ADVANCED CATARACT SURGERY: MEASURE TWICE, CUT (I.E. IMPLANT) ONCE

BY ZAINA AL-MOHTASEB, MD

The goal of cataract surgery has evolved from simply removing an opacified natural lens, into a refractive procedure that aims to provide a high level of spectacle independence. This progression from safety to achieving excellent refractive outcomes coincides with numerous innovations in surgical instrumentation. These include better microscopes to aid surgeons' visualization for safer surgeries, more modern phaco instrumentation that allows surgeons to emulsify cataractous lenses more efficiently, and high-technology biometers and sophisticated intraocular lens calculation formulas that allow surgeons to determine the correct IOL powers to implant. Even with all of these improvements, one principle remains constant: successful visual outcomes depend on implanting the correct IOL spherical power and cylinder magnitude and axis.

Meticulous biometric measurements and the use of appropriate IOL calculation formulas are crucial to implanting an IOL that will deliver the desired result. Modern biometers use technology beyond A-scan ultrasound, and advanced formulas incorporate metrics beyond just axial length and corneal power. Although the percentage of patients that land within 0.5 D of target refraction has increased over the years, we still haven't reached 100%. One major element is that we are still estimating effective lens position and total corneal measurements are not perfectly accurate using the technologies we have today. A great adjuvant to preoperative measurements is the ORA SYSTEM wavefront aberrometer (Alcon).

The ORA SYSTEM Technology intraoperative wavefront aberrometer obtains real-time ocular measurements after the removal of the natural lens during cataract surgery. ORA SYSTEM Technology uses a Talbot Moiré aberrometry system to produce a wavefront that is analyzed to derive the sphere, cylinder, and axis[1] through a proprietary process. Together with measurements and calculations completed preoperatively, ORA SYSTEM Technology calculates the IOL power using a modified vergence formula and then recommends the IOL sphere and cylinder power to be implanted in the eye to achieve the lowest residual refractive error.

In the operating room, the ability of the ORA SYSTEM Technology's intraoperative aberrometer to take measurements of the aphakic eye gives me the opportunity to confirm the IOL calculations done preoperatively and to verify the correct IOL power which I need to implant during the surgery. IOL power accuracy can be affected by multiple factors, including the posterior surface of the cornea, dense or opaque cataracts, and previous refractive surgery.[2,3] In this scenario, the IOL power that was estimated preoperatively is validated in real-time during cataract surgery, enabling me to confirm that the selected lens is most likely to achieve the patient's visual goals.[4]

In a study with 215 patients with postmyopic LASIK eyes, 67% of eyes that underwent cataract surgery with intraoperative ocular measurements using ORA SYSTEM Technology achieved a postoperative refraction within 0.5 D of target compared to 46% in the group in which the power of the IOLs implanted were based only on preoperative calculations alone (Figure 1). Additional use of intraoperative

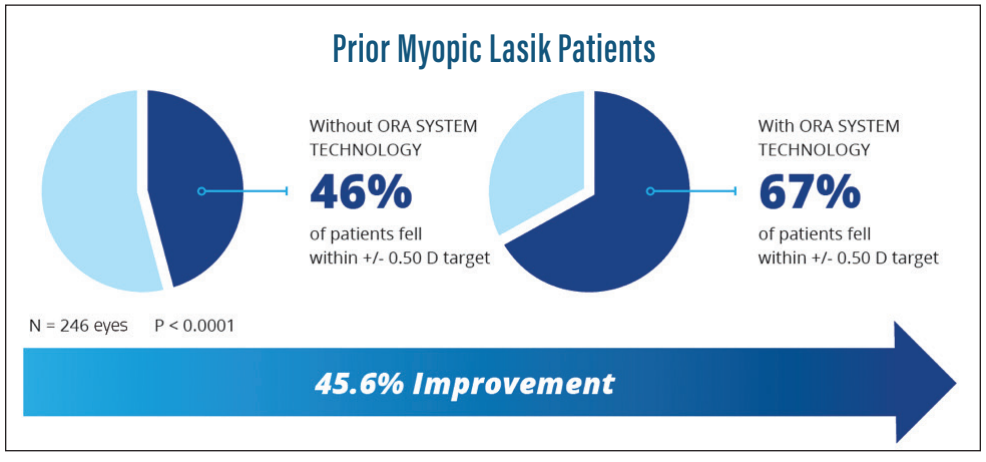

Figure 1. The ORA SYSTEM Technology empowers the surgeon to achieve predictable postoperative refractive outcomes which are unique to each patient's visual needs.[2]

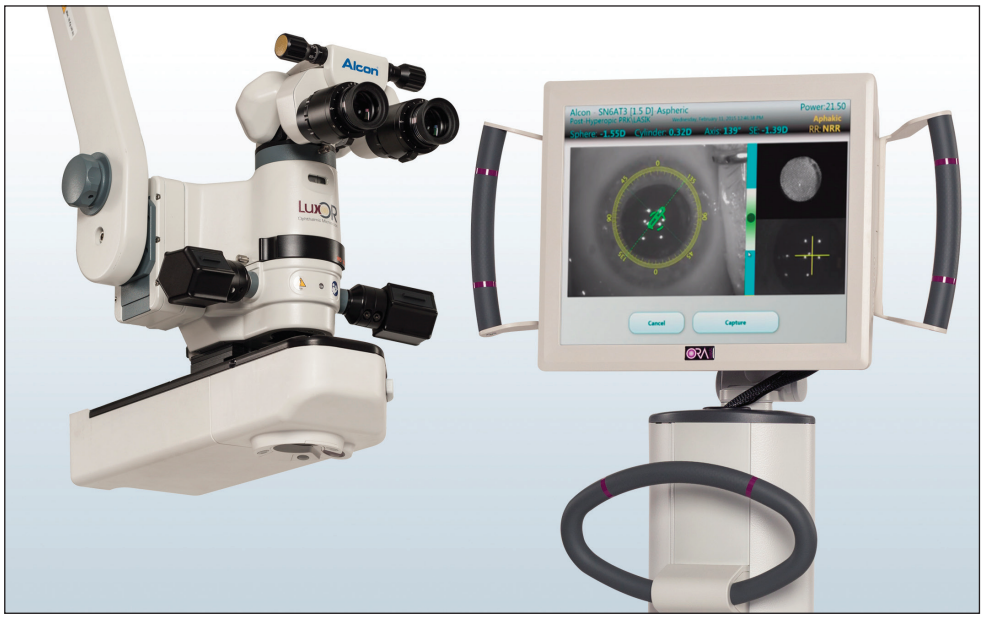

Figure 2. The ORA SYSTEM Technology.

aberrometry showed a 45.6% improvement in the percentage of postoperative refractive outcomes within 0.5 D of target.[2]

It can be argued that additional measurements in the operating room entail additional steps which may add to total surgical cost and time. However, I feel that the additional investments in cost and time are marginal with respect to the efficiency gained in consistently achieving predictable cataract-refractive results.[5]

In my surgeries, I have found the ORA SYSTEM Technology (Figure 2) very helpful as an adjuvant to preoperative measurements and IOL calculations in verification of the correct IOL power, both sphere and cylinder, that needs to be implanted to achieve the planned postoperative visual outcome for patients—especially ones who are post refractive or have high magnitude of astigmatism. ■

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