

Area of Schlemm's canal in healthy and glaucoma eyes imaged using swept-source optical coherence tomography



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PURPOSE

Optical coherence tomography (OCT) of the anterior segment (AS) can provide visualization of small features such as the trabecular meshwork and Schlemm's canal (SC) and become an important tool for diagnosis and treatment of glaucomatous patients. In this study, we evaluate the capability of an AS add-on lens module in visualizing Schlemm's canal and its diagnostic potential by evaluating the cross-sectional area in healthy and glaucomatous eyes.

METHODS

- A swept-source OCT instrument, PLEX® Elite 9000 (ZEISS, Dublin, CA) with prototype software, was equipped with an AS add-on module. The limbal area was scanned with a High-Definition (HD) Cross scan. An external fixation target was used to perpendicularly scan the limbal region.
- HD Cross = 6 mm cross pattern, 5 B-scans with 0.125 mm separation, 1024 A-scans/B-scan and 1536 pixels in depth (3 mm depth) at 100 kHz, with 5 repetitions averaged.
- Both eyes of 2 healthy and 2 glaucomatous patients (8 eyes) with ages ranging from 32-67 years old were scanned. Acquisition was done by an expert operator to confirm the presence and consistency of the SC and its location in the scanned area. The area of the SC was then visually evaluated by an expert.

CONCLUSIONS

PLEX Elite 9000 with AS add-on module provides good quality visualization of Schlemm's canal in both healthy and glaucoma patients. Thus, it has the potential to be used as a diagnostic tool for glaucoma. Future efforts will be toward optimizing the scan pattern specific to SC, its segmentation, and quantification of cross-sectional area in larger sample groups.

RESULTS

Schlemm's canal was successfully observed in all 8 cases, although it is generally easier to visualize SC in healthy and younger subjects. Consistently the cross-sectional area appears to be smaller in older and glaucomatous eyes (Figure 1). However, more data is needed for a clinically significant comparison of cross-sectional area.

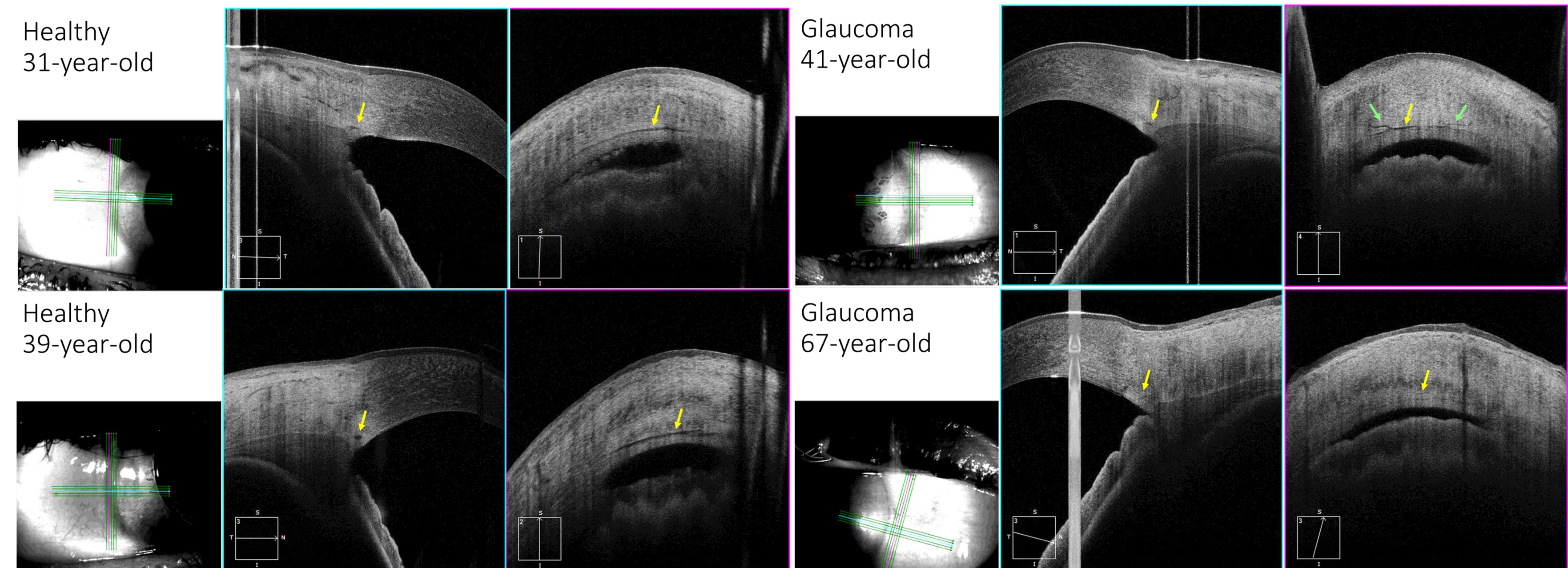


Figure 1: Visualization of Schlemm's canal (yellow arrows) in 4 healthy and glaucoma eyes and visualization of collector channels (green arrows) in a glaucoma eye.

