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Impact of Corrective Lenses on the Supra-threshold Visual Field Test with Augmented Reality Headsets

Nadine Rady; Catherine Johnson; Valeria Lopez; Georgeana Mijares; Mary K Durbin; Alexandra Nicklin, OD; Mohamed Abou Shousha

+ Author Affiliations & Notes

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Abstract

Purpose : The suprathreshold visual field (SVTF) test using augmented reality (AR) headsets offers a method of portable screening for visual field defects. For patients with refractive error, the current standard of practice utilizes corrective lenses while testing. In this study, we explore whether the omission of corrective lenses impacts the efficacy of the SVTF as a screening tool for visual field loss.

Methods : Twenty-one adult patients with refractive errors were recruited over a two-week period at a tertiary academic eye institute to take the STVF test using the Heru re:Imagine full threshold strategy (Heru, Inc, Miami, FL) implemented on MagicLeap 1 AR headset (MagicLeap, Plantation, FL) with and without lens correction. Of these patients, fifteen underwent full threshold visual field testing. Patients were alternated between taking the STVF with or without correction first. Correction was achieved using classic trial lenses attached to a lens-holder and inserted in the headset. One or both eyes were tested depending on the presence of refractive error. STVF were deemed abnormal if two or more stimuli, other than those in the blind spot, were missed. Measures of sensitivity, specificity, and kappa statistic were calculated.

Results : Our study included 28 eyes, 76% females (n = 16), 57% Hispanic or Latinos (n = 12), with a mean age of 53.6 years. All the patients wore corrective eyeglasses. The mean myopic spherical equivalence was -3.60, and the mean hyperopic spherical equivalence was +2.13. The majority (57%) of the participants had cylinder power in their prescription (n = 12). Relative to the full threshold VF, the sensitivity of the STVF with correction was 57%, while without correction was 29%. The specificity of the STVF test with correction was 92%, while without correction was 58%. The kappa statistic for inter-rater reliability is 0.3, suggesting a fair agreement with a 75 percent observed agreement.

Conclusions : Our data suggest that the use of corrective lenses is of value for the efficacy of the supra-threshold test as a screening tool. Future directions include a larger sample size with a particular focus on patients with high cylinder power, and high-myopes and hypermetropes.

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