Swept-Source vs Spectral-Domain OCT in Anterior Segment Imaging

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1. Main Text

Optical Coherence Tomography (OCT) has revolutionized anterior segment imaging, providing in vivo cross-sections of the cornea, anterior chamber, and lens. Spectral-Domain OCT (SD-OCT) employs ~840 nm light with high resolution but limited penetration, while Swept-Source OCT (SS-OCT) uses ~1050–1310 nm tunable lasers, offering deeper penetration (~6 mm), faster scan speeds, and wide-field volumetric imaging. SS-OCT visualizes the full anterior chamber even in dense cataracts and captures 360° angle views rapidly, whereas SD-OCT is superior for superficial detail (e.g., Schwalbe's line). These differences make SS-OCT a powerful tool for cataract biometry, glaucoma angle assessment, and corneal mapping.

2. Methods and Results

We performed a narrative literature review comparing SS-OCT and SD-OCT for anterior segment applications. Studies consistently show SS-OCT enables superior imaging depth and fewer biometry failures in dense cataracts, while providing reliable 360° angle scans. SD-OCT remains valuable for high-resolution corneal imaging. The translational relevance is clear: SS-OCT supports earlier glaucoma detection, better cataract surgical planning, and comprehensive corneal assessment

3. Acknowledgement

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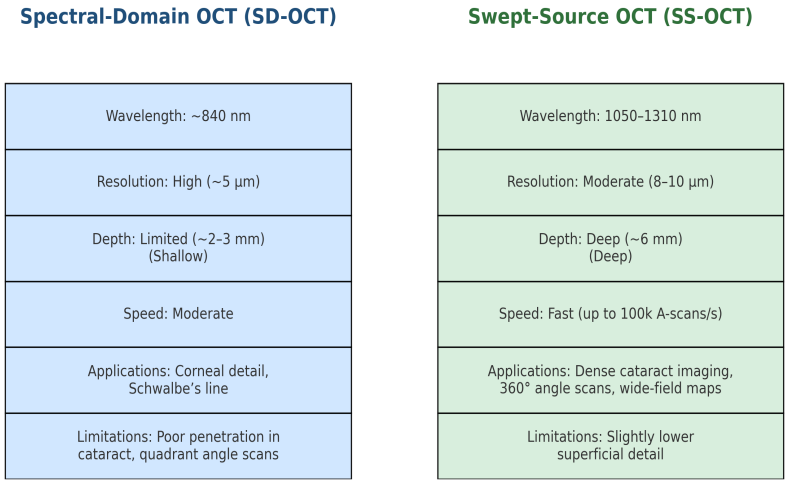

Fig. 1. Comparison of Spectral-Domain OCT (SD-OCT) and Swept-Source OCT (SS-OCT) for anterior segment imaging.

4. References

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