For New Readers

Welcome to everyone who has joined Glaucoma NZ since the last issue of Eyelights! Here are some basic facts about glaucoma:

There are different types of glaucoma, but they all involve damage to the optic nerve at the back of the eye.

Glaucoma is not curable. If you have glaucoma you must be monitored for the rest of your life.

Current treatments for glaucoma all aim to lower eye pressure.

Medication in eye drops can have side effects on other parts of your body. Tell your eye specialist.

People of all ages can get glaucoma.

A family history of glaucoma means you are at much greater risk of developing glaucoma.

If you have glaucoma you should tell your relatives, especially close relatives like sisters, brothers and adult children, of their additional risk and advise them to have their eyes examined.

Glaucoma NZ is a registered charitable trust which receives no government funding. It relies solely on donations, sponsorship, grants and fundraising.

Visual Field Tests

Part 1 of this series (Eyelights Vol 5 Issue 1) discussed measuring your eye pressure.

Part 2 (Eyelights Vol 5 issue 2) covered examination of your optic disc.

In this third and final segment we describe how your peripheral vision is measured.

Glaucoma damages our peripheral vision or 'visual field'.

So how would you go about measuring it, to detect a problem in the first place or to monitor for any further loss?

You could buy a square metre of black felt to hang on the wall, then sit your subject down a metre in front of it, with instructions to keep looking at a central white spot. Then, like a magician, advance from the edge a little white disc on the end of an invisible black wand - ask your subject to tell you when they first see it.

You could map out all the edges of the visual field this way – and check that there are no blind spots within these edges (apart from the one that is allowed to be there which corresponds to the place where the retinal nerve fibres leave the eye).

That is exactly how visual fields used to be measured and the method was named after Bjerrum.
Then came the Goldmann ‘perimeter’ (‘peri’ meaning round, about and ‘meter’ meaning measure). This used a clever arrangement of levers to move a projected light towards the centre on the inside surface of a round white bowl. A corresponding pointer moved on a paper grid so that marks could be made when the light was first seen and later joined up to map the visual field. The size and brightness of the white light could be varied to give a range of standardised measurements. This test was the gold standard for a number of years. However, even with a skilled operator it was somewhat open to interpretation.

Then along came computers! These allowed precisely controlled small increases in a light’s brightness, so that the level at which the person just sees it can be measured. Lights are projected at different points in the perimeter’s bowl until all parts of the visual field have been covered.

A number is given to the difference between the test spot brightness and the background brightness. The numbers are then put together in a visual field map.

Also this digital information, which has been acquired in a standardised way, can be analysed and compared to visual fields of a normal population. Better still, it can be compared to an age-matched normal population - important since our visual field sensitivity diminishes gradually with age.

This computer assisted testing process is more objective and efficient than previous methods. But that doesn’t mean that you, the examined, will find it any easier!

The test is designed to identify the threshold of seeing, ie. that light intensity just visible against the background. You have to make a subjective decision each time as to whether you see the light or not. Such intense and repeated decision-making over five minutes for each eye is hard work! You are allowed to be tired afterwards.

Fortunately most people can perform very reliable field tests, and the software program assesses reliability which makes the test printout even more useful.

Once good baseline field tests are obtained they need to be repeated on a regular basis. These tests are to see if visual field defects are progressing, and to help determine what level the eye pressure needs to be lowered to, to halt progression.

As poet James K Baxter wrote, “Loss is a precious nectar”. It helps us appreciate what we have in the first place to lose. Let’s be thankful for full visual fields that give us much of our awareness of landscapes and loved ones. And let’s look after them.

Continues...
Humphrey Visual Field Test

There are a number of different models of computer perimeter. One common brand is ‘Humphrey.’ The result of a Humphrey field test is shown here.

The printout shows a typical glaucoma defect: a curved bow-shaped blind patch within the normal-seeing field. A defect like this corresponds to the typical pattern of structural defect that occurs in the optic nerve head and retina.

The top number-grid shows the point values measured in a 24 degree field test, central fixation being where the vertical and horizontal lines intersect. The numbers represent the level of brightness at which the test light is just seen against the background (from zero when not seen even at great brightness to a maximum of about 34 for normal vision, when a very small additional brightness can be seen).
The greyscale plot to the right represents these same numbers in graphical form, the darker the shading the worse the vision with black showing areas of complete blindness.

The lower right number-grid represents the difference between this patient’s eye and an age-matched normal one, this time zero being normal and up to -34 (below normal level) being completely blind for that point.

The greyscale plot next to it shows the statistical probability that this patient differs from a normal patient (ie. has glaucoma), small dots being normal and black squares being highly likely to be different from normal. This is the most useful plot for your eye professional to look at for diagnosing glaucoma, because it has a built-in comparison to the age-matched average normal field.

Please note that however bad a field test may look, it does not give much indication of your ‘visual acuity’ (sharpness of central, fixation vision.) Acuity is often last to be affected by glaucoma progression, and is measured on a Snellen vision chart or similar.

Your Eye Examination - Summary

A checklist for your visit to the optometrist

Glaucoma NZ recommends that people without any symptoms of eye problems have an examination for glaucoma by the age of 45. If the examination is normal we recommend it be repeated every 5 years. The examination is not only to detect glaucoma early, but also to assess your risk of developing glaucoma.

Your vision will be tested, but how well you see detail is no indication of glaucoma unless very severe damage is present.

In a routine examination for glaucoma you should also expect:

☑ Questions about any family history of glaucoma
☑ Questions about any eye injuries in the past
☑ Questions about whether you use any drops, ointments, nasal spray or tablets containing steroids.
☑ Discussion of your extra risk if you are very short sighted
☑ Discussion of the risk for angle closure glaucoma if you are long sighted
☑ Measurement of your eye pressure, by Goldmann tonometer if possible (See Eyelights Feb 08)
☑ Examination of the angle
☑ A check for the presence of other conditions that could lead to glaucoma
☑ An assessment of the health of the optic disc (See Eyelights June 08)

On the basis of the clinical findings a decision would be made as to whether you require:

☐ A visual field test. If the optic disc is suspicious of glaucoma a visual field test should always be done. (See p4)

If the optic disc is very healthy and there are no risk factors present, then a 5 yearly examination is appropriate.

Further investigations

Other tests are also used, often when you have been referred to an eye specialist for investigation and possible treatment. Some optometrists also offer these assessments.

Ask your eye health professional about:

☐ Gonioscopy to examine the angle
☐ Measurement of central corneal thickness
☐ Stereo photography
☐ Scanning of the optic disc with modern technologies eg. HRT, GDx or OCT