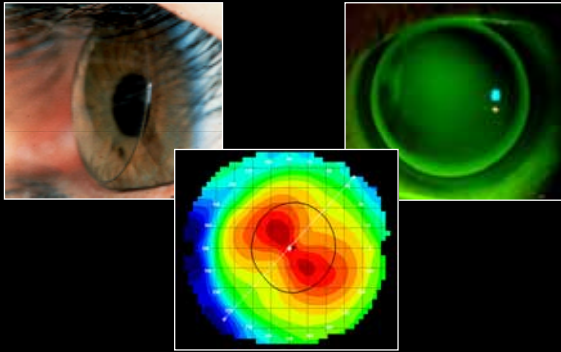
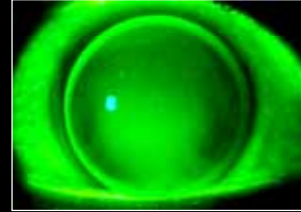


The Fundamentals of GP Lenses Design and Fitting



Disclosures

Patrick Caroline FAAO
 Associate Professor Pacific University
 Consultant for Paragon Vision Sciences



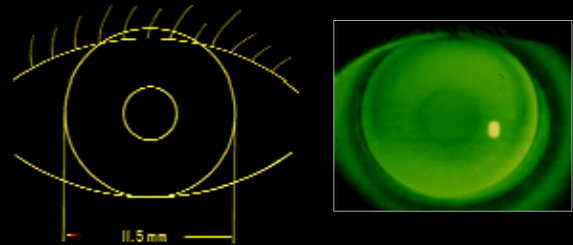
GP Fitting

- #1 Lens Diameter
- #2 Base Curve Radius
- #3 Lens Power



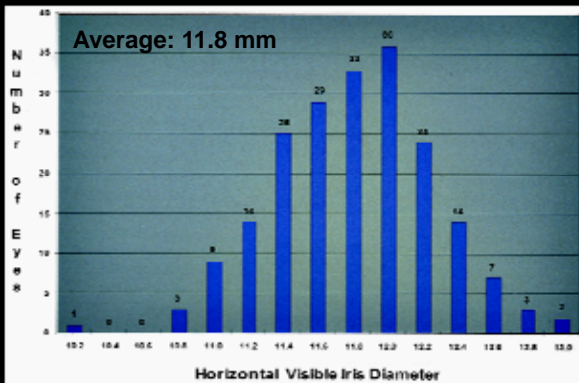
Step #1

Overall Lens Diameter, Measure
 (Horizontal Visible Iris Diameter)



Traditional GP Lens Diameters: = 8.0 to 10.0 mm

Corneal Diameter



Corneal Diameter / Lens Diameter

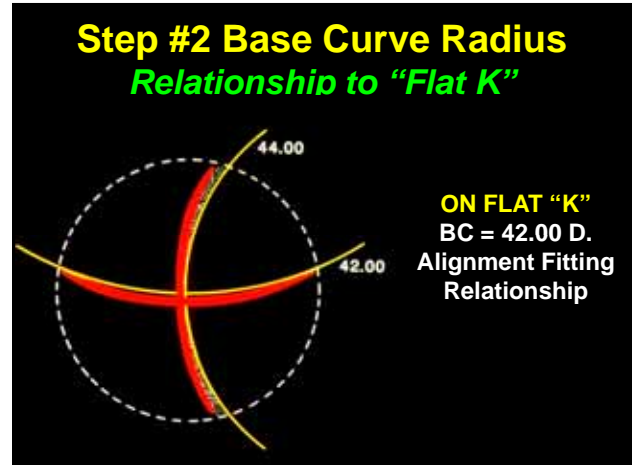
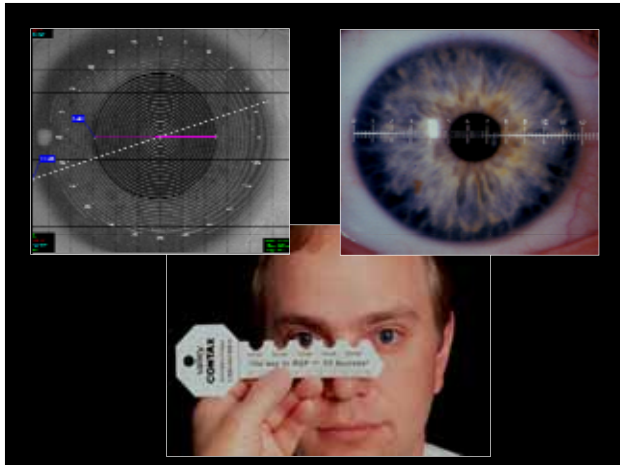
HVID

