

Ophthalmology Times

CUTTING-EDGE ADVANCEMENTS

Keratoconus: Thinking outside the cone

Cases highlight various scenarios ranging from highly complex to simple

by Arun C. Gulani, M.D. , M.S.



In the previous “Gloves Off with Gulani” column, (OphthalmologyTimes.com/ThinkOutsideTheCone), I discussed the philosophy of viewing keratoconus as a refractive anomaly that can be brought to emmetropia rather than one in which the cornea is worked upon, or worse still, the topography is corrected while the patient is left with less- than-perfect vision.

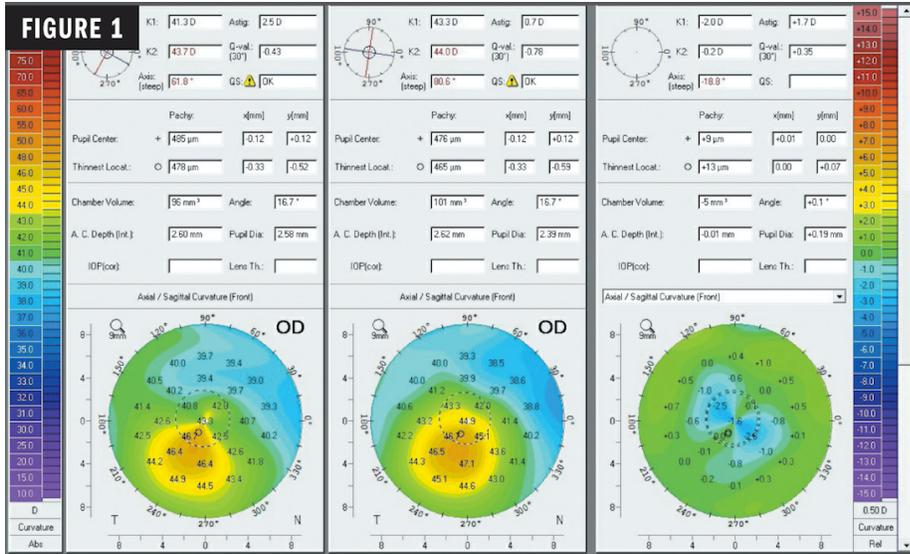
I want all surgeons to believe in the patients’ potential, have confidence in their own surgical skills, and then commit to emmetropia as a possible outcome in these cases. Yes, in some cases you might not succeed, but in most cases you will. It’s the mindset and expectation that will drive the thought process as a single or staged process toward a logical pathway to emmetropic endpoints.

I also want to blur the diagnostic language by approaching all corneal ectasia (natural and surgery induced) based on my 5S system rather than on terminology that prevents “thinking outside the ‘cone’.”

In this column, I will describe various keratoconus case scenarios from my referral-based practice—ranging from the highly complex to simple—that can be improved with single or staged techniques that move patients toward emmetropia.

In sharing my outcomes and philosophies over the past two decades with patients referred from around the world, I want to reinstate surgeons’ confidence in laser advanced surface ablation (ASA)/PRK as a valuable keratorefractive technique, corneal implants (Intacs, Addition Technology) as a directional and reversible technology; phakic and pseudophakic implants as optically manipulative ingredients; and the entire range of lamellar corneal techniques followed by corneal collagen crosslinking (CXL), which, I believe, should be a permanizing surgery to “trap” the visual endpoint gained by such an innovative trajectory of visual endpoints.

Usually, I start my teaching sequence from simple surface surgeries to deeper into the cornea and then lens-laser combinations and complications reversals. However, this time, I juggle different case scenarios to keep surgeons engaged and actively thinking, with my end goal being to help surgeons realize through this plethora of keratoconus presentations that every



case of keratoconus deserves the utmost commitment to emmetropia.

Figure 1. This is the case of a 40-year-old man who was referred to me following CXL performed twice by two different surgeons and implantable collamer lens (ICL) surgery by a third surgeon in his keratoconic eye. The patient was left with

hyperopic astigmatism.

On reviewing his options, I reiterated to him that all three of his surgeons had done an excellent job and actually made it easy for me to take him to his end zone.

