Optical and ultrasound methods yield different axial length measurements

THE two main systems used to measure axial length, ultrasound and partial interference laser interferometry, produce markedly different results. Moreover, these differences vary among short, normal, and long eyes, according to the results of a study presented by Ana Calatayud at the annual ESONT conference.

The study categorized the eyes into three axial length groups—short (4%), normal (78%), and long (18%). Comparisons of the measurements obtained with each technique in those subgroups showed that the IOLMaster continued to measure longer than the Ocuscan in the short and normal eyes. The differences in those cases were not technician-dependent.

In the short eyes, the axial length measured with the IOLMaster was 0.32±0.08 mm longer than that measured with the Ocuscan. In the normal eyes, the difference between instruments was 0.20±0.90 mm. Among long eyes, the two techniques yielded values that were much closer on average—the mean difference between instruments was 0.04±0.36 mm, although within the subgroup of long eyes, the Ocuscan produced the longer measurement instead of the IOLMaster.

The axial length measurements were obtained after measuring corneal curvature with an automated keratometer followed by instillation of anaesthetic drops in both eyes. The Ocuscan was always used first, taking 10 axial length measurements in each eye. After deleting the value from the first measurement, the mean standard deviation (SD) was calculated. If the SD was greater than 0.1 mm, two other extreme readings were deleted, and all of the measurements were repeated if the SD still exceeded 0.1 mm. After waiting 10 minutes, the axial length measurement was determined with the IOLMaster.

She explained that the team measured axial length with the Ocuscan first because the technician can manipulate readings with the Ocuscan, deleting values and repeating the measurement in order to obtain a standard deviation less than 0.1 mm. In contrast, the IOLMaster provides an axial length measurement automatically without any technician input. If they had used that technique first, they might have been biased in calculating the Ocuscan value to try to obtain a result similar to the IOLMaster.

In contrast to reports from other investigators, our study results suggest that the IOLMaster is too great not to be taken seriously.