Optical Quality of Three Multifocal Lenses

We enjoyed reading the article by Esteve-Taboada et al., but were disappointed by their interpretation of their data. Their optical model has important limitations that make it inappropriate to make broad clinical generalizations from their findings.

First, the “aberration-free” eye model is highly artificial. In particular, the absence of any spherical aberration is relevant to only a small percentage of eyes undergoing cataract surgery. Our understanding is that the FineVision Micro F12 lens has a spherical aberration of -0.1 µm and the AT LISA tri lens has a spherical aberration of -0.18 µm. Because the TECNIS Symfony lens has a spherical aberration of -0.27 µm, it would be disadvantaged in this model.

Second, the authors used monochromatic light at 545 nm. This again is a testing parameter that does not reflect real-world vision. As we understand it, the TECNIS Symfony lens corrects for chromatic aberration, so testing with white light would better simulate what patients might experience.

Finally, more accurate appraisal of clinical performance would require evaluation of the impact of many other factors: different pupil sizes, astigmatism, other higher order aberrations, and decentration.

REFERENCES

Reply

We read with interest the comments by Drs. Koch and Wang regarding our article. We fully agree with all of the comments addressed by the authors. As indicated in the manuscript, we used an aberration-free eye model to test the intraocular lenses (IOLs) in vitro, so the results obtained are only valid under this condition. It would be interesting to consider different corneal profiles to simulate different corneal conditions. Furthermore, and as also stated in the article, a light source with a radiance peak centered on 545-nm wavelength was used to take the measurements. The results shown in our article are only valid under the reported conditions (model eye, wavelength, pupil aperture, etc.). Certainly, if different testing conditions are used, the results obtained might differ from the ones reported.

We also agree with the authors that the evaluation of clinical performance would require assessment of the impact of many other factors. Different pupil sizes, residual refractive error, higher order aberrations, decentration, tilt, photic phenomena, and visual response are all factors that should be considered in the visual performance evaluation. As was stated in our article, in vivo studies are needed to fully understand the clinical performance of the IOLs.

We would like to thank Drs. Koch and Wang for contributing to highlight the limitations of this study and to help the readers of the journal to understand the real conditions in which the conclusions obtained can be applied.

REFERENCE

Jose Juan Esteve-Taboada, PhD
Alberto Domínguez-Vicent, MSc
Antonio J. Del Águila-Carrasco, MSc
Teresa Ferrer-Blasco, PhD
Robert Montés-Micó, PhD
Burjassot, Spain

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