

Patient information

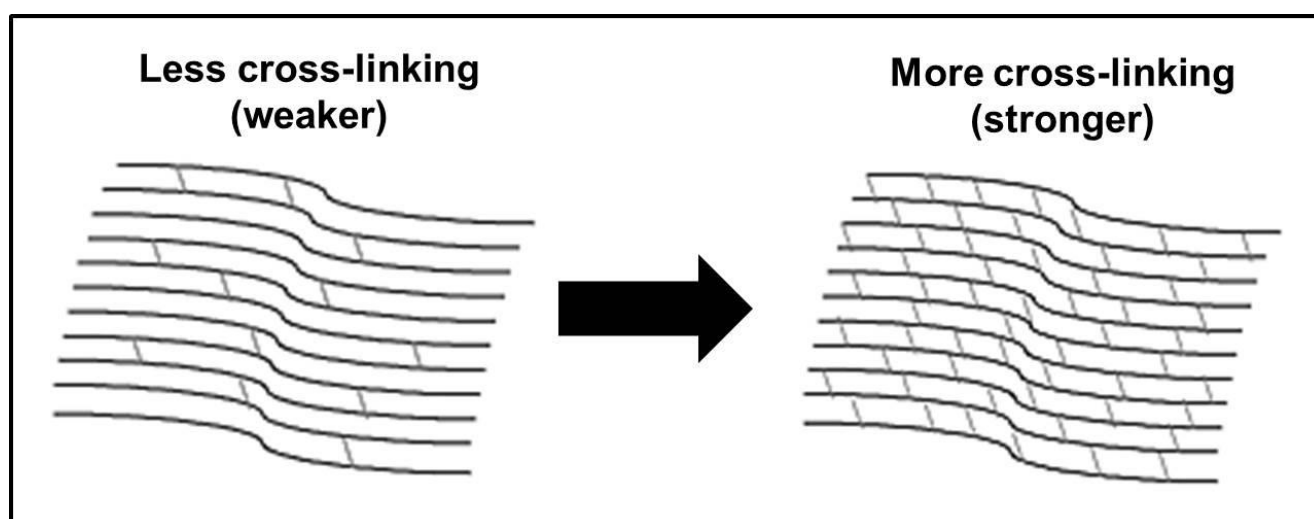
Corneal Collagen Cross-linking with Riboflavin (C3R)

St Paul's Eye Department – Royal Liverpool Hospital

What is Corneal Collagen Cross-linking?

You have a condition called Keratoconus which affects the shape of your cornea. This progressive change in shape of the cornea leads to visual deterioration.

C3R is performed by removing the corneal epithelium and applying Riboflavin drops to the eye. After the cornea is saturated with the riboflavin, the eye is exposed to an ultraviolet (UVA) light. This UVA light interacts with the riboflavin, producing reactive oxygen molecules which cause the formation of chemical bonds between and within the corneal collagen fibrils, making them stiffer.



It is a 45-60 minute procedure; wherein Riboflavin drops (vitamin B2 commonly used in food) are applied to the cornea at regular intervals and activated by ultraviolet radiation to induce cross-links.

What is riboflavin?

Riboflavin is the vitamin B2, this occurs naturally in many common foods like milk, cheese and leafy green vegetables. The drops are absorbed into the cornea and into the aqueous fluid of the eye.

It has two effects during the UV treatment.

It helps with the chemical reaction cross-linking the collagen fibres in the cornea, increasing their strength and absorbs any UV light which penetrates the cornea, thus preventing damage to the internal structures of the eye such as the lens and retina.

What are the benefits?

This is not a cure for keratoconus; the aim of this treatment is to slow down the progression. Whereas all currently available treatments such as spectacles, contact lenses and INTACS (plastic segments placed within the cornea) are aimed at reducing the steepness of the cornea without stopping disease progression, C3R has been shown to slow or stop disease progression (at least temporarily) and improve corneal curvature in 70-80% patients.

This will try and prevent further deterioration in your vision and the need for a corneal transplant. You will still need to wear contact lenses or glasses afterwards.

You may need to change your glasses or contact lenses as your prescription may alter.

C3R can be used in other conditions leading to corneal ectasia (Pellucid marginal degeneration, post-laser eye surgery ectasia and regression), corneal melts and corneal infection (ultra-violet light kills bacteria).

What are the risks?

The surface of the cornea (epithelium) is removed before the application of the eye drops. Until this heals, the eye will be painful.

Some patients find the eye sensitive to light for some weeks after the treatment.

Post-operatively there will be inflammation, and this could possibly lead to corneal scarring, with impairment of vision in 5-10% of cases

An infection of the cornea may occur in around 1-3% of cases.

Your keratoconus might progress in the future.

If you are worried about any of these risks, please speak to your Consultant or a member of their team.

Is anyone not suitable for treatment?

A corneal thickness of at least 400µm is required (although it can be done in thinner corneas by making it swell with hypotonic drops during treatment).

Results in severe Keratoconus are unpredictable, hence any one with keratometry readings of more than 60D are excluded.

Any previous conditions which might have caused corneal scarring (for example- cold sore/shingles in the eye, other infections or scars) may lead to medical advice against treatment or explanation of the increased chance of complications.

Pregnant patients are also excluded because of an unpredictable healing response.

Does C3R make any other later treatments more difficult?

