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Poster

Evaluation of the Diagnostic Performance of the Ocular Response Analyzer for Subclinical Keratoconus

Fernando Fuentes Bonthoux [1] , Jeremías G. Galletti [2] , Tomás Pförtner [3]

1. ECOS (Clinical Ocular Studies) Laboratory, Buenos Aires, Argentina; Ophthalmology Division, Hospital de Clínicas José de San Martín, University of Buenos Aires, Argentina 2. Institute of Experimental Medicine, National Academy of Medicine/CONICET, Buenos Aires, Argentina 3. ECOS (Clinical Ocular Studies) Laboratory, Buenos Aires, Argentina

Corresponding author: Fernando Fuentes Bonthoux, fuentesbonthoux@gmail.com

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Abstract

Purpose: To evaluate the performance of previously derived diagnostic cutoff points for corneal hysteresis (CH) and corneal resistance factor (CRF) for detecting subclinical keratoconus. Methods: 65 eyes from 65 healthy subjects in group 1 and 67 eyes from 67 keratoconus patients were evaluated with Ocular Response Analyzer (ORA), corneal topography, aberrometry and anterior segment optical coherence tomography. Only eyes with central corneal thickness (CCT) between 441 and 560 µm were included, and for group 2, the eye with the lowest average corneal power (ACP) was chosen. Observations were stratified in 20-µm intervals to which cutoff points obtained from previous work on an independent sample were applied. The Keratoconus Severity Score (KSS) was used to grade keratoconus. Results: Group 2 eyes had lower CCT (µm, 515.1±3.516 vs 492.0±3.386, $p<0.01$), CH (9.417±0.1951 vs 8.427±0.1702, $p<0.01$) and CRF (9.095±0.2161 vs 7.382±0.1985, $p<0.01$). CH and CRF cutoff points had overall 79.1% and 82.1% sensitivity and 50.8% and 60.0% specificity, respectively, for detecting keratoconus. 49 eyes (73.1%) in group 2 did not meet topographic criteria for keratoconus ($KSS\leqslant 2$), but fellow eyes of these observations had manifest keratoconus ($KSS\geqslant 2$). CH and CRF sensitivity for these subclinical keratoconus eyes was 85.7% and 81.6%, respectively. False positive cases for both parameters had significantly more negative refractive spherical equivalent (for CRF, -6.619±0.9553 vs -10.03±1.185, $p=0.03$), but did not differ meaningfully in ACP or higher-order aberrations of the first corneal surface. Conclusions: CH and CRF can detect subclinical biomechanical abnormalities if the confounding effect of CCT on these measurements is considered. Overall diagnostic performance seems to be better for CRF and the false positive rate could be partially ascribed to highly myopic eyes, which also show weakened corneal biomechanics. ORA could constitute a useful adjunct in the preoperative evaluation of refractive surgery candidates.

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