Volk Eye Check

Optometrist Dr Simon Barnard and IRISS chief executive Yuval Yashiv speak to *OT*'s Ryan O'Hare about developing their new diagnostic tool

DESPITE THE likes of OCTs and abberometers, some of the standard diagnostic tests used in optometry today have changed little over the years. The cover test, the Hirschberg and the millimetre ruler remain a valuable part of the optometrist's diagnostic toolbox, but still require the artful interpretation of the practitioner.

Dr Simon Barnard and Yuval Yashiv are two of those looking to apply a little more science to the art. The pair are part of the team behind the Volk Eye Check, a diagnostic device aimed at optometrists and ophthalmologists. The device is a camera and diagnostic tool which enables the practitioner to glean a wealth of diagnostic information about a patient, all from a single snapshot of their eyes. The detailed measurements of the pupil, iris and eyelids it provides could aid practitioners in the diagnosis of a host of conditions, from strabismus to ptosis and beyond.

"Basically, it brings into the 21st century things that we, as optometrists and ophthalmologists, still do with a millimetre ruler," explained Dr Barnard.

Under the bonnet

The basis of Eye Check is a 16 megapixel camera (more powerful than most current smartphone cameras) and diagnostic and reporting software – all self contained within a small white box about the length of an elongated iPhone. The Eye Check is set up to measure seven parameters, including pupil size, eyelid position and horizontal visible iris diameter, and can provide additional data and accuracy for the practitioner. Crucial to its design is ease of use, with the creators claiming that non-clinical practice staff can photograph patients with minimal training. Once the photograph has been taken, a report is generated which is sent as a PDF file via Wi-Fi to the practice system, or to a specified email address. The report can then be added to the patient's record for future reference, or attached to a referral letter.

From patients to patents

Dr Barnard recalled how almost four years earlier, Mr Yashiv, then a patient, approached him with the concept. The pair set up IRISS Medical Technologies to develop the idea.

Now, after more than three and a half years of development, design and testing (in Norway, the US and the UK), the device is available to eye health practitioners in the UK. The company has already been granted two patents to protect the algorithms at the heart of the system, and have filed for a third to protect the product in the US. The team also secured a deal to have Eye Check manufactured and distributed by Volk Optical – fitting neatly into its existing portfolio of handheld diagnostic tools. "We've been to four shows in the US and there's excitement from the large proportion of clinicians who have seen it," said Mr Yashiv, adding: "There's nothing like it and it's generating a lot of interest."

"This could help to confirm in cases when you're not sure"

While generations of optometrists have relied on the reflective specks of a Hirschberg test to confirm a strabismus, the limits of human vision confine detection to the scale of thousandths of a metre – so the smaller squints may be missed. "The smallest that we can perceive is a difference of about one millimetre in asymmetry," explained Dr Barnard, "but one millimetre is a 20 prism dioptre squint." This is where the Eye Check comes into its own.

In cases of less pronounced strabismus, the advantages of electronic measurement can provide the additional accuracy needed to identify even the smallest of squints. "You still make your diagnosis, but this could help to confirm in cases

when you're not sure," said Mr Yashiv, who is keen to point out that the Eye Check is the aid and not the decision maker. The underlying aim, the team explained, is to create a level playing field, to remove subjectivity from the measuring process and to negate the impact of inter-clinician variability.

More than meets the eye

The benefits of electronic measurement for squint may be clear, but Dr Barnard highlighted other key areas in which the Eye Check can make, and has already made, an impact. Detailed measurements of corneal diameter or highlighting pupil border and position could have an impact on the fitting contact lenses. For instance, patients with pupil eccentricity, where the pupil is not located in the centre of the iris, would naturally find it very difficult to use multifocal contact lenses which may be powered for distance at the periphery. Such additional information could help to identify candidates for specialist contact lenses.

Dr Barnard recounted an instance in which a patient presented in practice after neck surgery. Their Eye Check report showed a 0.22mm difference between pupil diameters, with little reaction from the right pupil in lower light. The difference indicated signs consistent with damage to the sympathetic nerve controlling the iris muscles.

"This is diagnostic," Dr Barnard confirmed, "although it's only a quarter of a millimetre, it tells me it's Horner's syndrome. There's no way we can measure that with a ruler."

The patient's spinal surgeon has shown interest in the diagnostic potential for the measurements after surgery, with the findings to be published in a clinical journal later in the year. Future iterations could one day provide more information on the extent of damage due to neurological conditions such as stroke or traumatic brain injury.

Future gold standard?

The team has high aspirations for its creation, with Mr Yashiv sharing his predictions for the Eye Check: "We could see it being used in the field and filtering down from eye care specialists down to primary care; to GPs, health visitors and paediatricians."

For Dr Barnard, while there is potential for its use in other conditions, the impact the Eye Check could have on catching squint at a young age remains a priority. "About 3% of population have a strabismus, and about 3% of adults end up with a lazy eye," he explained. "It's the biggest cause of one-eyed blindness, or partial sight, in the developed world and it's because it's not detected early."

He added: "If you wait until they get to school at the age of four, the [visual] cortex has already developed. So you've got to try and catch it young. What we hope is that in five years' time, these will be in the hands of health visitors and they can just take a picture of every one-year-old and it will find the squint very early on."

• The VOLK Eye Check is available in the UK priced at £1,995, and will be oficially launched at ESCRS in September. For more information, visit http://volk.com/eyecheck/