

Swept-Source optical coherence tomography angiography of the anterior segment

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PURPOSE

Several pathologies can affect the anatomy of the ocular circulatory system and cause changes in blood flow. Optical coherence tomography angiography (OCTA) provides a noninvasive tool for the assessment of the anterior segment vasculature, which may aid in the diagnosis and management of iris neovascularization, tumors, and pterygia, among others. We conducted a clinical study to evaluate the ability of a swept-source OCTA system to image the anterior segment of the eye.

METHODS

- A modified PLEX®Elite 9000 swept-source OCT system (ZEISS, Dublin, CA) with 200 KHz sampling frequency and 6mm scan depth was used to image the ocular anterior segment of five healthy volunteers.
 - Two scan patterns were used in this study:
 - Pattern 1: 16x16 mm field of view (FOV) with 500 points per B-scan, two B-scans per averaged cluster, and 500 clusters.
 - Pattern 2: 8x8 mm FOV with 300 points per B-scan, four B-scans per averaged cluster, and 300 clusters.
- Scleral surface of all subjects was scanned using pattern 1
- Limbal area of all subjects was scanned using pattern 2
- Iris of all subjects was scanned using both patterns
- Enhanced depth imaging (EDI) mode was used to achieve better sensitivity in deeper regions.

RESULTS

- A total of five eyes of five subjects were scanned in this study. In two subjects, iris scans were unsuccessful, likely due to dark pigmentation. All other scans were successfully acquired.
- Figure 1 presents OCT structural and angiography images
- Blood flow shows superficially on the sclera, while it is concentrated on the deeper region of the iris and absent on the avascular section of the limbal angle.

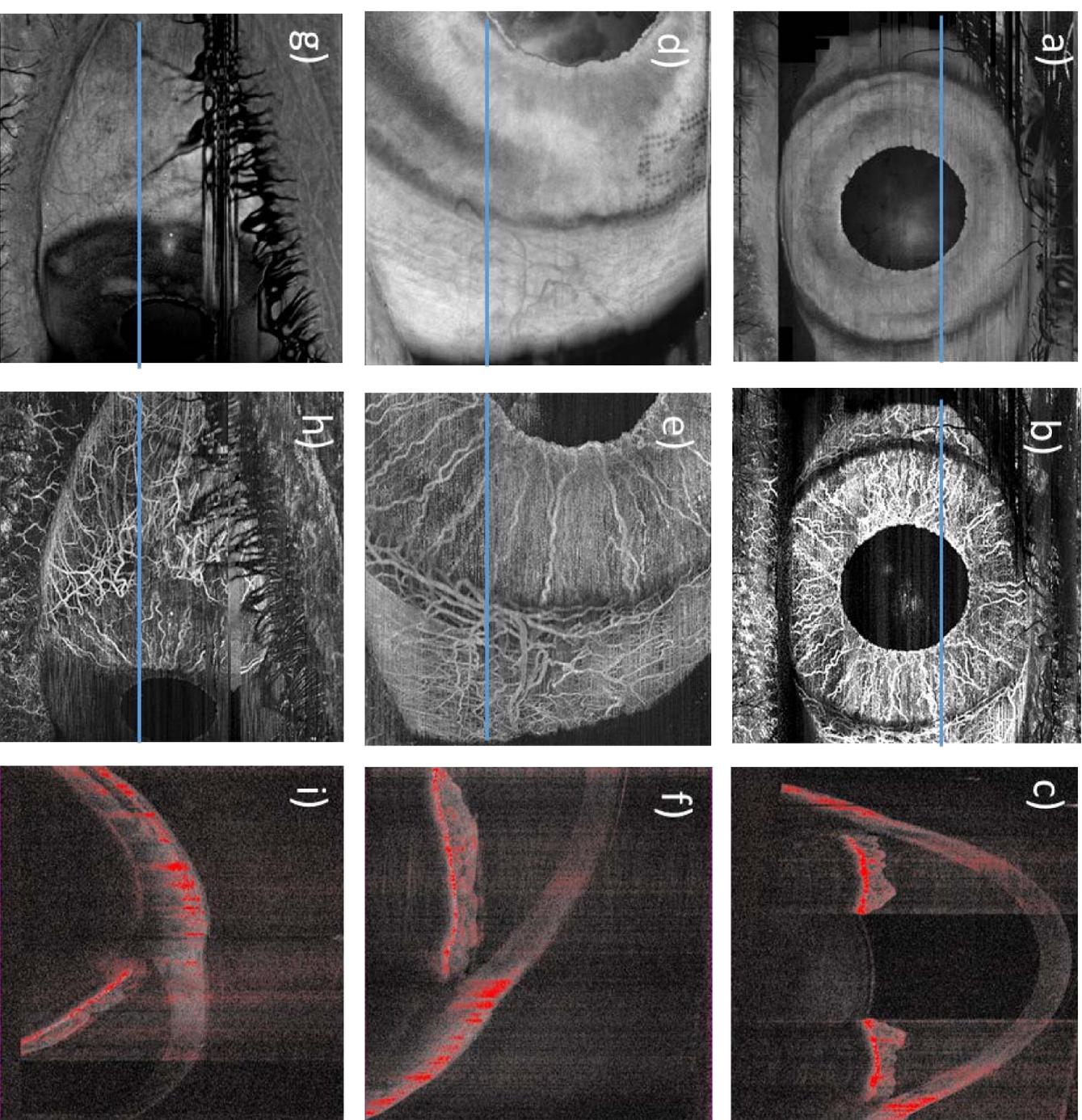


Figure 1. AS imaging using a 200 kHz SS-OCT prototype system. Structural and vascular images obtained from the iris (a-b), limbus (d-e) and sclera (g-h), and their corresponding B-scan images, acquired at the location denoted by the blue line, (c), (f) and (i). The red color denotes blood flow signals.

CONCLUSIONS

We have demonstrated the ability of the modified PLEX®Elite 9000 swept-source OCT system to image the vasculature of the iris, limbus and sclera. The speed of the system yields images free of motion artifacts and the depth-window allows for visualization of the anterior segment without fold-back errors.

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Disclosures: SB (E), SK (E), RW (E), TS (E), TC (E), PS (C), JS (E): Carl Zeiss Meditec, Inc.