

Feb 2025. Journal of Pediatric Ophthalmology & Strabismus

Doi:10.3928/01913913-20250110-01.

Mobile Graphic Device Vision Screening for Unilateral Amblyopia in Pediatric Patients.
Gold AS, Weitzman SA, Hans M, Medow N, Moon JY, Kane SA. February 19, 2025.

Abstract

PURPOSE To determine whether inter-ocular brightness disparity during a self-directed video game on a mobile device can effectively detect unilateral amblyopia.

METHOD Forty-nine children of ages 3 to 17 years participated in this prospective, non-interventional study. A series of sample images pairs were presented on an iPad (Apple, Inc) to illustrate the concept of relative brightness. Participants subsequently wore spectacles with orthogonally polarized lenses to dissociate image pairs between eyes. The video game employed a forced-choice algorithm that varied relative brightness disparity between images in a stepwise manner. Participants chose the brighter of each pair of images until the end point of equal brightness was detected. The game was repeated to assess consistency. Eye examination records with acuities measured in logarithm of the minimum angle of resolution units were subsequently reviewed to compare with the video game results.

RESULTS The study had a mean game time of 108 seconds. Inter-ocular brightness disparity greater than 0.3 log units indicated a relative afferent brightness sense defect. The video game detected unilateral amblyopia with 88% sensitivity and 95% specificity. The positive value was 78% and the negative predictive value was 98%.

CONCLUSIONS This iPad video game can be played by children at least as young as 3 years of age. Inter-ocular brightness disparity is a sensitive and specific sign of unilateral amblyopia in a general pediatric population. The non-threatening nature and engaging format of this video game makes it a promising and accessible method for early amblyopia screening.