

NOVEL 3D COMPUTER-AUTOMATED THRESHOLD AMSLER GRID TEST

Wolfgang Fink^{1,2} and Alfredo A. Sadun²

¹California Institute of Technology, Pasadena, CA, USA

²Doheny Eye Institute, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

Purpose: To introduce a novel 3D visual field test, developed by Fink and Sadun, that allows for an unprecedented characterization of the structure of visual field defects in three dimensions (see <http://www.wfbabcom5.com/wf335.htm>). **Methods:** With one eye covered the patients are placed in front of a touch-sensitive computer screen at a fixed distance. While focussing on a varying central fixation marker the patients trace with their finger the areas on an Amsler grid that are missing from their field of vision. Increasing degrees of contrast of the Amsler grid are simulated by repeating the test at different greyscale levels. The results are recorded and later displayed as topographical contour rings by the computer test program, resulting in an immediate 3D depiction of the central hill-of-vision. **Results:** Several clinical studies have been conducted at the Doheny Eye Institute and over 200 patients have been examined so far. Conditions such as optic neuritis, anterior ischemic optic neuropathy (AION), age-related macular degeneration (ARMD), glaucoma, and ocular hypertension have been successfully detected by the 3D visual field test. **Conclusions:** The 3D computer-automated threshold Amsler grid test is an innovative, non-invasive, accurate, sensitive, and fast (4-5 min. per eye) visual field test. It provides several advantages over state-of-the-art standard automated perimetry, including: a) additional information through 3D rather than 2D depiction of scotomas, such as location, extent, slope, depth, and shape; b) superior angular resolution (1° compared to typically 6°); c) simple test-setup (merely a touch-sensitive computer monitor and the test software); d) excellent patient compliance. In light of its promising initial tests, the 3D visual field test has the potential for the early detection and monitoring of various diseases over time, in particular but not limited to glaucoma and macular degeneration.

Return this form to: John Wild PhD, IPS President
Department of Optometry and Vision Sciences, Cardiff University,
Redwood Building, Cathays Park, Cardiff CF10 3NB, Wales, UK