- 11.4 mm or less
- 11.5 mm and greater

Lens Diameter

- 9.0 mm
- 9.5 mm





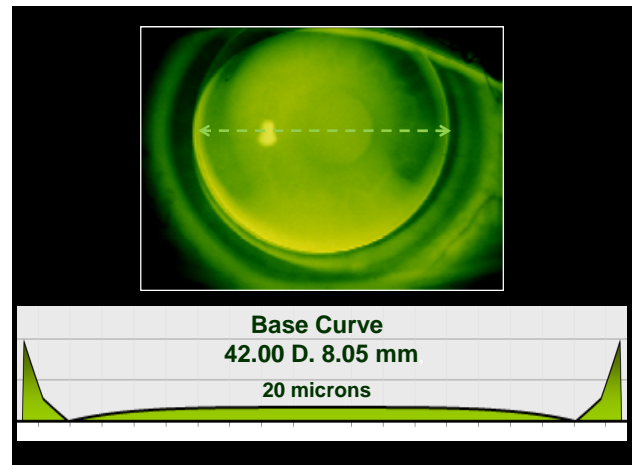
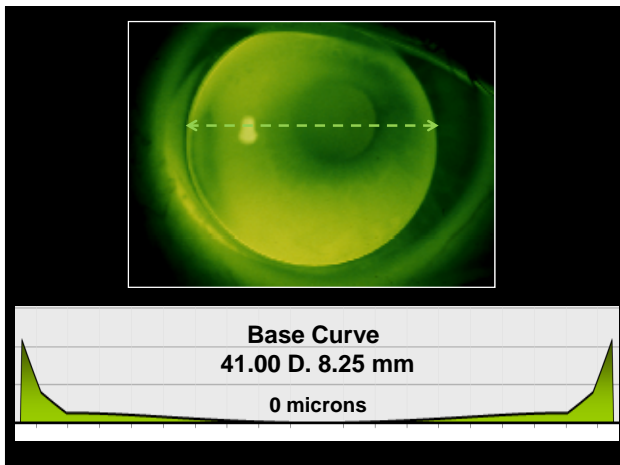
GP Fitting Factors

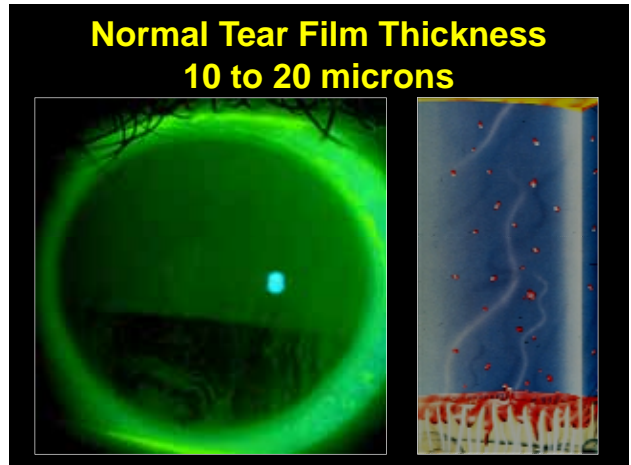
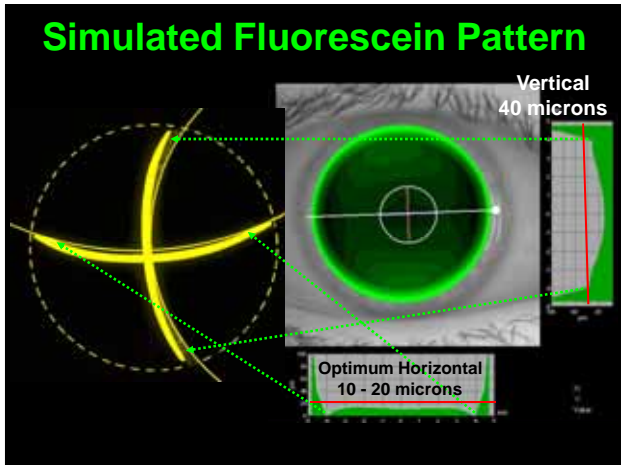
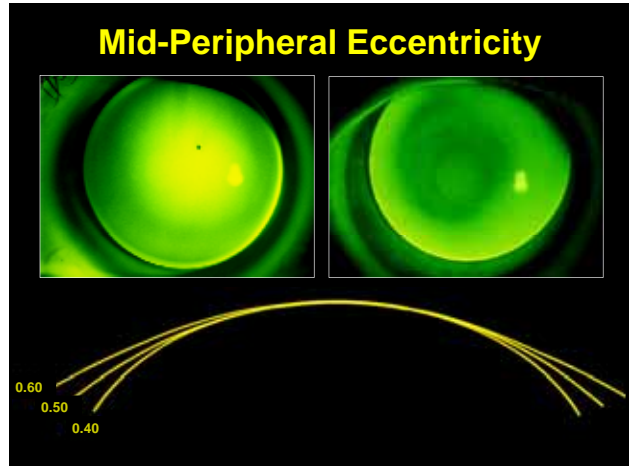
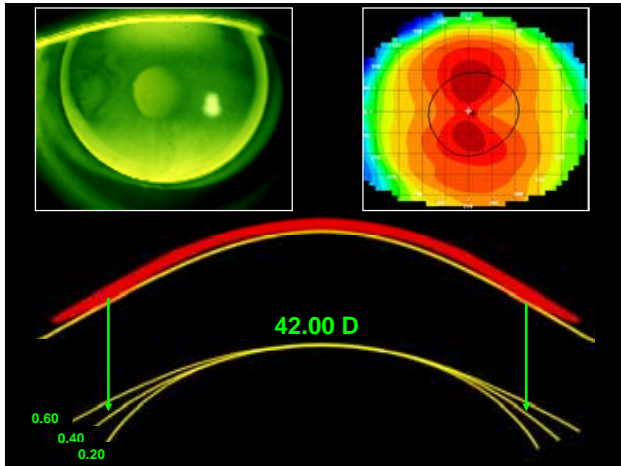
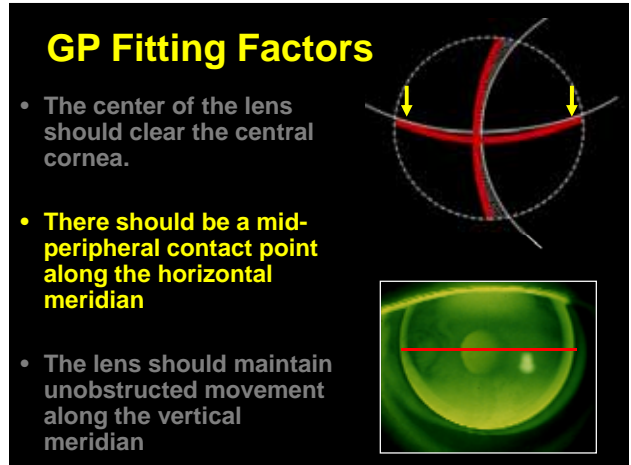
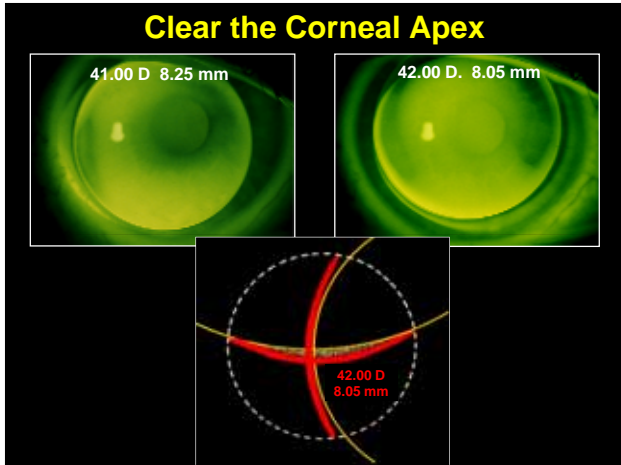
- The center of the lens should clear the central cornea.
- There should be a midperipheral contact point along the horizontal meridian
- The lens should maintain unobstructed movement along the vertical meridian

