Specialty Soft and Hybrid Contact Lenses

B.W.Phillips, NCLEM, FCLSA

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.

Softperm

- Original design by Precision-Cosmet
  - Marketed as Saturn II lens -1983
- Design fuses styrene-based RGP center with low water hydroxyethyl methacrylate (HEMA) soft-lens skirt
  - Idea was to provide good comfort but have optic of RGP for best quality vision
- Performance limitations with Saturn lens
  - Redesigned and marketed as SoftPerm Lens- 1985
- Softperm offered larger OAD, larger central central optic zone and RGP pcs allowed wider range of applications

Overcoming Limitations

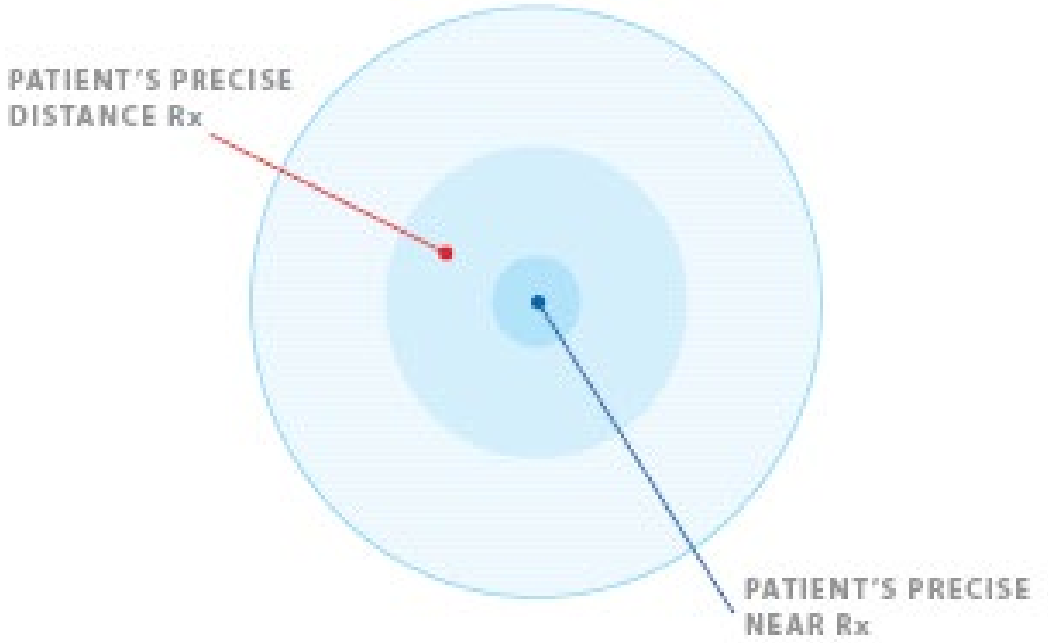
- Quarter Lambda Technologies, Inc. of SanMarcos, CA
  - commenced a focused research and development program September 2001 to create an improved hybrid contact lens.
- October 2003- company received IRB approval to begin with four of the SynergEyes products.

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*

Spherical Design

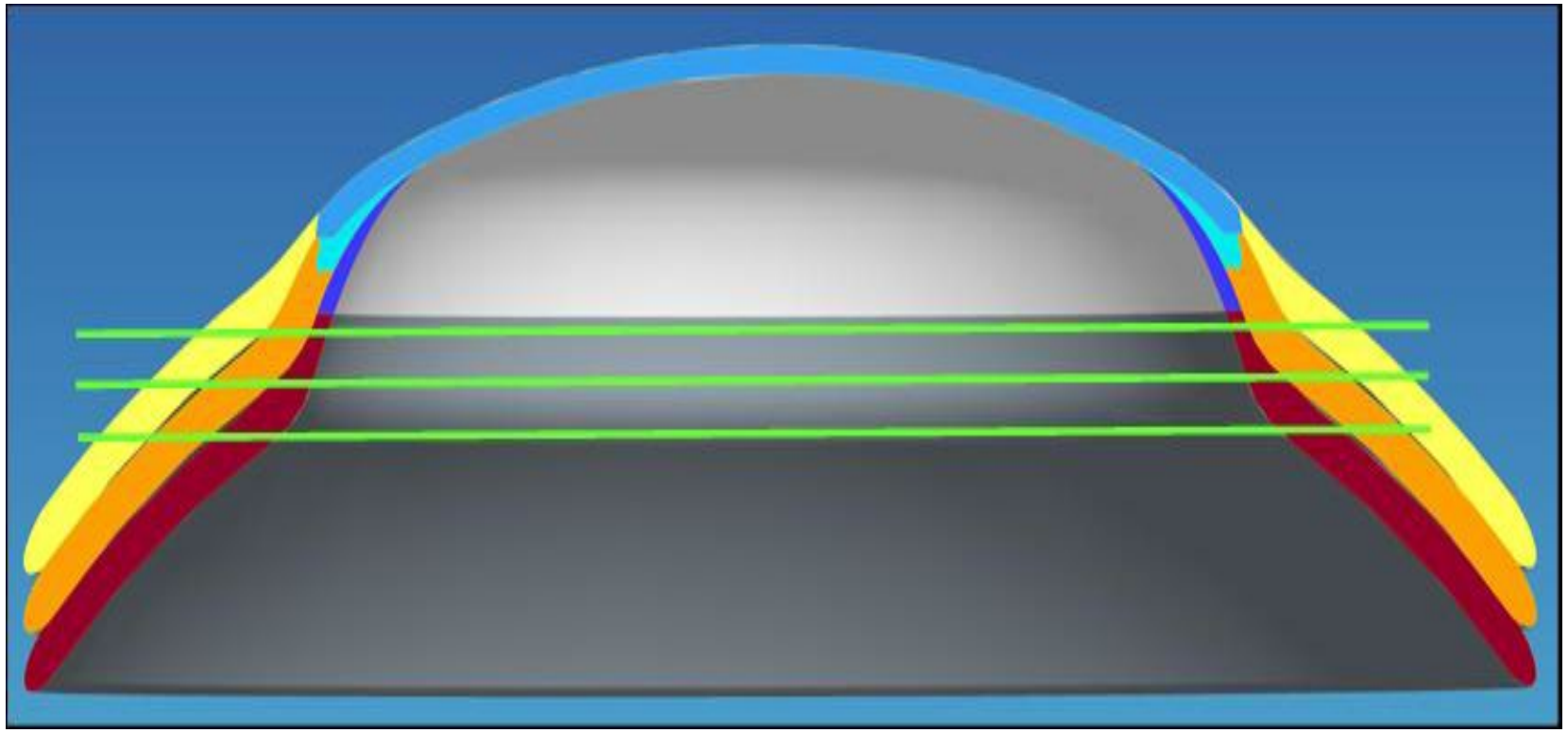
- Naturally occurring ametropia
  - Moderate to high myopes, hyperopes and astigmats who desire the pristine vision of an RGP with the all day comfort and stability of a soft lens OR
  - Any patient who has never achieved good vision with soft/soft toric lenses or who cannot tolerate the comfort of RGPs



How to fit the new Hybrid Design on Presbyopes

A Reverse Geometry Hybrid Contact Lens Design!

