

Adjunctive treatments to crosslinking emerge

by Rich Daly EyeWorld Contributing Writer

Some surgeons have found adjunctive therapies can work well with corneal crosslinking

When surgeons consider adjunctive treatments to corneal crosslinking (CXL), the severity of corneal thinning and the presence of comorbidities are key factors.

George Waring IV, MD, founder and medical director, Waring Vision Institute, Mount Pleasant, South Carolina, emphasized the need to assess such corneal cases individually.

Crosslinking alone is beneficial for strengthening the cornea and improving its biomechanics. To surgically address irregular astigmatism in such eyes, Dr. Waring uses either a single or a coupled asymmetric ring. To correct myopia, implantable contact lenses can benefit patients, while scleral or hybrid specialty lenses can treat irregular astigmatism or myopia.

"Typically, if it is a mild cone, meaning the earliest topographic changes with minimal thinning with usually minimally adequate visual acuity, then we would recommend crosslinking alone to stabilize the cone and prevent inflammation," Dr. Waring said.

In moderate or severe cases, Dr. Waring typically recommends a single- or double-inch corneal ring segment implant and crosslinking.

"There may be a role for an implantable contact lens for myopia and for the regular component of astigmatism because now there's a contact lens available. Also there may be a role, particularly in the more severe cases, for a specialty contact lens on top of that," Dr. Waring said.

For Raymond Stein, MD, medical director, Bochner Eye Institute, Toronto, Canada, the combination of topography-guided custom ablation treatment (TCAT) PRK and CXL has become the preferred treatment for progressive keratoconus, pellucid marginal degeneration, and ectasia after laser vision correction.

"This allows for a highly customized treatment in which steep areas of the cornea are flattened and flat areas are steepened," Dr. Stein said. "This reduces irregular astigmatism. We can add a small refractive component, but the main goal is to improve best corrected spectacle acuity and not uncorrected visual acuity."

Dr. Stein tries to limit tissue removal to 50 microns. He limits the use of Intacs (Addition Technology, Lombard, Illinois) to cases in which the central cornea is less than 430 microns. That approach leaves 99%

of such patients of his treated with TCAT PRK and CXL.

Contraindications to TCAT PRK include significant central corneal scarring or cases with excellent uncorrected acuity in which the corneal steepening is primarily below the pupillary zone.

Similarly, Eric Donnenfeld MD, clinical professor of ophthalmology, New York University, New York, prefers to perform TCAT over Intacs because the results of TCAT—in good candidates—are generally better and there is no risk of late rejection, extrusion, or infection, which can occur with Intacs.

In addition to topographic abnormalities, Dr. Donnenfeld can treat myopia with laser correction.

When a patient is not a good candidate for an excimer laser ablation, Dr. Donnenfeld will use Intacs. For example, Intacs can benefit patients with insufficient residual stromal bed, and Intacs is superior to TCAT for pellucid marginal degeneration, as long as the peripheral cornea has a pachymetry of at least 400 microns.

"When performing TCAT on patients with peripheral steepening such as pellucid the tissue ablation is in the periphery, and this results in a hyperopic treatment pattern that may make the patient significantly more myopic than they were to begin with," Dr. Donnenfeld said.

AT A GLANCE

- CXL alone is appropriate for the earliest topographic changes with minimal thinning.
- TCAT PRK and CXL can treat progressive keratoconus, pellucid marginal degeneration, and ectasia after laser vision correction.
- Intacs can benefit CXL patients with insufficient residual stromal bed for TCAT and is superior to TCAT for pellucid marginal degeneration.
- Some patients treated sequentially with adjunct CXL treatments obtain better results than those undergoing combined procedures.

"I prefer to treat the topographic abnormality with TCAT and to reduce or eliminate the residual myopia as long as the stromal bed is sufficient to remove additional tissue."

Whether to combine

Dr. Waring said U.S. surgeons have slowly begun to combine transepithelial treatment or PRK with crosslinking.