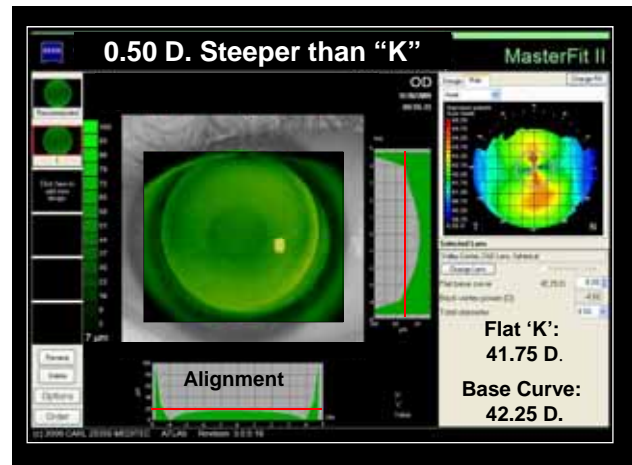
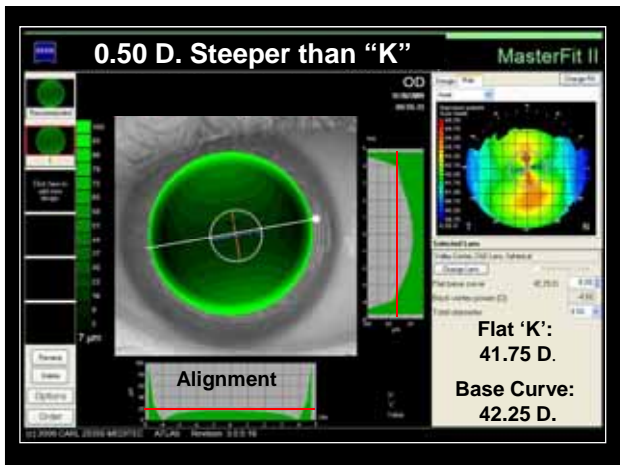
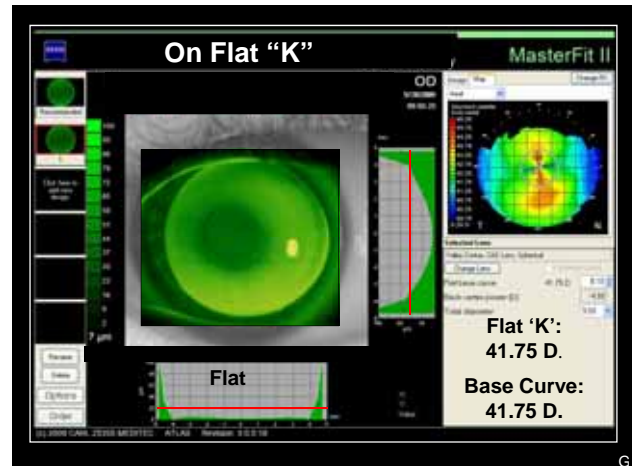
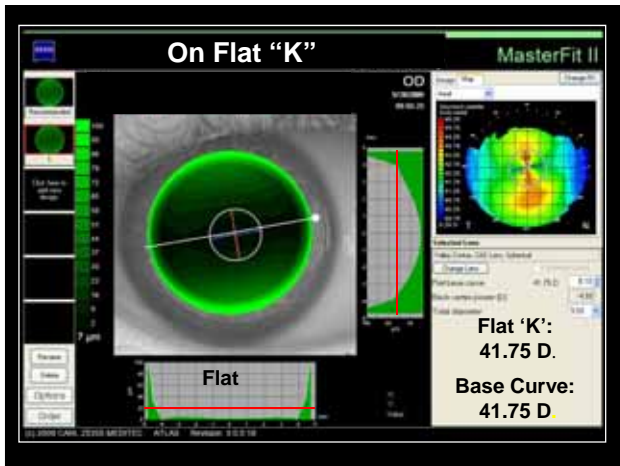
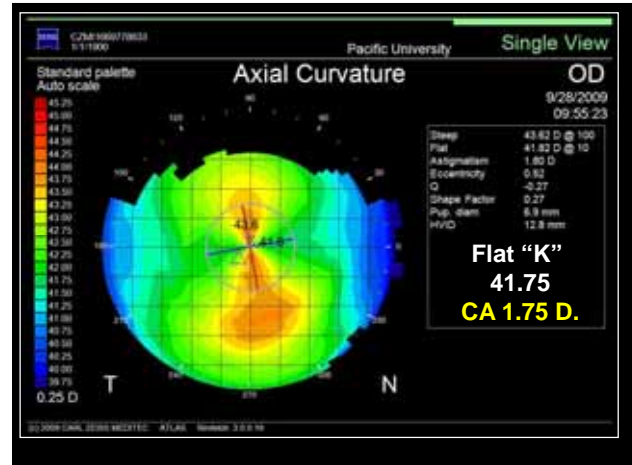
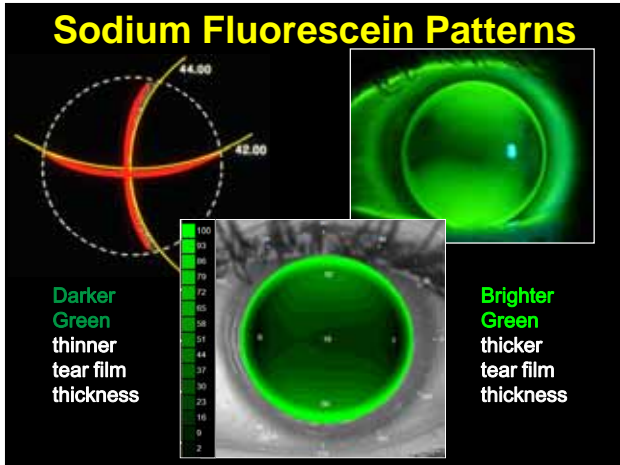
42.00	42.00
44.00	44.00
90	90
0.45	0.45
-3.00	-3.00
-1.50	-1.50
180	180

