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**Corneal Epithelial Thickness Measured Using Anterior Segment Optical Coherence Tomography as a Diagnostic Parameter for Limbal Stem Cell Deficiency.**

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**Authors:** Qingfeng Liang, Qihua Le, Daniel W Cordova, Chi-Hong Tseng, Sophie X Deng

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**Public Summary:**

This study investigates the use of Anterior Segment Optical Coherence Tomography (AS-OCT) as a diagnostic tool to diagnose Limbal Stem Cell Deficiency (LSCD). AS-OCT is a high resolution imaging technique used to image the cornea. This equipment is readily available at the clinic and easy to perform. The study concluded that central cornea thickness and maximum limbal thickness are decreased in patients with LSCD, making AS-OCT a reliable tool to diagnose LSCD in combination with other diagnostic methods.

**Scientific Abstract:**

**OBJECTIVE:** Using anterior segment optical coherence tomography (AS-OCT), we investigated the epithelial thickness (ET) of the central cornea and limbal regions in patients with limbal stem cell deficiency (LSCD) as a diagnostic and staging parameter. **DESIGN:** Prospective, cross-sectional study. **METHODS:** The central corneal epithelium thickness (CET) and maximum limbal epithelium thickness (mLET) were measured in the superior, inferior, nasal, and temporal limbus on AS-OCT images of the normal and eyes with LSCD. CET was obtained by 1-point (OCT-CET1) and 3-point measurement (OCT-CET3). The values of OCT-CET1 and OCT-CET3 were compared to the CET obtained with in vivo confocal microscopy (IVCM-CET). **RESULTS:** Sixty-eight eyes of 50 patients with LSCD and 52 eyes of 34 normal subjects were included. The mean ( $\pm$ -standard deviation) OCT-CET3 was 55.0  $\pm$  3.0  $\mu$ m (range, 50.6-62.0  $\mu$ m) in the control group and 41.6  $\pm$  10.8  $\mu$ m (range, 0-56.3  $\mu$ m) in the LSCD group ( $P < .001$ ). OCT-CET3 had a better correlation with IVCM-CET ( $r = 0.91$ ) than did OCT-CET1 ( $r = 0.87$ ,  $P = .001$ ). The degree of reduction in OCT-CET3 increased in more advanced clinical stages of LSCD (all  $P < .001$ ). The OCT-CET3 cutoff value that suggests LSCD was 46.6  $\mu$ m. Compared with the control group, the LSCD group had decreases in mLET in all 4 limbal regions (all  $P < .001$ ). The sensitivity and specificity of OCT-CET3 is the highest among all mLET in detecting LSCD. **CONCLUSIONS:** Both CET and mLET were thinner in patients with LSCD than in normal subjects. OCT-CET3 appears to be a reliable parameter to confirm LSCD when there is clinical suspicion.

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