TLC for the FLC

(the funny-looking cornea)

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Statement of Disclosure

The presenter and organizers for "TLC for the FLC" by Dr. Mari Fujimoto has no financial relationship with any company or products mentioned in this presentation.

Expected Learning Objectives

This course will review various cases of irregular corneas and deepen the understanding of selecting an appropriate specialty lens modality, as well as how to troubleshoot a fit. This course will also delve into understanding the sagittal depth of the ocular surface and contact lenses to enhance visual and physiologic fitting outcomes.

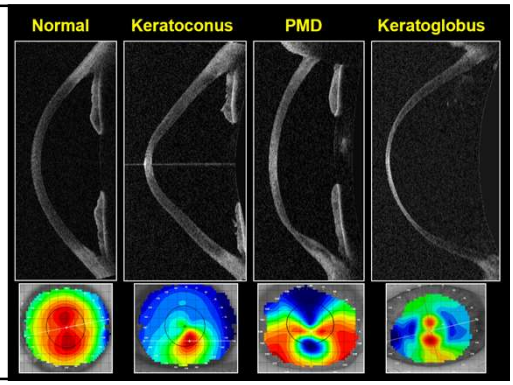
At the end of the session, attendees should be able to:

To enhance GP and soft contact lens fitting by effectively collecting and utilizing data from the corneal topographer

To inform the primary care clinician on new techniques in fitting soft contact lenses and corneal GP lens design.

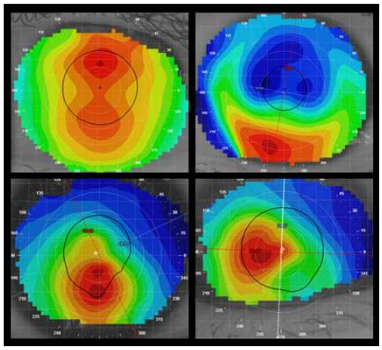
To review the applications of the various specialty lens options for the ectatic and post-surgical cornea, as well as troubleshooting for physiologic and visual complications.

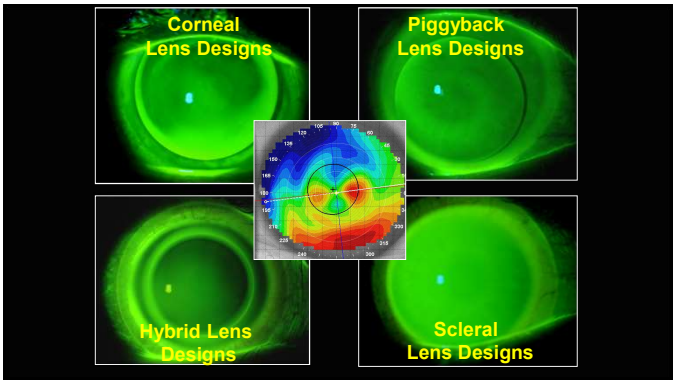
FLC = Funny-Looking Cornea



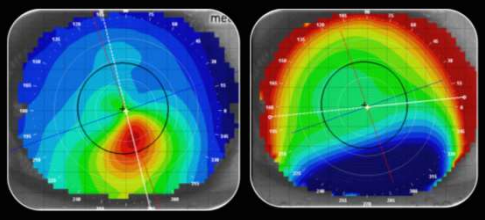
A Road Map to Selecting a Specialty Contact Lens