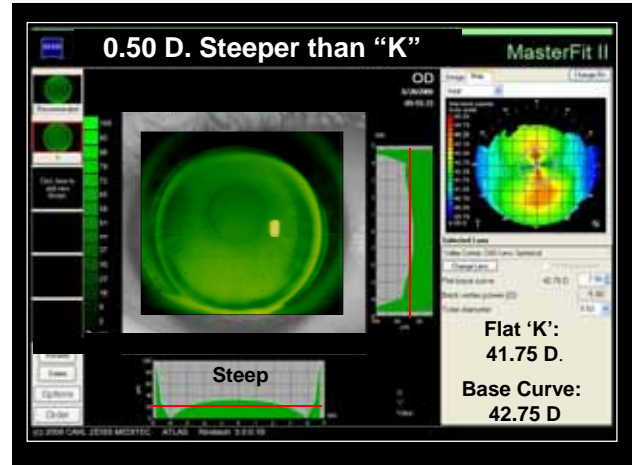
(8.25) (8.05)

41.00	Base Curve / Ecc	42.00
-2.00	Power / Ecc	-3.00
0.15	Center Thickness	0.15
9.5	Diameter	9.5









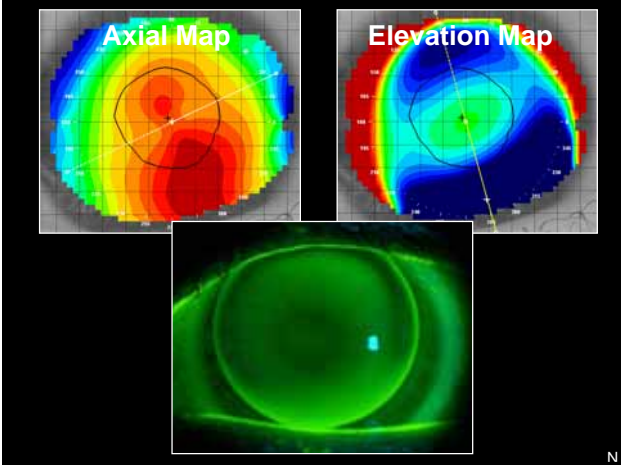
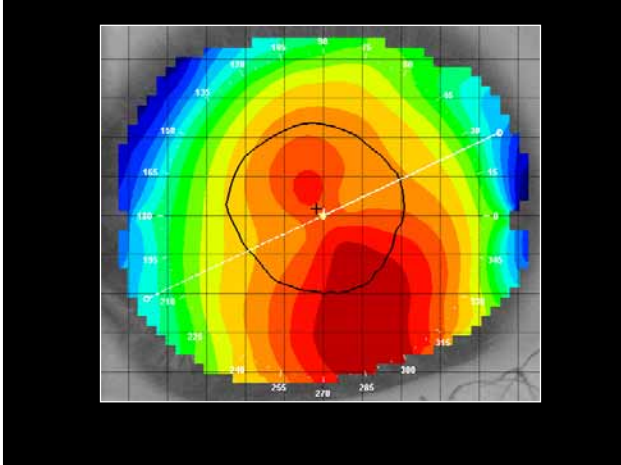
<p>Alignment Fitting Relationship</p>	<p>10 to 25 microns</p>	
<p>Apical Clearance Fitting Relationship</p>	<p>26 microns or Greater</p>	
<p>Apical Touch Fitting Relationship</p>	<p>9 microns or Less</p>	