I performed laser ASA surgery to bring him to emmetropia and unaided 20/20 vision. (Surgeons involved in this case included

Collaborating surgeons in this case included William B. Trattler, MD, Center for Excellence in Eye Care, Miami; Brian Boxer Wachler, MD, Boxer Wachler Institute, Los Angeles, and Raymond Stein, MD, Bochner Eye Institute, Toronto.)

This case also underscores the fact that the number of surgeries a patient has had in the past is immaterial and should not be a roadblock in the unrelenting quest for emmetropia.

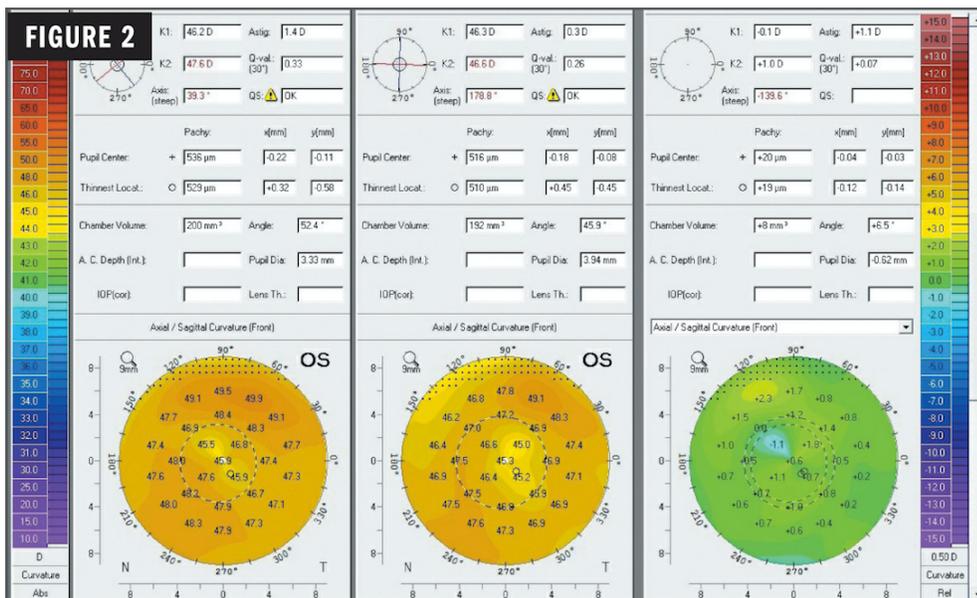


Figure 2. This 58-year-old woman underwent successful cataract surgery performed by her own surgeon. However, her astigmatism was left untreated and she was not satisfied with the visual outcome. Because of the implanted monofocal lens and the open posterior capsule and an

accurately measurable and favorable myopic astigmatism as the residual refractive error, I performed laser ASA and achieved emmetropic 20/20 vision.

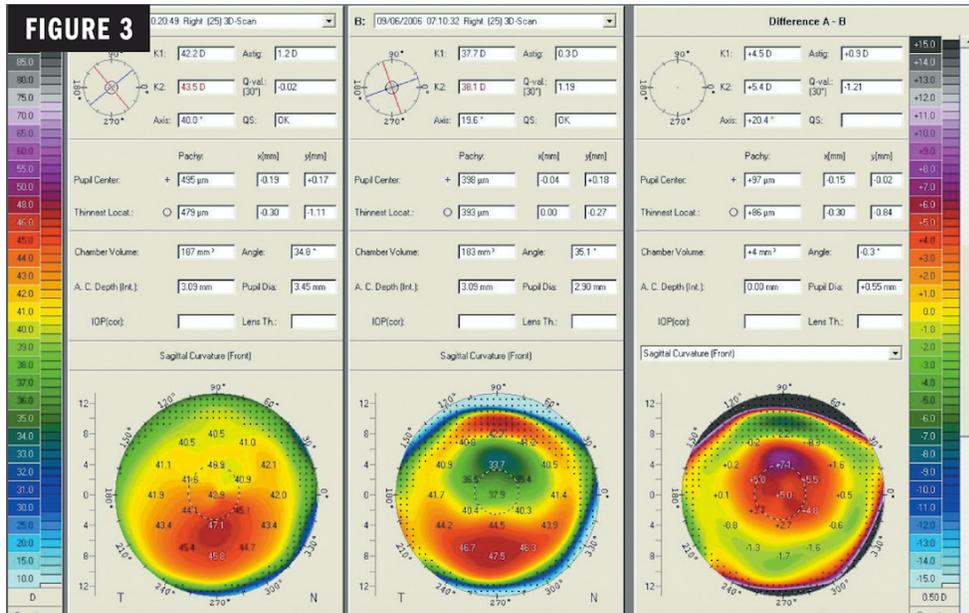


Figure 3. In certain selected cases (based on the Gulani-Nordan criteria), patients can undergo laser PRK for myopic astigmatism and be brought to emmetropic 20/20 outcomes. Topography might not always correlate with unaided visual endpoints. Thus, refraction is the starting point and unaided vision is

