



EYESI INDIRECT ROP

Training simulator for retinal examinations
on preterm infants

Look closer. See further.

 HAAG-STREIT
SIMULATION

Eyesi Indirect ROP Training of retinal examinations on preterm infants

The Eyesi Indirect Ophthalmoscope ROP Simulator (Eyesi Indirect ROP) is a mixed reality simulator for training of retinal examinations on preterm infants using a binocular indirect ophthalmoscope. The simulator comes with a didactically structured curriculum designed for teaching device handling and classification of retinopathy of prematurity (ROP).

PROCEDURAL & DIAGNOSTIC TRAINING

Expertise comes from experience

Performing indirect ophthalmoscopy on a preterm infant requires fine motor skills and the ability to interpret an inverted retina image. At the same time, the examination must be carried out quickly and skillfully to keep stress release for the patient to a minimum. The Eyesi Indirect ROP simulator enacts all relevant aspects of the examination scenario to offer eye specialists a lifelike, yet risk-free, training experience.

EMBEDDED CURRICULUM

Classification of ROP

The Eyesi Indirect ROP teaches the main characteristics of ROP and how to recognize the different zones and stages according to the "International Classification of Acute Stages of Retinopathy of Prematurity". Trainees also become acquainted with their specific country's guidelines for screening intervals and treatment of ROP. With a didactically structured curriculum for self-guided training and objective assessment and feedback, Eyesi Indirect ROP allows trainees to become experienced – before they examine their first real patient.



Lifelike training environment

The Eyesi Indirect ROP simulator enacts every relevant aspect of the real examination scenario. It consists of a head-mounted stereo display representing an ophthalmoscope, a patient model head with eyes, and mimics of lenses and a scleral depressor. When wearing the device, the user is presented with an immersive 3D simulation of the patient; the indirect ophthalmoscope mimic, the handheld lens, and the patient's eye must be aligned exactly to visualize the retina. To add to an immersive, close-to-life environment, the patient's eyes can be indented and tilted into different directions using the scleral depressor.

Standardized curriculum

The simulator comes with an embedded curriculum featuring virtual patients with different stages of retinopathy, including aggressive ROP, plus disease and retinal detachment. The standardized curriculum ensures that each resident has been trained on the same range of pathologies.

Evidence-based assessment

The Eyesi Indirect ROP provides both trainees and educators with an objective performance assessment. Immediate feedback after each case helps trainees to improve their skills systematically.

High-end mixed reality **Immersive training experience**

The Eyesi Indirect ROP simulator mimics the examination down to the last detail, using a head-mounted stereo display representing an ophthalmoscope, two lens mimics, a patient model head with pliable eyes, and a scleral depressor. A touch screen displays the user interface and a live view of the examination.



HIGH-END MIXED REALITY & HAPTIC FEEDBACK

Realistic device handling training

The Eyesi Indirect ROP applies mixed reality technology, combining real and virtual images. When trainees put on the head-mounted stereo display and pick up the lens mimic, they see their own hand holding the virtual lens and a 3D virtual patient in place of the model head. The ophthalmoscope mimic, the lens, and the patient's eye must be aligned precisely to visualize the retina. To add to an immersive, close-to-life environment, the pliable eyes of the patient model head can be indented and tilted into different directions using the scleral depressor. The effect of the manipulation is simulated in real-time.

REAL-TIME SIMULATION

Optical effects

The Eyesi Indirect ROP provides a highly realistic and dynamic 3D simulation of the patients' retinas and the ophthalmoscope lens, allowing trainees to get accustomed to physical optical effects such as chromatic aberration or inversion of the image.