GP Fitting Factors

- The center of the lens should clear the central cornea.
- There should be a midperipheral contact point along the horizontal meridian
- The lens should maintain unobstructed movement along the vertical meridian

Inferior Clearance

Inferior Clearance



Management of Astigmatism With Gas Permeable Lenses

Spherical Design

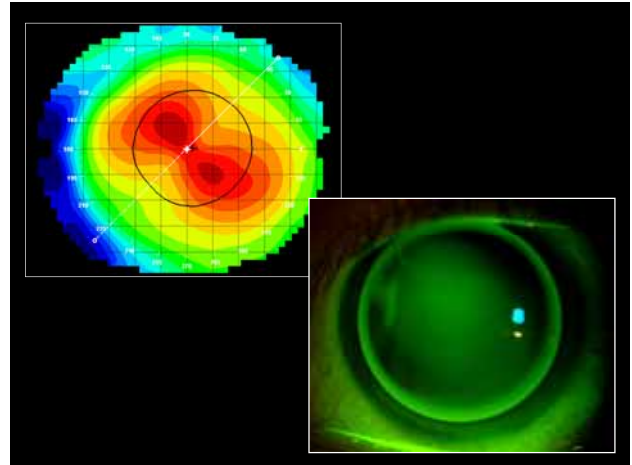
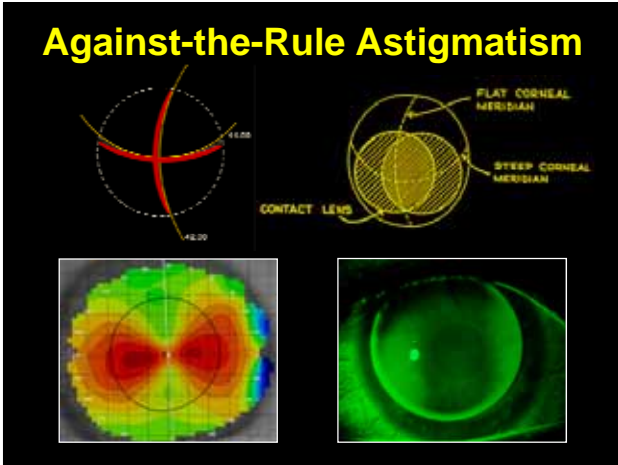
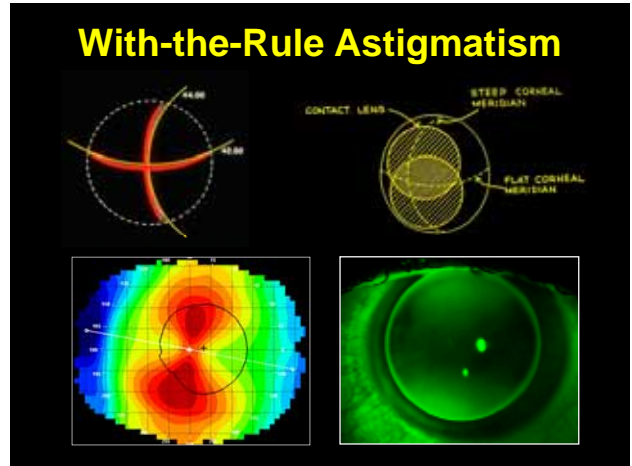
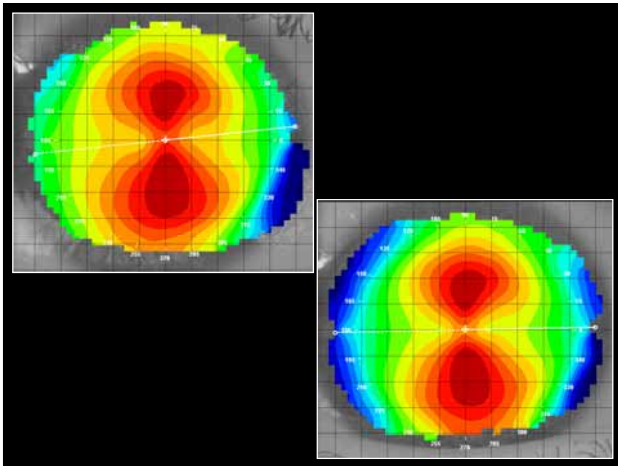
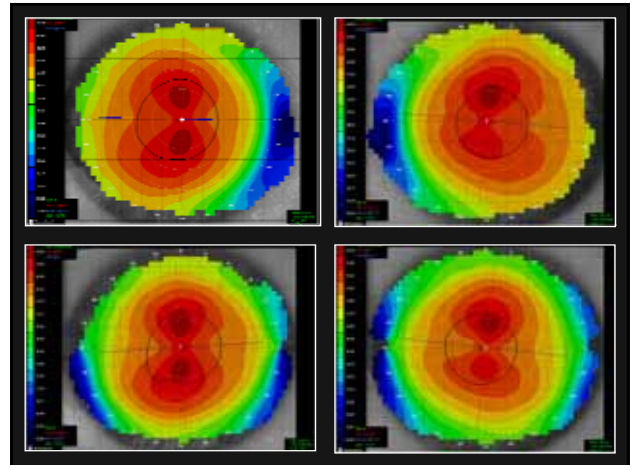
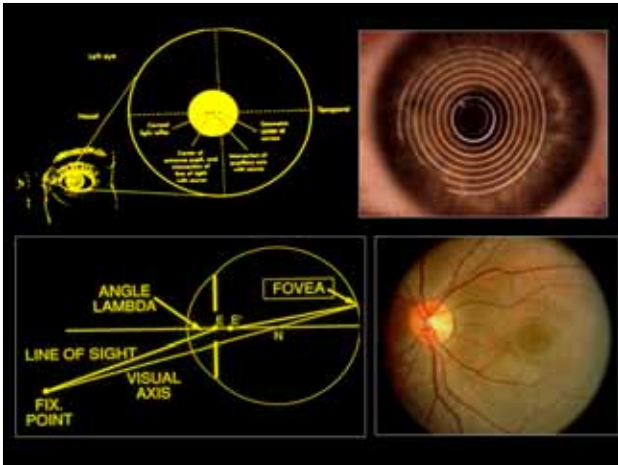
Toric Design