However, he has seen patients treated with adjunct treatments obtain better results with sequential, rather than simultaneous,

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Monitoring progression

"Typically, once patients are determined to be stable at 6 months or 1 year, annual exams are adequate to monitor for progression," Dr. Trattler said. "Of course, if patients note changes in vision in either eye, they should return earlier for repeat testing."

Although CXL strengthens the cornea, some patients have such weak corneas that they require two CXL procedures, Dr. Trattler said. Progression may not be evident for 1 to 3 years because the changes can occur very slowly over time, he explained. When monitoring for progression, surgeons should measure uncorrected visual acuity, spherical

equivalent refractive error, best corrected visual acuity, topography, and tomography. If using a Pentacam (Oculus, Wetzlar, Germany), two screens Dr. Trattler recommends are the Belin ABCD screen, which evaluates changes over time, as well as difference maps. "Evaluating changes over time with the Sagittal view difference map is quite helpful. Progression is noted when there is steepening in the steep area and flattening in the flat area," he said.

Dr. Talley Rostov said she will retreat if there is more than 1 D of consistent change. However, her retreatment rate is only 3% to 5%.

In patients who are 15 to 25 years old, Dr. Majmudar lets them

know that there is a higher incidence of progression and that they should be more closely monitored in the first 3 to 5 years after the procedure. "Progression after keratoconus is a controversial topic, and there is no good metric that is widely adopted as the sine qua non of keratoconus progression. At this time, we are using a combination of change (steepening) in keratometric indices coupled with loss of best corrected visual acuity as an indicator of progression," he said. **EW**

Reference

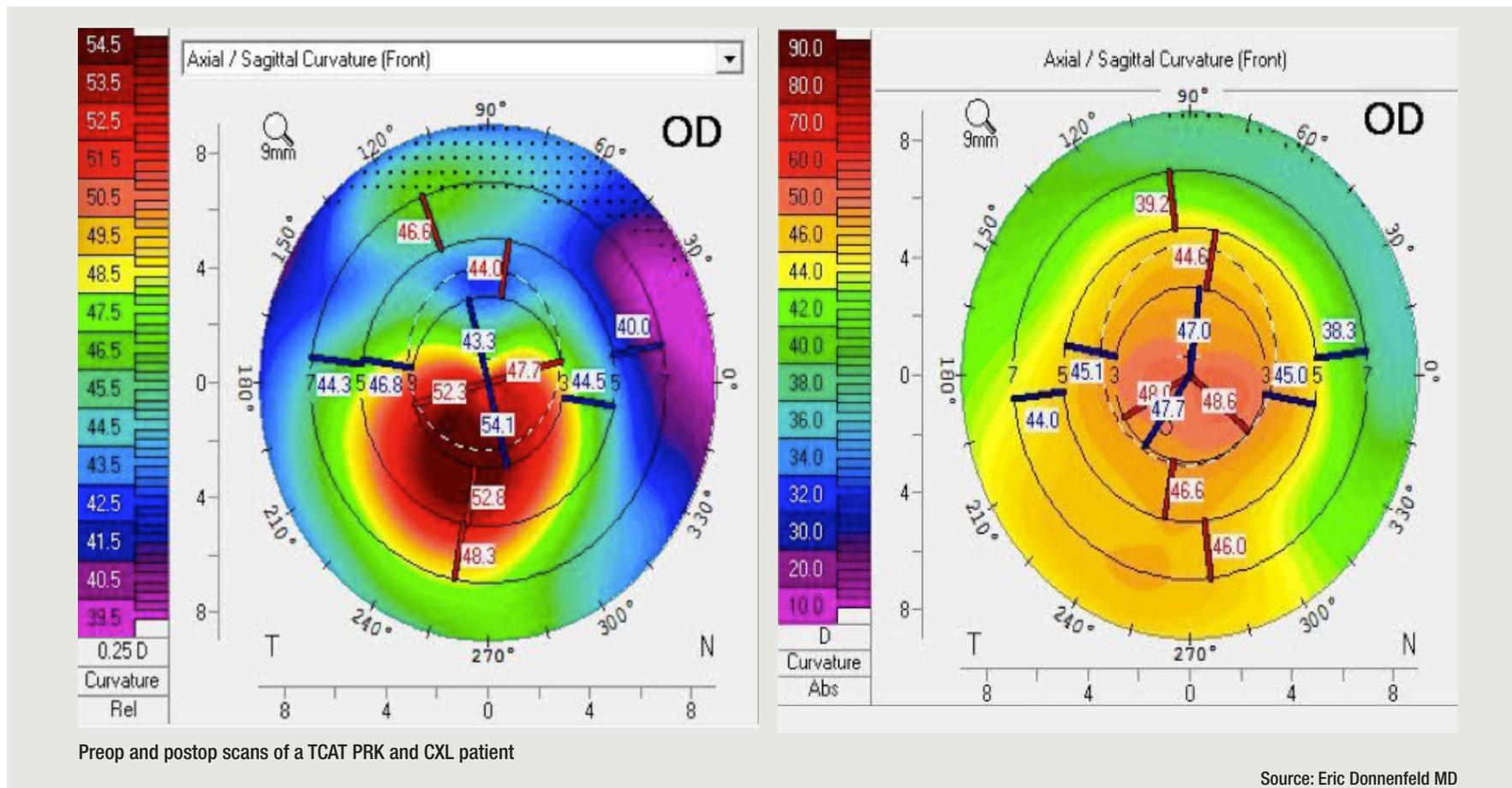
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Editors' note: Dr. Majmudar has financial interests with Alcon (Fort Worth, Texas), Bausch + Lomb, and CXL Ophthalmics (Encinitas, California). Dr. Talley Rostov has financial interests with Allergan and Bausch + Lomb. Dr. Trattler has financial interests with Allergan, Bausch + Lomb, CXL USA, Avedro, and Oculus.

