Secondary spherical aberration adjustment basis for advanced aspheric monovision technique

by Cheryl Guttman Krader in Vienna

PROMISING RESULTS
Secondary spherical aberration adjustment basis for advanced aspheric monovision technique

by Cheryl Guttman Krader in Vienna

“Combining the procedure with pre-treatment evaluation using the Adaptive optics visual analyzer developed by Voptica SL to fully customise the induced SA would be an amazing next step”

Secondary aspheric treatment of the Light Adjustable Lens (LAL, Calhoun Vision) to create an optimised form of monovision provides patients with excellent visual acuity for most distances and allows for spectacle independence, reported Pablo Artal PhD, at the XXIX Congress of the ESCRs. The procedure has been dubbed “advanced aspheric monovision” to distinguish it from standard monovision, which is based on inter-eye differences in refraction. It involves bilateral implantation of the LAL. The dominant eye is treated for near emmetropia and zero spherical aberration (SA) to optimise distance vision. The non-dominant eye is made to be slightly myopic and to have some negative SA that results in increased depth of focus and enables good uncorrected near vision.

Dr Artal presented results from the first 14 patients treated with advanced aspheric monovision. All of the surgeries and light treatments were done by Jose Maria Marin MD, Department of Ophthalmology, Hospital Virgen de la Arrixaca, Murcia, Spain. Measurement of refraction and spherical aberration to guide the light adjustment procedures was performed using a Hartmann-Shack wavefront sensor. Post-adjustment, SA measured with a 4.0mm pupil in the aspheric eye ranged from -0.05 to -0.2 microns, and the results also showed good vision for distance in the dominant eyes as well as across the near and intermediate range for the non-dominant eyes, and the binocular results showed a summation effect such that binocular UCVA for all distances was equal to or slightly better than that of the better monocular result.

Spectacle independence Considering a subgroup of four patients with -0.1 to -0.2 microns of SA in the aspheric eye, 100 per cent had simultaneous UCVA better than 20/20 at 10m, J1 or better at 60 and 40cm, and J2 or better at 30cm, reported Dr Artal, professor of physics and founder and director of the Optics Laboratory, University of Murcia, Spain.

“Achieving perfect refractive outcomes was the primary goal for creating the LAL. However, the LAL technology also allows options for manipulating the optics so that it can provide good quality near vision for spectacle independence. In fact, many of the patients in this early series became spectacle independent, and we think these are very promising results,” he said.

However, even better outcomes may be achieved in the future by taking advantage of the customisation feature of the procedure, Dr Artal told EuroTimes.

“In this study, patients were treated to achieve a specific amount of negative SA in each eye based on a target range we determined in a previous study using adaptive optics. However, this earlier research was done in normal subjects and not in patients,” he explained.

“Combining the procedure with pre-treatment evaluation using the Adaptive optics visual analyzer developed by Voptica SL to fully customise the induced SA would be an amazing next step,” he concluded.