Essence and advantages of the MP1 Microperimeter

Visual Acuity is not enough to quantify human visual function and its impairment in relation to daily-life activities: MP1 provides an effective way to quantitatively measure human visual function.

Limits of conventional perimetry

Especially in case of low-vision patients, conventional perimetry shows:

- limited precision and repeatability (due to un-tracked eye movements);
- low sensitivity to small scotomas;
- no determination of fixation characteristics.

Limits of fundus imaging

Morphological analysis does not allow quantitative evaluation of the "quality" of vision functions and therefore it does not allow to <u>measure</u> changes in the retinal functions.

The combination of conventional, computerized perimetry and digital fundus imaging is *microperimetry*, which allows quantitative assessment of visual function through a "fundus-related" perimetry exam.

Essence of MP1

MP1 gives, as a microperimeter, the above possibility to evaluate the functional aspects of vision, also in case of low vision patients, in direct association with the retinal morphology, in better accordance with the patient's subjective perception of the "quality" of his/her vision.

MP1 provides a quantitative analysis of fixation, in terms of site (determination of the PRL, *preferred retinal locus*) and stability.

MP1 allows accurate and reliable detection of scotomatous areas (even very small ones), i.e. areas of reduced sensitivity to light stimuli, in terms of their position, extension and severity. More in general MP1 allows accurate, automatic, mapping of retinal sensitivity.

Limits of SLO microperimetry

SLO has represented the birth of *microperimetry*, with the following limitations:

- no automatic eye tracking $\Rightarrow$ high examination time,
  $\Rightarrow$ no automatic perimetry,
  $\Rightarrow$ no automatic follow-up,
- no conventional white-on-white perimetry (red laser);
- no flexibility in configuring exam parameters;
- no color imaging of fundus;
- high price;

MP1 advantages

Many of the advantages of the MP1 derive from the automatic eye-tracking:

- accurate and fast analysis of stability and site of fixation;
- reduced examination time, for all kind of exams;
- perimetry exams are easy to administer and accurate;

Further advantages include:

- automatic perimetry exams are available;
- automatic follow-up exams yield good repeatability;
- the instrument can be operated in non-mydriatic conditions (4 mm.);
- the possibility to customize most of the test parameters (background, fixation target and stimuli) allows the operator to adapt the exam to the specific patient and pathology;
- the color retinography is more suitable for diagnosis than B/W pictures;
- price is affordable.

More specifically, in the clinical use, following are some of the MP1 key points:

- importance of the fixation analysis as a predictive factor for determining the potential effectiveness of different surgical treatments;
- possibility to monitor fixation (site and stability) in time during the evolution of any pathology or to detect variations in fixation by any cause;
- possibility to plan the surgery so to avoid damages in the area where fixation is located (especially when fixation site is not located at the fovea);

- possibility to detect scotomas even in presence of good residual VA and, more in general, possibility for early screening of retinal pathologies by detecting subtle changes in sensitivity at specific retinal locations;
- possibility to roughly predict the effectiveness of a therapy and tune it on a specific pathology / patient, for example in case of:
  a. Retinal translocations;
  b. Treatment of macular holes;
  c. Transpupillary thermotherapy (TTT);
  d. Photodynamic therapy (PFT);

  also in case of patient with very low residual VA;
- possibility, through follow-up exams, to measure the effectiveness of any therapy (including pharmacological ones) in terms of recovery of stable fixation and increase in macular sensitivity, in better accordance with subjective perception of quality of vision;
- possibility to quantitatively evaluate the relation between retinal functions and morphological evidence in presence of pathologies, for example macular thickness and retinal sensitivity in case of macular edema;

Finally, preliminary studies show good correlation between MP1 results, OCT and focal ERG.