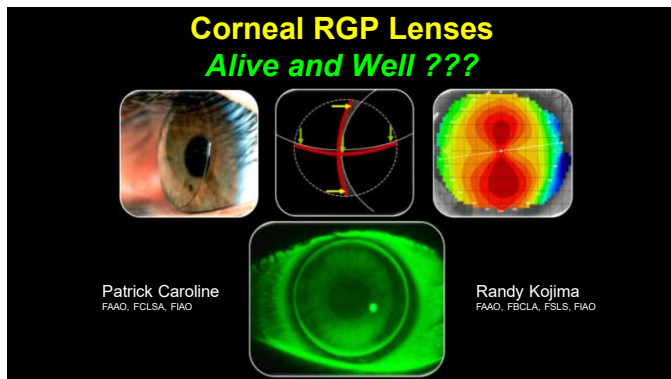
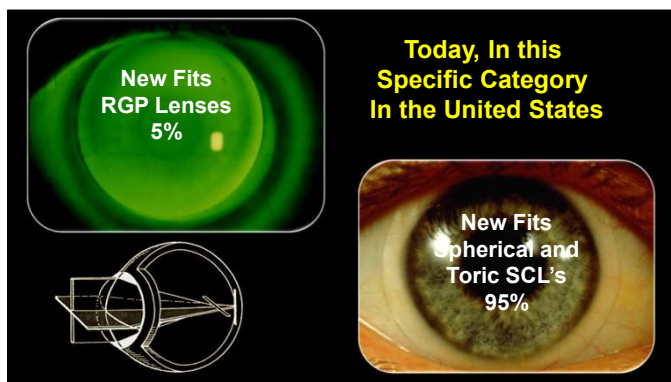




1



2



3



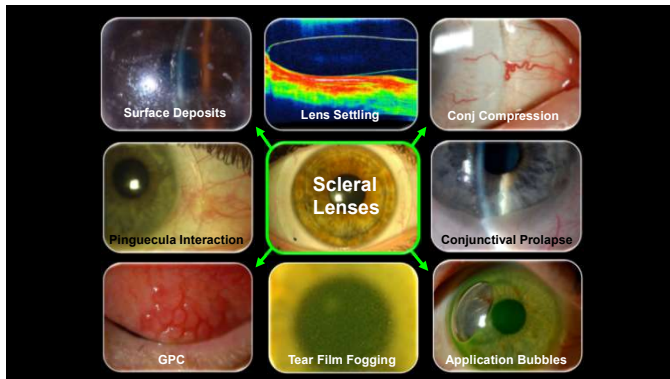
4



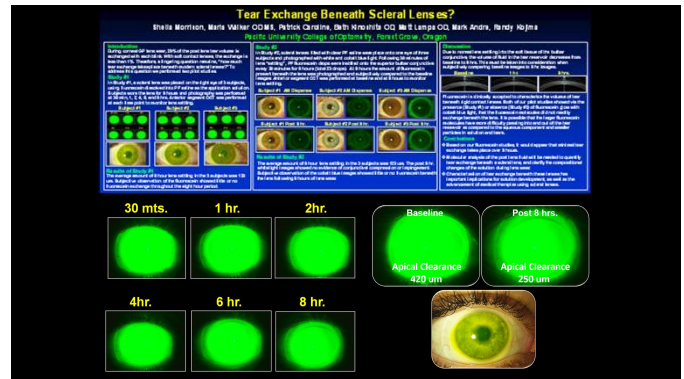
5



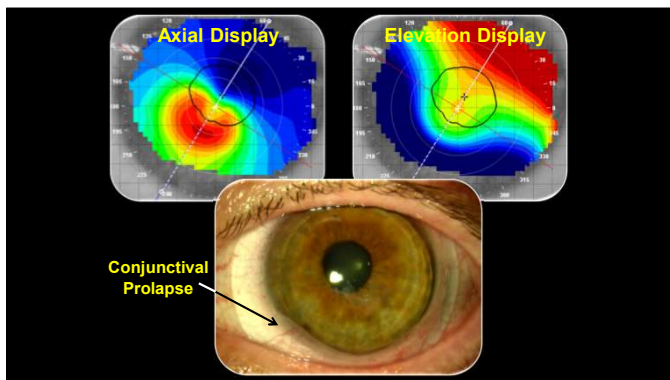
6



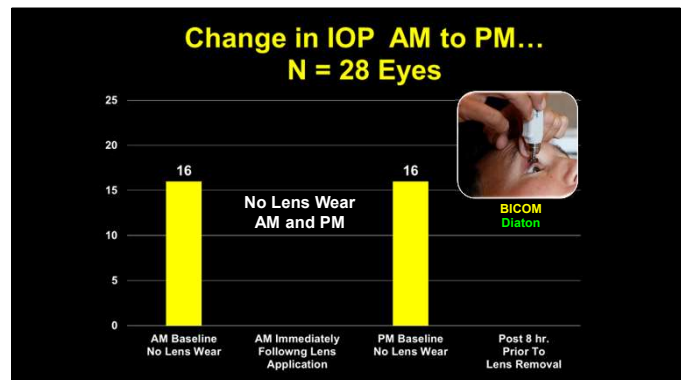
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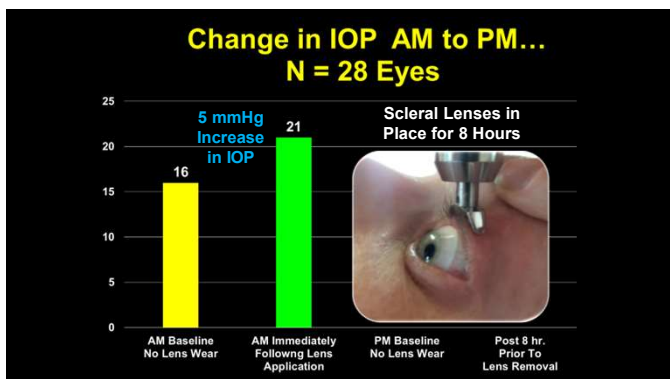
8



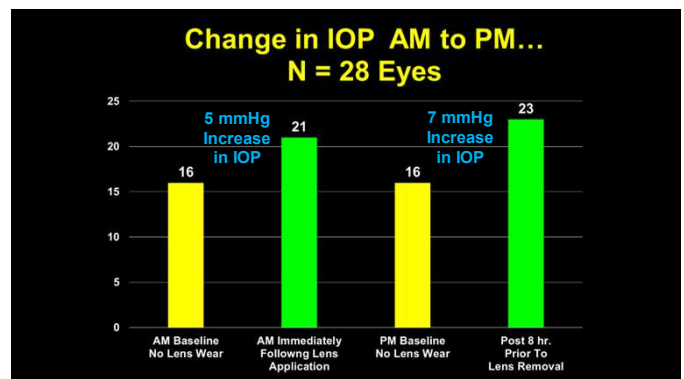
9



10

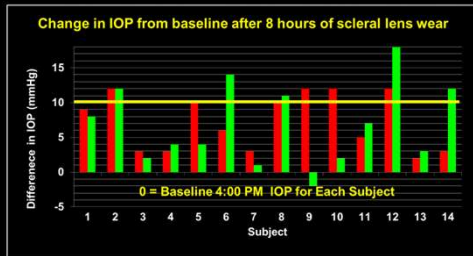


11



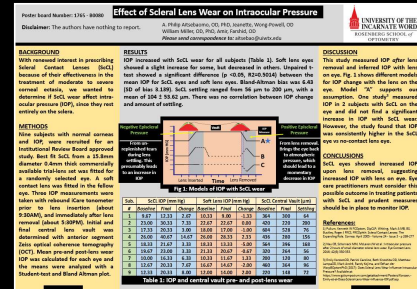
12

11 of the 28 had increases in IOP of 10 mmHg or GREATER



13

Immediately Post-Scleral Lens Removal Average Increase in IOP 6.26 mm Hg



14

GP Lenses: Pros



Radford, 2002
Stapleton, 2008



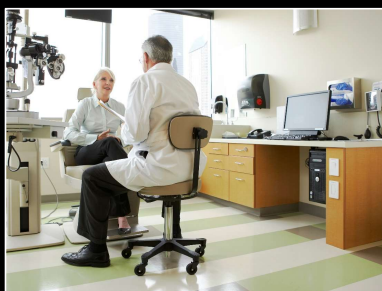
15

Simplicity



16

Longevity



17

Contact Lens Tear Exchange

• GP's: 10-20%
(1979 Polse, 1999
McNamara)



