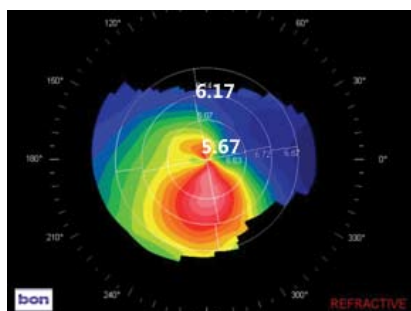


## Fitting Keratoconus with KeraSoft®3 SiH Contact Lenses

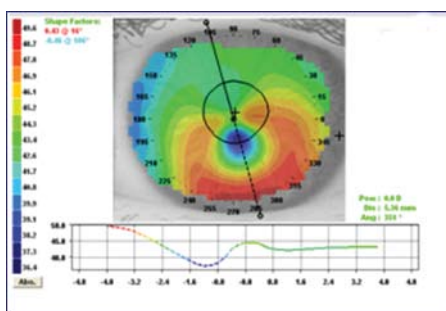
KeraSoft®3 contact lenses are specifically designed for keratoconus, i.e., for corneas that are steeper centrally with regular peripheral regions. For other types of irregular cornea, including advanced or irregular keratoconus, the KeraSoft®IC contact lens is recommended.

### Checking the corneal shape

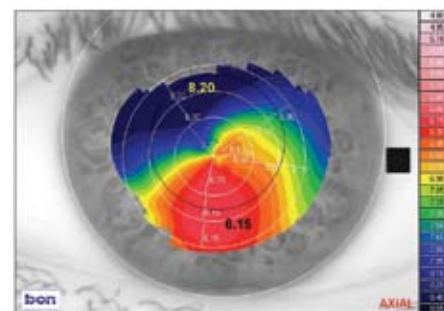
Although KeraSoft®3 can be fitted without using topography; corneal mapping is a very valuable tool in any keratoconic fitting.



**Keratoconus**  
Figure 1



**Pellucid Marginal Degeneration**  
Figure 2



**Pellucid Marginal Degeneration**  
Figure 3

### Keratoconus vs. Pellucid Marginal Degeneration

It is important that a distinction is made between keratoconus and the related condition, Pellucid Marginal Degeneration (PMD). As can be seen from the topographies in Figures 1, 2 and 3, PMD is characterised by a central flat area with a “kissing birds” or “crabs claw” appearance. Typically, whereas keratoconus usually presents with medium to high myopia, PMD refractions are often low minus to plus with high minus cyls with a vertical axis. The example in Figure 3 shows what initially appears to be a typical inferior keratoconus, with central K of around 6.15; it is in fact PMD with a very flat superior corneal curvature of 8.20mm. These cases may in fact give relatively steep central Ks on a normal keratometer, which can be misleading.

### Choosing the first lens

The standard diameter in a KeraSoft®3 trial set is 14.50mm and the BCOR of the lenses range from 8.00mm - 8.60mm. The range of back curves may seem rather flat, compared to an RGP lens. However, this is a soft lens and it needs to be borne in mind that the fitting of the peripheral curve is a key component.

The KeraSoft®3 product sheet suggests which lens to try first based on approximate keratometer readings. On this basis, the keratoconus example in Figure 1 would be fitted with an 8.00mm BCOR as a first lens.

BCOR	Diameter	Power	Approximate K Readings	
8.00 (A)	14.50	-12.00 and 14.00	<6.00	Recommended initial fitting lens for keratoconus with central cones and normal peripheries
8.20 (B)	14.50	-10.00 and -8.00	6.00-6.50	
8.40 (C)	14.50	-6.00 and -4.00	6.50-6.80	
8.60 (D)	14.50	-2.00 and Plano	6.80-7.20	
8.80 *	14.50	Plano	For flatter peripheries (see below)	
9.00 *	14.50	Plano	For Irregular Corneas see KeraSoft®IC Fitting Guide	

\* These parameters are not included in the KeraSoft®3 fitting set but can be ordered separately

Once the lens has been inserted, allow to settle for around 10 minutes before trying to assess the fit. Bubbles may form under the lens at first and if they persist, then this can indicate a tight fit. If they disappear after 20 minutes and there is good movement, then this usually indicates the fit is acceptable. Once experience is gained in the appearance of the fits, then one can tell after 10 minutes if a lens is likely to settle properly or not.

