

# Specialty Contact Lens Fitting

Katherine Bickle, OD, PhD, FAAO

# Financial Disclosures

Clinical Investigator for Alcon, CooperVision, and  
Johnson and Johnson

# Indications for Specialty Lenses

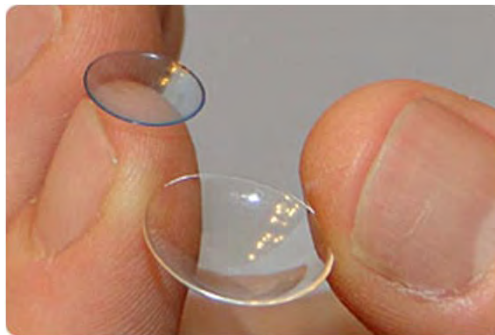
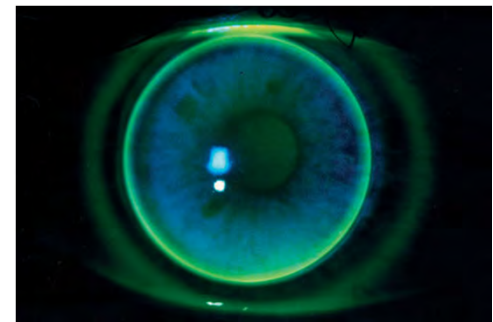
- Keratoconus
- Pellucid Marginal Degeneration
- Keratoglobus
- Post corneal transplant
- Post refractive surgery ectasia
- Corneal trauma and scarring
- Post RK
- Stevens-Johnson Syndrome
- Aphakia
- Post Intacs corneal implants
- Dry eye syndrome
- Additional indications

# Factors to Consider When Fitting Specialty Lenses

- Visual and functional goals
- Lifestyle, occupation, hobbies
- Ocular and systemic health history
- Aperture size
- Dexterity
- Previous contact lens type(s) worn
- Financial (materials, solutions, etc.)

# Specialty Contact Lens Options

- Soft
- Hybrid
- Piggyback
  - GP over a soft CL
- GP
  - Corneal
  - Scleral



# Case: Pediatric Myope

- 10-year-old caucasian male interested in contact lenses for sports
  - Spectacle Rx:
    - OD: -6.50 -0.25 x155 20/20
    - OS: -5.75 -0.75 x005 20/20
  - Myopic progression over the past year: -1.00 Diopter
  - Medical history: Unremarkable
  - Slit lamp examination: Unremarkable
  - Topography: Normal

# Clinically Significant

An 8-year-old patient presents with a refractive error of -1.00 DS OU

<b>Percentage of myopic reduction</b>	<b>Patient's final refractive error</b>
0%	-5.00 D
25%	-4.00 D
50%	-3.00 D
75%	-2.00 D
100%	-1.00 D

\*Estimate myopia progression of -0.50 D per year from ages 8-16

# Center Distance Soft Bifocal Contact Lenses

<b>Brand</b>	<b>Proclear Multifocal "D" and XR "D"</b>	<b>Biofinity Multifocal "D"</b>	<b>Biofinity Toric Multifocal "D"</b>	<b>MiSight</b>	<b>NaturalVue Enhanced Multifocal</b>
<b>Material</b>	Omafilcon A	Comfilcon A	Comfilcon A	Omafilcon A	Etafilcon A
<b>Power ranges</b>	+20.00 to -20.00 D	+6.00 to -10.00 D	+10.00 to -10.00 D (-0.75 to -5.75 DC)	-0.50 to -7.00 D	+4.00 to -12.25 D
<b>Add powers</b>	+1.00 to +4.00 D in 0.50 D steps	+1.00 to +2.50 D in 0.50 D steps	+1.00 to +2.50 D in 0.50 D steps	One add	One add
<b>Replacement</b>	Monthly	Monthly	Monthly	Daily disposable	Daily disposable
<b>Fitting tips</b>	~-0.50 D more minus than spherical equivalent	~-0.50 D more minus than spherical equivalent	~-0.50 D more minus than spherical equivalent		

