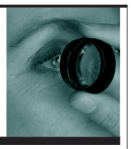


PRACTICAL TIPS FOR IMPROVING THE EFFICACY OF DILATION

The following practical tips may be considered to enhance the clinical effectiveness of pupil dilation:

- The higher concentration of mydriatic (1 per cent) should be used on patients with darker irides, due to the pigment binding of the drug
- Simple eyelid closure and digital occlusion of the tear duct for at least two minutes after eye drop instillation reduces systemic absorption of any topical drug by up to two-thirds
- Instillation of a topical anaesthetic prior to instillation of the mydriatic increases the speed of onset of both tropicamide and phenylephrine by enhancing corneal permeability and reducing irritation caused by the medication. It also prolongs recovery time
- Dilation of narrow angles is generally considered to be safer with an anti-cholinergic such as tropicamide. Phenylephrine 2.5 per cent increases the risk of pupil block, because of its mode of action
- Instillation of one drop of 2.5 per cent phenylephrine followed by one drop of tropicamide 0.5 per cent or 1 per cent is likely to give greater dilation than either drug used alone – maximising the effect on both the iris sphincter muscle and iris dilator muscle. This can be useful for patients whose pupils are difficult to dilate including patients with diabetes. Consideration should be given to patients with cardiovascular disease, in which case phenylephrine would be contraindicated
- In systemic disease and with concomitant drug therapies, tropicamide (0.5 per cent or 1 per cent) remains the mydriatic of choice as phenylephrine is frequently contraindicated

how best to utilise them depending on the patient.In all cases, consideration should be made regarding indications for use and risk factors involved when carrying out a dilated fundus examination. Good record keeping is essential when using any diagnostic agent and particularly when a patient declines pupil dilation; records should reflect this and it should be noted that the patient has been advised the importance of the need for further investigation to rule out any undetected pathology.

Tina Patel practises in South London and is an assessor for the College of Optometrists

Laser-like precision

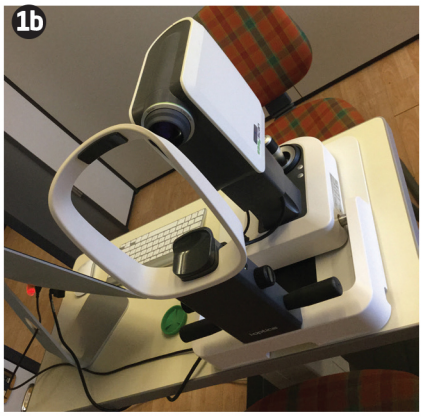
Bill Harvey takes a look at the EasyScan scanning laser ophthalmoscope, newly launched in the UK at this year's Optrafair

Scanning laser ophthalmoscopy has been around for some years now and allows high contrast imaging of selected layers of the fundus, the depth of the layer highlighted dependent on the wavelength of the incident light. At the Grafton Optical stand at this year's Optrafair, there was much interest in the EasyScan, an instrument already making inroads in the US and European market and now being launched in the UK. I recently tried out the machine and found the retinal detail revealed in the undilated patient to be most impressive.

EasyScan

The EasyScan is a confocal scanning laser ophthalmoscope (cSLO) that captures retinal images from an undilated patient in a matter of seconds (Figure 1a and 1b). After entering patient data, the machine is aligned with the pupil and then, either using an autofocus option or by manually focusing using the image of the retina on the attached computer screen, captures data from two points of fixation – centrally and nasally, the latter showing an image centred on the disc.

The use of specific wavelengths with a cSLO allows penetration to specific layers and minimises back scatter and absorption from any media opacity or the retinal surface, so offering a high contrast image (see Figure 2 for a comparison of a cSLO with standard white light imaging). The EasyScan is a dual colour cSLO using infrared (785nm) and pure green (532nm) light. The green image is from the retinal nerve fibre layer and capable of showing the microvascular structure up to the fourth bifurcation, while the infrared light reaches the choroidal vessel layer which is the deepest layer (Figure 3 upper image,



White light fundoscopy	Scanning laser ophthalmoscopy
Low contrast	High contrast
Only the surface	Different retinal structures
Limited by pupil size, environment	Capture possible with pupil size >1.5mm
Not possible to image through cataract	Capture possible with mild to moderate cataract

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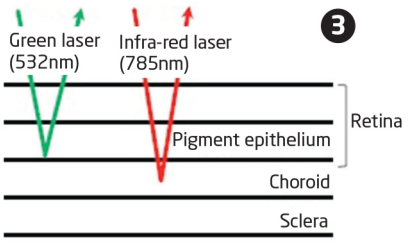

