

Astigmatic Axis Repeatability in Normal, Keratoconic, Collagen cross-linked and LASIK-treated Eyes with Novel Multi-Colored Spot Reflection Topography

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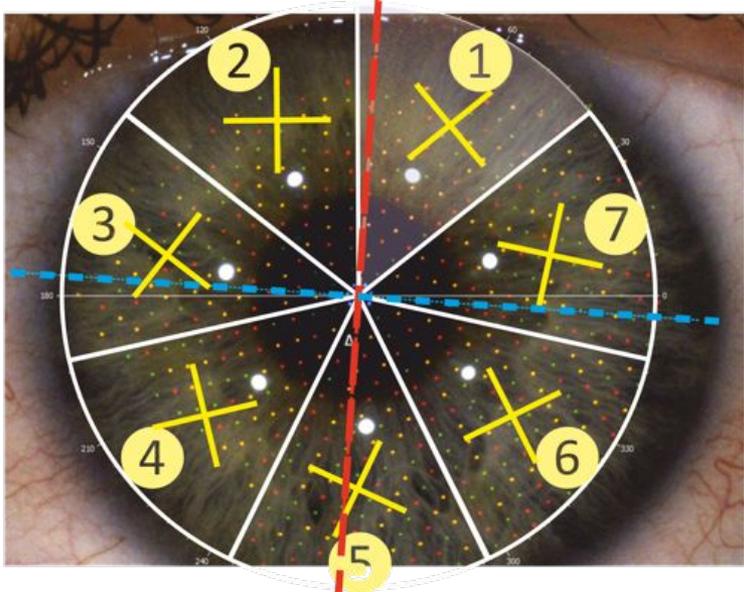
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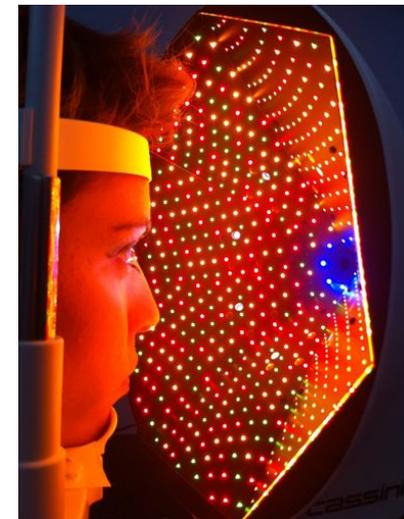
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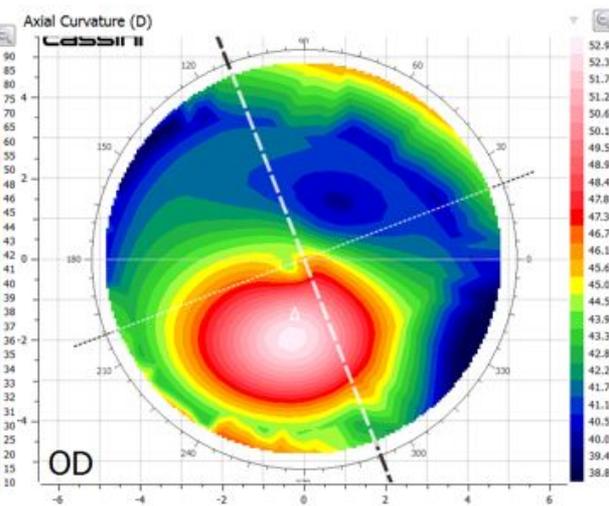
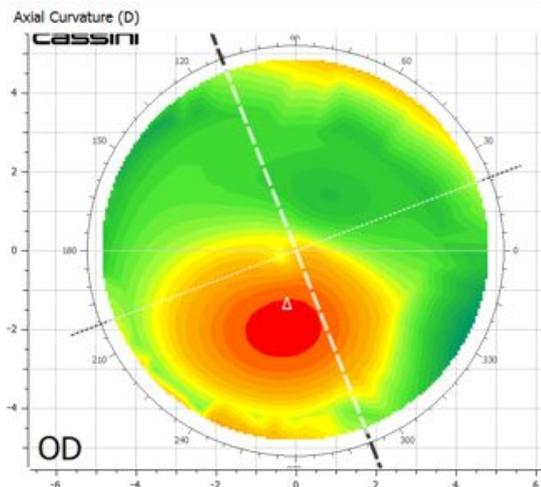
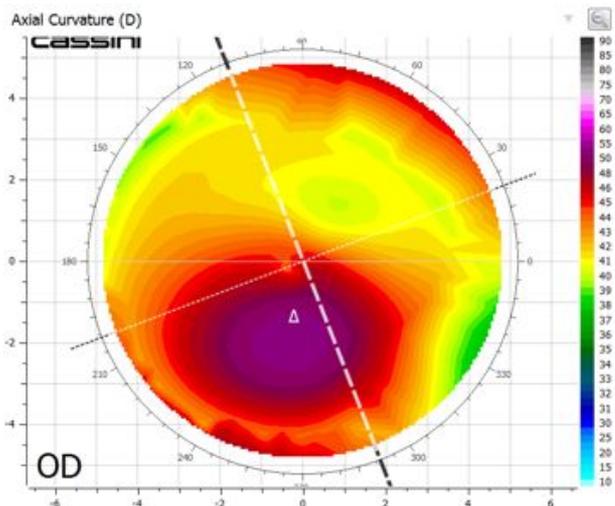




