A couple of years ago, I caught up with Dr Simon Barnard who demonstrated to me a new hand-held instrument, the Volk Eye Check, which he had developed as an effective way of screening children, even the very young, for a variety of potential anomalies such as strabismus, anisocoria, partial ptosis and so on. I was impressed at the time by its ease of use, its portability (essentially the unit looks like a smartphone), its apparent sensitivity as confirmed by early work by Barnard, and the way the data was easily analysed and transferrable. At that time, the instrument developed by Barnard with IRISS Medical Technologies was not commercially available, but it was clear that a full blown launch was imminent.

Volk Eye Check

Recently, a further developed version of the Volk Eye Check was launched by US company Volk. The instrument is now available in the UK (distributed by Birmingham Optical) and I was able recently to get hold of one to try. Of similar size and feel to the original, the Volk Eye Check is white and sleek, has a large rear facing touchscreen and comes complete with pouch, screen pen, and USB for charging (Figure 1) and, if not making use of the wireless data transfer options, moving data to a computer. As results are automatically generated as PDFs and the unit itself houses a database of results, no specialist software is required. Once the on button is pressed, the main screen immediately highlights the next big development; as well as the eye check function, the instrument now boasts a contact lens programme too.

If undertaking the Volk Eye Check, the first step is patient data entry. This may be done prior to a clinic or school visit. As well as the usual personal details, the monocular PD, if known, may be added. The unit is then ready to take the Volk Eye Check readings. It works from a distance which allows both eyes to be assessed and that will be preferable for use on the very young. The patient’s eyes are aligned on the screen and they are asked to look at a flashing coloured target just to the left. This aids fixation for the very young and also gives the appropriate convergence and viewing axis to make assessment of corneal reflexes accurate (Figure 2). The developers have found that the camera focus is enhanced by a target sticker placed on the patient’s forehead (Figure 3). Readings without this are possible, but usually take longer, the unit asking for more captures than the typical two or three when all is set up correctly. I also found that ambient lighting was critical – a normally lit consulting room is ideal. When I tried in various home settings, lower light levels made capture a little more difficult and took longer. Each capture is achieved by centring the patient’s eyes on screen, moving to the correct working distance and, when a red dot on screen turns green, pressing the capture button. A flash and it’s done. After a brief analysis, the screen indicates if there has been any problem or if another reading is needed.

The final results are stored and the unit was pre-set with my email. Using a Wi-Fi setting, the unit immediately emailed the results for each patient to me ready for later analysis (Figure 4). As can be seen, there is a long list of measurements recorded for each eye and any difference between the eyes for those measurements. This way, the machine will record any anisocoria, any difference in horizontal visible iris diameter (HVID) and palpebral aperture differences. It also records pupil eccentricity in two meridians.

Contact lenses

The new contact lens module is a little easier and is best carried out with the forehead sticker. For this, the patient is directed to simply look at the lens of the Volk Eye Check and capture is then undertaken once the appropriate working distance is reached. The subsequent report (Figure 5) reveals the following:

- Pupil diameter
- Pupil centre to upper lid and to lower lid
- HVID
- Vertical and diagonal iris diameter
- Corneal sag
- Vertical and horizontal pupil eccentricity

Data interpretation

So for ease and speed of use, and especially data transfer and clarity
of display, the unit passes with flying colours. But what is the clinical significance of this assessment? I had the unit for only a short time so patients tended to be older and without any major pathology. I did have it to hand by sheer coincidence for a pre-registration optometrist course preparing for stage 2 assessments. Part of this assessment is a contact lens fit and they are required to measure HVID and palpebral aperture among other things. It was useful to have a simple method of validating results. Excellent though the Volk Eye Check was for this, it is not really its main use.

Anything capable of detecting strabismus in the young is to be welcomed and the Volk Eye Check is able to do so on very young patients and those with behavioural impairment very well. Its speed of use, incorporation of attention enhancing lights and sounds, and long working distance make it ideal. The earlier the intervention once strabismus is detected, the better the long-term visual outcome. Figure 6a shows confirmation of orthophoria in an autistic child. Autistic spectrum disorder (ASD) often makes clinical evaluation with any degree of accuracy very difficult, especially if measurement is invasive or at close proximity. Figure 6b shows results where a deviation in an ASD child has been detected where it had been missed previously using traditional assessments.

Figure 6c shows confirmation of orthophoria in a child with an apparent esotropia. Confirmation of pseudotrabismus is very useful in practice and having some tangible and easily explained evidence helps the parent or carer to be reassured that their child has no ocular concerns beyond normal...
developmental face shape. I don’t think many readers would have missed the esotropia shown in the report in Figure 6d, but the Volk Eye Check is excellent at confirming the success of hyperopic correction in straightening the eyes (Figure 6e).

Pupil size difference is often physiological but this would be confirmed by adjustment of the ambient lighting. If the difference remains constant at different light levels then a normal variation would be confirmed. However, if there is a difference in asymmetry, as shown in Figure 7a and Figure 7b, then anisocoria is suspected. The child in Figure 7 was subsequently confirmed as having congenital Horner’s. The often subtle partial ptosis is also detected by the Volk Eye Check.

The excitement around the contact lens module is with regard to aspects of fitting. A significant number of patients feel discomfort in available lenses due to their corneal profile (measured as sag) being atypical. The Volk Eye Check detects these before the process has gone beyond the point of dispensing, and flag up that a specialised profile lens be opted for too. Furthermore, the need for good centration of multifocal lens designs has led to many practitioners using topographers to assess this and modify fit or design where the centration is likely to impact on resultant vision. The Volk Eye Check easily assesses eccentricity and should prove a useful and quick way of indicating multifocal design suitability.

I think many will immediately find the Volk Eye Check a useful and adaptable addition to their equipment, improve paediatric eye care, and now enhance contact lens work. I found the unit easy to use and would be very happy to use one in a primary care clinic. I am also completely convinced that this is just the start and have already thought of future possible adaptations.

References

● Further information from www.birminghamoptical.org