Structure-function relationships

This study compared a new form of visual field analysis, flicker defined form, with conventional analysis techniques and compared both with anatomical measurements of the retina. These measurements are important in the diagnosis and evaluation of glaucoma, a disease of the optic nerve in which nerve cells die, leading to progressive loss of vision. Flicker defined form (FDF) tests for recognition of an illusion: A group of white dots surrounded by black dots alternates quickly with black dots surrounded by white dots. To a healthy eye, this appears to be a grey ring against a uniform background (Fig. 1). An early manifestation of glaucoma -induced damage may be the inability to see this pattern.

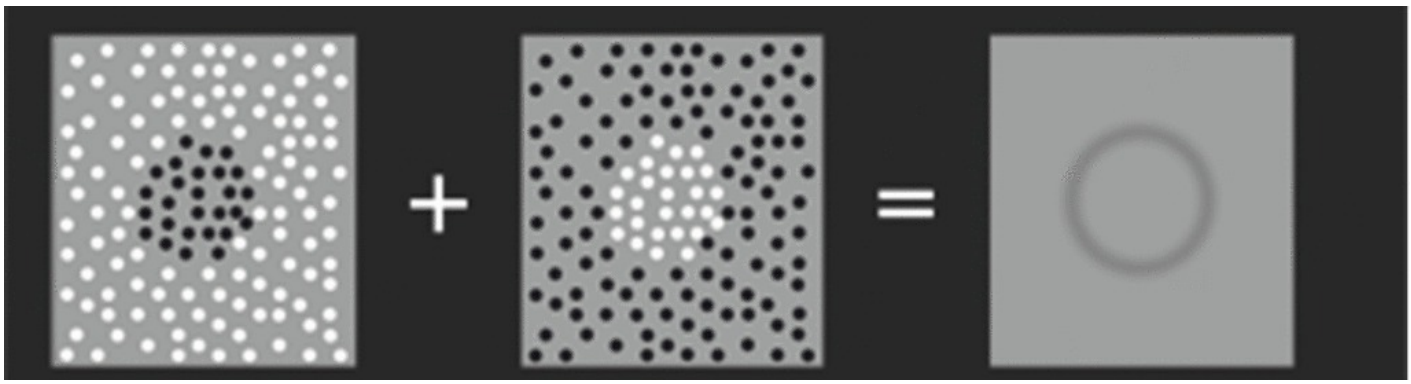

Fig. 1. The FDF Illusion

Standard automated perimetry (SAP), the current standard in visual field analysis, uses a flash of white light against a white background as a stimulus. We found that FDF's gross measurements of visual field, or mean deviation, correlated well with SAP's, and correlated very well with anatomic measurements of the optic nerve head. FDF's measurements of another parameter of visual fields, called pattern standard deviation, did not correlate well with SAP's.

These results indicate that FDF is a viable tool in the evaluation of glaucoma, and its use should be studied further, especially in early glaucoma, where the FDF illusion may provide a detection advantage over SAP.

The two images on the left are alternated at high frequency, creating the perception of the image on the right in healthy patients. The image is reproduced with permission from Heidelberg Engineering.

Publication

Flicker defined form, standard perimetry and Heidelberg retinal tomography: Structure-function relationships.

Ichhpujani P, Lo DC, Cvintal V, Waisbourd M, Averbuch A, Leiby BE, Myers JS, Spaeth GL, Katz LJ

Can J Ophthalmol. 2015 Aug