

# Single shot widefield swept-source OCTA with 90° add-on lens



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Poster # PB0073

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## PURPOSE

- Widefield imaging techniques continue to expand the retinal field-of-view (FOV) of optical coherence tomography angiography (OCTA).
- Additional peripheral retina vasculature can be viewed with widefield OCTA, helping to decrease or eliminate the need for invasive procedures, such as fluorescein angiography.
- This study compares the expanded FOV of images captured using an external lens attachment to the standard FOV on a swept-source (SS) OCT system.

## METHODS

- A 90° add-on lens was designed as an attachment to the PLEX® Elite 9000 (ZEISS, Dublin, CA) SS-OCT system (1060 nm central wavelength).
- This external positive meniscus lens module has the effect of increasing the maximum field angle to about 46° and decreasing the working distance from 28 mm to approximately 11 mm.
- PLEX Elite prototype software was modified and equipped with a widefield scan pattern (Angio 23x23mm) and automatic adjustment to compensate for the lens diopter and working distance.
- Subjects (age range 45-88 years) with various stages of diabetic retinopathy or retinal vein occlusion were scanned with the PLEX Elite. Each subject was scanned with the following two scan patterns:
  - Angio 15x15 mm (834 A-lines x 834 B-Scans acquired at 200kHz) without the add-on lens: FOV 60°.
  - Angio 23x23 mm (834 A-lines x 834 B-Scans acquired at 200kHz) with the add-on lens: FOV 90°.

## 90° FOV in OCTA is an effective alternative to other widefield imaging modalities

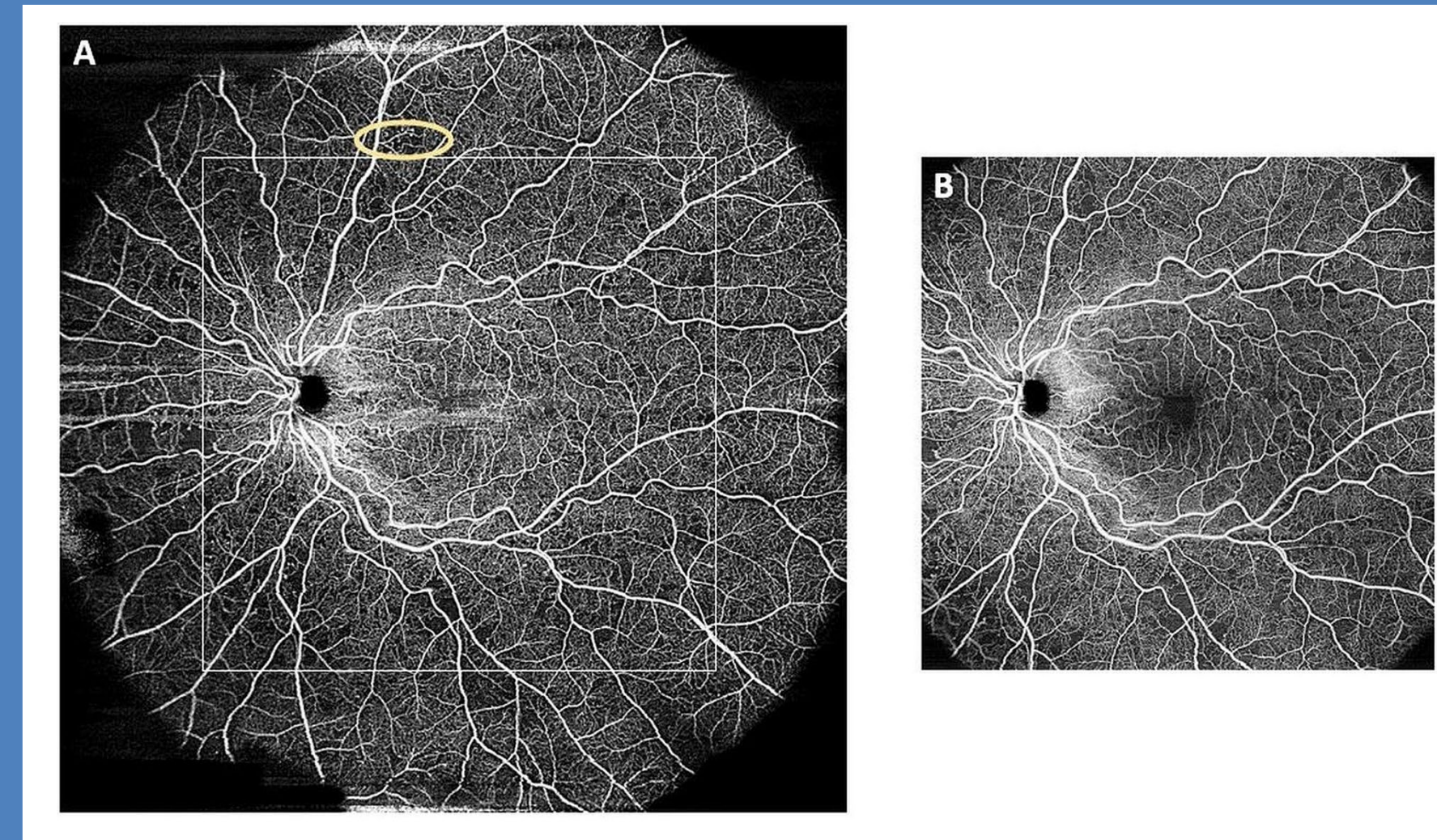


Figure 1. (A) 90° OCTA en face projection of early diabetic retinopathy using add-on lens  
(B) 60° OCTA en face projection

