



CONDUCTIVE KERATOPLASTY

THE MINIMALLY INVASIVE NON-LASER TREATMENT FOR PRESBYOPIA AND HYPEROPIA

DEFINITIONS

1. Emmetropia is where the eye has no optical error for distance. Such patients have never required any optical aids (i.e. glasses or contact lenses) to have good distance vision.
2. Presbyopia is where the ability to focus on near objects declines with increasing age. This process often begins after the age of forty and it gradually worsens to a maximum in the early to mid seventies.
3. Hyperopia is long-sightedness where the eye requires the assistance of a “plus” optical aid to focus distant objects sharply on the retina.
4. Astigmatism is where the cornea has different curvatures in different meridians.

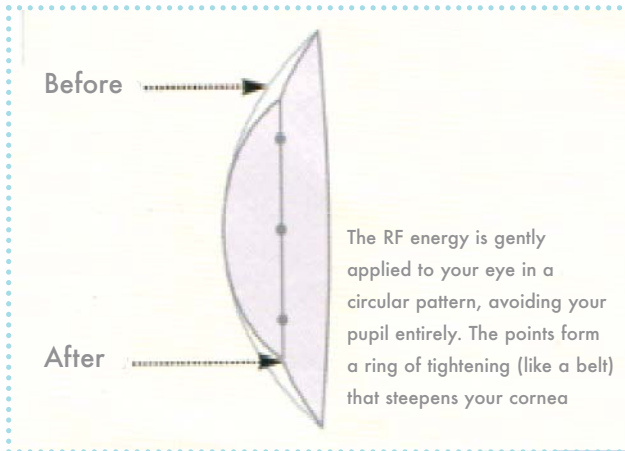
BACKGROUND

In the emmetropic Presbyope the inability to perform near tasks is their only visual disability.

HOW DOES CK WORK?

CK is a laserless radiofrequency-based technique that produces a homogenous temperature increase that causes collagen fibres to shrink. When it is applied in a predetermined circular pattern the peripheral cornea flattens and the central cornea steepens. This then allows near objects to be focused on the retina again. This treatment is applied to your non-dominant eye thus giving you effective MONOVISION (i.e. good unaided binocular near and distance vision).

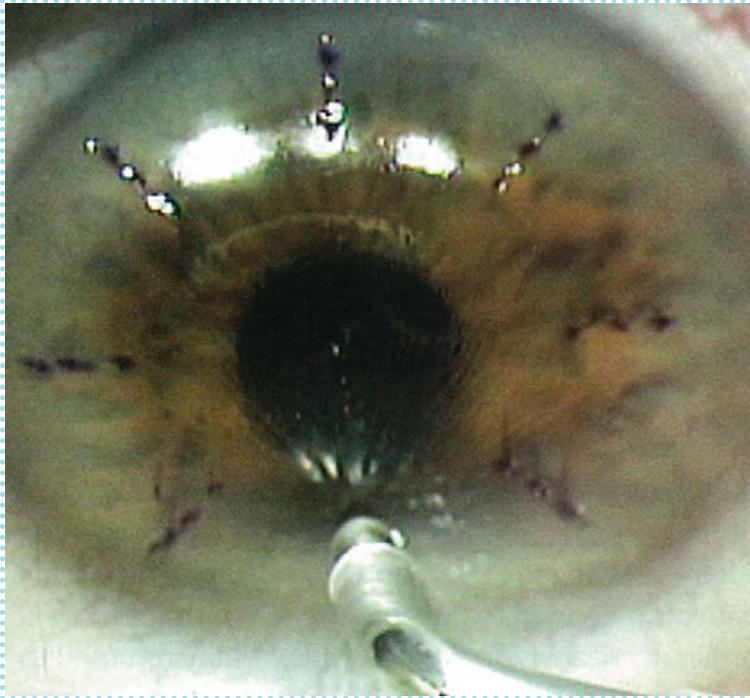
The diagram below shows how a circular pattern of CK burns serves to reshape the cornea and thereby alter its curvature.



