

The Versatility of SD-OCT in Patient Screening

The use of this imaging modality has become more widespread.

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Imaging is central to the diagnosis and management of virtually all ophthalmic conditions. Conditions that require regular assessment of disease progression and treatment response call for the frequent use of many imaging techniques. In these situations, a fast, comfortable, and precise tool is essential to both doctor and patient. As a result, ocular imaging equipment manufacturers have developed new-generation spectral-domain optical coherence tomography (SD-OCT) instruments. These devices are highly versatile and carry out numerous ophthalmic imaging functions with great ease and speed. Only a decade ago, ophthalmic physicians relied on assessing ocular structures through basic microscopy, but today the approach has changed to a cross sectional, tomographic analysis. This marks a paradigm shift in ophthalmic imaging, such that the focus is no longer on merely looking at structures, but is now on analyzing every tissue layer and reconstructing images to provide physicians with a comprehensive image of the eye's internal structures.

OUR EXPERIENCE

My colleagues and I started using 1 of these new generation SD-OCT machines in early 2010, the 3D-OCT (Topcon). Presented with the challenge of setting up a large ocular health screening study among 5000 healthy participants, we needed an accurate method of imaging many people in quick succession. We calculated that to screen all participants within our allocated data collection period, we would have to meet a restricted time slot of approximately 3 minutes per person. Our aim was not only to capture fundus photographs for all participants, but also to perform refractions and take ocular health histories. With this

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in mind, we knew that our desired machine would have to capture all the data we needed by doing little more than taking one shot of 1 eye and a second shot of the other eye. In addition, we had to rely on staff with only basic technical training and with little background in the field of ophthalmology.

By permitting simultaneous performance of high-resolution (12.3 megapixels) nonmydriatic fundus photography and high-resolution OCT, the 3D-OCT system from Topcon allows an accurate impression of the central 45° of the retina to be obtained in conjunction with a full OCT image. Prior to using a SD-OCT device, we relied on conventional OCT machines. On making the switch to a new generation OCT machine, we noticed that we could obtain a higher quality of retinal and subretinal images in less time. We have used the device on refractive patients with narrow 1.5-3.0-mm pupils and phakic IOL implants in photopic conditions—a very challenging imaging situation for any device—and achieved OCT scans of the macula that were indistinguishable from those taken in emmetropic eyes with dilated pupils.

BENEFITS FOR THE PATIENT

One of the key benefits to the SD-OCT is that it is

USER-FRIENDLY TOOLS ON THE 3D-OCT SYSTEM

The 3D-OCT system from Topcon features a user-friendly color touch screen display on which captured OCT data can be viewed in 2-D or 3-D mode and alongside fundus images. Its Pin-Point Registration tool ensures that the location of the OCT image within the fundus image is always indicated. In addition, the compare function of the device allows users to perform side-by-side comparisons of different images, while the automatic image transition tool facilitates image capture by allowing automatic focus and shooting of images.

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not only practical for the physician using the machine but also for the patient. Conventional ocular examinations require pupillary dilation prior to funduscopy, and patients often complain that the resulting visual blurring that persists for several hours after dilation is a cause of great inconvenience. The SD-OCT allows a retinal examination to be performed without dilation. Patients really appreciate this feature primarily because they can drive home safely after their eye exam.

I have found that when I explain the nature of the examination to my patients, they immediately expect a long and complicated process to follow. When I sit patients in front of the SD-OCT and everything is over within a minute, the usual response is, “Was that all?” Further, patients have reported a less intense and shorter-lived visual disturbance from the flash of the fundus camera when the SD-OCT is used in preference to conventional methods that require pupil dilation.

SUMMARY

In my opinion, the future holds much promise for the use of new-generation OCT machines. In the past, OCT machines have been considered as a less favored tool—reserved for use in particularly difficult cases. However, the new generation of SD-OCT ensures that OCT can be considered as a high throughput screening method suitable for use on all patients that require ocular imaging. Our studies so far have allowed us to build a large reference database of specific values, such as retinal thickness and chamber angle, using the device. This was only possible because of the speed and ease with which SD-OCT captures data, and reflects just how wide the true scope of OCT use is. Recent study findings also suggest that blood flow assessment

lies within the capabilities of OCT imaging.¹⁻⁵ This is an area to watch in the near future. ■

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