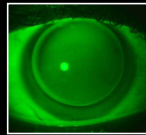
• SCL: 1-2%
(1979 Polse, 1999
McNamara)



18

Tear Layer Under Contact Lenses

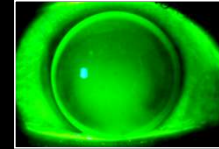
- **Silicone Hydrogel: 2 microns**
 - 2003: Nichols & King-Smith (2003), Qi et al (2010)
- **GP Lenses: 8-20 microns**
 - Taylor & Wilson (1995)



19

Tear Mixing

- Meng Lin, UC Berkeley, 2010
- cellular debris, bacteria or unwanted chemical particles
- Various soft: 22-35 minutes
- GP's: 5-7 minutes



20

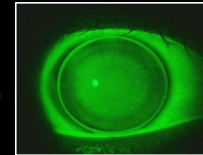
MK Incidence

- | | |
|---|---|
| <ul style="list-style-type: none"> • UNSW-Vision CRC: Stapleton, Keady, Edwards, et al. ('03-'04) • Incidence per 10,000 • 19.5 ON wear * • 10 Occasional ON * • 2 Daily Disposable * • 1.7 Daily Wear * • 1.2 RGP • * Includes all soft material types | <ul style="list-style-type: none"> • UK case Control Study: Radford, Minassian, Dart et. Al. ('03-'05) • Relative Risk (Daily Disp 1.0 - reference) • 5.3x ON wear * • 1.9x Occasional ON * • 1.6x Daily Wear * • 0.16x RGP • * Includes all soft material types |
|---|---|

21

Adaptation to GP Lenses

- Carracedo, 2016
- N = 22
- 27% drop out rate
 - Discontinued within 10-15 days
 - Lower TBUT
- 73% success rate
 - Achieved day long comfort within 10-15 days



22

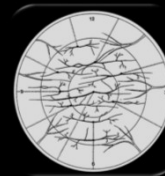
Vision with GP Optics



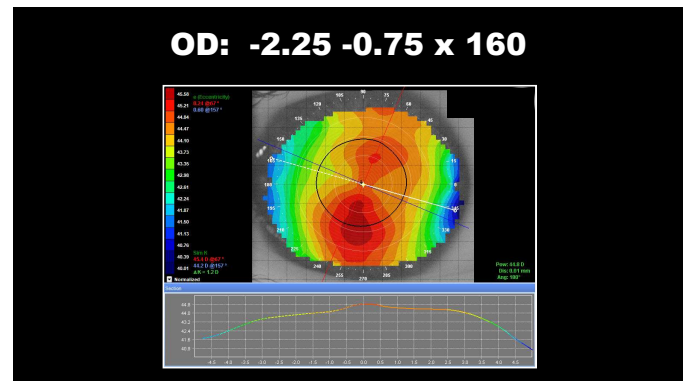
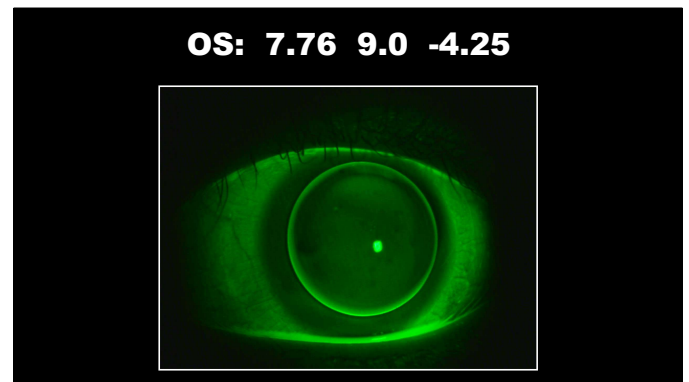
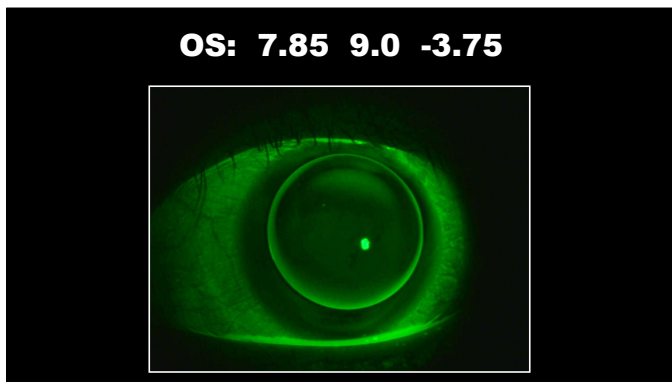
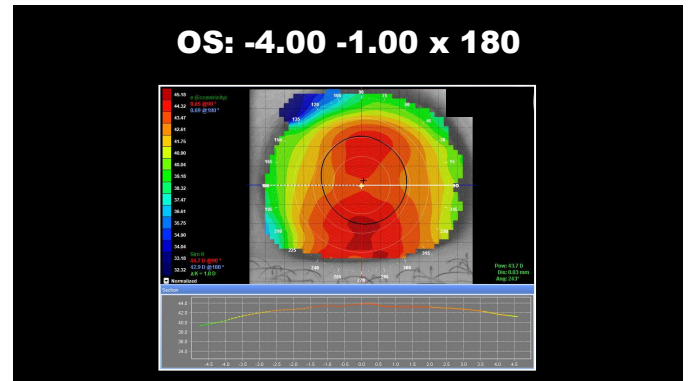
23

GP Lens Adaption

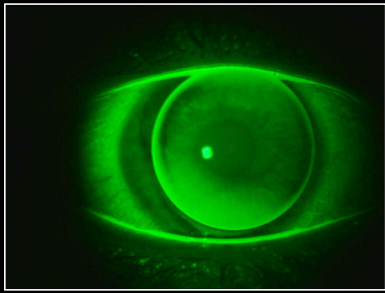
Movement



24

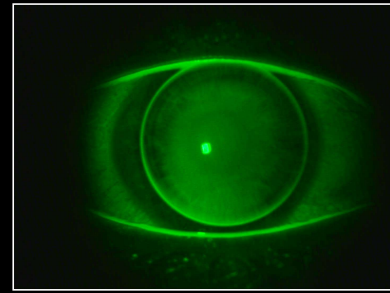


OD: 7.76 9.5 -1.50



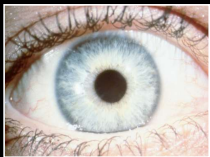
31

OD: 7.58 9.5 -2.50

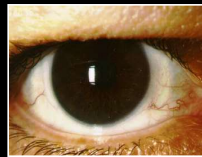


32

Fitting Philosophies



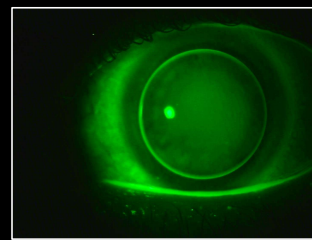
8.6 – 8.9mm
Small Diameter



9.3 – 9.6mm
Large Diameter

33

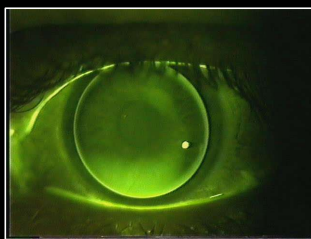
Inter-Palpebral



- Diameter: 8.6 – 8.9
- Steeper than apex: 0.50-1.00Dp Steeper

34

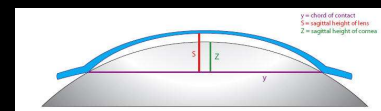
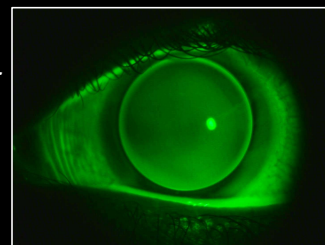
Lid Attachment



