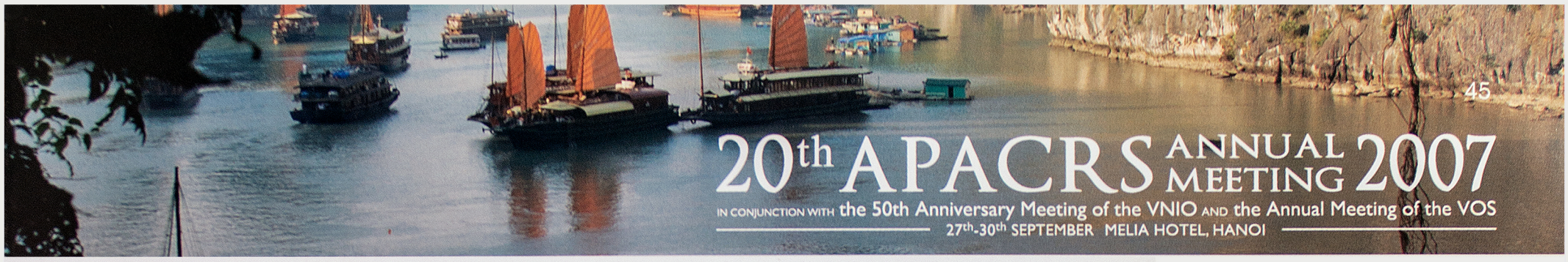

OCT imaging in retinal disorders

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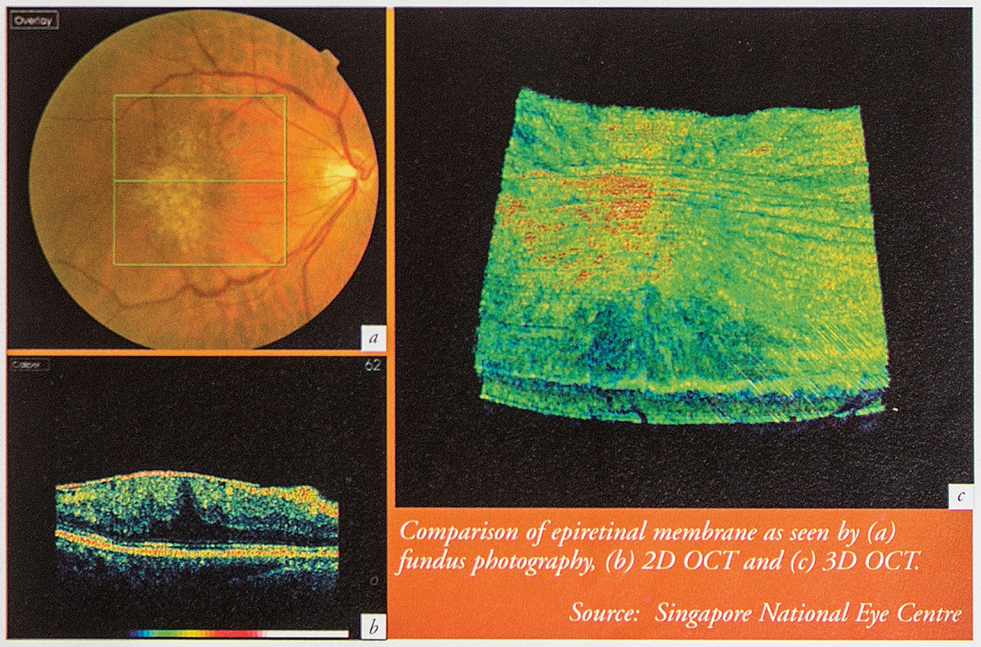
Optical Coherence Tomography (OCT) is a standard diagnostic and imaging technique in most clinical practices today. It is a fast and noninvasive scan of the macula. By imaging the retinal histological structure, an OCT scan obtains information similar to that from an optical biopsy, but without the need for excision and histopathologic specimen processing. The OCT employs Michelson interferometry using near-infrared light (820 nm) from a super luminescent diode. The light is split, and the machine compares the echo time delay of the light reflected from the retina with the echo time delay of the same light reflected from a reference mirror at a known distance. The reflected light is recombined, and the resulting interference fringe is detected and measured by a photodiode detector. The information obtained is then used to produce an image of the retina.

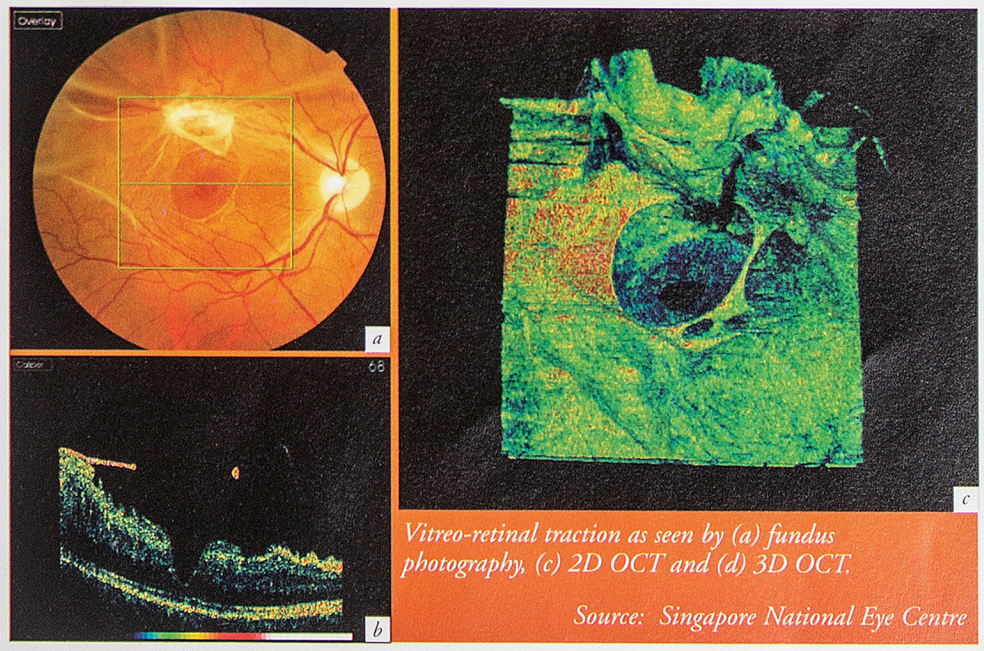
Patients can expect a brief, comfortable experience with the OCT. Each scan acquisition usually takes slightly more than one second, and the entire test lasts only five to seven minutes.

More recently, the Fourier Domain spectral detection OCT (3D OCT-1000, Topcon Corporation, Tokyo, Japan) has been shown to be 50 times faster than the conventional Time Domain OCT (TD OCT) system. More data can also be collected compared with the conventional TD OCT due to its higher scanning speed. This new system extracts the necessary information from the spectrum of the light signal using its Fourier transform. The increased scanning speed dramatically reduces motion artifacts. In addition, multiple images may be acquired at different points on the retina at the same time thereby providing wider retinal coverage. The resolution of the scan has also improved to 5- to 6-micron axial image resolution, compared to the 10-micron axial resolution of standard OCT systems. In addition, the Fourier Domain OCT is able to acquire three-dimensional



Comparison of epiretinal membrane as seen by (a) fundus photography, (b) 2D OCT and (c) 3D OCT.

Source: Singapore National Eye Centre



Vitreo-retinal traction as seen by (a) fundus photography, (c) 2D OCT and (d) 3D OCT.

Source: Singapore National Eye Centre