

MAKING THE MOST OF OCT IMAGING



The utility of fundus evaluation in the front-line optometric clinic

By **Thao Hannaford, M.Optom, B.Optom (Hons.), Grad. Cert. Arts, BA**

I am the owner of a private, independent practice located in a regional area southwest of Sydney with a diverse population of approximately 130,000. The majority of the community is aging, and my staff and I see an abundance of age-related ocular conditions such as cataracts and macular degeneration in the course of general practice.

In Australia, optometrists are considered primary eye care providers and operate in concert with both general practitioners and ophthalmic surgeons. Our area has a single ophthalmology practice that serves a radius of 70 km (~44 miles); due to the rural nature of the location, this represents several distinct localities. The next closest providers are in the capital cities of Sydney or Canberra, both major population centres that are up to 2 hours' travel away, which makes our local care quite important. Consequently, my staff and I comanage and refer patients to our local ophthalmology practice. The

ophthalmology practice is quite wide in scope, including a retinal specialist and a glaucoma specialist for when surgical and/or advanced therapeutic treatment is required. In order to ensure appropriate referrals, we rely on optical coherence tomography (OCT) as an invaluable tool to help us detect and quantify eye conditions.

AN EFFICIENT AND VERSATILE OCT DEVICE

My team and I use the NIDEK Retina Scan Duo 2 combination OCT and fundus camera (Duo 2) as it facilitates efficient practice flow without compromising the quality of our care. Since the recent software upgrade, we now use the retina map function on all patients as part of routine testing. The image's 12X9-mm-wide area captures the entire retina in one scan, and it also includes a B-scan of the macula and optic disc, which is ideal in routine primary care as an adjunct to other testing. Some pathologies are not

readily apparent with fundus photography alone, such as the early stages of disease—an example being the case of subtle, early macular edema. However, the multiple base layers of an OCT base scan permit rapid and simple observation of leakage (Figure 1A and B). I have found it beneficial to use the data to comanage patients with my local ophthalmologist and track patients' disease progression (see sidebar, *The Most Common Pathologies I Have Detected Using the Duo 2*).

The array of functions on the Duo 2 is truly impressive. The B-scan Denoising function on the Duo 2 solves the problem of speckle noise in OCT images and provides high-definition images comparable to a multiple-image-averaging technique by using a proprietary deep-learning algorithm. This technique is an improvement that ensures that the quality of the OCT images is consistently sufficient for clinical decision-making.

In addition to fundus photography

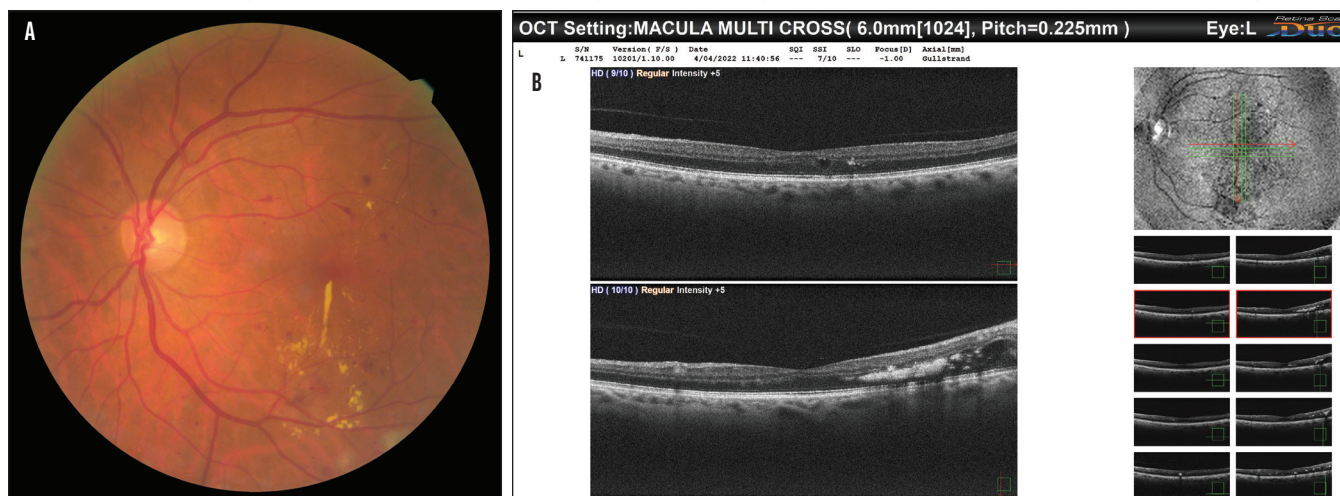


Figure 1A and B. A case of moderate non-proliferative diabetic retinopathy with center-involved macular edema identified with the NIDEK Duo 2 device.

