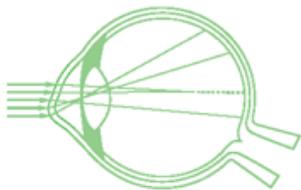


Corneal Cross Linking

Corneal Collagen Cross Linking with Riboflavin (CXL) and Intacs for Keratoconus, Ectasia, and Infectious Keratitis

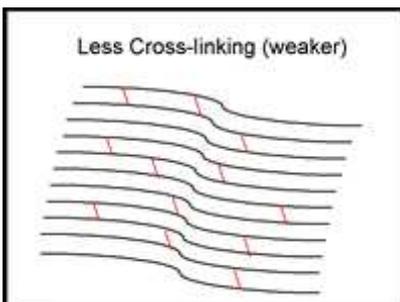
Corneal Collagen Cross Linking with Riboflavin (CXL) is a new treatment for Keratoconus, Ectasia and Infectious Keratitis that has been proven outside of the US to strengthen a weakened corneal structure. CxL is currently in US Food and Drug Administration (FDA) clinical trials.

Keratoconus is a disease of the cornea which allows the cornea to become weak and it may gradually bulge outward. Most often, this bulging is in the lower half of the cornea and first presents as astigmatism. Progression results in increasing myopia and astigmatism. However not all astigmatism is due to keratoconus. In mild or early stages of keratoconus (forme fruste keratoconus), eyeglasses may still correct the astigmatic vision.



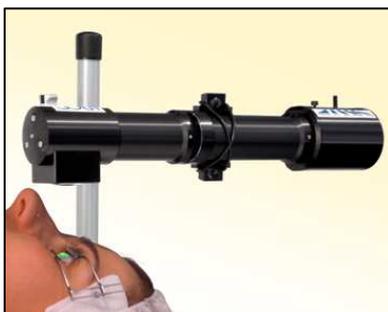
Keratoconus and ectasia create an irregular cornea that can be treated with CXL and/or Intacs / Keraring / Ferrara ring inserts.

The 30-minute corneal crosslinking treatment is performed in the doctor's office. During the treatment, custom-made riboflavin eye drops are applied to the cornea, which is then activated by ultraviolet light. This amazingly simple process has been shown in laboratory and clinical studies to increase the amount of collagen cross-linking in the cornea and strengthen the cornea. In published European studies, such treatments were proven safe and effective in patients.



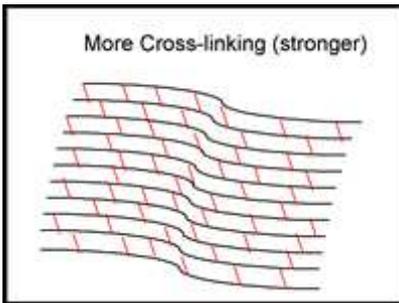
The theory behind CXL treatment is that the fibrils of the layers of the keratoconus cornea lose their ability to link to each other.

This treatment works by increasing collagen cross-linking, which form the natural "anchors" within the cornea. These anchors are responsible for preventing the cornea from bulging out and becoming steep and irregular, as found in advanced keratoconus.



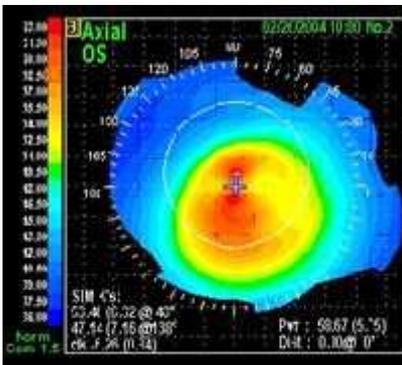
UVA light is applied in precise amounts using a specialized device with LED lights.

Eye Care For You



CXL treatment causes more cross-linking of the fibrils, making the cornea stronger.

The abnormal curvature of the cornea due to keratoconus changes the cornea's focusing power / refractive error producing moderate to severe blurriness of vision. As keratoconus advances, rigid gas-permeable (RGP) contact lenses maybe the only non-surgical way to achieve clear vision. If keratoconus continues to advance, scarring of the central cornea may occur.



The image shows a map of an eye with keratoconus. The off-center red and yellow area shows the forward bulging due to keratoconus.

Approximately half of keratoconus patients have no negative lifestyle effects beyond corrective lenses. The cornea stabilizes after a few years without ever causing severe vision problems. For others, the only resolution to keratoconus has been PKP (corneal graft), with a long healing period and unpredictable refractive error. Even after corneal transplant PKP, keratoconus can reoccur in the new donor cornea. Fortunately, there are these two new methods to treat keratoconus much earlier, which are much less invasive than a corneal transplant.

An established treatment for keratoconus is Intra-corneal ring (ICR) segment inserts such as Intacs, Keraring and Ferrara ring. Intacs are a medical device originally approved by the FDA for the correction of 1.00 to 3.00 diopters of myopia (nearsighted, shortsighted) and virtually no astigmatism. ICR's like Intacs inserts are the only refractive surgery procedure that adds structural integrity to the cornea. This unique attribute made Intacs an ideal treatment for keratoconus.

Intacs are clear small semicircular plastic rings of various thickness that are inserted deep within the cornea layers outside the visual axis. Insertions of these rings flatten the central area of the cornea and correct myopic refractive error. A major advantage of ICR like Intacs is that no tissue is removed and there is no ablation or incision across the visual axis. Keraring & Ferrara rings are narrower for a stronger effect.



Intacs are tiny plastic rings surgically added to the cornea.

Eye Care For You

Intacs surgery is not truly reversible because of the incision, but the Intacs can be completely removed or exchanged for a different size. Intacs inserts cannot be felt by the patient and are no more visible than a contact lens. After insertion and healing, Intacs require no maintenance.

The placement of ICR like Intacs inserts remodels and reinforces the cornea, eliminating some or all of the irregularities caused by keratoconus. Follow-up visits will be required to monitor the healing process and to evaluate the visual benefits of the procedure. Even after a successful ICR / Intacs procedure for keratoconus, glasses or contacts may still be required. However ICR / Intacs have been shown to improve vision and reduce or stop the progression of keratoconus, thereby saving the patient from needing PKP.

Intacs have been approved for the treatment of keratoconus by the FDA under a Humanitarian Device Exemption (HDE). Humanitarian Use Devices (HUDs) are medical devices specially designated by the FDA for use in the treatment of fewer than 4000 patients per year with rare medical conditions. Ferrara rings and Kerarings were developed in Brazil and is available outside the USA.

Corneal cross linking treatments can be combined with ICR like Intacs to flatten the keratoconus cone even more than with Intacs alone. In these cases, corneal cross-linking treatments stabilize keratoconus from getting worse as well as help the Intacs reverse the keratoconus steepening that had already occurred.

Corneal Collagen Cross-Linking (CXL) and Intacs for Keratoconus and Ectasia



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