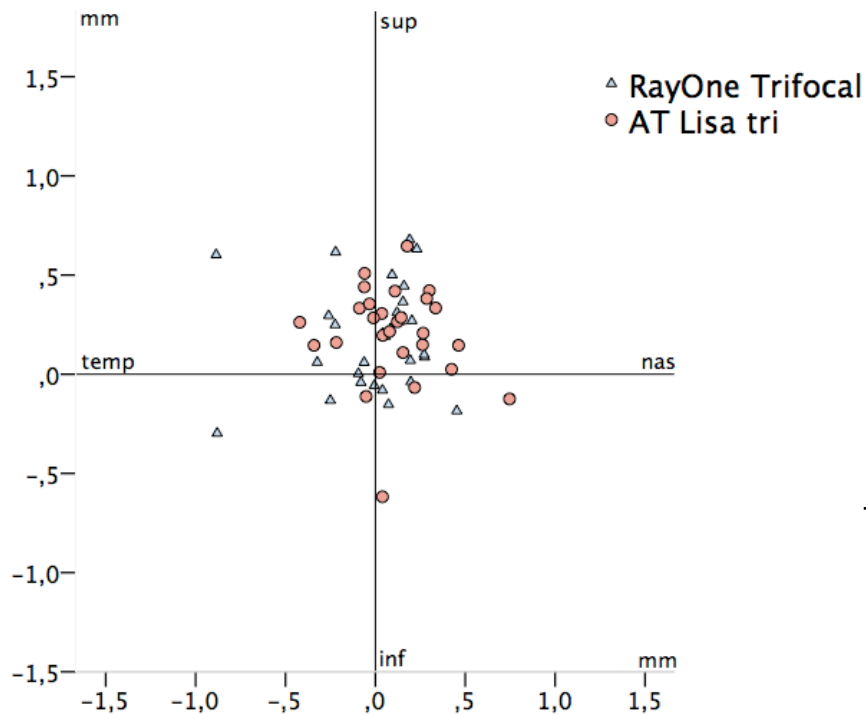
TRIO18 OS
RayOne Trifocal

TRIO18 OD
AT LISA tri

OPTEC 6500 Vision Tester

| | Photopic | | Mesopic | |
|-------------------|-----------------|---------------|-----------------|---------------|
| | RayOne Trifocal | AT LISA tri | RayOne Trifocal | AT LISA tri |
| Miosis | 13.5 (± 5.9) | 17.3 (± 7.4) | 8.7 (± 4.7) | 12.0 (± 4.9) |
| | p= 0.493 | | p= 0.082 | |
| Miosis + Glare | 14.1 (± 6.7) | 16.2 (± 7.0) | 4.6 (± 4.8) | 5.2 (± 5,3) |
| | p=0.808 | | p=0.790 | |
| Mydriasis | 9.0 (± 5.9) | 12.3 (± 7,1) | 6.8 (± 4.4) | 9.6 (± 4.6) |
| | p= 0.293 | | p= 0.297 | |
| Mydriasis + Glare | 6.3 (± 5.7) | 9.0 (± 7.5) | 0.2 (± 1.0) | 1.4 (± 2.5) |
| | p= 0.691 | | p= 0.159 | |

