

Contributing Factors to Corneal Deformation in Air Puff Measurements

Farhad Hafezi

Department of Ophthalmology, Geneva University Hospitals, Geneva, Switzerland and the Keck School of Medicine, University of Southern California, Doheny Eye Institute, Los Angeles, California; farhad@hafezi.ch

Corneal collagen cross-linking with riboflavin and UV-A (CXL) is a method to increase the biomechanical resistance of the cornea. In the past 10 years, CXL has become the gold standard in the treatment of progressive corneal ectasia (keratoconus, pellucid marginal degeneration, and postoperative ectasia) in wide parts of the world.

Whereas the ophthalmologist has a number of tools to assess progression of ectasia preoperatively, assessing successful arrest of ectasia progression is most often achieved indirectly, by comparing pre- and postoperative Placido-based and/or Scheimpflug topographical images. The Ocular Response Analyzer (ORA; Reichert Inc., Buffalo, NY) was a first step toward a direct measurement of the induced biomechanical changes.¹

In the present study, Kling et al.² show that an air puff device coupled with an ultra-high-speed Scheimpflug camera (CorVis; Oculus Instruments, Wetzlar, Germany) is able to detect changes in the viscoelastic properties of the cornea following a CXL treatment.

Not only might this device give the ophthalmologist the possibility to assess changes in human corneal biomechanics due to hormonal changes, disease, or postoperative complications,^{3,4} it might also be highly useful to the basic researcher in the assessment of changes induced in an experiment setup, without having to sacrifice the animal for strip extensometry.

References

1. Spoerl E, Terai N, Scholz F, Raiskup F, Pillunat LE. Detection of biomechanical changes after corneal cross-linking using Ocular Response Analyzer software. *J Refract Surg.* 2011;27:452–457.
2. Kling S, Marcos S. Contributing factors to corneal deformation in air-puff measurements. *Invest Ophthalmol Vis Sci.* 2013;54:5078–5085.
3. Hafezi F, Iseli HP. Pregnancy-related exacerbation of iatrogenic keratectasia despite corneal collagen crosslinking. *J Cataract Refract Surg.* 2008;34:1219–1221.
4. Hoogewoud F, Gatziofias Z, Hafezi F. Transitory topographical variations in keratoconus during pregnancy. *J Refract Surg.* 2013;29:144–146.