the endpoint of such endeavors with safety and long-term follow-up a necessity. CXL can always be performed if needed.

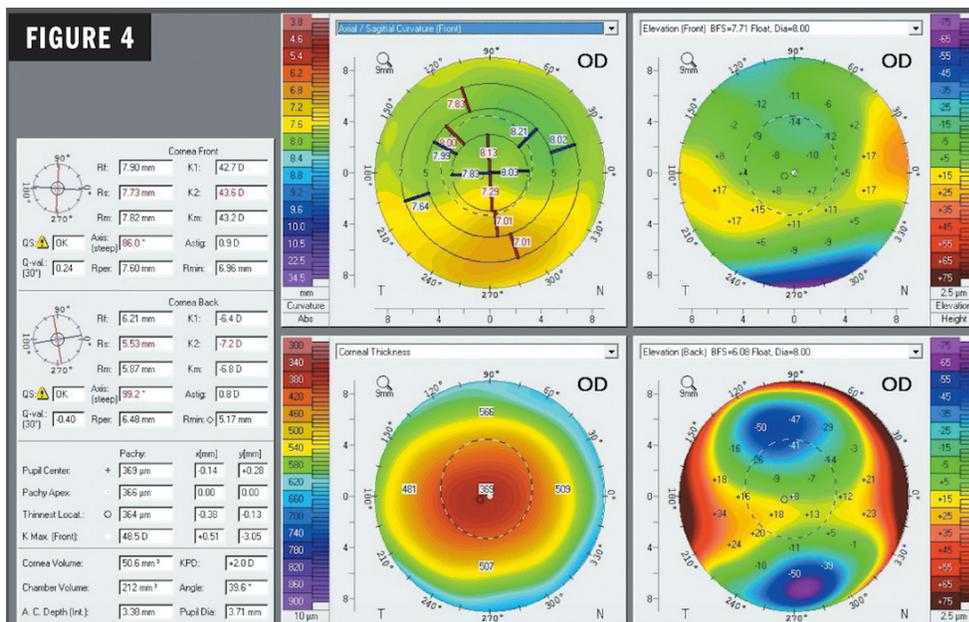


Figure 4. In this 38-year-old woman with low myopia and astigmatism, she elected to have laser PRK with me, which was performed successfully with a future planned stage of collagen CXL to stabilize her outcome. This was performed when she returned to her home in Colorado.

(Collaboration in this case included Peter Andrews, MD, who is in private practice in Longmont, CO.)

Figure 5. This slide shows the preoperative and postoperative CXL topography of this patient. The patient has unaided vision of 20/20 in this keratoconic eye. The final refractive error was – 0.25 sphere.