- Diameter: 9.3 – 9.6
- Flatter than K – 0.50Dp

35

**9.5mm
Diameter**



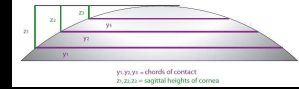
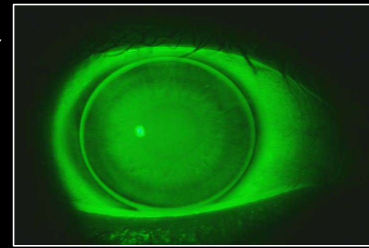
36

What did orthok teach us?



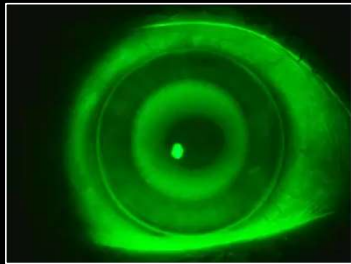
37

11.0mm
Diameter



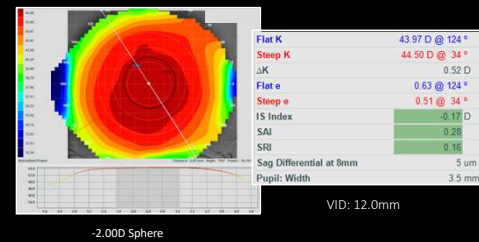
38

What did orthok teach us?



39

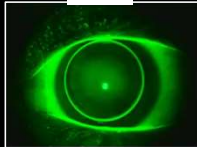
What would be the best
diameter for this eye



40

9.0mm

9.5mm



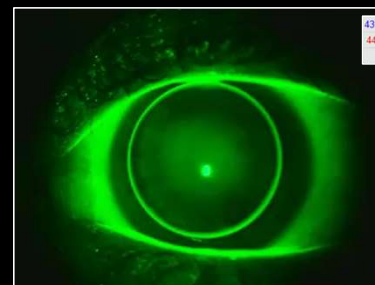
10.5mm

11.8mm



41

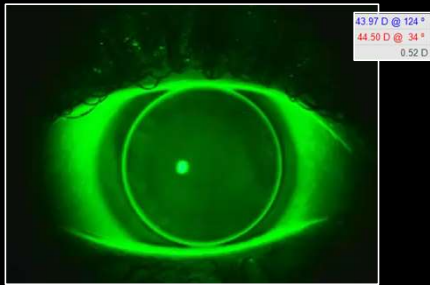
9.0mm Diameter / 44.50



43.97 D @ 124°
44.50 D @ 34°
0.52 D

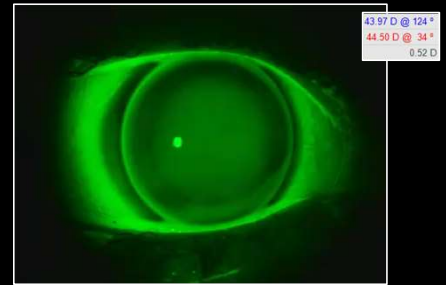
42

9.5mm Diameter / 44.00



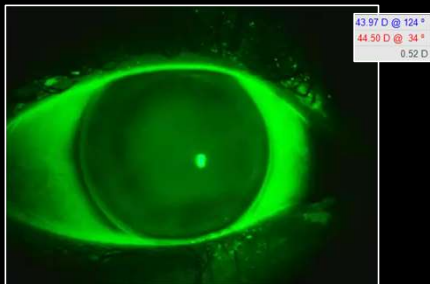
43

10.5mm Diameter / 43.50

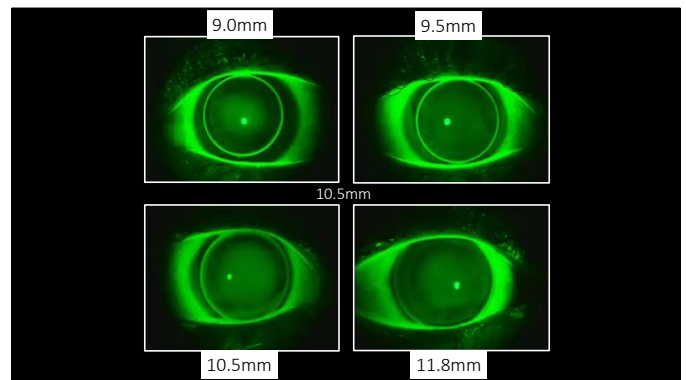


44

11.8mm Diameter / 43.25



45



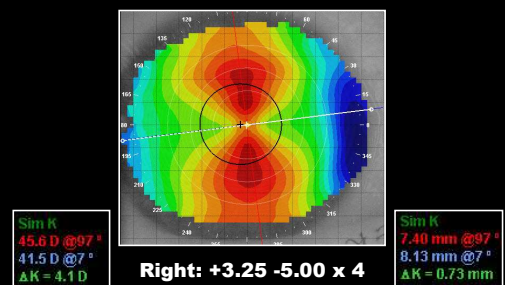
46

Four Categories of RGP Indications and Fitting

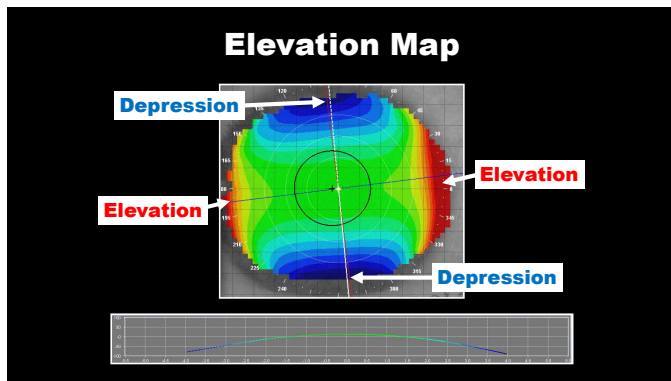
Category #1 Normal Myopia and Hyperopia	Category #2 Astigmatic Fits & Refits	Category #3 Special Applications	Category #4 Irregular Astigmatism
	Toric SCL	Ortho K	Injury
	Toric RGP	Presbyopia	Surgery
			Corneal Disease

