Fourier Domain Anterior-Segment OCT evaluation of DSAEK graft thickness.

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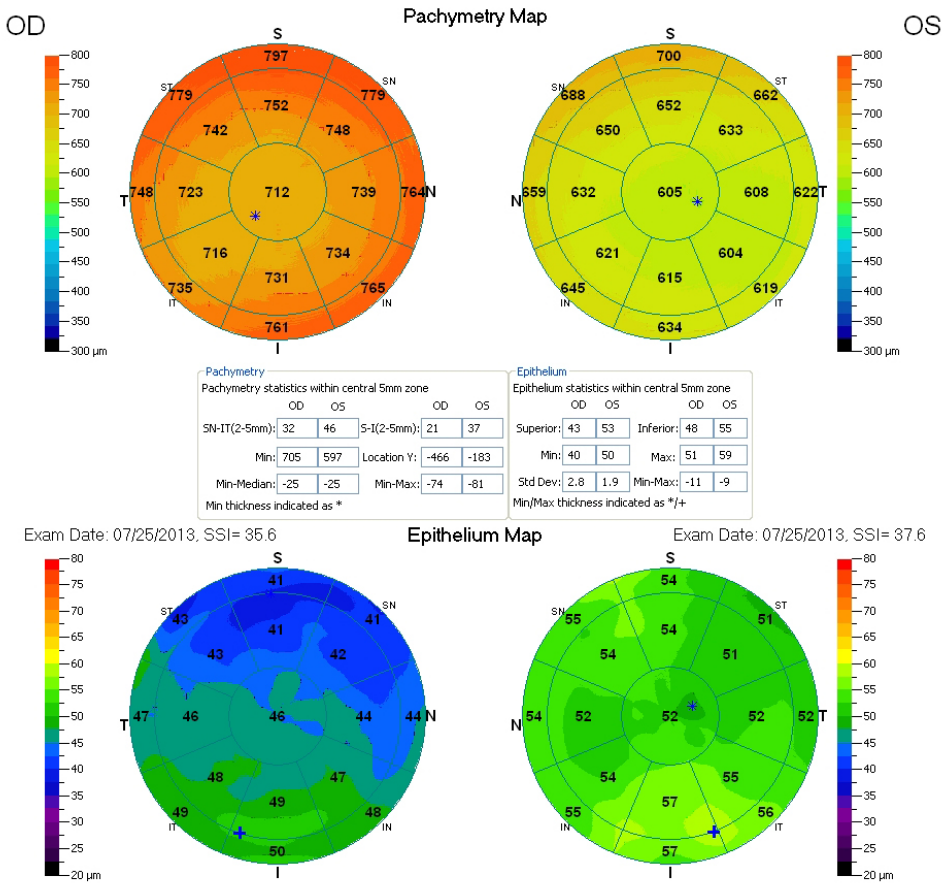
Purpose

To evaluate central corneal thickness (CCT) and central graft thickness (CGT) changes following Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK).



