

EyeRoute Ophthalmic Image Management System

A practical approach to storing and retrieving valuable clinical data.

BY JULIA T. LEWANDOWSKI, SENIOR ASSOCIATE EDITOR

Eye care practitioners face a challenge in effectively organizing, storing, and retrieving digital images. Bulky paper charts are inefficient and hinder clinicians' ability to compare serial images. Physicians can export digital images to a computerized database, but this strategy is only useful if they can locate and retrieve the results of specific tests at a moment's notice.

The physicians from Sabates Eye Centers decided to overcome this challenge by implementing a centralized image management system for their eight locations in and around Kansas City, Missouri. When the first program they tried did not meet their needs, they switched to the EyeRoute ophthalmic image management system (Topcon Medical Systems, Inc., Paramus, NJ). In an interview with *Glaucoma Today* glaucoma specialist Rohit Krishna, MD, and IT director Patrick Beesley described how they use the EyeRoute system.

MULTIPLE LOCATIONS

"Each of Sabates Eye Centers' eight offices has between 10 and 20 examination lanes," Dr. Krishna told *GToday*. "Our specialists generate an impressive volume of diagnostic images as they move between locations. We therefore needed a system that could simultaneously transmit digital images to a central server and allow us to access stored images from any office."

Ready access is only part of the equation. Dr. Krishna commented, "Speed is also important. I should be able to retrieve digital images from a central server as quickly as I can print a hard copy directly from the diagnostic device."

According to Mr. Beesley, the key to quick retrieval is compression. "The EyeRoute system reduces the size of digital files by nine to one without degrading the quality of images," he said. "This process not only saves on storage, but [it] decreases the amount of time needed to transmit data to and from the server." When it comes to digital files, Mr. Beesley added, smaller is always better.

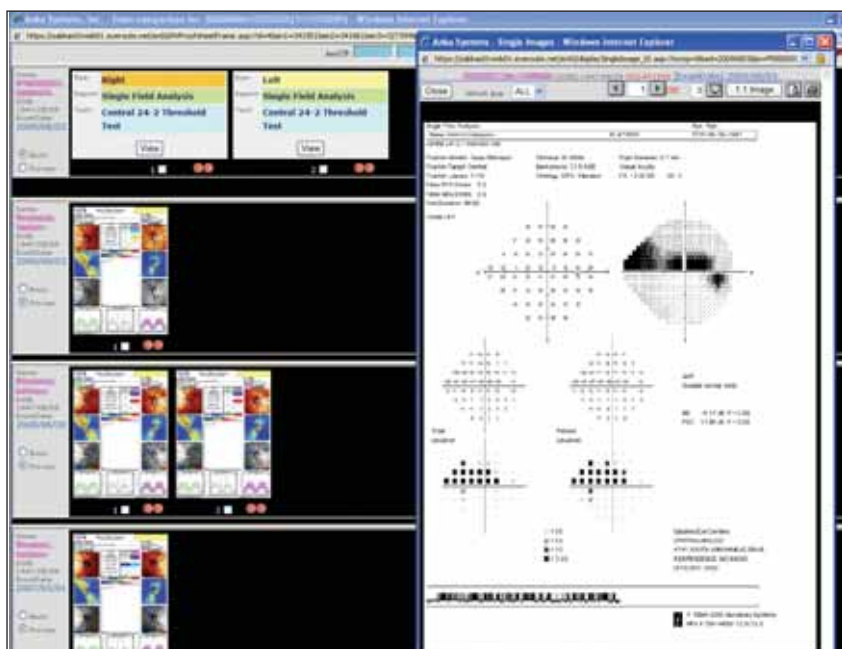


Figure 1. The ophthalmic image management system allows physicians to display the results of different diagnostic tests on a single page.

CLINICAL BENEFITS

During a typical office visit, glaucoma specialists evaluate patients with multiple imaging modalities (eg, Humphrey visual fields [Carl Zeiss Meditec, Inc., Dublin, CA], optical coherence tomography, disc photographs, and scanning laser polarimetry). “The EyeRoute system allows me to access the results of all of these tests with a single click,” said Dr. Krishna. “Its Web-based interface allows me to display digital photographs and printouts on any computer connected to the Internet. I can compare images captured during different evaluations, sort them according to eye, or even request test results from specific years (Figure 1). Placing images side by side also helps me detect gross changes in the appearance of the optic nerve and the retinal nerve fiber layer.”

PATIENTS’ EDUCATION

According to Dr. Krishna, the EyeRoute system is a valuable tool for educating patients about glaucoma. “Before I see patients, they spend between 30 minutes and 1 hour undergoing various tests,” he said. “I believe that showing patients their diagnostic images helps them understand why these tests are necessary.”

Demonstrating how glaucoma affects the optic nerve may improve people’s understanding of the disease’s progression, Dr. Krishna said. “Patients tend to appreciate the real-life consequences of optic nerve cupping and visual field defects when they can see these changes in their own eyes,” he explained. “If their vision has deteriorated since their last visit, I display the results of their current and previous tests on the computer and show them exactly why” (Figure 2).

