

## Patient information – external disease and corneal service

# Corneal cross-linking

Corneal cross-linking (CXL) is a treatment for patients with keratoconus which can prevent their condition getting worse. It is successful in more than 90% of cases. After treatment, you will still need to wear spectacles or contact lenses. Your eye will be sore for about one week after the procedure. Although vision is often hazy at first, most patients can resume contact lens wear and return to work after one week. As with all operations, there are risks: CXL is safe, but there is a small chance (about 1 in 30) of worse vision afterwards.

### What is CXL?

Keratoconus gets worse because the cornea weakens. CXL, also known as C3R, uses ultraviolet light and vitamin B2 (riboflavin) drops to stiffen the cornea. Used together, they cause fibers within the cornea to cross-link – or bond more tightly. This treatment mimics the normal age-related stiffening of the cornea, which is known as natural cross-linking.

### Which patients benefit from CXL?

The treatment is recommended only for patients whose corneal shape scans show that their keratoconus is getting worse, or for those who are at particularly high risk of worsening keratoconus. Because of natural cross-linking with age, keratoconus usually stops getting worse by the mid-30s, so CXL is not normally required for older patients.

### What evidence is there that it works?

Collagen cross-linking is the only treatment currently available that appears to stop keratoconus from getting worse. Evidence from three randomised clinical trials one year after CXL showed success in halting keratoconus progression in more than 90% of treated eyes, with more than 45% of eyes also gaining an improvement in corneal shape. Longer-term results (up to five years) from a different study suggest a similarly high success rate in preventing keratoconus progression. Vision is better after treatment than before in about 50% of eyes treated with CXL.

## Which type of CXL is Moorfields performing?

We perform a rapid version of 'epithelium-off' CXL, which is an up-to-date, and potentially safer, variation of standard CXL. Standard CXL involves 30 minutes of ultraviolet (UV) light treatment. Rapid CXL speeds this process up by delivering the same total amount of UV light energy in eight minutes. Recent research has shown that the cornea may tolerate this shorter burst of UV light better than a longer treatment period.

Rapid CXL is widely used, but as with any recent variation in treatment, long-term results are not yet available. You will be monitored for up to five years to confirm that your corneal shape has stabilised. CXL can be repeated if the shape does not stabilise after your first treatment.

## Will I have both eyes treated at the same time?

If you need CXL for both eyes, we can offer you treatment for both eyes at the same time. If you would prefer to delay the second eye treatment, please request this at the clinic appointment prior to your treatment.

## What happens during CXL?

CXL is performed as a day-case procedure by a senior ophthalmic nurse. Although the procedure takes less than 30 minutes, there is usually some waiting


time before treatment and you will also need to stay for a short while afterwards so we can check that you have everything you need to go home. Please be prepared to spend up to half a day in hospital.

You will be asked to lie flat on the treatment table. Anaesthetic drops are used to numb the surface of your eye before a small clip is placed to keep your eyelids open. The surface skin of your eye (epithelium) is gently brushed clear and riboflavin drops are applied every few minutes for at least 10 minutes. Following this, the ultraviolet light is shone at your eye for eight minutes. A soft 'bandage' contact lens is placed on your eye at the end of the procedure.

## What happens after CXL?

You will be given eye drops to use after the procedure. The soft 'bandage' contact lens will remain in your eye until the surface has healed (about seven days). If the bandage lens falls out during this time, please throw it away – do not attempt to reinsert it.

The anaesthetic drops will wear off later on the day of your procedure, and your eye will be gritty, red and sensitive to light for several days. Everyone's experience of pain is different, with some patients reporting very little discomfort and others describing the first few days as very painful. Your eyes could be light sensitive



and many patients find sunglasses helpful.

Your vision will be quite blurred at first, but will clear gradually over the first few weeks.

It is normal to experience fluctuating pain within the first two days after surgery. However, if you experience increasing pain three or four days after the procedure this could be indicative of infection and you should visit A&E. Please note that infection is rare, affecting fewer than 1% of patients.

### **Do I need to take time off work or studies?**

Yes. You should allow at least one week off while most of the surface healing occurs, or two weeks if your job involves a lot of computer work, and the treatment is being done on your best eye. You will be putting eye drops in every hour for the first day, and then every four hours for the following days.

Day to day activities such as watching TV or using a computer will not do any damage to your eye, but you might find it more comfortable to rest with your eyes closed early on.

You will be given an appointment the following week to check your eye is healing properly.


### **What should I do, or not do, after CXL?**

It is important to put the eye drops in regularly as prescribed. Wash and shower normally, but try to avoid getting water in your eyes. You may exercise, but should not swim before the surface of your eye has healed.

We will check your vision in the clinic the week after your procedure to confirm if your vision is good enough to drive. It is normally safe to resume contact lens wear once the eye surface skin layer has healed. This typically happens around the end of the second week after your procedure.

### **What are the risks of CXL?**

In general, CXL is very safe, but like all operations your eye needs time to heal and problems do occasionally occur. About 3% of patients will lose some vision in the treated eye as a result of haze, scarring, corneal surface shape irregularity or infection. In most cases, this visual loss is potentially reversible with a corneal transplant. Without CXL treatment, at least 20% of all patients with keratoconus will eventually require a corneal transplant. The risk of transplantation for patients with



documented disease progression is probably higher.

**For further information, please visit [www.keratoconus-group.org.uk](http://www.keratoconus-group.org.uk)**

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**Moorfields Eye Hospital NHS Foundation Trust**  
**City Road, London EC1V 2PD**  
**Phone: 020 7253 3411**  
**[www.moorfields.nhs.uk](http://www.moorfields.nhs.uk)**

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### **Moorfields Direct advice line**

Phone: 020 7566 2345

Monday to Friday, 9am to 9pm, for information and advice on eye conditions and treatments from experienced ophthalmic-trained nurses.

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### **Patient advice and liaison service (PALS)**

Phone: 020 7566 2324 or 020 7566 2325

Email: [pals@moorfields.nhs.uk](mailto:pals@moorfields.nhs.uk)

Moorfields' PALS team provides confidential advice and support to help you with any concerns you may have about the care we provide, guiding you through the different services available at

Moorfields. The PALS team can also advise you on how to make a complaint.

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### **Your right to treatment within 18 weeks**

Under the NHS constitution, all patients have the right to start their consultant-led treatment within 18 weeks of being referred by their GP. Moorfields is committed to fulfilling this right, but if you feel that we have failed to do so, please contact our patient advice and liaison service (PALS) who will be able to advise you further – see above for contact details. For more information about your rights under the NHS constitution, please visit [www.nhs.uk/choiceinthenhs](http://www.nhs.uk/choiceinthenhs).