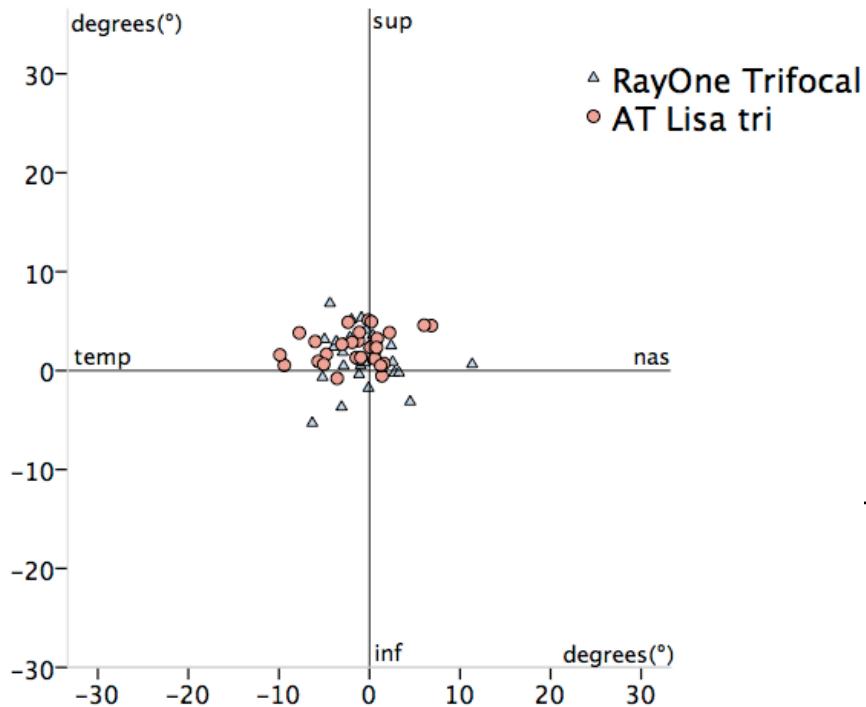
Decentration



| | RayOne Trifocal | AT Lisa tri |
|------|-----------------|-------------|
| Mean | 0.92 | 0.94 |
| SD | ± 0.32 | ± 0.23 |

p = 0.465

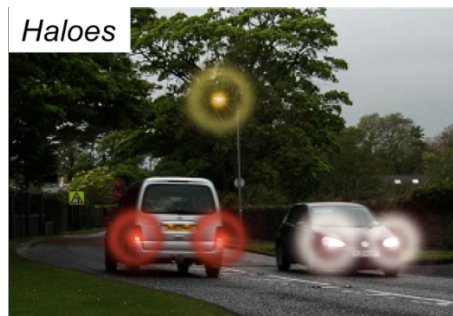
Tilt



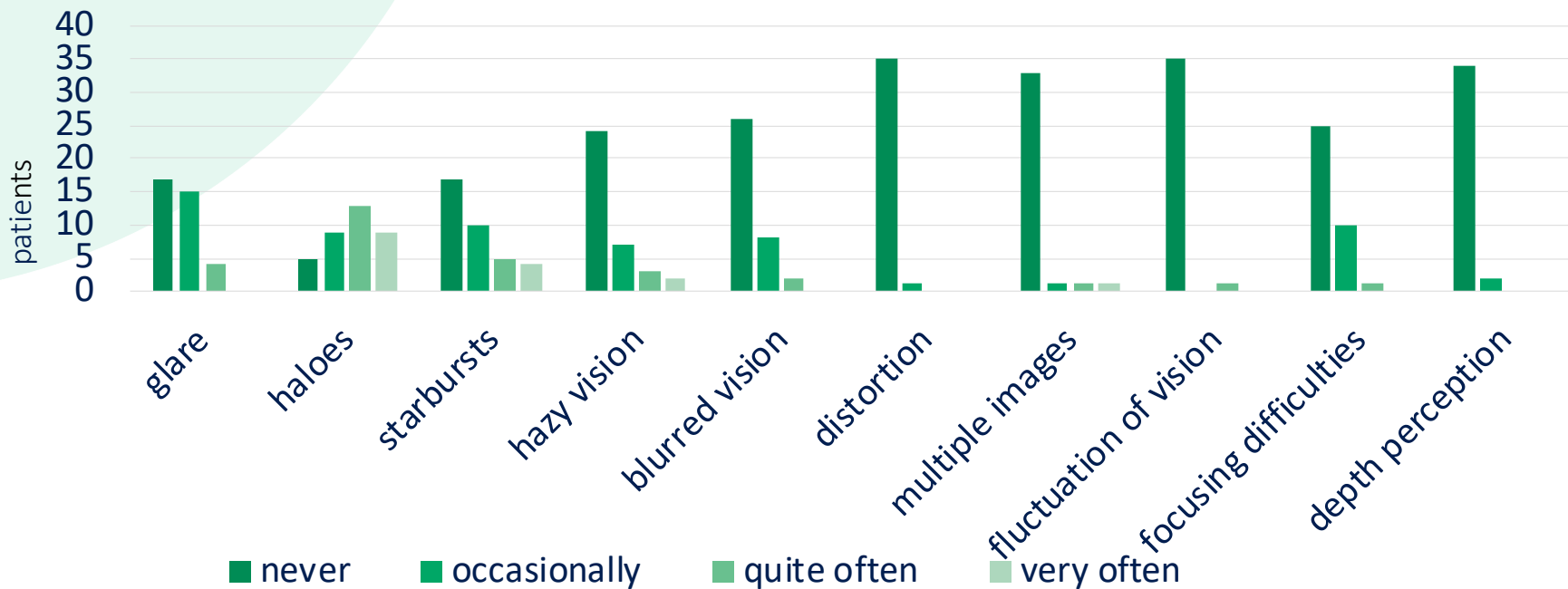
| | RayOne Trifocal | AT Lisa tri |
|------|-----------------|-------------|
| Mean | 3.09 | 3.20 |
| SD | ± 0.91 | ± 0.94 |