LIGHT & LENS

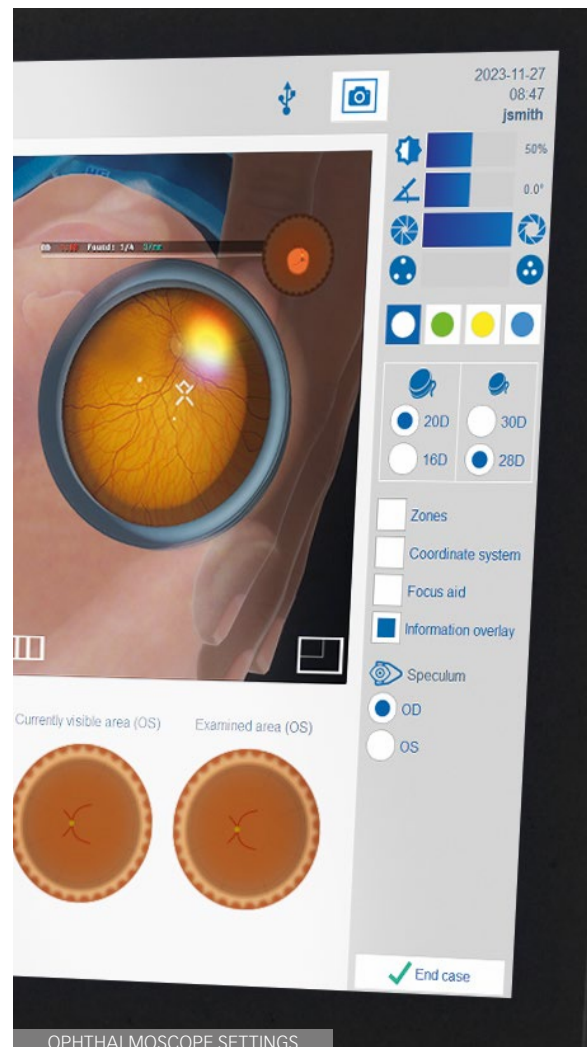
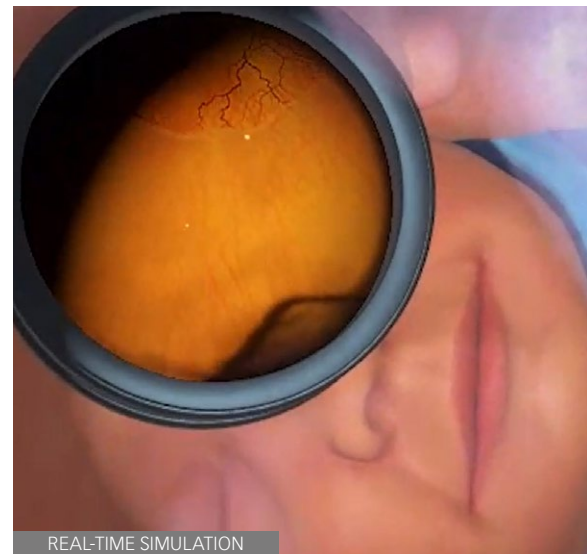
Ophthalmoscope settings

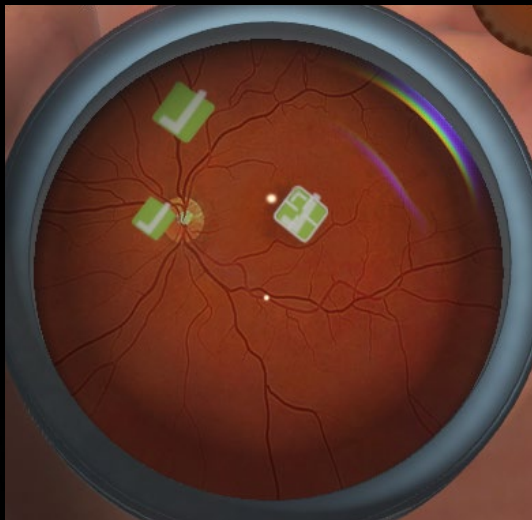
On the touch screen, trainees can control the indirect ophthalmoscope settings, such as the angle and diameter of the light cone, light intensity, filters, lens magnification, or adapting the optics to the patient's pupil size.

PATIENT'S EYES

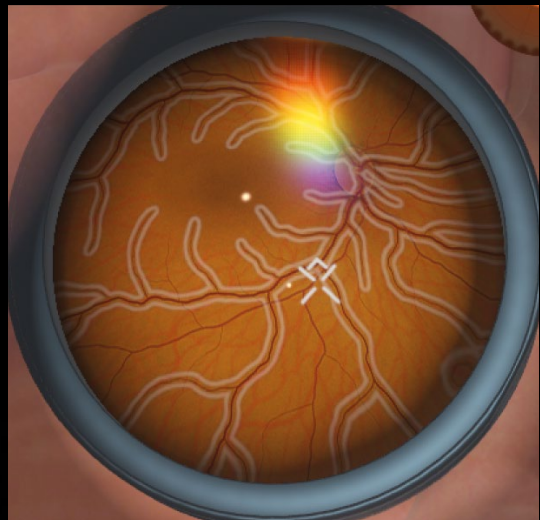
Examination settings

Users can further control the examination using the touch screen, for example, by inserting a speculum into the left or right eye, hearing the sound of the baby crying, or activating random eye movements.

