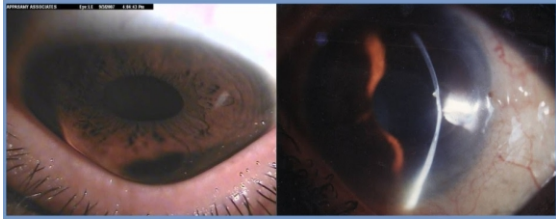


What is Keratoconus ?

Keratoconus is a unique corneal disease which usually affects young adults, where in the cornea of an eye becomes thinner, conical and astigmatic due to weakness of the collagen layer. The rays of light cannot be focused properly on the retina due to change in the shape of the cornea resulting in deterioration in quality of vision. It is estimated that Keratoconus affects 1 in 2000 individuals.



Keratoconus affects most of the youngsters in their teens cornea becomes thinner & bulges out like a cone vision deteriorates faster affecting the quality of life.

The diagnosis is confirmed by topography maps of the cornea and other various clinical parameters. In early stages, vision can be improved with cylindrical glasses or rigid gas permeable contact lenses. However, in advanced stage corneal transplant surgery may be needed to improve the eye sight.

In Keratoconus, essentially basic defect is weakness of corneal collagen. Corneal collagen cross linking - CXL or C3R addresses this main issue.

However, this procedure is applicable only in early to moderate progression of the disease. The cornea should have an adequate thickness to receive procedure. Therefore, an early diagnosis Of keratoconus will enable these patients to avail better modality of treatment.

What is corneal collagen cross linking- C3R ?

Collagen cross linking of cornea with Riboflavin (C3R) is the latest revolutionary treatment for keratoconus. This procedure has been proven to strengthen the weak corneal structure by increasing cross links between collagen fibers of the cornea which are basically anchoring fibrils between two layers. It causes the collagen fibrils to thicken, settle and crosslink to reach to each other making the cornea stronger and more stable.

Keratoconus patients now have a new hope, a new treatment modality, collagen cross linking-C3R can arrest the disease progression and thereby prevent the need for surgical intervention in future. Although the procedure does not provide cure for keratoconus, it certainly can stop its progression and patients can continue using their glasses or contact lenses to improve the eyesight.

Hence, attempt should be made to diagnose keratoconus early enough and stop its progression using collagen cross linking. Corneal topography can detect keratoconus much before it can be picked up by only an eye examination.

Hence, early recognition and prompt decision on the part of patient as well as clinician will change the course of the disease and its ultimate outcome

Indications of collagen cross linking:

Corneal Ectatic Disorders

- Keratoconus
- Latrogenic keratectasia e.g. Post Lasik keratectasia
- Pellucid Marginal Corneal Degeneration

The Procedure:

This procedure itself is simple and safe to undergo on an outpatient basis. Actual surgical procedure time is about an hour and the UV therapy lasts for only half an hour. First the eye is anaesthetized using topical drops, then the first covering or an epithelial layer of the cornea is removed or scratched with specialized instruments followed by frequent instillation of Riboflavin drops on the cornea.

Once certain level of Riboflavin has reached the corneal tissue, UV-A radiation is given for half an hour to the treatment area with a specially designed (UV-X) machine. The yellow pigment of the Riboflavin absorbs the Ultraviolet - A light, increases the amount of collagen cross linking in the cornea and in turn strengthens the cornea.

The eye may be patched or a contact lens inserted in the eye for a day or two till the surface epithelium heals completely. Then the patient can go back to work which is usually 2-3 days post surgery. Patient is asked to use medication for about 4-6 weeks after the surgery. However, care has to be taken to prevent any infection occurring to the operated eye.

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 cornea increases in rigidity soon after the procedure, although the process of cross-linking continues on for a period of few days afterwards. During this process new chemical bonds are induced. The changes get established by 6 month post surgical procedure and a person can have improvement in quality of vision enabling him/her to lead a near normal life.

Advantages of the Procedure

Safe, non invasive, effective and proven procedure can arrest the disease, progress, thereby prevent the need for surgical intervention in future Improvement in quality of vision.

Till date in controlled clinical studies, more than 1400 human eyes have been cross linked world wide with a follow-up of up to 7 years. Clinical studies have shown a significant increase in Best Corrected Visual Acuity (BCVA) in more than 85% of the treated eyes. It was observed that 6 month after corneal cross linking the refractive cylinder was reduced in over 80% of the eyes.

Advantages of C3R:

- It modifies biochemical & bio-mechanical characteristics of the cornea.
- The Riboflavin / UVA light causes increases in the strength of the first 200-250 microns of cornea
- Deeper structures do not get damaged
- The progression of keratoconus or keratectasia can be stopped
- The number of keratoplasties can be reduced
- The treatment is easy, simple and now cost in comparison to a Corneal Transplant Surgery

If there is progression to the disease, an early cross- linking treatment is recommended. This procedure treats the cause and not only the symptoms.

Surgical treatment other than C3R:

Intacs implants:

This is newer surgical treatment for mild to moderate keratoconus. In this surgery, fine plastic implants are placed in the peripheral cornea, which helps flatten the central cornea, thereby improving the unaided vision. Most of the patients are able to return back to normal glass wear or comfortable contact lens wear post treatment.

Deep anterior lamellar keratoplasty- DALK:

In advanced stages of keratoconus when C3R is not possible, surgical intervention is often necessary to restore structural integrity and improve quality of vision.

Traditionally full thickness corneal transplantation procedure was performed in advanced stages of keratoconus. However, with advancement in surgical technique now it is possible to replace selective layers of host cornea with donor tissue.

Deep anterior lamellar keratoplasty is one such procedure where in the most vital layer of the host cornea is retained and front layers of the cornea are replaced with normal thickness donor tissue. In this procedure the risk of rejection is minimal. However, this procedure is technically more demanding, hence only well trained surgeons perform this procedure all over the world.



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Advanced Treatment of Keratoconus