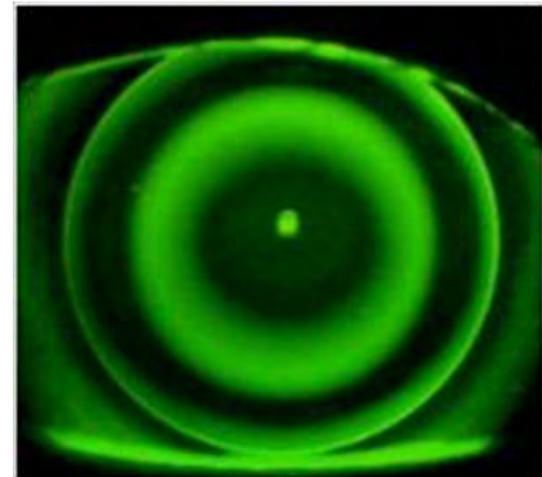


# Case: Pediatric Myope

- First lens selected
  - OD: Comfilcon A -6.00/+2.50 add “D” lens
  - OS: Comfilcon A -6.00/+2.50 add “D” lens
- Over refraction
  - OD: -0.50 DS
  - OS: -0.50 DS
- Final CL Rx
  - OD: Comfilcon A -6.50/+2.50 add “D” lens 20/20
  - OS: Comfilcon A -6.50/+2.50 add “D” lens 20/20

# Corneal Reshaping Lenses

- FDA approval
  - Refractive error: - 5.00 D to -6.00 D
  - Cylinder: -1.50 DC to -1.75 DC
  - No age restriction



# Case: Pediatric Myope with Astigmatism

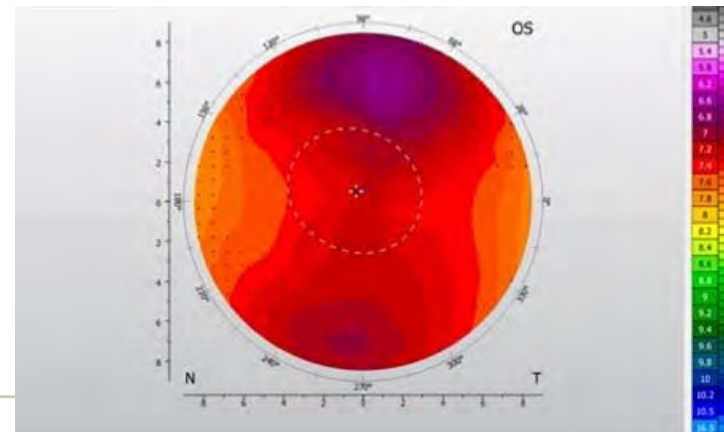
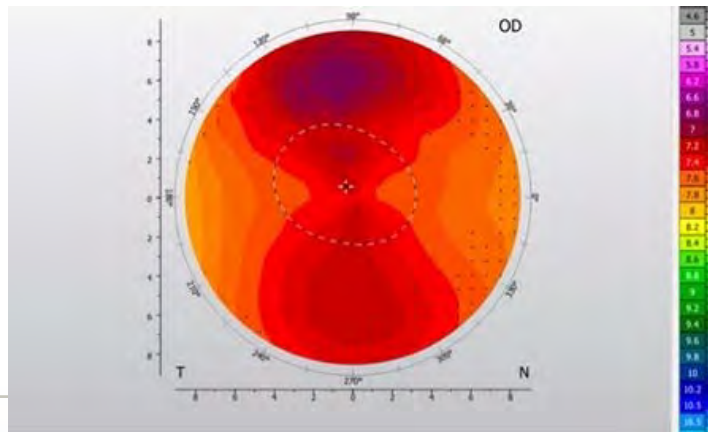
- 12-year-old caucasian female interested in contact lenses
  - Spectacle Rx
    - OD: -1.75 -1.50 x003 20/20
    - OS: -2.50 -1.00 x005 20/20
  - Ocular history: Spectacle use only
  - Initially fit in Comfilcon A toric lenses to assess fit prior to ordering multifocals
  - Final CL Rx
    - OD: Comfilcon A -2.50 -1.25 x005/+2.50 add "D" lens
    - OS: Comfilcon A -3.00 -1.25 x005/+2.50 add "D" lens

# Case: High Myopia

- 31-year-old caucasian female referred for CL fit
- Patient has been wearing soft lenses and reports good comfort with lenses but interested in other options for better vision
- Spectacle Rx
  - OD: -12.00 -3.00 x014 20/25-1
  - OS: -13.75 -1.75 x170 20/25

# Case: High Myopia

- Order hybrid lenses empirically (keratometry values, HVID, and refraction)
- Initial CL parameters
  - OD: Duette TH, BC: 7.3, SC: 8.1, Rx: -11.50 DS 20/20
  - OS: Duette TH, BC: 7.2, SC: 8.1, Rx: -12.50 DS 20/20



