IRREGULAR CORNEA & HYBRID LENSES: A PERFECT COMBINATION

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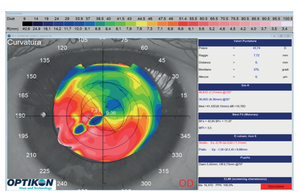
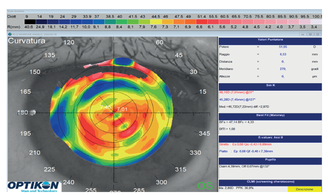
INTRODUCTION

Keratoconus is the classic case in which a rigid contact lens provides a new refracting surface for an irregular cornea and gives improved visual acuity, whereas spectacles frequently offer no significant benefits. Also in PRK, a laser technique used to sculpt the central corneal surface producing a reduction in myopia, and in case of radial keratotomy RGP contact lenses are used after the surgery. Rigid gas permeable lenses are considered the primary visual correction tool for irregular cornea, like keratoconus or post cornea surgery[1]. Even with the various geometries, designs and options available, RGP lenses are often difficult to fit for some irregular cornea. Patients sometimes experiencing fluctuating vision, discomfort or RGP lens intolerance. To increase comfort, lens centration and visual acuity, hybrid contact lenses and scleral lenses today present an effective solution for irregular cornea correction[2]. Keratoconus specialists used piggyback lenses to treat patients with keratoconus before hybrid contacts were available. Piggyback lenses gave patients the benefit of good vision from a gas permeable lens while still providing good comfort[3]. Fitting a gas permeable lens on top of a soft contact lens is called a piggyback lens. This combination gave pretty good comfort and vision. Piggyback lenses are rarely used now since hybrid lenses and scleral contact lenses both provide better vision, comfort, and ocular health. Hybrid contact lenses have the rigid gas permeable (GP) central part that correct corneal astigmatism surrounded by a soft skirt[4–5]. This combination provides the clear vision of a GP lens and the comfort of a soft contact lens. The SynergEyes family of hybrid contact lenses are a popular keratoconus treatment option for patients experiencing decreased vision due to mild to moderate keratoconus. The UltraHealth hybrid contact lens is the newest version of the SynergEyes keratoconus family[6]. It differs from the original SynergEyes hybrid lens by adding a high oxygen permeable (SiHy) soft lens skirt in addition to an ultra-high oxygen central gas permeable lens. Thus, improving on one of the disadvantages of the original SynergEyes design. Because of this, when a hybrid contact lens is indicated, most keratoconus specialists tend to choose the Ultrahealth hybrid contact lens over the original SynergEyes lenses. Keratoconus patients tend to have high contact lens wearing times, therefore high oxygen permeability is especially important[7].

CASE HISTORY

Old patient came into our clinic to be refitted with hybrid contact lenses, he is using hybrid contact lenses from more than 20 years. His first hybrid contact lenses were SoftPerm and suddenly he changed to Janus. When he came into our clinic he was fitted with a Janus in R.E and a Duette in L.E. with the following parameters:
R.E. Janus 7.40/ 8.40 / 8.70 / 14.30 -08.00
L.E. Duette 7.30 / 8.70 14.50 -07.50
He presents irregular cornea in booth eyes in details:
R.E. presents PRK made more than 25 years ago with keratoconus
L.E. presents an early keratoconus.
It was not possible to do a subjective over refraction because patient came with the lenses on and he didn't want to spend a couple of days without lenses also because he didn't even have a pair of glasses or a spare pair of lenses. To have a reliable topography I took off his lenses and leave him without them for 4 hours in order to reduce the lens print on the cornea.





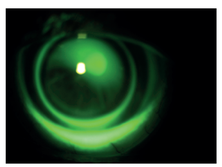
EYE	SIM K in MM	SIM K in DT	E Values
R.E.	7.21@125° 9.36@35°	46.81@125° 36.05@35°	Steep: Es -0.79 Flat: Ep -1.56
L.E.	7.01@37° 7.45@127°	48.15@37° 45.28@127°	Steep: Es 0.66 Flat: Ep 0.68

REFERENCES

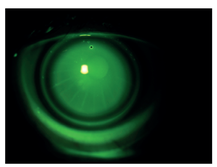
1. Andrew Gasson and Judith A. Morris, The Contact Lens Manual – A Practical guide to fitting, Butterworth Heinemann, Elservier
2. Downie , L.E. et al. Contact Lens Management on Keratoconus. Clin EXP Optom. 2015; 98: 299-311
3. Synergeyes UltraHealth fitting guide. Available at: www.synergeyes .com
4. Abdalla YF, Elsahn AF, Hammersmith KM, Cohen EJ. SynergEyes lenses for keratoconus. Cornea. 2010 Jan;29(1):5-8. [PubMed]
5. Carracedo G, González-Méijome JM, Lopes-Ferreira D, Carballo J, Batres L. Clinical performance of a new hybrid contact lens for keratoconus. Eye Contact Lens. 2014 Jan;40(1):2-6. [PubMed]
6. Mohammadpour M, Heidari Z, Hashemic H. Updates on Managements for Keratoconus. J Curr Ophthalmol. 2018 Jun; 30(2): 110–124. [PubMed]

