Clinical Issues:
What tests and strategies to use for whom and when?

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Core Concepts

• For each patient, choose thoughtfully the best visual field test or combination of tests as well as intervals between tests. This may change with time.
• Frequency doubling technology (FDT) and short-wavelength automated perimetry (SWAP) should not be used routinely instead of standard automated perimetry (SAP).
• To diagnose and monitor glaucoma several testing strategies may be useful such as Full Threshold, SITA standard, FAST PAC and SITA FAST.
• Full threshold testing does not offer additional benefit to SITA and requires more time; SITA FAST takes less time again, but with greater variability.

Functional Assessment in Glaucoma

All glaucoma patients and suspects should have periodic visual field examinations if they are able to perform this test. This functional assessment in glaucoma is crucial to provide the information necessary to make the best decisions in a patient’s management. The clinician must choose thoughtfully the best visual field test (or combination of tests) as well as the interval between examinations for each patient.

As testing technologies and software analysis for visual fields continue to evolve, standard automated perimetry (SAP) remains the gold standard for diagnosis and monitoring of progression in glaucoma. While other testing modalities are available, e.g. frequency doubling technology (FDT) and short-wavelength automated perimetry (SWAP), these should not be used at the expense of SAP1.

As the most widely utilized hardware, the Humphrey field analyzer (HFA) is will be the example in this article, although the same principles apply to other SAP modalities such as Octopus perimetry.

To diagnose and monitor glaucoma, several testing strategies can be employed: Full Threshold, SITA (Swedish Interactive Thresholding Algorithm) standard, FAST PAC, screening strategies and SITA FAST. Full threshold requires a long period of concentration and does not appear to offer additional benefits to SITA standard2,3. A SITA FAST test takes less time but has a greater degree of variability2,4. It is less useful to monitor glaucoma, but can be used as a first screening test for diagnosis.

Using the same test pattern over time improves the chance to detect visual field changes. As the 24-2 test pattern saves time compared with the 30-2 pattern, without compromising the ability to diagnose or to monitor glaucoma progression, it is the preferred test pattern for most patients6.

In patients with advanced glaucoma and/or visual field loss approaching fixation, a HFA 10-2 test is useful to monitor for progression in this critical central region of vision. 10-2 tests can be alternated or combined with 24-2 tests in patients with remaining peripheral vision, such as patients with one hemifield threatening fixation but with the other hemifield relatively normal. Although there is currently no statistical progression analysis available within the HFA for 10-2 fields, thresholds from these important points close to fixation can be compared subjectively. (Figure 1). Alternatively, pointwise linear analysis can be utilized with third party software packages such as PROGRESSOR or PeriData.

In patients with severe visual field damage, particularly with decreased central visual acuity, where a traditional Size III stimulus does not provide a dynamic range to observe progression, a Size V stimulus can be useful to assess the remaining visual function. (Figure 2).

The number and frequency of visual field tests need to be considered carefully in the context of the burden of repeated tests on patients, the number of visits required, the reliability of test results and financial implications. The optimal frequency for visual field tests depends on the course and severity of the disease and patient factors such as age, test tolerability and performance. As there is considerable variation between individuals for rate of progression, more frequent initial tests provide an earlier and more accurate analysis of this rate for the individual. Ideally, 6 visual field tests in the first two years following a glaucoma diagnosis should be done, and then the number can be adjusted (1).

In summary, a correct selection of visual fields, both for diagnosis and monitoring will depend on the individual patient’s characteristics. Most frequently a SITA 24-2 test will offer the best combination of test speed, reliability and

Figure 1. 24-2 Matrix of the 24-2 pattern (A) vs the 10-2 pattern (B) on retina.

Figure 2. Comparison of Size III (A) vs Size V (B) testing stimulus in a patient with advanced visual field damage.
availability of analysis software to be utilized to monitor glaucoma. Other test strategies such as SITA Fast, 10-2 patterns and size V stimulus can be used in special circumstances.

References:

Practical Tips: Minimizing artifacts and avoiding pitfalls in interpretation

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Core Concepts
• Successful communication between perimetrist and patient are of utmost importance.
• The patient needs to be comfortably and properly positioned. Activate the forehead rest alarm.
• Comments by the operator on patient performance and accompanying circumstances are useful for interpretation.
• Potential operator errors are listed in the field analyser manual and should be reviewed by the technician from time to time.
• The greyscale is of limited use but distinctive patterns such as the Clover leaf, the Maltese Cross or Swiss Cheese suggest that test data is not reliable.
• The foveal threshold measurement option should be switched on.
• Use of the diamond fixation targets can help obtain reliable fields in patients with central vision defects (e.g. from macular degeneration).
• “Baseline fields” should be established as soon as possible and updated as needed.
• Always consider the complete clinical picture including the role of coexisting conditions. Never interpret the visual fields in isolation.

Given the objectives (and space constraints), I will mention a few well-known artifacts but concentrate more on selected issues that are easily overlooked in a busy clinic.

Instilling positive attitudes in patients and staff is a neglected but important component for effective perimetry.1 The person conducting the test does not require special qualifications but is as important as the machine. Their explanation, demonstration and interaction with the patient help obtain valid information. Though the grey scale is the least useful part of the printout, the occasional, typical patterns produced by some artifacts do make it worth just a passing glance. Distinctive appearances on the grey scale include the “Clover Leaf” pattern suggestive of patient fatigue, the “Maltese Cross” that occurs when the patient is a “slow starter” and the “white” scotomas (or “Swiss Cheese” appearance) produced by the false positives of “trigger happy” patients. The presence of more abnormal points on the pattern deviation as compared to the total deviation plot is a subtle indicator of false positives even when they have not been identified or labelled as excessive.

Such issues usually improve with proper instruction and as the patient gets over the learning curve. It usually takes two or three fields to get over the learning curve but a first field is not entirely useless. If an unreliable first field correlates with clinical findings, it still pro-