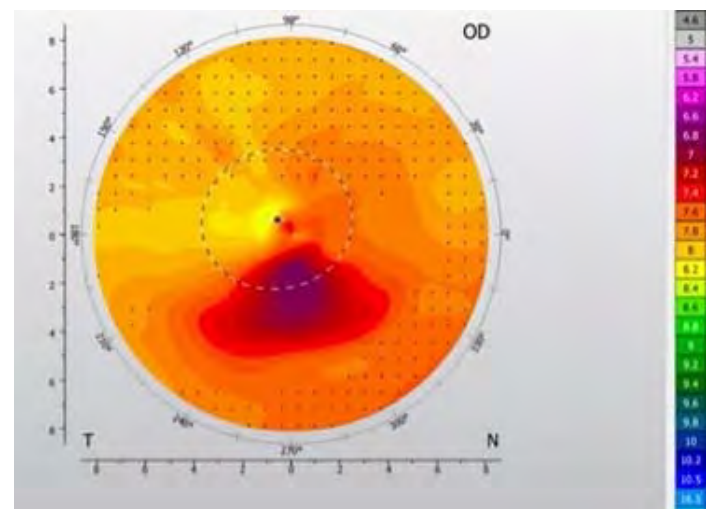
# Case: Hyperopia with Astigmatism

- 14-year-old Caucasian female referred for CL fit
  - Medical history: Ichthyosis
  - Ocular history: Amblyopia, spectacle use
  - Slit lamp examination: (-) ectropion OU, extremely tight eyelids OU, significant scaling around eyelids OU, incomplete blinks OU, reduced TBUT OU, and mild inferior corneal staining OU



# Case: Hyperopia with Astigmatism

- Initial CL parameters
  - OD: Comfilcon A toric +4.00 -0.75 x160
  - OS: Comfilcon A toric +5.00 -1.75 x010
  - Lack of daily disposable lenses available in patient's Rx
- Considerations
  - Handling
  - Patient's needs
  - Dry eye treatment
- Topography the following year



Wt: 7.84mm	K1: 43.00	Int.A.(30°): 0.09	Axis H: 175.9°
Rr: 7.40mm	K2: 46.30	Int.V.(30°): 0.62	Axis V: 81.0°
Rms: 7.65mm	Rms: 44.10	Int.(30°): 0.36	Asig: 1.220
Smex: 49.30	x: 0.10mm	y: -0.90mm	TIC: 1
Pupil: 7.90mm	x: -0.30mm	y: 0.32mm	AA: 48%
Dist: 11.70mm	x: -0.62mm	y: 0.06mm	

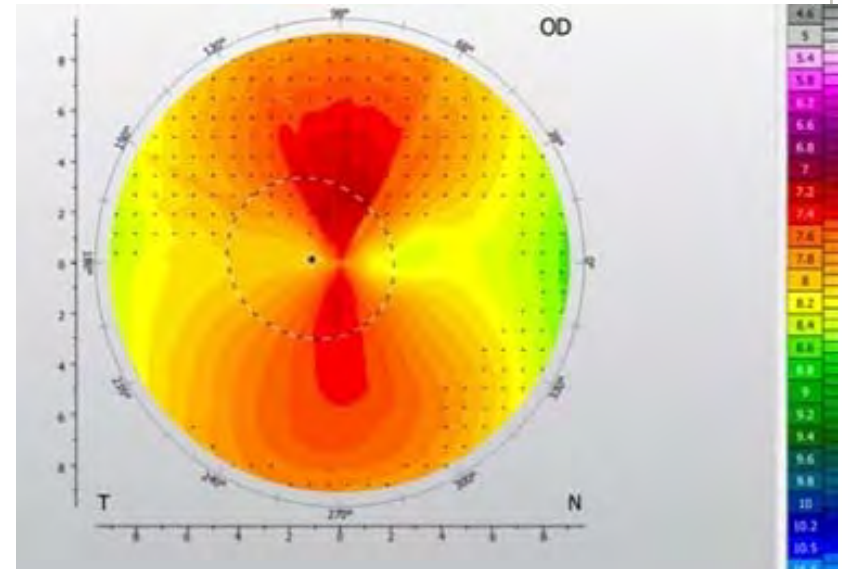
# Case: Significant Hyperopia and Astigmatism

- 14-year-old caucasian female who needs updated spectacle Rx
- Spectacle Rx:
  - OD: +7.75 -4.25 x175 20/20
  - OS: +7.75 -4.50 x176 20/20
- Ocular history: Spectacle use and vision therapy
- Attempted soft lenses but unable to successfully insert lens



