GP Lenses

3 Step GP Lens Fitting
#1 Lens Diameter
#2 Base Curve Radius
#3 Lens Power

**Step #1**
*Determine the Overall Lens Diameter (Horizontal Visible Iris Diameter)*

Corneal Diameters: = 10.5 to 13.0 mm
Average = 11.8 mm

**Vertical Measurement Gauge**

- Large > 12.2 mm
- Normal 11.4 to 12.1
- Small < 11.4 mm

**HVID Distribution**
300 Consecutive Eyes

- Less than 11.4
  - Select 9.0 mm design
- 11.5 or Greater
  - Select 9.5 mm design
Select a Diagnostic Lens Equal to the Patient’s Flat-"K"

Example: K’s 43.00 @ 180 / 44.50 @ 90

Diagonal Lens 43.00 D

- 11.4 mm or less  9.0 mm
- 11.5 mm and greater  9.5 mm

• One drop of a topical anesthetic
• Clean and condition the lens
• Apply the lens to the eye

Sodium Fluorescein Patterns

Step #2 Base Curve Evaluation

• The center of the lens should clear (vault) the central cornea.
• The lens should come to rest (land) on the midperipheral cornea along the horizontal meridian.
• The lens should have unobstructed movement along the vertical meridian.
Base Curve Evaluation

- The center of the lens should clear (vault) the central cornea.
- The lens should come to rest (land) on the midperipheral cornea along the horizontal meridian.
- The lens should have unobstructed movement along the vertical meridian.

Mid-peripherally... the lens will always “land” at the point of greatest elevation.

Photokeratoscopy

- The closer the rings are to one another, the steeper the cornea.
- The further the lines rings are from one another, the flatter the cornea.

1.12 D. WTR Astigmatism

43.00 D. = 0.75 Flatter Than “K”
0.75 Flatter Than “K”

44.00 D. “On” Flat “K”

22 microns of Apical Clearance

On Flat “K”

44.50 D. = 0.75 Steeper Than “K”

38 microns of Apical Clearance

0.75 Steeper Than “K”

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.
Peripheral Lens Design

Gas Permeable (GP) Lens Periphery
- Multiple Spherical Radii
- Aspheric
- Tangent

Adequate Clearance
Inadequate Clearance

Step #3
Lens Power
1. Spherical overrefraction
   If the VA is not correctable to 20/20 or BCVA
2. Sphero-cylinder overrefraction

Step #3 Overrefraction… (OR)
CL Power -3.00 OR -2.00 sph
Final Lens Power = -5.00 D.
Management of Astigmatism With Gas Permeable Lenses

Incomplete Astigmatism

Limbus-to-Limbus

K's 43.00 @ 175
46.00 @ 985
Irregular Astigmatism post-PKP

Diagnostic Lens
- Selection
  Temporal OR Other?

Critical Data Points
- T
- S
- I
- X
- N

Shape - Prolate

Monocular Diplopia?
Graft Tilt

The lens is loosest where the cornea is the steepest.

Graft Tilt

The lens is tightest where the cornea is the flattest.

Obstructed Vertical Movement

Central or incomplete Astigmatism

Which Lens Modality ???

Axial Display (Power) Map

Elevation Display

954 microns
When the differences in corneal height (along any given meridian) exceeds 400 microns, consider a scleral lens design.

Upper Lid Position and Lenticulation

Lenticulation

Gas Permeable Lens Institute
WWW.GPLI.INFO
- Click N’ Fit
- GP Calculator
- Grand Rounds Trouble Shooting
- Many Other Resources
Corneal Sphericalization

Difference display 11/06 and 6/08

6.00 D Steepening

4.50 D Steepening

What are our options for these patients?

Tri-Curve Design                Piggyback Design                    Hybrid Design

Aspheric Design                                                               Reverse Geo Design

Scleral Design               Custom SCL Design                Multi-Curve Design

Contact Lens Options

Why can’t this patient achieve quality vision with glasses or conventional soft contact lenses?

63.00 Dp

40.00 Dp

Draping effect of soft lenses

Draping effect of soft lenses

No lens               Map over Soft CL
Soft Keratoconus Lenses (0.3 - 0.5mm thick)

Map over Soft Keratoconus Lens

Map over GP

How would we approach this case?

Case CL: Right Eye

Elevation Map

Right: +3.25 -5.00 x 4
Left: +1.25 -3.25 x 180
Spherical GP lens:
Horizontal Meridian
8.10  10.2  +3.25
22 microns

Spherical GP lens:
Vertical Meridian
8.10  10.2  +3.25
135 microns

Right Eye: Spherical GP
8.10  10.2  +3.25
Bi-toric GP lens:
Horizontal Meridian
8.10/ 7.45  10.2  +3.25/-1.75 net
25 microns

Bi-toric GP lens:
Vertical Meridian
8.10/ 7.45  10.2  +3.25/-1.75 net
22 microns

Right Eye: Bi-Toric
8.10/ 7.45  10.2  +3.25/-1.75 net
Case ML: Right Eye

-5.00 -3.50 x 10

Elevation Map

Elevation
Depression

Keratoconus
GP lens:
Horizontal Meridian

7.70 10.2 -6.50
35 microns

Keratoconus GP lens:
Vertical Meridian

52 microns
185 microns

Right Eye: Keratoconus GP Lens

7.70 10.2 -6.50

Case CB: Right Eye

+0.50 -5.75 x 85
For this patient...Scleral