Treatment of Keratoconus

(Corneal Collagen Crossling Procedure)

What is Keratoconus?

Keratoconus is a bilateral ocular disorder in which the cornea assumes a conical shape due to thinning of the stromal collagen tissue. It is a relatively frequent disease with an incidence of 1 in 2000 in the general population. It classically has its onset at puberty and is progressive until the third or fourth decade of life when it usually arrests. Keratoconus can be detected clinically by slit lamp examination by an Ophthalmologist and the diagnosis can be confirmed by corneal topography.

What are the causes of Keratoconus?

It is a disease of an uncertain cause with an unpredictable course. Risk factors include - Eye rubbing, Family history, Genetic predisposition , Connective tissue disease.

What are the symptoms of Keratoconus?

An early symptom of Keratoconus is a change in the spectacle power. When the disease progresses, vision deteriorates and may not improve with spectacles. It also causes distortion in vision with multiple images, streaking and sensitivity to light.

What is the treatment for Keratoconus?

The methods of treatment include :

1. Use of Contact Lenses: Early Keratoconus can be managed by giving rigid Contact Lenses to the patient which correct the irregularity of the cornea and provide better quality of vision. However, the disadvantage of contact lenses is that, in severe cases, optimal fit is not achieved and rigid lenses are more difficult to wear.

2. CXL (Corneal Collagen Cross linking with Riboflavin): It is based on collagen cross-linking with ultra-violet A (UVA, 365 nm) and Riboflavin (vitamin B2, a photo sensitizing agent). This changes the intrinsic biomechanical property of the cornea, increasing its strength by almost 300%. This increase in corneal strength has been shown to arrest the progression of Keratoconus.

3. Intacs: These are acrylic rings inserted in the corneal stroma to decrease corneal irregularity in cases of Keratoconus. They can improve uncorrected vision without contact lenses. These can also be combined with CXL.

4. Cornea Transplant: This is a surgical treatment, which is reserved for advance cases of Keratoconus, where the vision can not be improved with glasses or contact lenses. Here the central portion of the cornea is removed and replaced with a donor cornea of similar size. Even though surgery enjoys a high success rate, it is a more invasive procedure. It carries the risks of any intraocular surgery. Since it involves the grafting of a donor cornea, there is a small risk of a rejection, leading to failure of the graft.

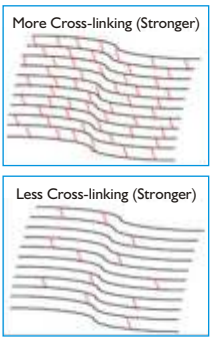
How CXL is done?

The treatment is performed under topical anaesthesia with the patient in a lying down posture in the sterile environment of the operating room. The patient's corneal epithelium is gently removed; following which Riboflavin solution is applied every 5 minutes for the first half an hour. Thereafter the patient's cornea is exposed to UVA light for half an hour. The treatment is painless and lasts for an hour, at the end of which the eye is patched.

The cornea is the clear, transparent dome in front of the "black portion" of the eye. It is also the main focusing surface, which converges light rays as they enter the eye to focus on the retina. It is thus the most important part of the optical apparatus of the Eye. Loss of transparency directly results in loss of vision. The normal shape of the cornea is spheric.

Collagen Cross Linking Riboflovin with UVA

Until recently, there was no method to change the integrity and strength of the cornea itself for keratoconus patients. The non-invasive treatment C3-R®* (corneal collagen cross-linking riboflavin) treatment has been proven to strengthen the weak corneal structure in keratoconus. This method works by increasing collagen cross-linking, which are the natural "anchors" within the cornea. These anchors are responsible for preventing the cornea from bulging out and becoming steep and irregular (which is the cause of keratoconus).



The figures above show the parallel corneal layers (white) and the collagen cross-linking (red) which increased after C3-R® treatment.*

Who is a suitable candidate for Collagen crosslinking ?

- Patient must be a proven case of keratoconus with documented progression of the disease.

- Patient's corneal thickness must be at least 400 microns.
- Patient should not be pregnant or nursing.

Is there a need for hospitalization after the treatment?

There is no need for hospitalization after the treatment. However, you will need to go home and take rest for 2-3 days.

When can the patient resume normal routine?

After the treatment, patient will be able to resume work within 4 - 5 days. Care should be taken to avoid entry of dust or contaminated water into the eyes during this period. The use of contact lenses may be resumed 6 weeks after treatment.

When will my vision improve after the procedure?

Your vision will gradually start improving after a month and your contact lens fitting may change during this time. These changes continue even upto one year after the treatment.

Will I still need glasses and contact lenses after the treatment?

Yes, though this treatment might reduce cylindrical power by couple of diopters and you will still require corrective glasses or contact lenses, as the case may be.

Advantages of C3R

- Simple non invasive treatment
- Halts the progress and causes some regression
- No handling of lenses every day
- No stitches
- No incisions
- Quick recovery

This treatment is known to stop progression of keratoconus and in early cases may even cure the disease.

What are the complications of the procedure?

As per the literature available at present there are no known complications of the procedure. However the problems associated with the procedure are transient blurring of vision & slight pain and discomfort for initial 2 days.

How often must the patient come for follow up ?

The surgeon will examine the patient's eye daily for the first 2 to 3 days until the epithelial healing is complete. Eye drops will be used for 6 months. Patient will have to come for follow up at 6 weeks, 3 months, 6 months, 1 year and 2 years after the procedure.

Can both eyes be treated at the same time?

If both eyes are suitable for Collagen crosslinking, the treatment is performed on one eye at a time .The timing of treatment of the second eye is best decided in consultation with your ophthalmologist.

What are the possible side effects of the procedure? A foreign body sensation, irritation or watering accompanied by pain is not uncommon on the day of treatment. Analgesics for relief from pain will be prescribed, and the pain usually subsides within 24 hours. Dryness of the eyes frequently follows this treatment and may last for 6 to 8 months. Tear lubricants are therefore recommended for the period.

Concerns using UVA light

UVA light can potentially harm the vital cell layer of the cornea known as the endothelium as also the crystalline lens and the retina. However, the use of riboflavin and the choice of the wavelength of UV light used, substantially reduces the intraocular penetration of UV rays to negligible levels. Potential side effects are therefore avoided. It is mandatory to perform a preoperative measurement of the corneal thickness and to exclude patients with corneal thickness less than 400 microns.

The 3 & 5 year results of the Dresden clinical study on collagen crosslinking in human eyes has shown arrest of progression of keratoconus in all treated eyes Collagen crosslinking has thus emerged as a safe and effective, inexpensive non surgical promising new treatment for Keratoconus to slow the progression of the disease and to delay or avoid corneal graft surgery.

LASIK CELL

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