

# Oculus Easyfield

*Tina Romanay gives an assessment of the Oculus Easyfield and describes some cases of its use on patients in City University's new clinic. Of particular interest is whether it may address some of the challenges of the disability discrimination legislation.*

**Optometrists** have carried out examination of the visual field for many years, either routinely or for further investigative purposes.

Perimetry is the measurement of the differential light threshold, ie the minimum light threshold necessary to evoke a response.

Most visual field screeners offer quick screening and/or advanced threshold strategy programs, to enable detection or assessment of a defect. Unfortunately most screeners, which tend to be big, bulky, non-portable, expensive and time consuming, are not easily accessible to those practitioners outside hospital-based or private practice, and therefore visual field examination is often omitted.

Implementation of section 21 of the Disability Discrimination Act 1995 as of October 1 1999, requires healthcare providers to take all reasonable steps to ensure that the services they provide are as accessible to disabled people as they are to the general population. Either providing extra help or making changes to the way they provide their services and auxiliary aids may affirm this.

## **SERVICE PROVIDERS' DUTY**

This is of particular interest to optometrists. As service providers, practitioners must take reasonable steps to provide auxiliary aids or services if this would enable (or make it easier for) disabled people to make use of their services.

## **WHAT IS AN AUXILIARY AID?**

An auxiliary aid or service might be the provision of a special piece of equipment or simply extra assistance to disabled people from (perhaps specially trained) staff. In some cases a technological solution might be available. In any event, service providers should ensure that any auxiliary aids they provide are carefully chosen and maintained\*\*\* maintained.

The duty to provide auxiliary aids or services requires the service provider to take such steps as is deemed reasonable to make its services accessible to disabled people. What might be reasonable for a large service provider (or one with substantial resources) might not be reasonable for a smaller service provider.

The service provider will have to consider what steps it can reasonably take. How effectively it is able to do so will depend largely on how far it has anticipated the requirements of disabled customers.

The Act leaves open to interpretation what particular auxiliary aids or services might be provided in specific circumstances. Disabled people may be able to help the service provider to identify difficulties in accessing the service and what kind of auxiliary aid or service will overcome them.

## **EQUIPMENT AVAILABILITY**

Optometrists will find that there is a reasonable choice of small and portable instruments available to measure intraocular pressures. However, there is not a vast a choice when it comes to perimeters. This article will therefore concentrate on the Oculus Easyfield, which has recently been launched on the market.

## **OCULUS EASYFIELD**

The Oculus Easyfield from Birmingham Optical is the latest visual field screener to reach the market in the last nine months. It offers a portable, compact, cost-efficient, and adaptable alternative to most screeners, making it attractive to practitioners doing domiciliary work or practitioners who work in a confined space.

The instrument comprises the Oculus Easyfield Perimeter, an Easyfield control unit, tabletop power supply unit, patient response button and set-up disc software.

### **Easyfield control unit**

The Easyfield control unit has four push buttons based on the left-hand side, which allow you to:

- Start a new test
- Enter new patient details
- Select other functions (ie allow patient data to be transferred from a PC)
- 'Go to' existing patient list.

Underneath the screen there is a control knob and two push buttons. The push buttons are 'enter' and 'cancel' keys, while the control knob allows you to alternate between different functions. In most situations the cancel key is made

The compact size of the Oculus Easyfield makes it attractive for domiciliary work redundant and this is particularly advantageous to avoid deleting complex information during an examination.

The control unit has a 40,000 patient data base facility which is remarkable for a small unit. Patient details are entered on to the data management system by using the control knob. It records the first name, surname, date of birth and date of examination.

An advantage of the control unit is that patient data can be exchanged between the PC and the unit. This makes it possible to save copies of examination results (which would allow for comparisons of data to be made against future tests), to import examination data and to update the software of the control unit.

The control unit also has the facility of an integrated printer, which prints the results of the examination in a compact readable form, the size of a till receipt.

### **Oculus Easyfield Perimeter**

This is a compact instrument based on the Goldmann perimeter. It comprises a white bowl with a background luminance of 10cd/m<sup>2</sup>, radius of 300mm (projected), stimulus size Goldmann III and eccentricity to 30' either side of fixation. It is covered by a cone shaped headrest. The bowl is viewed through an aperture 60mm in diameter.