In the case of the PMD (Figure 3) central K readings may suggest a first lens choice of 8.00mm or 8.20mm; in fact, a flatter lens would be more suitable. Based on topography, an 8.60mm lens was fitted successfully. Without topography, the steeper first lens choices would give fluctuating vision (clearer after the blink) and poor lens movement. In that situation, the procedure would be to continue to fit ever flatter lenses until an improvement in vision and good lens movement was achieved.

## Lens Movement/Laser Mark

The KeraSoft®3 has more substance than most lathe-cut soft contact lenses and therefore can demonstrate much more movement than a typical soft lens. One way of assessing the movement is to assess the rotational behaviour of the lens, utilising the laser mark.

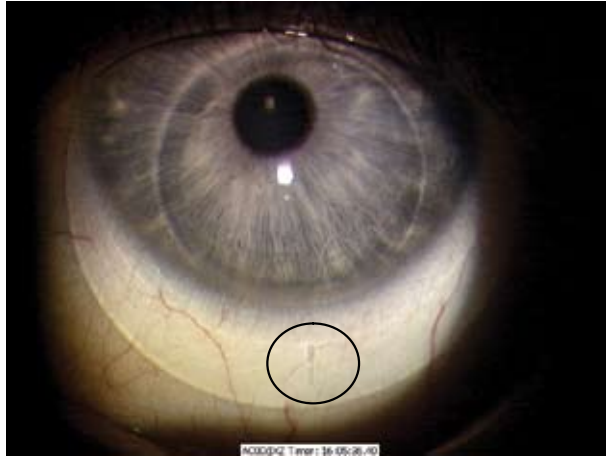


Figure 4

Each trial lens has a laser mark that indicates the position of the prism ballasting (see Figure 4). This mark should usually be inferior and vertical, and should remain vertical even if the lens moves 2-3mm post-blink. If the mark rotates back and forth unpredictably with blinking, this is usually an indication that the lens is too flat. Sometimes the laser mark will simply orientate slightly off axis. However, this is acceptable as long as the lens stays rotated in that position.

This picture also shows how much a KeraSoft®3 lens can drop on upward gaze and still be a good fit.

**Important:** The position of the laser mark should always be given when ordering the final lens.

## Over Refraction

Accurate refraction is always a problem with keratoconics, so it may be difficult to establish a good starting point for over refraction. When using RGPs, it is typical to think in terms of the spherical over refraction. However, with KeraSoft®3 it is important to assess the astigmatic over refraction as well as the sphere. One good way to get a starting point is to use the autorefractor over the top of the lens. This is usually more accurate using the IOL setting on the autorefractor (if it has this setting). This method will usually give a good indication of any astigmatism present.

An extra source of information is that provided by the use of topography over the top of the lens. Although no indication of sphere is given, usually there is a good idea of cyl and axis which, combined with the autorefractor results, can be very helpful. It is always worth looking at the cyl correction, even if the patient can achieve quite good results with a sphere alone. This is due to the fact that keratoconics, especially those who have not yet been fitted with contact lenses, tend to tolerate shadowing and doubling of images very well, so double check to see if giving the cyl will help acuity.

If the over refraction gives disappointing or unexpected results, the fit needs to be reassessed. If there is little lens movement and the vision fluctuates on blinking, then it is recommended that a flatter lens is tried. Sometimes, if vision is not as expected and all lenses appear quite tight, this can indicate that a 14.00mm diameter lens is required.

Vision that varies unpredictably can mean the lens is too flat, in which case the rotation should be double checked using the laser mark as a guide.

Once the suitable fit and vision are achieved, the initial fitting lens (with warranty included) can be ordered. For this the following information is required:

Trial lens details: BCOR, Diameter and power  
Laser mark position  
Over refraction  
HVID  
BVD

**Note:** If the over refraction axis has automatically been corrected to take into account the position of the laser mark, this should be made clear when placing the order for the lens.

## Checking the ordered fitting lens

When the lenses are received, check for fit and vision. If the vision/fit is not as expected, then over refract with the lens in situ, as sometimes adding the cylinder changes the dynamics of the lens slightly and the lens sits in a different position.

Over refraction may give a significant cyl at a different axis. This is an induced effect of the cyl sitting at the wrong axis and the correction needed can be calculated from the results achieved. The lens can be re-ordered giving the over refraction results and/or the new rotated position using the laser mark. Again, over refraction using autorefractor is useful in this situation.