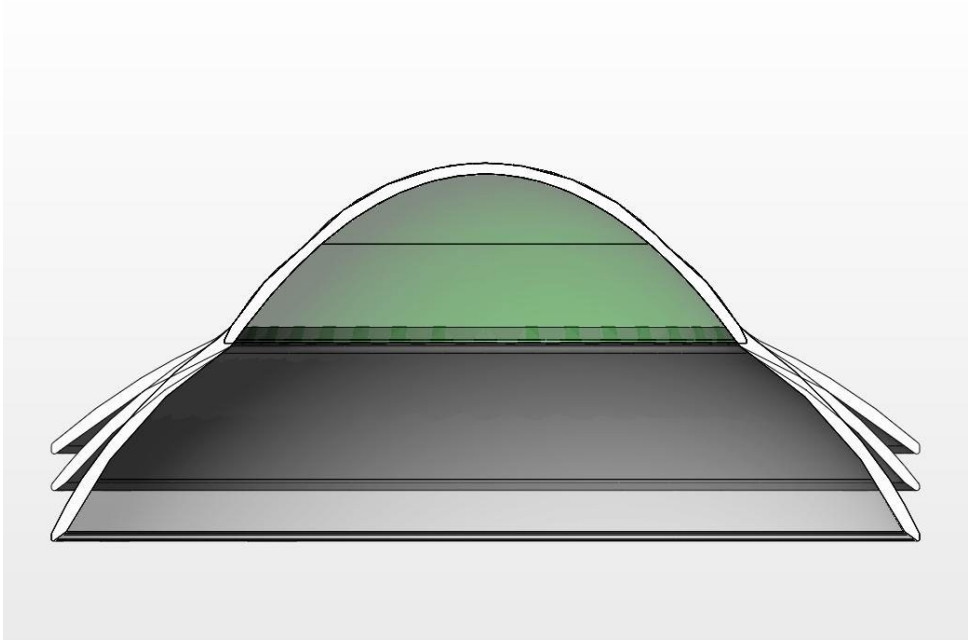
- *SynergEyes® PS*



SynergEyes® KC

Prolate ellipsoid base curve

Spherical Skirt begins at 9.0 mm diameter



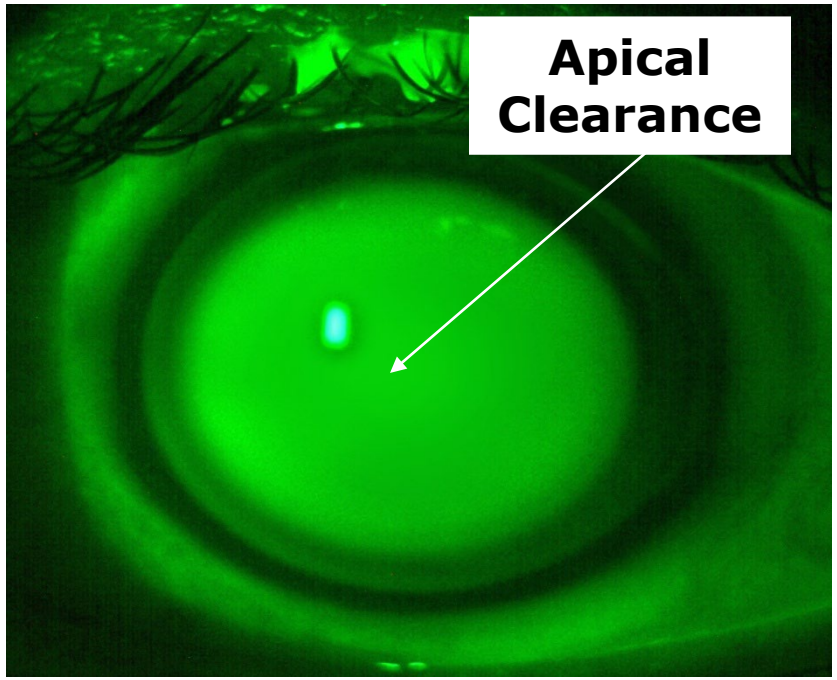
3 skirt curve options for fitting flexibility


ClearKone™
Restoring vision. Changing lives.™
by SynergEyes®

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
- 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

Step 1: Determine Vault



Ideal Vault Fit

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.

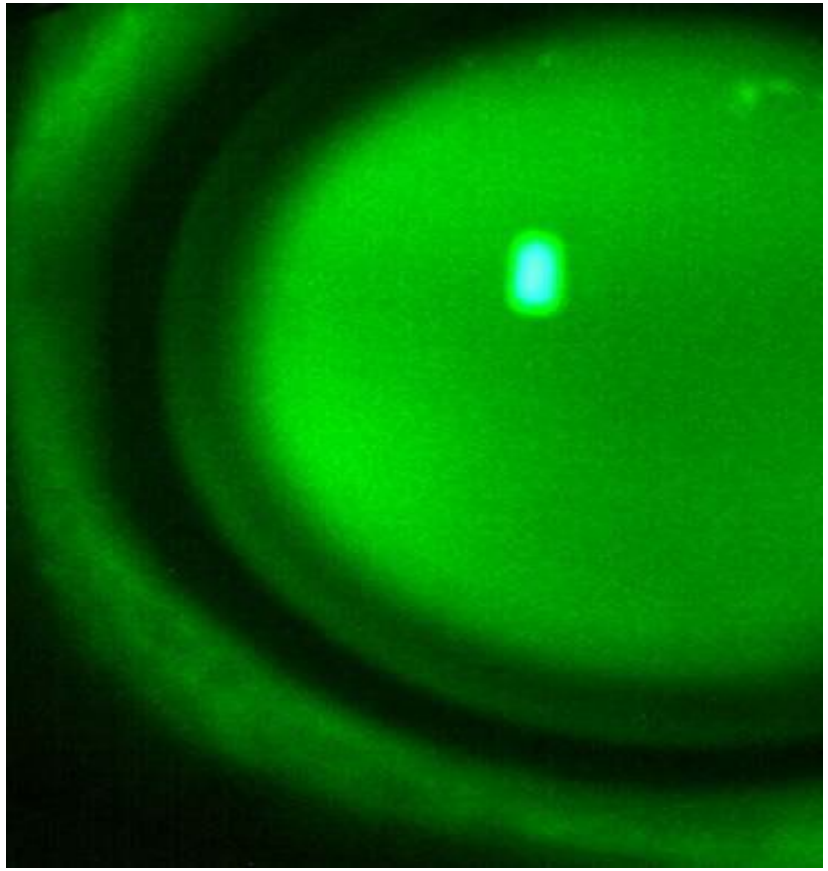
After a few minutes of wear, the patient will tell you if you have bearing because the lens will not be comfortable.

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

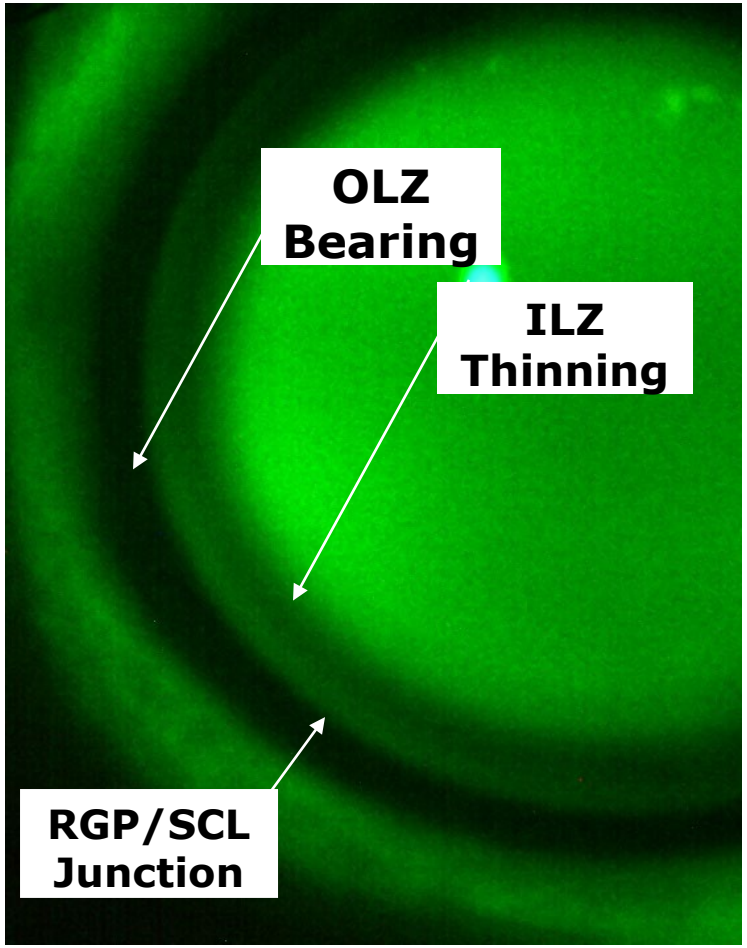
- **Inner Landing Zone (ILZ)** – Portion of the lens that lands on the RGP material



- 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.

