

# DIABETIC RETINOPATHY MANAGEMENT: AN ADVANCED APPROACH

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Patients with diabetic retinopathy can present difficult clinical questions, even to the most experienced experts. Whether and when to administer treatment and how to gauge effectiveness are topics that have been front and center in eye care for a long time. More fundamentally, understanding precisely how the disease is affecting the health of the eye has proven challenging, because while measurements like vision loss signify disease progression, visual acuity recovery after treatment does not necessarily correlate with improvement in underlying structure and function.

## Structural Diagnostics

Structural diagnostic testing used to track diabetic retinopathy, such as OCT and fundus photography, have a defined role in understanding how a patient's retina is being affected. Over time, serial imaging can demonstrate progression; in the context of diabetic macular edema, it can also show the degree of swelling and areas being affected. After treatment, OCT can depict resolution of swelling and other clinical findings that often correlate with improvement in vision—but this still provides little

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information about whether the retina is functioning or recovering properly.

## Modern Diagnostics

Another form of diagnostic testing, full field electroretinography (ffERG), provides objective information on retinal function loss and recovery—data that is integral to the ability to stage the disease, understand the appropriate treatment for your patients and clinical endpoints, and titrate treatment to make sure they are receiving the best medical care.<sup>1-6</sup>

Flicker ERG (a step of the standard ISCEV ffERG that flashes at  $\geq 30$ Hz) provides objective information about the function of the cones that is relevant across the spectrum of diabetic retinopathy. By measuring the summed electrical responses of cone cells within the retina to a flash stimulus from a hand-held mini-ganzfeld, flicker ERG can help identify early pathologic changes that precede disease progression or loss of vision.<sup>4</sup> In later disease states, flicker ERG demonstrates the viability of retinal cells, allowing doctors to evaluate the level of retinal dysfunction, and, in turn, classify the severity

of ischemia in eyes with diabetic retinopathy.<sup>1-5</sup> In advanced or unresponsive cases, information from these electrodiagnostic tests can be relevant when considering switching therapy options.

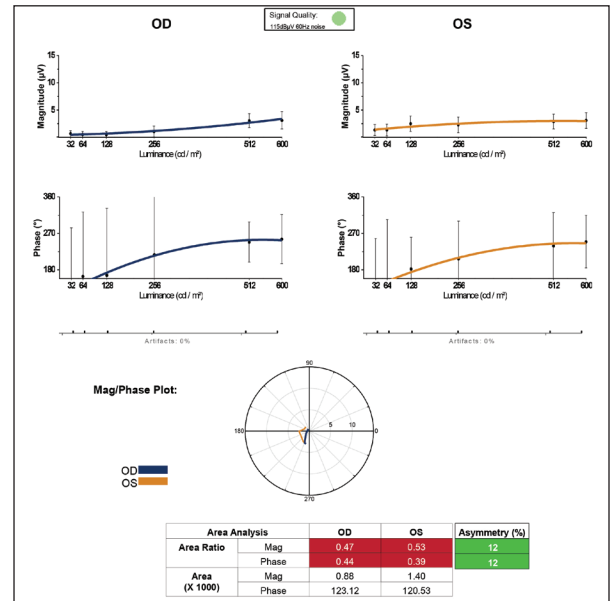
Some of the greatest challenges in diabetic retinopathy surround treatment choices, and this may be where flicker ERG is of greatest benefit, as the test is an indicator of who is at risk for progression, how likely a patient is to respond to treatment, and whether function has been lost or recovered in response to treatment.<sup>1-6</sup>

When it comes to managing diseases of the human eye, the availability of crucial information about the health of visual function can make all the difference in the outcome. For the estimated 30 million Americans living with diabetes—about 7.7 million of whom have some form of diabetic retinopathy and almost all of whom will develop ocular manifestations of diabetes in their lifetime<sup>7-8</sup>—the ability to detect diabetic retinopathy and target and adjust treatment over time means saving vision.

