

On the edge of ectasia

by Maxine Lipner EyeWorld Senior Contributing Writer

Overview of under flap crosslinking

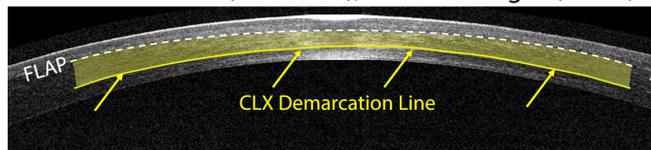
For post-LASIK patients who may find themselves in the early stages of ectasia, performing collagen crosslinking under the flap may help them retain their vision with quicker recovery times than with traditional crosslinking, according to **Avi Wallerstein, MD**, assistant professor of ophthalmology, McGill University, and co-national director of LASIK MD, Toronto, Canada. He cites results published in the December 2016 issue of *Clinical Ophthalmology* that show that there was no ectasia progression at 6 months.¹

Under flap collagen crosslinking has been studied in conjunction with high myopic and hyperopic LASIK cases to try to prevent regression, he said. To determine if corneal crosslinking under the flap might be effective for early ectasia patients, investigators launched the study. "I said, 'We have this technique that we're trying in primary LASIK, why don't we use the same idea and treat the people that have the most difficult complications after LASIK surgery, which is ectasia,'" Dr. Wallerstein said, adding that the idea was to catch such cases early before they faced a very irregular cornea with a decrease in best corrected visual acuity.

Treating under the flap

The investigators' plan was to make the ectasia diagnosis based on topography and then do crosslinking, but in this scenario, do it under the LASIK flap. "Normally, when we diagnose post-LASIK ectasia it is a little too late, so they already have a lot of visual changes and a lot of astigmatism, and then we do the traditional epi-off or epi-on crosslinking," Dr. Wallerstein said. "This

Post-ufCXL OCT (3 months); 5 mins UV-light (5.24 J)



OCT image outlining where crosslinking takes place, i.e. under the flap and before the endothelium.

Source: Avi Wallerstein, MD

is an alternative to doing traditional crosslinking, which has a lot of disadvantages." Among these, it's an uncomfortable procedure for patients, it's not an easy thing for practitioners to do, and there's a long recovery period, he continues. "But if you do it with this technique, you're able to get back to work, and you're seeing reasonably well thereafter and certainly there's no pain," he said. "The other important thing is we would halt the progression of ectasia before it gets very bad."

Using the procedure is fairly straightforward, he finds. "We lift the flap, and then we soak the corneal stroma, which is underneath the flap with riboflavin," Dr. Wallerstein said. "We protect the flap so that no riboflavin actually goes on it, and once that's done we irrigate or clean away any excess riboflavin." The flap is then placed back in position, and the ultraviolet light used on the surface of the cornea, he continued, adding that this activates the riboflavin, which produces free radicals and causes extra-covalent bonds resulting in crosslinking. All this is happening underneath the flap, and that's the part of the cornea that practitioners are making stiffer, not the flap itself, he stressed.

The fact is, once you've made a cut in the cornea, there is a lot of evidence to suggest that the flap does not contribute to the biomechanical stability of that cornea. "In a normal LASIK procedure, once you make a

flap and you put the flap back, it's really not contributing to the biomechanical strength of that cornea anymore," Dr. Wallerstein said. That said, putting this under the flap crosslinking procedure to use makes sense, he believes.

This technique also uses less energy than the traditional crosslinking approach, relying instead on an accelerated protocol, which doesn't go as deep. "In fact, I want my crosslinking to be a bit shallower because I'm starting from a deeper level, and so I want to make sure that the endothelium is not damaged," he said.

Studying early ectasia

Included in the study were patients with very early and mild post-LASIK ectasia. "We identified these patients on a follow-up, with new onset change in astigmatism, and new topographic changes consistent with ectasia," he said. In addition, only those patients with uncorrected distance visual acuity of 20/40 or better were included because if vision was worse, it meant that the ectasia was more advanced, he explained.

Investigators had seven eyes that fit these criteria. They found that at 6 months, results were promising, with subsequent 12-month data now in hand to substantiate this. "The parameters that we looked at that tell us whether there is ectasia progression or not remained constant," Dr. Wallerstein said. "In terms of vision, the visual accuracy

and efficacy were constant, the maximum keratometry was constant, and the cylinder was constant." Also, they found that the procedure was safe. "There were no complications such as the ones that you can potentially see with standard epi-off crosslinking," Dr. Wallerstein said. "It was also a much quicker recovery time than surface crosslinking—patients were fine soon after because it's just a flap lift then flap repositioning." The next day they were comfortable, he stressed.

Dr. Wallerstein hopes that practitioners come away from this with the idea that this technique of under flap crosslinking may be considered for treatment of early post-LASIK ectasia. "Up until now we haven't been carefully looking at our patients to find them and say, 'You are starting to get ectasia,'" he said, adding that these patients are often lost to follow-up, presenting instead when their vision is really bad and their ectasia quite advanced.

"I think the take home is we have a treatment here that could potentially work, and with this treatment you have to do it at an early point in time for this complication," Dr. Wallerstein said. "Therefore, you have to follow your patient after LASIK regularly and look for early ectasia so that you can intervene before you get the significant detrimental effects that come with post-LASIK ectasia." **EW**

Reference

1. Wallerstein A, et al. Under-flap stromal bed CXL for early post-LASIK ectasia: A novel treatment technique. *Clin Ophthalmol*. 2016;16:1-8.

Editors' note: Dr. Wallerstein has no financial interests related to his comments.

Contact information

Wallerstein: awallerstein@lasikmd.com

Eyeing continued from page 104

was very safe on the endothelial cells, Dr. Majmudar noted. "We got good, adequate staining with the 5-minute application (at this concentration)," he said. Even with the advent of the stromal marking stamp that the eye banks now provide, these results here remain

valuable. The study proves the point that this is a viable staining method for practitioners to be able to visualize DMEK tissue and get it into proper position without concern that they're creating further endothelial cell loss, Dr. Majmudar concluded. **EW**

References

1. Majmudar PA, et al. Enhancing DMEK success by identifying optimal levels of trypan blue dye application to donor corneal tissue. *Cornea*. 2017;36:217-21.

Editors' note: Dr. Majmudar has no financial interests related to his comments in this article.

Contact information

Majmudar: pamajmudar@chicagocornea.com