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Poster Abstracts

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Reducing aberrations from multifocal intraocular lenses using higher-order aberration-correcting scleral lenses

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Introduction: To evaluate the effectiveness of higher-order aberration (HOA)-correcting scleral lenses in improving visual quality and reducing optical aberrations in a patient implanted with multifocal intraocular lenses (IOLs) who reported postoperative visual disturbances despite acceptable visual acuity outcomes.

Case report: A female patient 49 years of age with bilateral multifocal IOL (Lenstec) implantation presented 7 months postoperatively with complaints of glare, halos, and reduced visual quality. Baseline measurements included best-corrected visual acuity (BCVA) and wavefront aberrometry. The patient was fitted with custom wavefront-guided HOA-correcting scleral lenses (Zenlens CHROMA HOA), which were designed using ocular surface topography and wavefront data. A total of 9 follow-up visits were conducted over 7 months. Post-lens fitting evaluations included BCVA, repeat aberrometry, and subjective visual quality, comfort, and lens stability assessment.

At baseline post-surgery, BCVA was 20/20-1 OU at distance and 20/20 OU at near but the patient reported debilitating glare. Per wavefront aberrometry, baseline HOA root mean square (RMS) values were 1.27 μm OD and 1.24 μm OS. Following successful final fitting of the wavefront-guided scleral lenses, BCVA improved to 20/15 OU at distance and near without the use of spectacles. Repeat wavefront aberrometry demonstrated a significant reduction in total HOA RMS values to 0.75 μm OD and 0.46 μm OS, with reductions particularly observed in coma components, while maintaining a low amount of spherical aberrations to provide adequate near vision. Subjective patient-reported improvements in visual clarity, reduction of dysphotopsia, and enhanced contrast sensitivity were reported with high satisfaction regarding their vision, comfort, and being able to wear the lenses all day with robust stability.

Conclusion: This case report demonstrates that wavefront-guided HOA-correcting scleral lenses can effectively neutralise aberrations introduced by multifocal IOLs, improving visual quality and patient-reported vision outcomes. This approach represents a promising non-surgical option for managing postoperative optical aberrations in pseudophakic patients with multifocal IOLs.

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