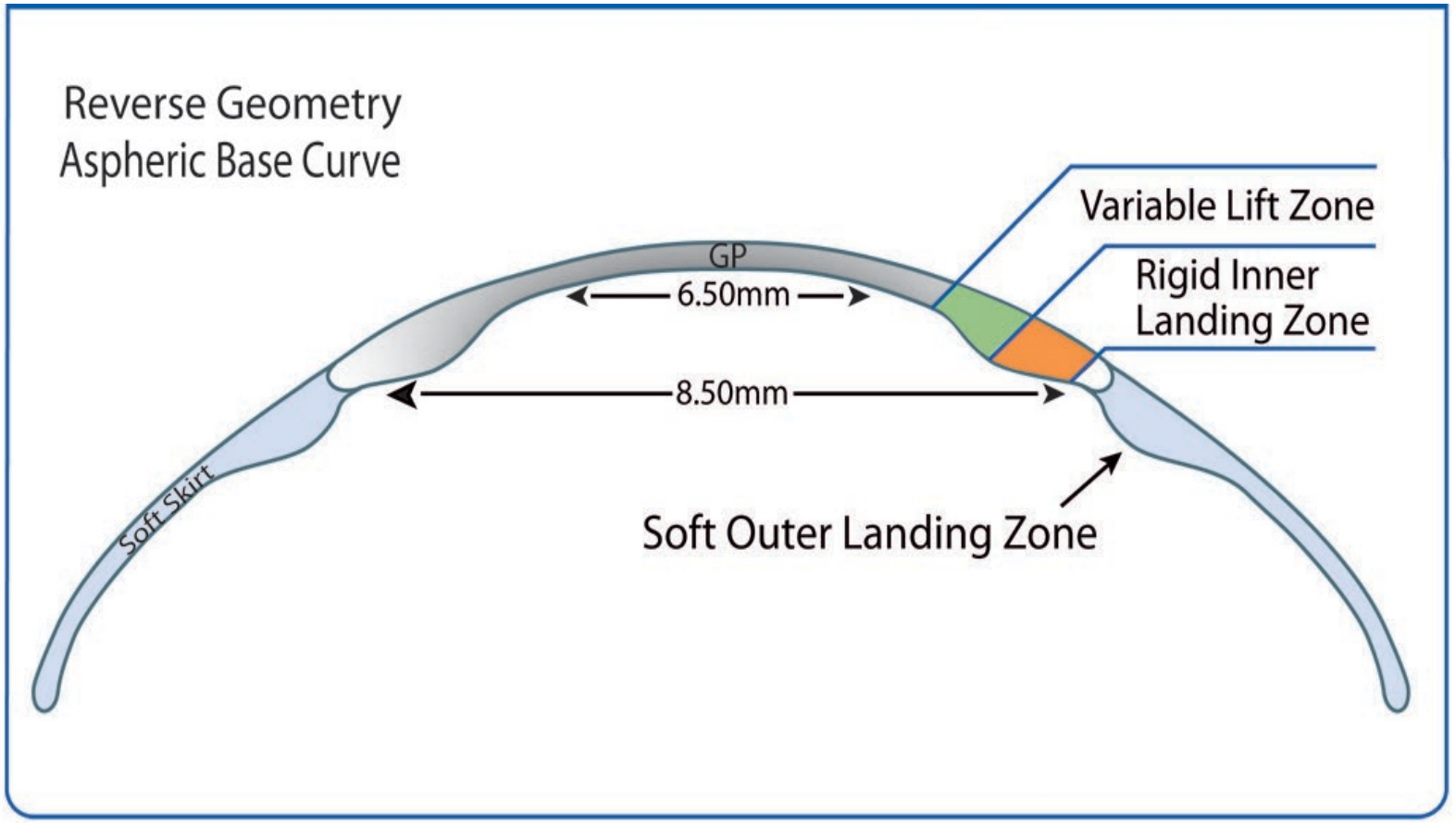
Ideal Skirt Curve Fit



ULTRAHEALTH

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

New Lens Design



- ***2 Landing Zones increase comfort***

SynergEyes iD Single Vision

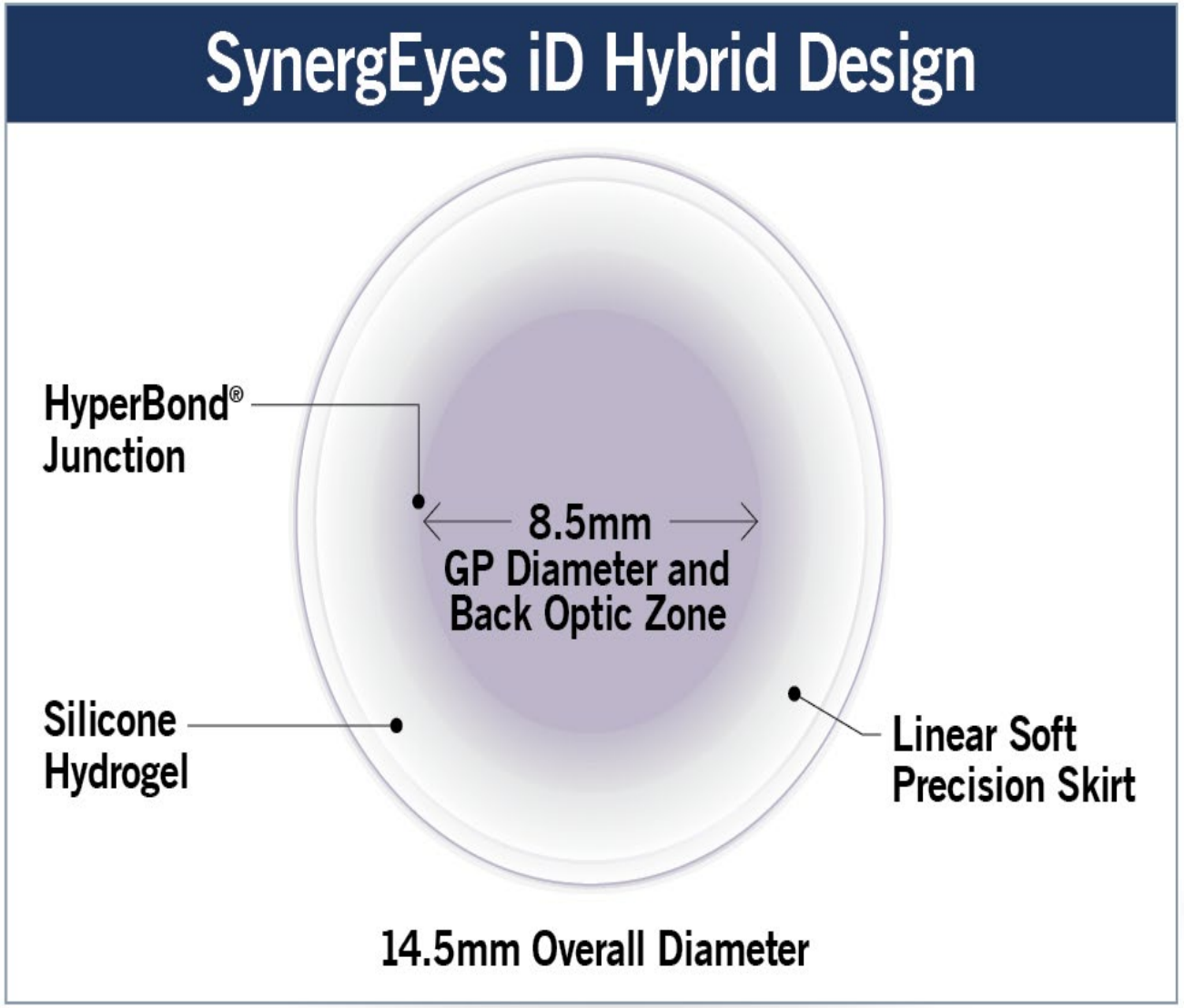
- **Individually Designed for Premium Performance**

- Personalized lenses made specifically for each patient by providing Ks, HVID and Rx.
- Exceptional clarity of a GP lens

