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Photoreceptor rearrangement and vision restoration in eyes with outer retinopathy: Quantitative assessment by fractal analysis DELIA CABRERA DEBUC, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, ROBERT TCHITNGA, University of Dschang, Faculty of Science, Department of Physics, P.O.Box 67 Dschang, Cameroon, MEDICAL IMAGING COLLABORATION, FRACTAL ANALYSIS COLLABORATION — The differentiation between normal and abnormal photoreceptor rearrangement before and after treatments may improve understanding on the sequence of events involved in the visual field defects. In this study, we evaluated a fractal analysis approach to quantify photoreceptor rearrangement and vision restoration. We analyzed Optical Coherence Tomography (OCT) data from an individual with outer retinopathy before and after treatment. The outer nuclear layer (ONL) was delineated from the rest of the retinal structure by using a custom-built segmentation algorithm. We then determined the fractal box dimension of the ONL's outline using the box counting method. Thickness and reflectance of the ONL were also calculated. Our results showed that the ONL's fractal dimension, thickness and relative reflectivity decreased after treatment. These early results showed that ONL's fractal dimension could be used as an index of photoreceptor rearrangement, which might lead to a more effective approach to therapy and improved diagnosis.

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