

# Wavefront-Guided PRK for Refractive Error Following Cataract Extraction with Aspheric IOL Implantation

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# Background

- National cataract outcome studies have found 74.6% of patients are within  $\pm 1.0$  diopters of the target SE following cataract surgery<sup>1</sup>
- IOL power calculation is more difficult in patients with prior corneal surgery, including LASIK and RK
- Methods of correcting refractive error include IOL exchange, piggyback IOL and laser refractive surgery
- Wavefront-guided laser refractive surgery treats HOAs and improves contrast sensitivity
- Accurate wavescans are difficult to obtain with the VISX WaveScan Wavefront System in patients with certain IOLs, such as multifocal IOLs

<sup>1</sup>American Academy of Ophthalmology Cataract and Anterior Segment Panel. Preferred Practice Pattern Guidelines. Cataract in the Adult Eye. San Francisco, CA: American Academy of Ophthalmology; 2011

# Purpose

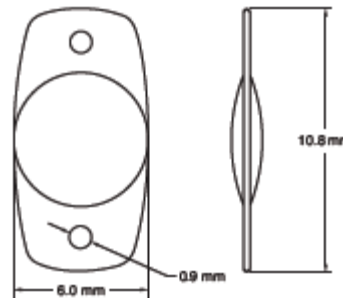
- To describe the use of wavefront-guided PRK to correct refractive error and reduce higher order aberrations in post-cataract surgery patients with collamer aspheric IOLs

# Methods

- Retrospective review of 8 eyes of 5 patients who underwent wavefront-guided PRK with iris registration to correct residual refractive error following cataract extraction and IOL implantation
- All eyes were implanted with a CC4204A nanoFLEX collamer aspheric IOL (STAAR Surgical Company, Monrovia, CA)
- All procedures were performed by a single surgeon at one institution over the last 2 years
- Visual acuity, manifest refraction and wavefront error were determined pre and 1-11 months postoperatively

# Aspheric IOL

**Model:** CC4204A  
**Optic:** 6.0 mm Biconvex Aspheric  
**Length:** 10.8 mm  
**Haptic:** Collamer Single-Piece  
0.9 mm Fenestration  
**Diopters:** 10.5 to 30.5  
**A-Constant:** 119.0  
**ACD:** 5.55 mm



