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PURPOSE

OCT angiography (OCTA) of the inner retina capillary networks has been shown to provide significant diagnostic value. Similar images of the choriocapillaris are however much more difficult to interpret, because individual capillaries are typically not resolved well [D]. We compare images of the human choriocapillaris obtained with a prototype MHz swept-source OCT (SS-OCT) with images from a commercial spectral domain OCT (SD-OCT) system.

METHODS

- Developed a clinical 1060 nm MHz SS-OCT prototype:
 - 1.7 million A-scans per second
 - 90 dB sensitivity (@ 1.9 mW sample power)
 - 3 mm imaging depth in tissue
 - 8 μ m axial resolution in tissue (FWHM)
 - 8 μ m lateral resolution in tissue (FWHM)
- Acquired OCTA scans
 - 640 (X) x 1536 (Z) x 10 (repetitions) x 320 (Y)
 - FOV: 2.3 mm (X) x 1.2 mm (Y)
 - 800 Hz B-scan rate
- Calculated OCTA flow B-scans {F}
- Segmented the RPE
- Flattened the B-scans according to the RPE fit
- Created the choriocapillaris OCTA enface projection {E} by integrating 20 μ m at the depth indicated by the arrow in {F}.
- Compared the MHz choriocapillaris OCTA images with images of the same eye obtained with a CIRRUS™ HD-OCT 5000 with AngioPlex® OCT Angiography (ZEISS, Dublin, CA) {A, B, D}

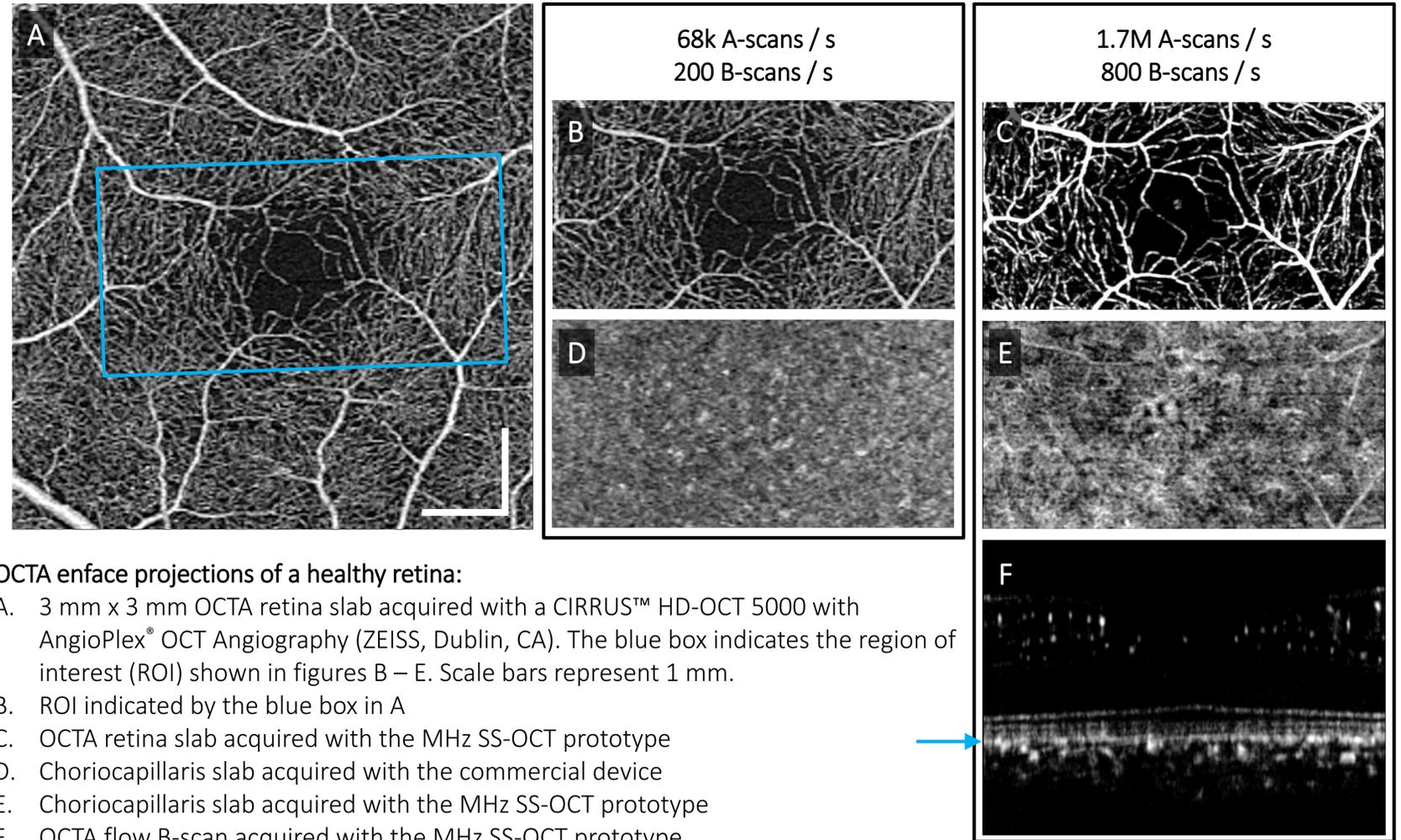
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RESULTS



OCTA enface projections of a healthy retina:

- A. 3 mm x 3 mm OCTA retina slab acquired with a CIRRUS™ HD-OCT 5000 with AngioPlex® OCT Angiography (ZEISS, Dublin, CA). The blue box indicates the region of interest (ROI) shown in figures B – E. Scale bars represent 1 mm.
- B. ROI indicated by the blue box in A
- C. OCTA retina slab acquired with the MHz SS-OCT prototype
- D. Choriocapillaris slab acquired with the commercial device
- E. Choriocapillaris slab acquired with the MHz SS-OCT prototype
- F. OCTA flow B-scan acquired with the MHz SS-OCT prototype

CONCLUSIONS

- B-scan repetition rate influences the visual appearance of the choriocapillaris layer in OCTA images.
- The number of B-scan repetitions and the lateral resolution however have a strong impact as well. We recommend at least 5 B-scans repetitions and a lateral resolution below 10 μ m.
- Next steps include increasing the field of view and imaging patients with diseases that disrupt the choriocapillaris.

References

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