# Case: Significant Hyperopia and Astigmatism

- Topography (K's matched refraction)
- GP lens parameters
  - OD: BC: 8.06, OAD: 9.5, Power: +8.25/-4.25, minus lenticular
  - OS: BC: 8.11, OAD: 9.5, Power: +8.25/-4.50, minus lenticular
- Hybrid lens parameters
  - OD: BC: 8.00, flat skirt, Power: +7.25
  - OS: BC: 8.0, flat skirt, Power: +7.50



R1: 8.11mm	R2: 41.60	WCA(DP): 0.57	AsK: 0.19
Rc: 7.33mm	K2: -6.25	WCA(DP): 0.66	AsK: 0.27
Rm: 7.71mm	Rm: 43.90	WCA(DP): 0.58	AsK: -4.60

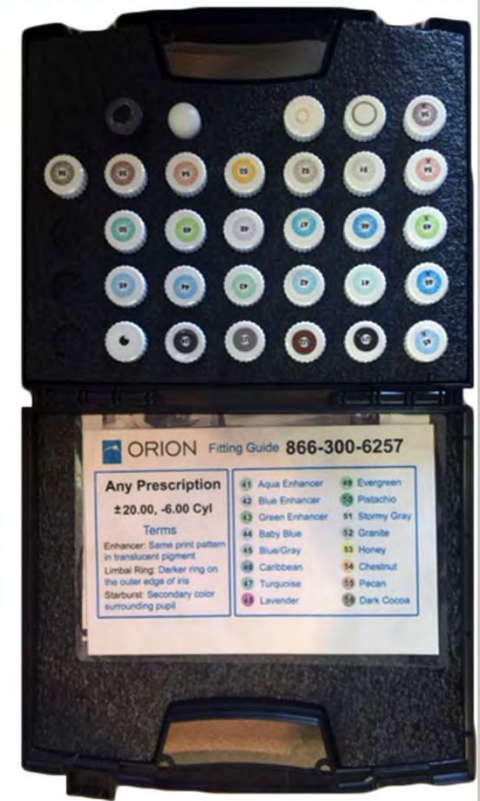
# Case: Aniridia

- 61-year-old caucasian male who suffers from severe photophobia
  - Spectacle Rx:
    - OD: +7.75 -1.25 x041
    - OS: +7.00 DS
  - Ocular history: Aniridia OD, OS, cataract removal OD, OS, dry eye OD, OS
  - Initial CL Rx:
    - OD, OS: Power: +7.00, BC: 8.6, OAD: 14.0 mm, clear pupil (4.5 mm)



# Case: Aniridia

- Specialty colored contact lenses
  - Hand painted lenses
  - Computer generated lenses
- Lens parameters
  - Sphere: +20.00 to -20.00 DS
  - Cylinder: up to 6.00 DC
  - Axis: 1 to 180
  - Base curve: 7.8 to 9.2
  - Diameter: 13.5 to 16.0 mm
- Color Design
  - Iris dimensions: 10.5 to 12.75 mm
  - Clear pupil sizes: 2.8-6.0 mm
  - Black pupil sizes: 3.0-6.9 mm



Underprint



Iris



Starburst



Limbal

# Case: Keratoconus

- 65-year-old caucasian male with 30+ year history of keratoconus
  - Spectacle Rx:
    - OD: +0.50 -6.75 x022/+2.25 add VA: 20/25+2
    - OS: -1.75 -3.00 x160/+2.25 add VA: 20/20
  - Medical history: Significant for seasonal allergies
  - Slit lamp examination: mild Vogt's striae OU, (-) corneal scarring, 1+ NS OU
  - Ocular history: Unsuccessful with soft lenses, corneal GP's, and hybrids

# Benefits of Corneal and Scleral GP's

	Corneal GP	Scleral GP
Comfort		X
Patient ease of insertion and removal	X	
Patient's occupation	X	X
Stability of vision		X
Lack of mid-day fogging	X	
Ocular health	X	X
Cost	X	
Significant corneal irregularity		X

# Scleral Lens Insertion

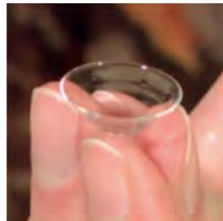
## Solutions to fill lens bowl



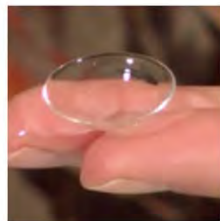
## Devices for lens insertion



DMV LARGE PLUNGER (TOP)  
DMV LUMASERT (BOTTOM)