Around 700 color LEDs illuminate the cornea



Pentacam Placido and Cassini topos



Methods

Steep and flat keratometry and astigmatism axis measurement repeatability was investigated via a novel multicolored-spot reflection topographer (Cassini) in a group of control patients (group-A), and three study groups, namely a myopic LASIK-treated group-B, a keratoconic group-C, and a cross-linked group-D.

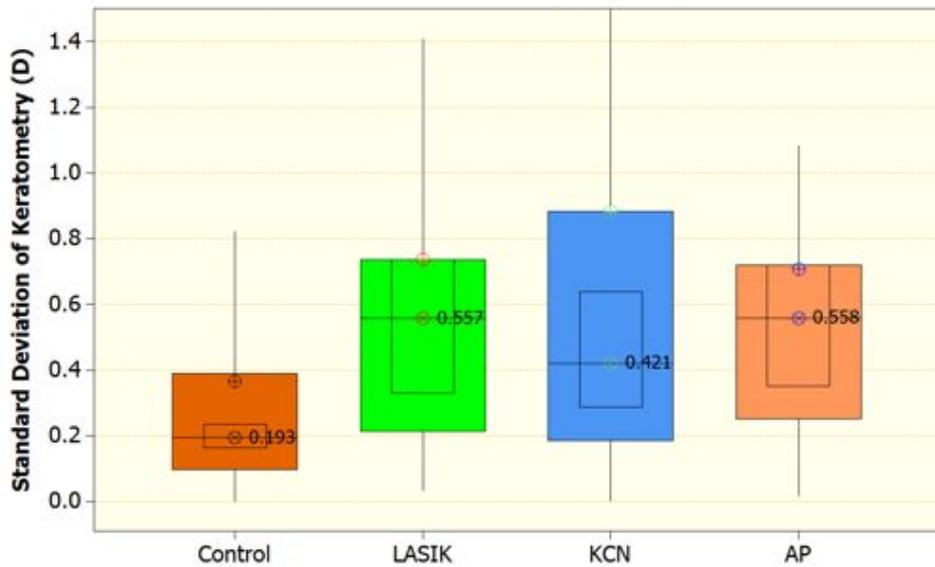


Results

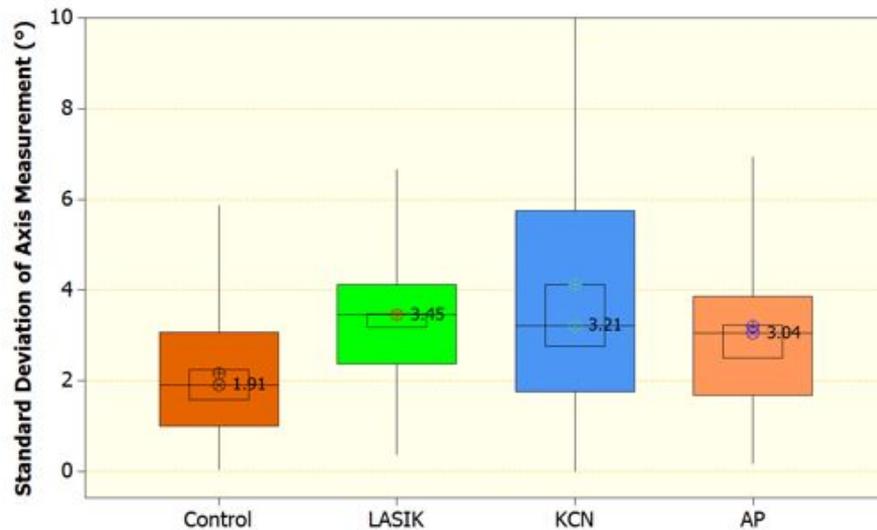
Flat keratometry repeatability was 0.74 ± 0.89 (0.03 to 5.26) D in the **LASIK group-A**, 0.88 ± 1.45 (0.00 to 7.84) D in the **keratoconic group-B**, and 0.71 ± 0.94 (0.02 to 6.23) D in the **Athens Protocol group-C**. The **control group-D** had flat keratometry repeatability 0.36 ± 0.46 (0.00 to 2.71) 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 Athens Protocol 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) $^{\circ}$ for the LASIK group-A, 4.12 ± 3.17 (0.02 to 12.13) $^{\circ}$ for the keratoconic group-B, and 3.20 ± 1.99 (0.17 to 8.61) $^{\circ}$ for the Athens Protocol group-C. The control group-D had axis repeatability 2.16 ± 1.39 (0.05 to 5.86) $^{\circ}$.



