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Disclosures: L. van Vught, G.P.M. Luyten, and J.-W.M. Beenakker have a patent pending on the improved IOL design.

Comment on: Comparison of clinical outcomes between vector planning and manifest refraction planning in small-incision lenticule extraction for myopic astigmatism



Jun et al. should be congratulated on their important study comparing clinical outcomes between vector planning (VP) and conventional manifest refraction (MR) for the treatment of myopic astigmatism with small-incision lenticule extraction (SMILE).^{1,2} The findings of this groundbreaking study demonstrated statistically significant better outcomes for the VP-treated patients for both refractive cylinder and corneal astigmatism as well as internal aberrations as quantified by ocular residual astigmatism (ORA) than those treated by conventional MR. Angle of error, correction index (CI), and linearity of slope of line of best fit between surgically induced astigmatism vector and target-induced astigmatism vector were also significantly better.

With such clear-cut superiority of the VP group, it is difficult to rationalize such a problematic conclusion recommending a requirement for a nomogram adjustment. A nomogram adjustment means that this Zeiss SMILE device is systematically over or under correcting astigmatism across ALL treatments—which is incorrect according to the results in this study in which the overall CI is very close to the ideal 1.0. The authors suggest a nomogram adjustment for the cylinder treatment of the MR group alone. If a nomogram adjustment was to be applied to the MR group, which has a CI of 0.88 by refraction, then the overcorrection by corneal values of 1.24 (arithmetic mean of 1.06 for both CI) would be further increased to cause adverse corneal outcomes for the MR group. When extended to the VP group, this would also adversely affect the excellent outcomes achieved, with the CIs of both refractive (1.04) and corneal (0.98) analyses (arithmetic mean 1.01) being optimal.

Just as treatment is shown to have benefit by an ideal balance between corneal and refractive astigmatism parameters, so too does the analysis postoperatively of nomogram adjustments benefit by both being taken into account as performed below.

CI analysis: (1) corneal measurements (from Table 3) MR 1.24 VP 0.98 (2) refractive measurements (from Supp. Table 2 calculated for zero target) MR 0.88 VP 1.04.

The statistically significant difference between MR and VP is not due to any nomogram adjustment being required, but rather the VP method of incorporating both corneal and refractive astigmatism parameters into the treatment profile, leading to beneficially reduced astigmatism, cylinder, and internal aberration outcomes.

Furthermore, the stated solution to resolve differences that exist between corneal and refractive values by repeating the MR with more care or accuracy belies the fact that care was likely taken with the first test and a significant proportion of eyes will still have ORAs greater than 0.75 diopters after retesting.

This study reconfirms the findings by Arbelaez et al. in demonstrating better outcomes for VP with less corneal astigmatism remaining postoperatively, compared with treatment using MR parameters.³ This important benefit was achieved without compromising refractive cylinder outcomes. However, it seems the authors here may have misinterpreted the astigmatism analyses of their own study in suggesting a nomogram adjustment would provide benefit when in fact from their own published figures, as tabulated above, the Zeiss SMILE device without any correction adjustments is performing excellently by examining both corneal and refractive astigmatism parameter analyses.

With several studies now demonstrating the benefits of VP when treating astigmatism, consideration should be given to VP being adopted as the standard of care in refractive surgery for the treatment of myopic astigmatism.

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Disclosures: N. Alpíns has a financial interest in the ASSORT Surgical Management Systems used to support the planning and analysis of astigmatic correction. ASSORT holds trademarks and patents in vector planning.