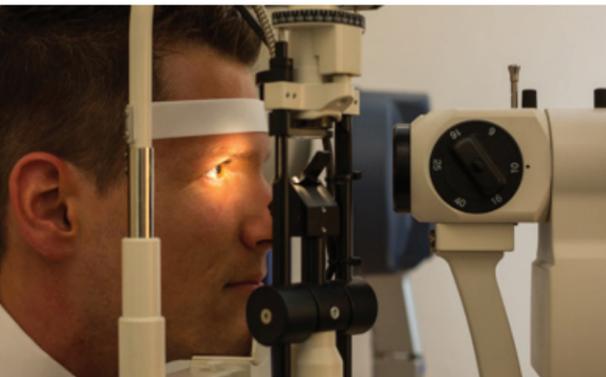


Collaborating with Surgeons

Cross-linking is an ideal opportunity for shared, collaborative care with ophthalmologists. Optometrists are an essential part of post-operative care management after corneal cross-linking. After treatment, you may increase the frequency of monitoring exams for keratoconic and post-LASIK patients, and provide ongoing medical care, as many patients will require several contact lens refittings while their corneas stabilize post-procedure.

Post-Op Care: What to Expect



Epithelial Healing

The US Phase III clinical trials of corneal cross-linking were conducted using an epi-off procedure, and therefore, the FDA approved treatment protocol entails removal of the corneal epithelium.

Typical Post-Op Care:

1. A bandage contact lens is placed over the treated cornea
2. A topical antibiotic, non-steroidal anti-inflammatory (NSAID) and steroid QID is prescribed for the first week
3. Steroid is typically continued for another 1-3 weeks

Post-operative care management is up to the physician's discretion. Although there is certainly some variation, corneal specialists will often see patients for the 1-day and 1-week visits and then, once the epithelium is intact, send them back to co-managing doctors for the remainder of the follow-up care. Patients should be monitored for resolution of epithelial defects.

Contact Lens Fitting

Scleral lenses or other vaulted designs are a good option for these patients as they do not rest on the corneal surface and avoid disrupting the epithelial healing. It is important to make patients aware that vision may change slightly during the first few months, and the contact lens prescription may need to be updated.

For fitting purposes, one can expect that the cornea will be flatter but not dramatically so. The procedure essentially "locks in" the cornea where it is so the ectatic condition should not progress any further.

"We report good visual results in patients who were fit in contact lenses after having undergone CXL. Contact lens fits were as early as two weeks (soft lenses), but ranged depending on patient's functioning needs and observed changes in corneal topography in the postoperative healing period. GP lenses were fit at the earliest 3 months postoperatively. Contact lens choice is a balance between patient's needs and the lens able to achieve good comfort with optimal visual results."

"Since CXL topography changes may occur up to 12 months postoperatively, the contact lens practitioner must continue to monitor these patients to ensure continued good lens fit and eye health."

¹ Chang, Clark OD, MS, Fry, Kristen L. OD, MS, & Scheid, Terry OD. (2010, January). Contact Lens Prescribing Considerations following Corneal Collagen Crosslinking. Poster session presented at the Global Specialty Lens Symposium, Las Vegas, Nevada.

Keratoconus and Corneal Cross-Linking Information for Referring Physicians



First and Only FDA Approved

Therapeutic treatment for progressive keratoconus and corneal ectasia following refractive surgery



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www.ClearAdvantageLaser.com

Photrexa® Viscous (riboflavin 5'-phosphate in 20% dextran ophthalmic solution) and Photrexa® (riboflavin 5'-phosphate ophthalmic solution) are photoenhancers indicated for use with the KXL® System in corneal collagen cross-linking (CXL) for the treatment of progressive keratoconus and corneal ectasia following refractive surgery.

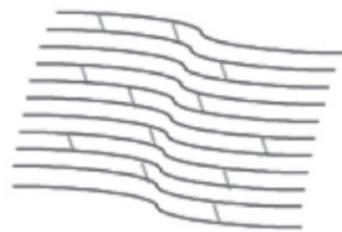
Corneal Cross-Linking

Corneal collagen cross-linking is a medical procedure that combines the use of ultra-violet light and riboflavin (vitamin B2) drops.

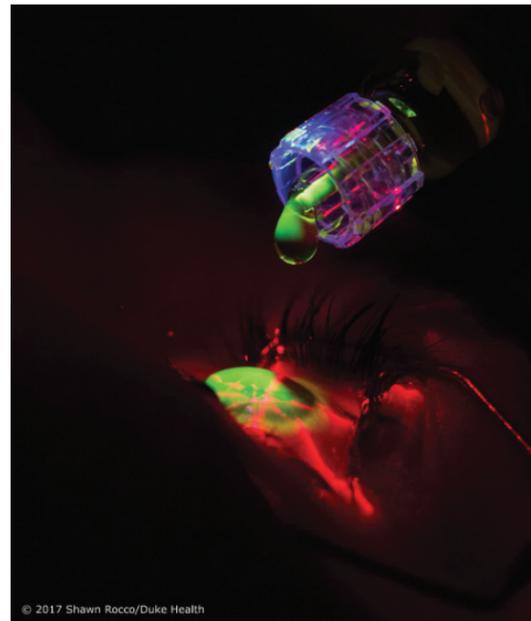
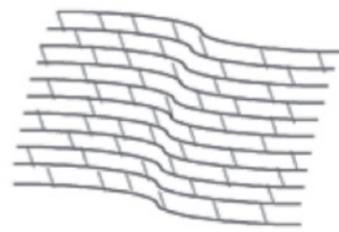
Corneal cross-linking¹:

