

## Clinical Insight

# Some (of the many) Advantages of the Mirante for Vitreoretinal Disease Management

By Rich Bains, Clinical Expert

Multimodal retinal imaging with all-in-one multilaser devices such as the Mirante is becoming increasingly popular for assessing vitreoretinal pathology. Notably, the combined message of many of the presentations from the recent Euretina 2021 meeting indicates that multimodal imaging is providing new insights into vitreoretinal disease and biomarkers of prognosis.

Unique to the Mirante is Retro mode imaging. Retro mode is akin to the concept of retroillumination of the anterior segment, presenting a surface relief map or “lunar view” of retinal pathology. Interestingly, recent studies on multimodal imaging with the Mirante for characterizing drusen and geographic atrophy reported that fundus autofluorescence (the gold standard) and Retro mode imaging with the Mirante are well correlated with similar reproducibility.<sup>1</sup> This is particularly important given that an expert group (Classification of Atrophy Meeting) has recommended multimodal imaging as the optimal method for assessing patients with atrophy due to age-related macular degeneration.<sup>2</sup> The disease burden of age-related macular degeneration makes this statement particularly notable. The “3D” type images generated from Retro mode imaging may gain more clinical prominence in light of previous studies that report that different types of drusen and reticular pseudodrusen portend differing prognoses.<sup>3</sup> Investigators recently reported the clinical impression that Retro mode imaging readily presented the “3D” shape of the various types of drusen and reticular pseudodrusen that allowed a greater appreciation of the different phenotypes.<sup>4</sup> Hence, the incorporation of Retro mode imaging in the diagnostic workup may be clinically advantageous for interrogating macular pathology.

The combined benefit of widefield imaging and 4096 X 4096 ultra-high resolution imaging ensures diagnostic information is available even on the peripheral retina without losing image

### Image Gallery



Figure 1. Ultra wide field color SLO image



Figure 2. Color and Retro mode image examples. Drusen are highlighted in “3D” in Retro mode imaging.

Images courtesy of Luigi Sacco Hospital, University of Milan, Italy



clarity. In fact, clarity is maintained whether you magnify a region of interest or assess the far periphery using many of the imaging modalities in the Mirante. The Ultrafine mode for OCT allows almost a near histologic appreciation of the retinal structure, allowing a view of subtle retinal pathology that may not be clear at lower resolutions. Recent feedback with widefield imaging with the Mirante indicates the relatively new finding that drusen and pseudodrusen extend to the far periphery, a feature that in some cases is much more apparent with Retro mode imaging than color fundus imaging. Additionally, current research indicates that evaluation and documentation of the retinal periphery are becoming increasingly important for disease prognosis and management (eg. diabetic retinopathy). The advantage of the ultra-high resolution imaging and widefield imaging is the ability to detect early pathologic changes that allows earlier onset of treatment.

Observations from meetings (ARVO and Euretina) and published research indicate the benefits of multimodal retinal imaging. The accurate correlation of multiple imaging modalities allows enhanced lesion location and provides functional and anatomical insights into chorioretinal disease and the resulting pathology. Multimodal imaging with the Mirante interrogates disease with complementary imaging modalities for an appreciation of disease activity from an all-encompassing perspective - *structural, anatomic, and functional*.

## All about Mirante

The Mirante is a combined ultra-high resolution SLO/OCT device that provides perhaps the most comprehensive set of imaging modalities for retinal diagnosis. This device includes 8 diagnostic modalities including optical coherence tomography (OCT), scanning laser ophthalmoscope (SLO), OCT-Angiography, fundus autofluorescence (FAF), fluorescein angiography (FA), indocyanine green angiography (ICG), Retro mode illumination, and widefield imaging. Each modality was carefully selected for its clinical utility. For example, the separate, red, green, and blue fundus images present quick information on lesion depth, OCT presents layer-by-layer structural information, and video capture of combined indocyanine green and fluorescein angiography presents functional information on chorioretinal blood flow. Blue and green FAF presents information on macular integrity by analyzing tissue autofluorescence and remains an untapped resource for understanding retinal metabolism over time. Additionally, widefield and ultra wide field imaging are becoming increasingly important for assessing the extent of retinal (eg. diabetic retinopathy, drusen) and uveitic pathologies (eg. inflammation). Taken together, the spectrum of imaging technologies in the Mirante allows a correlation of the chorioretinal structure and function in one diagnostic device that enhances diagnosis, prognostication, monitoring, and management of disease.

## REFERENCES

1. Cozzi M, Monteduro D, Parrulli S, Corvi F, Zicarelli F, Corradetti G, Sadda SR, Staurenghi G. Sensitivity and Specificity of Multimodal Imaging in Characterizing Drusen. *Ophthalmol Retina*. 2020 Oct;4(10):987-995.
2. Holz FG, Sadda SR, Staurenghi G, Lindner M, Bird AC, Blodi BA, Bottoni F, Chakravarthy U, Chew EY, Csaky K, Curcio CA, Danis R, Fleckenstein M, Freund KB, Grunwald J, Guymer R, Hoyng CB, Jaffe GJ, Liakopoulos S, Monés JM, Oishi A, Pauleikhoff D, Rosenfeld PJ, Sarraf D, Spaide RF, Tadayoni R, Tufail A, Wolf S, Schmitz-Valckenberg S; CAM group. Imaging Protocols in Clinical Studies in Advanced Age-Related Macular Degeneration: Recommendations from Classification of Atrophy Consensus Meetings. *Ophthalmology*. 2017 Apr;124(4):464-478.
3. Ahmed D, Stattin M, Haas AM, Graf A, Krepler K, Ansari-Shahrezaei S. Drusen characteristics of type 2 macular neovascularization in age-related macular degeneration. *BMC Ophthalmol*. 2020 Sep 25;20(1):381.
4. Monteduro D, Cozzi M, Parrulli S, Staurenghi G. Topographic detection and characterization of drusen and subretinal drusenoid deposits: contribution of Retro mode modality in a multimodal imaging approach. Abstract 3471. Presented at: ARVO 2019; April 28-May 2, 2019; Vancouver, British Columbia, Canada.