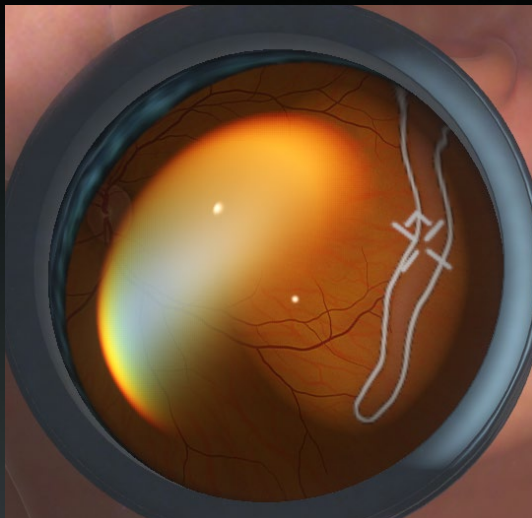




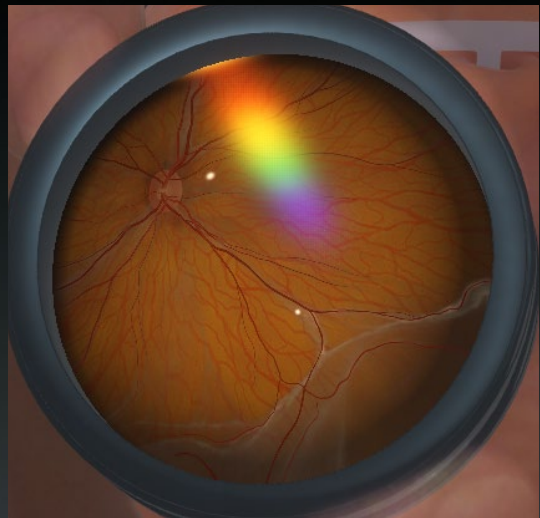
COURSE A: ABSTRACT SCENARIO



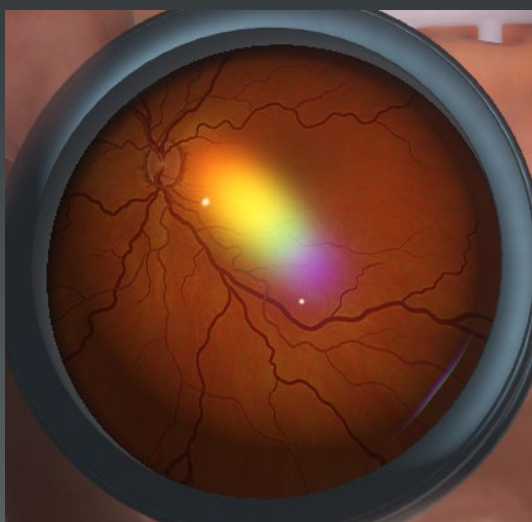
COURSE B: IMMATURE RETINA



COURSE C: LESION HIGHLIGHTED



COURSE D: RETINAL DETACHMENT



COURSE E: PRE-PLUS DISEASE

Step-by-step to
expert performance

Eyesi Indirect ROP courseware

Examination & classification training

Simulator-based training allows for a standardized learning experience and ensures that all students reach the same level of clinical proficiency. With a ready-to-go courseware, the Eyesi Indirect ROP simulator can easily be integrated into educational programs.

STANDARDIZED CURRICULUM

Ready-to-go courseware

The courseware of the Eyesi Indirect ROP simulator is organized into five courses of different levels of difficulty. Each training course contains several cases. Students advance through the curriculum independently and self-guided. Educators can lock or unlock courses as required.

OVERVIEW

Eyesi Indirect ROP courseware

Course A: Device Handling

To train the basic handling and operation of an indirect ophthalmoscope, course A offers abstract scenarios in which colored geometric shapes have to be found on the retina. The level of difficulty rises as objects have to be found on the periphery or are spread over the entire retina. Trainees will become familiar with using different lens types and ophthalmoscope settings. They also train the handling of the scleral depressor to examine the periphery and the ora serrata.

Course B: Retinal Anatomy

Course B offers an introduction to the basic anatomy of the posterior segment. Trainees learn to identify the anatomical features of a premature retina, their location, and the relative distance between them. Further, they use this relative distance to identify the retinal and vascularization zones necessary for ROP diagnosis.

