

Teaching Cataract Surgery on Simulated Systems

The Kitaro DryLab & WetLab cataract system quickly won over the staff at the New York Eye and Ear Infirmary.

BY RICHARD S. KOPLIN, MD

For as long as I can remember, the core elements of teaching residents the art and science of cataract surgery depended on the ubiquitous pig's eye. What a mess it was!

The lack of "feel" when emulsifying the consistently immature pig's lens gave little sense of realism to the surgical experience. The effort was actually no more than an introduction to the handpiece and the console's functions—not unimportant, but certainly not a totally integrated cataract teaching system. Simulated systems represent a step forward.

VIRTUAL REALITY

Some of the drawbacks to the classic phaco wet lab have been addressed by the elegant virtual reality surgical simulator from engineers at VRmagic known as the EyeSi System. Residents at the New York Eye and Ear Infirmary where I practice have found using the device to be a confidence-building experience. Its cost (upwards of \$100,000), maintenance concerns, and limitation with regard to teaching in groups, however, have rendered this system of only limited value.

SOMETHING MORE PRACTICAL

In 2011, we were introduced to the ingenious Kitaro DryLab & WetLab cataract system (Frontier Vision; distributed in the United States and Canada by FCI Ophthalmics, Inc.). It quickly won over our staff. The system is utilitarian and clean, enough so that we can use it in our ORs and take advantage of the superior microscopes.



Figure 1. The Kitaro DryLab system.

Moreover, the unit is affordable and multifunctional (capsulorhexis, nuclear manipulation and emulsification, I/A, and lens implantation).

Students quickly learn how to set up the Kitaro DryLab system (Figure 1), which can be used with or without an operating microscope and includes an "anterior capsule" made of a polyester film of dual layers stretched over an artificial lens made of a clay resin. This "eye" is set in a plastic receptacle. Then, using a small amount of viscoelastic, the student sets out to perform a capsulorhexis using any combination of a bent needle and Utrata forceps.

The DryLab elements also include nuclei of various precut designs, which allow the student to understand the notion of divide and conquer as well as the various chopping techniques. A realistically made resin nucleus can be chopped to any degree and remodeled for reuse after curing for 20 minutes.

The Kitaro WetLab product (this is where an actual phaco system is employed) includes artificial nuclei of varying degrees of hardness (Figure 2). There is a veneer



Figure 2. The Kitaro WetLab product.

of cortex anteriorly and below the nucleus to lend realism and demonstrate spatial relationships attendant to the act of phacoemulsification. The cortex is set beneath a realistic cornea. Entries into the anterior chamber are accomplished using a keratome and 15° blades, as in real surgery.

My fellow instructors and I have run a number of training sessions using the Kitaro system with as many as 10 stations. We begin the program with a short introduction to the system followed by a virtual festival of capsulorhexis making. The materials are relatively inexpensive, quick to set up, and—mercifully—clean.

The drawbacks to the Kitaro product are few. Ergonomics requires some adjustment to the eye, as it is set within a receptacle mask. For phacoemulsification, the bottle's height should be adjusted to make up for the lack of distension in the simulated eye; otherwise, infusion fluids will sometimes squirt indiscriminately from the various ports. Students will not experience events associated with chamber collapse because the system is rigid.

Although we have not had experience with the system, the Phak-i Surgical Practice Eye, manufactured by Eye Care and Cure, has also entered the realm of simulated eye surgery using man-made synthetic materials. It offers options that include suturing a realistic cornea as well as performing simulated corneal transplants.

CONCLUSION

The manufacturer will soon release a number of new teaching additions to the dry and wet kits. These will include simulations for managing a small pupil, weak or ruptured zonules, transscleral lens fixation, extracapsular procedures, and posterior capsular management. ■

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