47

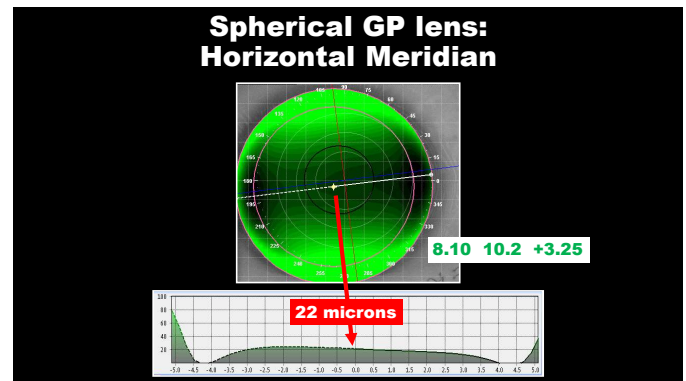
Case CL: Right Eye



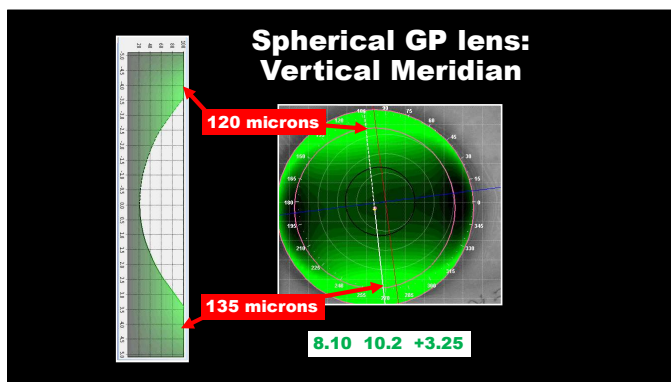
48



49



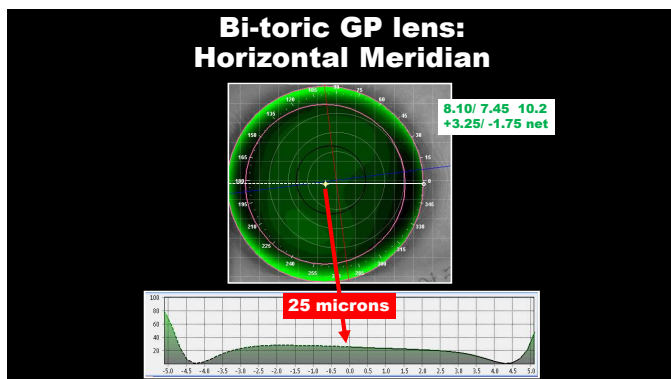
50



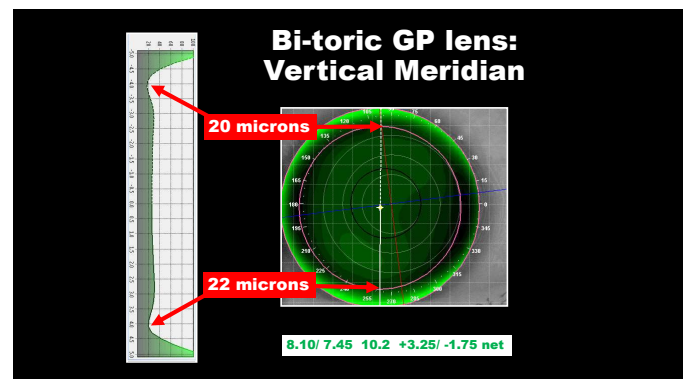
51



52

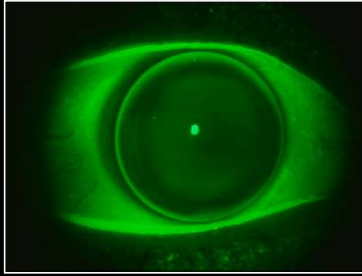


53



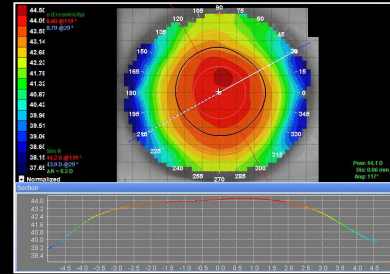
54

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



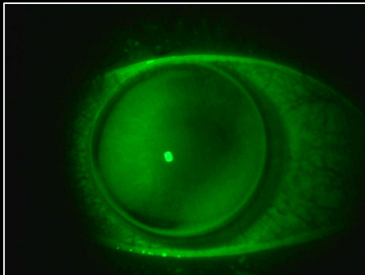
55

Case: KE



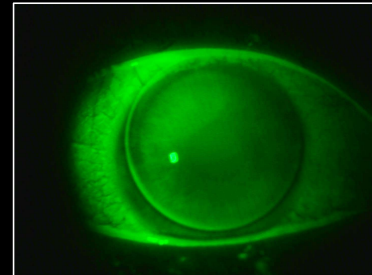
56

BC on Flat K



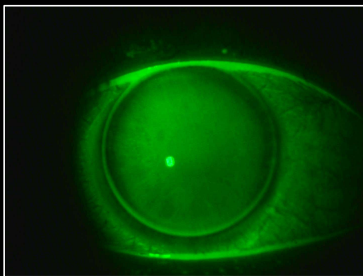
57

0.75Dp Steeper than K



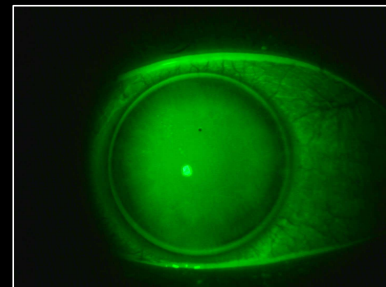
58

1.50Dp Steeper than Flat K



59

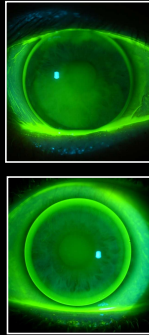
2.25Dp Steeper than Flat K



60

Edge Lift

- Apical clearance acceptable?
- Ideal width (0.50mm)?



61

Step 4: Lens Power

Over-refraction Method

- Lens power
- Over-refraction (vertexed)
- Final lens power

- Trial: -5.00
- O/R: -0.75
- Final Power: -5.75

Empirical Order

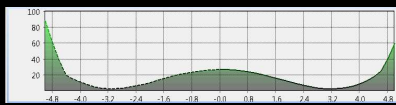
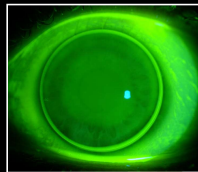
- Spectacle Rx (vertexed)
- SAM compensation (1.50Dp)

- Rx: -4.50Dp
- Rx: -4.25 (vertexed)
- SAM: -1.50
- Final Power: -5.75Dp

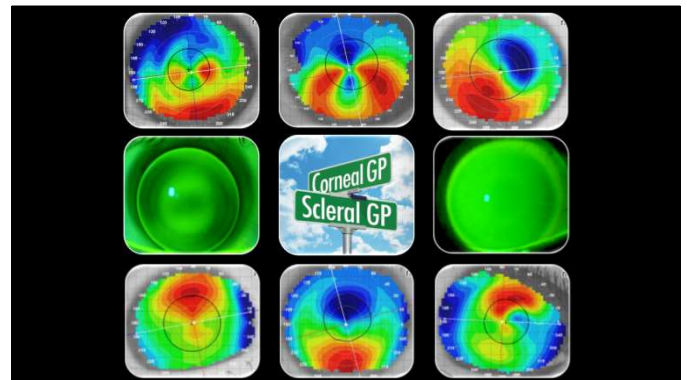
62

New Generation of GP Lenses

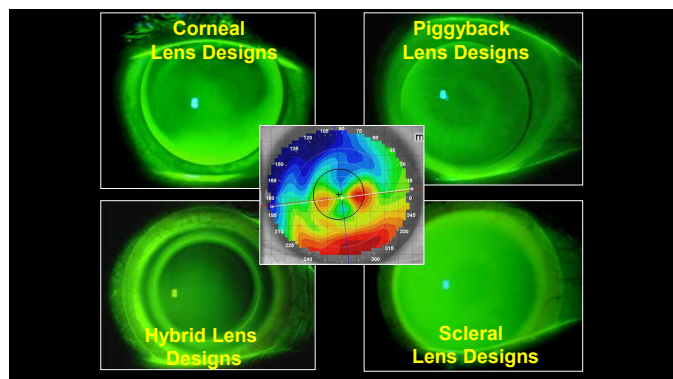
- Improved centration
- Improved comfort
- GP Vision