- Corneal Topography
  - Axial Map
  - Elevation Map
  - HVID/DVID



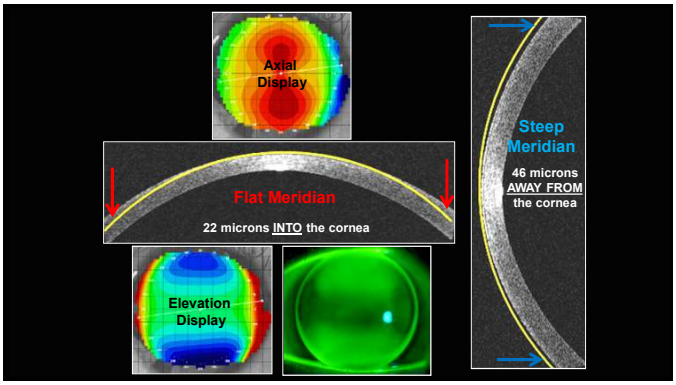


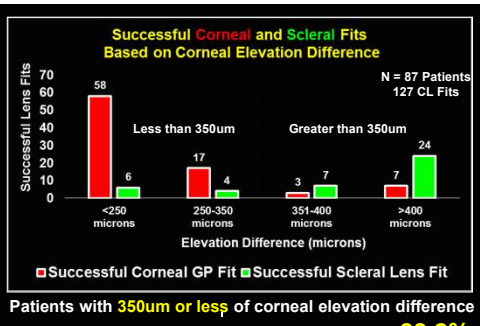
Curvature vs. Elevation



Axial Display
Power Map

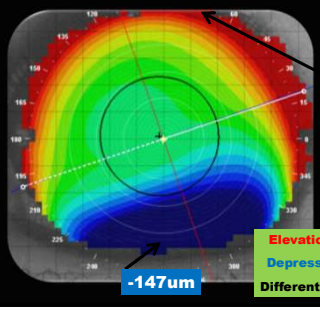
Elevation Map
Height Map

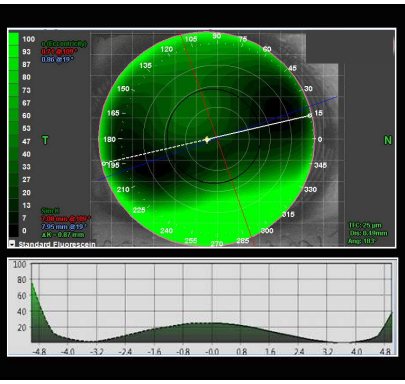


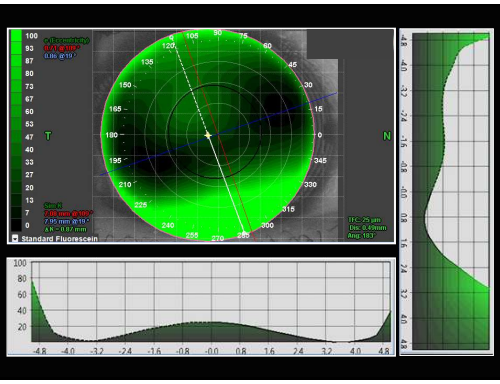


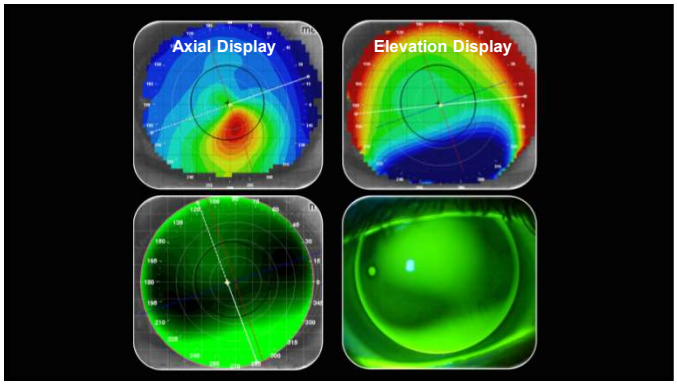
Patients with 350um or less of corneal elevation difference (along the greatest meridian of change) have an 88.2% chance of success with a corneal GP lens.

