

Issue: [April 2008](#)

Spotlight ON TECHNOLOGY & TECHNIQUE

Coming to the Big Screen: 3-D Surgery

By Leslie Goldberg, Associate Editor

TrueVision Systems (Santa Barbara, Calif.) is pioneering the use of 3-D, high-definition digital imaging to transform stereomicroscopy in surgical and educational settings. TrueVision is a 3-D vision system that attaches to microscopes, converting optical images viewed through the microscope into digital 3-D images displayed on a projection screen or monitor in real time. Both surgeons and operating room staff can view and collaborate on what traditionally only one person at a time could observe through the microscope's binoculars.

"This is a real paradigm shift in visualization for the ophthalmologist," says Forrest Fleming, TrueVision Systems' CEO. "We are taking them from an optical visualization to a full HD 3-D digital visualization — full stereoscopic imaging. That's what this technology really does — it converts the optical platform to a digital platform which will allow new digital software applications, that will improve patient outcomes to be added in the future."

"This new microscopic viewing technology may eventually replace the need to be chained to the oculars of a microscope," says Robert Weinstock, M.D., director of cataract and refractive Surgery at the Eye Institute of West Florida in Largo, Fla. "It already has several useful teaching applications. There are some progressive surgeons who are using it for operating to eliminate the necessity of leaning forward and looking through the oculars. I use TrueVision as my primary visualization for many surgical procedures."

The Benefits of Using TrueVision

Fleming says that the benefits of the system will continue to increase for ophthalmologists over time. "Today, the benefits are ergonomics to the physician —not being tied to the microscope's eyepiece. This reduces neck, eye and back strain," he says. "The surgeon is also more connected to his OR staff. The surgeon can go from the macro to the micro view easily — moving from screen to microscope is a more natural modality."

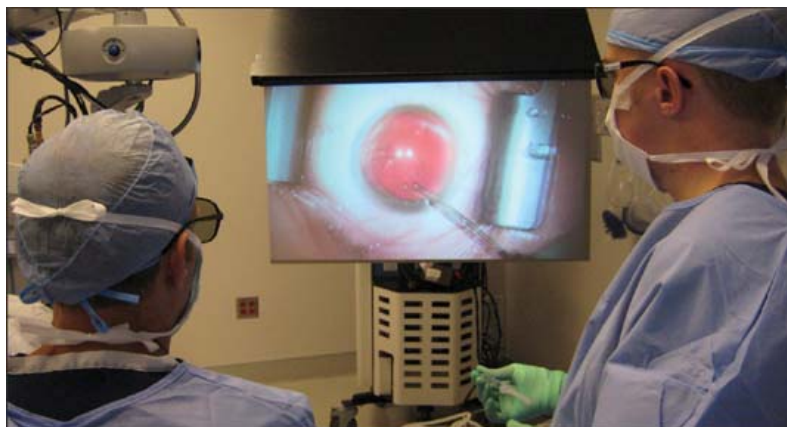


Figure. Dr. Weinstock wearing TrueVision's 3-D glasses while performing cataract surgery using the TrueVision system.

In addition, the heads-up 3-D high definition image has some advantages over the conventional optical view through the eyepieces, says Dr. Weinstock. "You see exactly what you view through the oculars except you get a greater sense of depth perception, a wider field of view and a larger magnification because the screen is so large. Additionally, you don't have to focus on something up so close."

Dr. Weinstock explains that when viewing through the oculars of the microscope, the distance between the surgeon and the optical view of the surgical field is only 18 to 24 inches — which means that there is some accommodation going on and also some strain on the eyes. "When looking at the screen, you are relaxing your accommodation and looking more at a distance target, putting less strain on your own eyes," he says.

TrueVision enables the integration of 3-D images from the microscope with other medical digital image sources such as CT and MRI data. It features the ability to save and retrieve images for recordkeeping, documentation and sharing without giving up the resolution, color and stereo depth found in the original optical image.

Dr. Weinstock says his favorite TrueVision features are the improved ergonomics, the ability of the surgeon's eyes to never have to leave the surgical field, improved peripheral vision while operating and better OR team dynamics due to scrub techs ability to view the same image the surgeon is seeing.

"Team members are wearing the glasses as well, and can see what I am doing," says Dr. Weinstock. "The team can anticipate what I need next. This all adds up to the patient receiving better care and less time in the eye."

TrueVision Applications

With 3-D HD recording, surgeons are able to record, edit and playback microsurgery procedures. All viewers are able to see 3-D images just as though they were looking into the microscope. Users can record and run seminars and teach — all in 3-D.

"This will revolutionize how surgeons benefit from video-based education," says Dr. Weinstock. "The surgeon recording in 3-D doesn't even have to be wearing the glasses. If he is not comfortable using the heads-up display, he can look through the microscope and just record in 3-D. This makes for a natural transition from teaching applications to full operating room use as a heads-up view of the surgical field. We are already beginning to hold courses and video-based educational symposia in 3-D. Surgeons viewing the previously recorded 3-D footage have stated that it is a huge leap in the educational value of watching videos of surgical cases."

"I think TrueVision is an excellent teaching instrument and ergonomic device," says Doug Katsev, M.D., of the Sansum Clinic in Santa Barbara, Calif., who has been using the system for the past 4 years. "I feel good when I can see everything moving around on the larger screen and everyone is in tune with the surgery. I've used TrueVision for LASIK procedures and it works really well. It's also great for the patient's family watching the procedure with the 3-D glasses. They get the added 'wow' effect, which is pretty impressive."

Dr. Katsev says the system is also an important telemedicine tool. He provides the following example: "If you are sending a slit lamp exam to somebody and you are in Bakersfield and want to get an opinion, you can send it to somewhere like UCLA and they can view the image with a field of depth. That is very advantageous." He says it is also a good informational tool at the slit lamp. "If you have a patient with a cataract, you are able to show him/her the depth of their cataract, where it is and why it is considered a certain type of cataract at its location. I think there is going to be an educational benefit, a teaching benefit and that this will add up to a benefit to the field of ophthalmology." **OM**

For more information about TrueVision, visit their Web site at www.truevisionsys.com

Dr. Weinstock has a financial interest in TrueVision.