



Hybrid Lenses: Past, Present, and Future

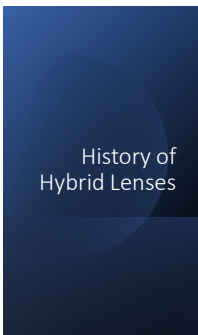
B.W. Phillips, F.C.L.S.A.

1

The Past



2



History of Hybrid Lenses

- Hybrid lenses
 - Rigid gas permeable optic zone
 - Hydrogel peripheral zone
 - Have been available for 40 years
 - Their use in keratoconus was first described by Little in 1971.

3

Overcoming Limitations

Quarter Lambda Technologies, Inc. of San Marcos, CA commenced a focused research and development program September 2001 to create an improved hybrid contact lens.

October 2003- company received IRB approval to begin with four of the SynergEyes products.



4

New Hybrid Technology

- **2005** SynergEyes receives FDA approval for *SynergEyes® A* and *SynergEyes® KC*
- **2006** SynergEyes receives FDA approval for *SynergEyes® PS* and *SynergEyes® Multifocal*

5

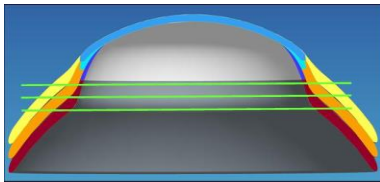
Spherical Design

- Naturally occurring ametropia
 - Moderate to high myopes, hyperopes and astigmats who desire the pristine vision of an RGP with the all day comfort and stability of a soft lens OR
 - Any patient who has never achieved good vision with soft/soft toric lenses or who cannot tolerate the comfort of RGPs

6

A Reverse Geometry Hybrid Contact Lens Design!

- *SynergEyes® PS*

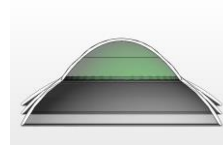


7

SynergEyes® KC

Prolate ellipsoid base curve

Spherical Skirt begins at 9.0 mm diameter



3 skirt curve options for fitting flexibility

8

Patent-pending Vault design

The vault value describes the overall relative depth of the lens on the cornea.

The goal is to determine the appropriate vault that provides complete apical clearance.

Design gives the ability to “vault” over the vast majority of ectasias without bearing

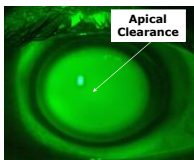
9

Patent-pending Vault -pending Vault

- Design results in substantially lower lens power.
- Closer lens alignment to the cornea in conjunction with the lacrimal lens results in significantly lower powers.
- Enhances optical quality and improves Visual Acuity for the patient.
- Lower lens power in conjunction with superior centration substantially reduces coma and minification.

10

Step 1: Determine Vault



If the increased vault now results in apical clearance, you have reached the endpoint.

If the increased vault still results in bearing, increase the vault 100µ

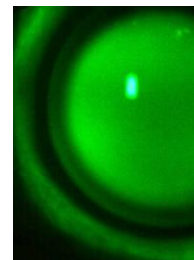
to reach the fitting end-point.

After a few minutes of wear, the patient will tell you if you have bearing because the lens will not be comfortable.

11


ILZ and OLZ


- **Vault** - The vault value describes the overall relative depth of the lens
- **Outer Landing Zone (OLZ)** - Portion of the lens that lands on the soft material
- **Inner Landing Zone (ILZ)** - Portion of the lens that lands on the RGP material

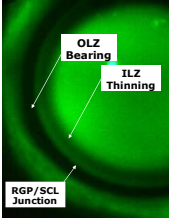


12

Ideal Skirt Curve Fit

 Evaluate skirt only after proper vault determined and is on eye

 **GOAL:** on most patients, best fit landing area achieved when NaFL thinning is observed in ILZ and bearing in the OLZ.




THE FUTURE



13

14



ULTRAHEALTH

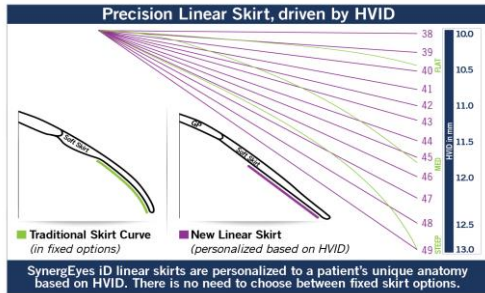
UltraHealth is the most advanced technology hybrid contact lens for keratoconus.

15

SynergEyes iD Single Vision

- **Individually Designed for Premium Performance**
- Personalized lenses made specifically for each patient by providing Ks, HVID and Rx.
- Exceptional clarity of a GP lens
- Empirically designed lens offers a streamlined fit, and a high rate of first-lens dispense, patient preference and satisfaction, and revenue retention.

