# Comparing the Stromal Demarcation Line Depth in Standard Versus High-Intensity Corneal CXL Using Anterior Segment OCT

PURPOSE: To compare the depth of the corneal stromal demarcation line at center and periphery in standard versus high intensity collagen cross-linking (CXL) using Visante (Carl-Zeiss Meditec) anterior segment optical coherence tomography (AS-OCT).

METHODS: Cases with keratoconus or post-LASIK ectasia with CXL performed by a single surgeon in a private setting tertiary hospital during a 24 month period (November 2011 to November 2013) were retrospectively reviewed. Cases were divided into Group 1: standard 30 minutes CXL with average intensity 3.0 mW/cm$^2$ and Group 2: high intensity 10 minutes CXL with average intensity 9.0 mW/cm$^2$. Cases without postoperative AS-OCT (routinely performed 1 month postoperatively) were excluded. The corneal stromal demarcation line at center and periphery (nasal, temporal, superior and inferior 3mm from center) on postoperative AS-OCT were measured by a single observer and compared.

RESULTS: A total of 33 patients were included (18 in Group 1, 15 in Group 2). The baseline demographics, refractive error (cylinder and spherical equivalence), keratoconus grading, pachymetry and keratometry values were matched. The mean demarcation line at center was 295 µm (group 1) vs 203 µm (group 2) ($P<0.0005$, Mann-Whitney U test). The mean depth at 3 mm periphery (nasal, temporal, superior, inferior) in group 1 were 260 µm, 269 µm, 232 µm, 242 µm. All had a statistical significant reduction compared with center ($p=0.001$, Friedman test). The respective measurements in group 2 were 204 µm, 201 µm, 196 µm, 189 µm, and all had no statistical significant reduction compared with the central ($p=0.177$, Friedman test).

CONCLUSION: The stromal demarcation line at center was significantly shallower in high intensity CXL compared with standard CXL. However, the treatment volume profiles were different in the 2 groups, as the reduction of demarcation line depth towards peripheral cornea in standard CXL was not observed in high intensity CXL.