and the OCT screening functions, I regularly use the platform's finer mapping capabilities, such as the macula cross and disc cross scans. For glaucoma, the disc map has proven useful in the detection of neural loss, and the macular map measures macula thickness and ganglion cell density loss, which is usually evident before visual field loss is detected. For macular pathology, the cross scan can effectively show the depth and size of lesions. The FAF (fundus autofluorescence) function on the Duo 2 lets me evaluate the retinal pigment epithelium for macula conditions such as macular degeneration (without using contrast dye).

SPECIALIZED DATABASE FOR HIGH MYOPES

The Duo 2 includes two functions that have proven valuable in the detection of early glaucoma. As part of my doctoral program, my literature review has highlighted evidence that practitioners often make false-positive diagnoses for glaucoma in myopic eyes due to long axial lengths (two published papers include Rolle et al¹ and Shoji et al²). The Duo 2 has both standard and long axial length normative databases, and it also performs axial length compensations that are key in reducing the incidence of false-positives due to biometric deviations from normative models. Although the long axial length normative database was developed based on Asian eyes, I still find it a useful tool, rather than defaulting to a Gullstrand eye model and the standard normative database. Both of these features are beneficial in order to be more accurate in diagnosis.

In order to use the Duo 2's normative database and long axial length normative database effectively, I tend to first measure the patients' axial length with the NIDEK AL-Scan Optical Biometer, and then enter that value into the Duo 2's data analysis. Without an axial length input, the Duo 2 will default to an axial length of 24.38 mm. Thus, the Duo 2 works best in conjunction with the AL-Scan, which I also use

THE MOST COMMON PATHOLOGIES I HAVE DETECTED USING THE DUO 2:

- macular degeneration
- neovascularization (CNV)
- drusen, exudates, cotton wool spots
- vitreomacular traction
- macular holes/pseudoholes/lamellar holes
- macular edema
- central serous chorioretinopathy
- epiretinal membranes
- diabetic retinopathy
- retinal vein occlusions
- optic disc drusen
- glaucoma
- papilledema

for fitting contact lenses and managing myopia, so the benefit of the AL-Scan is threefold in these contexts.

PRACTICE EFFICIENCIES AND EASE OF USE

Maintaining the practice's workflow is a persistent challenge. Our appointments average 40 minutes per patient; while our goal is to finish the general test in half an hour and use the last 10 minutes to do imaging, this may not always be achievable. Within a standard consultation, we also aim to educate the patient about their condition and answer any questions they may have. I place a high value on communicating effectively with patients, and here again, the efficiency of performing multiple scans in one sitting allows me to do this.

The Duo 2 OCT has been a valuable investment for our practice. My staff and I have found it intuitive to use, and training on the new software has been simple to follow (although most of us were trained in using OCT at university, so the technology is familiar). As long as the patient is correctly positioned (that is, proper alignment of the chin and forehead relative to the unit), capturing images with the Duo 2 has proven to be consistently simple. Obstacles to a high-quality scan with the Duo 2 are if the patient moves (although the B-scan Denoising function can help compensate for movement to some degree), has

ocular surface issues, or has cataracts developing. However, the device has an Ultra fine mode that slows down the rate of the scan, so that even if the eye has media issues, I can often glean enough information from the base scan to diagnose pathology.

Switching to the retina map as our default scan for routine eye testing will prove to be interesting to see the effect of this change in the context of our consultation and clinical flow. I would expect that moving forward, very early detection of various ocular diseases will be the main significant outcome, which is a definite positive for both the patient and the optometry profession. ■

1. Rolle T, Bonetti B, Mazzucco A, Dallorto L. Diagnostic ability of OCT parameters and retinal ganglion cells count in identification of glaucoma in myopic preperimetric eyes. *BMC Ophthalmol.* 2020;20(1):373. doi: 10.1186/s12886-020-01616-5.

2. Shoji T, Sato H, Ishida M, Takeuchi M, Chihara E. Assessment of glaucomatous changes in subjects with high myopia using spectral domain optical coherence tomography. *Invest Ophthalmol Vis Sci.* 2011;52(2):1098-102. doi: 10.1167/iops.10-5922.

Product/model name:

Optical Coherence Tomography RS-330

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