Reproducibility of nerve fiber layer thickness measurements using 3D fourier-domain OCT

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PURPOSE
Conventional time-domain optical coherence tomography (OCT) has been shown to provide reproducible retinal nerve fiber layer (RNFL) measurements. Recently, high-speed, high-resolution Fourier-domain 3D-OCT has been introduced to improve OCT quality. It can provide 6-mm(2) high-density scans to provide RNFL thickness measurements. The purpose of this study was to test the reproducibility of 3D-OCT RNFL thickness measurements in healthy volunteers.

METHODS
Thirty-eight eyes were included in the study. High-density 6-mm(2) 3D scans were registered by two independent operators. RNFL thickness was calculated for eight areas corresponding to the ETDRS areas and for two ring areas. The ETDRS grid was centered on the optic disc. Intraclass correlation coefficients (ICC) and coefficients of variation (COV) were calculated. Interobserver reproducibility was visualized by using Bland-Altman analysis.

RESULTS
Intrasession reproducibility was good with a mean ICC of 0.90. The mean COV for operator 1 and 2 was 4.2% and 4%, respectively (range, 1.9%-6.7%). Highest reproducibility was found for the two ring areas and the superior and inferior quadrants. Mean differences in RNFL thickness measurements for ring 1 and 2 between operator 1 and 2 were 0.9 microm (limits of agreement, -11.4 to +9.6 microm) and 0.1 microm (limits of agreement -4.1 to +3.9 microm), respectively.

CONCLUSIONS
3D-OCT RNFL thickness measurements in healthy volunteers showed good intra- and interobserver reproducibility. 3D-OCT provides more RNFL thickness information compared to conventional time-domain OCT measurements and may be useful for the management of glaucoma and other optic neuropathies.
type: journal paper/review (English)
date of publishing: 01-08-2008
journal title: Invest Ophthalmol Vis Sci (49/12)
ISSN electronic: 1552-5783
pages: 5386-91