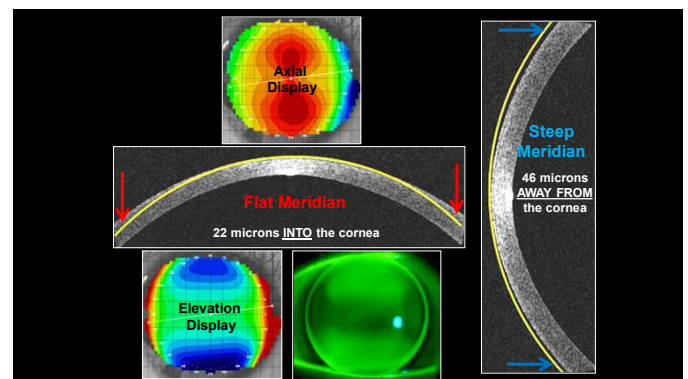
63



64

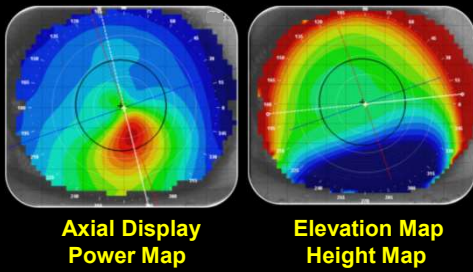


65



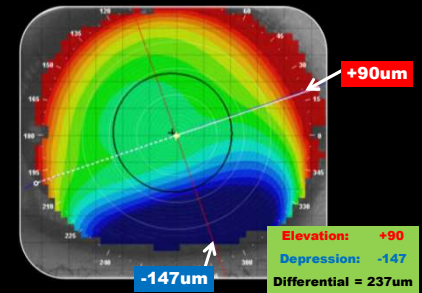
66

Curvature versus Elevation

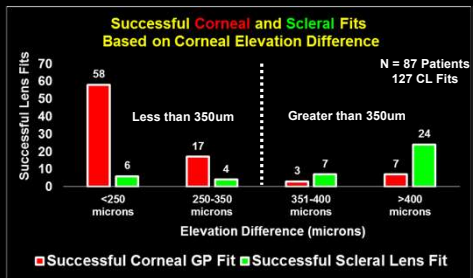


67

Elevation Display Map

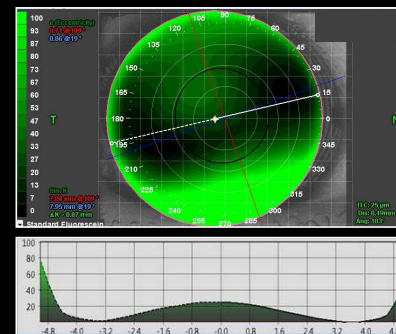


68

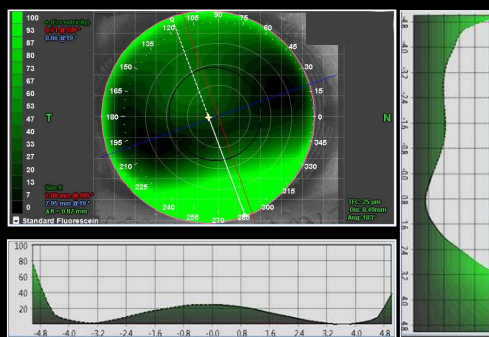


Patients with **350um or less** of corneal elevation difference (along the greatest meridian of change) have an **88.2%** chance of success with a corneal GP lens.

