



Figure 3. The final outcome of the patient, confirming the biomechanical change in cornea following collagen cross-linking.

enhancement, after measuring the flap thickness intraoperatively in order to avoid significantly reducing the postenhancement residual stromal bed. (Since 2000, I have tried to adhere to the guideline of 270 μm for residual stroma following LASIK.)

Another potential method of treatment for this patient would be to perform a customized retreatment with asphericity adjustment as an additive (Wavelight 400 Hz Allegretto Wave Eye-Q laser). I would include a treatment goal of -0.50 D for the Q-value (asphericity), in order to reduce spherical aberrations that are typically induced during the correction of high myopes. The hope is that the postenhancement Q-value would be less positive. Through past experience, we have learned that correction of -10.00 D shifts the 30° asphericity of the cornea from an average -0.30 D to ± 2.00 D, therefore inducing significant spherical aberrations.

In the case of this patient, I chose not to use either of the previously mentioned options. Considering that the cornea was stable, I pulled from my experience with UVA collagen cross-linking (CCL) as a means to rehabilitate ectatic corneas after LASIK. I proposed that the patient was experiencing a late biomechanical shift of the thinned cornea. The patient and I discussed the option of cross-linking the cornea and then enhancement, if necessary. I determined that performing an enhancement first may not be successful if the refraction continued to regress in the future. We, therefore, decided to proceed with collagen cross-linking with the PriaVision device (PriaVision, Menlo Park, California) for 30 minutes in conjunction with 1% riboflavin solution applied every 2 minutes to the surface of the deepithelialized cornea.

Initially, the patient was unsatisfied and experienced pain and discomfort for the first 10 days while the epithelium healed. That changed at 1-month follow-up, however, when we discovered her UCVA was back to 20/20 and her refractive error was -0.25 D. In the end, our patient

achieved a visual acuity of 20/15. As seen in the comparison map of the posterior cornea surface (Figure 3), the left image is the pre-UVA CCL posterior cornea surface, which is devoid of any signs of ectasia. The middle map is the same posterior surface 1 month following UVA CCL. It is evident that there has been a flattening change in the mid-periphery of the posterior cornea.

I would, therefore, use this case to confirm previous reports on the biomechanical changes of the cornea following LASIK, and establish a significant biomechanical effect of the UVA cornea cross-linking to the operated cornea—with a change in the posterior cornea contour centrally and paracentrally. I believe this case shows that any surprise regressions noted—even years—after LASIK could be biomechanical changes of the cornea, and could be treated by this minimally invasive alternative.

RUI MARTINHO, MD; F. FALCÃO REIS, MD, PHD; AND AMANDIO A. ROCHA-SOUSA, MD

Primary consideration for this case must include the refractive stability of the patient, since we only would consider treatment once that is achieved. If refractive stability were achieved, we would treat the patient's right eye with LASIK. Our option is based on the actual corneal thickness of 460 μm .

We would use the Schwind Esiris (Schwind eye-tech-solutions, Kleinostheim, Germany) to treat the -1.50 D, with a corresponding ablation of 15 μm to 16.5 μm (considering an optical zone of the same 6 mm). Using the same 125- μm flap after the ablation, the residual thickness should be 319 μm , which is thick enough for the procedure and better than the inferior limit of 250 μm . The corneal aberrometry should also be considered. We assume that the Pentacam evaluation does not show abnormalities in the field, so we do not recommend a customized ablation (eg, ORK-CAM [Schwind eye-tech-solutions]). We also think that the same flap could be relifted for this second LASIK procedure.

Relifting the flap may be done easily within 2 years of a previous refractive surgery.¹ A new LASIK flap, however, is required in cases with previously complicated surgery. Relifting the flap for LASIK retreatment is an effective and safe procedure. Two recent clinical cases show that the proper even management of the trauma and LASIK dislodged flap (from a surgery that occurred 7 years ago) may restore excellent visual acuity.²

CARLOS M. MOEDAS, MD

Based on our present knowledge, the patient should have had a phakic IOL implanted, instead of undergoing LASIK for a -11.00 D correction. It seems that in this case, the LASIK procedure was used beyond the advisable limits.

REFRACTIVE SURGERY **COMPLICATIONS MANAGEMENT**

Because this case is missing important data, like the initial K- or pachymetry readings, I wonder about this patient's present quality of vision. Any additional subtractive surgery (ie, LASIK or PRK) is not advisable, and alternatives, like phakic IOLs, are not available for such a low degree of ametropia.

As the other eye is only -0.75 D at the moment, I would suggest this patient wear spectacles or contact lenses, or opt for no correction. I would also tell the patient that her previous surgery has caused her cornea to become unstable and that her dioptric error will probably continue to increase.

As soon as that occurs, I would implant a phakic IOL on the right eye. Depending on the patient's anatomy and preferences, I would choose from either (1) a posterior chamber sulcus-supported ICL or (2) an anterior chamber iris enclavated IOL (Artiflex; Ophtec, Groningen, the Netherlands). Both lenses can be implanted under topical anaesthesia through a 3.2-mm incision. The patient should have at least 2,000 cells and a relatively deep anterior chamber (at least 2.8 mm). There are minor complications that prevent us from performing an ICL implantation, (ie, a weak zonula, because the patient was initially measured at -11.00 D). Additionally, a convex iris can cause chronic iris rubbing and is a contraindication to implanting an Artiflex lens.

Patient preferences and activities are also an issue, because some patients dislike seeing the lens on the anterior chamber. The patient in this case presentation may opt for an ICL, but she should be informed about the low risk of developing cataract.

JOAQUIM C. MURTA, MD, PhD

Even with microkeratomes that create thin flaps and excimer laser programs that preserve corneal tissue, we should not treat 11.00 D of myopia with an excimer laser. With this in mind, I would not consider an enhancement (ie, LASIK, PRK, Epi-LASIK, other another modality), despite no apparent ectasia on the topography and Pentacam, and a central cornea thickness of 460 μm .

If the patient had developed 1.50 D of myopia within the last year, I would wait at least 9 months to 12 months, to know if this process is stable. Highly myopic patients develop cataracts earlier than the normal population, which could be the cause for this myopia change. If the refraction was stable after 9 months to 12 months, no alterations were observed at the slit lamp examination, and the patient firmly wanted to correct the -1.50 D, I would consider correcting her mild ametropia with two 0.25-mm intracorneal rings (Intacs; Additional Technology, Inc., Des Plaines, Illinois), implanted horizontally. This option is appealing because it is a reversible, noninvasive procedure.

Furthermore, implanting a phakic IOL could be an alter-

native procedure. Because the degree of myopia is small, however, I believe that it would not be worthwhile to take the risk of an intraocular surgery.

The patient has a UCVA of 20/40 in one eye and should have 20/30 or 20/25 in the other eye with a binocular UCVA of at least 20/30. Because this is not very disabling, spectacles or contact lenses are always possibilities. ■

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