Corneal ectasia remains a rare but potentially devastating complication after LASIK. In the past, treatment options have been limited; however, exciting advances have expanded our alternatives for visual rehabilitation. Any effective management strategy for ectasia after LASIK will encompass three fundamental principles: 1) halt the ectatic process; 2) reduce corneal curvature irregularity; and 3) correct the residual refractive error.

Corneal collagen cross-linking (CXL) retards, aborts, or in many cases, partially reverses the ectatic process in eyes with keratoconus and ectasia after LASIK as measured by simple metrics (visual acuity and corneal steepness). However, quantifying the CXL effect in greater detail has proven more challenging. In this issue, Reinstein and colleagues report a novel technique for monitoring changes in the ectatic cornea after CXL treatment. Using Artemis very high-frequency digital ultrasound (ArcScan Inc, Morrison, Colorado), they were able to demonstrate epithelial remodeling after CXL, which may be a more sensitive indicator of treatment efficacy than current metrics. This modality could prove beneficial in monitoring success of CXL treatments, especially with the variety of techniques available on the horizon.

Cross-linking is minimally effective as a refractive procedure per se; corneal curvature irregularity must be significantly reduced before improved visual acuity can be achieved. Topography-guided surface ablation appears promising in this regard. Early reports suggest that the best results come from simultaneous topography-guided PRK followed immediately by CXL. This combination therapy has already demonstrated efficacy in eyes with keratoconus. In this issue, Kanellopoulos and Binder report the benefits of this combination treatment for ectasia after LASIK. Using a topography-guided PRK ablation to regularize the corneal curvature and improve corneal shape followed immediately by CXL, the authors report improvements in uncorrected and corrected distance visual acuity for most eyes.

Some debate remains regarding the order and timing of treatments, optimal CXL protocols (including riboflavin administration time and ultraviolet light application), and the risks and benefits of mitomycin C application. Further, a question remains as to the amount of tissue that can be safely ablated in these cases. This has yet to be established, and to date, authors have been appropriately cautious in this regard, ablating only small amounts of tissue, striving to regularize corneal curvature rather than significantly reduce refractive error.

Given the potential limitations of safe tissue ablation, additional treatment modalities will be required for ultimate visual rehabilitation. For some patients, phakic intraocular lenses (IOL) may fill that role. In an upcoming article, Izquierdo and colleagues report success with sequential CXL and phakic IOL implantation in keratoconic eyes, which should theoretically work equally well for eyes with ectasia after LASIK. The ultimate combination therapy will potentially include all of these modalities, and maybe more!

Whatever the final outcome, this marks an exciting time in our field, as we move closer to rehabilitating the postoperative ectatic eye and restoring quality vision to our patients.

REFERENCES