FITTING SEQUENCE R.E

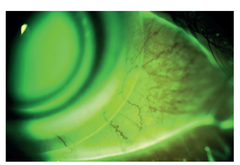
Trial lens	Fitting Characteristics
Synergeyes UltraHealth 250 FLAT 14.50 -09.00	Too flat, uncomfortable, too much movement
Synergeyes UltraHealth 350 FLAT 14.50 -08.00	Good central image, little bubble at 12 o'clock, too much movement, little air bubbles enter from the periphery.
Synergeyes UltraHealth 350 MED. 14.50 -08.00	Good central image, good ILZ, good movement and good comfort. Decide to fit this lens on R.E. next control after 1 hour.



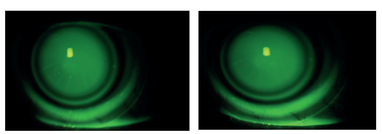
Synergeyes UltraHealth 250 FLAT 14.50 -09.00 Too flat, uncomfortable, too much movement



Synergeyes UltraHealth 350 FLAT 14.50 -08.00 Good central image, little bubble at 12 o'clock, too much movement



Little air bubbles enter from the periphery.



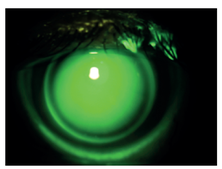
Synergeyes UltraHealth 350 MED. 14.50 -08.00 Good central image, good ILZ, good movement and good comfort.

CONCLUSION

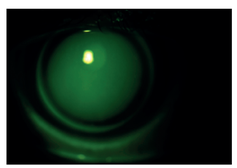
A hybrid contact lens is a specialized contact lens that may be an option for patient that are uncomfortable wearing RGP lenses. Hybrid contact lenses attempt to give people the visual acuity of a rigid gas permeable lens with the comfort of a soft contact lens. A hybrid contact lens is composed of a center rigid gas permeable contact lens with an outer skirt made of a soft lens material. These lenses are available single vision, people with corneal astigmatism, keratoconus and people who have had LASIK surgery or other surgery and they are unhappy with the results. As this case report shows it is possible to refit old patient that used to wear old hybrid lenses geometry with a very good success. The importance is to wait minimum one hour after doing the over refraction in order to see the lens assessment and control the ILZ zone. Following step by step the fitting procedure it will be very easy to find the good lens.

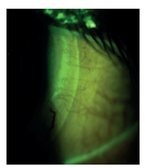
FITTING SEQUENCE L.E

Trial lens	Fitting Characteristics
Synergeyes UltraHealth 250 MED. 14.50 -09.00	Good central fluo, discomfort, no movement
Synergeyes UltraHealth 250 FLAT 14.50 -09.00	Good central fluo, improved comfort and movement. Decide to fit this lens on L.E. next control after 1 hour.



Synergeyes UltraHealth 250 MED. 14.50 -09.00 Good central fluo, discomfort, no movement



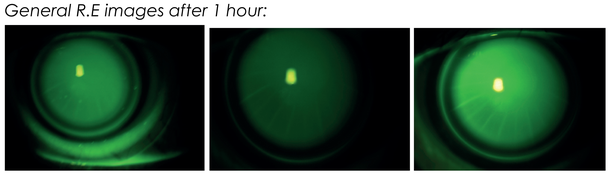


Synergeyes UltraHealth 250 FLAT 14.50 -09.00 Good central fluo, improved comfort and movement.

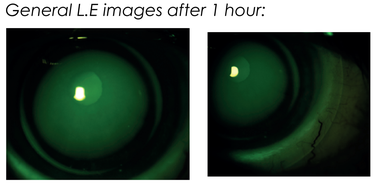
AFTER 1 HOUR

Trial lens	Fitting Characteristics
R.E. Synergeyes UltraHealth 350 medium 14.50 -08.00	Good central fluo, no corneal touch. Periphery still lifted but no air bubble enters and patient is in comfort.
Synergeyes UltraHealth 250 FLAT 14.50 -09.00	Good central fluo, no corneal touch. Good ILZ and good periphery. No air bubbles and comfort.

General R.E images after 1 hour:



General L.E images after 1 hour:



Over-refraction:
R.E. no necessary 20/32 monocular
L.E. -01.00 20/25 monocular
Binocular 20/20
Final lens ordered:
R.E. Synergeyes UltraHealth 350 MEDIUM 14.50 -08.00
L.E. Synergeyes UltraHealth 250 FLAT 14.50 -10.00