Course C: Classification (Learning mode)

In this course, different patients with pathological characteristics and anomalies of ROP, such as lesions and plus disease, are presented. Trainees learn to identify the related findings and to differentiate the stages of ROP.

Course D: Classification (Exam mode)

Course D presents the patients from Course C in a random order. Trainees need to apply the knowledge acquired in the previous course and must identify and classify all findings in an input mask.

Course E: Clinical Cases

The clinical cases are based on real patient cases with a complete, detailed clinical history. Trainees are provided with comprehensive patient information and perform a targeted retina examination of the premature patient. The examination findings have to be classified in an input mask.

Guidance & assessment

Classification training

The Eyesi Indirect ROP offers an interactive training environment that provides trainees with immediate feedback on their performance. Educational guidance elements support beginners in their learning process. Additional medical background information helps to deepen the understanding of anatomical and pathological characteristics. A personal findings library, which is also accessible on the VRmNet web portal, allows students to recap their learning matter.

Training time: 0:08:45
Case: Acute disease and A-ROP 2

2023-11-27
09:28
jsmith

50%
0.0°

20D 30D
16D 28D

Zones
Coordinate system
Focus aid
Information overlay
Speculum
OD
OS

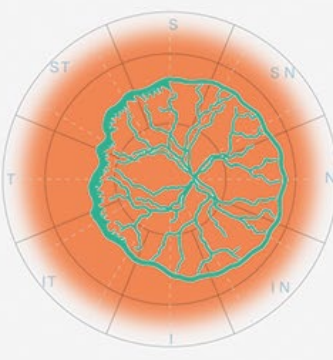
Restart case
Next case 9
Close case

Retina structures ★★★★★

Score: 100.0 / 100.0


Found: 100.0%

- Neovascular proliferation: **seen**
- Plus disease: **seen**
- Ridge: **seen**



Examined retina ★★★★★

Score: 14.6 / 30.0
Retina examined: 48.6%



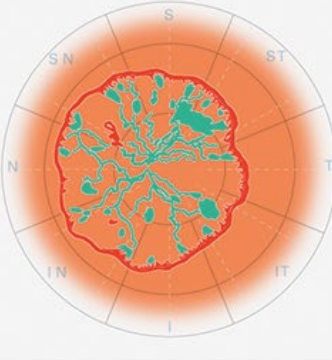
Per quadrant examination:

Retina structures ★★★★★

Score: 40.0 / 100.0


Found: 40.0%

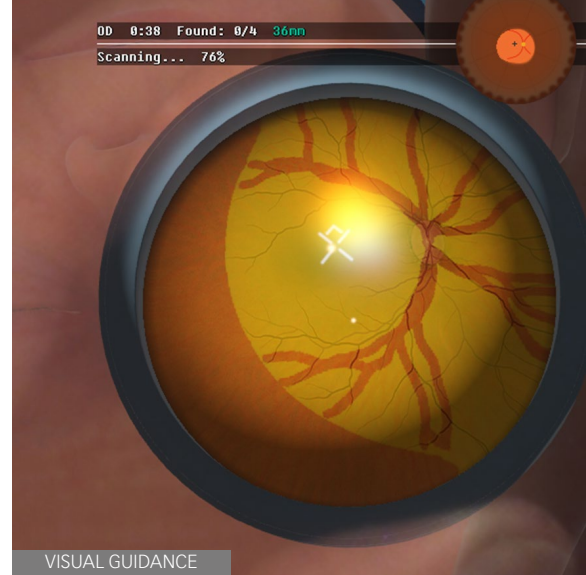
- Intraretinal microvascular abnormalities (IRMA): **not seen**
- Neovascular proliferation: **not seen**
- Plus disease: **seen**
- Ridge: **not seen**
- Subretinal Hemorrhages: **seen**