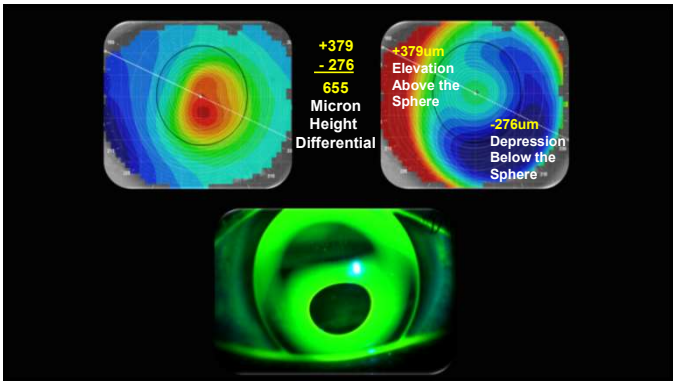
Elevation Display Map

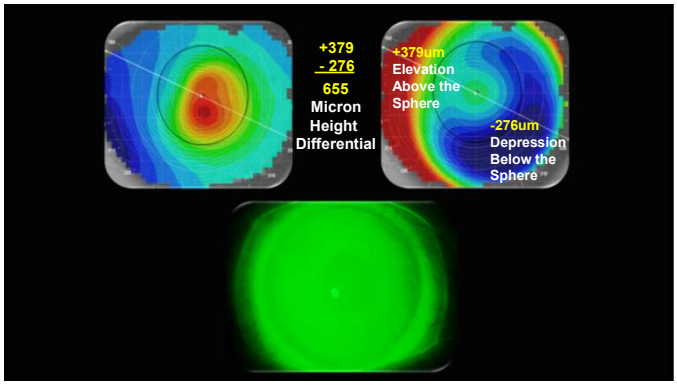






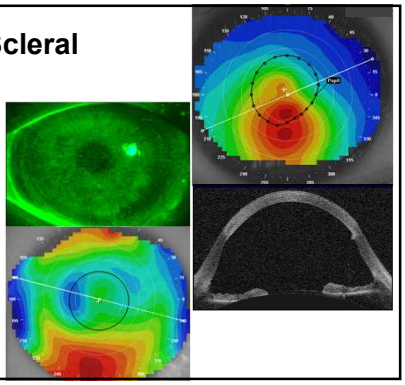






Indications for Scleral Lens Wear

- **Irregular corneas**
  - Corneal ectasia
  - Post-keratoplasty
  - Post-refractive surgery
- **Ocular surface disease**



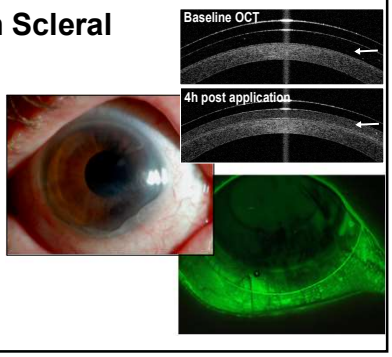
Advantages of Scleral Lens Wear

- Rehabilitation and protection of the ocular surface
- Lens stability
- Comfort

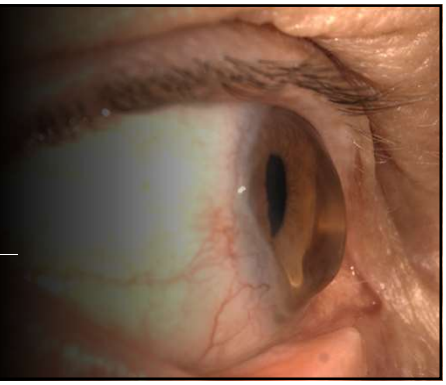
Challenges with Scleral Lens Wear

- Scleral shape
- Fogging
- Prolapse
- Neovascularization
- Oblate corneas/aphakia

- Application and removal challenges



Pellucid Marginal Degeneration



Case 1: 53 YO Female

CC: "Vision is great in both eyes. My left lens is very comfortable, but I can feel my right lens every time I wear it."
Ocular medications: Patanol 0.1% BID OU
Systemic Health: Seasonal allergies, otherwise unremarkable

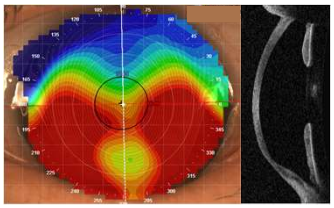
Habitual CLs:
OD: Habitual Custom Designed Scleral Lens **VA:** 20/20
OS: Habitual Scleral: 5856/37.00/+4.25/18.0/2.5D toric PC **VA:** 20/20

Anterior Segment Evaluation

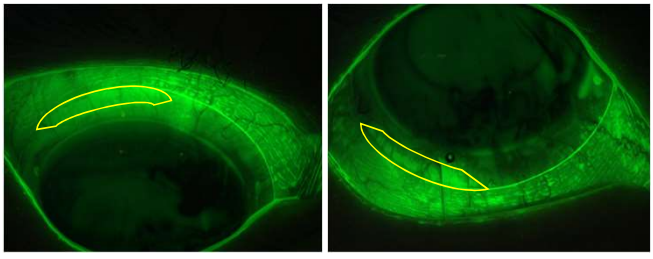
Right Eye		Left Eye
Clean, no crusts/flakes	**Lids and Lashes**	Clean, no crusts/flakes
Palpebral: 1+ papillae inferiorly and superiorly, tr injection	**Conjunctiva**	**Palpebral:** tr papillae inferiorly and superiorly
Clear, mild inferior thinning (-) striae, (-) scarring	**Cornea**	Clear, mild inferior thinning (-) striae, (-) scarring
Deep and Quiet	**Anterior Chamber**	Deep and Quiet

