

00017      **The Use of TeraHertz Scanning System as a New Quantitative Tool in Corneal Edema**

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**Aims:** To evaluate the feasibility and accuracy of using the Terahertz (THz) scanning system as a quantitative tool in the evaluation of corneal edema.

**Methodology:** Fifty fresh porcine corneas and ten human cadaveric corneas with different extents of corneal edema resulting from different time duration after procurement were used. All the corneas were scanned with the TPS Spectra 3000 Teraview THz system, as well as the anterior segment optical coherence tomography (ASOCT) for the measurement of central corneal thickness (CCT). The porcine corneas were further scanned for 5 consecutive days. The Thz peak intensity and the area under curve (AUC) from the spectral domain were recorded, and were correlated with CCT measurements.

**Result:** For the 50 porcine eyes, the THz peak intensity and AUC, as well as the CCT, increased with time. The mean peak signal intensity was  $159951 \pm 5122$ ,  $177338 \pm 5012$ ,  $224761 \pm 6223$ ,  $250290 \pm 5665$ , and  $327236 \pm 6368$  atomic units, mean AUC was  $72978 \pm 4689$ ,  $77368 \pm 6522$ ,  $80913 \pm 5651$ ,  $80914 \pm 7815$ , and  $153146 \pm 6790$ , and mean CCT was  $682 \pm 45$ ,  $745 \pm 68$ ,  $836 \pm 48$ ,  $1006 \pm 66$ ,  $1225 \pm 62$   $\mu\text{m}$ , for the corneas with the procurement time of 0, 1, 2, 3, 4 days, respectively. The correlation was stronger between the AUC and CCT ( $r = 0.80$ ,  $P = 0.028$ ), than between the peak intensity and CCT ( $r = 0.75$ ,  $P = 0.034$ ). For the human cadaveric corneas with different extents of corneal edema, the AUC was positively and strongly correlated with the CCT ( $r = 0.81$ ,  $P = 0.014$ ).

**Conclusion:** The Terahertz scanning system has the potential to be used as a novel tool to quantitatively evaluate corneal edema. It may be helpful in monitoring the disease progression in patients with corneal edema.