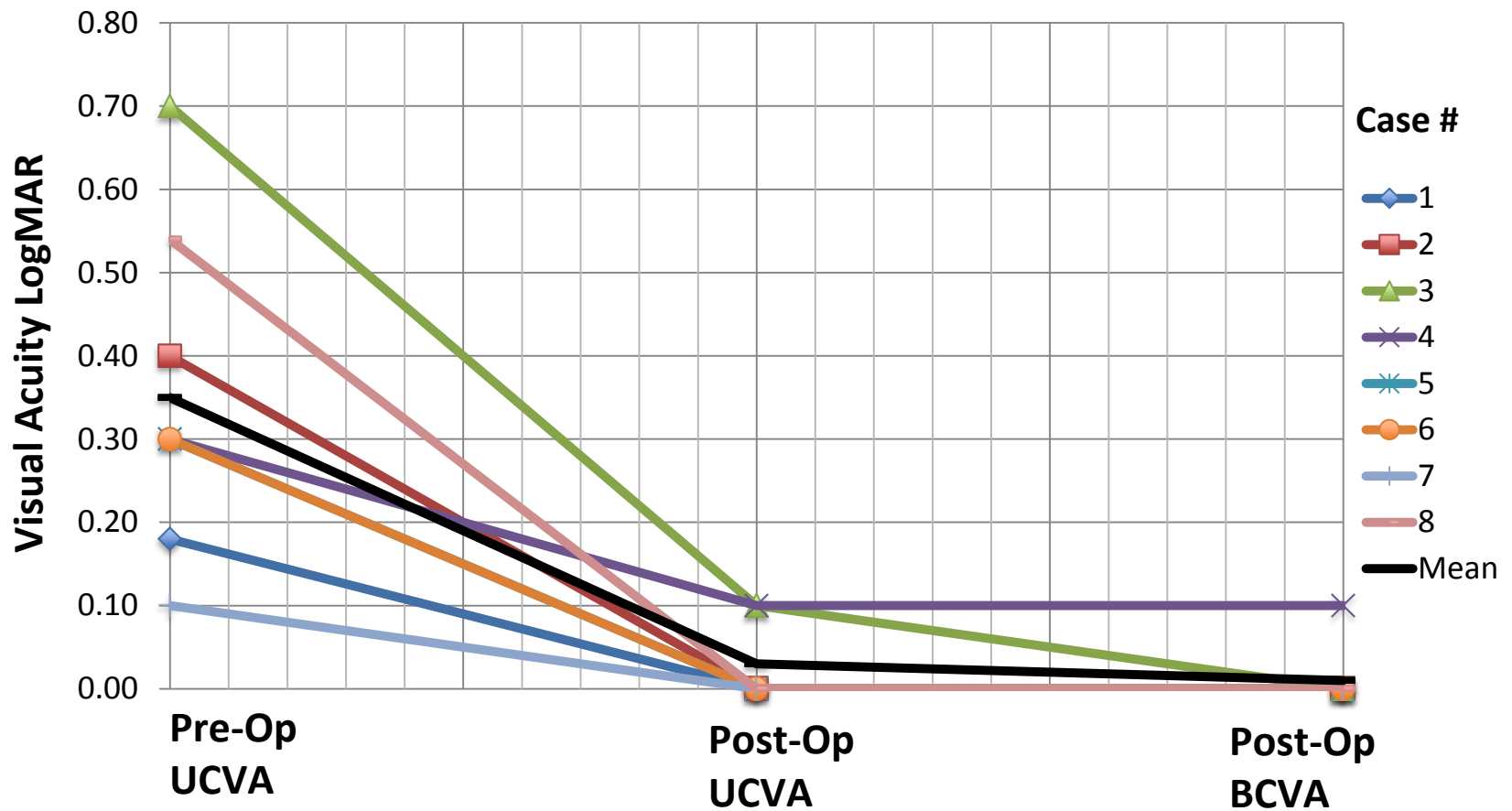
**nanofLEX**<sup>TM</sup>

Collamer Aspheric Single-Piece IOL

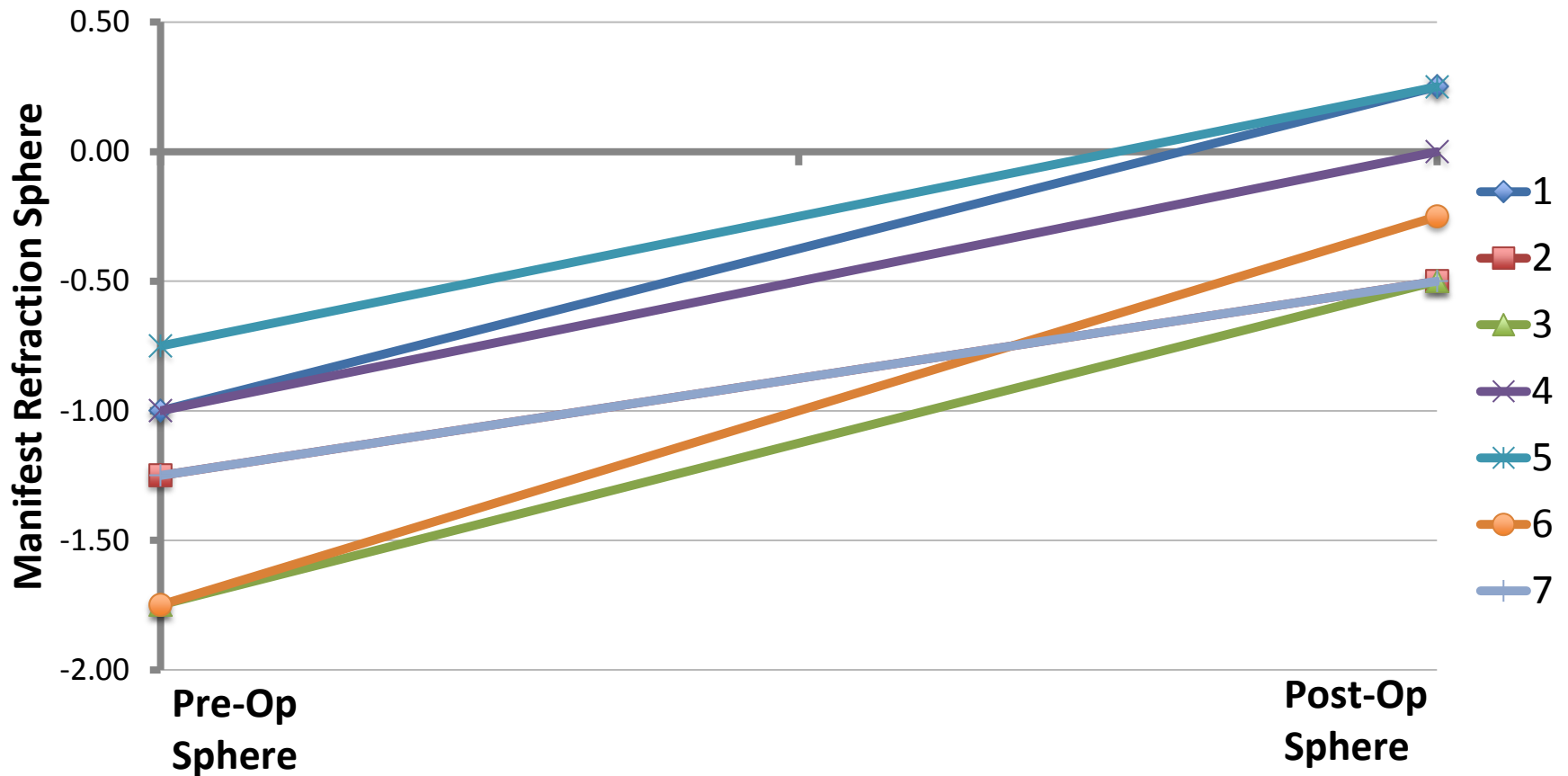
# Results

- We were able to obtain high quality wavescans through the collamer aspheric IOLs
- UCVA improved in all eyes
  - Mean improvement of  $0.33 \pm 0.16$  logMAR, range 0.10 – 0.60 logMAR
- Best corrected visual acuity (BCVA) improved or remained 20/20 in all eyes
- Two eyes resulted in hyperopic overcorrection
- Mean HOAs measured by RMS error decreased
  - Mean pre-operative HOA measured by RMS error was  $1.30 \pm 0.17$  (range 1.04 – 1.5)
  - Mean post-operative HOA measured by RMS error was  $1.09 \pm 0.65$  (range 0.51 – 2.19)