Pellucid Marginal Degeneration (PMD)

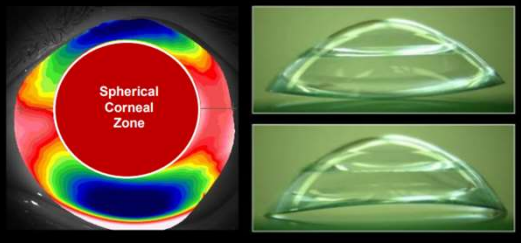
- Compared to KCN, PMD is often diagnosed later in life
  - Usually diagnosed between ages 20 – 50 in PMD, compared to puberty – early 20s in KCN
- Kissing doves or crab claw pattern of steepening on topography
- Corneal thinning is located more inferiorly in PMD



Right Eye Scleral Fit

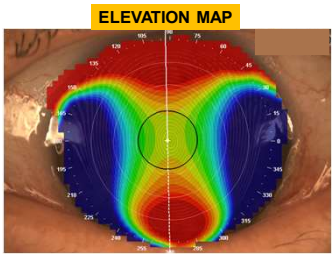


Toric Lens Periphery

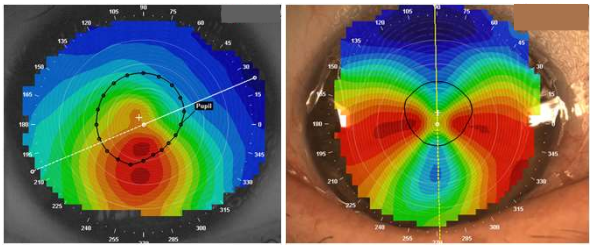


Custom SCLs for Corneal Ectasia

- Increased center thickness masks irregular astigmatism
  - May be able to adjust the center thickness depending on severity of corneal irregularity
- Improved comfort compared to corneal GPs and sometimes scleral lenses
- Daily wear only and quarterly replacement

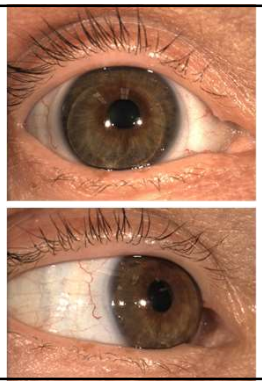


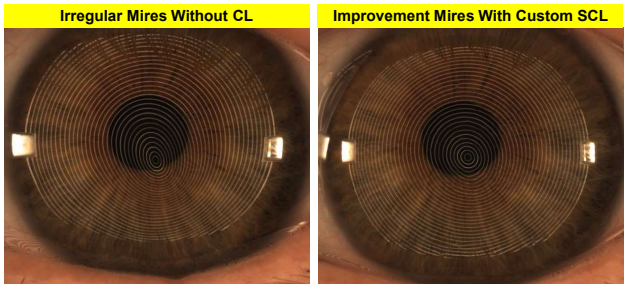
KCN vs PMD: Axial Maps



SCL Refit OD

- No shadows with diagnostic keratoconus SCL and over-refraction
- Patient reported improved comfort in SCL!
- **VA OD in dispensed lens:** 20/25

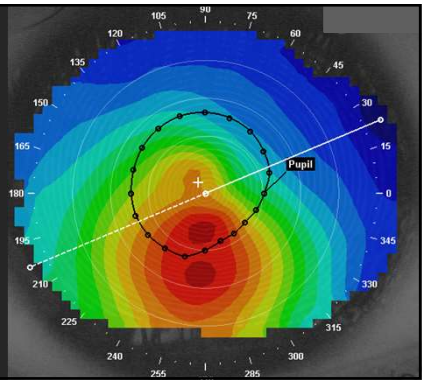




The FLC: PMD

- Assessing the scleral lens with NaFl before removal may help you pinpoint an area of edge lift or leakage
- Depending on the severity, patients with PMD may do well in spectacle lenses, but typically are more successful with a SCL or a scleral
- Custom SCLs with an increased center thickness may decrease the patient's visual symptoms of irregular astigmatism

Keratoconus



57 YO Female

CC: "Sometimes my right eye feels irritated, but overall I am doing well with my lenses. I just came in for my regular follow-up!"

