



The Effect of Malposition and Positional Compensation in Wavefront Guided Scleral Lenses

Jenny Wong OD MS^{1,2}, Nicolas Brown BS², John D. Gelles OD^{3,4}

1) Contact Lens Institute of Nevada, Las Vegas, NV

2) OVITZ Corporation, Rochester, NY

3) Cornea and Laser Eye Institute - CLEI Center for Keratoconus, Teaneck, NJ

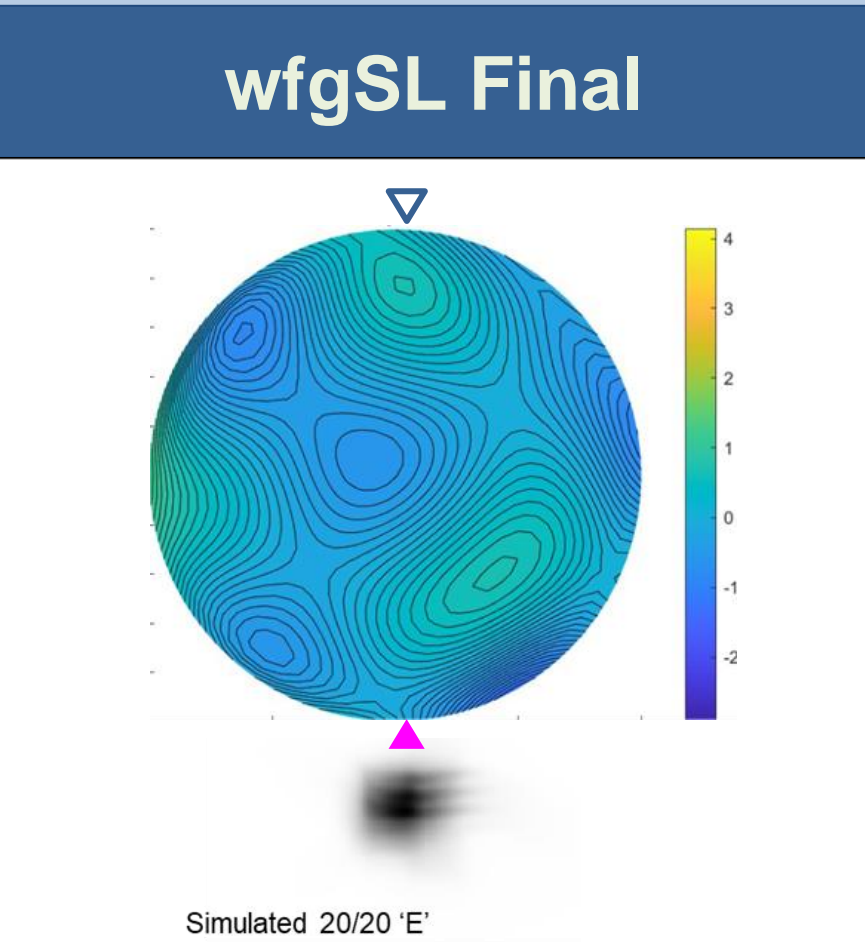
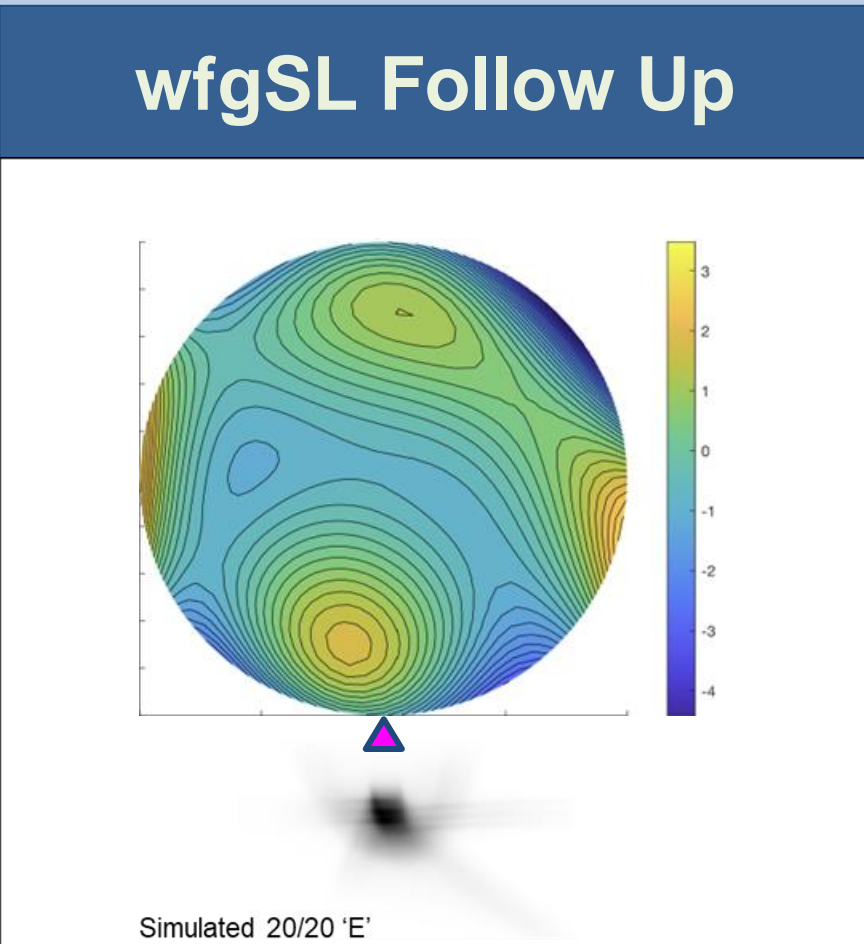
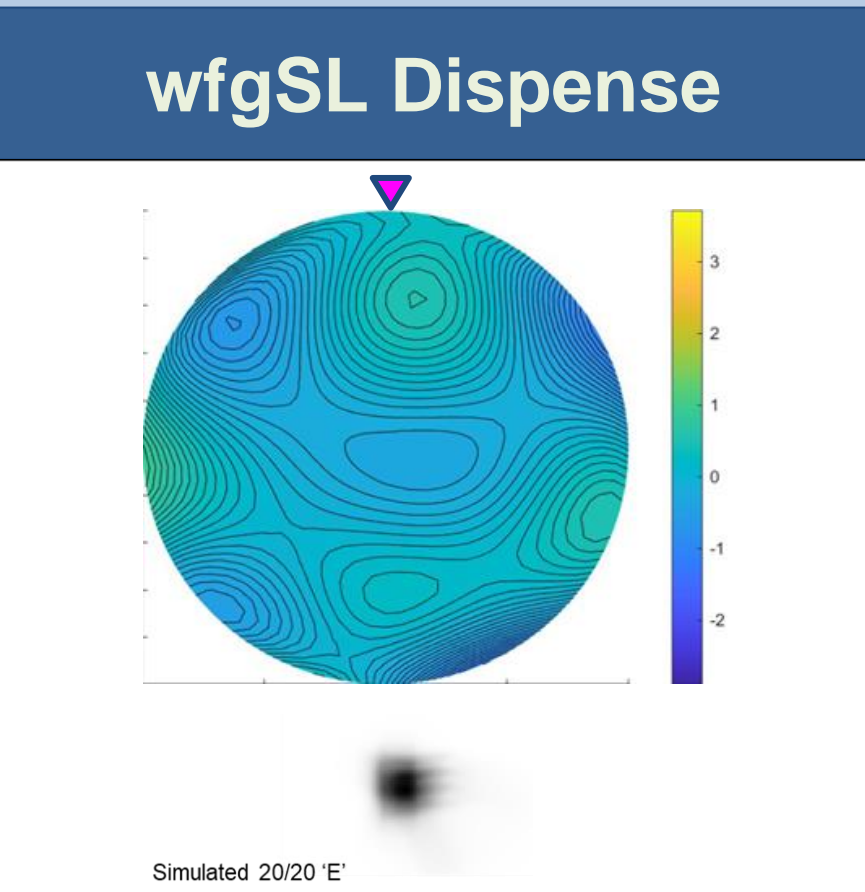
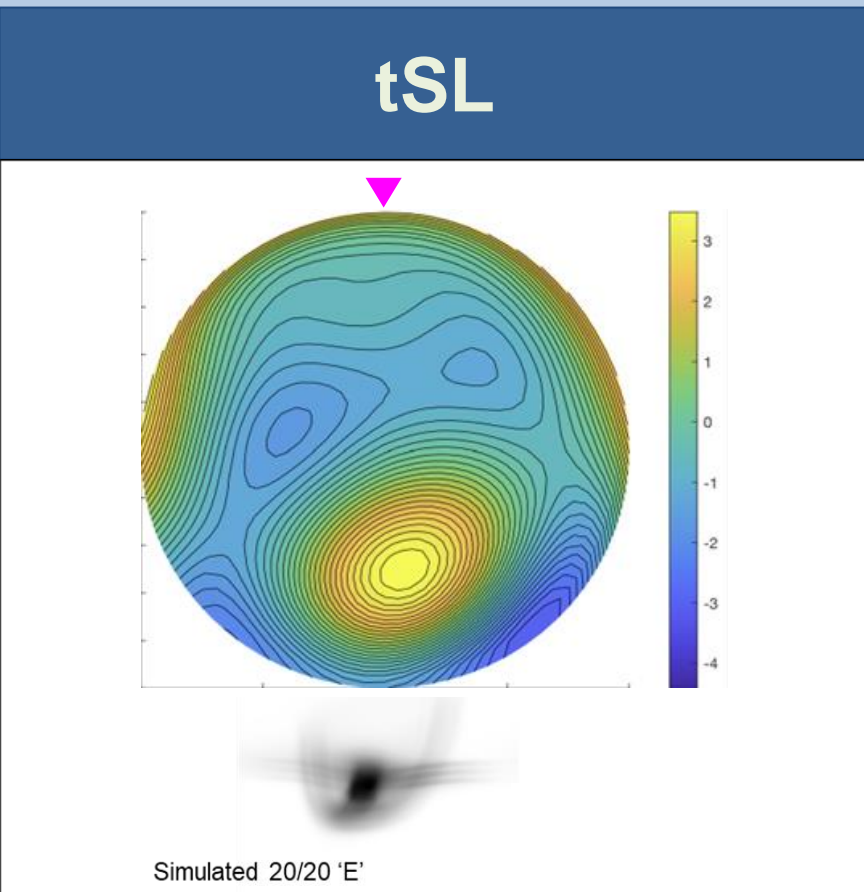
4) Institute of Ophthalmology and Visual Science, Department of Ophthalmology, Rutgers New Jersey Medical School, Newark, NJ

