



# Mapping the macula

**Bill Harvey** reports on how a new microperimeter may help decide on the management of patients with early maculopathic change

It first came across the MAIA instrument last year when reporting on the trials looking into the effectiveness of specific laser treatment to minimise the progression of dry age-related macular degeneration (AMD) (*Optician* 23.11.12). The instrument was being used not only to scan and store an image of the macular area, but also to use a perimetric technique to show the functionality of the macular area in terms of response to light stimuli.

### The MAIA

The MAIA (Figure 1), now distributed by Haag Streit UK, is the ideal tool for detecting and monitoring retinal functional changes and observing the effectiveness of treatment, over time. It features a confocal line scanning laser ophthalmoscope (SLO), a real-time eye-tracker to ensure accuracy and repeatability, and 4-2 threshold fundus perimetry (microperimetry). Operating with a minimum pupil diameter of 2.5mm, the MAIA assesses the function of the macular by providing accurate measurements of macular sensitivity, fixation stability and the site of fixation.

The MAIA offers three different testing modes; 'Fast Test', 'Expert Test' and 'Follow-Up Test'. The 'Fast Test' can perform a macular assessment in less than three minutes per eye, something essential to help specificity with older patients.

The SLO captures clear and detailed confocal images of the retina at a resolution allowing some structures that might be missed by fundus cameras, such as macular drusen and lamellar holes, to be visualised. MAIA is also equipped with threshold sensitivity analysis software, enabling it to accurately and precisely measure and monitor functional changes compared to an age-related database of 'normal' reference values. This permits the differentiation of normal age-related loss of macular sensitivity from pathological changes that require treatment. I like this functionality as it may offer useful insights into how AMD patients see the world and so help decide on a preferential looking plan to aid their adaptation to their



central scotoma.

The included EyedB software is an advanced statistical package which enables the MAIA to process the measured data and rapidly evaluate the macular function. This is then compared with a reference database of normal subjects to provide colour-coded outcomes (see case study on page 32).

To measure functional changes due to a disease or the efficacy of retinal treatment, MAIA accurately retests the same points that have been measured in the baseline test and produces a graph of the results, plotting the sequential changes in macular sensitivity and fixation stability.

MAIA measures 36 points over a 10-degree area to evaluate the function of the macular and give a complete and detailed test. Additional, personalised measurement points can be added to the selected grid if needed.

Designed for speed and ease of use, the MAIA features intuitive 25MHz eye-tracking technology that automatically identifies the patient's eye, and stability of the fixation. Even if the patient moves, the results will still be accurate. The MAIA has proven results of over 90 per cent sensitivity and specificity in the detection of early and intermediate AMD.

The instrument is designed to identify the normal, age-related, decrease in sensitivity and differentiate it from the pathological changes associated with macular degenerations



and other retinal diseases. It also is very easy to use, so might easily be incorporated into a pre-screening area and operated by non-qualified staff.

