A new 3D monitor-based random-dot stereotest for children

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PURPOSE: Objective testing for random-dot stereovision in preverbal children requires some type of dissociating glasses. Drawbacks of such methods are the alteration of natural visual conditions and sometimes nonacceptance of the glasses. For this reason, a new, natural method for random-dot stereopsis measurement was developed and tested. METHODS: Random-dot circles (diameter 10 cm, crossed disparity of 0.34 degrees) were generated on an autostereoscopic display and presented to 18 normal children (mean age, 5.1 +/- 1.1 years), 8 with anisometropic amblyopia (mean age, 4.9 +/- 1.3 years), 14 with infantile essential esotropia (mean age, 5.3 +/- 0.7 years), and 16 with primary microstrabismus (mean age, 5.2 +/- 1.4 years). While the position of the stimulus randomly changed among four possible locations, eye positions were recorded by infrared photo-oculography. If two or more consecutive saccades ends corresponded to the stimulus coordinates, a positive response was assumed. The results with the new test were compared with the ability to recognize the Lang I random-dot stereotest. RESULTS: Twenty-four of 26 Lang I-positive children had positive responses (sensitivity of 92.3%), 29 of 30 Lang I-negative children had negative three-dimensional (3D) stimulus responses (specificity, 96.7%). The positive predictive value of the new test was 0.96 (95% CI, 0.79-0.99); the negative predictive value, 0.94 (95% CI, 0.78-0.99); and the overall accuracy, 0.95 (95% CI, 0.85-0.99). CONCLUSIONS: This new 3D monitor-based test allows objective assessment of random-dot stereopsis in children older than 3 years.