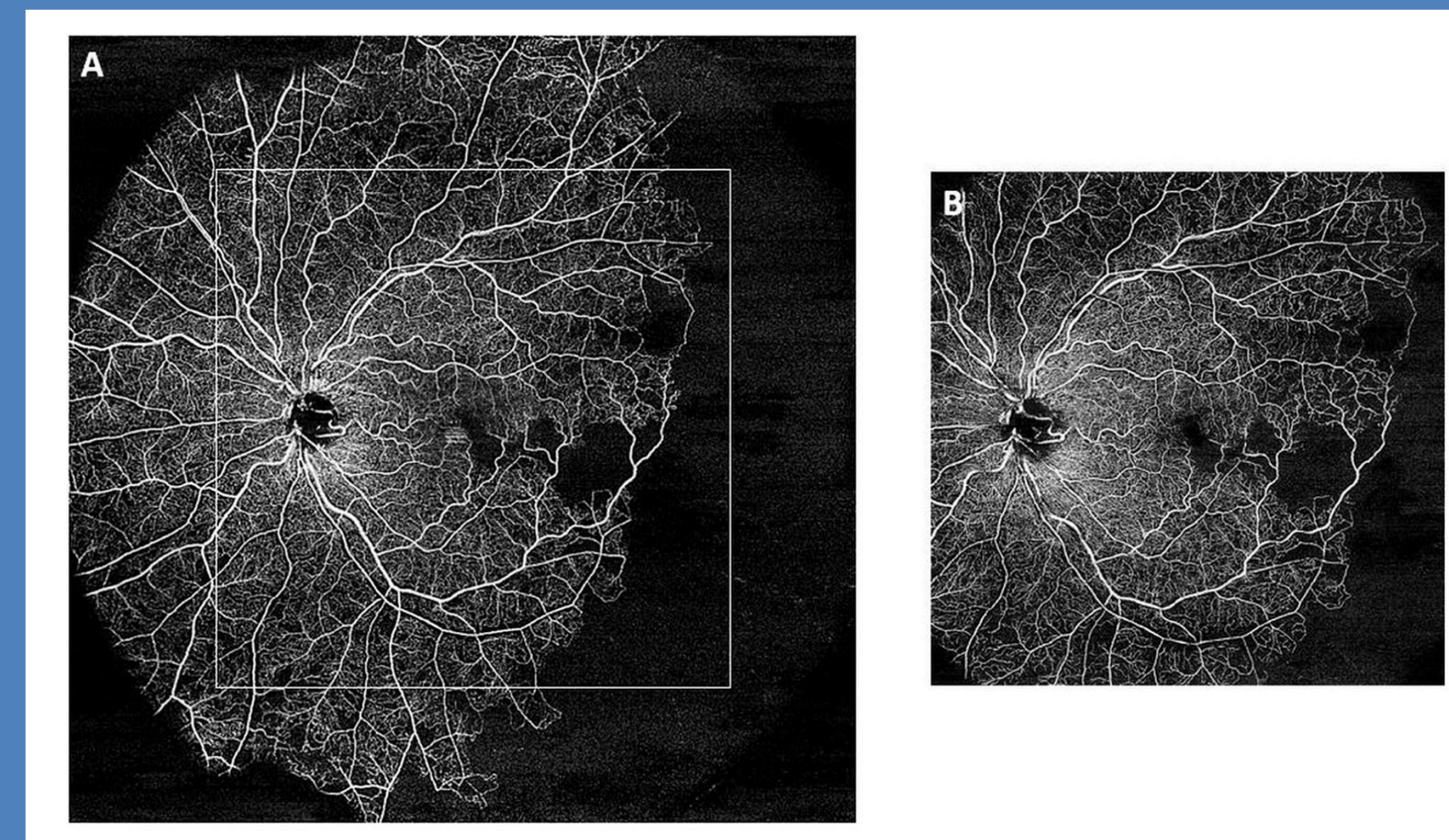


Figure 2. (A) 90° OCTA en face projection of retinal vascular occlusion using add-on lens  
(B) 60° OCTA en face projection

- These images were compared and reviewed by an expert to determine whether additional retinal abnormalities could be identified outside of the standard 60° FOV.

## RESULTS

- Paired images from 31 patients were reviewed by the expert observer. All 31 exhibited additional retinal abnormalities in the 90° FOV that were not seen in the standard 60° FOV.
- Figure 1 displays an expanded FOV where more microaneurysms (circled) along with additional areas of capillary nonperfusion can be seen beyond 60° in a patient with diabetic retinopathy.
- Figure 2 illustrates the extent of a vascular occlusion into the far periphery that is easily seen with the 90° FOV.

## CONCLUSIONS

- We have demonstrated that additional retinal findings can be discovered by expanding the FOV to 90° with the use of an auxiliary lens attachment on the PLEX Elite.
- Capturing only one image is much more convenient than other methods that montage multiple images.
- This larger FOV continues to make OCTA an effective alternative to other widefield imaging modalities.

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Disclosures: KR (E), TC (E), ZN (E), WL (C): Carl Zeiss Meditec, Inc.; FS (N); KB (E), SW (E): Carl Zeiss Vision GmbH; FZ (C): Abbvie, Apellis, Bayer Healthcare, Janssen, Novartis, Biogen, Boehringer-Ingelheim, Genentech/Roche, MSD, NovoNordisk, Sanofi, Stada; FZ (R): Abbvie, Bayer Healthcare, Clearside, Kodiak, Novartis, Biogen, Genentech/Roche, Sanofi