As far as the present literature suggest, the treatment has no effect on any future surgery or treatment. It does not prevent or complicate eye surgery for any other problems such as glaucoma or cataracts which may be needed later in life.

Are there any age limits?

There are no age limits, but as Keratoconus usually stabilises by 40 years of age, treatment above this age are uncommon.

What are the alternative treatments?

Alternative treatments for keratoconus are to wear spectacles or rigid (gas permeable) or scleral contact lenses or to have corneal surgery such as INTACS to flatten the conical shape of the cornea even further (this can be performed before corneal cross linking).

What will happen if I decide not to have treatment?

Eventually the cornea may need to be removed and replaced by a corneal transplant. Although corneal transplantation is often successful, it is only generally performed once the keratoconus has progressed to an advanced state, and following corneal grafting it may take between 12 and 18 months to provide an improvement in vision. There is also a lifelong commitment to care for the graft. There is risk a corneal graft may be rejected and/or fail.

Getting ready for your procedure

- On the day of your procedure arrange to have somebody to bring you and to take you home.
- Wear clothes which are comfortable to lie down in.
- You can eat and drink as normal.
- Please take your normal medication.
- Please leave all cash and valuables at home. If you need to bring valuables into hospital, these can be sent to General Office for safekeeping. General Office is open between 8.30am and 4.30pm Monday to Friday. Therefore, if you are discharged outside these times we will not be able to return your property until General Office is open.

- The Trust does not accept responsibility for items not handed in for safekeeping.

The day of your procedure

Be prepared to stay on the ward for about two hours. The procedure is done in a quiet room where you will need to lie down flat for about an hour.

- A lid speculum is used to keep your lids open for the procedure.
- Local anaesthetic drops are applied throughout the procedure.
- The doctor will remove the superficial layer on the cornea (epithelium).
- Riboflavin drops are instilled every two minutes for 15 minutes.
- The doctor will measure your corneal thickness.
- The ultraviolet light is directed to shine on your cornea for 15 minutes; this will produce the corneal cross linking.
- Dilating drops and antibiotic ointment are instilled.
- An eye pad is applied.

Overnight

The eye can be very painful overnight and you will be given anaesthetic drops which will ease the discomfort for this initial period. Tablets will be prescribed as pain control and given for you to take home and use as directed. (Codeine phosphate 30mgs and Paracetamol 500mgs).

If you are in discomfort please carry out the following instructions:

- Remove the eye pad if you are wearing one.
- Put two drops of Proxymetacaine into your eye and wait five minutes.

- Replace the eye-pad (if required).
- Take one or two tablets of Codeine and two tablets of Paracetamol from the pack you will be given, as prescribed.

These measures should give relief - and may be repeated up to three times overnight.

During the first 24 hours it is advisable to avoid drinking alcohol as you are taking pain killers.

You will be given the following to use at home.

- Antibiotic ointment (Chloramphenicol) hourly for seven days.
- Steroid eye drop (Maxidex) four times a day for four weeks.
- Proxymetacaine anaesthetic drops to use if needed (Store in the fridge).

The nursing staff will advise you about painkillers before you leave the hospital. Please tell the nurses what painkilling tablets you have at home.

Your eye

As the epithelium has been removed this will cause the eye to be sore as it heals, the healing process can take a few days

- You may need to wear a pad on the treated eye for 24 hours.
- Use the shield to cover the eye at night time for one week.
- Use your drops as prescribed, making sure you wash your hands.
- Avoid squeezing your eyes after drop instillation, close the lids gently and keep closed for a few minutes.
- Try to keep the eyes closed as much as possible on the first day; this will make them feel more comfortable.

- You will notice the eye will water a lot more than usual, this is to be expected.
- Light may affect the eye, wearing tinted glasses may help.
- To prevent water going into your eyes, shower with your eyes closed.
- When washing your face be careful around the eyes.
- The vision will fluctuate over a period of time, this is normal until the eye settles.
- Make up can be worn approximately two weeks post treatment.
- No swimming for six weeks following treatment.
- **Do not rub your eye.**

Eye Treatment

Eye-drops will be required for several weeks and instructions will be given at the clinic visits.

Getting back to normal

Remember you have just had a painful procedure. It is normal to feel more tired than usual for a few days afterwards.

Returning to work

It would be normal to take up to ten days off work allowing time to recover from the pain and discomfort. Remember you must be able to put in your eye drops even after you have returned to work.

Further Appointments

You will have a visit to the clinic two days and nine days after the procedure to check on the healing of the corneal surface (epithelium). Further follow-up appointments will be needed.

Feedback

Your feedback is important to us and helps us influence care in the future.

Following your discharge from hospital or attendance at your Outpatient appointment you will receive a text asking if you would recommend our service to others. Please take the time to text back, you will not be charged for the text and can opt out at any point. Your co-operation is greatly appreciated.

Further information

Corneal Nurse Team (9am-5pm Mon-Fri)

Tel: 0151 706 3915

Text phone number: 18001 0151 706 3915

Primary Care (out of hours)

Tel: 0151 706 3949

Text phone number: 18001 0151 706 3949

Stephanie Moss, Admin Officer (9am-5pm Mon-Fri)

For appointments, waiting lists and general enquiries

Tel: 0151 706 2034

Text phone number: 18001 0151 706 2034

www.keratoconus-group.org.uk

www.nkcf.org

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All Trust approved information is available on request in alternative formats, including other languages, easy read, large print, audio, Braille, moon and electronically.

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