The cone has a vertical adjustment making it advantageous for those patients who are unable to adjust their height. I found this particularly useful for a patient that was wheelchair bound. The perimeter was placed on a desk that was at a good height for the patient, and adjustments were made to the funnel to allow for patient comfort. This was in comparison to another popular field analyser, where the patient was unable to rest their chin on to the rest comfortably with the instrument in its lowest position. There is a headrest, which is adjustable horizontally to allow for changes in position when testing the left/right visual field. A disadvantage found in this, however, is that the instrument does not allow for a large nose.

A lens mount can be fitted to the aperture to correct for distance and near refractive error, taking into account the fixation distance of the perimeter. This attachment sits almost flush with the viewing aperture, and is slightly smaller in size thereby minimising visual field defects that may be caused by lens artifacts. A patient response button is also located on the perimeter, which the patient holds during the examination, in order to respond to the stimuli presented. The response button has the facility to pause the test during an examination.

The perimeter may be used irrespective of ambient luminance, and this is very useful in situations where lighting cannot be controlled, for example in domiciliary work.

### **Examination program**

To start the program, a new patient is either created or selected from the patient list. After doing this, the control unit displays the patient data system and preselected examination parameters.

**Examination:** This gives you the option to load pre-existing examinations, print results and create new patients.

**Program:** This selects pre-defined programs, for example: screening, standard, macula and glaucoma. This is very useful when you want an examination to begin as quickly as possible.

**Statistics and display:** These compare statistics and display standard, relative, grayscale, 3D and sectional profiles on threshold related programs.

**Settings:** This allows you to adjust the instrument's settings to your preference, for example: brightness of the camera and display, print format.

Although pre-selected examination parameters may have been chosen, the instrument gives you the flexibility to adjust the examination to your requirements.

Here you can adjust:

- The eye being examined (left/right)
- The pupil diameter, either manually or using the camera image. This is particularly useful when differences in pupil sizes cause artificially depressed visual fields
- Any lenses used to correct refractive error during an examination can also be entered
- The area, strategy, fixation, and speed of the test can also be adjusted to suit your needs.

### **Area**

The Oculus Easyfield offers five different area grids to determine the specific locations at

which individual measurements are carried out.

These are:

- **10-2** - A grid with 61 test points from 0 to 10°. Fixation displacement occurs in this test in order to achieve 61 test points in a 10° area. The examination carries out fixation displacement in three phases, first central then upper and finally lower fixation, and pauses to allow the patient to change fixation
- **Single points** - Any number of points can be chosen to test the visual field. Points are chosen, by moving the control knob and entering or deleting a point. Each point is then marked with a red square so that you can keep a note of the points you have selected. In this test fixation displacement also occurs
- **24-2** - A grid with 55 test points from 0 to 24°
- **30-2** - A grid with 77 test points from 0 to 30°
- **Quadrant** - A specific quadrant or half field may be selected.

The option to specify your own testing points in the single points option is very useful, so that specific points can be examined further.

One of the disadvantages of these tests is that the pre-specified points cannot be extended. Therefore to examine more points you would need to use a 'user defined, program.

### Strategy

The examination strategy based on the choice of assessment required can be either threshold or suprathreshold. This is used to determine the threshold of luminance difference sensitivity (LDS) at each grid location.

In all the tests the initial 'expected' brightness is determined by measuring the threshold of the retina centrally and peripherally to give an approximate estimate of the peak of the 'hill of vision'.

The Oculus Easyfield offers five examination strategies.

These are as follows:

- **Suprathreshold 2-zone** - A test stimulus of 6dB brighter than the expected brightness is presented at each location. If the patient responds to the light stimulus it is recorded as normal, if not it is recorded as an absolute scotoma (black square) '
  - **Suprathreshold 3-zone** - As above, except that after the second response if the patient does not respond to the stimulus, it is shown at full brightness ie 0dB. If the patient reacts to it, it is recorded as a relative scotoma (X)
  - **Suprathreshold quantity defects** - As above but when a relative scotoma is found it determines its exact threshold value using the 4/2 strategy
- The advantage of suprathreshold method of testing is that rather than determining the LDS at each point it localises defects by identifying deviations from the normal course of the test during an initial examination, therefore making it possible to measure lots of points in a short space of time. An advantage of this method of examination according the Easyfield manual is that it makes it possible to reveal small scotomas
- **Full threshold 4/2** - Determines the threshold value as precisely as possible at each test

point. Four points at a time are selected from the grid and examined in isolation. Here if the patient responds to the 'expected' determined brightness, the stimulus is presented 4dB darker, if no response is given the threshold is made 2dB brighter. Alternatively if the patient does not respond to the 'expected' brightness the stimulus is presented 4dB brighter, if this is then seen it presents the stimuli 2dB darker

- **Fast threshold** - As above, but rather than four test points being examined, the visual field is tested as a whole. The advantage of this strategy is that it is quicker as it determines the threshold of a point by taking the mean value when presenting a stimulus at maximum and minimum brightness. It also takes into account results of threshold values of neighbouring points. A disadvantage noted in this test compared to the full threshold is that the results are less informative if patient responses are inaccurate.