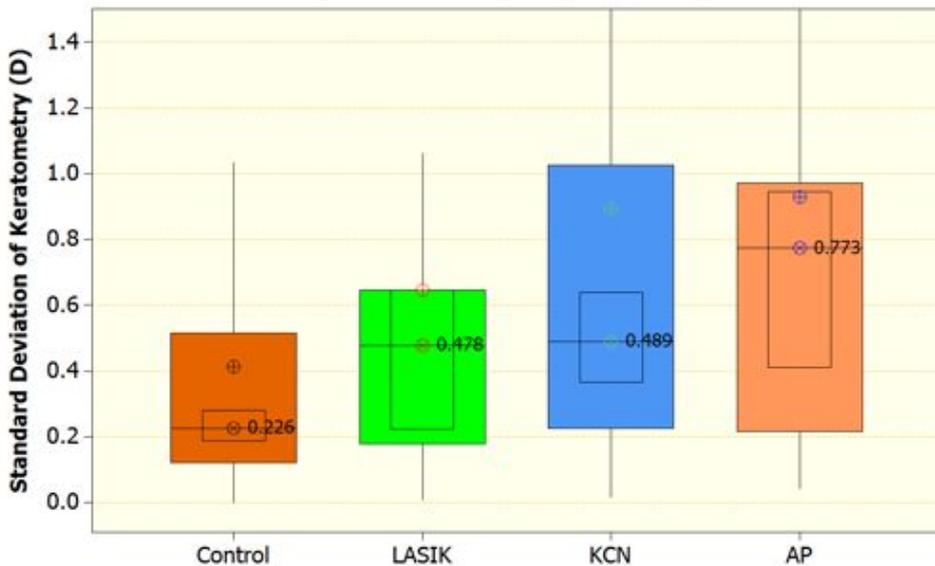
Flat Keratometry Repeatability



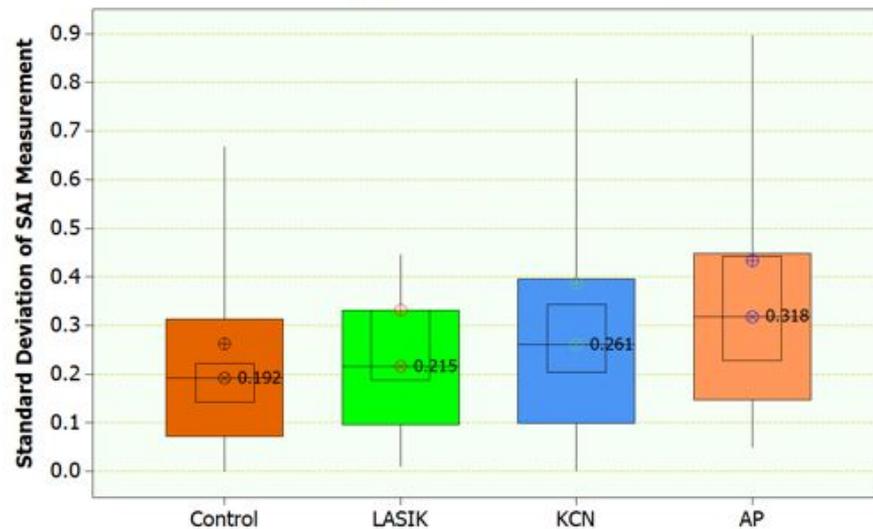
Axis Measurement Repeatability



Steep Keratometry Repeatability



Surface Asymmetry Index Repeatability



Conclusions

This novel corneal topography device appears to offer very high specificity in estimating astigmatism and corneal keratometry and specific corneal irregularity indices even in topographically challenging corneas such as LASIK-treated, keratoconic, and cross-linked. The system identified astigmatism shift from on average ‘with-the-rule’ to ‘against-the-rule’ with aging. Employment of this novel multi-colored spot reflection topography results in astigmatism magnitude repeatability under 0.6D and axis repeatability **under 3°**.