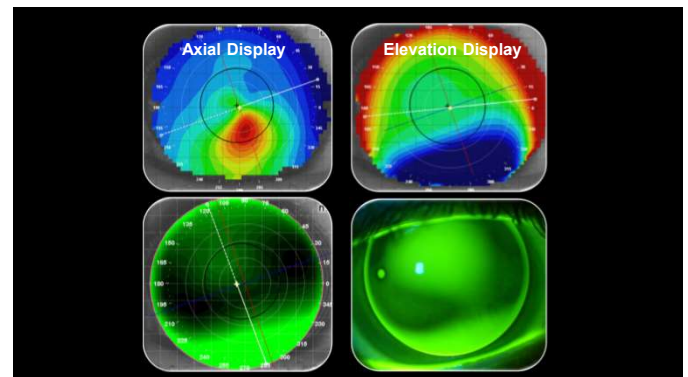
69



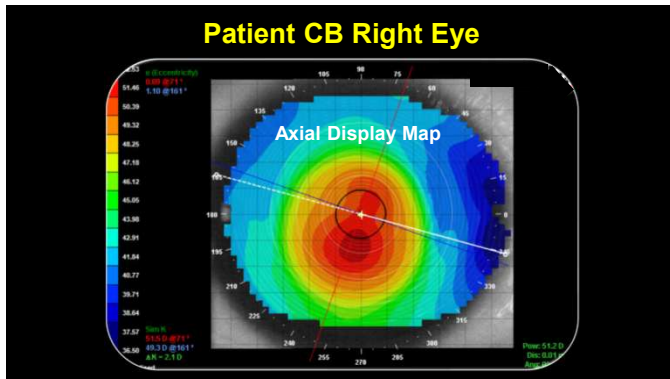
70



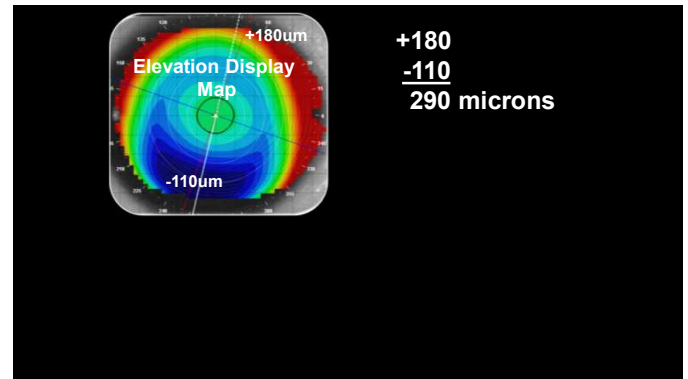
71



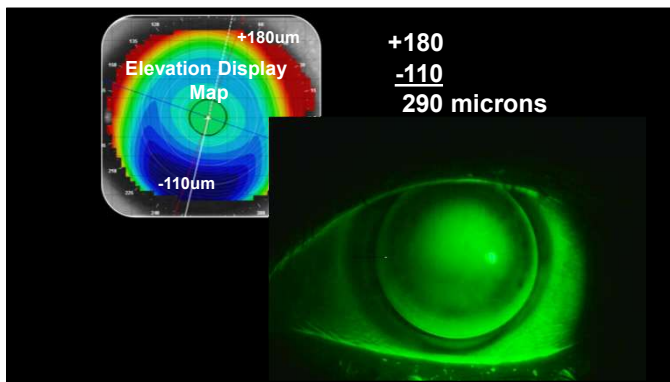
72



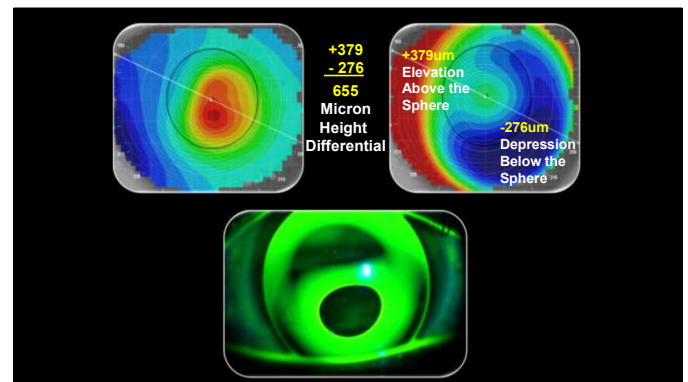
73



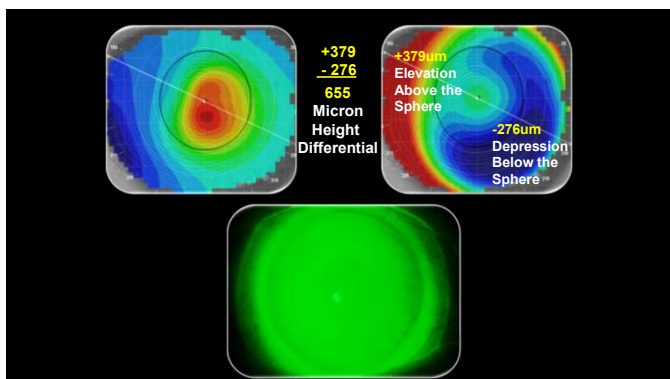
74



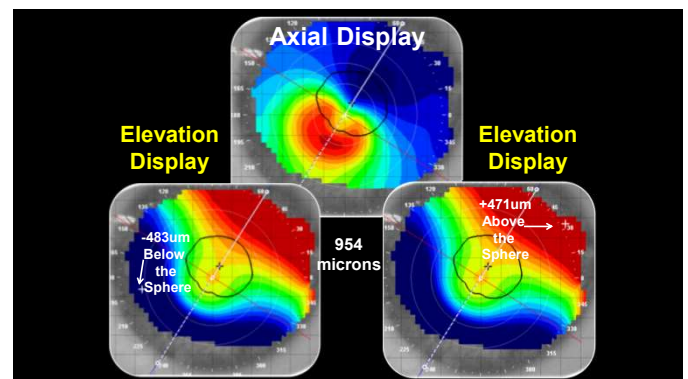
75



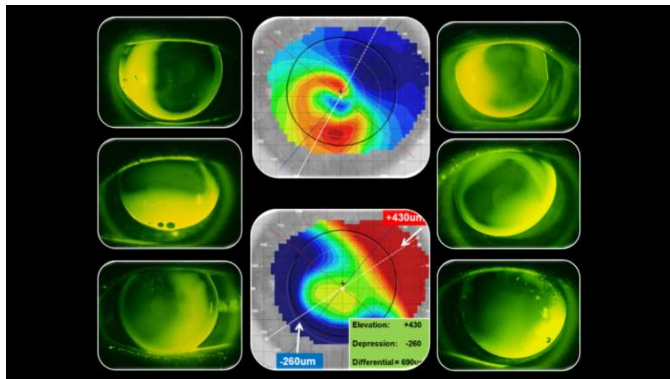
76



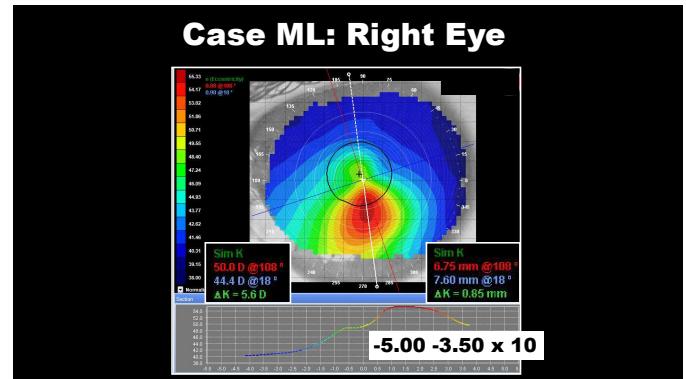
77



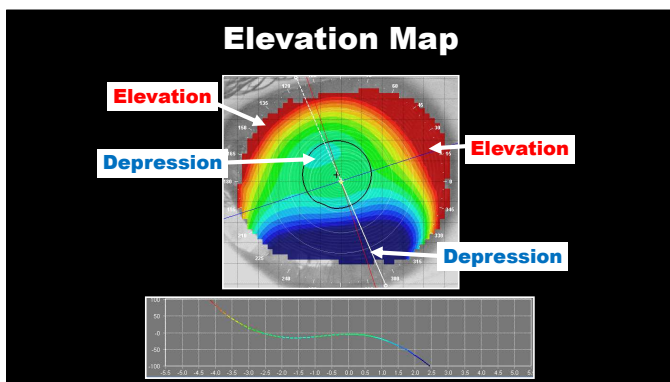
78



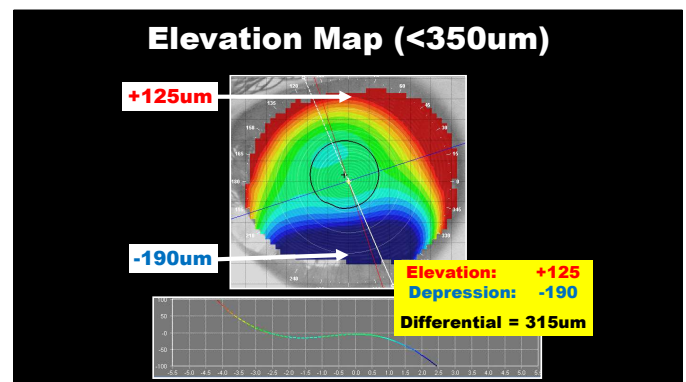
79



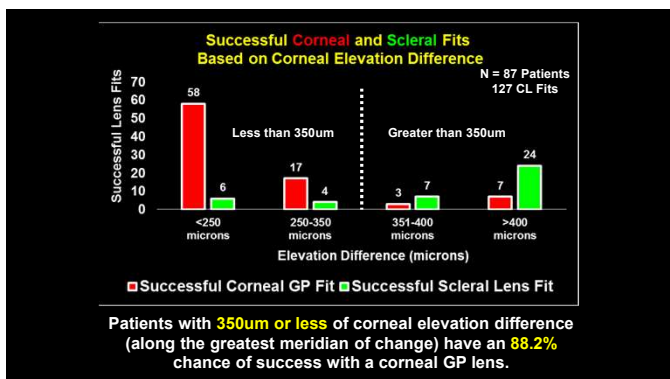