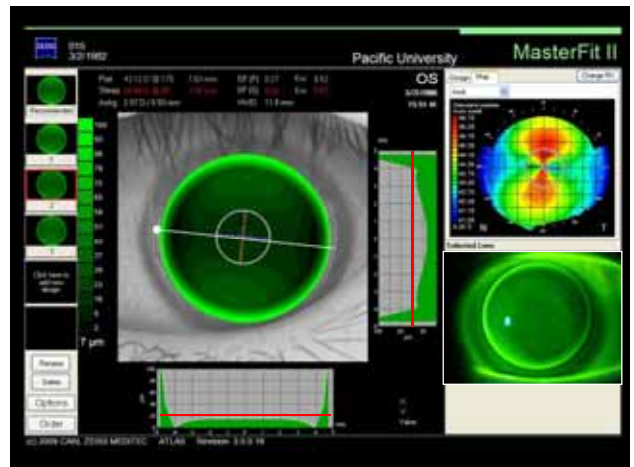
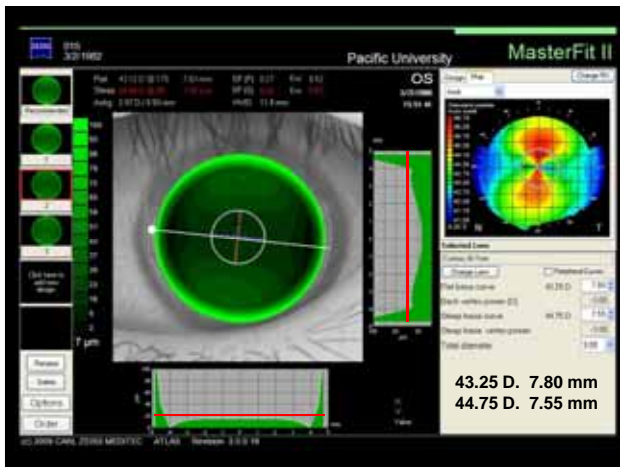
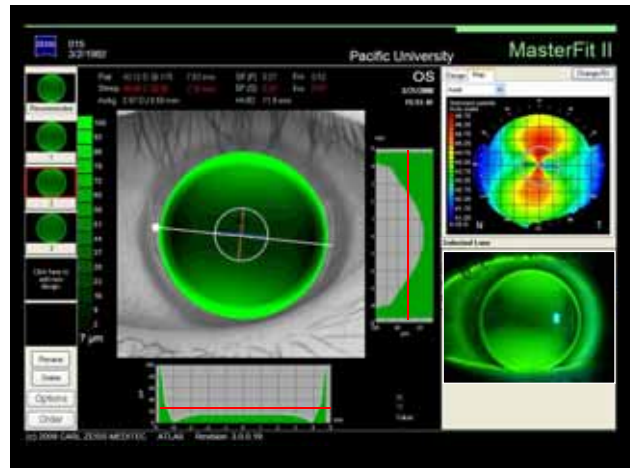
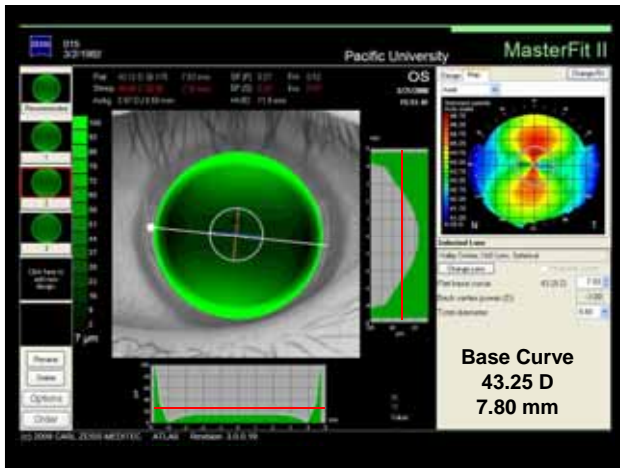
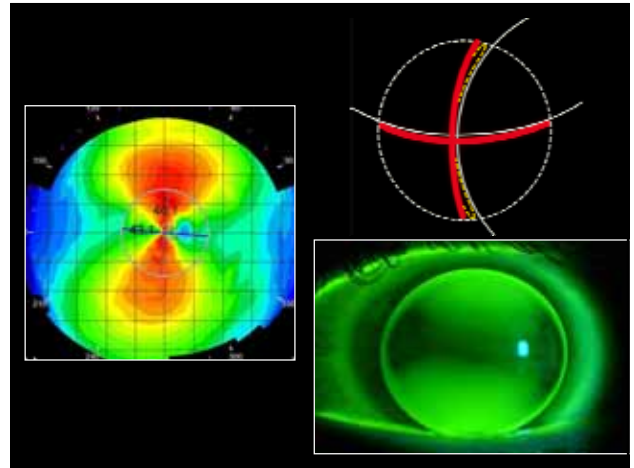
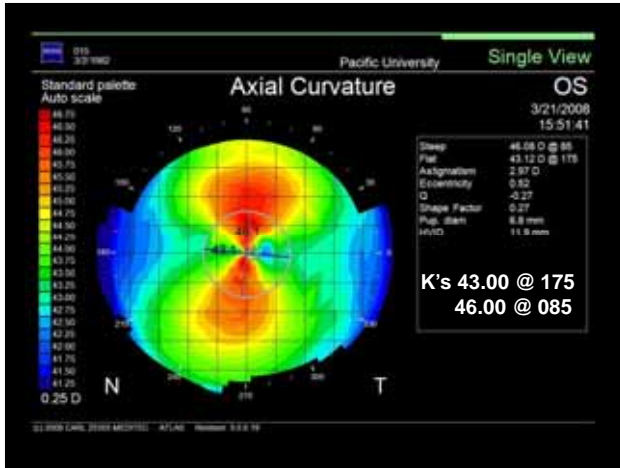
Incomplete Astigmatism Limbus-to-Limbus

