Selecting additional test locations to enhance the 24-2 pattern using a scoring system

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Purpose:
The 24-2 test pattern may underestimate and sometimes miss paracentral glaucomatous defects 1,2. The goal of this study was to use past experience to select test locations from the 10-2 pattern to add to the 24-2 pattern so as to improve its capability for glaucoma detection and follow up. In order to minimize fatigue, only 10 additional test locations were added.

Methods:
A small expert group in visual field testing and structure-function correlation was asked to suggest test locations from the 10-2 test pattern that may be added to the 24-2 pattern to improve the detection and follow up of paracentral glaucomatous defects 1,2. Next, publications on the prevalence and depth of glaucomatous macular defects 3,5,6,7,8 were systematically evaluated and their regional information was entered into an Excel sheet. The superior field and the inferior field were evaluated separately. For each study, cut off values were defined to translate the study outcome into a number 0 (≤50th %ile), 1 (>50th %ile) or 2 (>90th %ile). The final score as in Figure 1b was then calculated as the average of all individual scores. Suggested test locations with a score of 1 or less were replaced with test locations with higher scores, applying the following rules: I) at least 2 new test locations per quadrant; II) selecting the highest scores. In a final step, a sanity check was performed with two previously not included studies: A study on visual field progression criteria 9 confirmed that the new and existing macular test locations cover 3 clusters with 3 or more test locations. A publication analyzing the vulnerability of the macula for glaucomatous damage using Optical Coherence Tomography 10 confirmed that the 2 most vulnerable zones are covered with 7 and 8 test locations respectively.

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Results:
The figure to the left shows the combined test pattern consisting of 64 test locations in OD orientation: All test locations from the 24-2 test pattern and 10 selected test locations from the 10-2 test pattern. The figure to the right shows the average scores for all 10-2 test locations on the 0-2 scale described under Methods and based on literature. The selected new test locations are marked with a red frame.

Conclusions:
A new combined test pattern was created using the 24-2 test pattern as a basis and 10 test locations from the 10-2 test pattern. The selected test locations allow to form additional progression clusters in the macular area and cover areas known to be susceptible to glaucomatous defects both from structural and functional studies.

References:
3) Hood DC, McEldred AM, Swanson WH, Gardiner SK, Flanagan IG