REPRODUCIBILITY AND REPEATABILITY OF ABERRATION MEASUREMENTS IN MYOPIC EYES

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ABSTRACT

Aims: To evaluate the reproducibility and repeatability of high order aberration (HOA) parameters measured by Zeiss i-profiler Plus, Zeiss ATLAS Corneal Topography and Carl Zeiss WASCA Analyzer in myopia eyes.

Methodology: 34 eyes were measured for the third and fourth-order aberration of ocular and corneal aberrations. Measurements for corneal aberration were obtained from Atlas Corneal Topographer 9000 and i-Profiler Plus. Whereas measurements for ocular aberration were taken from WASCA Analyzer and i-Profiler Plus. The Zernike coefficients, root mean square of third and fourth-order of high order aberration (HOA) were evaluated for both corneal and ocular aberration. Repeatability of 3 measurements from each instrument was evaluated by within-subject standard deviation (Sw), coefficient of variation (COV), and intraclass correlation coefficient (ICC). The Bland and Altman method was also performed to assess agreement in measurements between devices.

Results: Atlas Corneal Topographer 9000 able to provide higher reliability for corneal aberrations measurements in terms of repeatability and reproducibility compared to i-Profiler Plus with the ICC findings for RMS of third and fourth-order and most of the Zernike coefficients revealed higher than 0.900 and COV values were less than 0.31%. For ocular aberration, WASCA Analyzer demonstrated high reliability of repeatability and reproducibility compared to i-Profiler Plus due to high reliability in ICC findings and COV values were less than 0.40%. WASCA Analyzer and i-Profiler Plus have a strong agreement with an r-value of 0.986 and 95% limit of agreement of 0.113 to 0.192 in terms of ocular aberrations, while for corneal aberration, Atlas Corneal Topographer 9000 and i-Profiler Plus provided r-value of 0.696 and 95% limit of agreement of 0.025 to 0.040.

Conclusion: All of these devices are highly repeatable and reproducible in measuring HOA parameters in myopia eyes. However, all the instruments cannot be used interchangeably