Enhanced Ectasia Screening: The Need for Advanced and Objective Data

To the Editor:

We read with interest the report from Drs. Abdulmassih-Gonçalves and Gonçalves.1 The authors should be commended for publishing a case of ectasia after LASIK, which was detected and addressed by collagen cross-linking. We also appreciate their willingness in sharing the preoperative raw data from rotating-Scheimpflug tomography, which generated interesting information that we address in this letter.

The tomography examination was taken by the OcuLyzer (Wavelight, Inc., Erlangen, Germany), which has the same hardware characteristics as the Oculus Pentacam (Oculus Optikgeräte GmbH, Wetzlar, Germany). Although the OcuLyzer software is designed for topography-guided ablations with the Wavelight excimer lasers, there are significant differences on diagnostic parameters when compared to Pentacam.

Objective tomographic parameters, which go beyond curvature and central corneal thickness, are critical for clinical decisions when screening for ectasia risk after laser vision correction.2 Advanced analysis from the raw data generated by the OcuLyzer allowed for the calculation of Ambrósio’s Relational Thickness3 and the deviation value from the Belin-Ambrósio Enhanced Ectasia Display (BAD-D), which demonstrates enhanced accuracy for detecting milder forms of ectasia, defined as the fellow eye with relatively normal curvature maps from patients with asymmetric keratoconus (considered as forme fruste keratoconus) (Figure 1).4 BAD-D in the right eye was higher than 1.22, the cut-off value for forme fruste keratoconus (93.62% sensitivity and 94.56% specificity).4 Ambrósio’s Relational Thickness average was lower than 521 µm in both eyes, the cut-off value for forme fruste keratoconus (91.94% sensitivity and 93.05 specificity).4 Ambrósio’s Relational Thickness maximum in the right eye was lower than 386 µm, the cut-off for keratoconus detection (99.17% sensitivity and 97.28% specificity).4

The patient was 21 years old at the time of the OcuLyzer examination. Therefore, the Ectasia Risk Score System should be recalculated to 5 for the right eye and 4 for the left eye. Although the consideration of age may be an important factor for the lack of specificity of the Ectasia Risk Score System, there is compelling evidence that supports the younger age being related to lower biomechanical properties of the cornea.2

In a retrospective study involving preoperative clinical and Pentacam data from 23 cases that developed ectasia after LASIK and 266 stable LASIK cases (more than 12 months of follow-up), age was a strong predictor of ectasia risk, being combined in a stepwise logistic regression analysis with BAD-D and residual stromal bed to calculate the Ectasia Susceptibility Score-1.

The Ectasia Susceptibility Score-1 represents the percentage of risk for developing ectasia, with a threshold of 6.45%. This allows for 100% sensitivity and 94% specificity, which is better than BAD-D, the best isolated parameter with a cut-off of 1.29 (87% sensitivity and 92.1% specificity).5 Considering the calculated residual stromal bed of 281 and 301 µm,1 the Ectasia Susceptibility Score-1 would be 96.75% and 79% for the right and left eye, respectively. Also, minimal re-
sidual stromal bed providing an Ectasia Susceptibility Score-1 lower than 6.45% would have been 410 and 390 µm for the right and left eye, respectively. Therefore, advanced surface ablation or small incision lenticule extraction would have been better options for laser vision correction in this case, along with phakic intraocular lenses.

REFERENCES

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Drs. Ambrósio and Belin are consultants for Oculus. Dr. Ambrósio is also a consultant for WaveLight-Alcon. The remaining authors have no financial or proprietary interest in the materials presented herein

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