

PURPOSE

To analyze through imaging acquired with adaptive optics (AO) the macular anatomy after treatment of ocular syphilis.

METHODS

Using the RTX1 Adaptive Optics Flood Illuminated Camera (Imagine Eyes, Orsay, France), images were collected in 51 eyes from 32 patients after adequate treatment for syphilis. 17 eyes (32,69%) had images considered suitable for further analyzes. Images were processed by the manufacture's software AO Detect (Imagine Eyes, version 2.0) for automatized photoreceptors identification. Analyzes consisted of mean cone density (cells/mm²), distribution of the cones mosaic in terms of the neighborhood (percentage of cells with six neighbors - Voronoi domain) and cone spacing (average center to center distance between two adjacent cones). Cone counting was performed in different arbitrary regions of interest to allow comparable results with published data from healthy subjects.

RESULTS

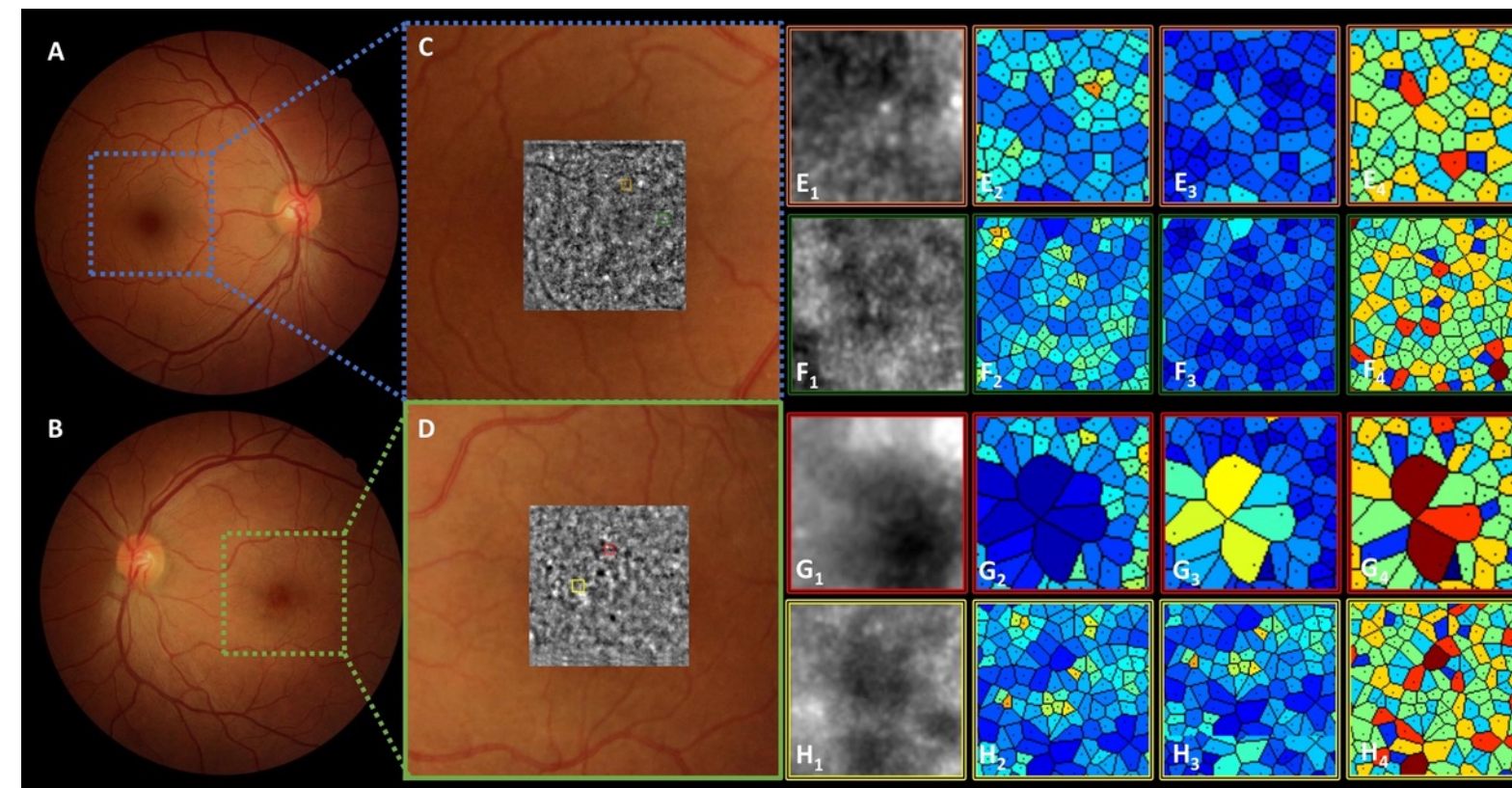
First, considering a 90 x 90 μm square, placed 1,5° nasal from the fovea, on the horizontal axis crossing foveal center. The mean cone density of 16 eyes from patients treated for syphilis was 11,283 ± 5,516 cells/mm². Cone spacing was 11.84 ± 4.56 μm, and the percentage of cells with six neighbors was 37.50 ± 6.91%.