p = 0.779

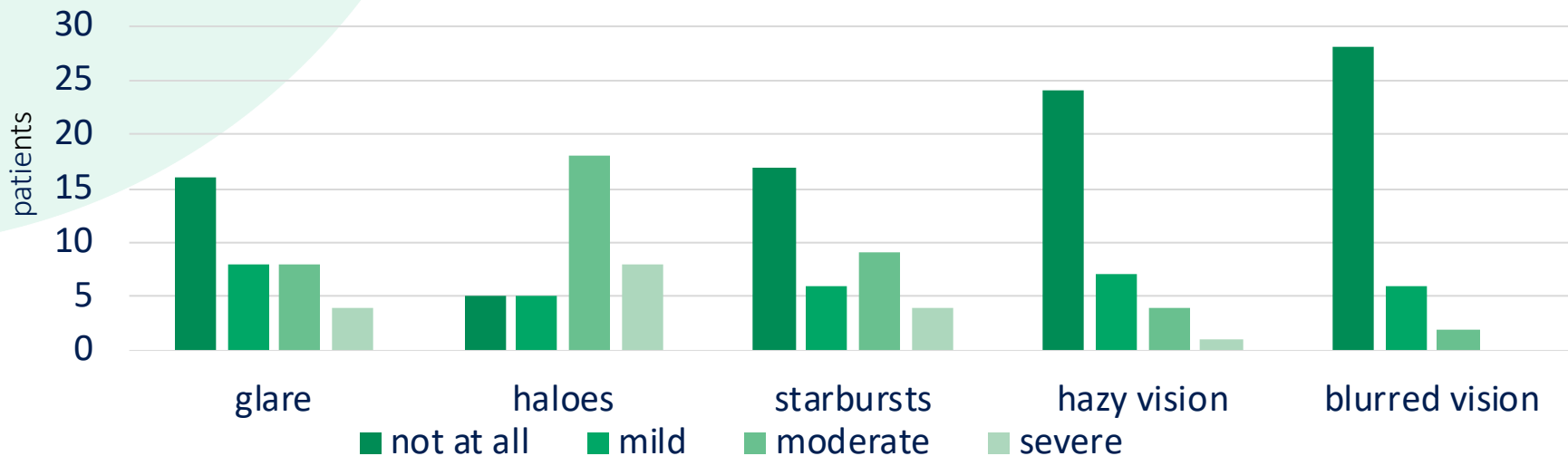
Quality of vision



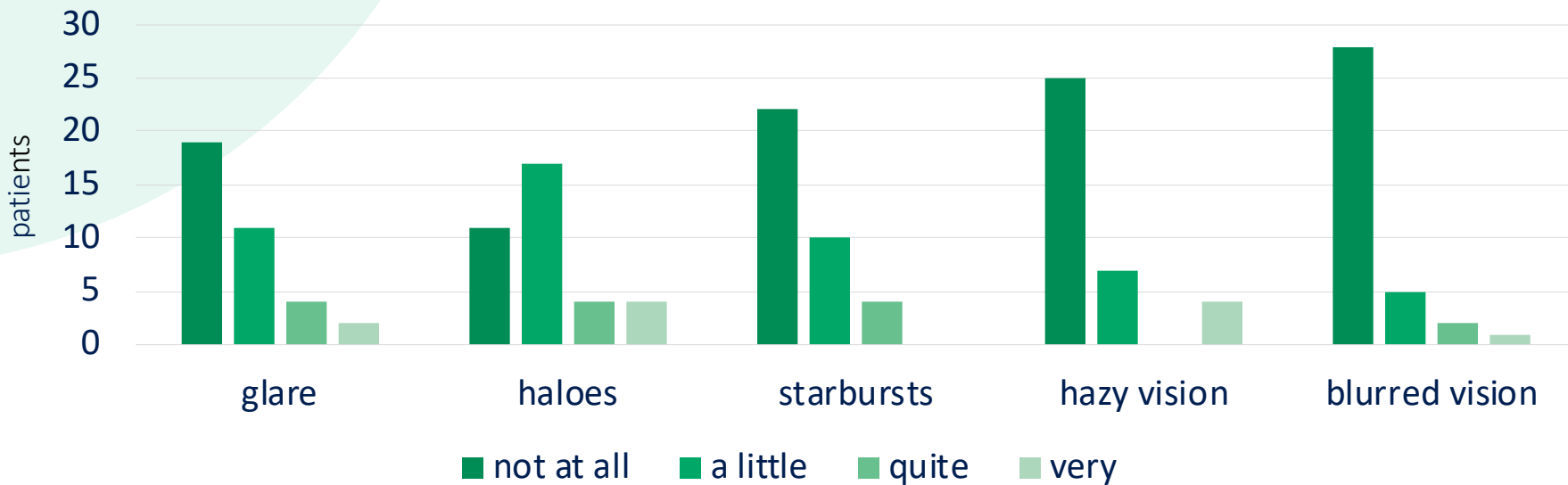
Quality of vision



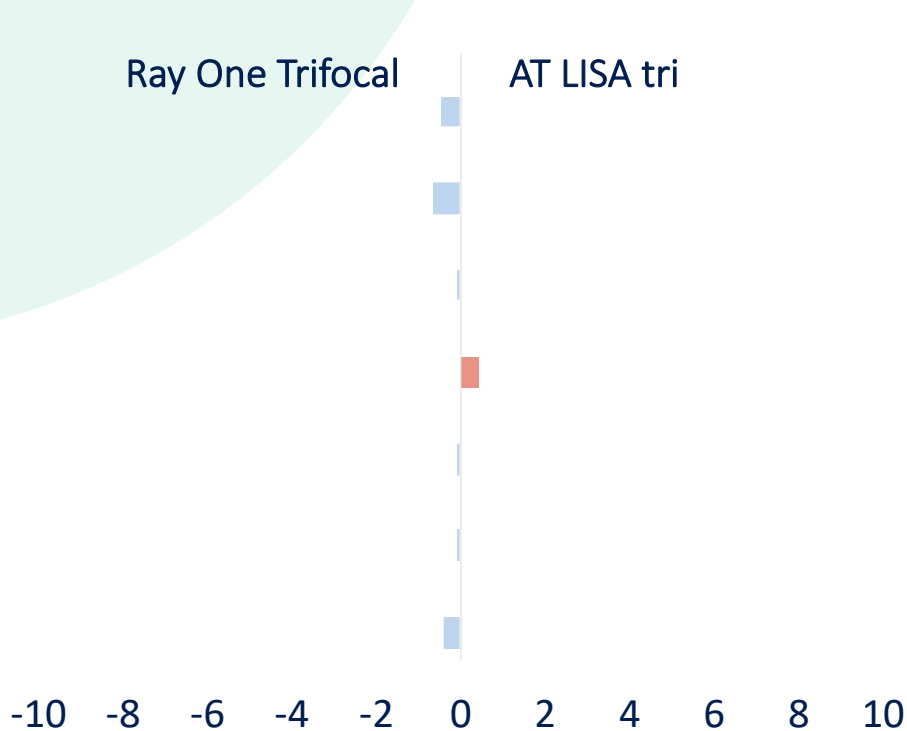
Severity



Bothersome



Subjective Disturbance of Vision



n=23

Overall Disturbance $p=0,67$

Subjective Starbursts. $p=0,34$

Subjective Glare $p=0,63$

Subjective Halo $p=0,43$

Subjective Near Visual Acuity $p=0,37$