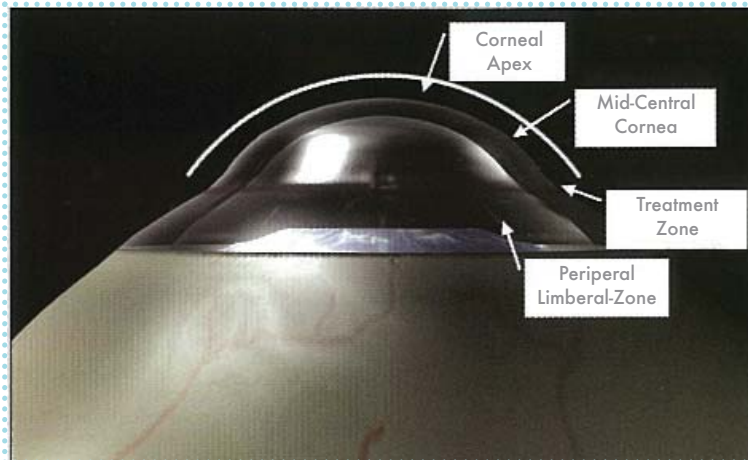
There is no cutting involved with this procedure and it can be performed in an office setting. It is a safe technique that has been approved by the FDA in the United States. It is fast and easy and generally takes only 3-5 minutes to perform and is virtually painless.

As with any surgical procedure there are potential complications such as glare and haloes. However, these have only ever been reported to be significant in very few patients. There has been no reported change in contrast sensitivity in lower lighting conditions after CK. The evaluation of depth perception after CK has shown that up to 93% of patients grade this as excellent, very good or good with only 7% grading it as fair.

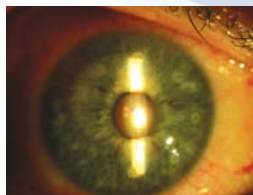
1 year after CK up to 98% of patients have found the quality of their vision to be improved, 84% were satisfied or very satisfied.



The above picture shows a cornea being treated with a CK probe. The probe is 500 microns deep and it generates heat by using the electrical properties of the cornea. The corneal stromal protein (i.e. collagen) provides resistance to the flow of current. This results in a controlled heating of the tissue and subsequent coagulation and shrinkage of the collagen. This process is self-limiting as resistance to the flow of current increases with the increasing dehydration of the collagen. Each treatment spot produces a cylindrical footprint that extends to approximately 80% of the depth of the mid-peripheral cornea.



Schematic of Cornea

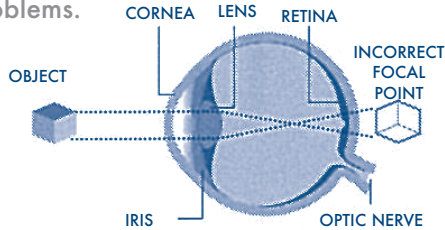


The above three pictures are of eyes that have been treated with CK at the Ardfallen eye clinic

To be a suitable candidate for CK your eyes must be healthy apart from the Presbyopia (or other refractive error for which you are being treated). Systemic contra-indications include Pregnancy, Breast feeding and any chronic disease or illness. Prior to the procedure your eye/eyes are cleaned and then Anaesthetic drops are applied. The intended treatment pattern is marked on your cornea with dye which rinses away after the procedure. The very thin CK probe is then used to apply the pattern of CK treatments to your cornea.

BETTER EYESIGHT THROUGH RADIO WAVES

A new non invasive vision correction procedure called conductive keratoplasty uses radio frequency energy rather than lasers to correct the vision of people with near-vision problems.

