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Importance of Accommodation and Eye Dominance for Measuring Objective Refractions

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**ABSTRACT**

**PURPOSE:** To explore factors affecting the difference between objective refractive data measured under monocular closed-field viewing and binocular open-field viewing.

**DESIGN:** Prospective observational case series.

**METHODS:** Setting: Institutional. Study Population: Twenty-nine healthy volunteers (58 eyes; mean age,  $38.4 \pm 10.0$  years; range, 25-60 years). Observation

Procedures: Objective monocular refractions (MR) measured with the Nidek Auto Ref/Keratometer ARK-730A; objective binocular refractions (BR) and objective accommodative amplitude (AA) measured with the Grand Seiko Auto Ref/Keratometer WAM-5500; ocular dominance measured using the hole-in-the-card test; presence and magnitude of far/near (30 cm) phoria evaluated by the cover test and alternating cover test using a prism bar. Main Outcome Measure: The difference between objective refractive data measured under monocular closed-field viewing and binocular open-field viewing.

**RESULTS:** The spherical equivalent (SE) of the BR was significantly ( $P < 0.001$ ) more hyperopic by  $0.51 \pm 0.33$  diopter (D) than the MR. The difference (BR minus MR) tended to decline with increasing age and decreasing AA ( $r = -0.231$ ,  $P = 0.08$ ;  $r = 0.223$ ,  $P = 0.092$ , respectively). The correlation between age and difference in SE was significant in dominant eyes ( $r = -0.372$ ,  $P = 0.047$ ) but not non-dominant eyes ( $r = -0.102$ ,  $P = 0.60$ ). In non-dominant eyes, the amount of near phoria was correlated significantly ( $r = 0.403$ ,  $P = 0.03$ ) with the difference in SE. The correlation was strong ( $r = 0.598$ ,  $P = 0.01$ ) in 17 subjects with more than 3 D of AA.

**CONCLUSIONS:** Binocular assessment of refraction is important for precise refractive therapy.

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