Results: 41 eyes from normal subjects and 9 glaucomas at very different stages of the disease were examined with the SPARK strategy in the Easyfield and Smartfield perimeters. The Easyfield was used for the comparison because it is an established instrument with an equivalent stimulus range, but using individual LEDs on a spherical screen.

The SPARK strategy (3, 4, 5) makes four threshold estimations in four successive phases. It does so by probabilistic deduction based on the frequency of defects and topographical dependency between the defects in the normal and affected visual fields. The final threshold at each point is the result of averaging the thresholds obtained at the same point on the four phases. This way errors are minimized and the results are made stable.

This uniformity was confirmed in the glaucoma population. A Bland-Altman analysis showed that the difference did not increase, but progressively decreased to 1.3 dB in deep defects. Threshold by probability correlation in glaucoma cases was 0.93 (p < 0.001), which is within usual threshold fluctuation.

Conclusion: Observed differences between normal subjects on both instruments are slight, especially considering the multiple design differences (stimulus spectral composition, pixel effects, frequency, spherical vs. tangent screen, etc.).

These differences are within the range expected from a prototype and equally affect the whole scale of possible defects. Therefore, we could consider the dynamic range of both instruments to be equivalent. Now that these differences have been detected, they can be compensated for by slightly adjusting the different variables of the stimuli or by building a specific normal database, or by doing both simultaneously.

Both perimeters share some advantages, like being quiet, so that no mechanical noises interfere with the patient’s response. However, Smartfield has some advantages in relation to Easyfield. It is portable, fixation is at infinity, stimulus could be arranged at any positions, fixation point could be moved to widen the examination area, stimulus with different sizes, shapes or colors could be generated, etc.

... and Comparison with Humphrey SITA Fast

Fluctuation: Smartfield Spark vs. Humphrey SITA Fast

32 eyes from normal subjects and 58 glaucomas were examined twice with the Humphrey perimeter using SITA Fast strategy and twice with Smartfield using SPARK strategy.

Results: The fluctuation of thresholds was significantly lower in Smartfield-SPARK than in Humphrey SITA FAST at all levels. Below 20 dB it was reduced to less than half.