Examined retina ★★★★★

Score: 17.3 / 30.0
Retina examined: 57.8%





VISUAL GUIDANCE

EDUCATIONAL SUPPORT

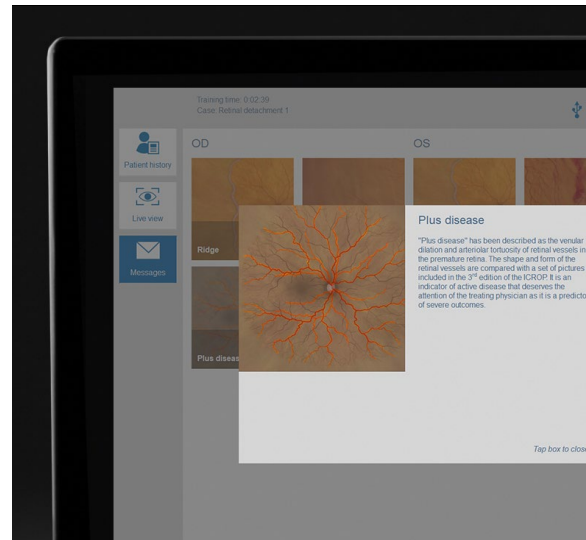
Guidance elements

The Eyesi Indirect ROP features visual and auditive guidance to support beginners in their learning process, for example, by highlighting anatomical findings on the retina. During the examination, a head-up display is visible in the oculars of the ophthalmoscope showing information such as the names of detected anatomical structures or the duration of the examination. For better orientation, the head-up display also provides a retina chart that highlights the areas already examined.

MEDICAL BACKGROUND

Findings tiles

When a trainee detects a pathological finding in the more advanced cases, it is highlighted on the retina. A findings tile appears on the touch screen, providing medical background information. All detected findings are stored in the trainee's personal findings library and are also accessible on the VRmNet web portal for recap. The findings menu on the simulator can be used to start cases associated with the specific finding.

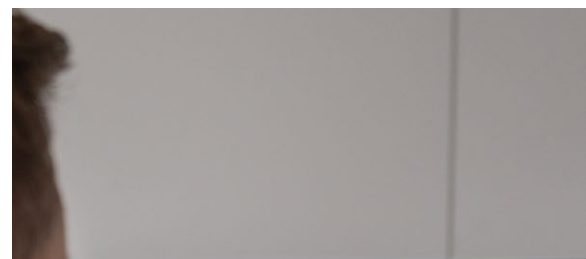


FINDINGS TILE

COURSE D & E

Classification input forms

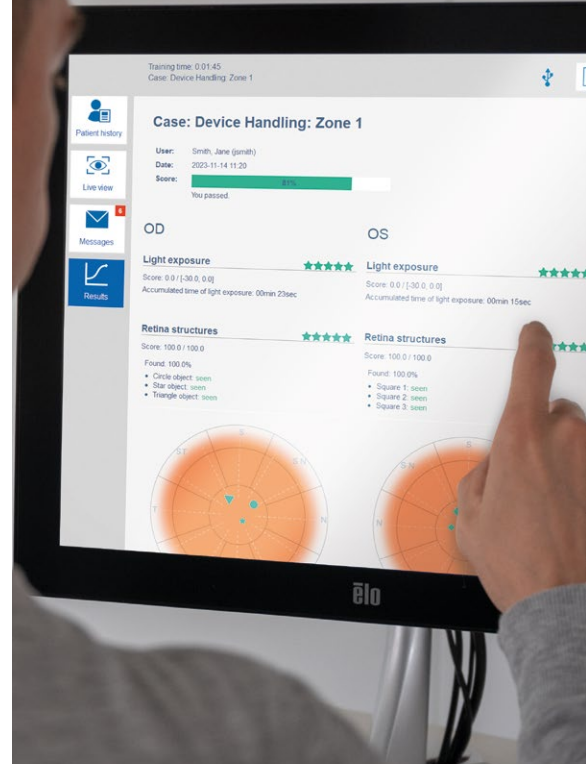
In courses D and E, trainees have to fill in their findings and classifications into input masks. Besides pathological characteristics and anomalies, they may also be asked to look out for non-retinal characteristics such as pupil rigidity or vitreous opacities. Finally, they have to conclude by providing a follow-up recommendation for screening intervals and treatment according to specific country guidelines.



COUNTRY-SPECIFIC GUIDELINES

Treatment recommendations

The Eyesi Indirect ROP teaches the main characteristics of ROP and how to recognize the different zones and stages according to the "International Classification of Acute Stages of Retinopathy of Prematurity". Trainees also become acquainted with their specific country's guidelines for screening intervals and treatment of ROP.



FINDINGS & CLASSIFICATION INPUT FORM

PERFORMANCE ASSESSMENT

Detailed evaluation

After each case, the Eyesi Indirect ROP presents trainees with a detailed performance summary. Evaluated parameters are, for example, the light exposure, completeness of the retinal area examined, completeness and correctness of findings, appropriate use of indentation, or examination time. The objective assessment allows trainees to improve their skills systematically. Required minimum scores ensure that trainees meet a standard skill level. Comprehensive training reports available on VRmNet also allow educators to assess their trainees' skill acquisition.