TRIPOD METHOD



TWO-FINGER METHOD



EZI APPLICATOR RING



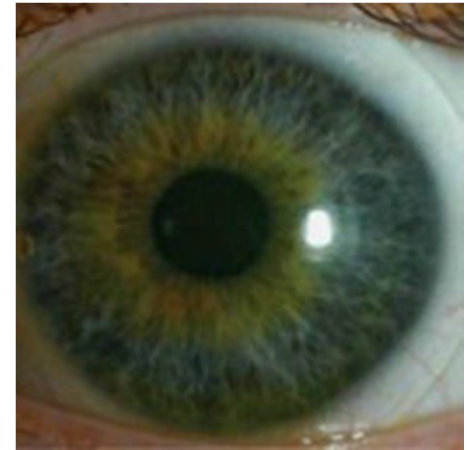
DALSEY SEE GREEN  
LENS STAND



CLIARA CHIO A&R DEVICE

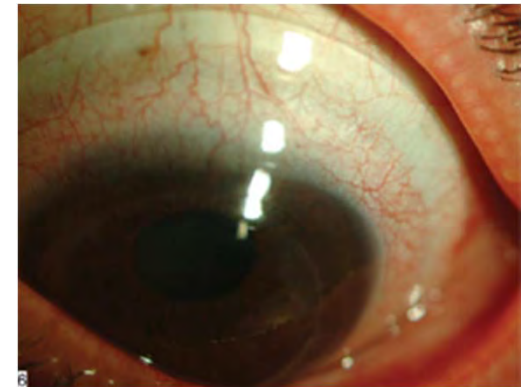
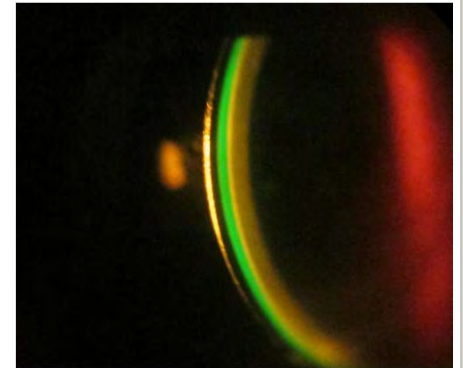
# Lens Diameter and Design Options

- Lens diameter
  - Corneal: 8.0 - 12.5 mm
  - Corneo-scleral: 12.5 – 15.0 mm
  - Mini-scleral: 15.0 - 18.0 mm
  - Large-scleral: 18.0 - 25.0 mm
- Lens design
  - Spherical, front surface toric, multifocal (simultaneous design)
  - Quadrant specific modifications
  - Back surface haptic toric



# Scleral Lens Fitting

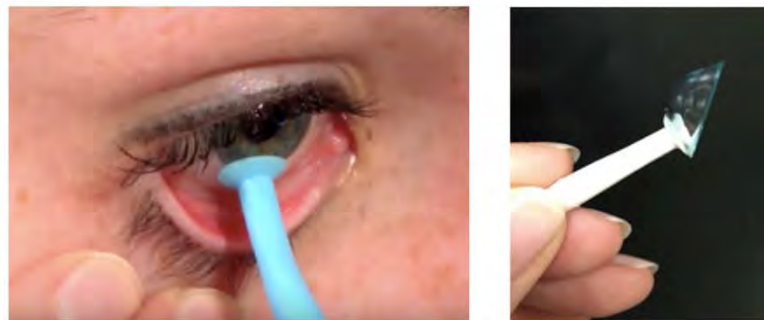
- Corneal clearance
  - Corneal touch (epithelial disruption, discomfort)
- Limbal clearance
  - Limbal staining
- Landing zone area and lens edge
  - Blanching of conjunctival blood vessels
  - Edge lift off
- Centration
- Movement





# Scleral Lens Removal

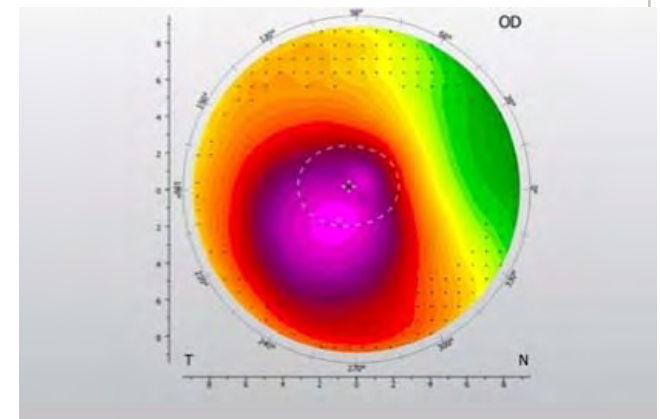
- Methods
  - Manually with eyelid
  - Plunger
    - Positioning to avoid injury
    - Graft patients
- Patient education