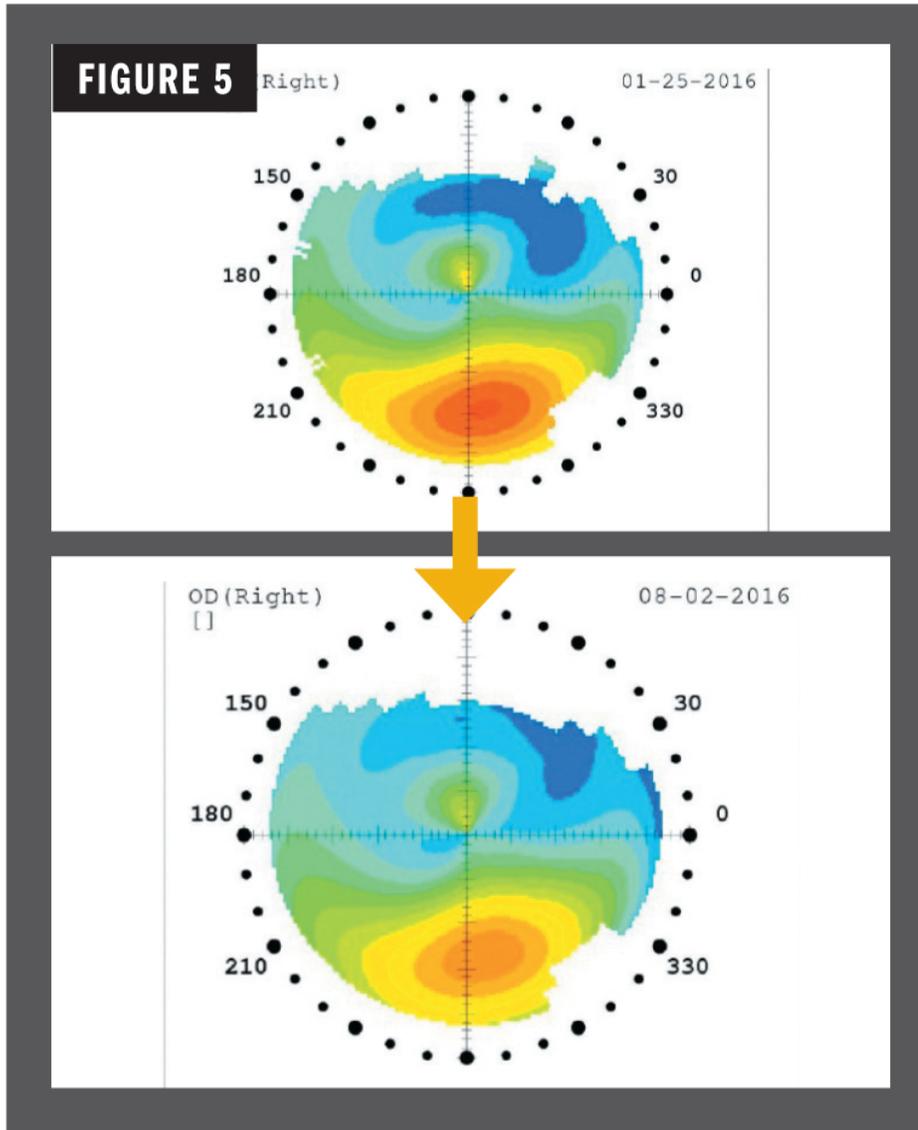
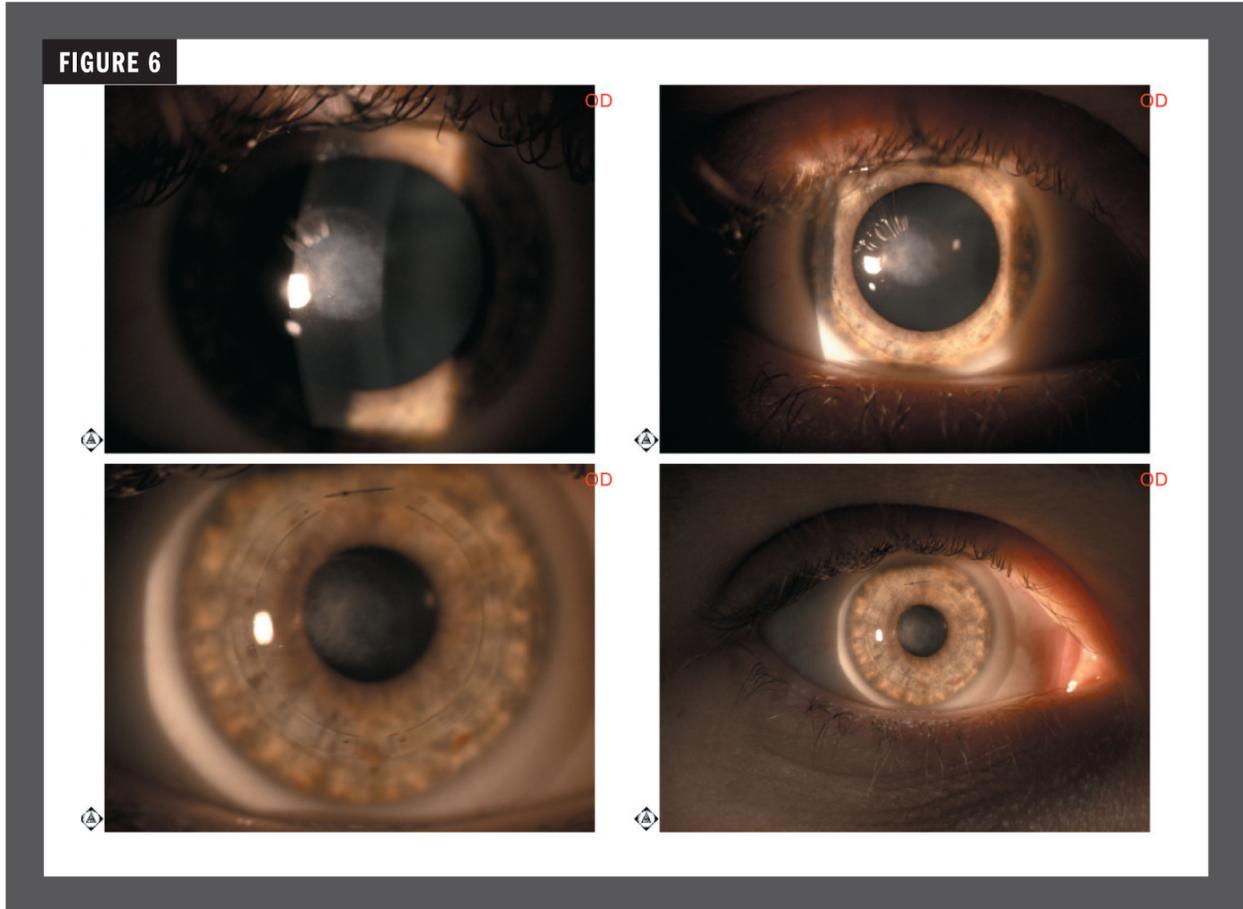