Second, a sample size of 64 x 64 μm, located 1,5° superior from the foveal center. Mean cone density of 16 eyes from patients treated for syphilis was 14,378 ± 4,963 cells/mm². Cone spacing was 10.10 ± 4.20 μm, and the portion of cells with six neighbors was 33.43 ± 8.91%.

RESULTS

Finally, considering the mean value of samples size of 100 x 100 μm, located 75 μm superior, inferior, nasal, and temporal from the foveal center. Mean cone density of 10 eyes from patients treated for syphilis was 9,506 ± 4,883 cells/mm². Cone spacing was 14.70 ± 5.33 μm, and the portion of cells with six neighbors was 38.68 ± 7.49%.

The comparison between means cone densities of the eyes that had had clinical manifestation (12 eyes) and those that had not (4 eyes) in the 90 x 90 μm square and the 64 x 64 μm square demonstrated that the former group had lower values (mean 9,682 ± 4,348 cells/mm² and 13,137 ± 4,412 cells/mm² versus 16,086 ± 2,500 cells/mm² and 18,101 ± 5,210 cells/mm², respectively).



The figure shows images of both eyes of the same patient, the right eye without clinical involvement and the left eye after properly treated uveitis. A and B retinography of the right and left eye respectively. E and G AO images of the 90 μm square of the right and left eye respectively. F and H images of the 64 μm square of the right and left eye respectively.

DISCUSSION

In our study, we have chosen three distinct sample sizes to allow comparable results with published data from healthy subjects. The first analyze of 90 μm square found a smaller value comparable to Mélanie Bidaut Garnier et al. study¹ (11,283 ± 5,516 cells/mm² versus 25,544 ± 2,851 cells/mm² respectively). In the second analyze of 64 μm square, the mean cone density calculated was 14,378 ± 4,963 cells/mm², smaller than the 32,281 ± 2,281 cells/mm² assessed by Danila Giannini et al.². Finally, in the 100 μm squares analyze, method used by Tomoko Nakamura et al.³ in thirty healthy subjects assessing the mean cone density values found 24,496 ± 3,220 cells/mm² a higher value than the 9,506 ± 4,883 cells/mm² measured in our study.

The asset of our study is that we, for the first time, described the changes in the photoreceptor mosaic in patients treated for ocular syphilis, comparing the results of distinct compatible regions of interest with data published by different researchers

In conclusion, this study shows that even with good visual acuity, the cone mosaic in patients treated for syphilis is altered. Further longitudinal studies, with functional and structural tests, are encouraged to better understand this condition.

REFERENCES

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2. Giannini, D., Lombardo, G., Mariotti, L., Devaney, N., Serrao, S., Lombardo, M. (2017). Reliability and Agreement Between Metrics of Cone Spacing in Adaptive Optics Images of the Human Retinal Photoreceptor Mosaic. *Invest. Ophthalmol. Vis. Sci.*, 58(7):3127-3137.
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