Corneal Changes and Surgically Induced Refractive Change Following Strabismus Surgery
Mohamed S. Sayed, M.D., Mehdi Tavakoli, M.D., Carla Osigian, M.D., Plangpong Saksirivuttu, M.D., Kara M. Cavuoto, M.D., Craig A. McKeown, M.D., Hilda Capo, M.D.
Bascom Palmer Eye Institute, University of Miami Miller School of Medicine

Introduction
- Recent advances in corneal imaging allow clinicians to measure lower (spherical and cylindrical refractive errors) and higher order aberrations (HOAs; spherical aberrations, coma, and trefoil, among others).
- Changes in HOAs may induce loss of contrast sensitivity, change in depth of field, and degradation of image quality. Modern excimer laser ablation profiles allow for correction of HOAs in a customized fashion, and have now become the standard of care in laser vision correction.
- Strabismus surgery may induce changes in the refractive status in terms of sphere, cylindrical power, and cylindrical axis.1,2 Many of the patients undergoing strabismus surgery are also candidates for cornea-based laser vision correction. In the wavefront era, knowing whether strabismus surgery induces significant changes in HOAs is imperative for careful surgical planning.
- To our knowledge, this is the first study looking into changes in HOAs induced by strabismus surgery.
- The findings of this study may lay ground for establishing guidelines on the most appropriate surgical sequence in patients undergoing both strabismus and refractive surgery.

Methods
- Prospective study on subjects (18-80 years of age) undergoing strabismus surgery.
- Corneal topography, refraction and aberrometry were performed preoperatively and at follow up using the iTrace platform (Tracey Technologies, Houston, TX), which provides objective refraction, placido-based corneal topography, and Hartmann-Shack-based wavefront aberrometry.

Results
- 27 patients were enrolled. At the first follow up visit, total HOAs changed by an average of 80µm.
- Mean sphere and cylinder power increased +0.4 D and +0.75 D, respectively, while the average change in cylinder axis was 32 degrees.
- At 4-6 weeks postoperatively, HOAs changed from baseline by an average of 0.072µm in 4 eyes that completed follow up.
- The mean change in spherical and cylindrical power was -0.3 D and +0.6, respectively, and the average change in cylinder axis was 6 degrees.

Discussion
- Our results demonstrate that significant changes in HOAs, sphere, and cylinder power and axis are common early postoperatively.
- While this can be attributed to early, temporary ocular surface changes, our long term follow up data may determine the long-term effect of strabismus surgery on these parameters.

Conclusion
- Significant changes in refractive status appear to take place following strabismus surgery. Our results suggest that strabismus surgery should be considered prior to refractive surgery. Longer follow up is needed to support such recommendation.

References