

**“PULL
OUT
SECTION”**

FITTING THE IRREGULAR CORNEA WITH THE ROSE K2 IC LENS

By Dr Paul Rose B.OPT, BSc, FNZSCLP

Fitting the irregular cornea (IC) is probably the greatest challenge for even the most experienced gas permeable (GP) lens fitter. These corneas often follow no patterns and have large amounts of irregular astigmatism.

The astigmatism is often oblique, with steep and flat areas arbitrarily placed around the cornea, so that achieving an optimal fluorescein pattern is nearly always impossible. So when fitting the IC, the main questions to consider are: “Can the patient wear the lens for a reasonable number of hours?”; “Is it stable?”, “Does it provide good vision?”; and “Is it affecting the cornea?”

Types of irregular cornea

Typically post graft, keratoglobus, pellucid marginal degeneration (PMD) and post Lasik ectasia all fall into the irregular cornea (IC) category. Keratoglobus is characterised by instances of globus cones covering a large area of the cornea, up to 75 per cent of which is below the visual axis, and is often accompanied by the presence of Munson’s sign. PMD is a bilateral corneal disorder hallmarked by a thinning of the inferior peripheral cornea typically 1-2mm above the inferior limbus. It is usually restricted to the four to eight o’clock region of the cornea, which exhibits a flat area just inside this region before steepening rapidly as the cornea thins.

Post Lasik ectasia occasionally occurs and is evident as an outward bulging of the cornea resulting in irregular astigmatism and poor vision.

In the author’s experience, fitting a significantly larger diameter lens is often necessary to get reasonable location and vision, and controlling the diameter becomes the singular most important factor to achieving a successful fit. It was with this in mind that the author designed the Rose K2 IC lens. The Rose K2 IC lens is a large diameter, intra-limbal lens with aberration control aspherics optics.

Maximising corneal integrity

The 18-lens trial set for the Rose K2 IC lens has a standard diameter of 11.4mm (although any diameter from 9.5mm to 12mm can be ordered) and includes base curves from 6.0 to 8.4 (with a total range of 5.7mm to 9.3mm). The lens has a large posterior optic zone diameter, which decreases as the base curve steepens. It also has an aspheric posterior surface for aberration control, and reverse geometry in the flatter bases to provide more accurate central and peripheral fit. The reverse geometry provides a larger ‘landing area’ onto the cornea to spread the ‘touch zone’ area and consequently minimise corneal insult, and avoid ‘seal off’ to maximise tear exchange.

It has always been the objective in the past to minimise lens diameter to maximise oxygen to the cornea, but with advances in lens materials, bigger diameters can now often be used with little or no affect on the corneal integrity. However, tear exchange, which is so often ignored in larger lenses, is still extremely important to obtain a comfortable lens that can be worn most of the day. With this in mind, the Rose K2 IC lens fits approximately 1mm inside the cornea and ideally moves 1mm to 2mm on blinking.

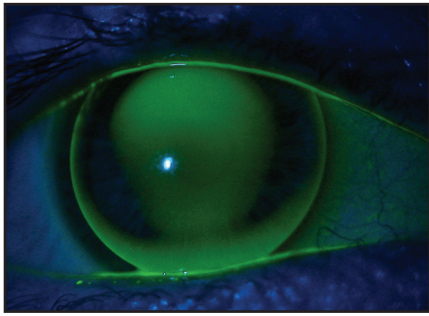


Figure 1. Central fit 0.2mm steep, with ideal edge lift

Systematic fitting solution

The Rose K systematic fitting used in fitting the Rose K keratoconus and post graft lens designs, which has proven to be successful in the hands of many practitioners throughout the world, continues with this design. With the Rose K fitting system, five separate aspects of the fit are considered, in the following specific order:

- Central fit (base curve, **Figure 1**)
- Peripheral fit (edge lift value, **Figures 2a-c**)
- Overall diameter
- Location
- Movement



