

Training Residents to Implant Premium IOLs

Learning the fundamentals of refractive cataract surgery is part of becoming a competent ophthalmic surgeon.

BY CHRISTOPHER E. STARR, MD

Residency is the critical link in transforming a medical student into a practicing ophthalmologist. During this 3-year training period, residents must learn how to diagnose and care for patients and perform procedures across the range of ophthalmic subspecialties.

Among all of the skills that residency programs teach ophthalmic residents, the ability to competently perform cataract surgery is at the crux of the graduation requirement. The American College of Graduate Medical Education, the governing body for residents' education, establishes the minimum requirements for surgical experience. Currently, residents must serve as the primary surgeon on at least 178 surgical cases, of which nearly half (86 cases) are cataract procedures.

With the increasing interest in toric, multifocal, and accommodating IOLs, the question arises: How do we prepare residents for this new realm of cataract surgery, in which expectations are high and the tolerance for error is low?

We have faced this issue previously with corneal refractive surgery. Today, the American College of Graduate Medical Education requires ophthalmic residents to be the primary surgeon or first assistant on at least six keratorefractive surgical procedures prior to graduation. Someday, there may be a similar requirement for experience with toric and/or presbyopia-correcting IOLs. For now, however, residency programs fill this important need through a combination of didactic training and observation, experiential wet lab or simulator training, and experience caring for patients.

DIDACTIC TRAINING AND OBSERVATION

Residents begin learning about premium IOLs in their first year, when the emphasis is on didactic training and the observation of attending surgeons. We offer residents evidence-based perspectives on all of the technol-



(Courtesy of VRMagic)

Figure 1. The Eyesi Surgical Platform (VRMagic) virtual reality simulator is used to practice creating a capsulorhexis.

ogies available and in the pipeline, from advanced phacoemulsification modalities to toric, multifocal, and accommodating IOLs. We also share our personal experience with these technologies and begin to educate the residents about the importance of correcting astigmatism, patient selection, informed consent, and setting reasonable expectations.

I believe it is critical that residents have substantial opportunities to observe skilled surgeons performing refractive, corneal, and cataract procedures. Not only do they gain knowledge about surgical technique, but this is the only way to learn the art of refractive cataract surgery—a very important part of building a premium IOL surgical practice.

We are fortunate today to also have a wealth of supplemental “observation” available online, via sites such as



(Courtesy of Dr. Starr.)

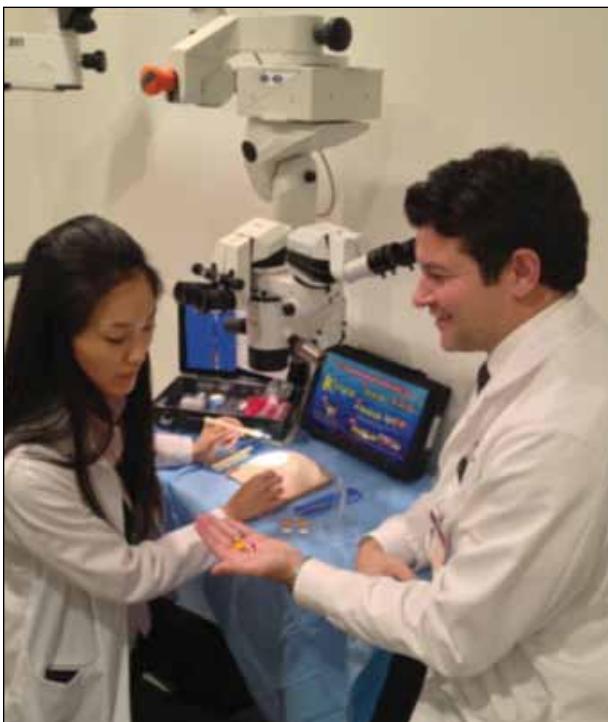


Figure 2. Dr. Starr works with a student to select an artificial resin clay nucleus of the desired density for use in the Kitaro (Frontier Vision Co., distributed in the United States by FCI Ophthalmics) simulator.

EyeTube.net, YouTube.com and many others. EyeTube represents a global classroom in which residents and experienced surgeons alike can always learn something new, from routine to cutting-edge procedures.

WET LAB AND SIMULATION TRAINING

The education of a surgeon is, by necessity, an experiential one, characterized by graded and progressive responsibility. Fortunately, we have many ways to train beginning surgeons on the skills required for cataract surgery without operating on actual patients.