PROPER POSITIONING OF THE SMALL DMV ON THE SCLERAL LENS EDGE

# Case: Keratoconus

- Initial lens parameters
  - OD: BC: 8.23 mm, OAD: 15.8, Power: +1.75 DS, SLZ: +4.00/-3.00, sag 4.354 Optimum extra with Hydra-PEG
  - OS: BC: 8.23 mm, OAD: 16.8, Power: +0.75 DS, SLZ: +3.00/-7.00, sag 4.857 Optimum extra with Hydra-PEG
  - Distance VA: OD: 20/20, OS: 20/20
- Patient later interested in multifocals
  - Setting appropriate expectations



Rh: 7.28mm	K1: 46.30	ecc-A(OD°): 1.07	Asph: 165.9°
Rv: 6.96mm	K2: 49.20	ecc-x(OD°): 0.97	Asph: 75.9°
Rtc: 7.13mm	Ktc: 47.30	ecc-C(OD°): 1.02	Asph: -2.00

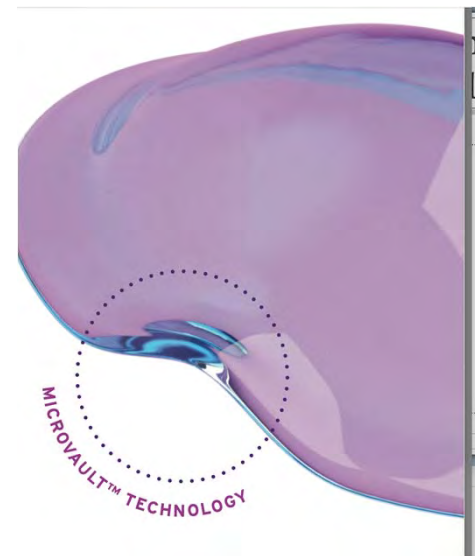
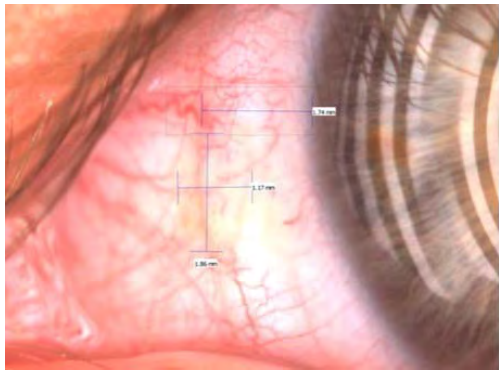
# Case: Keratoconus with Pinguecula

- 29-year-old caucasian female newly diagnosed with keratoconus
- Concerns for corneal transplant and renewing driver's license
  - BCVA with spectacles OD: 20/30, OS: 20/20
- Medical/ocular history: Keratoconus, chronic allergic conjunctivitis, dry eye syndrome, and rosacea
- Ocular exam: Faint Fleischer's ring OU, (-) scarring OU, pinguecula OU



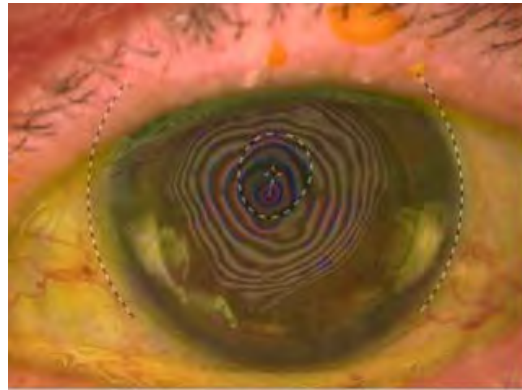
# Case: Keratoconus with Pinguecula

- Patient developed pingueculitis OS several months after being successfully fit in scleral lenses
- Redesigned scleral lens to include microvault

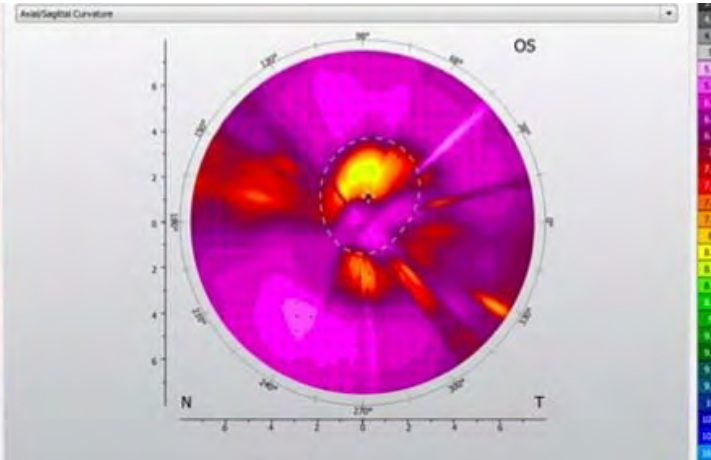


# Case: Post Multiple PK's

- 90-year-old female with history of multiple PK's OD, OS with current failed graft OD and glaucoma OD
- Previously tried corneal GP's and was unable to achieve successful fit
- Concerns with dexterity