Ocular Hx: Keratoconus OS > OD

Ks OD: 43.90 / 46.51 @ 161

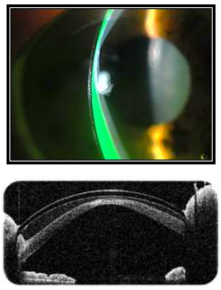
Ks OS: 54.57 / 61.29 @ 028

Systemic Hx: Unremarkable, (-)medications, (-) allergies

Eye	Lens	Base Curve	Power	Diameter (mm)	VA
OD	Spherical corneal GP	44.00 D	-13.25 DS	9.5	$20/20^{-2}$
OS	KCN GP	62.00 D	-26.00 DS	9.8	$20/25^{-}$
	2-week SCL (PBS)	8.4	+1.00 DS	14.0	

Keratoconus

- A progressive and non-inflammatory corneal ectasia that often has a bilateral asymmetric presentation.
- The prevalence of keratoconus is about 1-2 per 1000 people and has no gender predilection
- May be associated with atopic disease, collagen vascular diseases, eye rubbing, and may be hereditary in some cases



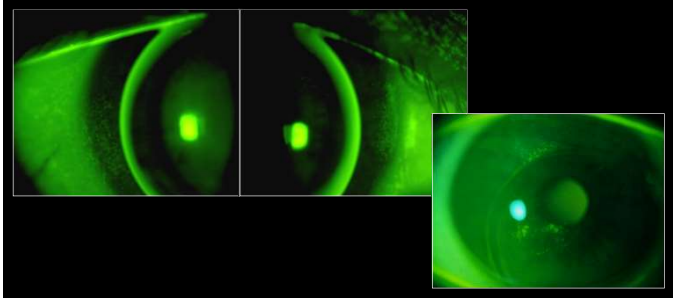
Contact Lens Evaluation

	Centration	Fit	Movement	Edge Lift	Stability
Right Eye	Inferior	**Moderate apical touch**	**Minimal**	**Thin in horizontal meridian**	Stable
Left Eye	Slightly inferior	Apical clearance and alignment, SCL has adequate drape N/T	Unrestricted movement with blink + adequate SCL movement	Adequate 360	Stable

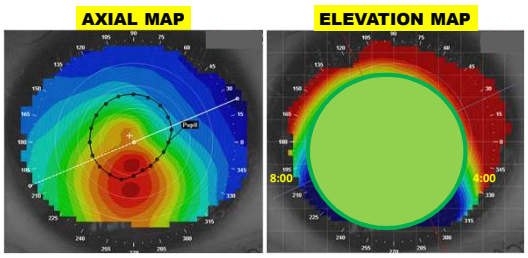
Anterior Segment Evaluation

Right Eye		Left Eye
Clean, no crusts/flakes	**Lids and Lashes**	Clean, no crusts/flakes
Palpebral: tr papillae inferior **Bulbar:** Clear, no injection	**Conjunctiva**	**Palpebral:** tr papillae inferior **Bulbar:** Clear, no injection
Epithelium: 1+ PEE at 3:30 and 8:30 and semi-circular indentation from 4 to 8:00 **Stroma:** <1mm area of mild opacification and neo bridging the limbus at 4:00; 1mm round faint anterior stromal scar inferior to visual axis, tr striae and thinning **Endothelium:** Clear	**Cornea**	**Epithelium:** (-)NaFl staining **Stroma:** inferior thinning, 1+ striae, ~1 mm faint anterior stromal scar inferior to visual axis , (-) Fleischer ring **Endothelium:** Clear

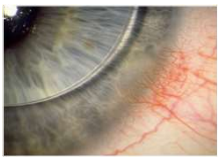
Corneal Findings OD

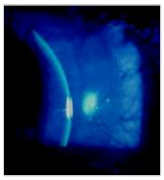


Keratoconus Topography



Vascularized Limbal Keratitis





- A GP complication that leads to hypertrophy of the limbal cells and focal stromal disorganization
- Often as a result of 3 and 9:00 staining and chronic corneal drying

- **Lens parameters to adjust:**
  - Decrease overall lens diameter
  - Flatten and/or blend the peripheral curves

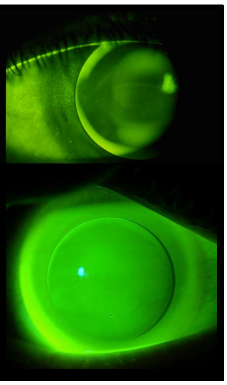
GP Refit OD

Based on the NaFl assessment, the patient was diagnostically refit from a spherical GP into a keratoconic GP on her right eye.