Teaching institutions have long relied on traditional wet labs, in which students practice on bovine or porcine eyes. This continues to be a very effective way for residents to learn to make incisions, handle tissue, and manipulate instruments under a microscope. In the context of learning premium IOL surgical techniques, it is particularly effective for hands-on practice when creating limbal relaxing incisions (LRIs). This is a procedure that residents are unlikely to do in the OR but is critical to achieving success with presbyopia-correcting IOLs. Using animal tissue, trainees can practice marking the cornea, aligning the blades, and mastering all the subtle nuances of LRI creation.

Cow and pig eyes are not ideal for learning to perform

the capsulorhexis and phacoemulsification, and new technology offers residency programs much better options for teaching these skills.

One such technology is the Eyesi Surgical Platform, a high-end virtual reality simulator for intraocular surgical training that can be equipped with cataract or vitreoretinal interfaces (Figure 1). Although the simulator is expensive, I have been impressed by its capabilities, particularly for creating the capsulorhexis, sculpting, grooving, and phacoemulsification. It is less effective for teaching incisions, tissue handling, and the injection of IOLs or ophthalmic viscoelastic devices.

Another simulation option that we use at Weill Cornell is the Kitaro WetLab and DryLab kits. This system features a polyester film with a two-layer structure that mimics the ocular cortex, which helps residents learn the skills necessary to perform a successful capsulorhexis. It also uses several consistencies of resin clay to mimic the human nucleus. The simulator eye is the same size and thickness as a human eye, with a tangible lens that the surgeon can groove, sculpt, crack, and emulsify quite realistically (Figure 2). It even has a posterior capsule that can break. The complete system itself is substantially less expensive than the Eyesi, but total costs depend on the amount of consumables used.

None of these methods is a perfect substitute for OR experience with patients, but they greatly expand opportunities for residents to practice in a controlled, relaxed environment—and allow the attending surgeon to provide extensive direction and instruction.

CLINICAL CARE AND SURGERY

In their second year, residents begin to assist with surgery, first performing the simpler steps of cataract surgery, such as loading the IOL into the cartridge and injecting it, as well as removing viscoelastic with I/A (known as “backing into surgery”). The third year is surgically intensive, with residents working to achieve their minimum procedural requirements and performing complete cases under direct supervision.

A big advantage to teaching premium IOL implantation is that the best preparation for live cases is simply learning to perform fastidious cataract surgery. We teach residents to approach every case as if it were a premium IOL case, from surgical planning, biometry, and IOL calculations to surgical skills and postoperative management. They should, for example, always make the main cataract wound on the steep axis and take other steps to minimize corneal astigmatism. They should be meticulous about the capsulorhexis' size and centration as well as carefully removing all cortex and viscoelastic in order to ensure proper effective lens position.

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tion. This approach will serve them well in future practice as potential phacorefractive surgeons.

I believe we can also best serve residents (and their future patients) by instilling in them an inherent attention to the refractive goals of the procedure. As they become accustomed to thinking about how each subtle step of surgery may affect the final visual outcome, they will be better philosophically prepared for refractive cataract surgery in their own practices. We take seriously our responsibility to teach them the “softer” skills—determining candidacy, managing expectations, developing empathy and rapport, weighing goals, and interpersonal communication—that are just as important as surgical prowess.

MAKING THE TRANSITION

Residents sometimes have the chance to implant a few premium lenses through manufacturers’ programs that provide IOLs to trainees for patients who could not otherwise afford them. Most of their experience, however, will be implanting single-piece acrylic monofocal IOLs. As they transition into clinical practice, it makes sense for residents—or for any surgeon new to premium IOLs—to start with one-piece premium IOLs such as the Tecnis Multifocal (Abbott Medical Optics Inc.) or AcrySof Restor (Alcon Laboratories, Inc.) IOLs, because there will be a minimal learning curve with the injection and centration of these lenses. In my experience, the Tecnis Multifocal single-piece lens tends to be a bit more forgiving of pupil size variations and minor decentrations, and thus, may be a reasonable starting point for beginning phacorefractive surgeons. Initial surgeries should also be performed on patients with reasonable expectations, normal anatomy, low astigmatism, and moderate cataracts. Fortunately, many patients fit this description.

If we have done our job well, graduating residents will enter practice as competent cataract surgeons with a solid understanding of premium technologies. Even without extensive personal experience implanting premium IOLs during residency, new surgeons should be mentally and surgically prepared to take on the additional challenges of implanting premium IOLs in practice. ■

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