# Results: Visual Acuity

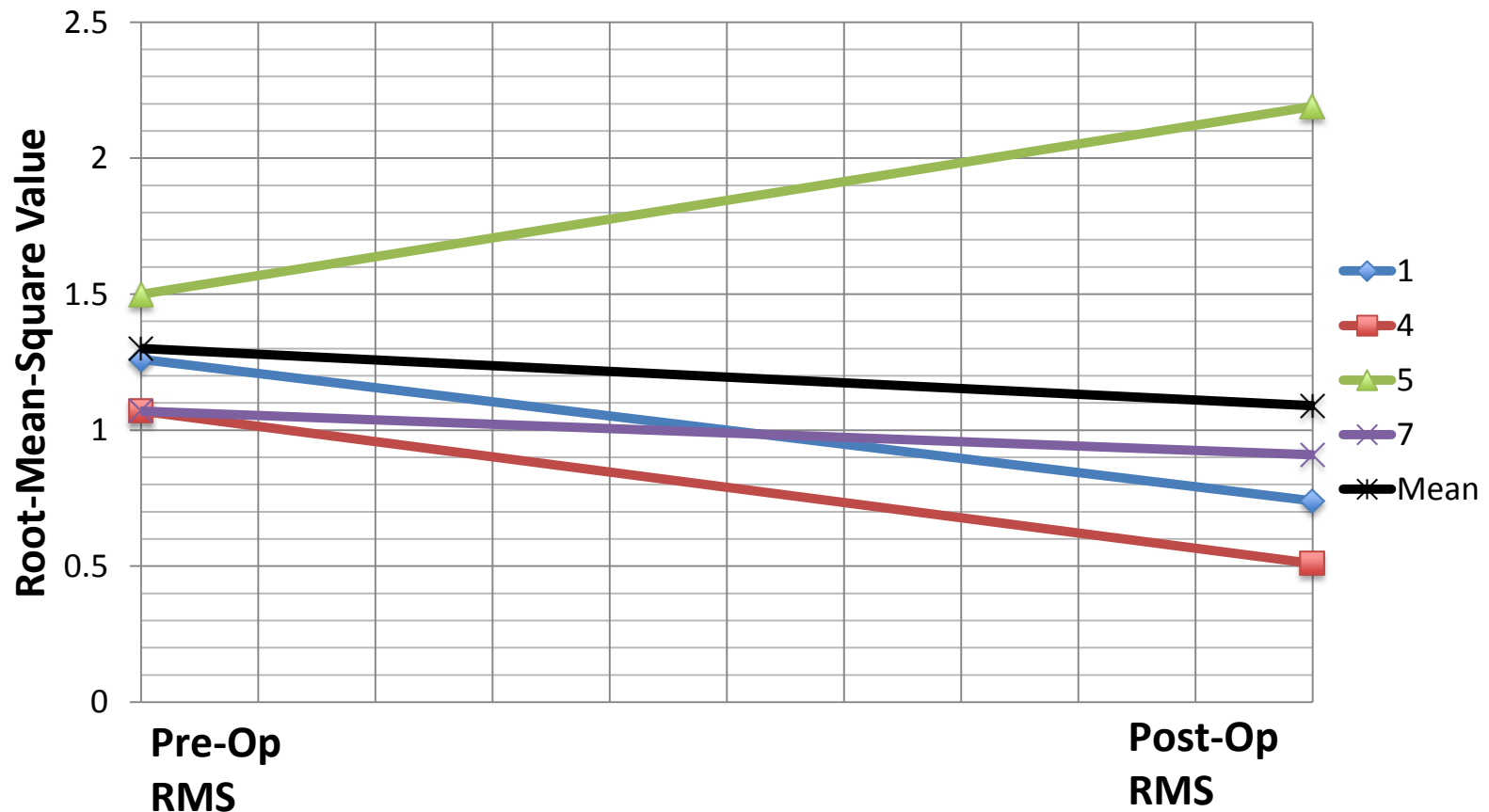


# Results: Manifest Refraction





# Results: Higher Order Aberrations



# Conclusions

- Wavefront-guided PRK is a safe and effective method to correct residual refractive error following cataract extraction with aspheric IOL implantation
- Mild nomogram correction may be needed to avoid hyperopia post PRK

# Implications

- The ability to perform wavefront-guided PRK retreatment may be a consideration in IOL selection for patients in which IOL calculation is difficult