

Operate With Your Head Up

TrueVision enables high-definition, 3-D surgical display on a monitor positioned near the surgeon.

BY ROBERT J. WEINSTOCK, MD

One of the most interesting and dynamic technological advancements in intraocular surgery over the past few years is the 3-D operating system. A growing number of anterior segment surgeons, myself included, have freed themselves from being hand-cuffed to the oculars of the microscope by performing surgery in 3-D and high definition (HD). Viewing the surgical field on a large flat-panel display gives me the feeling of being more immersed in the fine details of each case, with the comfort of knowing I can convert to the oculars at any time.

The TrueVision 3D Surgical System (TrueVision Systems, Inc., Santa Barbara, California; Figure 1), is a camera unit that attaches to standard surgical microscopes. This unit sends stereoscopic images and video to a 3-D, HD, large-screen monitor positioned a few feet from the surgeon. Using passive filter glasses, the surgeon and others in the operating room can view what is normally seen within the microscope oculars in 3-D HD on the monitor in real time.

I started using TrueVision for routine cataract cases in 2008. The first benefit I noticed was that it allows me to use a heads-up position throughout the case. I am no longer tied to my microscope oculars, giving me greater freedom of movement in my neck, back, and shoulders while viewing the 3-D monitor. My standard microscope oculars are retained in their normal position so that I can refer to them at any time during the case; however, I routinely perform entire cases using the 3-D monitor for primary visualization. I also appreciate the increased depth of field that TrueVision provides, and because the system utilizes my microscope optics and converts the optical image to a digital view, I can make adjustments using both the microscope and software settings to achieve excellent views in difficult cases.

At the 2010 American Society of Cataract and Refractive Surgery (ASCRS) meeting in Boston, I presented data from a retrospective review of routine cases performed in alternating operating rooms, one equipped with TrueVision 3D visualization and the other with standard oculars.¹ Both groups had excellent outcomes, and there was only a 2.7% mean procedure time difference between groups. The

TAKE-HOME MESSAGE

- The camera of the TrueVision system sends stereoscopic images and video to a 3-D HD monitor.
- The Refractive Cataract Toolset creates 3-D graphical overlays for image-guided cataract surgery.

biggest difference was the rate of unplanned vitrectomy, which was more than three times higher in the standard microscope group than in the TrueVision group.

US Food and Drug Administration (FDA) 510(k) clearance has been granted for the TrueVision Refractive Cataract Toolset, an application that provides 3-D graphical overlays for image-guided cataract surgery; however, this application is not yet cleared for use in other countries. I participated in the multicenter pilot clinical study of this software. The system captures 3-D images at the slit lamp and imports them into the operating room system live 3-D view using image registration and real-time eye tracking. Sizing and positioning of capsulorrhexis templates, limbal relaxing incision guidance, and toric IOL positioning can be performed onscreen within the live 3-D surgical view. This toolset creates graphical overlays for each incision or positioning step, eliminating the need for traditional limbal or corneal ink markings.

USE OF 3-D IN MY PRACTICE

My practice is a multisurgeon, multispecialty, high-volume private surgical center in a major metropolitan area. My colleagues and I use 3-D surgical visualization for cornea, cataract, and glaucoma procedures. Other practices and teaching institutions are using it for retina cases. As a practice differentiation asset, I find the TrueVision system invaluable. The 3-D medium is such a hot topic throughout popular culture and technology that patients are immediately interested in the aspects of my practice that incorporate 3-D.

(Continued on page 74)



Figure 1. Dr. Weinstock performs cataract surgery with aid of the TrueVision system.

(Continued from page 66)

3-D EDUCATION AND FUTURE USE

The ability to capture, record, and play back 3-D HD surgery images and videos allows me to incorporate 3-D throughout the practice. Our projection theater set-up is great for large groups; we have used it to teach patients about surgical procedures during live 3-D seminars and to teach area doctors about surgical comanagement. We have, in essence, become a full 3-D surgical practice.

Recording interesting and challenging cases in 3-D with the TrueVision system and playing them back in front of large audiences in educational settings is becoming more popular. Over the past few years, we have steadily seen an increased number of 3-D educational sessions and symposia at the American Academy of Ophthalmology (AAO) and ASCRS meetings. By watching in 3-D, the audience is able to gain valuable information regarding intraocular maneuvers and spatial relationships. When polled, viewing surgeons have almost unanimously commented that the 3-D format adds value to their educational experience.

I expect that as the system and software evolve, I will be able to utilize 3-D surgical guidance in other areas to improve my outcomes. Incorporating more pre- and intra-operative data into the 3-D surgical view could provide valuable information immediately at hand for surgeons. I anticipate applications being added to the TrueVision visualization platform that could affect how we perform almost any ophthalmic surgical procedure. ■

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1. Weinstock RJ. First clinical use of on-screen 3-D image guidance templates during small-incision cataract surgery. Paper presented at the American Society of Cataract and Refractive Surgery Annual Meeting; April, 12, 2010; Boston.