80



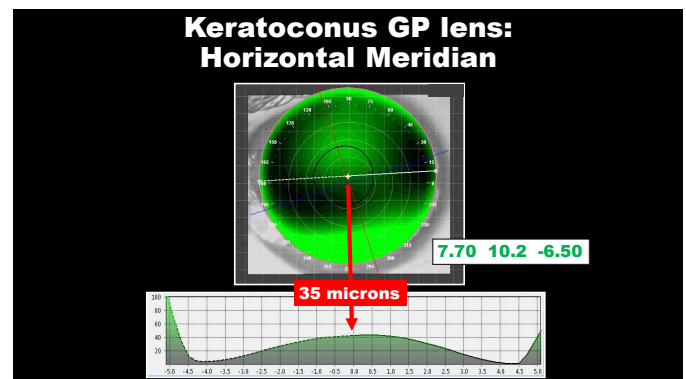
81



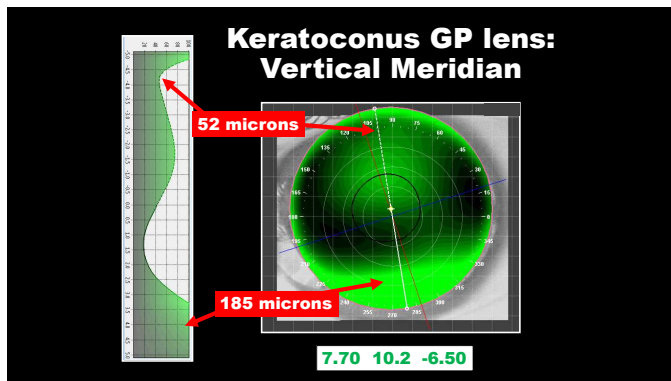
82



83



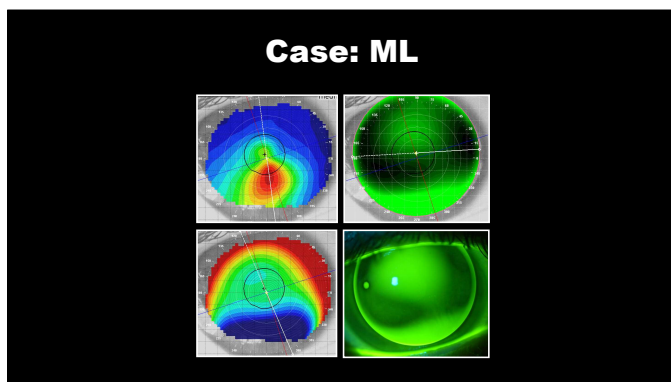
84



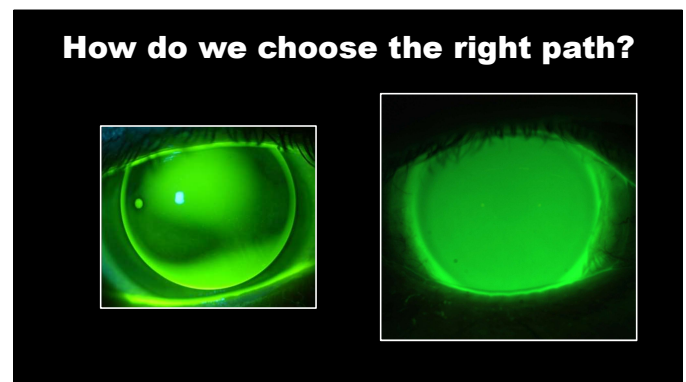
85



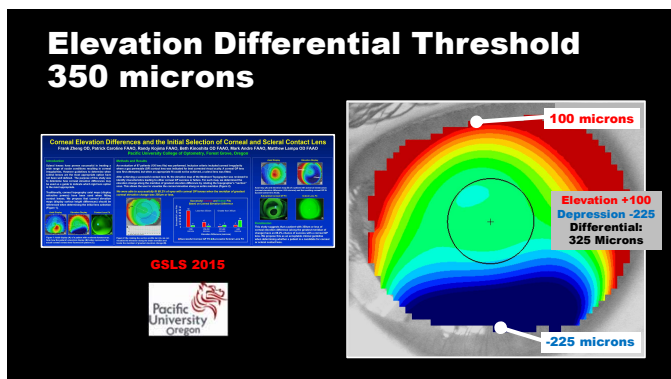
86



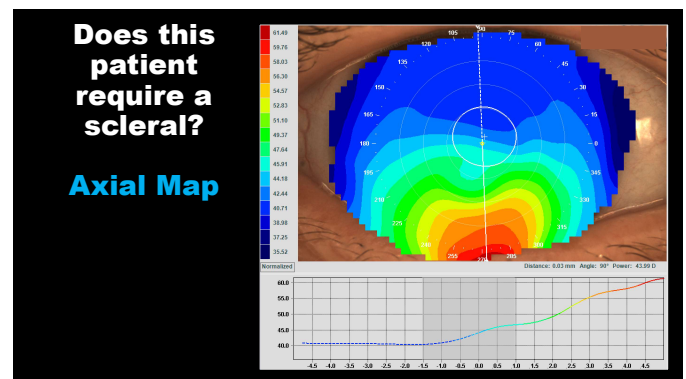
87



88



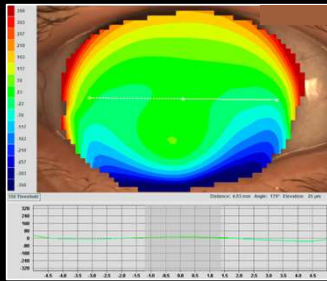
89



90

Novel software calculation

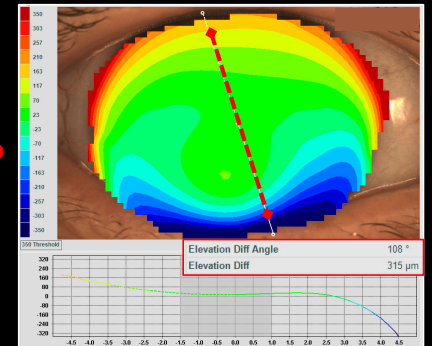
- Algorithm searches
- Employing the elevation map
- Across a 8mm chord
- 360° degrees (axis?)
- Highest elevation differential (microns)



