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Poster Abstracts
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Use of a portable corneal topographer to measure the radius of curvature and asphericity of the anterior surface of rigid contact lenses

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Purpose: This study aimed to evaluate the accuracy of a portable corneal topographer (TOCO) in determining the radius of curvature and asphericity of the anterior surface of rigid contact lenses.
Method: . The radius of curvature (r), conic constant (k), or eccentricity (e) were measured on two plano-convex lenses from Thorlabs (r_1 = 10.336 mm, r_2 = 7.7003 mm, k_1 = 0, k_2 = 0) and one plano-convex rigid contact lens from Laboratorios Lumilent (r = 7.8 mm, e = 0.5). Each lens was analyzed three times using the TOCO portable corneal topographer (Bleps Visión). The coordinates of the measured points were exported from the QUEMAP software and processed in Origin 2025 through a nonlinear surface-fitting routine, which fitted the data points to the equation of a conic surface using the Levenberg–Marquardt (L-M) algorithm.
Results: The mean values obtained from the three measurements for the Thorlabs lenses were r_1 = 10.3364 mm, r_2 = 7.7008 mm, k_1 = −0.0142, and k_2 = −0.0108. The differences between the measured and nominal manufacturer values were 0.0004 mm and 0.0142 for the first lens, and 0.0005 mm and 0.0108 for the second. For the Lumilent lens, the mean values were r = 7.8065 mm and e = 0.5253, with differences of 0.0065 mm and 0.0253, respectively, relative to the manufacturer's specifications.
Conclusions: The TOCO portable corneal topographer was able to accurately measure the radius of curvature and asphericity of the anterior surface of rigid contact lenses, achieving an error lower than 1% for the radius of curvature and less than 5% for the eccentricity. These findings demonstrated the potential of the TOCO as a precise metrological tool for quality control and characterization of rigid contact lens surfaces.

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