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Delineator variability in 3-D reconstructions of Spectral Domain Ocular Coherence Tomography images in normal human eyes

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Spectral Domain Ocular Coherence Tomography (SD-OCT) is one of the most informative tests of the optic nerve head structures used in clinical practice. Burgoyne et al (2007), presented a technique that exports these SD-OCT images to Multiview Horizons software (Devers Institute, Portland, Oregon) to delineate some of the important structures in the ONH, namely the Bruch's membrane (BM), Inner limiting Membrane (ILM) and the Lamina Cribrosa (LC). These marks were then utilized for 3-D reconstructions of the ONH and quantifications. The present study looked at the inter-delineator variability and intra-delineator reproducibility of 24 scan SD-OCT images in normal human eyes. We had two delineators (MEC and BLS) delineating five eyes each, each delineator repeating each eye 3 times. For each of the delineated 3-D reconstruction, a least square ellipse was fitted to the marks defining the Bruch's membrane opening (BMO), creating a BMO reference plane, using a prototype software (C++ language). The Lamina Cribrosa depths (LCD) were computed with rays fired from uniform sampling of LC in each OCT section to the Bruch's membrane opening (BMO) plane. The maximum and mean LCD measures for the superior, inferior, nasal and temporal quadrants were calculated. Statistical analysis was done with Sigmaplot (Systat Inc.) and correlations between variables were tested with Pearson's correlation analysis. We found no statistically significant difference in the BMO reference plane in between the delineators and within each repetition by a delineator ($p>0.05$). For all the five eyes, the mean and maximum LCD measurements were not significantly different (Pearson product moment correlation, $p>0.05$) with the three repeated sessions of delineations by each delineator (intra-delineator reproducibility). There was no significant difference between the two delineators for four of the five eyes for the mean LCD, and three of the five eyes for maximum LCD ($p>0.05$). We report that there was no significant variation in the mean and maximum LCD measurements within an individual delineator, though there are some significant variations between the delineators in a few of the eyes

Biography

Dr. Kankipati completed his Ph.D from Vision Sciences Department, University of Alabama at Birmingham, Birmingham, Alabama. His current research involves clinical testing of compliance of optic nerve head structures to acute stress states. He also collaborates with Devers Institute, Portland, Oregon in the 3 dimensional quantitative reconstructions of the optic nerve head of human donor eyes. Dr. Kankipati has published in top rated peer reviewed journals like the Investigative Ophthalmology and Visual Science. He also has a medical degree from India along with a masters degree in public health.