Introduction

- Wave-front guided scleral lenses (wfgSL) combat residual higher order aberrations (HOA).
- Due to the precision and sensitivity of this level of optical correction, alignment of wfg optics is paramount to success.
- This case highlights the effects of wfgSL rotation and subsequent wfg optic positional compensation in a patient with keratoconus (KC).

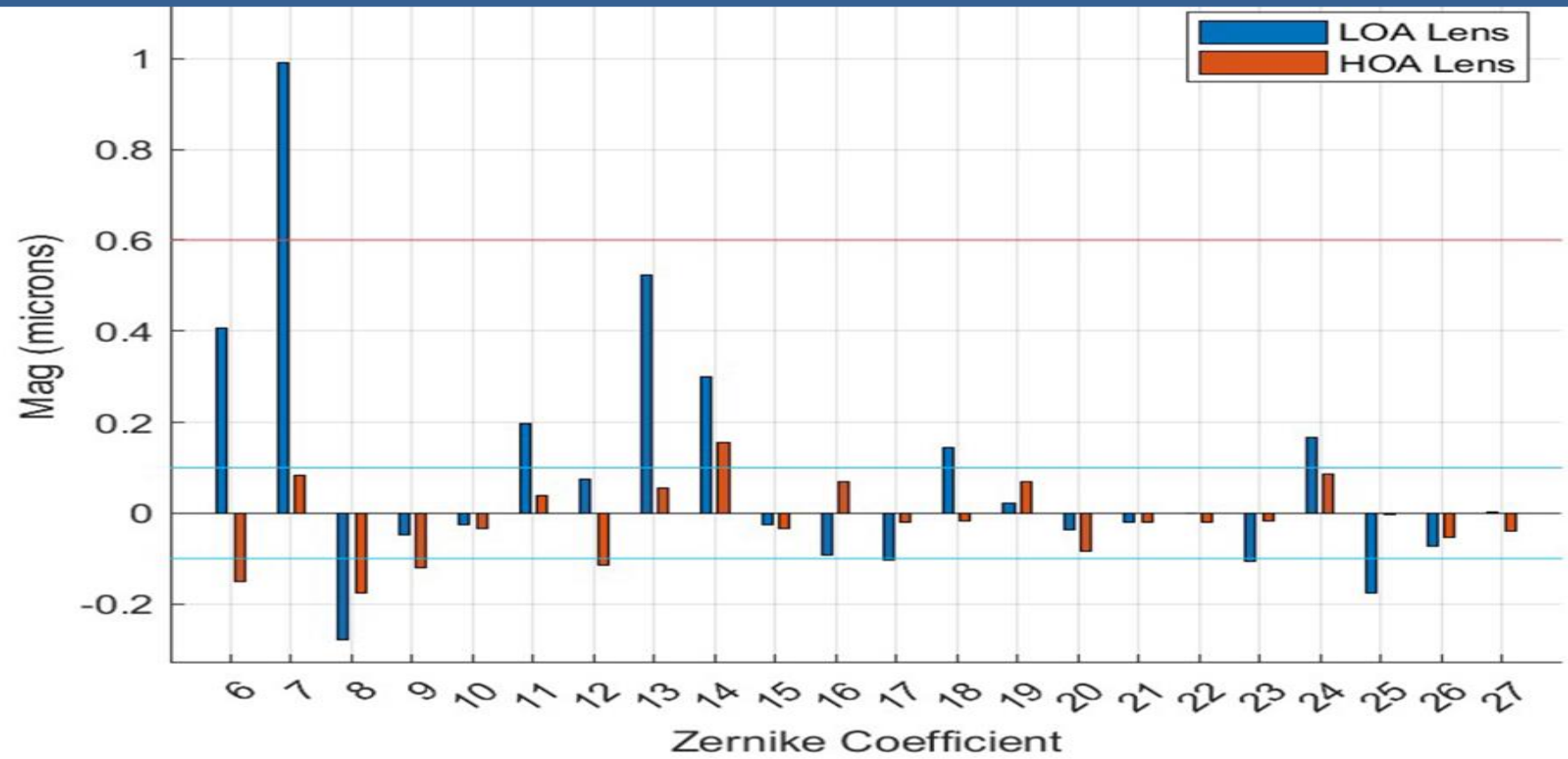
Case Description

- 65-year-old male with a history of KC, severe OS, forme fruste OD.
- The patient was fit with a traditional scleral lens (tSL) (BostonSight Scleral, BostonSight Tech, Needham, MA) on the OS only.
- A comprehensive system (Ovitz, xWave, Rochester NY) that included a dot matrix on the tSL and a wavefront aberrometer with iris and dot registration with direct data transfer was used to create a wfgSL.
- The wfgSL improved visual symptoms at dispense and patient was instructed to wear the new lens for 2 weeks
- Best contact lens visual acuity (BCLVA), and total higher-order root mean square (HORMS) was measured at each follow up
- At 2 week follow up the patient reported degrading vision shortly post lens application. Upon examination, the lens consistently rotates to 180 degrees on application
- A new lens was ordered to with positional adjustments of the wgf optics to compensate for the rotation and new visual axis position



