Cataract Surgery Training
Practice all Steps of Intraocular Cataract Surgery

Taking the Patient Out of the Surgical Learning Loop
Eyesi® Surgical is a high-fidelity virtual reality simulator for intraocular surgery training. The highly realistic simulation of cataract and vitreoretinal procedures increases the residents’ surgical experience without the risk of complications for patients. Residents can practice on their own or under guidance from a mentor. With Eyesi® Surgical, realistic and reproducible training is available at any time.

Expertise Comes from Experience
The Eyesi® Surgical simulator allows residents to accumulate surgical experience and refine essential skills through frequent practice. The available training tasks break down complex surgical techniques into smaller learning steps. Abstract training tasks foster basic skills like microscope handling or understanding of spatial boundaries. The surgical tasks include capsulorhexis, hydrodissection and hydrodelineation, phaco, irrigation/aspiration, and IOL insertion. Trainees also have the opportunity to practice complications, such as anterior vitrectomy or the insertion of a Malyugin ring.

Lifelike Training Environment for Optimal Practice
The Eyesi® Surgical simulator provides a cataract patient model head which can be operated on from a temporal or superior position. Trainees see the intraocular surgical field through an operating microscope. The view is in stereo and offers realistic depth of field. The focus and zoom can be altered by using the microscope foot pedal. The instrument handpieces are inserted through the incisions in the model eye.

Phaco Machine and Instruments like in the OR
Cataract instruments, such as forceps, visco cannula, cystotome, and phaco probe are available during virtual surgery. Just as in real surgery, discreet instrument movements are required to avoid undue wound stress, loss of viscoelastic, or diminished red reflex. Eyesi® Surgical provides an OR machine interface and a two-axis phaco foot pedal to control fluidics. Trainees must select appropriate phaco parameters in order to safely and effectively complete a surgical procedure.
Vitreoretinal Surgery Training

Realistic Training of Posterior Segment Surgery

**Lifelike Vitreoretinal Surgery Interface**

The Eyesi® Surgical platform can be equipped with a vitreoretinal eye interface and instrument set for posterior segment surgery training. In order to further enhance the lifelike training environment, it is also possible to integrate a BIOM/SDI hardware mimic, which is operated just like a real BIOM in the operating room. The complex interactions of auxiliary optics are accurately reproduced.

**Posterior Segment Training Modules**

The retina training modules are designed to help new fellows develop essential vitreoretinal surgical skills and manual dexterity. Frequent practice will improve proficiency in complex tasks such as posterior hyaloid detachment, peripheral vitrectomies, internal limiting membrane peeling (ILM), the removal of epiretinal membranes, or the treatment of retinal detachments with oil or gas endotamponades. A realistic posterior segment simulation environment is provided through the use of scleral indentation, a vitrectomy machine, variable illumination intensity of the light pipe and an endolaser.

**Eyesi® Surgical Courseware**

The Built-In Curriculum for Training of Eye Surgery

**Ready for Use on Day One**

The Eyesi® Surgical Courseware is a structured and ready-to-use training curriculum pre-installed on the simulator. The curriculum makes it uncomplicated for educators to deploy Eyesi® Surgical in their institution and easy for residents to begin focused simulator practice. For example, the Eyesi® Courseware teaches aspects of cataract surgery by combining basic skills training with surgical procedure training in a sequential, structured setup. To advance through a course, trainees must meet a required performance level on each task.

**Training at the Appropriate Level of Difficulty**

The Eyesi® Courseware allows residents to practice cataract and retinal surgery at a level of difficulty appropriate for their current abilities. Compared to a 1st-year resident, a 3rd-year resident has different surgical training needs. Accordingly, the Eyesi® Courseware consists of tiers with ascending levels of difficulty. Novices can practice before they enter the OR. Residents who are already starting to perform surgery can take the surgical skills taught to them in the OR by a mentor and practice the technique to achieve full competency. In addition, senior residents who are comfortable with eye surgery can train on complicated scenarios or learn more advanced surgical techniques.

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Cataract courses of the Eyesi® Courseware
Immediate Feedback after each Task
At the end of each training task, Eyesi® Surgical presents the trainee with a detailed performance summary. Various parameters relating to instrument and microscope handling, surgical efficiency and tissue treatment are recorded by the training system. This allows trainees to focus on weaknesses and systematically improve their skills.

