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Paper Abstracts
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Comparison of residual astigmatism and intermediate-to-near visual performance between spherical and toric soft contact lenses

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Purpose: To compare residual astigmatism and visual acuity across different viewing distances between toric and spherical soft contact lens wearers, and to evaluate whether lens design influences visual performance at specific distances.
Method: This prospective, randomized, single-masked, crossover study included 28 participants (mean age: 23.05 ± 3.69 years) with low to moderate astigmatism (−0.75 to −2.00 DC) and OSDI scores below 22. Each participant wore both spherical equivalent and toric soft contact lenses for one week each. Distance, intermediate (66 cm and 80 cm), and near (40 cm) visual acuities were measured using Snellen and ETDRS charts. Residual refraction was assessed using an open-field autorefractor. Corneal topography was used to evaluate pupil size, tear film stability, and blink parameters. Statistical analyses included between-lens comparisons and correlation analyses between residual astigmatism and visual acuity.
Results: Intermediate visual acuity at 66 cm significantly improved with toric lenses (−0.11 ± 0.07 logMAR) compared to spherical lenses (−0.07 ± 0.08 logMAR, p = 0.044). Residual astigmatism was significantly lower with toric lenses (−0.75 ± 0.32 D) than with spherical lenses (−1.03 ± 0.61 D, p = 0.010). No significant differences were found in pupil size, tear breakup time, or blink parameters. Residual astigmatism showed a moderate negative correlation with intermediate (r = −0.375, p = 0.004) and near visual acuity (r = −0.492, p = 0.001).
Conclusions: Toric lenses reduced residual astigmatism and improved intermediate-to-near visual acuity compared to spherical equivalents. Even low levels of uncorrected astigmatism may influence functional vision. These findings may inform future contact lens fitting strategies for patients with low to moderate astigmatism.

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