Figure 2a. Rose K2 IC lens with decreased edge lift – extremely tight edge lift



Figure 2b. Rose K2 IC lens with standard edge lift – tight edge lift

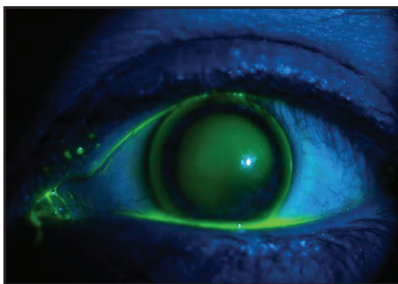


Figure 2c. Rose K2 IC lens with increased edge lift – optimum edge lift

Topographers are very helpful in estimating the choice of the first trial lens. The Medmont topographer has the Rose K designs incorporated, so the fitter can call up the IC design and the topographer will choose the first trial lens. The simulated image can then be manipulated to produce the optimum central fit. In the author's opinion, topographers are fairly accurate for attaining the central fit but less accurate for the peripheral fit, and of no value for the diameter selection.

The trial lens has a standard lift, but edge lift is controlled by ordering other lift values (five options) to ensure optimum peripheral fit and good tear exchange behind the lens (**Figure 3**). A fitting guide for the Rose K2 IC lens is available from David Thomas Contact Lenses (DTCL), the UK manufacturer and distributor of the Rose K family of lenses.

Lens design attributes

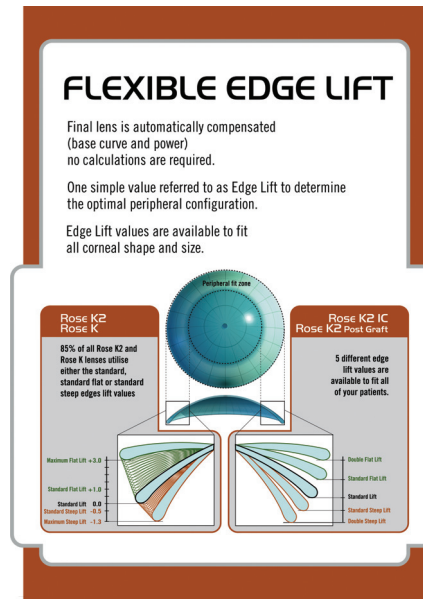


Figure 3. Edge lift options

Very large lenses are often more comfortable than smaller lenses, so serious corneal changes/damage can occur, even before the patient notices any problems or presents for an examination. By keeping the lens inside the delicate limbal area, good movement and tear exchange are retained resulting in longer wearing time and a healthier cornea. Even with the modern high DK materials with good oxygen transmission, such as the Boston XO (Dk 100), corneal trauma can occur when fitting outside of the limbus, as the actual Dk/T is very low where the lens is the thickest, and that is often near the limbal zone.

Enhancing patient care

The Rose K IC lens was first released in the USA in January 2007 followed by the UK in February. The lens has already gained popularity from many experienced GP fitters who are finding the IC design a very useful tool in the range of lenses required with these extremely challenging cases. Trial sets for purchase or loan can be obtained from DTCL.

In summary, the Rose K2 IC design is primarily indicated for pellucid marginal degeneration (PMD), keratoglobus, post graft (PK), post refractive corneal surgery/ectasia, and has secondary application for keratoconus patients with large oval sagging cones, as well as irregular corneas due to trauma. However except for PMD, the IC lens design is still rarely the author's Rose K lens of first choice, as it is better to minimise the area of the cornea to be covered by trying smaller diameter GP lenses first. However, the lens has proven extremely useful when all else has failed, particularly for cases where stability and location are a problem.

About the author

Dr Paul Rose graduated in optometry from the University of Auckland, New Zealand, in 1967 and again in 1969 with a BSc in Psychology and Mathematics. In 1998 he was elected as an inaugural fellow of the New Zealand Society of Contact Lens Practitioners. He has practised in Hamilton, New Zealand, for the last 38 years, and is the designer of the Rose K family of lenses. The Rose K keratoconus lens was awarded the Creative Design and Process Award by the CLMA (USA) in 2000 for "innovation in lens design and manufacturing process to the enhancement of the contact lens industry", and again in 2007 by EFCLIN. The Rose K design is fitted in over 60 countries and is the most prescribed lens for keratoconus in the world.

The lens has an extensive base curve range from 6.0 to 9.3 so will fit even the flattest post Lasik ectasia case, right through to the steepest keratoglobus. It is designed to sit inside the limbus, as once a lens starts to cover the limbal area where the corneal stem cells are located, tear exchange and subsequent corneal oedema, and in some cases even vessel growth into the corneal stroma, can become major problems.