The distribution of anisocoria in a group of unelected patients attending a primary care optometry practice

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Purpose
To analyse the distribution of anisocoria amplitude of a cohort of patients attending a primary care optometry practice for an eye examination using a hand held automated pupillometer.

Methods
The Volk Eye Check is a hand-held medical camera device with Xenon flash that captures analyses and displays, in real time, eye measurement data including pupil size under binocular conditions. The device requires the patient to fixate the centre of the camera lens. The device is held approximately 50cm from the patient (Figure 1) and the device directs the operator to adjust the working distance as required. A minimum of two flash photographs are required. The maximum duration of the flash is 100µs.

The Volk Eye Check has been shown to obtain accurate objective measurements of static eye data, such as horizontal visible iris diameter1. A calibration sticker applied to the patient’s forehead enhances accuracy, for static anatomical features, to approximately +/-1% of the structure being measured.

Data were captured from 143 consecutive patients aged between 2 and 91 years attending a London optometry practice for an eye examination. The patients were unelected in terms of any abnormal eye conditions. The ambient lighting conditions during the capture sessions were the same for every patient.

Results
The average anisocoria for this population was 0.17mm with a standard deviation of 0.15mm. 26 patients had 0.00mm difference between pupils. 10% had at least 0.40mm and 4% had at least 0.50mm with the largest anisocoria being 0.70mm.

Discussion
The findings of this study are broadly in line with previously published findings2. If 0.40mm is taken as the clinical cut off to define anisocoria, a further 21% had a difference that is just below the threshold.

Whilst pupil size will vary during the procedure because of a number of physiological factors, this study was comparing right and left pupil size, which theoretically should remain constant unless pathology is present. A possible confounding factor that may affect this measurement of anisocoria is physiological hippus. The authors do not know if physiological hippus is totally in phase and fully synergistic between right and left eyes.

In routine clinical practice, most optometrists and ophthalmologists assess pupil size and size difference subjectively. As an anecdotal finding, the authors have observed that clinicians can diagnose anisocoria subjectively (observation) at this level especially if the patient has blue eyes (Figure 2&3). It can however be a particular challenge to visualise the pupil on a dark iris (Figure 4).

The detection of anisocoria is important as this can be a sign of pathology. Although a cut off of 0.40mm is accepted as defining anisocoria, a difference of <0.40mm has been reported and documented with the Volk Eye Check in a confirmed case of acquired Horner syndrome secondary to cervical neck surgery3.

Conclusions
In this study, 10% of the study population showed anisocoria of at least 0.40mm. The patients in this population appeared to present as entirely normal and are presumed to have had no neurological issues that might affect pupil size. The Volk Eye Check showed itself to be a clinically valuable tool in measuring differences in pupil size.

References

Disclosure
All the authors are either employed by or have an interest in IRISS Medical Technologies Ltd www.irissmedical.com

Figure 1 Volk Eye Check in use

Figure 2 Example of 0.40mm acquired anisocoria secondary to Horner syndrome in a patient with blue eyes

Figure 3 Example of patient with light irides with 0.60mm anisocoria

Figure 4 Example of patient with dark irides with 0.50mm anisocoria (left pupil bigger than right) – VERY hard to see!