Color Light-Emitting Diode Reflection Topography: Validation of Keratometric Repeatability in a Large Sample of Wide Cylindrical-Range Corneas

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PURPOSE

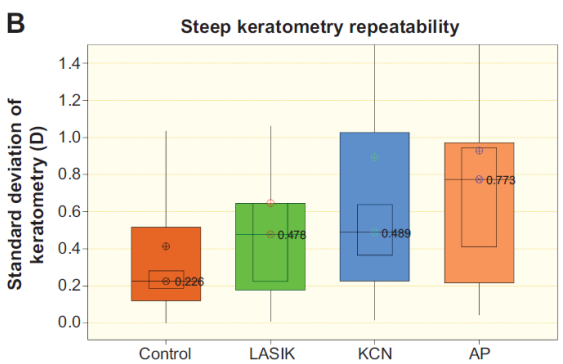
To investigate repeatability of steep and flat keratometry measurements, as well as astigmatism axis in cohorts with normal range and regular astigmatic such as eyes following laser-assisted in situ keratomileusis (LASIK) and normal population, as well as cohorts of high and irregular astigmatism such as keratoconic eyes, and keratoconic eyes following corneal collagen cross-linking, employing a novel corneal reflection topography device.

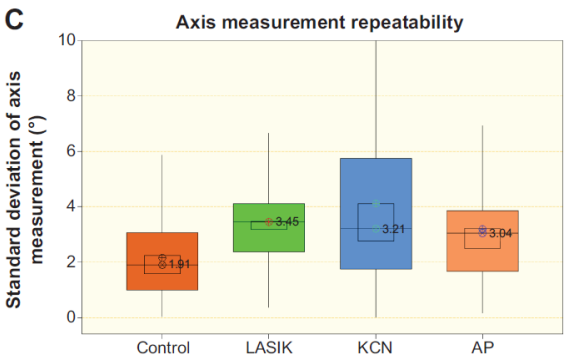
METHOD

Steep and flat keratometry and astigmatism axis measurement repeatability was investigated employing a novel multicolored-spot reflection topographer (Cassini) in four study groups, namely a post myopic LASIK-treated Group A, a keratoconus Group B, a post-CXL keratoconus Group C, and a control Group D of routine healthy patients. Three separate, maps were obtained employing the Cassini, enabling investigation of the intra-individual repeatability by standard deviation.

RESULTS

Flat keratometry repeatability was 0.74±0.89 (0.03 to 5.26) diopters (D) in the LASIK Group A, 0.88±1.45 (range minimum to maximum, 0.00 to 7.84) D in the keratoconic Group B, and 0.71±0.94 (0.02 to 6.23) D in the cross-linked Group C. The control Group D had flat keratometry repeatability 0.36±0.46 (0.00 to 2.71) D. Steep keratometry repeatability was 0.64±0.82 (0.01 to 4.81) D in the LASIK Group A, 0.89±1.22 (0.02 to 7.85) D in the keratoconic Group B, and 0.93±1.12 (0.04 to 5.93) D in the cross-linked Group C. The control Group D had steep keratometry repeatability 0.41±0.50 (0.00 to 3.51) D. Axis repeatability was 3.45±1.62° (0.38 to 7.78°) for the LASIK Group A, 4.12±3.17° (0.02 to 12.13°) for the keratoconic Group B, and 3.20±1.99° (0.17 to 8.61°) for the cross-linked Group C. The control Group D had axis repeatability 2.16±1.39° (0.05 to 5.86°).





CONCLUSION

The Cassini corneal topography device appears to offer high specificity in estimating corneal keratometry and specific corneal irregularity indices even in topographically challenging corneas such as LASIK treated, keratoconic, and cross-linked.