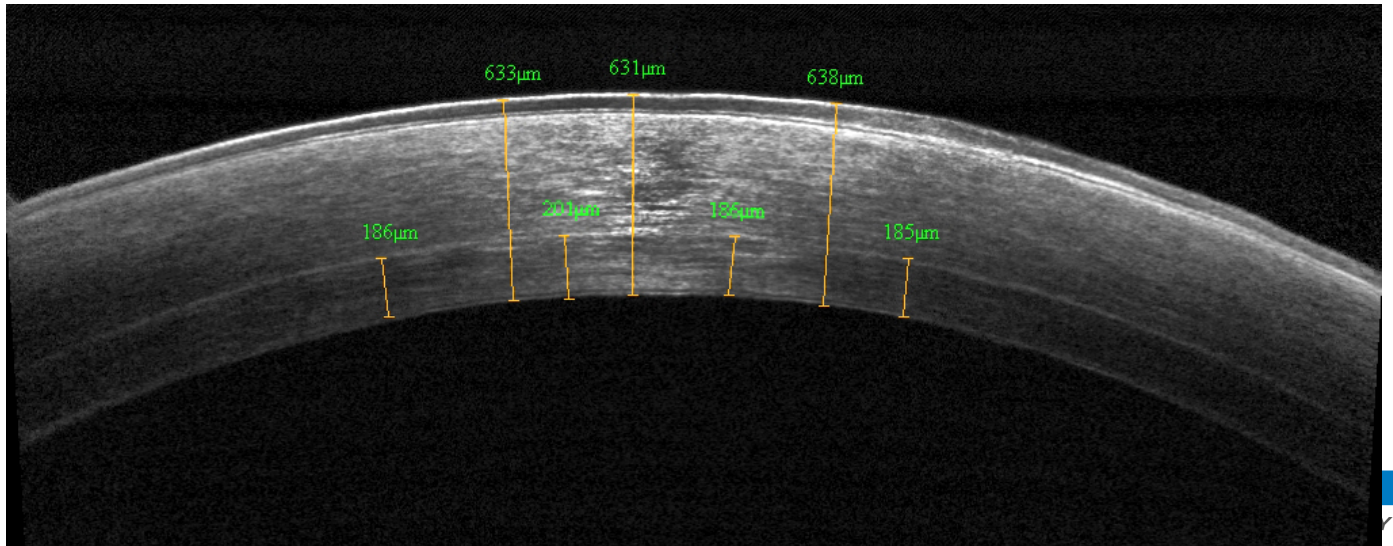
Methods

Fourier-domain Anterior-Segment Optical Coherence Tomography (AS-OCT, Rt-Vue 100, OptoVue, Fremont, CA)

High-resolution meridional scans pre-operatively and up to one-year postoperatively.

41 cases were investigated, 27 female and 14 male.

Central corneal thickness and central graft thickness data were obtained using three caliper tool measurements, reporting the average of each per eye.



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Results

The average ± standard deviation subject age in the study (5 men and 11 women) at the time of the operation was 49.9±15.3 (38 to 75) years of age.

Of the 16 different eyes, 5 were right and 11 were left.

Preoperative best-spectacle distance corrected visual acuity (CDVA) for all cases enrolled in group-A was 0.36±0.25 (decimal), ranging from 0.01 to 0.8.

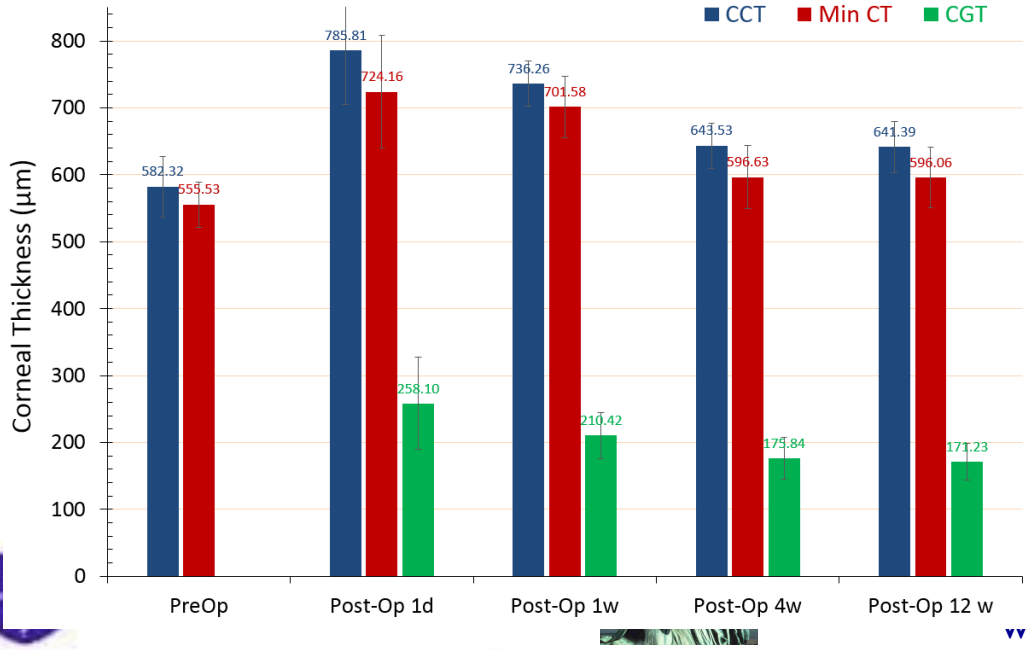
One month postoperative average CDVA was 0.66±0.33 (0.1 to 0.8), three-month CDVA was 0.71±0.28 (0.15 to 0.85) and six-month CDVA was 0.72±0.25 (0.2 to 0.85).