Monitoring Skill Development Over Time
By providing formal training reports, Eyesi® Surgical allows educators to objectively assess each resident’s skill acquisition over time. The detailed performance evaluation provided by Eyesi® Surgical allows educators to control the individual learning process and to establish measurable proficiency standards. Based on the objective assessment, training contents can be individually tailored to meet the needs of trainees relative to their current skill level.

About VRmagic
VRmagic first introduced Eyesi® Surgical in 2001 as a training simulator for vitreoretinal surgery procedures. In 2003 Eyesi® Cataract was presented. Since then, the training content available on the simulator has been continuously expanded. Teaching concepts for integrating simulator-based training into the medical curriculum have been developed and are constantly evaluated. Today, VRmagic is the world market leader for simulators used in ophthalmic training. With the ophthalmoscope simulators Eyesi® Indirect and Eyesi® Direct, VRmagic has introduced a product series of simulators for procedural and diagnostic training of retinal examinations.

Partners from Around the World
VRmagic cooperates closely with health professionals from around the world to continuously enhance simulation technology. Only through scientific exchange and the effort and commitment of our partners are we able to successfully develop and implement innovative and sustainable teaching concepts for medical education.

Eyesi® Drylabs were established in 2003 as an educational format where hands-on surgical training is provided on Eyesi® Surgical simulators. Today, Eyesi® Drylabs are conducted regularly at ophthalmological conventions worldwide.
Continuous Training through Data Synchronization
By networking all simulators of an institution through the VRmnet platform, training data is synchronized between devices. Trainees can continue their training on any connected simulator at any time.

Online Orientation and Medical Content for Students
To prepare students for their first training session, VRmNet provides an online orientation with short videos on simulator handling and courseware features for self-guided training. Students also have access to their training history and medical content from any browser.

Automatic Software Updates
The simulator software undergoes continuous enhancement. To ensure that trainees always benefit from the latest developments, the simulators connected to VRmNet are kept up to date with automatic software updates.

Independent Practice
Trainees start training independently and receive immediate, objective feedback on their performance.

Monitoring and Notifications
You can monitor your students’ training progress online. Configurable notifications and reports keep you informed on important milestones.

Certificate and Assessment
Students automatically receive a certificate after completion, and can view an objective assessment of their skills.
Reasons for Eyesi® Surgical

Peer-Reviewed Intraocular Surgery Training with Validated Concept

1. Less Complications in Intraocular Surgery
   The Eyesi® Surgical Simulator is a technically mature training system for eye surgery. Several studies prove that unexperienced surgeons who trained on Eyesi® Surgical have lower complication rates during intraocular surgery than peers who did not have the opportunity to train on Eyesi® Surgical. View the list of publications on our website.

2. Highly Realistic Training Experience
   Eyesi® Surgical offers a highly immersive, lifelike training environment without risk to patients. The simulator integrates all aspects of a real operation scenario. A global community of hospitals and universities have come to embrace this efficient way of training.

3. Pre-Installed Simulator Curriculum
   Expert surgical performance can only be gained through intense practice. Starting with basic skills, the training curriculum Eyesi® Courseware permits independent and repetitive practice of isolated steps, which leads trainees step-by-step to proficiency in cataract and vitreoretinal surgery.

4. Competency-Based Assessment
   Eyesi® Surgical provides trainees with immediate, competency-based performance feedback after each task, so that they can systematically improve their skills. The feedback contains various parameters relating to instrument handling and surgical efficiency. All training results are stored and form an individual learning curve for each resident.

5. Online Teaching Solution with VRmNet
   The online features of VRmNet help you to keep track of your residents’ skills. Manage user accounts with the web-based user administration, get trainees up to speed quickly using the online orientation, and have their training progress always at your fingertips via a user-friendly web interface.

Test-Drive Eyesi® Surgical
Come and try out the Eyesi® Surgical Simulator live at the next conference, or take part in a drylab. Visit www.vrmagic.com for an overview of the upcoming events, or contact us by email or phone.

ILM peeling: creating a flap in the membrane
Capsulorhexis complication: peripheral tear-out