

“Spherical aberration customization with an adaptive optics visual simulator”

Session Details

Session Title: **Vision & Accommodation Assessment**

Session Date/Time: Monday 24/09/2018 | 14:00-16:00

Paper Time: 14:54

Venue: Room A3, Podium 2

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Abstract Details

Purpose:

To validate in the clinic the use of the Adaptive Optics Visual Simulator VAO (Voptica SL, Murcia, Spain) for customization of spherical aberration (SA) to increase depth of focus (DOF).

Setting:

Laboratory of Optics, University of Murcia, Spain.

Methods:

VAO combines a Hartmann-Shack wave-front sensor to measure objective refraction and aberrations together with a spatial light modulator capable of correcting or inducing any optical profile while performing visual testing. Through focus visual acuity (VA) from +1.25 to -3.0 D in steps of 0.25D was measured in 8 dilated eyes with three different induced amounts of SA for a 4.5-mm pupil diameter: control (SA =0 μm), -0.15 and -0.30 μm . DOF was defined as the dioptric range from 0 to -3.00 D with VA better than 0.15 LogMAR. Ninety-five percent confidence interval (CI) was calculated as $1.96*SD$.

Results:

Negative values of SA increased depth of focus. The mean values of LogMAR VA at far, intermediate (100 cm) and near (33 cm) were for three conditions: control (-0.13, -0.01 and 0.58), -0.15- μm SA (-0.01, -0.10 and 0.25) and -0.30- μm SA (0.17, -0.05 and 0.13). There was a high inter-subject variability in VA for all values of defocus, with 95%CI ranged from ± 0.06 to ± 0.43 LogMAR. The DOF for control, -0.15 and -0.30- μm SA were 1.91, 2.66, 2.97 D and the 95%CI were ± 0.83 , ± 1.14 and ± 0.41 D respectively.

Conclusions:

Increasing the depth of focus with spherical aberration using the VAO adaptive optics visual simulator showed a high variability between different subjects for every defocus and condition. VAO is a new instrument that offers significant advantages in visual customization of SA to enhance DOF.

Financial Disclosure:

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