CORNEAL CROSS-LINKING (CXL) FREQUENTLY ASKED QUESTIONS

Is Corneal Cross-linking (CXL) a new treatment?
Yes. CXL was first performed in Europe in 2001. However, CXL was introduced in the United States in 2006 based on randomized clinical trials performed in Europe. More than 15 years ago, the procedure was pioneered. There are many long-term studies that demonstrate the safety and efficacy of the procedure.

What is the main goal of CXL?
The purpose of the treatment is to prevent progressive bulging and thinning of the cornea that can interfere with vision. With a stronger and more stable cornea, the risk of requiring a corneal transplant is reduced.

What is the success rate of CXL?
The success rate at preventing progressive bulging and thinning is 98 percent. Many patients have seen some modest regression of their corneal bulging, which can improve proper contact lens fitting and provide better vision with glasses than before treatment.

Can CXL be repeated?
In rare cases (less than 2 percent) where CXL is not successful in stabilizing a cornea, a repeat treatment can be performed. Since very few patients have ever required repeat CXL, less is known about the efficacy of a repeat treatment, but it has been shown to be equally safe as initial treatment.

Are certain patients not good candidates?
Patients must have sufficient corneal thickness for the procedure to be performed. Your doctor will perform measurements to confirm adequate thickness. CXL is not a good treatment when corneas have significant scarring that interferes with vision.

Is there an ideal age for CXL treatment?
Usually, the younger the patient, the greater the chance of preserving vision with CXL. But patients at any age may benefit from CXL. If they have worn contact lenses or have had decreased vision correction with glasses or contact lenses. Patients with advanced disease can have CXL, but vision may be less than ideal with glasses or soft contact lenses necessitating the use of rigid contact lenses.

Why does the ultraviolet light treatment time vary from clinic to clinic?
The original treatment protocol in Europe was the use of ultraviolet light for 30 minutes at an energy level of 3.00 J/cm2. This is the only treatment protocol that is currently FDA-approved in the US, but some practitioners use different treatment protocols.

Can vision be improved with CXL?
Although the main goal of CXL is to stabilize the cornea, 60 percent of patients have a small improvement in their vision. This is a result of the corneal surface becoming more regular after CXL.

Can the corneal epithelium be left intact or does it have to be removed?
Clinical studies have shown that best results are obtained when the epithelium is removed prior to treatment. Early research on leaving the epithelium intact has been positive, but long-term results are still needed.

What is required after the treatment?
After CXL a soft bandage contact lens is worn for 5 to 7 days. This promotes healing of the corneal epithelium. An antibiotic drop and a steroid drop are used for 1 to 2 weeks after surgery. Artificial tears can be used as needed for comfort.

Is vision better immediately after the procedure?
Is vision better immediately after the procedure? Usually vision is slightly blurry during the first month and then gradually improves. The blurred vision is related to the healing of the corneal epithelium.

How do I know if the treatment is successful?
Repeat corneal mapping is performed to determine corneal stability or flattening. The mapping is typically performed at 3 to 6 months after treatment and then at regular intervals.

What are the potential complications?
The complication rate and risk of infection is extremely low with CXL. Occasionally the healing of the corneal epithelium is slow, which can delay the return of best vision.

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When can I start wearing contact lenses?
When can I start wearing contact lenses? Your physician will determine when you can begin wearing contact lenses. Average wait time is usually two weeks after the procedure. If you have never worn contact lenses or need a new fitting, consult with your ophthalmologist about how long to wait before wearing lenses fitted.
Keratoconus is a common corneal condition occurring in more than 1 in 1000 people. The condition typically starts in adolescence or early adulthood with an uncertain cause. Progression is unpredictable, but in extreme cases, vision deterioration can require corneal transplant surgery. The cornea is the clear surface on the front of the eye. It is usually a regular spherical dome and is responsible for focusing images. The cornea consists of layers that are linked to each other by collagen. If the collagen cross links are lost due to keratoconus, there is a progressive corneal thinning and stretching. Keratoconus causes the cornea to bulge forward, producing an irregular cone shape that distorts how images are focused. Due to the irregular corneal shape it can be difficult to correct vision with glasses or soft contact lenses.

**RISK FACTORS**
Although the cause of keratoconus is unknown, genetic predisposition, certain systemic disorders such as Down Syndrome that can affect approximately 50 percent of family members, it can also be a random event. It affects men and women in equal proportions and is bilateral in 90% of patients.

**SIGNS & SYMPTOMS**
Early signs of keratoconus are usually blurred vision and frequent changes in eyeglass prescription, or vision that cannot be corrected with glasses. Other symptoms include increased light sensitivity, eye strain and irritation with excessive eye rubbing. Keratoconus symptoms usually appear during the late teens and early twenties.

**DIAGNOSIS**
Early keratoconus can often be overlooked with a standard eye evaluation, since it’s mild form rarely shows identifiable signs upon examination. Advanced corneal topography is needed to confirm the presence of the disease. It is important to be thoroughly assessed by a physician experienced in keratoconus treatments to receive the best care options.

**WHAT IS KERATOCONUS**
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**CORNEAL CROSS-LINKING TREATMENT**
**What is corneal cross-linking?**
Corneal cross-linking (CXL) has shown great success for treating keratoconus. The combination of riboflavin eye drops and illumination with UV-A light augments the collagen cross-links within the stroma and recovers some of the cornea’s mechanical strength. CXL, developed in Dresden, Germany, has been shown to slow or arrest the progression of keratoconus, and in some cases, reverse it.

**How is the treatment done?**
The treatment is performed one eye at a time. The patient lies flat on a surgical bed for approximately 60 minutes. The treatment is performed under topical anesthesia (using anesthetic eye drops). The surface of the eye (cornea) is treated with riboflavin eye drops for 30 minutes. The eye is then exposed to UV-A light for 30 minutes. After the treatment, antibiotic eye drops and a bandage contact lens are applied. The bandage lens is removed by the doctor within the week during follow-up visits.

**Who can benefit from this treatment?**
Collagen cross-linking treatment is not a cure for keratoconus, rather, it aims to slow or halt the progression of the condition. This is important to understand. The goal of the treatment is to prevent further deterioration in vision and reduce the risk of requiring a corneal transplant. Following cross-linking, patients will still need to wear eyeglasses or contact lenses for their best vision. Frequently, a change in prescription is necessary.

**What are the risks involved?**
Very few potential risks associated with this treatment have been reported to date. The ultraviolet light dose used is low to prevent damage to the important inner layer of the cornea or the other structures within the eye. No lens opacities (cataracts) have been attributed to this treatment in European trials. The treatment involves the outer layer (epithelium) of the cornea, so light sensitivity, mild discomfort and blurred vision is common during the first week of recovery.

Other lesser but more common risks include:
1. Inability to wear contact lenses for several weeks after the treatment.
2. Changes in corneal shape may require a new contact lenses or change in eyeglass prescription.

As is the case with any treatment, there may also be long-term risks that have not yet been identified. The increased corneal rigidity induced may wear off over time and further periodic treatments may be required.

Schedule a visit with one of our cornea specialists, who will perform a full eye exam along with special corneal testing to determine your eligibility for treatment and help you understand the options that are best for your vision care.

To schedule an appointment or for more information about this revolutionary treatment, please call 323.442.8355 or visit us up online at www.USCeye.org