A handheld radial shape discrimination hyperacuity test: Assessment of variability in a clinical population.

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Purpose: A novel handheld Radial Shape Discrimination test (hRSD), presented on an Apple iPod Touch, has been reported to differentiate between early and neovascular Age Related Macular Degeneration (nAMD; Wang et al., 2013). We have investigated the use of this test in a UK clinical setting.

Methods: Fifty-five participants (aged 78±7 years old) being treated for nAMD in their first eye, performed a supervised hRSD test with their fellow (non-nAMD) eye at two sessions, 45±17 days apart. 32 participants also performed the test with no near Addition. Test-retest differences, and the effect of performing the test without near Addition, were assessed using paired t-tests, Bland-Altman analysis and Intraclass Correlation Coefficients (ICC).

Results: Mean (±SD) hRSD thresholds were not statistically significantly different for the first and second sessions (S1: -0.55±0.17; S2: -0.56±0.18logMAR; $t(54)=0.72$, $p>0.05$). The upper and lower Bland-Altman 95% limits of agreement were 0.25 and -0.27 logMAR and the ICC (95%CI) was 0.71 (0.55 to 0.82). A small but statistically significant decrease in threshold was seen when near addition was not used ($t(31)=2.99$, $p<0.01$). The mean difference (95%CI) was 0.17 (0.06 to 0.30) logMAR.

Conclusion: The hRSD test was found to have good test-retest variability when performed in a clinical setting by elderly participants. The variability is similar to that of normally sighted younger adults (Knox et al., 2014). However, lack of near addition caused a statistically and potentially clinically significant decrease in hRSD threshold. It is advisable that the hRSD test is performed with near correction in this population.

References

Knox PC, et al (2014) Effects of age and blur on, and test-retest variability of, a handheld radial shape deformation test. *Invest. Ophthalmol. Vis. Sci.,* 55**:**5605.

Wang Y, et al (2013) Handheld shape discrimination hyperacuity test on a mobile device for remote monitoring of visual function in maculopathy. *Invest. Ophthalmol. Vis. Sci* 54: 5497-505.

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