Trusting the ORA System in Calculation Discrepancies

BY ROBERT J. WEINSTOCK, MD

In 2010, I performed unilateral LASIK targeting distance vision on a myopic gentleman in his 50s. This year, the patient returned because his vision in the LASIK-treated eye was worsening. The refraction showed a nearsighted shift. A thorough examination revealed a dense nuclear sclerotic cataract in the core of his crystalline lens—it was hazy and densely yellow, the type that typically causes a myopic shift in refraction.

I discussed with the patient the risks and benefits of cataract surgery after LASIK and the challenges of picking the correct IOL power. I explained that I felt his case would benefit from a more advanced form of cataract surgery, in which I would use preoperative wavefront imaging, topography, and multiple biometric devices to more thoroughly analyze the eye's status. I would also use the precision of femtosecond laser technology. I stressed how valuable it would be to use the ORA System (WaveTec Vision) to obtain an intraoperative aberrometry reading. It would help guide the correct power selection of the lens implant to restore the good distance vision in that eye, like he had enjoyed after LASIK.

In addition to manual keratometry, I used four devices to measure the eye's corneal astigmatism: the IOLMaster (Carl Zeiss Meditec, Inc.), the Lenstar (Haag-Streit AG), the Orbscan (Bausch + Lomb), and the Nidek OPD-Scan (Nidek, Inc.). I then compared the readings looking for similarities and discrepancies. Although the readings were very similar, I found slightly flatter Ks with the Nidek OPD, the manual keratometer, and Lenstar, and a bit steeper Ks on the IOLMaster and Orbscan. Before the ORA was available, using the average of the flattest central Ks on the OPD with the Holladay 2 formula in the IOLMaster had yielded the best results after myopic LASIK cataract cases.

I benefited from having this patient's historical data. It revealed a similar keratometric reduction in corneal power as a result of the refractive change at the spectacle plane. The average pre-LASIK K readings were 41.50 D, and the post-LASIK Ks were 37.75 D. These measurements correlated well with the patient's change from -3.75 D of myopia to plano after LASIK.

Usually, when our keratometric readings and historical data align, as they did in this case, the ORA's readings will only differ by about ±0.50 D from the lens power selected preoperatively, if at all. Here, there was a 3.00 D difference in power compared to the IOLMaster's suggestion of 16.50 D (Figure 1). The ORA called for a much stronger lens, 19.00 D, in order to achieve a slightly myopic postoperative outcome (Figure 2). I decided to repeat the ORA measurement. Even though this aphakic refraction was slightly different, the ORA still suggested an IOL power of 19.50 D to obtain a slightly myopic result (Figure 3). I had to make a call: either trust my preoperative data, which frankly looked reliable, or go with the ORA's reading.

Figure 1. The patient's preoperative ORA screen showing the IOL power selection of 16.50 D based on the presurgical measurements and postrefractive IOL power formulas.

I reasoned that if I followed the preoperative calculations and they were wrong, the patient's outcome would be approximately +2.00 D—very blurry hyperopic vision. If I used the ORA calculation and it was wrong, he would end up -2.00 D, and I would have to leave him myopic, exchange the IOL, or perform another excimer treatment. Because I believe that a myopic mistake is better than a hyperopic one, and because I had obtained the same reading twice on the ORA and have had so much success with its readings in past challenging cases, I followed the device. The ORA was spot-on: the patient's day-1 vision was 20/25, and his refraction was -0.25 D at his 2-week visit. He needed no further treatment, and he is very happy with his outcome.

Figure 2. The patient's first aphakic ORA reading.

Figure 3. The patient's second aphakic ORA reading.

In addition to strengthening my trust in the ORA system, this case reconfirmed for me the value of intraoperative aberrometry, especially on postrefractive patients.

CLINICAL BENEFITS OF THE ORA SYSTEM

My practice was one of the first in the country to receive the prototype of the ORA system, and my staff and I use the current model on almost half of our cataract cases. The system suggests the same IOL powers as our preoperative work-up approximately 60% of the time. In those instances, the device validates our calculations and leaves me with a greater sense of confidence. When I use the ORA, I do not worry about choosing the right lens or placing a toric implant on the correct axis.

The other 30% of the time, the ORA system's readings differ by perhaps +/-0.50 D from our preoperative calculations, in which case I usually follow the ORA's reading. The remaining 10% are the cases like the one described herein, where there is perhaps 1.00 to 3.00 D of difference between the preoperative calculations and the intraoperative biometry. These are the cases in which the ORA system has been a saving grace.

Additionally, the ORA has markedly reduced my rate of enhancements and IOL exchanges from roughly 7% to about 3%. Although surprises do still occur occasionally because of the difficulty in predicting where a lens is going to rest in its final position in the eye, I find that overall, the ORA system has improved my predicted outcomes.

USE WITH LASER CATARACT SURGERY

I have had to adjust my treatment of astigmatism with laser cataract surgery. Prior to the advent of femto limbal relaxing incisions (LRIs), I would make LRIs after I performed the aphakic reading with the ORA, or sometimes even after the lens was in place. I would compare the ORA reading to the preoperative topography and decide where to place the LRIs based on those two calculations. Then, I would repeat the ORA measurement to see if my LRI had an effect, or I would decide if I needed to make an additional LRI or lengthen the existing one, and in which direction, to help me titrate the reduction of astigmatism.

However, with laser-created LRIs that are based on preoperative topography and a modified nomogram made well before I take ORA readings, the aphakic reading guides my decision whether or not to dissect open the laser-created LRI. Often, I find that the aphakic reading shows a reduction of cylinder to less than 0.50 D without having to open the LRI. If significant astigmatism remains in the axis of the LRI, I will dissect open the laser LRI and repeat the ORA reading. I can titrate down the remaining cylinder in this fashion, and I can even add a manual LRI to extend the laser LRI with a diamond blade.

CONCLUSIONS

Patients who want greater independence from glasses are reassured by the option to take special intraoperative measurements of their eyes beyond those of basic cataract surgery. For surgeons who want to do everything they can to achieve LASIK-like outcomes for their refractive cataract patients, I feel the ORA is essential. On the surgical horizon is also a "real-time" ORA function that will allow surgeons to capture data more precisely when the eye is physiologic and the IOP is stable. ■

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