Above: Maps of HORMS while wearing tSL, wfgSL at dispense, wfgSL at follow up, and wfgSL final. The final wfgSL was redesigned to correct for wfg optic misalignment due to lens rotation. Solid pink triangle indicates SL position. Blue outline triangle indicates wfg optics orientation. All measurement are pupil size matched to 6.3mm.

OS Zernike Coefficient Comparison



Results

- tSL provided BCLVA of 20/30 and HORMS of 1.32um
- wfgSL at dispense 20/20- and HORMS of 0.42um
- wfgSL at follow was rotated 180 degrees and provided a reduced BCLVA of 20/60 with an increase in HORMS to 0.92um
- wfgSL optics were compensated for rotation and produced BCLVA of 20/25 and HORMS of 0.41um

Scleral Lens	BCLVA	HORMS (um)
tSL	20/30	1.32
wfgSL Dispense: Aligned	20/20-	0.42
wfgSL Follow up: Rotated	20/60	0.92
wfgSL Final: Compensated	20/25	0.41

Conclusions

- wfgSL malposition leads to a substantial VA reduction and an increase in HORMS.
- Compensation by repositioning the wfg optics led to an improvement in VA and HORMS indicating compensation can be performed if lens stability can be established.

References

- Hastings GD, Applegate RA, Nguyen LC, Kauffman MJ, Hemmati RT, Marsack JD. Comparison of Wavefront-guided and Best Conventional Scleral Lenses after Habituation in Eyes with Corneal Ectasia. Optom Vis Sci. 2019 Apr;96(4):238-247

Disclosures

Wong, J is a consultant for Ovitz. Gelles, JD has received research support, devices, or honoraria from Ovitz. Brown, N is an employee of Ovitz.

