

## A Device With Validated Precision and Accuracy

Measurements taken with the ANTERION are comparable to those taken with the IOLMaster 700. | OLIVER FINDL, MD, MBA



The ANTERION (Heidelberg Engineering; Figure 1) is a multimodal imaging platform that uses swept-source OCT

for anterior segment examinations and measurements. This modular platform combines corneal topography and tomography, biometry, and IOL calculation for improved workflow efficiency. It has a fast acquisition time and eliminates the need to move patients between diagnostic devices. Additionally, ANTERION provides visual confirmation of all measurements.

### PRECISION

My colleagues and I compared measurements obtained with the ANTERION to those obtained with the IOLMaster 700 (Carl Zeiss Meditec). A total of 389 eyes with age-related cataract were included in the study.<sup>1</sup>

**Axial length.** The ANTERION and IOLMaster 700 produced mean values of  $23.54 \pm 1.18$  mm and  $23.55 \pm 1.18$  mm, respectively. The mean difference between the two devices (0.01 mm) would lead to a 0.03 D error, which can be considered negligible on the final refractive outcome. Both devices obtained AL measurements in all eyes enrolled in the study; however, 14 eyes required manual correction of retinal pigment epithelium peak, a function that is only available with the ANTERION.



Figure 1. ANTERION is Heidelberg Engineering's platform optimized for the anterior segment.

**Keratometry.** The mean K readings were  $7.82 \pm 0.26$  mm and  $7.80 \pm 0.26$  mm for the ANTERION and IOLMaster 700, respectively. This difference was not clinically relevant and can be attributed to the various measurement zones used by each device.

**Anterior chamber depth.** ANTERION measures anterior aqueous depth whereas the IOLMaster 700 measures ACD. The mean ACD with the ANTERION was  $3.20 \pm 0.42$  mm, and it was  $3.13 \pm 0.43$  mm with the IOLMaster 700. Again, this difference was not clinically relevant.

**Lens thickness.** The mean lens thickness with the ANTERION and the IOLMaster 700 was  $4.65 \pm 0.43$  mm and  $4.59 \pm 0.43$  mm, respectively.

From this study, we determined that good agreement was found between the ANTERION and the IOLMaster 700 for all parameters that are critical to IOL power calculation.

### ACCURACY

We conducted another study comparing the repeatability of measurements with two swept-source OCT devices—the ANTERION and the IOLMaster 700—to the optical biometer Lenstar LS 900 (Haag-Streit). A total of 50 eyes were enrolled.<sup>2</sup>

**Axial length.** There was high repeatability with all three devices. In our hands, however, the ANTERION was slightly better than the Lenstar.

**Keratometry.** All three devices provided highly repeatable mean keratometry readings. The IOLMaster 700 was slightly superior for mean keratometry values, however, and the Lenstar produced slightly steeper keratometries. The within-subject standard deviation (Sw) was 0.083 for the IOLMaster 700, 0.018 for the ANTERION and 0.137 for the Lenstar.

**Anterior chamber depth.** Both swept-source OCT devices measured a slightly shallower anterior chamber depth ( $3.13 \pm 0.00$  mm for the ANTERION and  $3.06 \pm 0.03$  mm for the IOLMaster

700) than the Lenstar ( $3.24 \pm 0.06$  mm). Repeatability was also superior for the swept-source OCT devices (Sw: 0.004 for the ANTERION, 0.039 for the IOLMaster 700, and 0.134 for the Lenstar).

**Lens thickness.** Again, the Lenstar had the poorest reproducibility of the three devices. The Sw value was 0.037 for the ANTERION, 0.02 for the IOLMaster 700, and 0.180 for the Lenstar. This study showed that the ANTERION has a high repeatability and reproducibility of measurements, especially for axial length, anterior chamber depth, and lens thickness.

### POSTOPERATIVE AXIAL LENGTH

We also studied the differences between pre- and postoperative axial length with the ANTERION and IOLMaster 700 (unpublished). A total of 50 eyes with different stages of cataract were included in the study.

There was a slight difference in pre- and postoperative axial length for both devices, but it was smaller with the ANTERION (0.08 vs 0.07 mm). We noticed a slight correlation between the grade of cataract, where the difference was greater the denser the cataract was.

### CONCLUSION

The ANTERION is highly precise and accurate. The measurements taken with the ANTERION were comparable with those taken with the IOLMaster 700, with only very small differences between devices. ■

1. Fisis AD, Hirsnschall ND, Findl O. Comparison of 2 swept-source optical coherence tomography-based biometry devices. *J Cataract Refract Surg.* 2021;47(1):87-92.

2. Fisis AD, Hirsnschall ND, Ruiss M, Pilwachs C, Georgiev S, Findl O. Repeatability of 2 swept-source OCT biometers and 1 optical low-coherence reflectometry biometer. *J Cataract Refract Surg.* 2021;47(10):1302-1307.

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- Financial disclosure: Study support (Heidelberg Engineering)