

## **Comment on: Effect of residual astigmatism on uncorrected visual acuity and patient satisfaction in pseudophakic patients**

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We discussed the article by Schallhorn *et al* comparing the effect of residual astigmatism on visual outcomes and patient satisfaction in patients undergoing cataract surgery or clear lens extraction with astigmatism correction as part of the ESCRS Eye Journal Club (2<sup>nd</sup> June 2021).<sup>1</sup> Although it is intuitive that increasing residual astigmatism would adversely affect the likelihood of achieving an unaided distance visual acuity (UDVA) of 20/20 or 20/16 in eyes with an emmetropic refractive target, the authors demonstrate this trend in 17,152 eyes. We would like to highlight several points of discussion relating to the study's methodology.

The presentation of visual outcomes in terms of the likelihood of achieving UDVA >20/16 or >20/20 risks losing some meaning, since two groups with different residual astigmatism may differ by these thresholds, yet have an identical probability of achieving UDVA of 20/25. Consequently, some presentation of the spread of the raw visual acuity data in each group would be of interest.

The study included patients undergoing cataract and clear lens extraction, presenting a pooled analysis of outcomes. However, the demographics, pre-operative visual acuities, ocular co-morbidities, visual expectations and the orientation of pre-operative astigmatism are likely to differ significantly between the two groups. Subgroup analysis would have expanded the generalisability of the study and further clarified the threshold of pre-operative corneal astigmatism to include in surgical planning in each group. Subgroup analysis by pre-operative refraction may have clarified whether myopic patients prefer a low hyperopic over low myopic outcome which appeared true overall. It is unclear whether patients with ocular co-morbidities were excluded.

Moreover, inclusion of patients with BCDVA worse than 20/30 may compromise the reliability of post-operative subjective refraction.

It is uncertain whether the questionnaire is validated in the assessment of quality of vision, and for which distances. Satisfaction in this context is clearly a function of binocular vision, and cannot segregate responses exclusively to a single operated eye – the premise on which the analysis was based. This may obscure the influence of residual astigmatism in the dominant eye on measures of satisfaction. It would be of interest to know whether the refractive state of the fellow eye - or indeed binocular UDVA - had any influence on measures of post-operative satisfaction. The inclusion of patients with extended depth of focus IOLs may have further complicated this analysis. Response-rates of self-completed post-operative questionnaires may be biased by refractive outcomes; consequently, those with poorer visual function may have been under-represented.<sup>2</sup>

The prevalent view amongst cataract surgeons is that the orientation of residual astigmatism is visually significant. An unexpected, and potentially valuable, finding of this large study was that the orientation of residual astigmatism was not a significant predictor of visual outcomes on multivariate analysis, agreeing with another large study.<sup>3</sup> This report may help to shift perceptions amongst cataract and refractive surgeons of the visual impact of the orientation of post-operative astigmatism. Additional analysis grouping patients based on the orientation and magnitude of pre-operative corneal astigmatism would be of interest to further qualify these observations.

## References

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