Ordered: KCN GP / 46.00 / -13.00 / 9.8

	Centration	Fit	Movement	Edge Lift	Stability
Right Eye	Slightly inferior	Apical clearance	Unrestricted movement with blink	Adequate 360	Stable

The Clinical Application of a GP/SCL Piggyback System

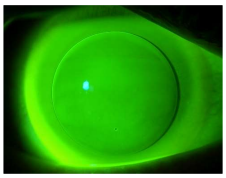


- Low-riding corneal GP
  - May induce 3 and 9:00 staining, VLK, scarring
- CL discomfort or lens awareness

- **SCL selection considerations:** low modulus, high Dk, daily disposable

GP Refit OD

Eye	Lens	Base Curve	Power	Diameter (mm)
OD	Spherical GP	45.00 D	-14.25 DS	9.5
	2-week SCL	8.4	+1.00 DS	14.0
OS	KCN GP	62.00 D	-26.00 DS	9.8
	2-week SCL	8.4	+1.00 DS	14.0



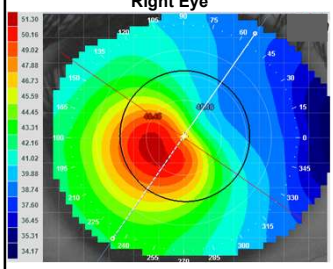
33 YO Male

- **CC:** Blurry vision and broken glasses.
- Patient has a history of keratoconus
- **Medical History:** Anxiety disorder, (+) tobacco use
- Uncorrected VA OD/OS: 20/200

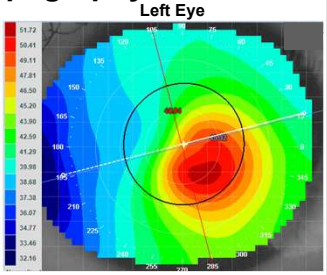
- Spectacle Rx:
  - **OD:** -2.25-2.00x028 **BCVA:** 20/25
  - **OS:** -2.00-3.75x165 **BCVA:** 20/20
  - Patient is uninterested in contact lens wear at this time

Corneal Topography

Right Eye



Left Eye



Ocular Health Examination

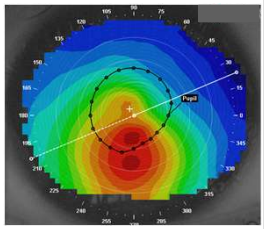
- Anterior segment OU: mild corneal thinning, (-)striae, (-)scarring
- IOP OD: 16 mmHg, OS: 16 mmHg

Right Eye		Left Eye
Distinct margins, pink and healthy	**Optic nerve**	Distinct margins, pink and healthy
0.6R, deep cupping	**C/D**	0.65R, deep cupping
Flat, dry, FLR(+)	**Macula**	Flat, dry, FLR(+)
No holes, tears 360	**Periphery**	No holes, tears 360

- Patient denies FHx of glaucoma

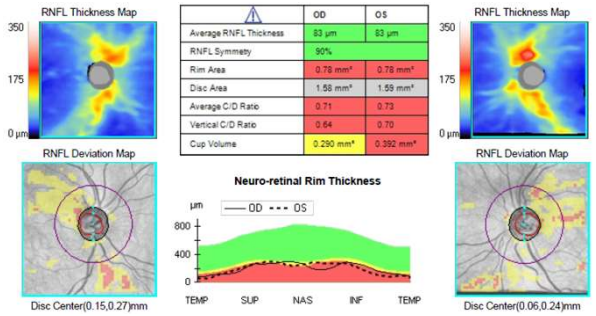
Keratoconus and Obstructive Sleep Apnea

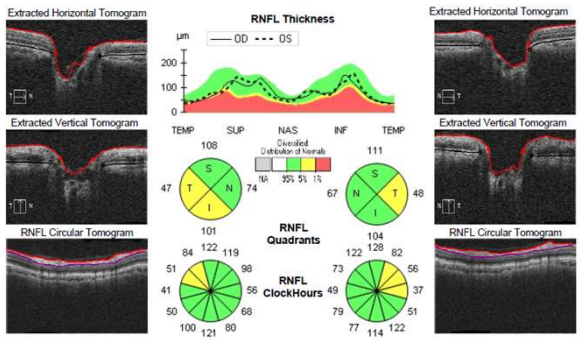
- OSA incidence may be 34-49% in men and 17-23% in women ages 30-70
- Associated with high MMP9 levels
- Patients with KCN are almost **2x** more likely to have OSA compared to patients without KCN
- Both conditions are associated with floppy eyelid syndrome (FES)