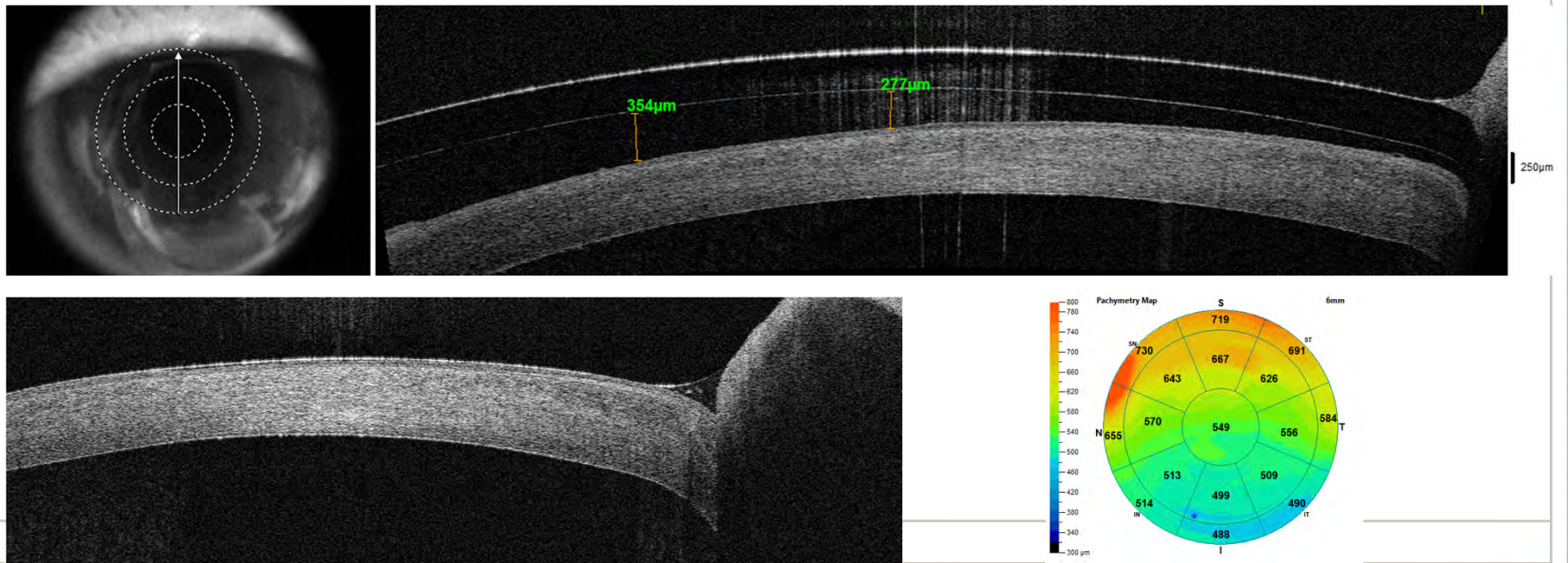


Anatomic data			
K1: 7.03mm	K1: 48.00	ecc.(D)? : 0.08	Axis?: 151.4°
K2: 6.72mm	K2: 50.20	ecc.v.(D)? : -1.15	Axis v.: 61.4°
K3: 6.88mm	K3: 49.10	ecc.(D)? : 0.54	Axis: - 2.20



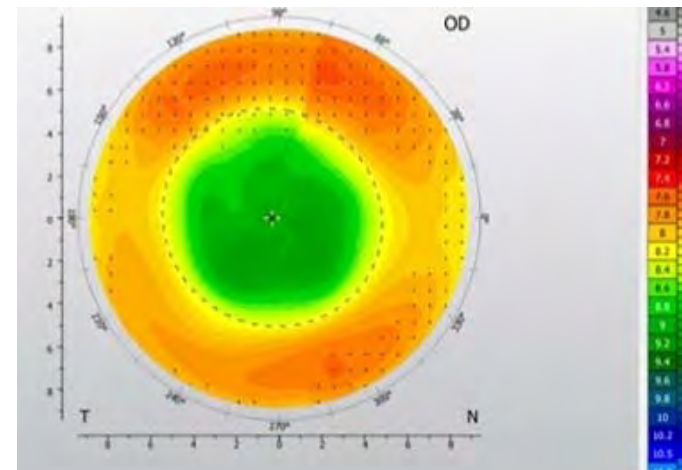
# Case: Post Multiple PK's

- After achieving successful fit, patient reported mid-day fogging and intermittent blurred vision
  - Added Regener-Eyes and Celluvisc to lens bowl
  - Adjusted fit to decrease central corneal clearance