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procedures with a limited treatment primarily focused on refractive data—that is, a limited refractive treatment based on refractive data and designed for vision correction and spectacle independence.

However, Dr. Waring has performed simultaneous crosslinking with Intacs and patients can do well.

Dr. Donnenfeld generally performs Intacs and CXL at the same time.

“Once I make the Intacs pocket with the femtosecond laser I inject riboflavin into the pocket, which helps achieve high tissue levels of riboflavin, then I insert the Intacs,” Dr. Donnenfeld said. “On the other hand, I prefer to perform CXL 3 months or more prior to TCAT, as I have had patients heal poorly when

both are performed at the same time.”

Pain possibility

Dr. Donnenfeld has never seen neuropathic pain after TCAT PRK or Intacs implantation. Although such pain is exceedingly rare, he said it is possible.

“The potential side effects of TCAT PRK are the same as all PRK procedures and include infection, scarring, and delayed healing, and with TCAT the results are less predictable than traditional PRK,” Dr. Donnenfeld said. “Intacs also has the risk of acute infection and can have late extrusion with infection. Other side effects include lipid deposition in the channels.”

LASIK flap

Dr. Stein said it is possible to perform CXL with riboflavin injected under a LASIK flap or into a pocket. However, clinical studies are still needed to definitively demonstrate the safety and success of that technique.

“However, if the surgeon thinks the patient is at a higher risk of corneal ectasia with LASIK or SMILE, I think it is safer to perform PRK with limited CXL,” Dr. Stein said.

Dr. Donnenfeld agreed that it is possible to perform CXL under a LASIK flap, into a pocket, or with SMILE.

“But I do not personally do any of these options other than placing riboflavin in an Intacs pocket, as I consider an ectatic cornea to have

increased risk of further ectasia with a flap or SMILE and prefer to perform PRK in these cases,” Dr. Donnenfeld said. **EW**

Editors' note: Dr. Donnenfeld has financial interests with Avedro (Waltham, Massachusetts). Dr. Waring has financial interests with Avedro and Oasis Medical (Glendora, California). Dr. Stein has no financial interests related to his comments.

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