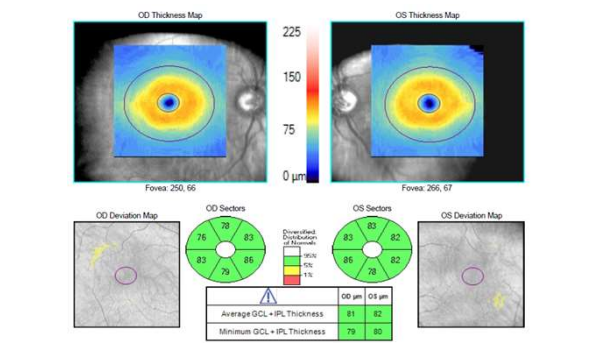


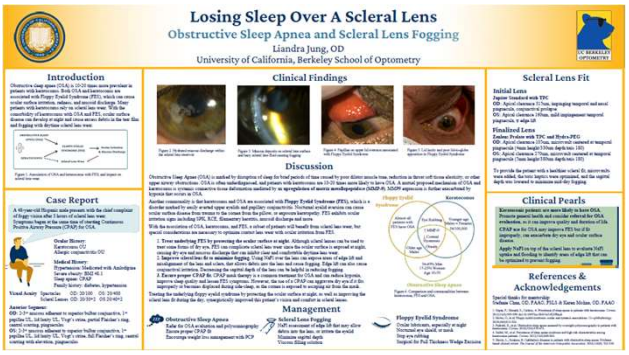
Normotensive Glaucoma (NTG) and Obstructive Sleep Apnea

- Risk factors for NTG: abnormal ocular blood flow, poor perfusion pressure, ischemic vascular disorders
- OSA can lead to morbidity and an increased risk of cardiovascular and cerebrovascular disease
- Increased risk of NTG with moderate to severe OSA







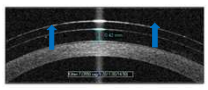


Potential Contraindications for Scleral Lens Wear

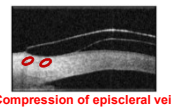
- Glaucoma
  - IOP
  - Drainage devices and blebs
- Endothelial compromise
- Overnight wear

IOP and Scleral Lens wear

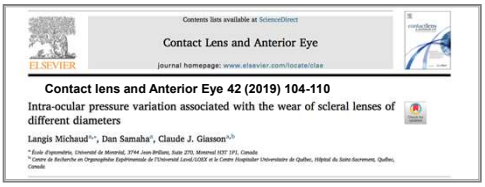
- May be due to negative pressure induced by suction under the scleral lens, or by compression of the episcleral venous system
- Studies at PUCO, UIWRSO, and the University of Montreal, have found previously found that scleral lens wear increased IOP in some patients by about **5 mmHg**
- Scleral lens wear also resulted in thinning of the RNFL on OCT



Negative atmospheric pressure



Compression of episcleral veins



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journal homepage: www.elsevier.com/locate/clae

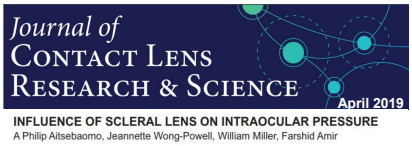
Contact lens and Anterior Eye 42 (2019) 104-110

Intra-ocular pressure variation associated with the wear of scleral lenses of different diameters

Langis Michaud[b,*], Dan Samaha[a], Claude J. Giasson[a,b]

- N = 21
- Age 24.7 ± 4.1 years old
- 15.8 and 18.0 mm scleral lens diameters of the same design, thickness and material

Conclusion: These results suggest that, as evaluated with a transpalpebral methodology, IOP during scleral lens wear may be increased in average **by 5 mmHg**, regardless of the lens diameter.



