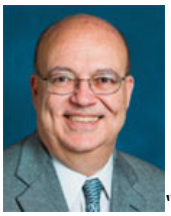
EW Supplement: Importance of selecting the appropriate platform for optimal patient outcomes

A new generation of optical biometry arrives



"I have used the instrument for IOL power calculation in hundreds of cases. The axial length measurements and K readings it provides are extremely precise, and ACD measurements are highly accurate."

H. John Shammas, M.D.

A new optical biometer approved by the FDA in October 2009 is designed to provide more accurate measurements for IOL power calculations and refractive surgery procedures than was previously possible and streamline practice workflow at the same time. The Lenstar LS 900 (Haag-Streit USA, Mason, Ohio) utilizes optical lowcoherence reflectometry (OLCR) and 820-µm super luminescent diode technology to capture nine measurements in a single scan:

- keratometry
- white-to-white distance
- pachymetry
- anterior chamber depth
- lens thickness
- pupillometry
- axial length
- eccentricity of the visual axis
- retinal thickness.

The compact footprint of the Lenstar LS 900 optical biometer

Unlike the optical biometer that preceded it in the U.S. market (IOL Master, Carl Zeiss Meditec Inc., Dublin, Calif.), the Lenstar LS 900 captures all biometric measurements on the patient's visual axis. H. John Shammas, M.D., medical director of the Shammas Eye Medical Center, Lynwood, Calif., and clinical professor of ophthalmology at University of Southern California's Keck School of Medicine, participated in a study comparing biometric measurements obtained with the Lenstar and IOL Master in 50 cataractous eyes and 50 eyes with clear lenses. 1

"We found a high correlation between the axial length and keratometry (K) measurements obtained by the two instruments," he said. "There were statistically, but not clinically, significant differences. We also found the Lenstar to measure slightly deeper anterior chamber depth (ACD). This was expected because it measures in the optical zone rather than by lateral slit illumination as is done by the IOL Master. The Lenstar ACD values are accurate and tend to be longer compared to the IOL Master as described in two recent publications (Rabsilber et al. J Cataract Refract Surg 2010; 36:230234 and Buckhurst et al. Br J Ophthalmol 2009; 93:949-953). The device measures corneal thickness from epithelium to endothelium and separately measures aqueous depth as the distance from the endothelium to the front surface of the crystalline lens. Accurate determination of ACD can be especially important in shorter eyes when the surgeon is using a latest-generation IOL power formula."

Other researchers who com pared measurements from the Lenstar LS 900 with measurements from the IOL Master and other devices have reported similar conclusions, 2-4 although one study found no statistically significant difference in measurements of axial length, corneal power, or anterior chamber depth between the instruments. 5 Dr. Shammas explained that the Lenstar LS 900 is the only optical biometer that measures lens thick ness in addition to other ocular parameters. "Newer formulas, such as the Holladay II and Olsen, use lens thickness as one of the variables for calculating IOL power. Surgeons using these new formulas and the IOL Master must measure lens thickness in a separate step with immersion ultrasound biome try or estimate it by patient age. This is not necessary when using the Lenstar, which improves efficiency in the clinic."

Time is also saved by the Lenstar LS 900 because it does not require moving patients to obtain separate measurements of central corneal thickness or pupil diameter in ambient light, which is an important consideration for premium IOL candidates, Dr. Shammas said. With regard to axial length measurement, like the IOL Master, the Lenstar measures from the anterior corneal surface to the retinal pigment epithelium and uses a correction factor to determine distance to the internal limiting membrane. Furthermore, with an additional 10 second step, the Lenstar can obtain exact retinal thickness at the point of the patient's line of sight. This is useful information for surgeons screening candidates for premium IOL procedures. In general, the Lenstar LS 900 software is easy to use, Dr. Shammas said. It can directly communicate with electronic medical records packages, and it reduces the risk of transcription error because it automatically populates data fields in IOL formulas and calculators.

Dr. Shammas feels that the Lenstar LS 900 may also offer more precise K readings than previously available optical biometers with integrated keratometry. It measures closer to the central visual axis using 32 reference points in two concentric rings of 1.65 and 2.3 mm. Dr. Shammas's experience is that this

might be an advantage, for example, in eyes that have smaller functional optical zones due to pre vious corneal refractive surgery. He summarized his clinical experience with the Lenstar LS 900: "I have used the instrument for IOL power calculation in hundreds of cases. The axial length measure ments and K readings it provides are extremely precise, and ACD measurements are highly accurate. All values obtained are very repro ducible. Furthermore, the Lenstar LS 900 is easy to use and simplifies the use of the latest and most accurate IOL power calculation formulas."

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