Repeatability of grating acuity and contrast sensitivity in children with cerebral visual impairment | IOVS

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Repeatability of grating acuity and contrast sensitivity in children with cerebral visual impairment

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Abstract

Purpose : Cerebral visual impairment (CVI) is a common cause of pediatric visual impairment globally. Children with CVI can have additional developmental delays in areas such as motor, cognition and speech. The location/extent of brain damage, frequency of seizures, medication can all contribute to the variability of clinical measurements in these children. Therefore it will be important to identify clinical tools with good repeatability to monitor and manage this condition. In this study, we aimed to determine the repeatability indices of 2 important clinical tests: grating acuity [Teller acuity cards (TAC), Peekaboo Vision app (PV)] and contrast sensitivity [Hiding Heidi cards (HH) and Ohio contrast cards (OCC)] tests in children with CVI.

Methods : A cross-sectional, prospective study was conducted on children with CVI visiting a paediatric neurology clinic in Hyderabad, India. Informed written consent was taken from parents. Grating acuity and contrast sensitivity tests were administered in a randomized sequence and testing time was recorded. Test-retest repeatability was carried out within 3.5 months on average.

Results : Thirty-two children (males: 22) with a mean age of 2.6±1.7 years (range: 9 months to 6.8 years) were recruited. Significantly different acuities were obtained with PV and TAC ($p<0.01$, 95% limits of agreement (LoA): -0.67 to 0.33 logMAR). Teller acuity cards (Coefficient of Repeatability (CR): 0.3) had better repeatability when compared to PV (CR: 0.83). Testing time with both acuity tests was found to be comparable ($p=0.76$). Significantly different contrast sensitivities were obtained with HH and OCC ($p=0.02$, 95% LoA: -0.31 to 0.47 logCS). Ohio contrast cards (CR: 0.32) had better repeatability when compared to HH (CR: 0.5). Significantly lesser time was taken to administer HH compared to OCC ($p<0.01$).

Conclusions : Repeatability was found to be better for TAC and OCC in measuring grating acuity and contrast sensitivity respectively. Differences in thresholding paradigms, number of cards depending on the step sizes measured and different types of

stimuli could be the possible reasons for poor agreement between the tests. Choice of visual function tests for children with CVI should consider the repeatability measure, especially for longitudinal follow-ups.

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