Author Response: Quantification of Vessel Density in Retinal Optical Coherence Tomography Angiography Images Using Local Fractal Dimension

On behalf of the author team, we thank Hu and Ding for noting our study to be interesting. Hu and Ding raise pertinent questions related to reproducibility of the optical coherence tomography angiography (OCTA) images and intra- and interobserver variability. We do acknowledge that the OCTA examination can take a long time, and patient eye movement can be a confounder in any analyses. There are two issues to be considered. One is the reproducibility of the OCTA image and the other is the reproducibility of the local fractal dimension method. In the latter case, as long as the same regions of the same OCTA image are analyzed, the output of the analyses will be the same, and reproducibility will be excellent. This is logically sound. In the former case, reproducibility may be an issue, if there are significant motion artifacts. In the study by Gadde et al. only patients with normal eyes and relatively stable fixation were used. As such, motion artifacts were minimal in the study cohort images. Figures 1A and 1B from Gadde et al. show an example of an OCTA image with artifacts and the corresponding local fractal dimension analyzed image, respectively. The motion artifacts are evident in both images. Thus, it was relatively easy to eliminate such images from the analyses or revise the study by analyzing repeatability of the OCTA examinations in normal eyes with the local fractal analyses method, if such images had occurred in the study cohort. Gadde et al. also corroborated the results (magnitude of vessel density and its regional distribution around the fovea) of the study with physiologic studies on normal eyes of animals, which did not suffer from any motion artifacts. If motion artifacts played a significant role in the analyzed data, such an agreement between animal eye studies and the study by Gadde et al. may not have been possible. We do concur that disease eyes may require repeat OCTA examinations because such patients may not have stable fixation. This needs to be assessed in future studies. Also with the faster swept source OCTA devices available now, the repeatability of OCTA images can only improve.

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References


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FIGURE 1. (A) Optical coherence tomography angiography (OCTA) image of the superficial retinal vascular plexus of size 3 × 3 mm with motion artifacts. (B) Corresponding contour map created with normalized ratio of local fractal dimension values.