Visual Improvement with Wavefront Guided Scleral Lenses for Keratoconus After Intracorneal Ring Segment Implantation

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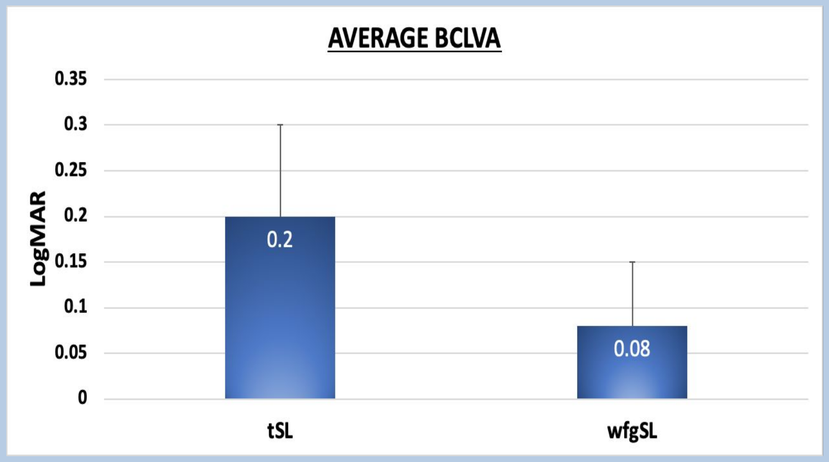
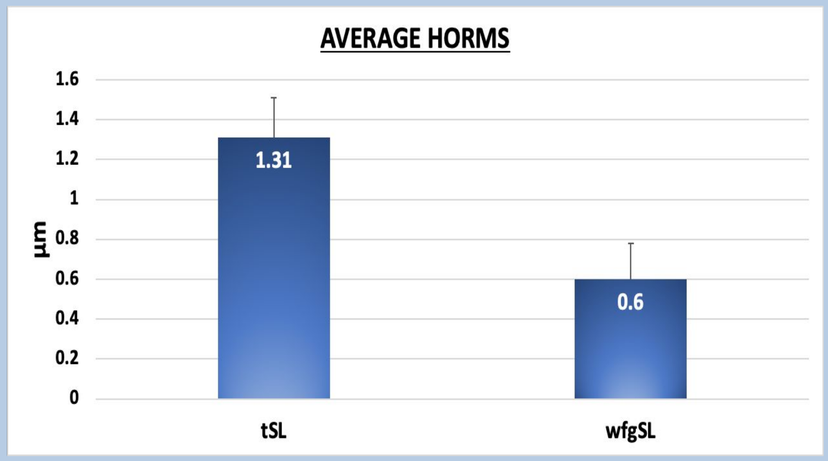
Introduction

- The application of wavefront-guided optics to scleral lenses has been shown to reduce higher order aberrations in eyes with keratoconus.[1]
- This retrospective review compares visual outcomes between traditional scleral lens optics (tSL) and wavefront-guided scleral lens optics (wfgSL) in patients with keratoconus after intracorneal ring segments (ICRS) implantation.

Methods

- 6 eyes of 4 patients, all with keratoconus and ICRS (Intacs, AJL Ophthalmic S.A., Spain), were fitted with a tSL with sphere and cylinder correction only.
- After the tSL was finalized, a comprehensive wavefront aberrometry system (xWave, Ovitz, Rochester, NY) was used to create a wfgSL (ARES, Ovitz, Rochester, NY).
- A crossover was performed, best-corrected lens visual acuity (BCLVA) and total higher-order root mean square (HORMS) were compared between the tSL and wfgSL after 4 weeks of lens wear.





Results

- The tSL cohort averaged BCLVA of 0.2 ± 0.1 LogMAR and HORMS of 1.31 ± 0.2 µm.
- The wfgSL cohort averaged BCLVA of 0.08 ± 0.07 LogMAR and HORMS of 0.60 ± 0.18 µm.
- An average BCLVA improvement of 0.12 ± 0.12 LogMAR ($p < 0.05$) and HORMS improvement of 0.72 ± 0.25 µm ($p < 0.05$).
- 4 of 6 eyes, 67%, improved 1 line or greater, and 2 of 6 eyes, 33%, showed no improvement in BCLVA with wfgSL.
- All eyes showed a reduction of HORMS of 30% or greater, ranging from 31% to 73%, with wfgSL.

Conclusions

- In patients with Keratoconus and ICRS, wfgSL reduce HORMS and improve BCLVA when compared to tSL.
- Further studies are needed to understand factors related to the level of improvement in HORMS and BCLVA.

References

1. Sabesan R, Johns L, Tomashevskaya O, Jacobs DS, Rosenthal P, Yoon G. Wavefront-guided scleral lens prosthetic device for keratoconus. *Optom Vis Sci*. 2013;90(4):314-323. doi:10.1097/OPX.0b013e318288d19c

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