Corneal and Graft Thickness Results

Preoperative CCT was 589.78±49.24 (559 to 645) µm.

One-month postoperatively, CCT was 736.26±34.52 (713 to 771) µm; CGT was 210.42±34.52 (145 to 243) µm.

One-year postoperatively, CCT was 640.39±38.75 (569 to 684) µm; CGT was 153.15±42.91 (90 to 291) µm.

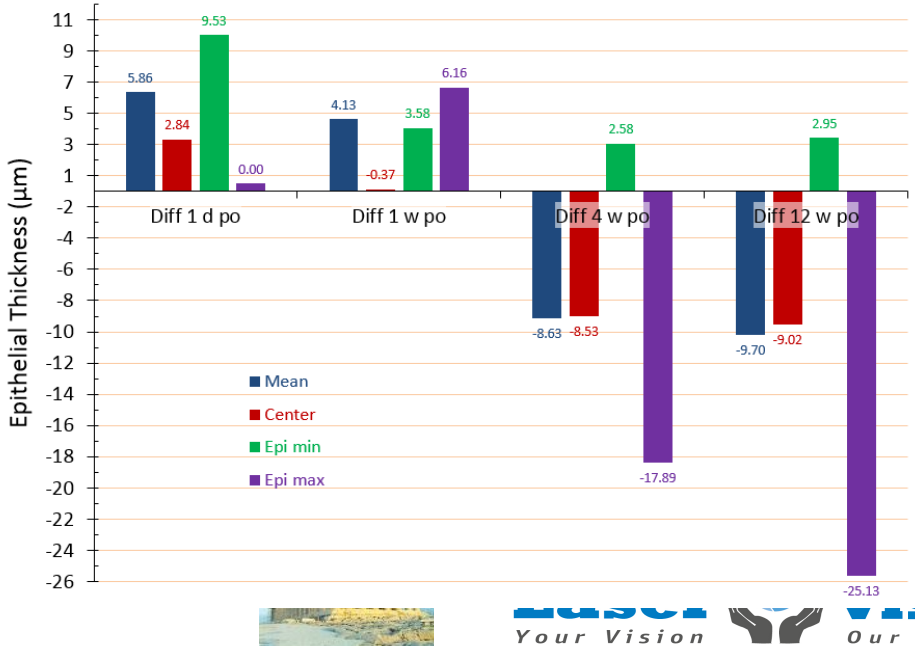


Epithelial Thickness Results

Pre-operatively, the center epithelial thickness was 55.74±9.29 (45 to 74) µm, and topographic thickness variability was 10.84±4.09 (5.90 to 18.80) µm.

Three months postoperatively, 46.72±5.23 (43 to 55) µm, and 3.77±1.46 (2.75 to 5.47) µm.

Average difference in the epithelial thickness, in comparison to baseline was -9.02 µm, +2.95 µm and 25.13 µm for center, mean and periphery, respectively. These differences were all statistically significant (paired analysis p <0.001, p <0.001, and p <0.001, respectively).



Discussion

To evaluate the efficacy of DSAEK in reducing stromal edema and epithelial layer irregularity we examined near term longitudinal development of corneal thickness, in the form of CCT and MinCT.

Near-term stromal deswelling and epithelial layer thickness recovery following DSAEK is related to the postoperative rehabilitation of the affected eye, particularly in bullous keratopathy cases. In addition, the epithelial thickness, which can be an indicator of the healing process and restoration of adequate endothelial function has been monitored up to six months postoperatively. In this work, we monitored minimum, mean, minimum and maximum epithelial thickness, and in addition, the topographic epithelial thickness variability.

Our study indicated that both CCT and MinCT, as well as the epithelial layer thickness (central, mean, maximum and minimum) were presented with a statistically significant increase the day following the DSAEK intervention, maintaining these levels at the 1 week postoperative visit. The corneal increase was consistent with the extra thickness due to the graft insertion; the difference on the CCT increase was correlated to the measured CGT.

Conclusions

- Central corneal and central graft thickness appear to stabilize after one-month postoperatively following DSAEK.
- Epithelial thickness returns to near 'healthy' levels following corneal deturgence.