



# Lens File: SynergEyes

Continuing our series looking at recently introduced specialist contact lenses, Sophie Taylor-West describes a hybrid contact lens design

**S**ynergEyes is a hybrid contact lens design, consisting of a high Dk RGP centre to provide the optics of a rigid lens, and a soft lens 'skirt', designed for stabilisation and improved patient comfort. The RGP portion of the lens is designed to vault the central cornea, and landing occurs at the soft

Figure 1 SynergEyes lens

skirt. They are particularly useful in the fitting of complex corneas such as in keratoconic, post-Lasik and highly astigmatic patients. There are now five SynergEyes designs available in the UK: SynergEyes A (advanced), SynergEyes KC (keratoconus), SynergEyes PS (post-surgery), SynergEyes Multifocal and the new SynergEyes ClearKone.

### Applications

SynergEyes is a particularly useful lens in cases where an RGP lens is required for good acuity, but a corneal RGP is either not tolerated, will not centre correctly or produces staining. Because the RGP part of the lens is designed to vault the central cornea, SynergEyes is a good option when a cornea cannot tolerate any central touch, such as with a 'proud nebula' in keratoconus, or patients with a fragile epithelium.

Because of the stabilising soft skirt, SynergEyes can also be used in the fitting of standard ametropia and corneal astigmatism, when standard RGPs are deemed unsuitable or are not well tolerated. They are also useful for refitting existing RGP wearers who suffer from three and nine o'clock staining, irritation from debris under the lens, or unstable vision. In addition, they can also be used to refit soft lens wearers who are unhappy with their level of vision, but

TABLE 1

Design	Indications
SynergEyes A	Myopia, hypermetropia and regular astigmatism and patients who don't achieve good VA with soft lenses or who cannot tolerate RGPs Mildly irregular or scarred corneas Mild to moderate central cones
SynergEyes KC	Emerging to moderate peripheral cones Emerging to severe central cones Post-Lasik induced ectasia Pellucid marginal degeneration
SynergEyes PS	Post-refractive surgery / post-Lasik patients Post-RK Post-PRK Pellucid marginal degeneration Degenerative corneal conditions or corneal trauma Post-penetrating keratoplasty and/or Intacs for keratoconus
SynergEyes ClearKone	Unsuccessful SynergEyes KC fittings Emerging to severe central cones Emerging to severe peripheral cones Globus cones Post-Lasik induced ectasia Pellucid marginal degeneration Most irregular corneas

Figure 2 Pinch the lens at the six o'clock position to remove

will not compromise on comfort.

The new ClearKone design uses reverse curve geometry to alter the sagittal depth of the lens, rather than manipulating the base curve. This allows the fitting of a much larger range of corneal

ectasias, including advanced peripheral cones and pellucid marginal degeneration, without compromising the optics of the lens. The indications for each design are detailed in Table 1.

### Technical details

The central RGP portion is made from Paragon HDS material (Dk 100), with a skirt of soft 27 per cent water non-ionic hydrogel material. The two parts of the lenses are joined using a patented 'Hyperbond' junction, which is extremely strong and durable. The lens also has a special surface treatment called 'HydroEyes' to improve surface wettability.

The RGP portion is 8.4mm in diameter and the total lens diameter is 14.5mm, for all SynergEyes lens designs.

SynergEyes lenses should be worn on



Figure 3 Ideal Synergeyes KC fit

Figure 4 Central touch in KC fit

Figure 5 Bubble under lens

daily wear basis and should be replaced every six months. A hydrogen peroxide-based solution is recommended for disinfection.

### Handling

Handling Synergeyes is slightly different compared with other lens types, and can be a cause for a failed fitting if not done properly. To insert, the lens should be filled to the brim with saline plus one drop of Fluoresoft high molecular weight fluorescein. The patient must lean forward with head down, and the lens should be placed on the cornea, coming up from underneath, thus trapping the saline under the lens to avoid air bubbles. Allow the lens to settle for around 30 seconds before assessing the fit. To remove the lens, pinch the soft skirt at the six o'clock position with dry fingers, with the patient looking up (Figure 2). As soon as the lens puckers it should come out easily.

### Fitting procedure

Synergeyes should be fitted using a diagnostic fitting set. A tolerance test using the diagnostic lenses is also