### **Quick start programs**

There are four pre-defined programs stored in the Easyfield:

- **Screening** - This measures an area of 24-2 with the Supra-2 strategy and central fixation
- **Standard** - This measures an area of 30-2 with the Supra-quantifying strategy and central fixation
- **Macula** - This tests an area of 10-2 with the fast threshold strategy and Heijl-Krakau fixation
- **Glaucoma** - This tests an area of 30-2 with the fast threshold strategy and central fixation.

These tests are a combination of the examination parameters available. The idea of these pre-defined programs is to offer quick and reliable tests to save time and fatigue. One disadvantage noted, however, was the limitation of the tests. For example, if the 'screening' program was chosen which measures 55 points and a defect was found, there was no option to extend the testing points to investigate the defect further. Therefore to do this, 'user-defined' program has to be utilised.

### **User-defined programs**

When a program is required that does not conform to the standard pre-determined programs, the Oculus Easyfield gives you the option to create your own program. I found this concept to be very useful and innovative.

Using the 'user-defined' program you first select a patient in the 'Go to, list. Select 'Start' where you specify the area and the points to be tested. This can then be saved under 'User' in the 'Program' option. Four user-defined programs can be stored In the Easyfield.

I found the advantage of this program is that it allows you to adapt, create and modify a test to your requirements and needs. For example, measuring specific points in the visual field or extending and concentrating on test points that may have been missed in the quick start programs.

### **FIXATION**

The Oculus Easyfield offers three methods of testing fixation.

- **Heijl-Krakau method** - With this method, stimuli are occasionally presented in the region of the blind spot. If the patient is fixating then the stimulus will not be seen. However, if the patient responds to the stimulus it is noted as 'false' and the results are recorded as a fractional value. The advantage of this method was its simplicity. However, I found that this

method increased examination time, did not detect small fixation errors and manifested fixation errors due to variations in blind spot position.

- **Central fixation check** - This method presents stimuli at the centre of the grid 8dB brighter than the measured central threshold value. If the patient does not respond to the stimuli it is recorded as false. This method of fixation was found to be most reliable.
- **Eye monitor** - An image of the patients' eye is presented on the monitor. This is used to align the patient as well as monitor large fixation losses. I found this to be very useful, as any fixation losses could be monitored during the examination and the patient could be advised to improve fixation.

### **SPEED OF TEST**

The oculus allows you to select the interval and duration at which the stimuli are presented. The speed of the examination is adjusted to match the patient's reaction time. The test may also be paused by either holding down the response button or via the control unit. This is useful where fatigue may occur or adjustments to the patient's position need to be made. The advantage of this 'adaptive' method means that testing time is controlled according to the patient's ability.

I chose to use the pre-determined programs to give some examples of examination results obtained using the Oculus Easyfield. I asked each patient for comment and will now relate some of the more significant results.

### **SCREENING**

**Patient name: Mrs PS**

**DOB: 10/4/1950**

The examination took just over two minutes. There were no fixation losses, and the number of points presented included the points used to determine the initial threshold value. The threshold value was noted in the centre of the print out, and all points seen were marked as a circle.

The patient found the screening test quick, comfortable and easy to understand.

**Patient name: Ms GE**

**DOB: 10/10/1973**

The examination took just over one minute. There were no fixation losses, and the number of points presented included the threshold estimation. Again the threshold value was marked in the centre of the printout. A test point missed was marked as a black square indicating an absolute scotoma.

The patient found the test quick and easy to understand. A criticism noted by the patient was that she did not like the way in which her nose hit the side of the viewing aperture, ie there was no allowance for facial features.

### **STANDARD**

**Patient name: Ms GE**

**DOB: 10/10/1973**

The examination took over one minute. This was due to more points and a larger area being presented.

The patient found this test quick and easy to follow.

**Patient name: Mrs LH**

**DOB: 31/12/1942** The examination took over one minute. Results were similar to that above.

The patient found the test quick and easy. She liked the appearance and size of the instrument and particularly liked that fact that she was not restrained to a chin rest.