16



17

SynergEyes ID Parameters

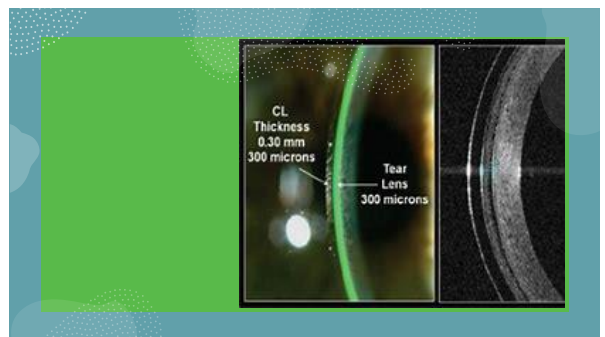
Diameter	14.5mm
Skirt	38 to 49 in increments of 1 step to accommodate HVID range of 10.0 to 13.0mm. HVID outside the measurements will default to 10.0 or 13.0mm.
Base Curves	7.10mm to 8.30mm in increments of 0.01mm
Single Vision Lens Powers	+10.00 to -15.00D +8.00 to -8.00D in 0.25D steps +8.50 to +10.00D in 0.50D steps -8.50 to -15.00D in 0.50D steps

18

Additional Options:

Additional Options:	<ul style="list-style-type: none"> Tangible Hydra-PEG coating available on request If your patient requires a thicker GP lens to reduce flexure and mask higher amounts of corneal cylinder, they would benefit from the Enhanced Profile Design. Enhanced Profile is automatically added to orders with 2.50D or more of corneal cylinder, and may be requested for less amounts of corneal cylinder.
UV Blocker	UVA and UVB
Recommended Wear & Replacement	Daily Wear Recommended replacement every 6 months

19



20



ULTRAHEALTH FC

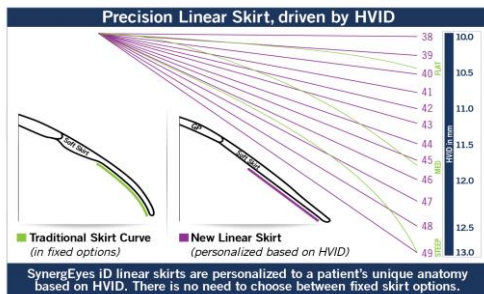
- UltraHealth FC is also available for post-refractive surgery patients. The oblate base curves offered in this addition to the UltraHealth family of lenses are well suited for post-Rk, post-LASIK and other cornea trauma conditions.

21

SynergEyes iD Single Vision

- **Individually Designed for Premium Performance**
- Empirically designed lens offers a streamlined fit, and a high rate of first-lens dispense, patient preference and satisfaction, and revenue retention.
- Personalized lenses made specifically for each patient by providing Ks, HVID and Rx.
- Exceptional clarity of a GP lens

22



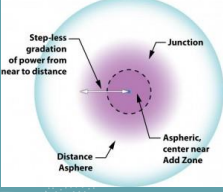
23

SynergEyes ID Parameters

Diameter	14.5mm
Skirt	38 to 49 in increments of 1 step to accommodate HVID range of 10.0 to 13.0mm. HVID outside the measurements will default to 10.0 or 13.0mm.
Base Curves	7.10mm to 8.30mm in increments of 0.01mm
Single Vision Lens Powers	+10.00 to -15.00D +8.00 to -8.00D in 0.25D steps +8.50 to +10.00D in 0.50D steps -8.50 to -15.00D in 0.50D steps

24

SynergEyes ID Multifocal EDOF



- Presbyopic wearers can experience clearer vision at all distances with the proprietary Multifocal Extended Depth of Focus (EDOF) optical design
- Even those with astigmatism will experience clear, stable vision, without the hassle of blur caused by toric lens rotation.

25


SynergEyes ID Multifocal EDOF

26

Power Profile is **non-monotonic and non-periodic**. This unique power profile provides:

- Good vision at all viewing distances, minimizing visual disturbances like ghosting and halos
- Consistent performance across pupils, decentration and individual's ocular aberrations


SynergEyes iD MF EDOF: Patented Optical Design Technology




Continuously and rapidly varying power profile. Non-monotonic and aperiodic. Not a zonal, bifocal, aspheric or diffractive. Illustrative power profile only.

Other Commercially Available Multifocal Designs

Zonal concentric lenses:
Periodic, power changes discrete and wide zones of same power.



Aspheric lenses:
Monotonic, progressive power change.



SynergEyes Id Multifocal EDOF Parameters

Diameter	14.5mm
Skirt	38 to 49 in increments of 1 step to accommodate HVID range of 10.0 to 13.0mm. HVID outside the measurements will default to 10.0 or 13.0mm.
Base Curves	7.10mm to 8.30mm in increments of 0.01mm
Multifocal Lens Powers	+5.50 to -10.00D +5.50 to -8.00D in 0.25D steps -8.50 to -10.00D in 0.50D steps Add Power: Low, Medium, High

27