Figure 6. This 20-year-old male was referred to me with a post-Pseudomonas dense central corneal scar with 20/100 best-corrected visual acuity. I planned for paired Intacs placement to stabilize the cornea, make it measurable, stretch the central scar, and convert the irregular astigmatism to regular astigmatism of a much lower degree, i.e., from 7.1 to 2.2 D. (In case this approach failed, I would use the Intacs channel as my starting plane for lamellar keratoplasty.)



Post-Intacs topography showed a regular bowtie in the center and the unaided visual acuity with the central scar still in place was 20/40-. Laser ASA surgery (in-corneal scar, Corneoplastique principles) was presented as a future option, but the patient opted to use soft contact lenses to achieve 20/25 visual acuity.

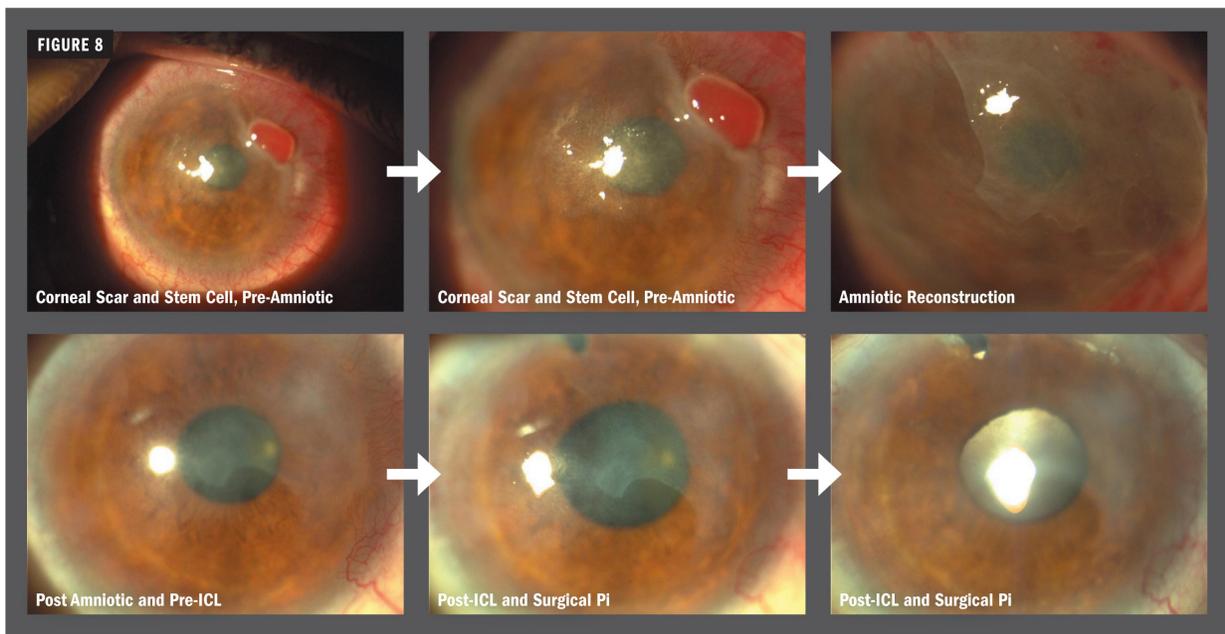
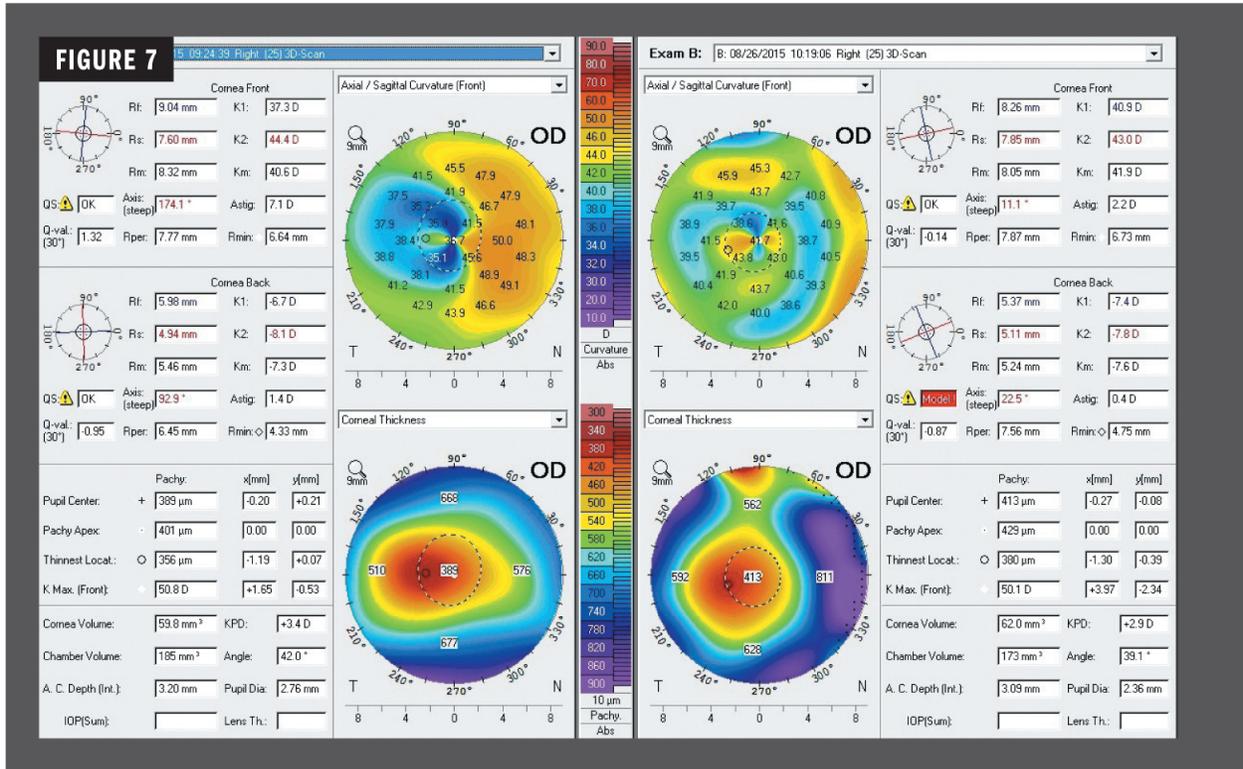
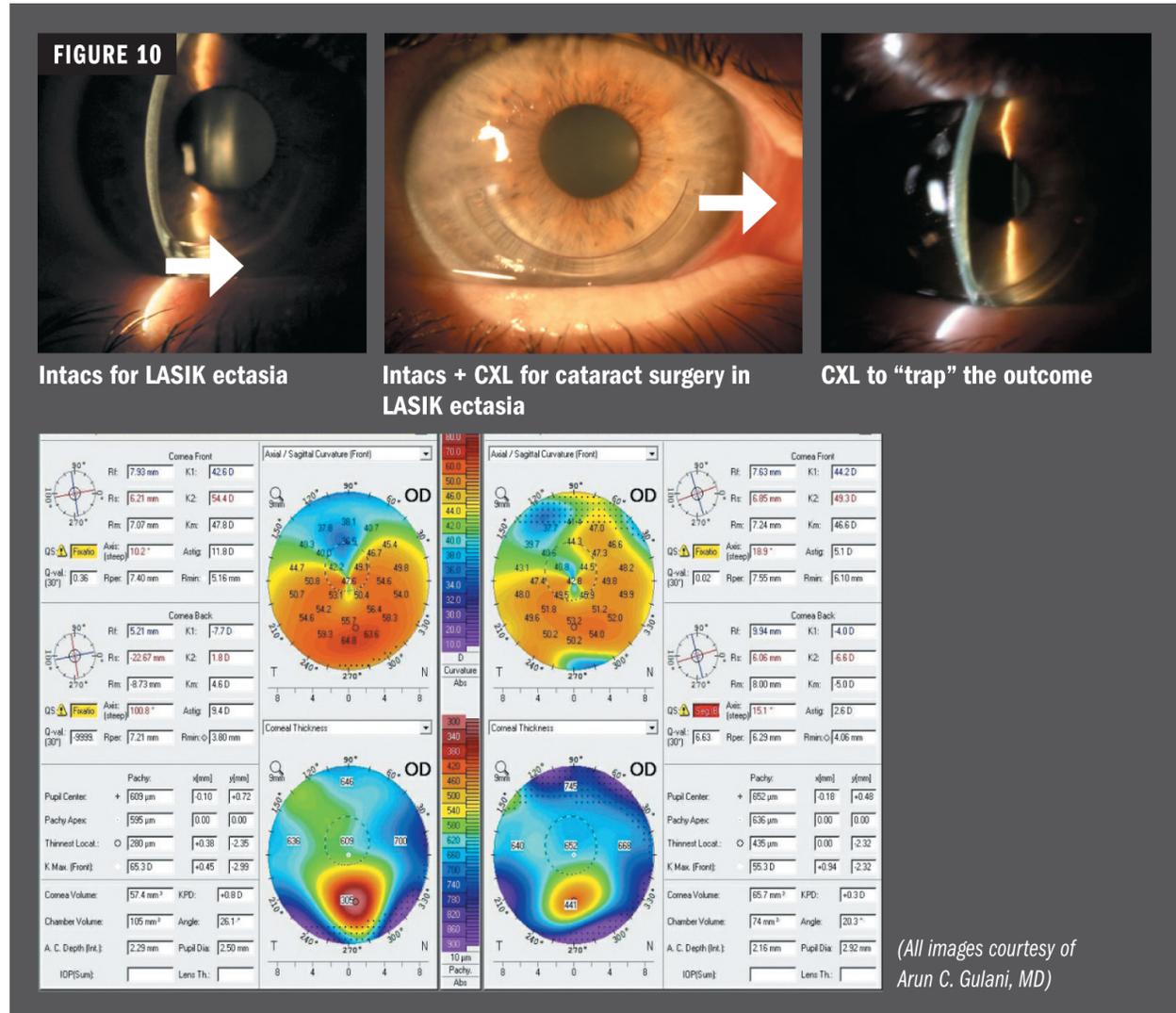
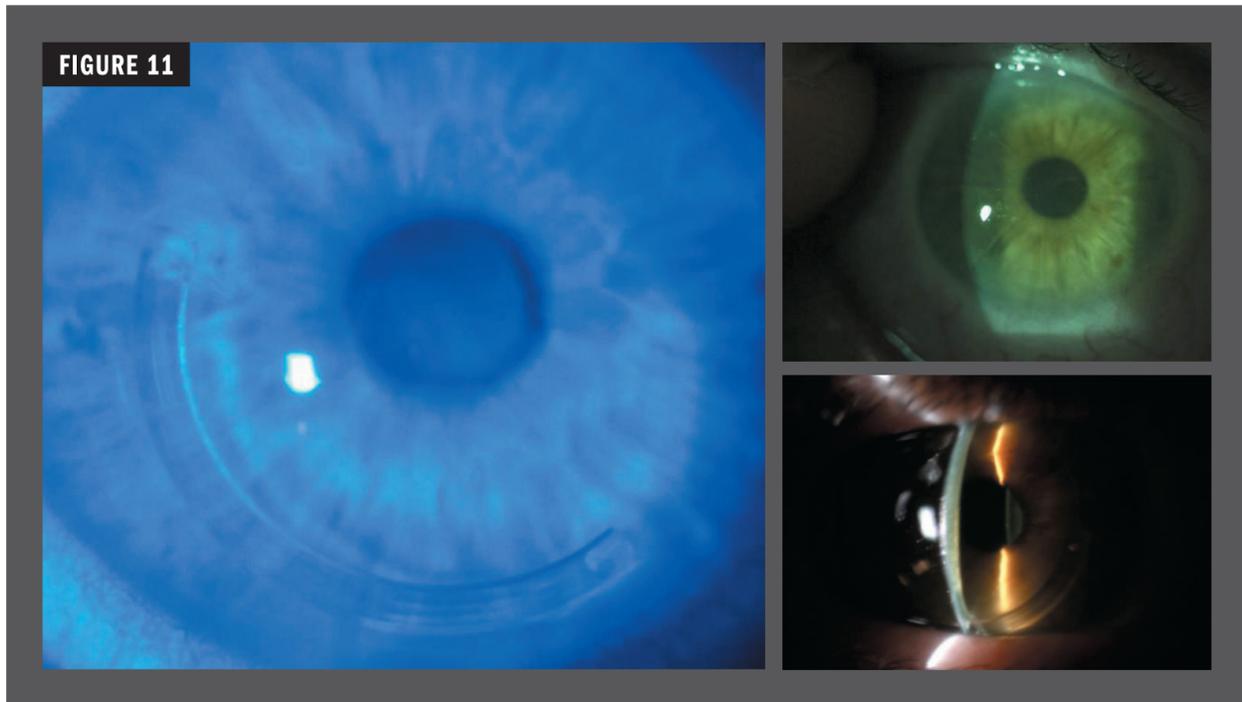


