

Figure 1 SL-OCT



Figure 2 SL-OCT unit on a slit-lamp column

# Van Herick versus OCT

**Bill Harvey** looks at the use of an anterior OCT instrument to assess the anterior chamber angle and how it compares with a more standard slit-lamp technique

It is now possible to achieve a high resolution cross-section view of the anterior eye using optical coherence tomography. This is, of course, useful for refractive surgeons, for assessing anterior eye pathology progression and the impact of treatment. The data gained makes it possible to achieve repeatable quantitative data regarding a whole host of parameters, such as anterior chamber volume, anterior chamber depth, corneal thickness, flap and pre-corneal tear film thickness, anterior angle size and iris to cornea separation at set distances from the angle.

Van Herick's technique is a subjective assessment of the ratio of a corneal section width to the gap between the corneal section and iris

when a beam is trained just within the limbus from 60°. Many optometrists use this technique as a guide to the potential for future angle shut down and a very narrow angle would be shown by little or no gap behind the section (so where the gap is less than a quarter of the section thickness). In some cases, no gap may be seen at all and in this case most practitioners would exercise some caution prior to dilation. Inter-practitioner variation in grading is a potential problem, as well as a tendency to over-exaggerate the size of the gap by moving the section too far on to the cornea. Having said that, large differences between the two eyes that cannot be explained by larger anisometropia or previous disease are best viewed with suspicion. Similarly, repeat readings suggesting a reduction

in gap, perhaps in a maturing cataract patient, are similarly significant and should influence management.

## OCT and Van Herick

The purpose of this small-scale trial was to assess the Van Herick (VH) grade of 34 eyes and then measure the anterior angle using the Heidelberg SL-OCT (Figures 1 and 2). To assess the VH grade, a photograph was taken using the Topcon SLD7 slit lamp with DV1 camera. The angles were graded by a decimal notation rather than the traditional grades of 1 to 4. This meant that a gap of just over half the corneal section would be classed as 0.6, whereas one just less than the corneal thickness would be graded as 0.9. Under the traditional system both would be classed as grade 3. Figures



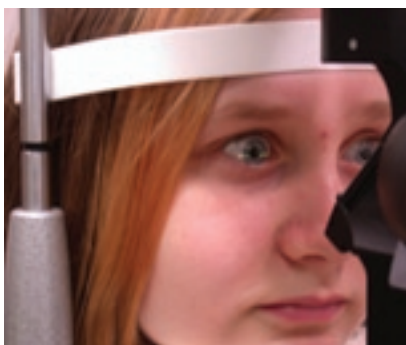
Figure 3 VH grade 0.7



Figure 4 VH grade 1.2



# Clinical



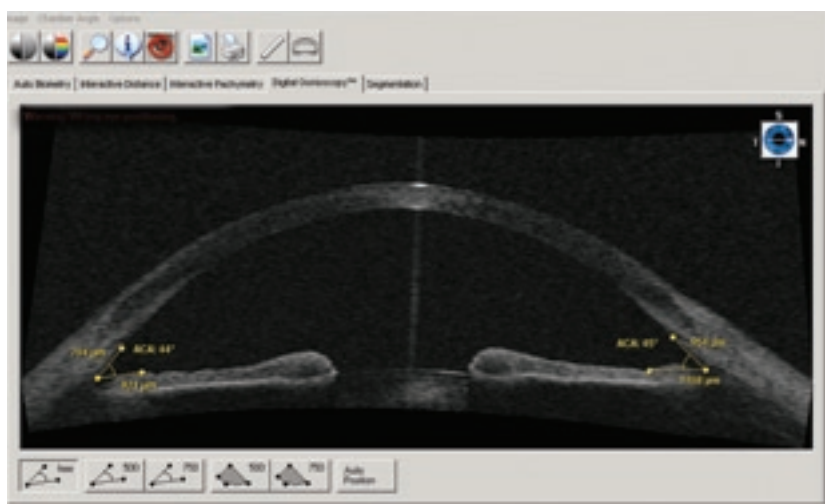
**Figure 5** Horizontal beam aligned on corneal apex

3 and 4 show grades of 1.2 and 0.7 respectively. To address somewhat the issue of inter-rater variation, photos were rated independently by two optometrists and the use of photographs and a decimal grading showed correlation of all readings.

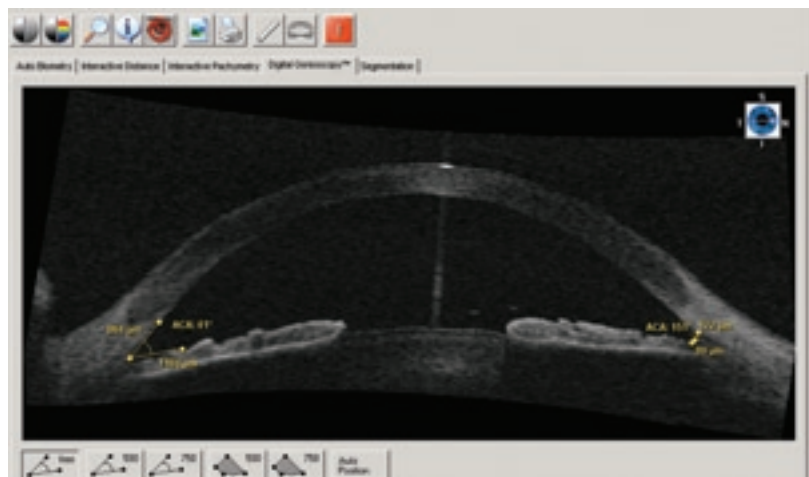
The SL-OCT (supplied by Haag Streit UK) is centred across the corneal apex (Figure 5) and scans taken. The data analysis for each scan was viewed by the 'digital gonioscopy' program which offers an automatic assessment of the anterior angle (Figure 6). Again to avoid inter-rater variation error, objective angles were used in all cases. Where a clear error was made (for example, look at the reading for the angle on the right of Figure 7), it is possible to adjust the caliper on screen to better fit the angle. However, inter-rater variation here was significant so instead these results were discounted.

## Results

The sample size was 34 eyes from 17 patients. The majority were students aged from 21 to 24, but several older patients were assessed. Average age was 25-years (range from 21 to 43). The average VH was 1.04 (range 0.1 to 1.7) while the average angle value was 50° (range 71° to 28°). The two data sets showed a good correlation with a



**Figure 6** Digital gonioscopy calculates the anterior chamber angle



**Figure 7** Occasional errors need to be discounted or the caliper repositioned

Pearson product moment correlation of  $r = 0.84$  based on  $n = 34$ . For the full database and scatter plot contact the author ([william.harvey@rbi.co.uk](mailto:william.harvey@rbi.co.uk)).

## Conclusion

Despite its assessment of the anterior angle based on a parameter some way out from the actual drainage area, it would appear that VH reasonably

relates to the angle and therefore has some predictive value in assessing the anterior chamber. Furthermore, the use of anterior OCT technique allows for an accurate and useful assessment of the anterior chamber. ●

● Thanks go to Haag Streit UK for the loan of the instrument. For further details contact 01279 414969.

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