ASK AN IT EXPERT

Glaucoma Today: *How reliable is the EyeRoute system (Topcon Medical Systems, Inc., Paramus, NJ)?*

Patrick Beesley: Reliability was an important factor in our decision to use EyeRoute. The glaucoma and retina specialists in our practice generate a lot of images—none of which we could ever afford to lose. On the rare occasions that we could not find an image, we were able to attribute the problem to human error and recover the missing information.

The EyeRoute system is engineered for redundancy. Each office has a capture station gateway, a miniserver that collects output from all of the imaging modalities. This miniserver also compresses and transmits the images to our central server.

At any given time, we have five copies of every image: one on the diagnostic device, two (uncompressed and compressed) on the capture station gateway, one on the server, and one on a backup tape.

GToday: *Do clinicians need a full-time IT expert to implement and maintain the EyeRoute system?*

Mr. Beesley: Not necessarily. Anyone who is using EyeRoute as the first step to implementing electronic medical records (EMRs), however, will need a dedicated employee to oversee the process. Successfully transitioning to EMRs involves a substantial investment of time and money. Everyone is going to encounter difficulties, so it only makes sense to have a staff member who can solve problems as they come up. An expert can also maximize the efficiency of image management systems and EMRs by creating customized interfaces.

GToday: *How have you customized EyeRoute to work with your EMR system?*

Mr. Beesley: Some of the templates I have created display information that is especially useful for glaucoma specialists such as patients’ current, target, and maximum IOP. I have also created a program that automatically retrieves the most recent diagnostic images from the EyeRoute system and embeds them into our EMR template (Figure 1). All of the information doctors need to evaluate patients is waiting for them when they walk into the examination room. This allows our doctors to use the time they would have spent looking for diagnostic images to interact with their patients.

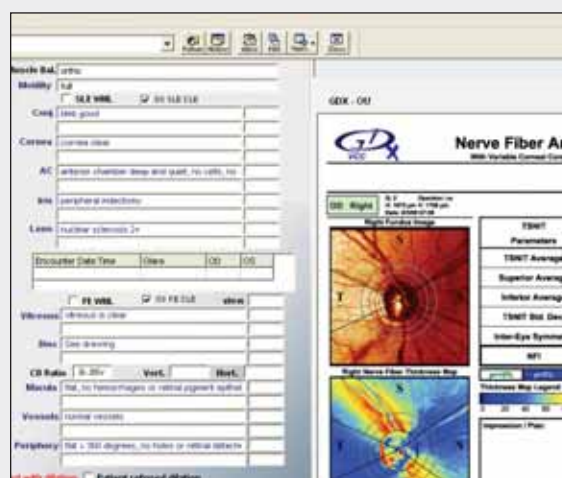


Figure 1. Partial screen shot of the customized template designed for Sabates Eye Centers.

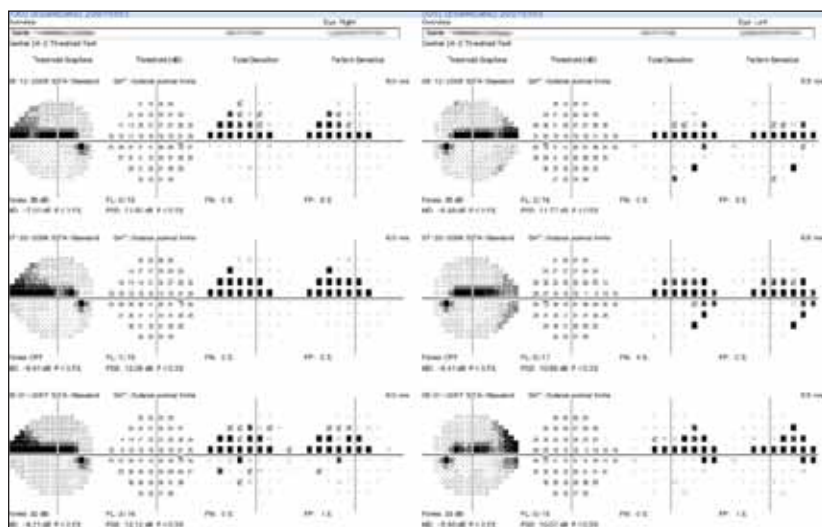


Figure 2. Side-by-side comparisons of previous and current visual field tests are useful for demonstrating glaucomatous progression.

A better understanding of glaucoma may improve patients' adherence to medical therapy. "When patients are confronted with the results of noncompliance, they might be more diligent about using their eye drops," he added.

FUTURE UTILITY

Although the EyeRoute system has enhanced Dr. Krishna's ability to access diagnostic images, he feels

that the technology could be improved. "Unfortunately, the system does not import raw data from ancillary machines," he said. "Because the images collected by the EyeRoute system are essentially digital reproductions of the diagnostic devices' printed reports, I cannot use them to perform statistical calculations. In the future, for example, I would like to be able to use the EyeRoute system to analyze 10 years' worth of decibel points on a Humphrey visual field test and to perform other kinds of analysis." □

Patrick Beesley acknowledged no financial interest in the products or companies mentioned herein.

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