### View from practice

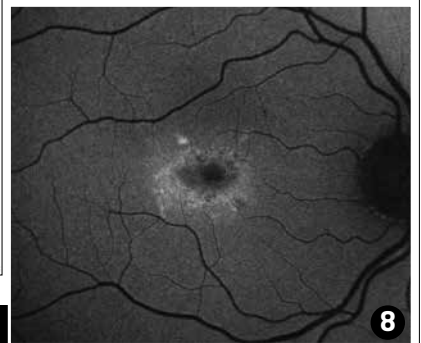
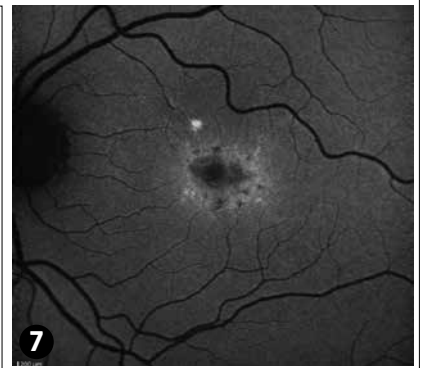
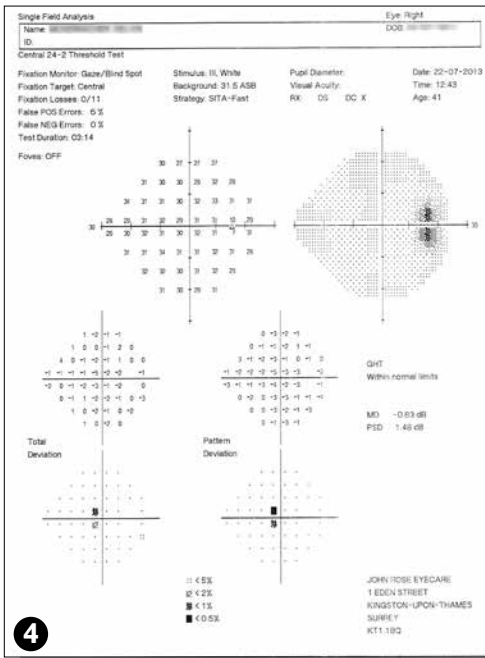
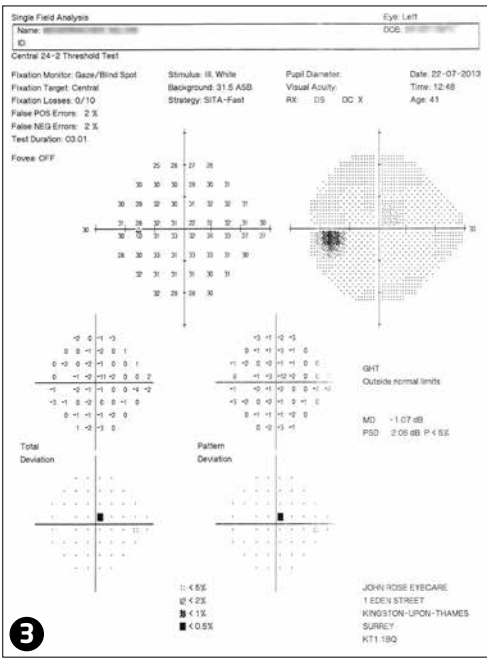
Microperimetry is an area yet to achieve a real foothold in general optometric practice, yet the potential to monitor changes in both the anatomy and the functioning of macular tissues is something, I feel, that should be of value to anyone with a serious interest in screening and monitoring macular health. I was very keen, therefore, to find out how an optometrist who had recently acquired the unit for his practice was getting on.

John Rose (Figure 2) established his Eye Care Centre in Kingston-upon-Thames some years back and has developed a reputation for investment in cutting edge technology. He invested in a MAIA in March, having had some interest for a while in microperimetry and finding many an occasion where his automated field analyser was just not able to give enough detail about macular and paramacular functional response. Rose has already incorporated the instrument into the routine work of the practice and everyone over 40 has a MAIA assessment along with full fundus imaging, OCT, full threshold field testing and pressures. The fee for a full eye examination is £130 and appointment books are full.

Each patient is assessed on the



# Instruments



'Fast Test' mode and, if anything is detected, they are re-booked for an 'Expert Test' on another day. As well as finding it useful in detecting early maculopathy, Rose is also interested in seeing how small children with learning difficulties respond to the test and is looking for evidence of a link between their reading performance and poor fixation.

## Case study

A 41-year-old male with good acuities attended the practice complaining of being aware of a 'difference between the vision in each eye'. This somewhat vague symptom had been noticeable since a trip to Australia some 10 years previously where he had witnessed (and stared at for some time) a bush fire. No one had ever looked into this properly and he had only sought attention now as he felt that colours were subtly different, especially in the morning, and there was a transient ring-shaped visual disturbance.

Humphrey field analysis showed a central loss but revealed little in detail (Figures 3 and 4). Macular scanning with the OCT showed some retinal pigment epithelial disturbances (Figures 5 and 6). Autofluorescence shows clear areas of macular lipofuscin aggregation (Figures 7 and 8). The MAIA 'Fast Test' detected a central disturbance and was followed up with the 'Expert Test'. This clearly showed in both eyes, though to a different degree, an annular scotoma related to some loss of retinal pigment epithelium (Figure 9 shows the plot for the right eye). This could be related to an unusual genetic condition, could be some form of toxic maculopathy of uncertain aetiology, or might be the residual cumulative impact of an historic long wavelength 'solar' or thermal retinitis. The patient is now under ophthalmological assessment. ●

● For further information go to [www.haagstreituk.com](http://www.haagstreituk.com)

