

IOL power calculations based on intraoperative values

Intraoperative aberrometry reduces reliance on preoperative data to determine accurate IOL power, especially in challenging cases, a surgeon says.

CHICAGO — Intraoperative aphakic refraction rather than IOL power calculation formulas can ensure precise and reliable optical outcomes in cataract surgery, a speaker said here.

Robert J. Weinstock, MD, elucidated clinical outcomes at Refractive Subspecialty Day preceding the joint

Africa Council of Ophthalmology.

The ORange intraoperative aberrometer (WaveTec) allows surgeons to make IOL calculations based on real-time data captured in the operating room. Traditionally, cataract surgeons have relied on preoperative data and IOL power calculation formulas to select

ware uses a vertex formula that recommends a lens power necessary to neutralize refraction to plano or near-plano. The aphakic refraction provided by the intraoperative aberrometry reduces the need to rely on preoperative IOL calculation formulas such as the Holladay II or SRK/T, which rely on keratometry values, Dr. Weinstock said.

"You are not relying on the [keratometry] value to be accurate to get the right lens power. You are eliminating the source of error that we are seeing with these cases," he said.



"Some surgeons create up to a 3-mm wound. That alone changes the refraction of the eye."

— ROBERT J. WEINSTOCK, MD

meeting of the American Academy of Ophthalmology and the Middle East

Keratometry and lens power

To show the utility of aphakic refraction, Dr. Weinstock reviewed the case of a 60-year-old woman who underwent cataract surgery about 10 years after undergoing a large myopic LASIK treatment.


"This is a perfect case for ORange, where we did look at the preoperative data but then used the ORange and the Talbot-Moire wavefront scan to refract the eye once the cataract was removed," Dr. Weinstock said.

Keratometry readings taken with the IOLMaster (Carl Zeiss Meditec) recommended an IOL power of 17 D. Manual keratometry readings suggested a power of 16.75 D. Readings taken with the Nidek OPD scan indicated a power of 18 D.

"Depending on what [keratometry values] you use, you would choose a different lens power," Dr. Weinstock said. "We didn't know which lens power to use."

Data from aphakic refraction performed with the ORange indicated a lens power of 19 D. Surgeons selected a slightly lower lens power of 18.75 D and achieved a strong visual outcome with refraction approaching plano.

The woman had an excellent visual result postoperatively and would have been hyperopic if a lower-power lens had been used as recommended by the preoperative measurements and formulas. "Those devices were giving me [keratometry values] that were too steep than what the real visual axis [keratometry values] were," Dr. Weinstock said.

Intended refraction with a lens power of 18.75 D was -0.16 D. At 14 days, the patient had uncorrected visual acuity of 20/15 and refractive error of -0.25 D. — by Matt Hasson 

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Disclosure: Dr. Weinstock is a paid consultant for WaveTec.

IOL power and correct astigmatism.

"People are now beginning to trust ORange," Dr. Weinstock said. "They are finding that it is often more reliable than our preoperative data. We are making more and more decisions based on what ORange is telling us in the operating room, using that data and having better outcomes with it."

Aphakic refraction is particularly useful in selecting IOL power in challenging cases, such as eyes that have undergone LASIK or radial keratotomy, or highly astigmatic eyes, Dr. Weinstock said.

The clear corneal incision and cataract removal also alter the optical properties of the eye.


"Some surgeons create up to a 3-mm wound," he said. "That alone changes the refraction of the eye, the amount of astigmatism and the axis of astigmatism. Taking out the cataract itself can change the dynamics of the scleral rigidity and the shape of the eye."

Avoiding refractive surprises

The ORange intraoperative aberrometer uses Talbot Moire technology instead of Shack-Hartmann aberrometry or Placido disk measurements.

"With the current technology, you are really not getting an accurate reading of what the real power of the cornea is through the visual axis," Dr. Weinstock said. "That is why there are often refractive surprises. You are using corneal keratometric values in your A-scan formula that are not accurate."


The ORange aphakic refraction soft-



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