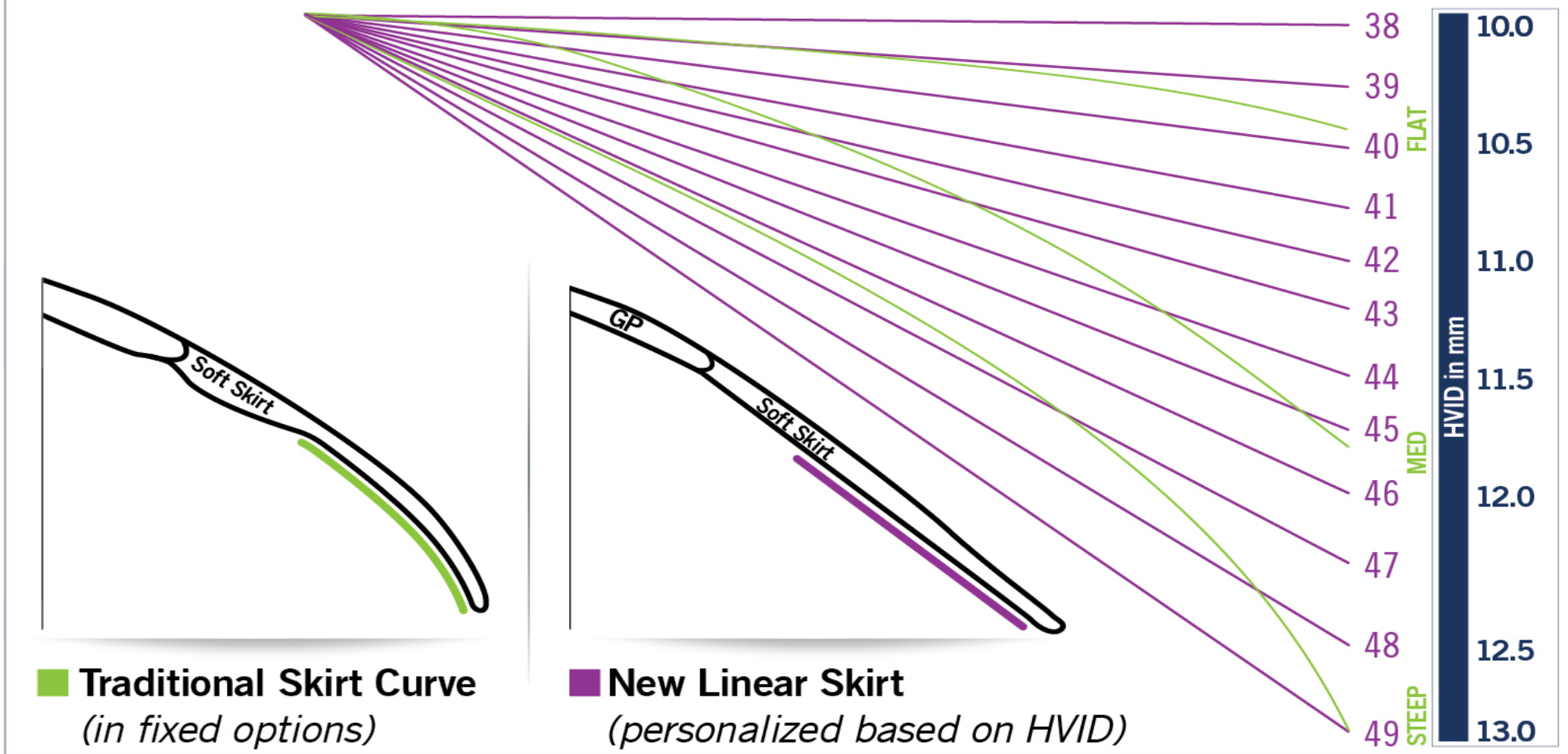
- Empirically designed lens offers a streamlined fit, and a high rate of first-lens dispense, patient preference and satisfaction, and revenue retention.

Lens Design

- SynergEyes iD hybrid lenses are individually designed to each patient's unique ocular anatomy utilizing Keratometric readings, HVID and Refraction to personalize precise lens parameters.



Precision Linear Skirt, driven by HVID



Traditional Skirt Curve
(in fixed options)

New Linear Skirt
(personalized based on HVID)

SynergEyes iD linear skirts are personalized to a patient's unique anatomy based on HVID. There is no need to choose between fixed skirt options.