# Case: Post RK

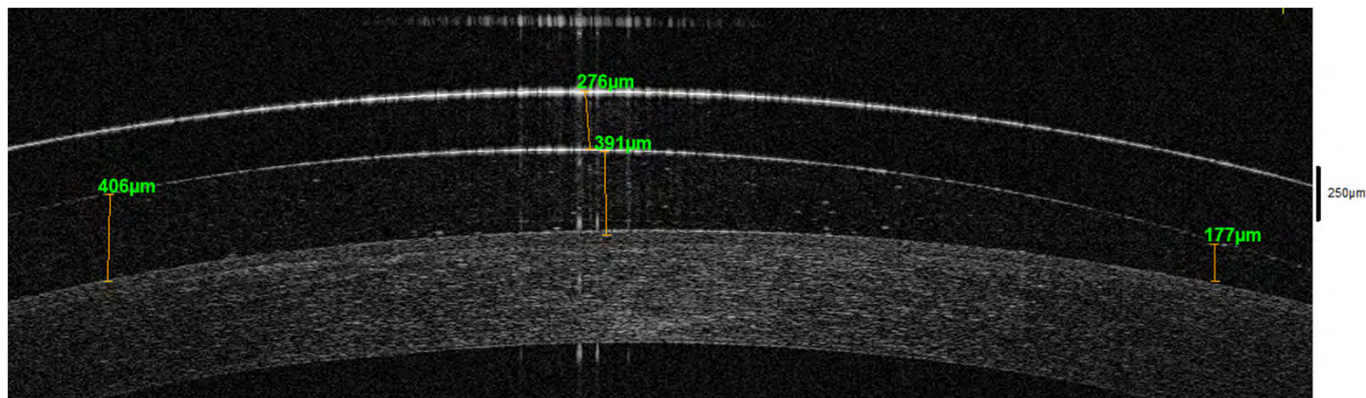
- 67-year-old Caucasian female referred for scleral lens fit OD (monovision with OD distance)
- Surgical history
  - 1994: RK
  - 2021: AST OU
  - 2022: AST OD
  - Considering AST again OD



Rn: 5.52mm	K1: 39.40	WCA (30°): 0.58	Asm R: 155.8°
Kv: 3.43mm	K2: 40.80	WCA (30°): 1.00	Asm V: 55.6°
Km: 5.47mm	Km: 38.80	Wt (30°): 1.01	Asm: 0.40

# Case: Post RK

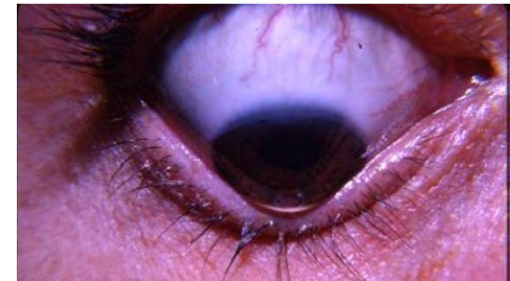
- BCVA with spectacles: OD: 20/25+2
- Initial scleral lens
  - VA OD: 20/20-1 (subjective improvement in vision compared to spectacles)
  - Occasional mid-day fogging





# How Can These Benefit our Patients and Practices?

- Scleral lenses
  - Improving a patient's quality of life
  - Referrals
  - Financially
- Myopia Control
  - Potentially reducing the risk of complications associated with significant myopia
  - Improving a patient's quality of life
  - Patients may be more suitable candidates for refractive surgery options
  - Referrals



# CL Manufacturers and Resources

- Resources
  - Scleral Lens Education Society
  - Gas Permeable Lens Institute (GPLI)
  - Contact Lens Manufacturers Association (CLMA)
  - National Keratoconus Foundation (NKF)
  - American Optometric Association Contact Lens and Cornea Section
  - American Academy of Optometry Section on Cornea, Contact Lenses, and Refractive Technologies
  - Manufacturers (fitting guides, consultants)

# Thank you!

Katherine Bickle: [kbickle12@yahoo.com](mailto:kbickle12@yahoo.com)