

Correlation of Objective Refraction by Z-View Wavefront Aberrometry With Manifest Refraction.

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Abstract

Purpose: To determine how well objective wavefront refraction correlates with subjective manifest refraction.

Methods: Refractive errors of 150 subjects (300 eyes) were measured with the Z-View diffractive grating wavefront aberrometer (Ophthonix, Inc., San Diego, CA) and by manifest refraction using a manual phoropter (Leica, Buffalo, NY) operated by an experienced clinician (BC). Subjects were examined for ocular health and clear media, and ranged in age from 9–55 years. The Z-View's low and high order aberration measurements were converted by the instrument's software into values for sphere, cylinder, and axis. 30 subjects under age 45 were randomly selected (range 21 to 45 years), and two pairs of eyeglasses with identical frames were manufactured for each of the 30 subjects. One pair was made based on the manifest prescription, the other pair was made according to the Z-View's sphere, cylinder, axis output. All lenses were single vision only designs. Subjects were tested for visual acuity (ETDRS chart) and contrast sensitivity (VectorVision, Inc., Greenville, OH) for each of the two eyeglasses. Then, each subject was asked to wear each of the two pairs of eyeglasses for 7 consecutive days and fill out a questionnaire about their subjective impression on the comfort and clarity of the eyeglasses.

Results: Excellent correlations between Z-View measurements and manifest refraction (n=300) were observed for sphere, cylinder, and axis data ($R^2=.96, .85, .88$, respectively). No significant differences in visual acuity, contrast sensitivity, and in subjective patient impression was observed in the wear test (n=60, $p>.05$ in all cases).

Conclusions: Objective refraction with the Z-View Wavefront Aberrometer shows excellent correlation with manifest refraction and can be efficiently employed in a clinical setting.