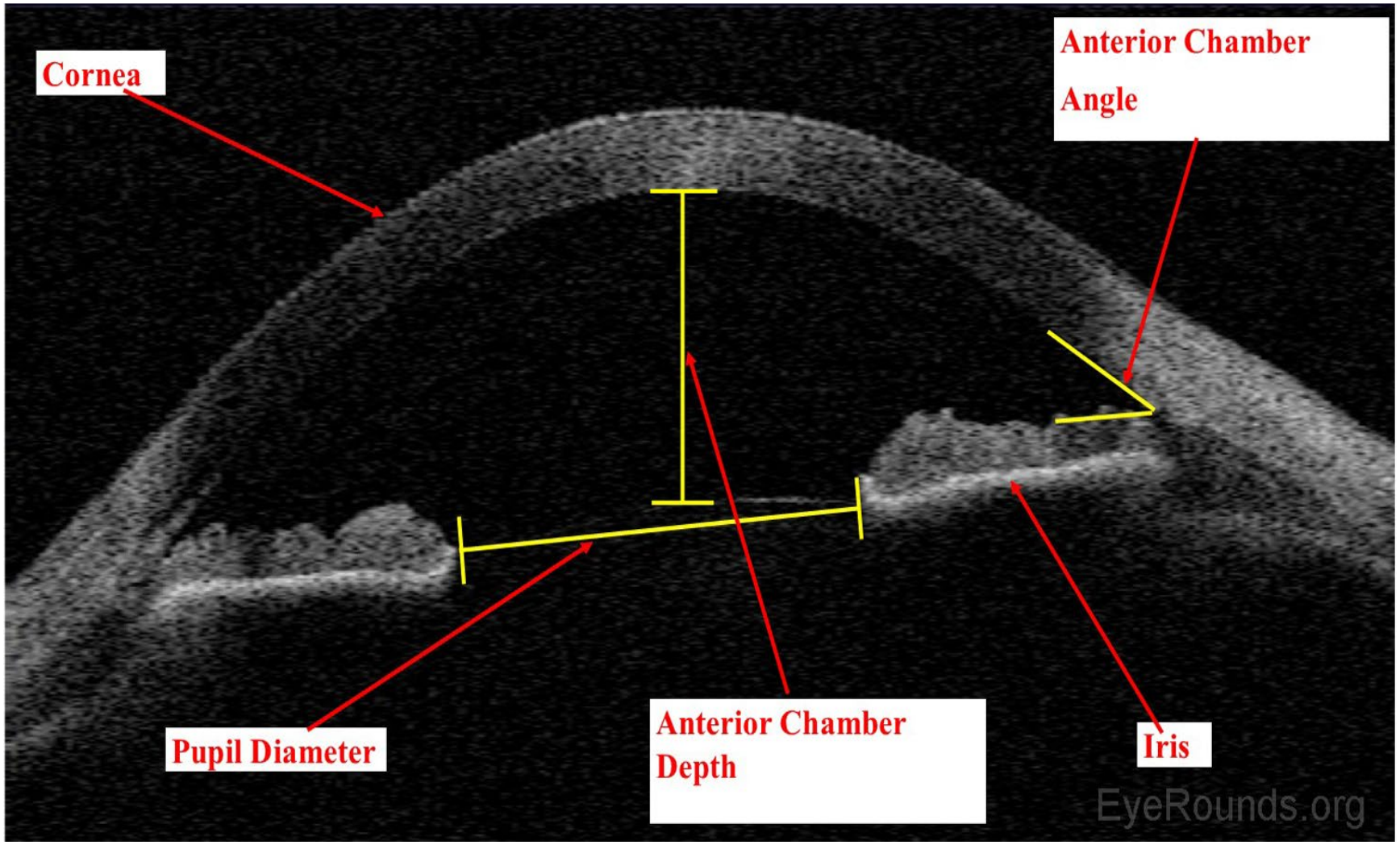
Synergeyes ID Parameters

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

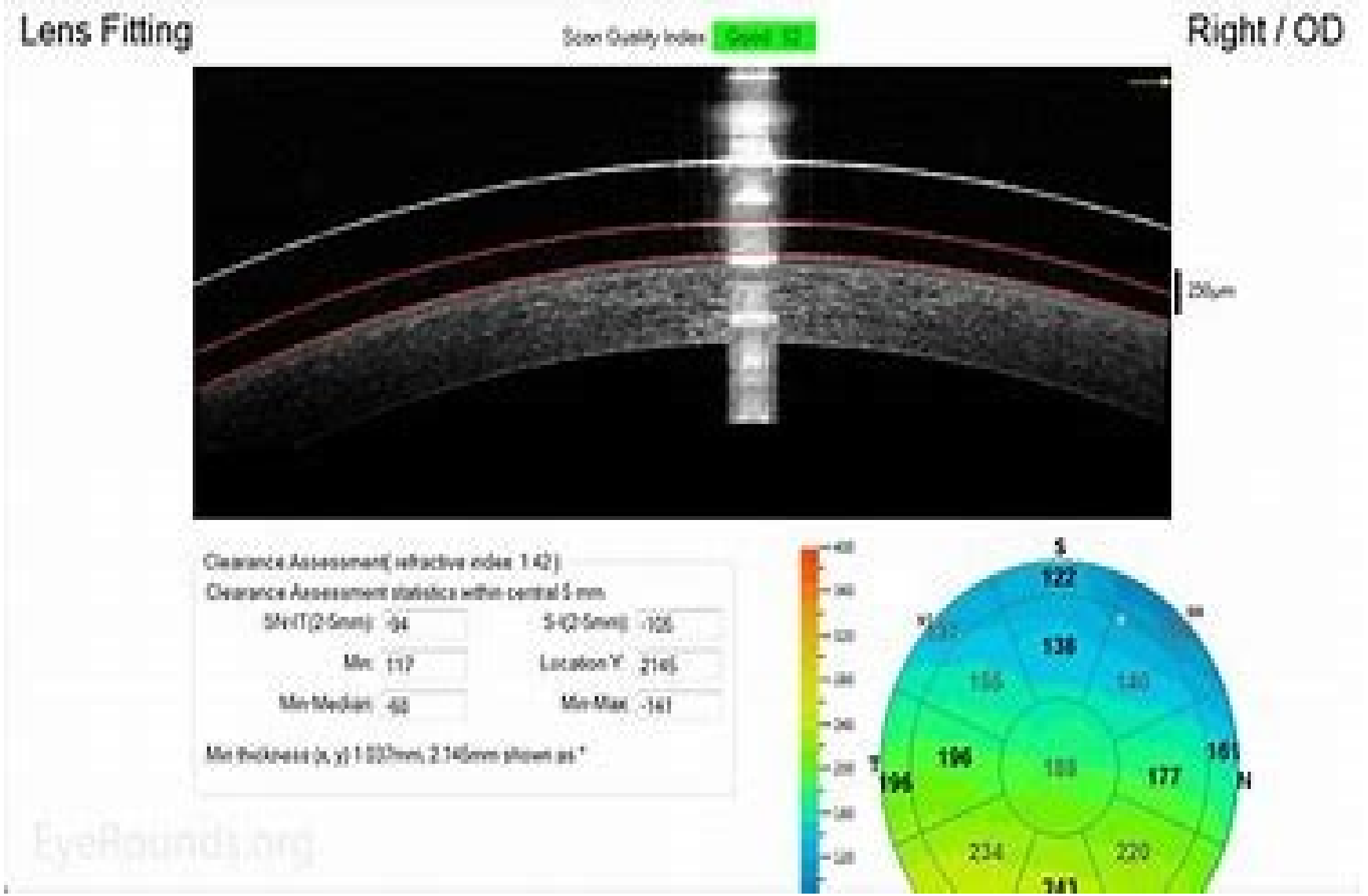
Additional Options:

Additional Options:	• 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

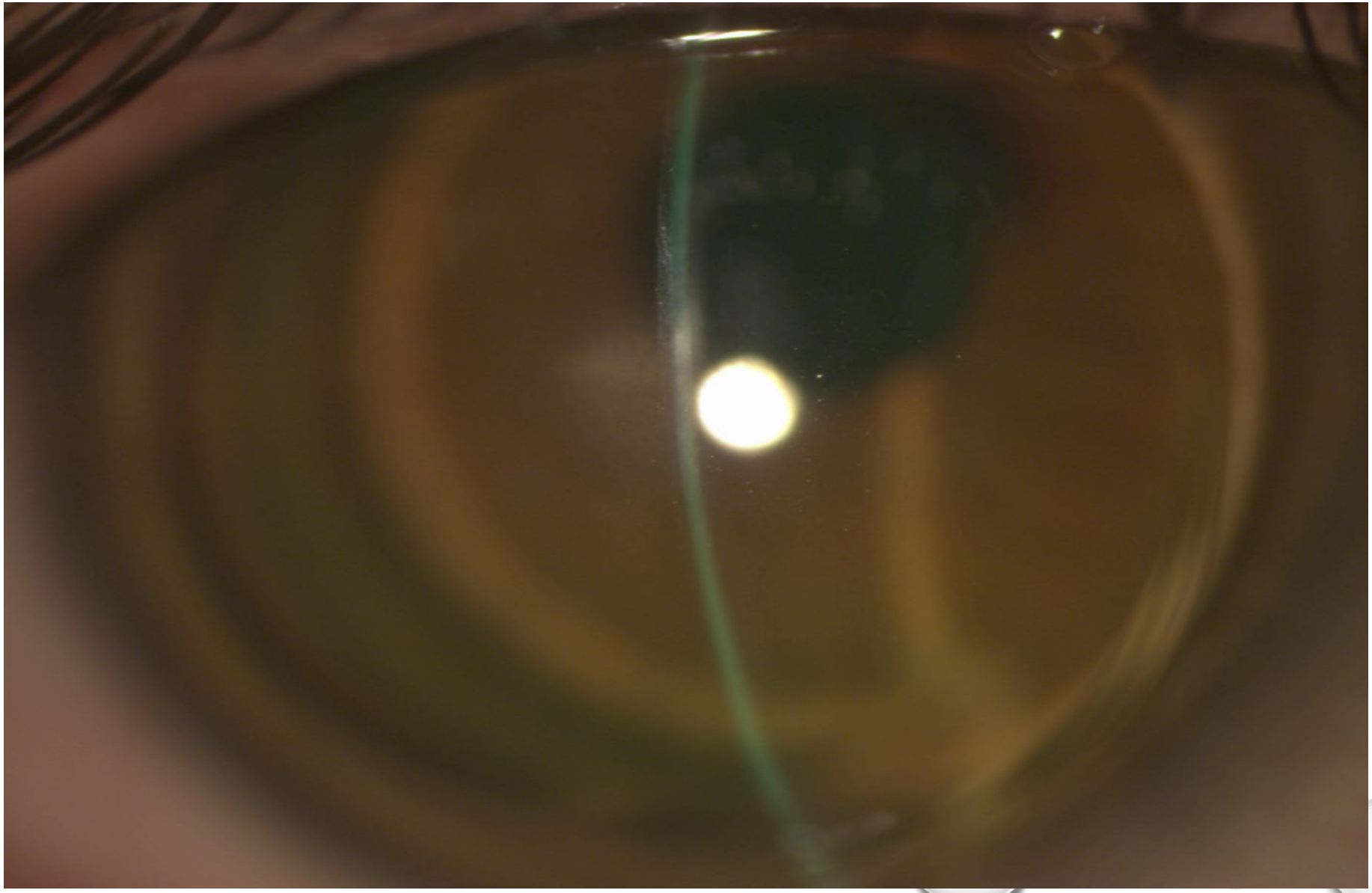
Sagital Depth with OCT

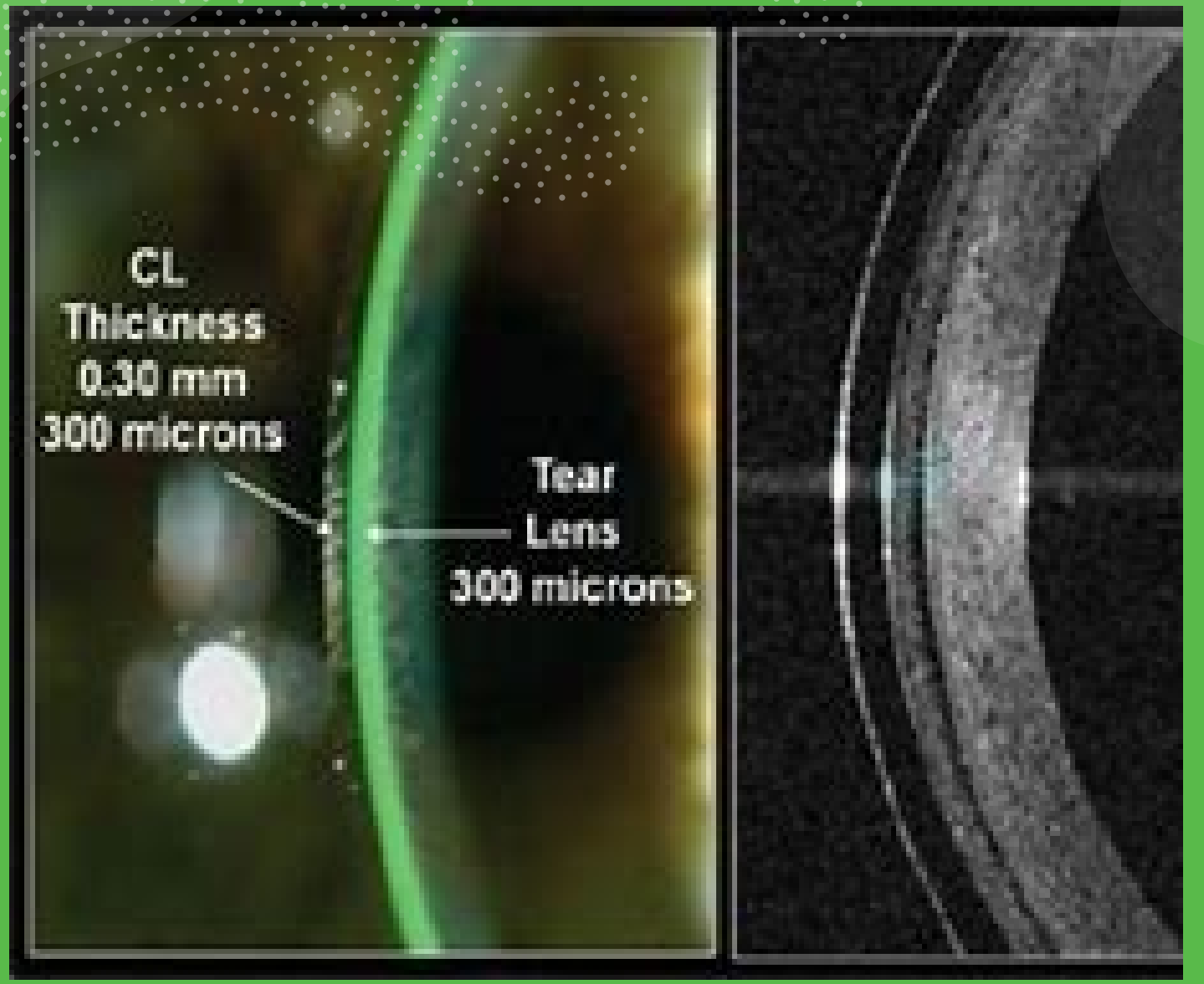


OCT WITH CONTACT LENS



Optic Section




CL
Thickness
0.30 mm
300 microns
Tear
Lens
300 microns

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.

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- Exceptional clarity of a GP lens
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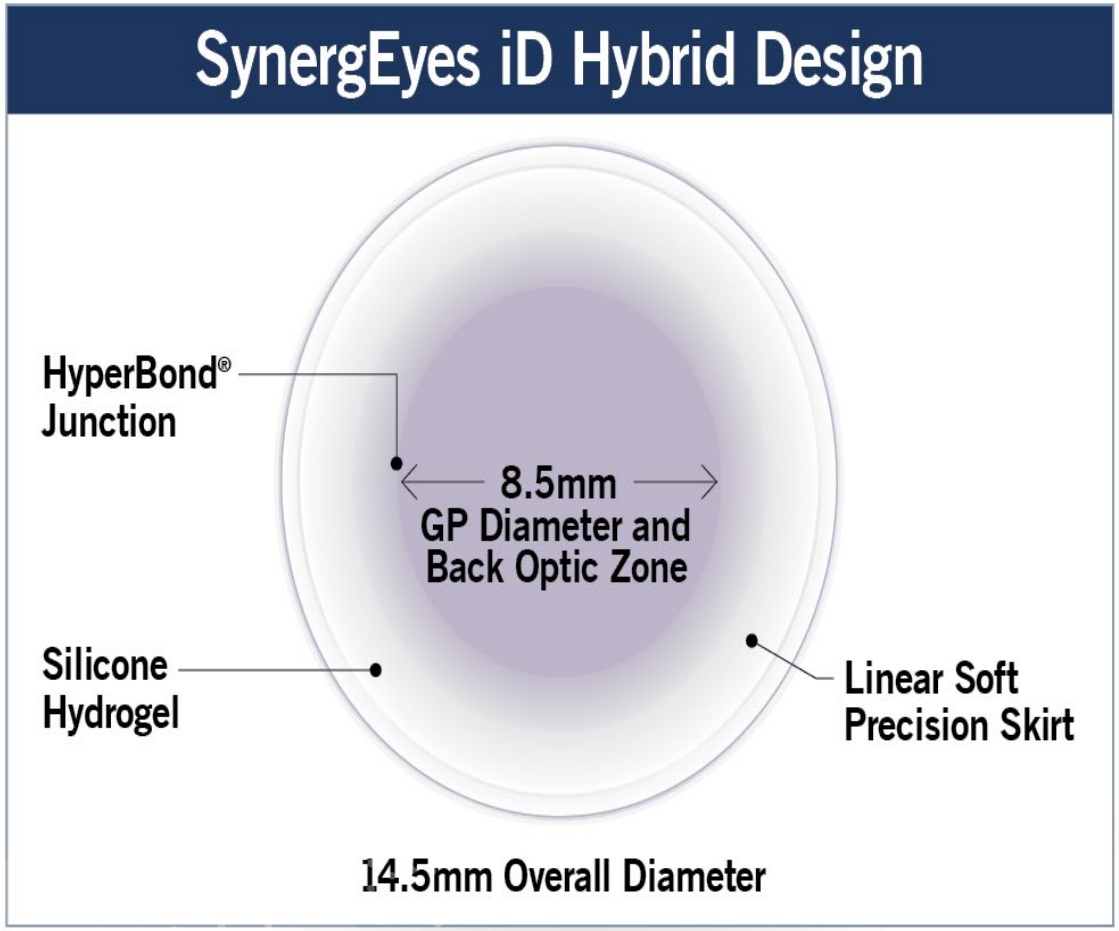
Lens Design



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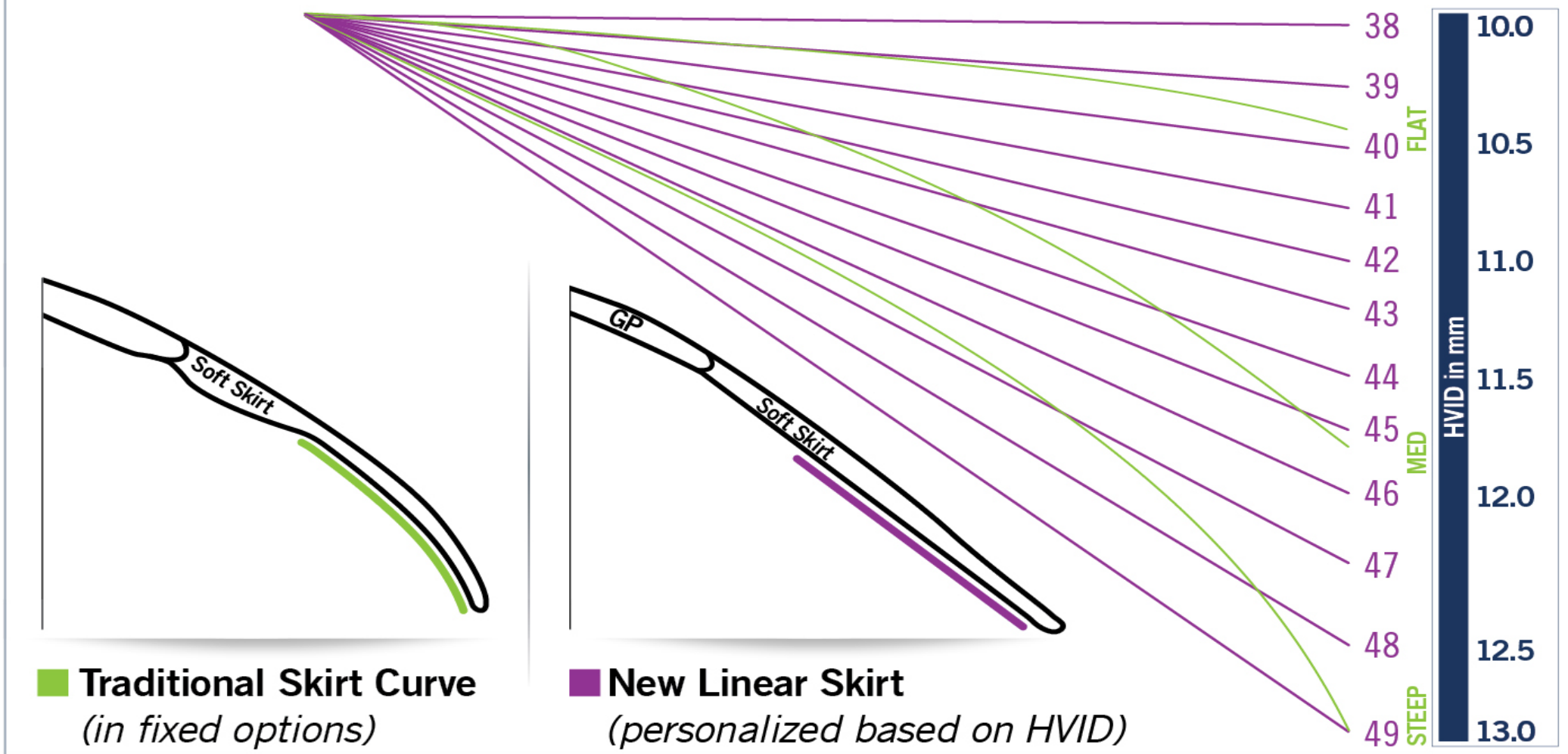