Subjective Intermediate Visual Acuity $p=0,26$

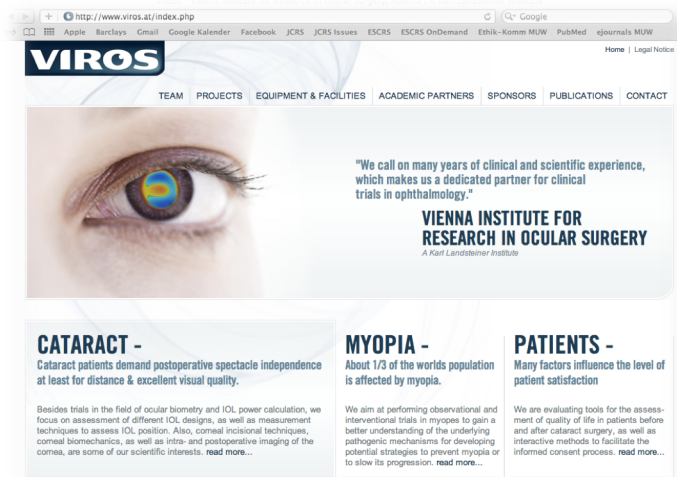
Subjective Distant Visual Acuity $p=0,20$

Conclusions

RayOne Trifocal showed...

- trend for slightly better UCNVA and DCNVA
- significantly better VA in intermediate zone in defocus curve
- no significant difference concerning dysphotopsia

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