### MACULA

**Patient name: Mrs LH**

**DOB: 31/12/1942**

The examination took over six minutes.

In the fast threshold strategy, shortterm fluctuation was calculated and appeared on the printout in brackets. This is a value for the retest variability of the sensitivity results, ie the reliability of the results according to the patient's responses. This result is then shown in the form of a Bebie curve.

The threshold strategy results are also viewed in the form of a grayscale, and deviation from age-related values can also be examined.

The patient found this test to be long, but liked the option of being able to 'pause' the test during the examination when feeling fatigue.

**Patient name: Mr PS**

**DOB: 11/09/1969**

The examination took over six minutes. This particular test used the Heijl-Krakau form of measuring fixation. This revealed a greater loss of fixation which I felt was not a true representation as the patient appeared to be fixated on the fixation monitor at all times. Using this fixation method also increased testing time. The patient had no complaints.

### GLAUCOMA

**Patient name: Mr PM**

**DOB: 14/05/1945**

This test used the fast threshold strategy and took just over nine minutes.

The patient liked being able to do the test with the lights on. This made him feel more relaxed and in a more natural environment. A symptom noted by the patient due to the duration of the test was the entoptic phenomena seen on the white bowl and feeling 'starry eyed'.

**Patient name: Ms AN**

**DOB: 05/05/1980**

The test again displays the grayscale and Bebie curve. When beginning the test the instrument revealed that the patient's threshold was below that of an age-matched normal result and gave you the option to re-start the test. When re-tested, although the same result was found, you had the option to continue the examination. Hence a large deviation could be seen when looking at the 'deviation from the age-related values'. This was a very good checkmark to have to decide if the patient had actually understood the test and what was

expected of them, or if there was simply a deviation from normal expected results.

The patient was very impressed with the size and appearance of the instrument.

The patient reported that she did not like the fixation target in the shape of a diamond, as she was not sure where exactly she should be looking and would have preferred a single dot for fixation.

### **USER-DEFINED PROGRAM**

**Patient name: Mrs PS**

**DOB: 10/04/1950**

This is an example of a user-defined program. Here I could specify my own area, strategy and points to be tested.

This gave me the flexibility to define my own program in order to investigate more test points and desired area.

### **SUMMARY**

The implementation of the Disability Discrimination Act requires healthcare practitioners to take such steps deemed reasonable to provide or make accessible, auxiliary aids to disabled people.

According to the Act, an auxiliary aid may be a special piece of equipment or simply extra assistance to a disabled person.

I feel that the Oculus Easyfield from Birmingham Optical provides such an alternative for perimetry. For example, I examined a patient who was wheelchair bound and unable to reach a screener based on a hydraulic table comfortably without propping cushions under him. The Easyfield, however, could be positioned at a more reasonable height, was more comfortable for the patient and therefore did not create any artificial defects due to incorrect positioning or fixation.

The Easyfield has the advantage of being compact, therefore making it very attractive to practitioners working in a confined space.

The instrument could also be useful for housebound elderly patients who require domiciliary visits, as it is portable and an optional carrying case is also available. This would be particularly good, as we know that the elderly most frequently develop visual field defects, and should be subjected to visual field examinations.

The Easyfield control unit has a large patient database, which is remarkable for such a small unit. Patient details and examinations can be exchanged between a PC and the unit. This is particularly useful to allow comparisons to be made against future examination results.

The perimeter can be used irrespective of ambient light, and I found this very beneficial in situations where I could not control the lighting.

The predefined programs allow you to begin the examination as soon as possible.

The user-defined programs allows you to specify your own program, by choosing your own

area, strategy and fixation of a test. This gives you the flexibility to adapt a test to your requirements.

The Oculus is compact and competitively priced at £4,150 plus VAT. I would highly recommend this to practitioners who are looking for a portable, compact and user-friendly perimeter.

### **Advantages of the Oculus Easyfield**

- Small
- Compact
- Cost
- Portable and light
- Adaptable - user-defined programs
- Offers all the normal strategies as a 'full' screener
- Large patient data base
- Download patient information to a PC
- Adjustable head rest vertically and horizontally
- Quick start programs

### **Disadvantages of the Oculus Easyfield**

- No option to extend on predetermined test points in a program
- White perimeter bowl causes Entoptic phenomena (as all white bowls)
- Viewing through the funnel does not allow for large facial features
- Difficult to decide where fixation should be kept ie four dots in the shape of a diamond spaced apart.
- Heiji-Krakau fixation is time consuming.

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*The equipment was kindly loaned by Birmingham Optical.*

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