

Approximate axial motion correction by OCT B-scan alignment



Yuanzhi Liu, PhD; Homayoun Bagherinia, PhD
Carl Zeiss Meditec, Inc., Dublin, CA, USA

Poster # 3569439

PURPOSE

- Axial motion correction (AMC) is essential for OCT image analysis such as retinal multilayer segmentation (MLS).
- Using orthogonal retrace scans is an effective technique for AMC, but sometimes it suffers from axial bulk motion and low image contrast (e.g. near the optic nerve head or large vessel areas).
- We propose a solution to address these problems by using OCT B-scan alignment.

METHODS

Algorithm

- Identify a reference B-scan in the OCT volume data, with selection based on B-scan quality (contrast, intensity, and SNR) and central retinal position.
- Starting with the reference B-scan, register neighboring adjacent B-scans using normalized cross-correlation in the axial direction.
- Repeat motion correction until the entire OCT volume is corrected axially.

Data

- CIRRUS™ 6000 AngioPlex (ZEISS, Dublin, CA) was used to image 15 subjects, with a mix of healthy eyes and eyes with pathology, such as age-related macular degeneration, macula edema, epiretinal membrane, and diabetic retinopathy. 107 scans in total were acquired, with 12 scans of 3 x 3 mm and 95 scans of 6 x 6 mm angiography.
- A grader reviewed the MLS results before and after axial motion correction to evaluate the impact of axial motion correction on MLS failures.

RESULTS

- Before AMC, MLS malfunctioned for 31 scans due to axial motion (failure rate of MLS 29%).
- After applying the proposed AMC, MLS failed only for 1 case (failure rate of MLS 1%).
- Figure 1 shows 2 examples of the MLS performance before and after the axial motion correction.

Email: yuanzhi.liu@zeiss.com

Disclosures: Y. L(E), H. B.(E): Carl Zeiss Meditec, Inc.

CONCLUSIONS

We have proposed an OCT B-scan based motion correction technique which is essential for a more robust MLS.

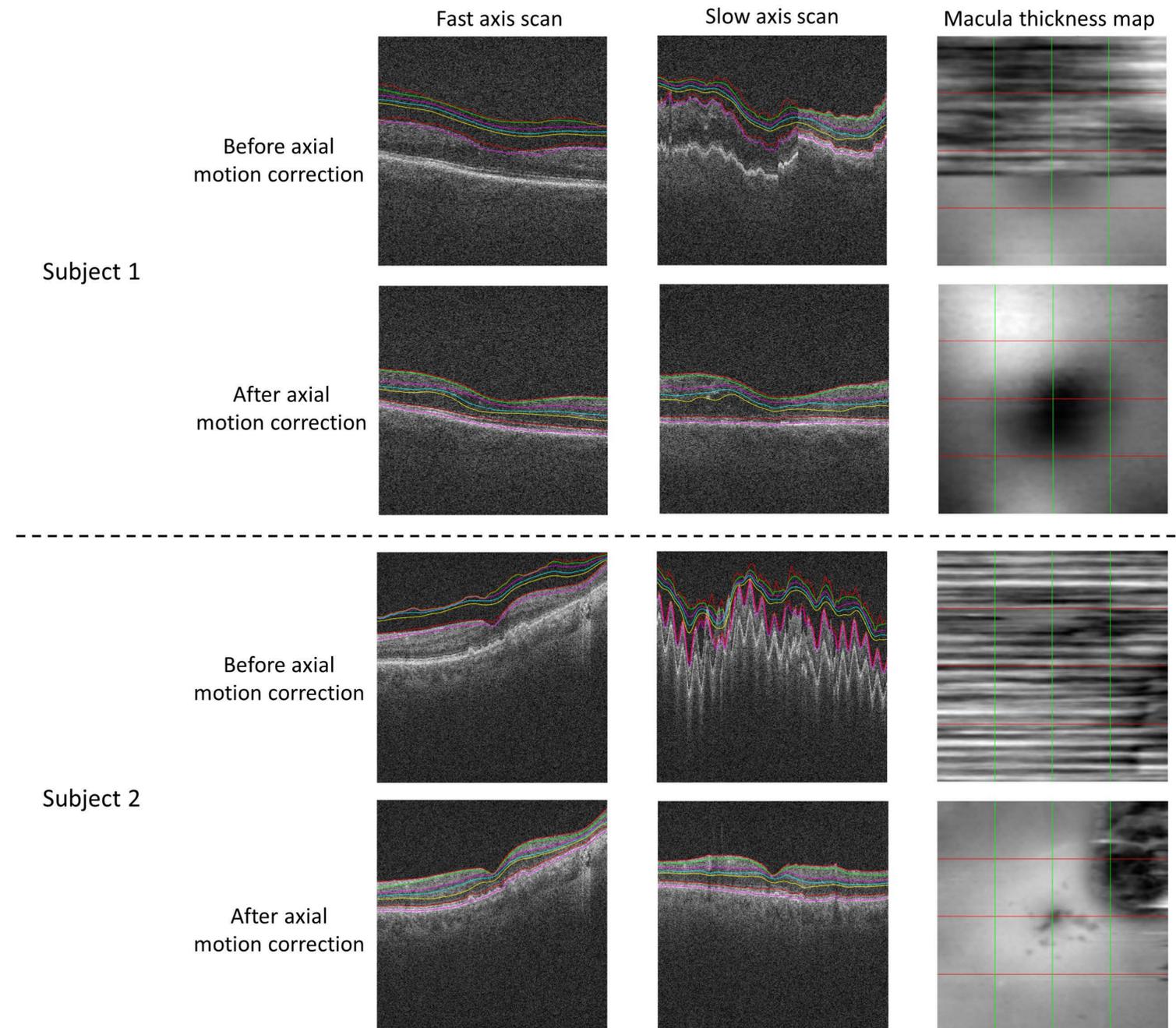


Figure 1. Two examples of multilayer segmentation before and after axial motion correction.