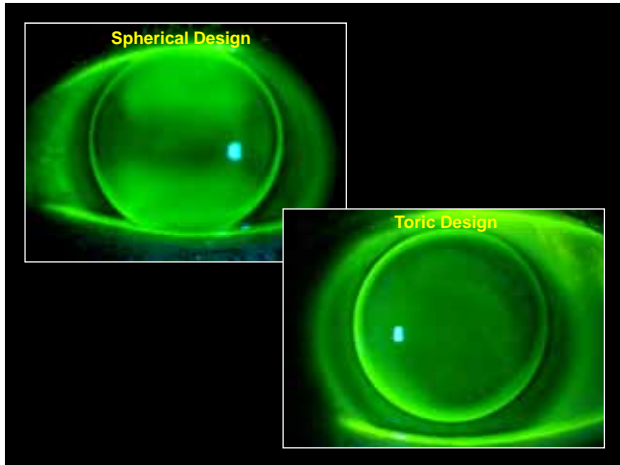
Sim K: 48.0D @ 101° 46.5D @ 11° dk 1.5D	Sim K: 42.5D @ 76° 41.2D @ 166° dk 1.3D
---	---

Incomplete/Central Limbus-to-Limbus

Angle Lamda

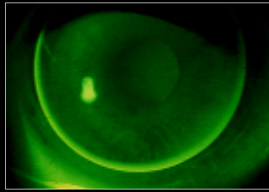






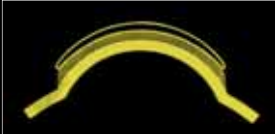
Step #3 Lens Power

1. Spherical overrefraction
 - If the VA is not correctable to 20/20 or BCVA*
2. Sphero-cylinder overrefraction




The diagram shows a lens on an eye with a single focal point, representing spherical overrefraction.

Alignment




The diagram shows a lens on an eye with a dashed line indicating the intended alignment.

Steeper Than "K" **Flatter Than "K"**



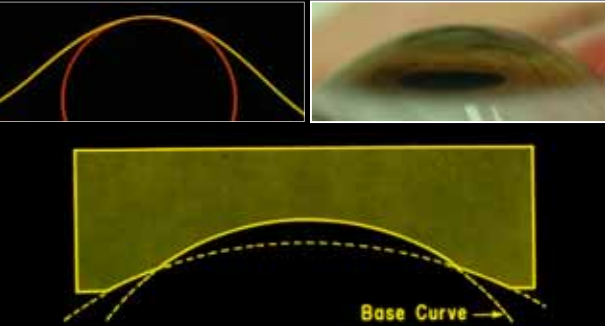
The image shows two diagrams illustrating lens alignment. The left one is labeled 'Steeper Than "K"' and shows a lens that is too steep. The right one is labeled 'Flatter Than "K"' and shows a lens that is too flat.

Lens Power



The image shows three diagrams illustrating lens power. The top diagram shows a lens with a power of 44.75 (7.00) and a base curve of 45.00 (7.50). The bottom left diagram shows a lens with a power of 42.75 (7.00) and a base curve of 45.00 (7.50), with a -3.00 D correction. The bottom right diagram shows a lens with a power of 46.50 (7.25) and a base curve of 45.00 (7.50), with a +3.00 D correction.

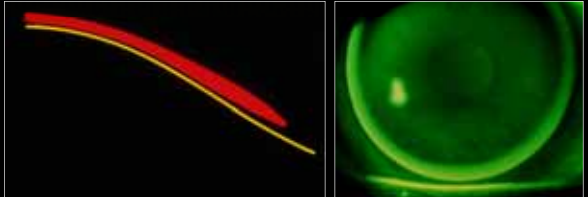
Peripheral Lens Design



The image shows two diagrams illustrating peripheral lens design. The top one shows a lens with a curved periphery. The bottom one shows a lens with a flat periphery and a dashed line labeled 'Base Curve'.

RGP Lens Periphery

- Multiple Spherical Radii
 - Aspheric
 - Tangent



The image shows two diagrams illustrating RGP lens periphery. The left one shows a lens with a curved periphery. The right one shows a lens with a flat periphery.

Secondary Curve

The Secondary Curve provides clearance of the lens in primary gaze and alignment with lateral gaze.