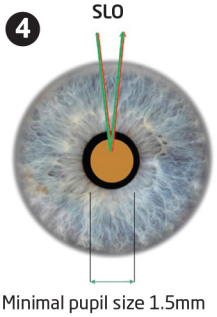

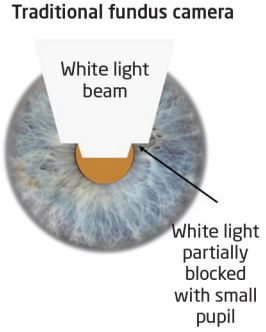

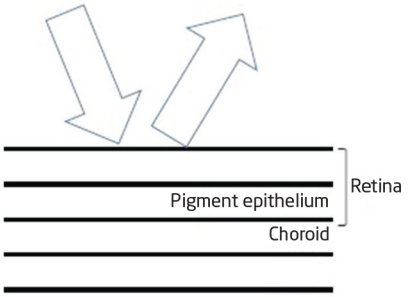

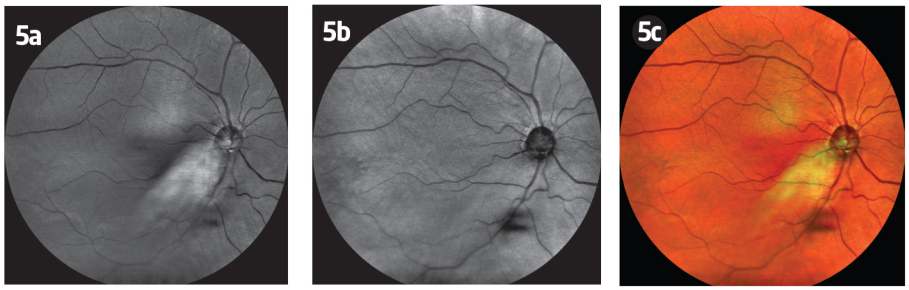

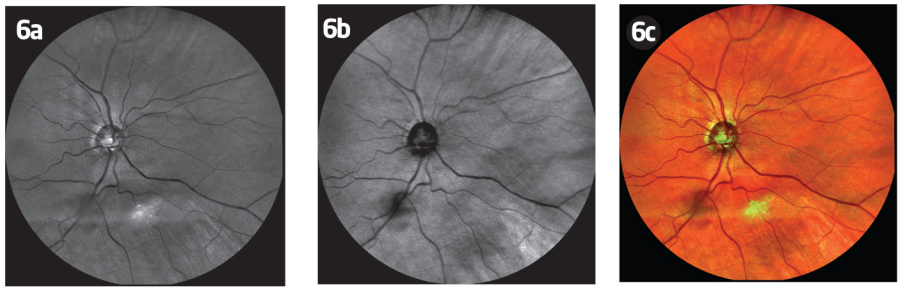

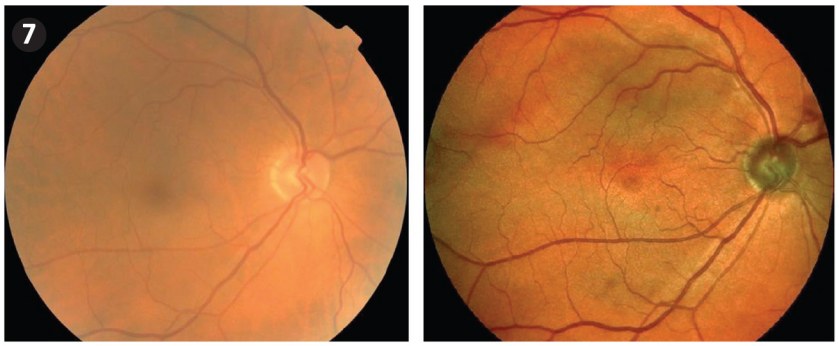

Traditional fundus camera without dilation

EasyScan without dilation

the lower image showing general retinal reflection of non-selective white light). Use of a collimated incident beam allows better penetration via a small pupil as compared with a typical white light flash (Figure 4), image from the latter degraded by reflectance of structures outside the pupil margin.

Figure 5 shows the image of my retina (5a the green image, 5b the infrared image and 5c the pseudocolour composite). Figure 6 shows the same but for the nasal fixation. Future development of the software is likely to allow mosaic fusion of different fixation points for a larger field view. Viewing these images immediately reveals differences from a standard white light presentation. The green image often shows white reflections from the inner limiting membrane. Both images show shadows caused by floaters, and these are seen to move on-screen (and shown even better in the video capture also stored by the machine). The improved contrast of the a composite image is immediately apparent (see Figure 7 for example).

Clinical benefits

Figure 8 shows a patient with background diabetic retinopathy and the green channel particularly emphasises the small microaneurysms developing. The green wavelength is absorbed well by haemoglobin and so reveals vascular compromise at an early stage of disease progression. Figure 9 shows how longstanding atrophic macular degeneration can be highlighted, the green channel revealing atrophy while the infrared showing the extent of choriocapillary stenosis and loss. Infrared light penetrates cloudy media better than white light, which is especially helpful when imaging patients with cataracts. Infrared reflectance imaging also can offer better visualisation of epiretinal membranes, macular drusen and cystoid macular oedema when compared to normal fundus photography and red-free light imaging.

A very nice feature of the EasyScan is the ability to generate an information sheet for the patient, showing details of their scan. This can easily be recreated with your own practice insignia and details and can be mailed to the patient directly if wanted – a nice way of encouraging and building practice loyalty (Figure 10, not shown here but can be viewed at www.opticianonline.net). I also like the way images may be uploaded to the manufacturer website for discussion or comparison (Figure 11, also not shown here but can be viewed at www.opticianonline.net).

For a detailed high contrast representation of retinal structure in the central 45 degree filed, the EasyScan performs well – even with the smallest pupils. Interpretation requires a little familiarity with the images (if you are not familiar with colour selective scans) but pays dividends by allowing early detection of small lesions along with an indication of their depth. The distinction of retinal pigment from choroidal pigment, or the depth of vascular anomaly are good examples where this is useful. Also, retinal imaging via less than transparent media is possible. Those in practices routinely screening using standard white light photography and regularly having to view those depressing black circles where no useful image has been obtained for an undilated elderly patient may want to know alternatives are out there.

● Further information is available from www.graftonoptical.com