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Customized ablation tool useful for re-treatment

Patients with decentered or small-optical-zone laser vision correction are good candidates for treatment

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Chicago—Topography-guided customized ablation (T-CAT, Alcon Laboratories) is a useful tool for normalizing topographic irregularity and improving visual symptoms in patients with complaints after decentered or small-optical-zone laser vision correction surgery, according to Tenley N. Bower, MD, who presented the findings of a retrospective study during the annual meeting of the American Society of Cataract and Refractive Surgery. The ablation profile is computed by the proprietary software of a specific excimer laser platform (WaveLight, Alcon) based on data acquired with a high-resolution Placido disc topographer (Topolyzer, Alcon). Avi Wallerstein, MD, and Mark Cohen, MD, co-national medical directors and co-founders of LASIK MD, are the senior authors of the project. Dr.Bower is a resident at McGill University, Montreal, Quebec, Canada.

"With the topography-guided ablation, we finally have the technology and ability to correct errors of a primary ablation as well as improve the related significant symptomatic complications," –Mark Cohen, MD

Outcomes

The study cohort included 32 eyes of 23 patients who underwent the topography-guided procedure at a mean of 30 months after their primary surgery. Based on analyses of data collected at the last available follow-up visit of 13 months, the topography-tailored re-treatment had a good safety profile and resulted in good refractive outcomes with statistically significant reductions in higher-order aberrations and significant improvement in subjective complaints in all eyes. "Patients who've undergone laser vision correction with a small optical zone or decentered ablation can complain bitterly about visual symptoms, including glare, halos, and starbursts, even though they might have good refractive outcomes and visual acuity results," said Dr. Wallerstein, assistant professor of ophthalmology, McGill University, Montreal. "The topography- guided custom ablation is able to treat highly irregular corneas by creating an ablation profile that mirrors the elevations and depressions seen on anterior elevation maps," he said. "In so doing, it smoothes topographic irregularities by steepening a flat area and flattening an adjacent steep area. "With the topography-guided ablation, we

finally have the technology and ability to correct errors of a primary ablation as well as improve the related significant symptomatic complications," Dr. Cohen said. "It is also useful for cases of irregular astigmatism associated with corneal scars and post-penetrating keratoplasty, and an excellent tool in combination with collagen crosslinking for keratoconus and post LASIK ectasia." Prior to T-CAT, SE was within 0.5 D of intended in 40% of eyes and within 1 D in 70%.At last visit after T-CAT, SE for both 0.5 D and 1 D of intended increased to 78% of eyes, with a significant reduction in cylinder. Two-thirds of the T-CAT-treated eyes achieved distance uncorrected visual acuity (UCVA) of 20/20 or better, and 77% achieved UCVA of 20/25 or better. "Comparison of these outcomes [with] the UCVA prior to T-CAT showed the procedure resulted in a significant improvement in vision," Dr. Wallerstein said. "Before T-CAT re-treatment, only 30% of eyes had UCVA of 20/20 or better." Prior to T-CAT, 25% of eyes had loss of one or more lines of best-corrected visual acuity (BCVA), whereas after T-CAT, all but one of those eyes regained the lost lines. T-CAT induced a 1-line BCVA loss in 2 eyes that had none previously. Analyses of the wavefront profile showed statistically significant reductions in vertical coma, total higher-order aberrations, and spherical aberration following T-CAT. Of note is that all patients had subjective improvement in their quality of vision, Dr. Wallerstein said.

Case studies

Dr. Bower highlighted the benefits of the topography-guided customized ablation with results from two cases. The first patient complained of significant night vision disturbances after undergoing LASIK in 1999 with a 5.2-mm treatment zone. Pre-T-CAT data showed BCVA of 20/20 with UCVA of 20/50 and a manifest refraction of –1.00 –0.50 × 5°. T-CAT was performed with a 6.5-mm zone and removed 29 µm of tissue. The postoperative anterior elevation map demonstrated widening of the effective optical zone that corresponded with symptomatic improvement. The second case involved a patient who had a superiorly decentered LASIK ablation and presented with UCVA of 20/50, BCVA of 20/25, with 2.5 D of irregular astigmatism within the central 5-mm zone on topography. The T-CAT ablation profile could be seen to be displaced inferiorly and removed 23.5 µm of tissue, resulting in regularization within the central cornea. The patient's UCVA and BCVA both improved to 20/20 and manifest refraction was +0.5 –0.25 × 30°.**OT**

Take-Home Message

Patients who have undergone laser vision correction with a decentered ablation or small optical zone can manifest significant visual symptoms. Topography-guided customized ablation (T-CAT, Alcon Laboratories) is a valuable modality for managing these difficult cases.

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Dr. Wallerstein, Dr. Cohen and Dr. Bower have no relevant financial interests to disclose.