91

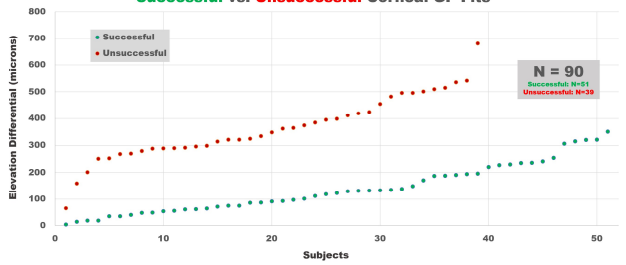
Elevation Differential Algorithm

Elevation Map



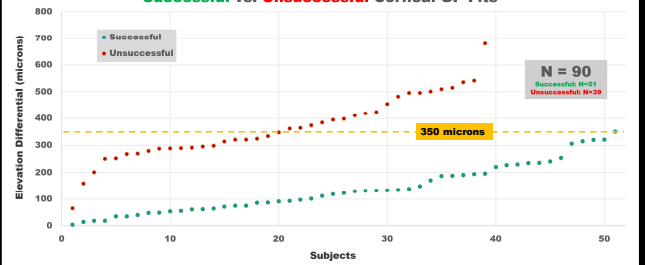
92

Elevation Differential: Successful vs. Unsuccessful Corneal GP Fits



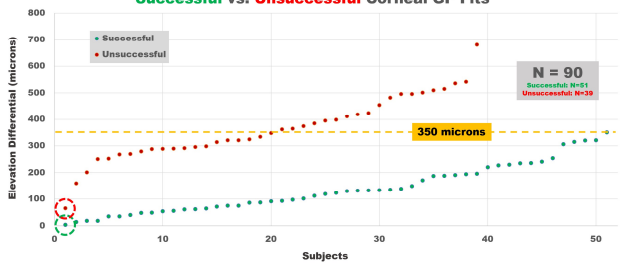
93

Elevation Differential: Successful vs. Unsuccessful Corneal GP Fits



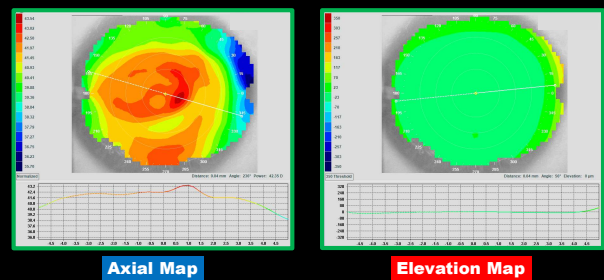
94

Elevation Differential: Successful vs. Unsuccessful Corneal GP Fits



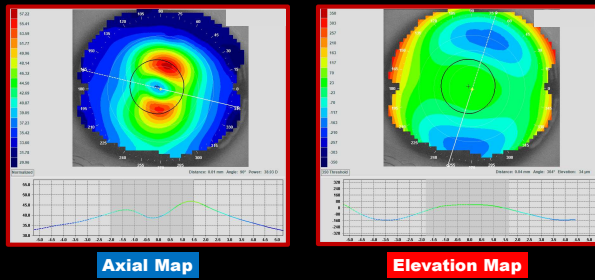
95

Lowest Elevation Differential 4 microns - Successful Fit

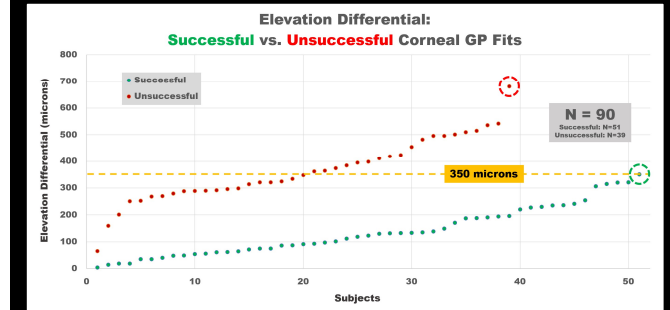


96

Lowest Elevation Differential 65 microns - **Un-successful Fit**

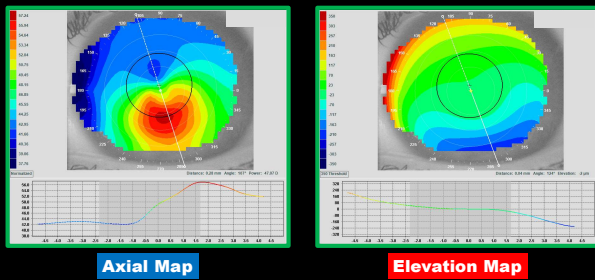


97



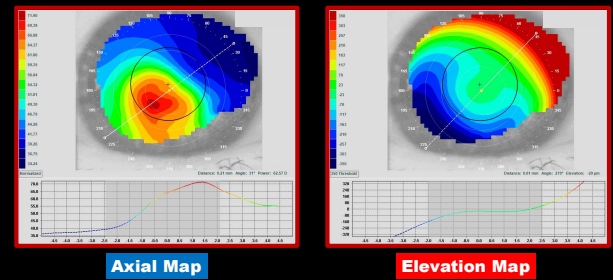
98

Highest Elevation Differential 350 microns - **Successful Fit**



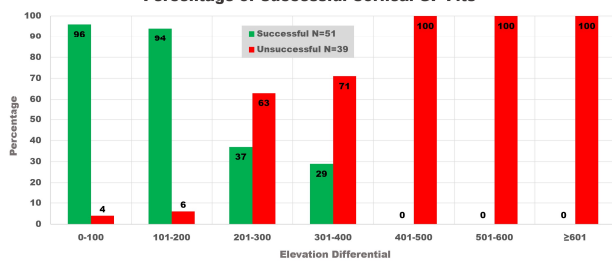
99

Highest Elevation Differential 681 microns - **Un-successful Fit**



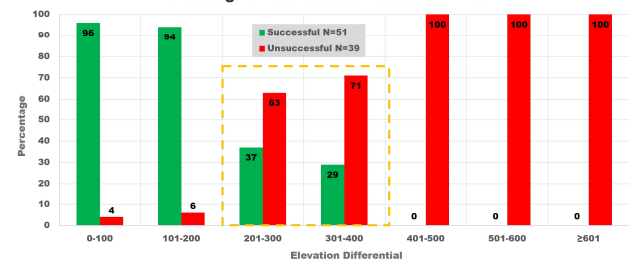
100

Elevation Differential: Percentage of Successful Corneal GP Fits



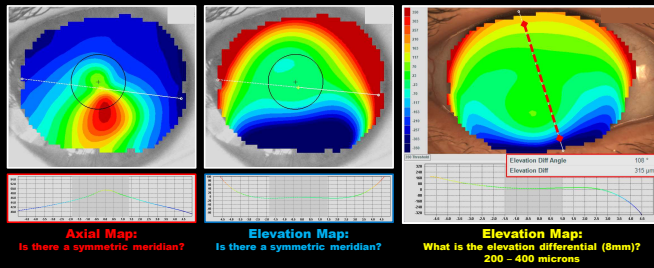
101

Elevation Differential: Percentage of Successful Corneal GP Fits



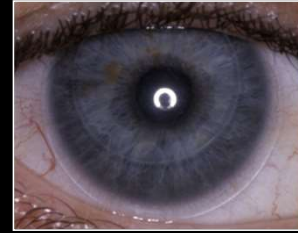
102

Review



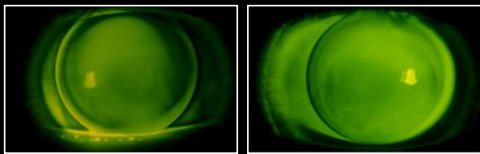
103

When can Piggybacking help us?



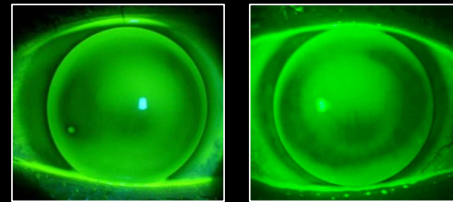
104

3 & 9 Staining



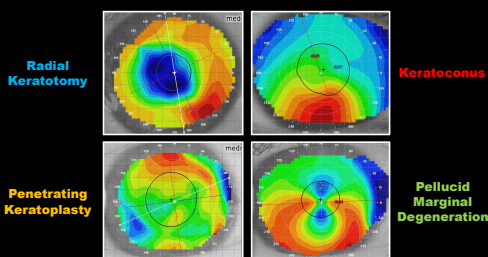
105

Avoiding Bearing on the Cone



106

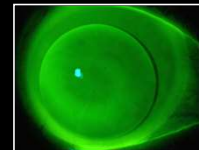
Oblate or Displaced Apexes



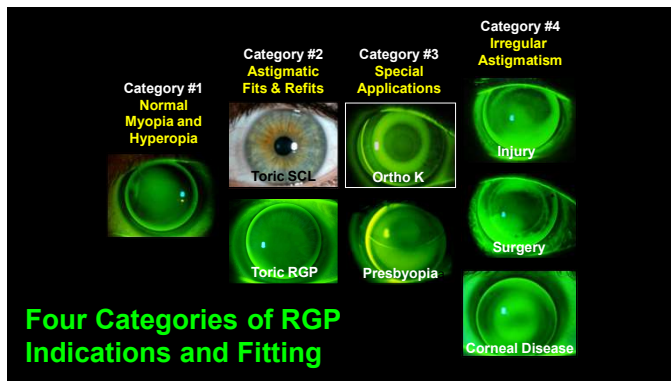
108

Piggybacking Considerations

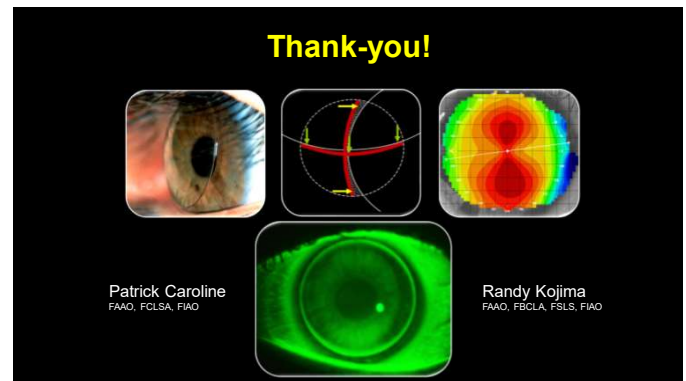
- Use plus (+) SCL Powers
• Romero-Jimenez, et al, 2013
- Consider Reverse Piggybacking
- SCL contributes 20% of it's labeled power
• Michaud, et al, 2013



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110



111