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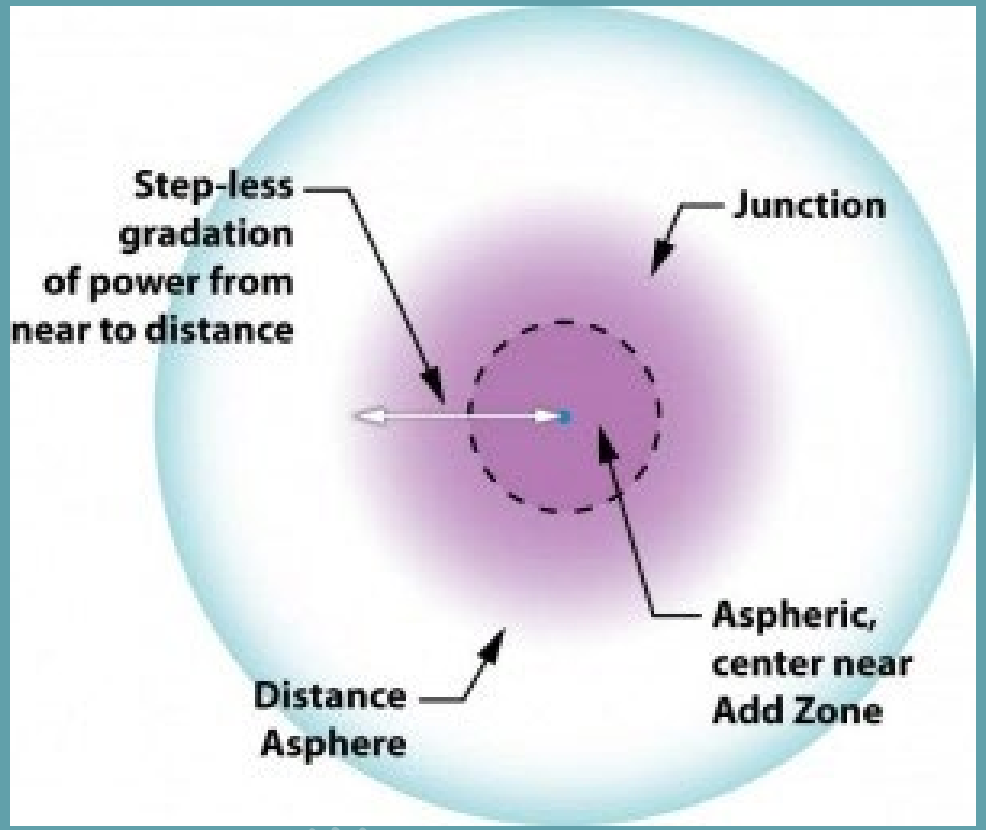
UV Blocker	UVA and UVB
Recommended Wear & Replacement	Daily Wear Recommended replacement every 6 months

SynergEyes ID Multifocal EDOF



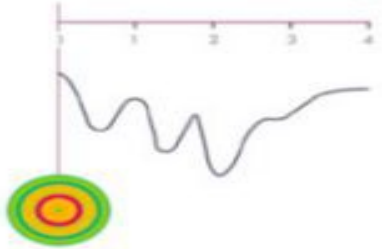
- Presbyopic wearers can experience clearer vision at all distances with the proprietary Multifocal Extended Depth of Focus (EDOF) optical design
- Even those with astigmatism will experience clear, stable vision, without the hassle of blur caused by toric lens rotation.

SynergEyes ID Multifocal EDOF

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 haloes
- **Consistent performance** across pupils, decentration and individual's ocular aberrations

SynergEyes iD MF EDOF: Patented Optical Design Technology

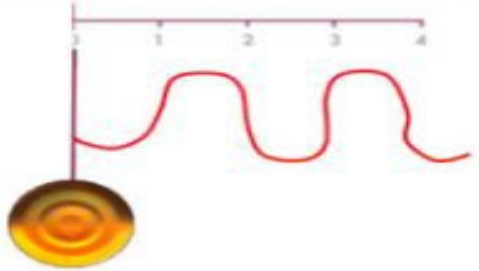


Continuously and rapidly varying power profile. Non-monotonic and aperiodic. Not a zonal bifocal, aspheric or diffractive.

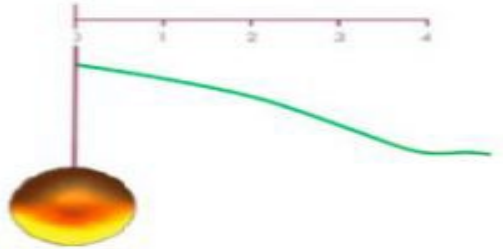
Illustrative power profile only.

Other Commercially Available Multifocal Designs

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



Aspheric lenses:
Monotonic progressive power change.



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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

SPECIALTY AND CUSTOM SOFT CONTACT LENSES

Therapeutic vs. Bandage

Bandage lenses

- A bandage lens is used to protect an injured eye or cornea for healing.

- Indications:
- Protect healing
- Provide comfort
- Provide protection
- Protect healing of a corneal graft

Therapeutic

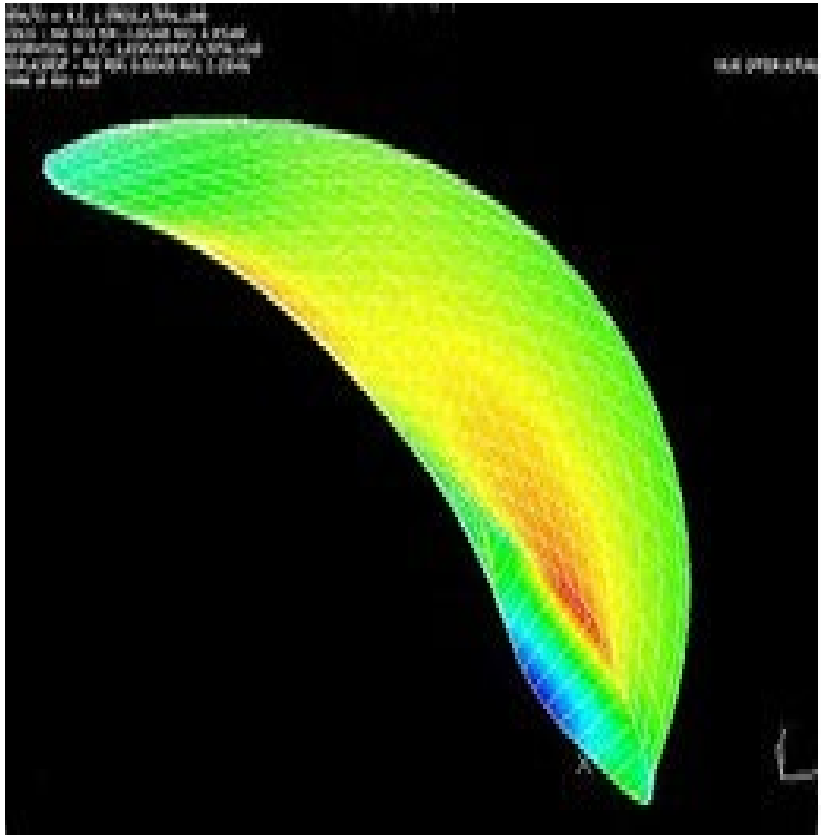
- A Therapeutic contact lens used to prevent disease, injury or pathology to the eye.
- this is when the lens is considered therapeutic.

- Therapeutic lenses are particularly useful for post-surgical management of patients because surgery of the cornea and other ocular structures (epikeratophakia, cataract surgery, corneal epithelial debridement) requires a period of healing to allow time for cell growth and adhesion.