TABLE 2

Parameters available in the Synergeyes range

Synergeyes A	Parameters
Spherical optic zone 7.8mm diameter	
Base curve:	7.10 to 8.00 in 0.10mm steps
Skirt curvature:	1.0 (steep), 1.3 (flat)
Sphere power:	+4.00 to -8.00 in 0.25D steps -8.50 to -20.00 in 0.50D steps +4.25 to +8.00 in 0.25D steps +8.50 to +20.00 in 0.50D steps
Synergeyes Multifocal	Parameters
Front surface centre near add, spherical optic zone	
Base curve:	7.10 to 8.00 in 0.10mm steps
Skirt curvature:	1.0 (steep), 1.3 (flat)
Sphere power:	+5.00 to -8.00 in 0.25D steps -8.50 to -20.00 in 0.50D steps
Add power:	+1.25D, +1.75D, +2.25D
Segment size:	1.9mm, 2.2mm
Synergeyes KC	Parameters
Aspheric optic zone.	
Base curve:	5.70 to 7.10 in .20mm steps
Skirt curvature:	Steep, medium, flat
Sphere power:	Plano to -20.00 in 0.50D steps
Synergeyes PS	Parameters
Reverse curve geometry with 6.5mm optic zone	
Base curve:	7.20 to 9.00 in 0.20mm steps
Skirt curvature:	8.3mm or 8.6mm
Sphere power:	+6.00 to -8.00 in 0.25D steps -8.50 to -12.00 in 0.50D steps
Lift:	L1 (flat), L2 (medium), L3 (steep)
Synergeyes ClearKone	Parameters
Spherical optic zone with reverse curve geometry and 7.4mm vault diameter	
Vault:	100-600µ in 50µ steps
Skirt curve:	Steep, Medium, Flat
Sphere power:	+2.00 to -8.00 in 0.25D steps -8.50 to -15.00 in 0.50D steps +2.50 to +5.00 in 0.50D steps

recommended prior to ordering. Each lens is laser marked, so that diagnostic lenses can be easily identified if muddled up. The basic principle of obtaining a good fit is to aim for the RGP portion of the lens to fully vault the cornea, but not so excessively that air bubbles are able to form. An outline of the fitting process for Synergeyes A, KC, PS and Multifocal is as follows:

Select your initial diagnostic lens: for Synergeyes A choose a lens which is 0.3mm than flattest K; for KC find the curvature at the apex then insert the closest available trial lens; for PS select the lens closest to the average central K-reading. Insert the lens selecting the steeper skirt curve where possible. For the PS lens begin with 'lift 2'

Assess the fit on a slit lamp with blue beam and Wratten filter. The ideal fit (Figure 3) will have:

- Total central corneal clearance, free of bubbles
  - Alignment under soft skirt, free of scleral impingement or fluting
  - Lens free to move on push-up test
  - No bearing at soft/RGP junction
- If you observe central touch (Figure 4), steepen the base curve. If you observe peripheral touch, either steepen the skirt curve, or if you are already using the steepest skirt option, steepen the base curve. If you observe peripheral touch with the PS lens, increase the 'lift' from L2 to L3
- If you observe bubbles under the lens (Figure 5), remove and re-insert



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ensuring the lens is filled to the brim with saline. If bubbles persist, try flattening the base curve. You are aiming for the flattest base curve that will still give total clearance

When you are satisfied with your fit, over-refract and order. Allow the lens to settle for 20-30 minutes where possible, to ensure it does not settle back too heavily.

Fitting SynergEyes ClearKone is slightly different; there are no base curves to choose from, instead the lenses vary with the 'vault value'. This is effectively the sagittal depth of the RGP part of the lens. It is recommended to begin with the 250µ vault lens with the medium skirt curve, and increase or decrease the vault value as necessary until total but non-excessive clearance is observed. Assessment of the fit should be done three to five minutes after insertion.

Full fitting guides and training are provided by the distributors to practitioners wishing to fit the SynergEyes range of contact lenses.

## Summary

The SynergEyes family of lenses have a plethora of indications and are a useful addition to the contact lens arsenal for

## FITTING TIPS

To successfully insert without bubbles, the lens must be as full as possible with saline (to the brim), and should go directly onto the patient's cornea. Ask the patient to pull down their own lower lid, while you pull up the top lid, as this makes things much easier. The RGP and soft elements are fitted independently in terms of radius; however, they work in conjunction with each other to achieve the correct sagittal depth – think in terms of overall height.

If your first lens selection has heavy bearing on the cornea (ie is much too flat), rather than try the next steepest lens in the set you may need to take a bigger jump and try two or three lenses steeper. Although the base curves seem to change in very large steps, on the eye these steps do not produce a huge difference in the fluorescein fit (particularly with the KC lenses due to their aspheric curves).

If the patient complains that a lens feels 'tight', contrary to intuition it is probably too flat, causing bearing at the soft/hard junction (Figure 6). To rectify, steepen the skirt curve, which increases the sag of the lens and helps to lift the junction away from the cornea, so that landing occurs at the soft part.

Keep in mind the fitting philosophy of SynergEyes lenses – the fitting process often goes against intuition, and problem-solving in most cases involves making the lens steeper! The only time you will need to go flatter is if there is excessive clearance, or a recurrent bubble.

Figure 6 Bearing at RGP/soft junction

complex patients. The fitting process is rather novel and at times seems counter-intuitive, but with practice it is a very rewarding lens to fit both in terms of patient satisfaction and profitability. A silicone hydrogel skirt option is due

for release in 2010, which will further increase its range of uses.

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