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Tear film aberration dynamics and vision-related quality of life in patients with dry eye disease.

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Abstract

OBJECTIVE: Corneal and ocular wavefront aberrations were recorded together with clinical examination results and patient-reported vision-related quality-of-life evaluation results to define the relevance of dynamic optical analysis of the eye in dry eye disease (DED).

DESIGN: Prospective and comparative clinical study.

PARTICIPANTS: Forty DED patients and 40 age- and gender-matched control subjects.

METHODS: Serial measurements of ocular and corneal higher-order aberrations (HOAs) after blink were performed for 10 seconds using the KR-1 aberrometer (Topcon, Clichy, France). Vision-related health-targeted quality of life was evaluated using the Ocular Surface Disease Index (OSDI) questionnaire. The clinical examination included tear film assessment (tear film break-up time and Schirmer I test), ocular surface damage assessment with the Oxford and van Bijsterveld indexes, and Meibomian dysfunction grading. Tear osmolarity also was measured.

MAIN OUTCOME MEASURES: The time course of HOAs and modulation transfer function (MTF) was compared between groups and was analyzed in comparison with the OSDI and clinical data in DED patients.

RESULTS: The root mean square of ocular and corneal total HOAs, particularly third-order aberrations, significantly increased over the 10-second period in DED patients, whereas no change occurred in controls. Analysis of MTF revealed progressive degradation of ocular optical quality resulting from loss of contrast at intermediate and high spatial frequencies in DED patients compared with controls. The progression index for corneal HOAs was correlated with the subjective index of patient-reported visual outcomes and with objective clinical findings of tear film and ocular surface damage.

CONCLUSIONS: Objective measurement of the time course of HOAs may constitute a new single instrument to evaluate and manage patients with DED because it reliably reflects the completeness of the disease.

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