

DETECTING PROGRESSION IN THE GREEN ZONE: GREEN DISEASE



Modern OCTs can detect glaucomatous changes in eyes that are still in the normal range.

BY MARK T. DUNBAR, OD, FAAO

Results of an OCT scan of the retinal nerve fiber layer (RNFL) are displayed in an easy-to-read, color-coded format that enables us to quickly decide if an eye is normal (the green zone), suspicious (yellow), or abnormal (red). In the context of a patient who is a glaucoma suspect, it stands to reason that if the visual field is normal and the OCT is normal, the patient probably does not have glaucoma. However, there is a large range of “normal” before the RNFL reaches the tipping point (Figure 1). As with perimetry, a patient can lose a third of his or her RNFL and still be within the normal range.

Fortunately, modern OCTs provide highly reproducible measurements, enabling us to identify patients who are losing ground, even while they are still in the green zone. A study by Kuang et al. found that assessment of RNFL thickness with OCT could detect glaucomatous damage before the appearance of visual field defects on standard automated perimetry.¹ In many patients, significantly large lead times were seen when applying OCT as an ancillary diagnostic tool.

The following is a case in point.

CASE: GLAUCOMA SUSPECT

- 50-year-old male, initially seen July 2012
- BCVA: 20/20
- IOP: 32 mm Hg OS
- OCT RNFL scan, ganglion cell anal-

- ysis, and visual fields were normal
- Monitored as glaucoma suspect

with ocular hypertension. Follow-up scans in December 2013

appeared normal and were essentially the same as those taken in 2012 (Figure 2). However, when scans from November 2015 are compared with the December 2013 scans, we can see progression (Figure 3).

By March 2016, a visual field defect had developed in

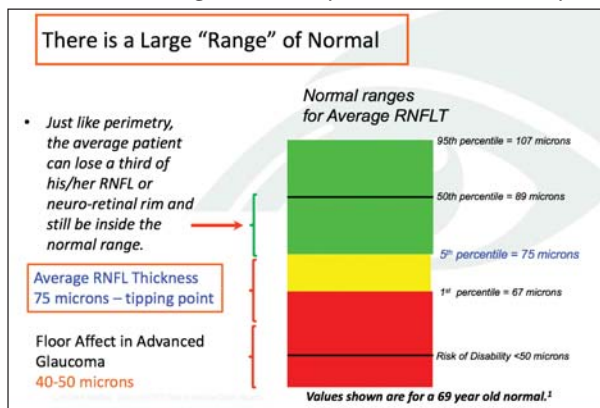


Figure 1. Highly reproducible measurements enable us to identify patients who are losing ground, even while they are still in the green zone.

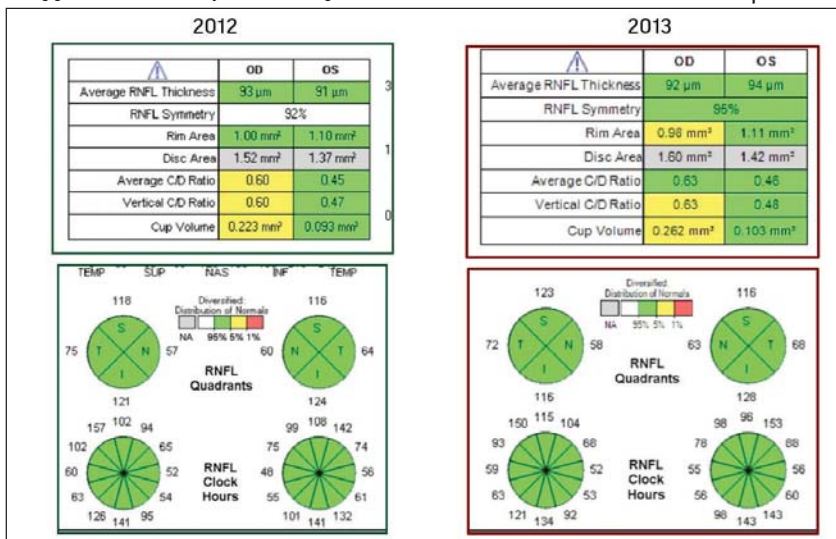


Figure 2. The scans from 2012 to 2013 are essentially the same. If anything, the 2013 scans are better. Note the clock hours at 11 o'clock on both right-eye scans.