Figure 10. A 58-year-old man was referred to me with ectasia following LASIK. I first performed single-segment Intacs placement (Gulani-Donnenfeld technique) to stabilize the cornea, make it measurable, and decrease the keratometry and astigmatism from 11.8 to 5.1 D. CXL then was performed to trap this planned outcome for a staged cataract surgery as the next step (outside-in technique).



I believe that CXL can and should be used to permanize all these procedures that lead keratoconus to a measurable refractive endpoint (preferably at emmetropia), and if not at emmetropia, then at least at a preparatory stage so that we can build on that measurable platform.



References

Gulani AC, Nordan LT, Alpins N, Stamatelatos G. Excimer laser photorefractive keratectomy for keratoconus. In: Wang M, ed. Keratoconus and Keratoectasia Prevention, Diagnosis and Treatment. Thorofare, NJ: Slack Inc.; 2009;145-151.

Gulani AC, Boxer Wachler B. Reshaping keratoconus: Laser PRK followed by corneal crosslinking. Mastering corneal collagen crosslinking techniques. In: Textbook of Ophthalmology. New Delhi, India: Jaypee Brothers Medical Publishing; 2009;120-131.

Gulani, AC. Think outside the cone: Raising keratoconus surgery to an art. Advanced Ocular Care. Nov/Dec 2010.

Gulani AC. Corneoplastique: Art of visual surgery. Video Journal of Cataract and Refractive Surgery. 2006;22(3).

Gulani AC. Principles of Surgical Treatment of Irregular Astigmatism in Unstable Corneas. Textbook of Irregular Astigmatism. Diagnosis and Treatment. Thorofare, NJ: SLACK Inc.; 2007;251-261.

Gulani AC. Corneoplastique. Techniques in Ophthalmology. 2007;5(1):11-20.

Gulani AC. Corneoplastique. Video Journal of Ophthalmology. 2007;22(3).