- Creates new corneal collagen cross-links
- Results in a shortening and thickening of the collagen fibrils
- Leads to the stiffening of the cornea

Less Cross-Linking (Weaker)



More Cross-Linking (Stronger)



Patient Identification

Appropriate patients over the age of 14 who have been diagnosed with progressive keratoconus or corneal ectasia following refractive surgery may be candidates for this procedure.

- Keratoconus is a bilateral, progressive corneal ectasia resulting in irregular astigmatism and loss of visual function, with onset in teenage years. Mean age of onset is 15.39 years.²
- Affects 1 in 2000 people³
- Corneal ectasia, a non-inflammatory condition marked by progressive corneal steepening and thinning, is a rare but serious complication of vision correction procedures.

The safety and effectiveness of corneal cross-linking has not been established in pregnant women, women who are breastfeeding, patients who are less than 14 years of age and patients 65 years of age or older.

¹ Beshtawi IM, O'Donnell C, Radhakrishnan H. Biomechanical properties of corneal tissue after ultraviolet-A-riboflavin crosslinking. *J Cataract Refract Surg.* 2013;39(3):451-62. doi:10.1016/j.jcrs.2013.01.026.

² Olivares JL, Guerrero JC, Bermudez FR. Keratoconus: age of onset and natural history. *Optom Vis Sci* 1997;74:147-151.

³ National Eye Institute, National Institutes of Health. <http://www.nei.nih.gov/health/cornealdisease/#h>.

Importance of Screening & Early Diagnosis

It is important to note that the goal of treatment for corneal cross-linking patients is to slow or halt the progression of the disease. For these patients, continued progression often results in loss of visual acuity or decreased tolerance to contact lens wear, caused by the ongoing changes in the cornea. Therefore, the earlier progressive keratoconus is diagnosed, the sooner treatment can be provided that may slow the progression of the disease and stabilize the cornea¹.

Signs & Symptoms of Keratoconus

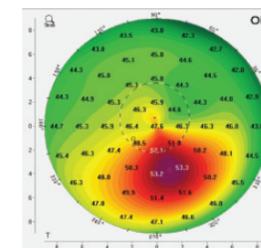
Early signs of keratoconus may include asymmetric refractive error, high or progressive astigmatism, or reduced best corrected visual acuity. The onset of keratoconus often occurs in teenage years or early twenties but can start at any time.

Patient symptoms may include:

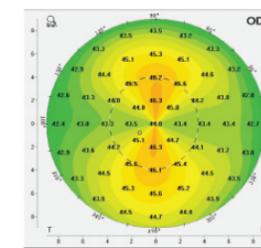
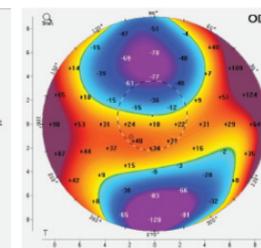
- Blurry vision
- Increased light sensitivity
- Difficulty driving at night
- A halo around lights and ghosting (especially at night)
- Eye strain
- Headaches and general eye pain
- Eye irritation, excessive eye rubbing

Keratoconus, especially in the early stages, can be difficult to diagnose and all of the above symptoms could be associated with other eye problems.

Diagnosing Keratoconus



Example topography of patient with keratoconus



Example topography of patient with normal astigmatism

Keratoconus is classically diagnosed with a slit-lamp examination.

Signs of keratoconus that may be observed include:

- Corneal thinning
- Fleischer's ring
- Vogt's striae
- Apical scarring

A measurement of the curvature of the cornea is also required.

This is done by:

- Keratometry
- Corneal topography or tomography
- Corneal OCT

Corneal topography has facilitated the diagnosis of keratoconus, helping establish the diagnosis earlier, follow progression more accurately and differentiate keratoconus from other conditions.

For more information about diagnosing keratoconus, visit the Academy of Ophthalmology's Practice Guidelines for Diagnosing KC <https://www.aao.org/preferred-practice-pattern/corneal-ectasia-ppp--2013>



"Patients with keratoconus who are <40 years of age should be scheduled for more frequent exams than in the past—every 3-6 months is probably appropriate, because they can rapidly progress in a very short period of time at this age."

– John D. Gelles, OD, FIAO, FCLSA

¹ Gelles, J. D., OD, FIAO, FCLSA. (2017, April). The Optometrist's Role in Keratoconus Management. *Advanced Ocular Care.*