The dependability and reproducibility<sup>9-10</sup> of Diopsys flicker ERG test results fosters improved ability to make crucial clinical decisions that may preserve the health of the eye. And thus, the objective, functional information that flicker ERG provides places you ahead of systemic manifestations on vision and reduces the risk of under or overtreatment to make sure your patients are receiving the best medical care.

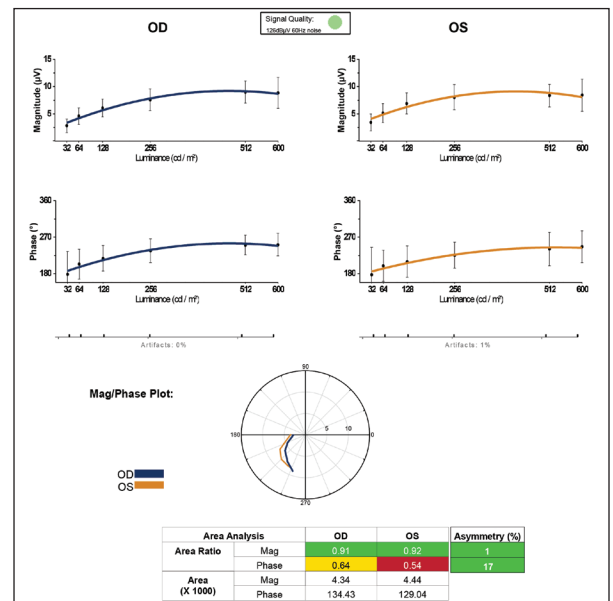
1. Bresnick GH, Palta M. Temporal aspects of the electroretinogram in diabetic retinopathy. Arch Ophthalmol. 1987;105:660-664. 2. Hologipian K, Greenstein VC, Seiple W, Hood DC, Carr RE. Evidence for photoreceptor changes in patients with diabetic retinopathy. Invest Ophthalmol Vis Sci. 1997;38:2355-65. 3. Kim SH, Lee SH, Bae JY, Cho JH, Kang YS. Electroretinographic evaluation in adult diabetics. Doc Ophthalmol. 1997-1998;94:201-13. 4. Pescosolido N, Barbato A, Stefanucci A, Buompriso G. Role of Electrophysiology in the Early Diagnosis and Follow-Up of Diabetic Retinopathy. J Diabetes Res;2015:319692. 5. Tzekov R, Arden GB. The Electroretinogram in Diabetic Retinopathy. Surv Ophthalmol 1999, 44:53-60. 6. Holm K, Schroeder M, Lövestam Adrian M. Peripheral retinal function assessed with 30-Hz flicker seems to improve after treatment with Lucentis in patients with diabetic macular oedema. Doc Ophthalmol. 2015;131:43-51. 7. Centers for Disease Control and Prevention (CDC). National Diabetes Statistics Report, 2017. Estimates of Diabetes and Its Burden in the United States. 8. Prevent Blindness America. Vision Problems in the U.S. Prevalence of Adult Vision Impairment and Age-Related Eye Disease in America. 2012. <http://www.visionproblemsus.org/>. Accessed Jan 29 2018. 9. Lam, D, et al. Evaluation of a Disposable Skin Electrode for Flash Electroretinograms (ERGs). In: Academy 2015 New Orleans. Program Number: 155190 10. Resende, A, et al. Repeatability of Steady-State Pattern Electroretinogram and Full-Field Electroretinogram using a novel office-based testing platform in normal subject. In: ARVO Annual Meeting. Investigative Ophthalmology & Visual Science September 2016, Vol.57, 3949.

## ffERG Pre- Anti-VEGF Injections



Results before anti-VEGF injections for diabetic retinopathy show magnitude and phase values out of reference ranges OU, suggesting poor retinal function. Pre-Injection BCVA: 20/100 OD, 20/40 OS.

## ffERG Post Anti-VEGF Injections



Results after anti-VEGF treatment for diabetic retinopathy show increased magnitude and phase values OU, suggesting retinal function improvement. Post-Injection BCVA: 20/70 OD, 20/30 OS.

The comments and examples provided are based on clinical experience and published literature. It is the responsibility of the Doctor to make any diagnostic and/or treatment decisions specific to each patient.