

Clinical Outcomes After Topography-guided Refractive Surgery in Eyes with Myopia and Astigmatism—Comparing Results with New Planning Software to Those Obtained Using the Manifest Refraction [Letter]

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Manoj Motwani

Motwani LASIK Institute, San Diego, CA,
92121, USA

Dear editor

In response to the study performed by Brunson et al “Clinical Outcomes After Topography-guided Refractive Surgery in Eyes with Myopia and Astigmatism—Comparing Results with New Planning Software to Those Obtained Using the Manifest Refraction,” there are significant issues with this study and the use of the Phorcides Analytic Engine that must be examined.¹

Both manuscripts now published concerning outcomes from the PAE have essentially followed the same script—focus on comparison to manifest refraction, comparing only visual results, no mention of axis variance from either manifest or Contoura measured astigmatism, no mention of controls in picking patients for inclusion in the study, such as a consecutive series to prevent “cherry-picking,” small deviations in between magnitudes of manifest, Contoura measured, and Phorcides astigmatism, no topographic analysis to demonstrate that a more uniform cornea was being created, no analysis of Zernicke higher order aberration polynomials to show that HOAs were reduced and not induced, no data concerning residual astigmatism after treatment (except for a line stating no patient had greater than 0.5 D of residual astigmatism), no subjective patient outcomes, and no scientific explanation as to why Phorcides should be used and not simply the Contoura measured astigmatism, which also analyses the higher order aberrations on the anterior corneal surface, which is the most important refracting element of any optical system.^{1,2}

Furthermore, the 20/15 results of 60% (in both manuscripts) are not even as high as the Alcon published results with WFO, which are 69%, nor are they as high as the results published utilizing the Contoura measured astigmatism and axis (LYRA Protocol) which has also been demonstrated to make a more uniform cornea, have excellent subjective patient visual outcomes, have better visual outcomes, and to successfully treat astigmatism based on Zernicke polynomials.^{1–8}

Brunson et al also mischaracterize LYRA Protocol as “some combination of . . . retaining use of the manifest cylinder and use of the topographic astigmatism and

Correspondence: Manoj Motwani
Motwani LASIK Institute, 4520 Executive
Dr., Suite 230, San Diego, CA, 92121,
USA
Tel +1 858 554-0008
Email drmmjlj@gmail.com

axis.”¹ The LYRA Protocol uses exclusively the full amount of the Contoura measured astigmatism and axis and performs a topographic analysis of the anterior cornea surface higher order aberrations and the lower order astigmatism that is present after elimination of them.^{9–12} Use of manifest astigmatism with topographic-guided ablation simply posits that there is no link between removal of corneal higher order aberrations and lower order astigmatism, and assumes that manual hand refractions between different surgeons/techs/optometrists are accurate, repeatable, and error free. It also erroneously states that the results are better than those of the LYRA Protocol, when the 20/15 results are not even as good as that of wavefront-optimized.

Furthermore, the proponents of manifest refraction and the proponents of Phorcides make assumptions that the astigmatism posterior to the anterior corneal surface is significant, needs to be treated, is constant over time and unsusceptible to lens changes, etc, can successfully be treated on the anterior corneal surface, and is not susceptible to epithelial compensation or optical quality issues from newly induced corneal higher order aberrations.^{1,2,4}

This manuscript again examines patients with only a small degree of difference between manifest, Contoura measured astigmatism, and Phorcides. The author has published a manuscript that shows that Phorcides becomes less accurate as the difference between manifest and Contoura astigmatism increases, a situation which requires greater accuracy not less.¹³ The author also has published that the main reasons for inaccurate outcomes with the LYRA Protocol have been mainly epithelial compensation before and after treatment, and corneal changes in some corneas that occur during flap construction.^{13–15} Posterior astigmatism was a vanishingly small reason for inaccuracy (in only two eyes of one patient), and in almost five years of constantly hunting for posterior astigmatism being a source of inaccuracy in our clinic utilizing topography/Contoura analysis, wavefront analysis, OCT epithelial mapping analysis and manifest refraction to do so has resulted in only a tiny number of eyes demonstrating inaccuracy due to astigmatism posterior to the corneal surface.

Finally, after surgically planning several hundred eyes with Phorcides it is difficult for us understand how the extra time and layer of Phorcides analysis is easier than simply utilizing the Contoura measured astigmatism and axis and adjusting the spherical equivalent or is “highly subjective” as the authors state. When Phorcides output is

similar to Contoura Measured as it seems it is in both the Brunson and Lobanoff studies, the output if the astigmatism axis is also similar would also be similar avoiding the need for the extra work in utilizing Phorcides. When the magnitude between manifest and Contoura measured astigmatism grows, the author has already shown Phorcides is highly inaccurate.¹³ The author simply does not find Phorcides an acceptable surgical planning tool, and believes that the data consistently points to creation of a uniform anterior corneal surface as the most accurate correction yielding the best visual outcomes with the best subjective patient vision.¹³

Disclosure

Dr Motwani holds patents for the LYRA Protocol and epithelial compensation of corneal aberration treatment. The author reports no other conflicts of interest in this communication.

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