Example:

Base Curve
42.75 D (7.90 mm)
Secondary Curve Radius
8.90 mm
Secondary Curve Width
0.4 mm



Peripheral Curve

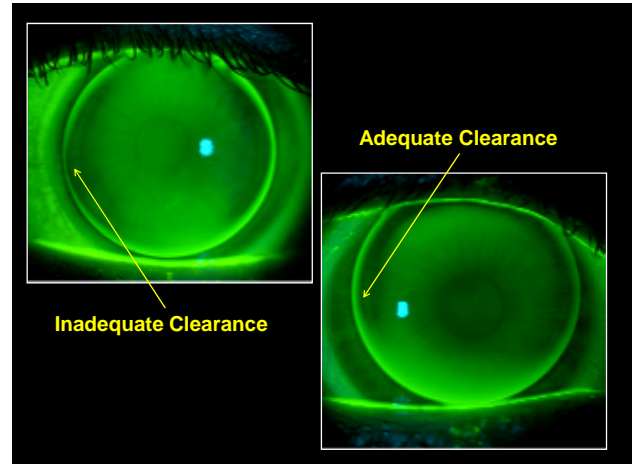
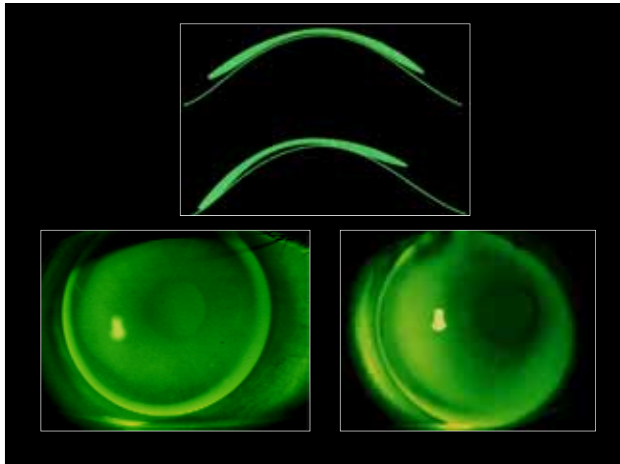
It is designed to clear the peripheral cornea and Limbus, radius 10.00 to 12.50

Example: Base Curve
42.75 D (7.90 mm)

Secondary Curve Radius
8.90 mm, Width 0.4 mm

Peripheral Curve Radius
11.50 mm

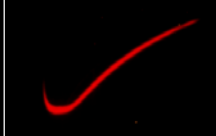
Peripheral Curve Width =
0.3 mm



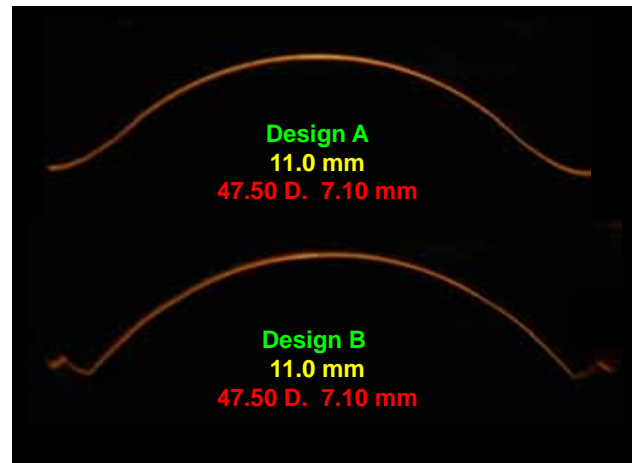
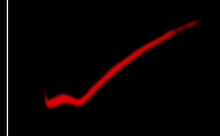
Profile Analyzer



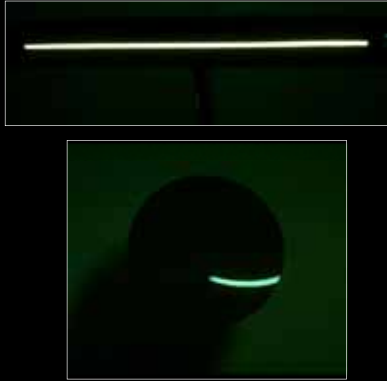
A Good Blend



A Poor Blend



Fluorescent Tube Technique



No SC or PC's



SC and PC's



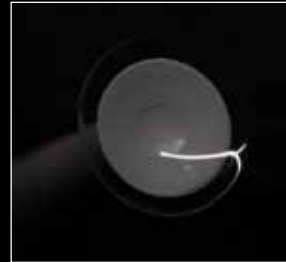
Blended SC and PC's



Burton Lamp Fluorescent Tube Technique



A Good Blend



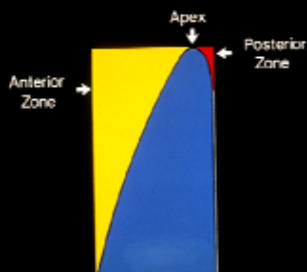
A Poor Blend



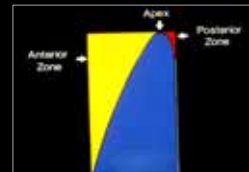
Edge Design

The **Lens Edge** is divided into three zones.

Anterior Zone
Posterior Zone
Edge Apex



Edge Contour

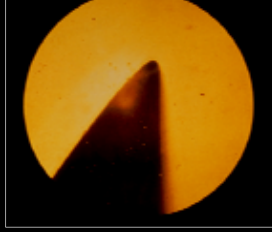


Edge Design

Unfinished Lens Design



Finished Lens Edge



GP Lens Design

