

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

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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 axis¹ 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

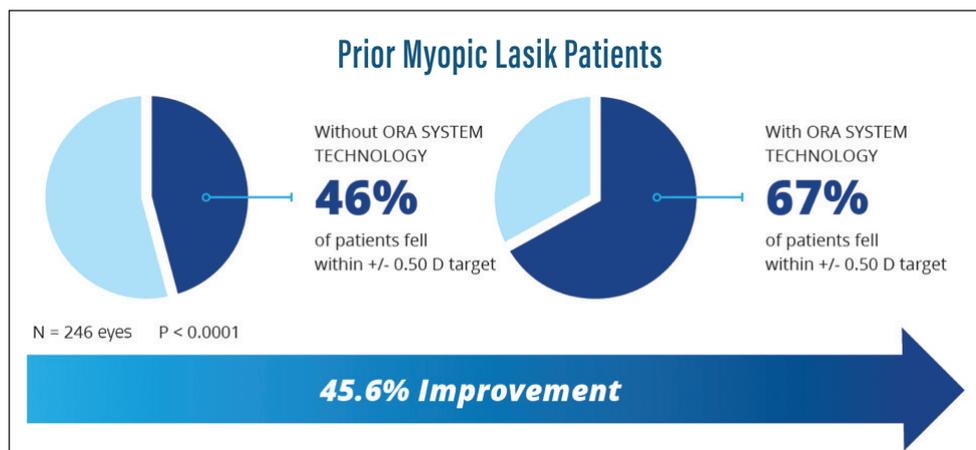


Figure 1. The ORA SYSTEM Technology empowers the surgeon to achieve predictable postoperative refractive outcomes which are unique to each patient's visual needs.²



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 adjunct 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. ■

1. Wiley WF, Bafna S. Intra-operative aberrometry guided cataract surgery. *Int Ophthalmol Clin.* 2011;51(2):119-129.
2. Ianchulev T, Hoffer KJ, Yoo SH, et al. Intraoperative refractive biometry for predicting intraocular lens power calculation after prior myopic refractive surgery. *Ophthalmology.* 2014;121(1):56-60.
3. Fram NR, Masket S, Wang L. Comparison of intraoperative aberrometry, OCT-based IOL formula, haigis-I, and masket formulae for IOL power calculation after laser vision correction. *Ophthalmology.* 2015;122(6):1096-1101.
4. Cionni RJ, Dimalanta R, Breen M, et al. A large retrospective database analysis comparing outcomes of intraoperative aberrometry with conventional preoperative planning. *J Cataract Refract Surg.* 2018;44(10):1230-1235.
5. Cionni RJ. Reply. *J Cataract Refract Surg.* 2019;45(2):254.

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ORA SYSTEM WITH VERIFEYE+ TECHNOLOGY IMPORTANT PRODUCT INFORMATION

INTENDED USE:

The ORA SYSTEM® Technology is designed to be used during ophthalmic surgery. Wavefront data is obtained, analyzed, and presented to the user via a cart mounted LCD touchscreen, within a period that does not impede the surgical procedure

The ORA SYSTEM® Technology is intended for use in the measurement and analysis of the refractive power of the eye (i.e. sphere, cylinder, and axis measurements).

The safety and effectiveness of using the data from the ORA SYSTEM® Technology have not been established for determining treatments involving

higher order aberrations of the eye such as coma and spherical aberrations.

U.S. Federal law restricts this device to sale by or on the order of a physician or ophthalmologist.

CAUTIONS:

It will be difficult to obtain accurate, consistent, and reliable measurements if any of the following conditions or situations exists:

Patients having progressive retinal pathology such as diabetic retinopathy, macular degeneration, or any other pathology that the physician deems would interfere with patient fixation.

Patients having corneal pathology such as Fuchs', EBMD, keratoconus, advanced pterygium impairing the cornea, or any other pathology that the physi-

cian deems would interfere with the measurement process.

Patient's for which the preoperative regimen includes residual viscous substances left on the corneal surface such as lidocaine gel or viscoelastics.

Visually significant media opacity, such as prominent floaters or asteroid hyalosis, will limit or prohibit measurement process. Image quality indicator will indicate when this is an issue.

Patients having received retro or peribulbar block, or any other treatment that impairs their ability to visualize the fixation light.

Utilization of Iris hooks during an ORA SYSTEM® Technology image capture will yield inaccurate measurements.