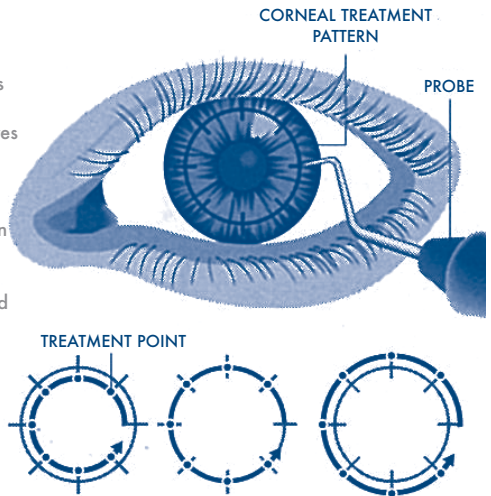


Losing Focus

Presbyopia, an age related condition, affects the ability of the lens to focus properly. Images are projected beyond the point at which the retina can accurately read them.

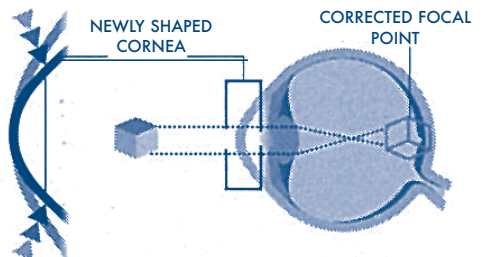
The Treatment

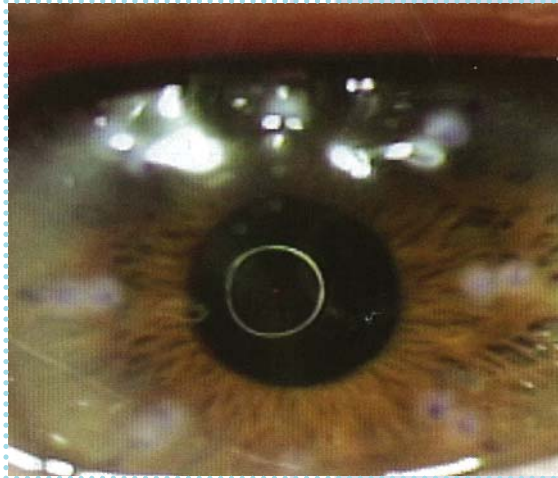
After an eye-drop anesthetic is applied to the eye, the cornea is imprinted with a circular pattern using rinse-away ink. Radio waves are applied to points along the pattern using a probe that is smaller than a human hair. This causes small areas of collagen in the cornea to shrink. The treatment begins centrally and further burns may be placed in an outward direction if required. The procedure usually takes about three minutes.



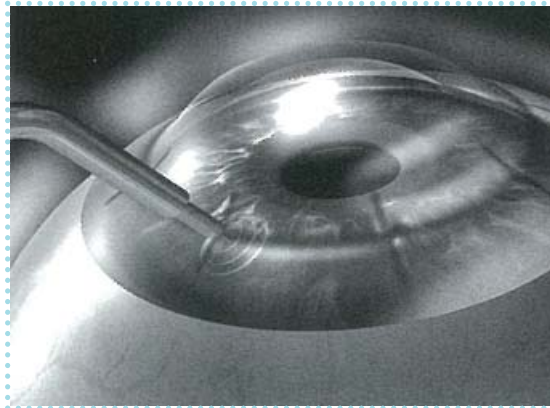
The effect

The treatment causes the cornea to tighten like a belt, reshaping its curvature to shift the focal point back onto the retina.





The above image shows a cornea that has just been treated with CK. This clearly shows that the energy from CK is applied deep in the corneal stroma and not on the surface. The treatment is intended to give you good near vision for "daily life" (i.e. you should be able to see menus, price tags, computer screens and light reading). It will only give you limited detailed vision (e.g. the phonebook). Post-operatively you will be prescribed light analgesia (e.g. Naprosyn), an antibiotic-steroid drop, a drop of Nonsteroidal Anti-inflammatory agent and an Artificial tear drop. Occasionally CK can result in some astigmatic effects but these are generally limited and do tend to decrease with time. Infrequently this may require additional treatment some months after the primary treatment.



If you do not wish to continue to struggle with your reading glasses then CK is the only FDA-approved technology designed to improve near vision.

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