Specialty Soft Contact Lenses for Keratoconus

- Patients who have mild keratoconus can sometimes successfully wear SPHERE AND TORIC contact lenses.
- However, most disposable soft lenses are generally unable to provide the required visual improvements for patients with moderate keratoconus.
- In these cases, patients will need to be fit with a specialty soft keratoconus lens if they desire to stay with soft lenses.

STABILIZATION



- Given the high amount of astigmatic power often prescribed, most specialty soft keratoconus lenses will be ballasted with a double slab-off design to stabilize front surface toricity.
- AVAILABLE IN HYDROGEL OR SILICONE HYDROGEL

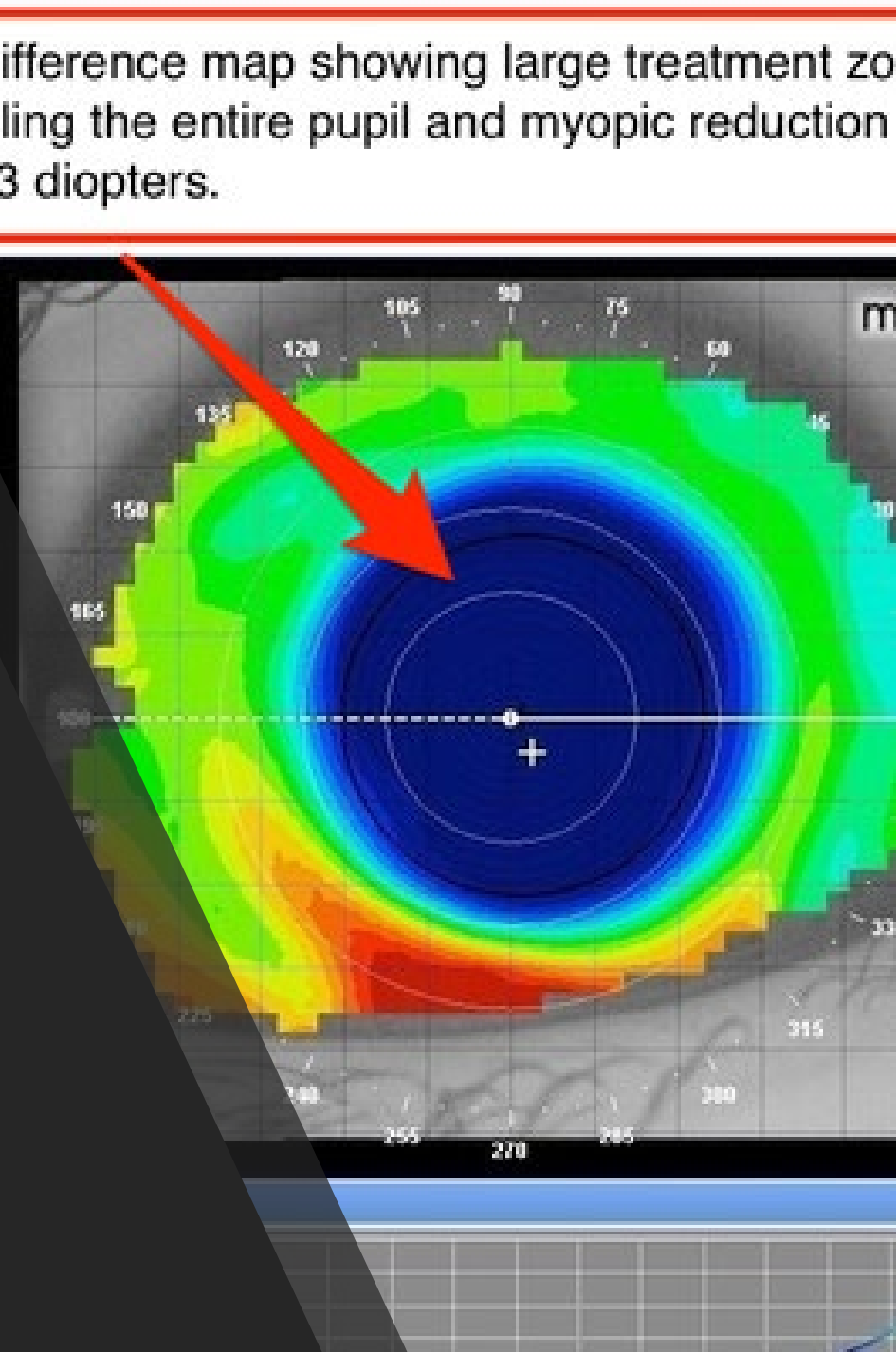
Specialty Toric Contact Lenses

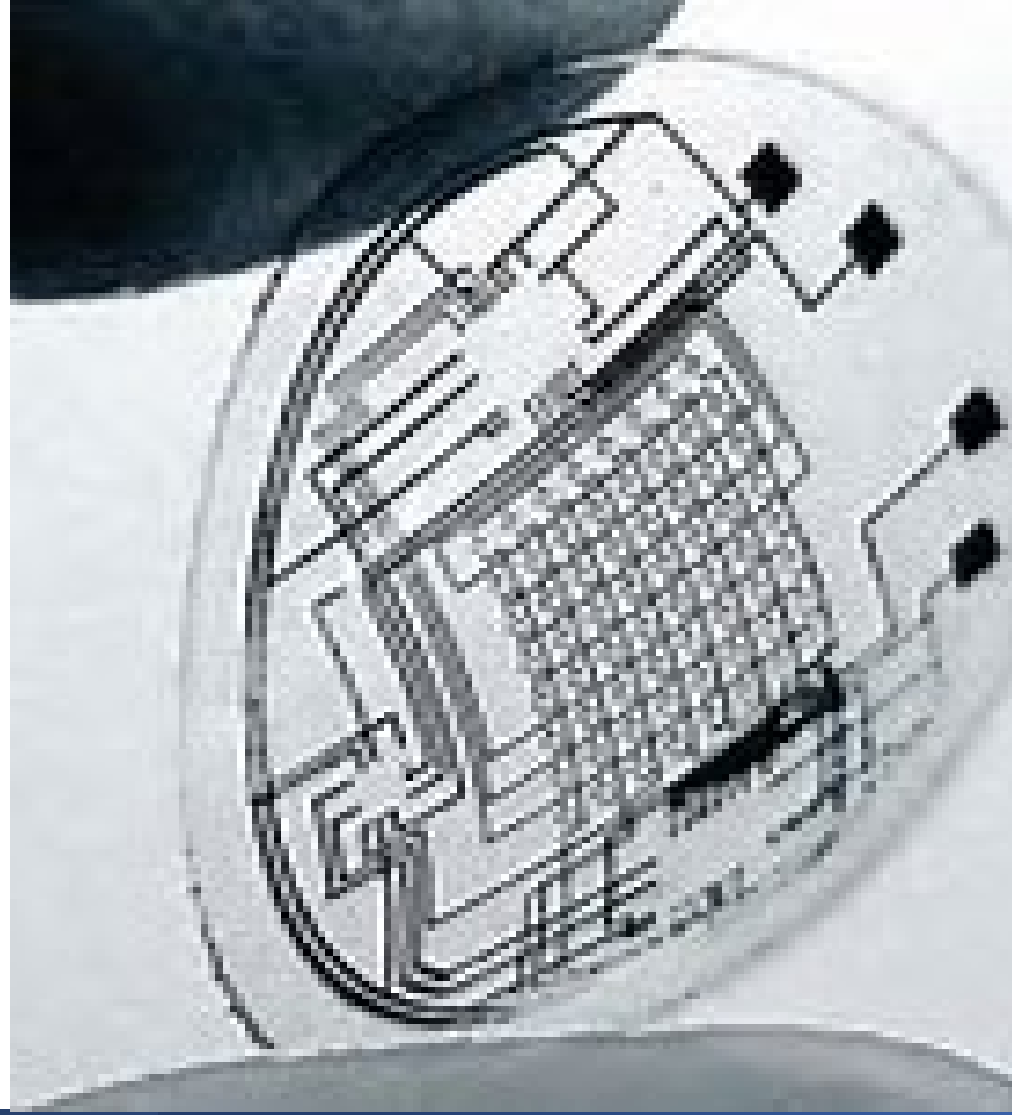
- How Many Toric Lens Designs Are Available?

- How Many Toric Multifocal Designs Available?

Contact Lenses for myopia control:

- Orthokeratology
- CRT
- Myopia control





Future specialty Lenses