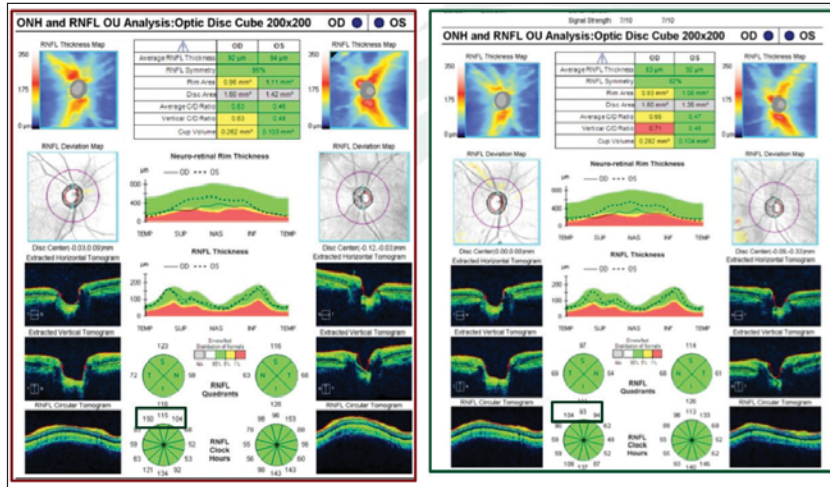


Figure 3. Progression is evident when scans taken in 2013 are compared with those taken in 2015.

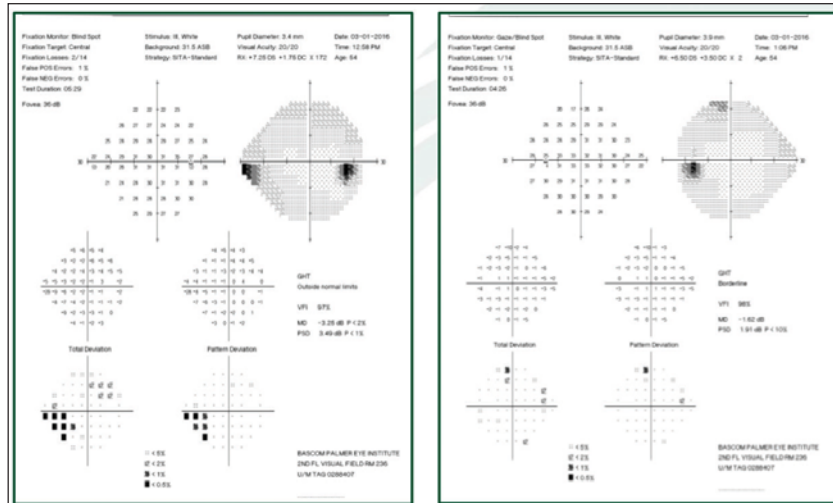


Figure 4. Ultimately, a visual field defect developed in the right eye.¹

the right eye (Figure 4), and by March 2017, OCT showed clear progression. The right eye was changing while it was still “normal.”

DISCUSSION

The average person has about 107 microns of RNFL, and the tipping point between normal and abnormal is at

about 75 microns. In other words, it is possible for a patient to lose a third of RNFL or neuroretinal rim and still be inside the normal range. That was the message with this patient. He was a glaucoma suspect with normal fields, and at multiple visits, OCT showed he was in the normal range. In retrospect, we were able to highlight statistically

significant changes that were occurring. Therefore, it appears the OCT is sensitive enough to pick up those statistically significant changes while patients might still be in the normal range. I think we have enough longitudinal data to show that OCT has that sensitivity.

CONCLUSION

None of these technologies or tests exists in a vacuum, and we cannot rely on any single test for diagnosing and managing glaucoma. I believe we now recognize that OCT has the sensitivity to pick up change, maybe even better than a visual field. Kuang et al. could detect change in more than a third of the patients before it became apparent on their visual fields, which has always been the gold standard. We have had this technology for a dozen years or so, and we are learning to trust and utilize it properly to be able to show change before it is significant.

It is important to pay attention to the indicators of normal/suspicious/abnormal that the OCT test results provide; however, it is paramount for clinicians to pay attention to the value differentials within each of these categories from visit to visit to ensure that there are no dramatic changes and losses in a patient’s RNFL. ■

1. Kuang TM, Zhang C, Zangwill LM, et al. Estimating lead time gained by optical coherence tomography in detecting glaucoma before development of visual field defects. *Ophthalmology*. 2015;122(10):2002-2009.

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