VRmNet

Web portal for networked simulators

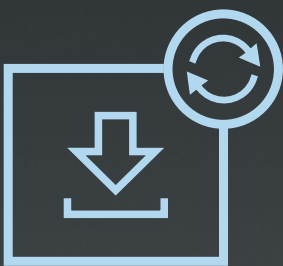
VRmNet is a web-based service available for networked medical training simulators from Haag-Streit Simulation. The web portal offers online features for both trainees and educators. Users can access their personalized VRmNet dashboard from any computer or mobile device 24/7.

EASY ADMINISTRATION

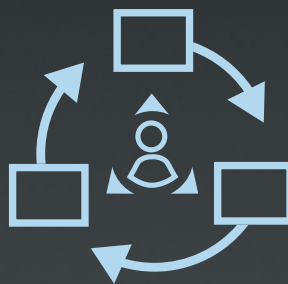
Staying informed

Educators can use VRmNet to comfortably set up users and manage courses. Configurable notifications and reports keep teachers informed on their classes' training status. Trainees log in to VRmNet to access their training data and their findings library for recap of learning content. To prepare trainees for their first training session, VRmNet provides an online orientation with short videos on simulator usage.

Benefits for operation & service



Automatic updates



Optimized allocation



Online service

Administration tools

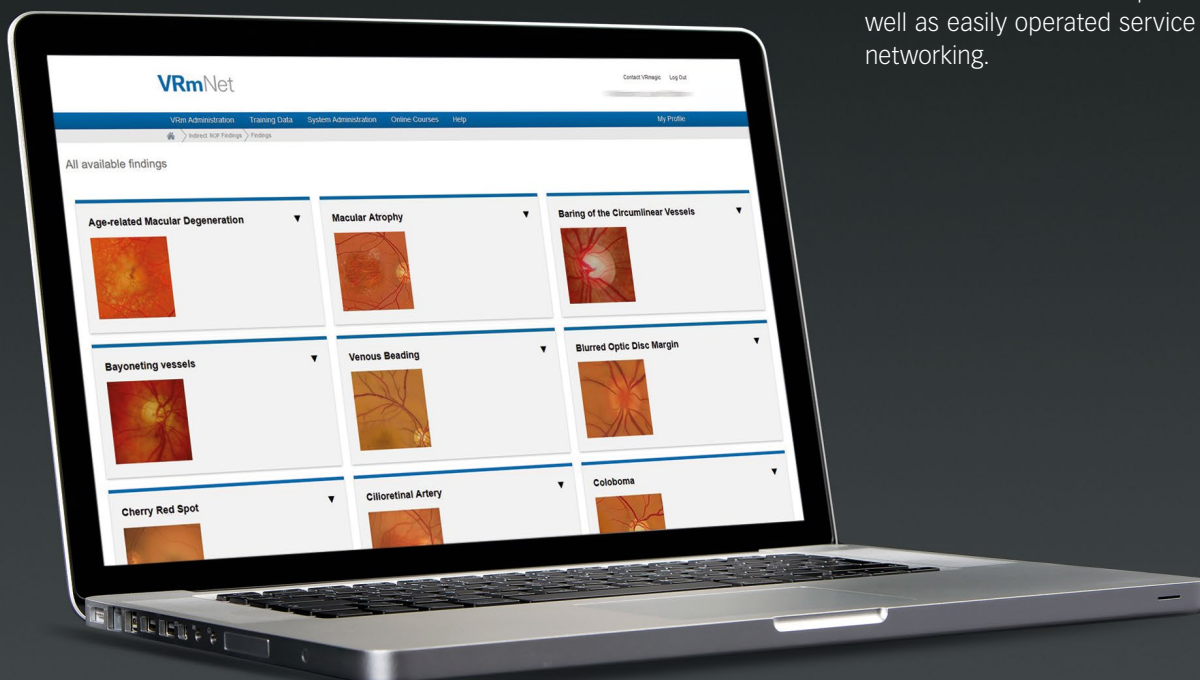
Educators can use VRmNet to comfortably set up users, manage courses, and monitor their classes' training progress.

Online learning for trainees

For trainees, VRmNet features an online orientation on training with the Eyesi Indirect ROP simulator, medical courses, and a library with background information for recap of learning content.

Automatic software updates

All simulators connected to VRmNet receive the latest software updates automatically. Customers benefit from data back-ups and synchronization as well as easily operated service through the VRmNet networking.



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