LETTER

Vector Analysis Reveals That Topography-Guided LASIK Targeting the Manifest Refraction (MR) is Superior to Topography-Modified Refraction (TMR) and Layer Yolked Reduction of Astigmatism (LYRA) [Letter]

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Dear editor

We read with interest "Primary Topography-Guided LASIK: A Comparative Study Comparing Treating the Manifest versus the Topographic Astigmatism".[1] We commend the authors for performing vector analysis of surgical astigmatic changes using the standardized Alpins Method for their outcomes analysis paper. However, the papers' conclusion is not supported by the vector analysis findings.

Astigmatism vector analysis answers the following clinical questions: 1 – Was the attempted astigmatic treatment undercorrected or overcorrected? 2 – Was the under/overcorrection due to the magnitude or axis of treatment? 3 – Was there a consistent axis error? Vector analysis is therefore essential for a complete evaluation of excimer surgical outcomes and for determining optimal nomogram adjustments to improve future outcomes. Refractive surgery journals have made this type of analysis the standard for reporting.[2]

The Alpins difference vector (DV) represents the vectorial difference, in diopters (D), between the desired target surgical treatment of astigmatism (TIA) and the achieved treatment that was induced (SIA). DV is small when the treatment is accurate and large when the treatment is inaccurate. The DV provides the most valuable statistical basis for comparing multiple surgical treatment options.

Aboalazayem et al compared treating the manifest refractive astigmatism (Manifest group), vs the anterior corneal astigmatism with spherical adjustment (Full TMR group), vs the anterior corneal astigmatism without spherical adjustment (Partial TMR group).[1] They concluded that treating the anterior corneal astigmatism is best. Yet their data shows superior vector analysis outcomes in the Manifest group, where the difference vector (DV) was as low as 0.20 D, compared to 0.90 D in the Full TMR group, or 0.50 D in the Partial TMR group. These results indicate that eyes in the TMR group and Partial TMR group had by far the greatest astigmatism treatment errors postoperatively in this comparative study. It is hard to reconcile how these groups are presented as having better vision. In addition, the coefficient of determination (R^2) between the TIA and SIA was 0.82 in the Manifest

group, compared to 0.62 in the full TMR group and 0.70 in the Partial TMR group. These findings indicate that the Manifest group had the most accurate treatment predictability.

It is encouraging to see that the data in the Aboalazayem et al paper validates our own vector analysis findings,[3] as well as those of Kim et al[4] and those of Trinh et al[5] where superior vector analysis data were also reported for Manifest-treated topography-guided eyes, compared to using TMR. However, despite the comprehensive vector analysis, the authors concluded that "Treating according to the topographic astigmatism shows the best outcome" - a statement that is not supported by the paper's vector analysis findings, nor by the above-cited literature.[3–5]

In summary, the authors' conclusion needs clarification or modification considering that the vector analysis and treatment predictability was significantly superior in the Manifest group. Their paper's vector analysis data replicate the outcomes of at least three previous studies,[3–5] confirming the superiority of treating the Manifest astigmatism versus the anterior corneal astigmatism. Considering these recent publications and our experience, we strongly recommend treating the manifest refraction. We appreciate the Authors contribution to the field.

Disclosure

Dr Wallerstein has indirect ownership in LASIK MD clinics and has no financial or commercial interests in the subject matter or materials presented in the current Letter to the Editor. Dr Gauvin has no conflict to disclose and no financial interest in the subject matter or materials presented in the current Letter to the Editor.

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