INFLUENCE OF SCLERAL LENS ON INTRAOCULAR PRESSURE

A Philip Aitsebaomo, Jeannette Wong-Powell, William Miller, Farshid Amir

University of the Incarnate Word, Rosenberg School of Optometry, San Antonio, Texas

- **SCL on one eye and a 15.8 mm scleral lens on the other**
- **iCare tonometry within 5 seconds post lens removal**

Results

IOP was elevated with SL wear for all subjects. Soft lens eyes showed a slight elevation for some but decreased in others. Mean IOP change was 5.81 ± 1.62 mm Hg for SL and -0.62 ± 0.88 mm Hg for soft lens

Conclusions

the results indicate that SL wear can elevate IOP. Eye care practitioners must consider this possible outcome in treating patients wearing SL. Additional studies are needed to determine the clinical implications of SL wear on IOP.

IOP and Optic Nerve Head Morphology during Scleral Lens Wear

Maria K. Walker, OD, MS, FAAO,[1]* Laura P. Pardon, OD, MS, FAAO,[1] Rachel Redfern, OD, PhD, FAAO,[1] and Nimesh Patel, OD, PhD, FAAO[1]

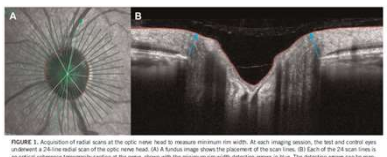


FIGURE 1. Acquisition of radial scans at the optic nerve head to measure minimum rim width. At each imaging session, the test and control eyes underwent a 24-line radial scan of the optic nerve head. (A) A fundus image shows the placement of the scan lines. (B) Each of the 24 scan lines is an optical coherence tomography b-section at the nerve, shown with the minimum rim width detection arrows in blue. The detection arrows can be manually adjusted as needed,[16] and the program software automatically measures the length of the arrows for each scan. The global (average of all scans) minimum rim width value was used for this study.

- Normal, healthy eyes showed greater thinning of the RNFL in the eye wearing the scleral lens for 6 hours (non-statistically significant)
- May mean that we need to monitor IOP and RNFL more closely in diseased eyes or patients with strong risk factors for disease

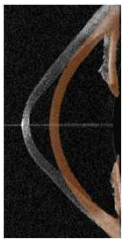
The impact of short-term fenestrated scleral lens wear on intraocular pressure

Samuel Y. Cheung, Michael J. Collins, Stephen J. Vincent*

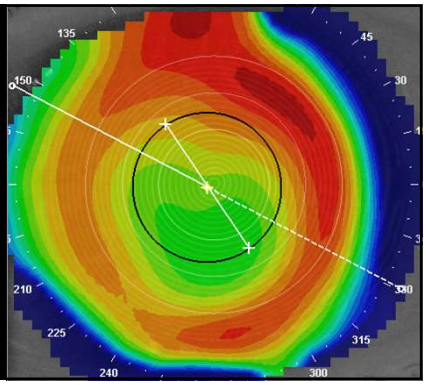
- IOP increased approximately **4 mmHg** in the majority of 50 young, healthy subjects

The FLC: Keratoconus

- In keratoconus, the cornea has a high eccentricity
  - This affects the fit and comfort of a corneal GP
  - Potential for GP-related complications
- Patients with keratoconus have an increased risk of other conditions (eg. OSA)
- When corneal elevation differences exceed **350 microns**, a corneal GP may not be the most optimal lens fit

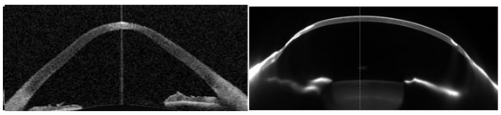


The Oblate Cornea



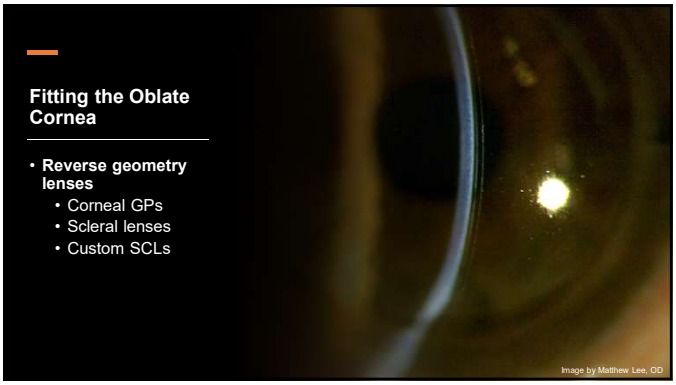
Prolate vs. Oblate Corneas

- **Prolate:** Flattening of the cornea as you move from the apex of the cornea to the limbus
- **Oblate:** Flat central cornea and steepening in the midperiphery
  - Post-PKP corneas, post-refractive surgery

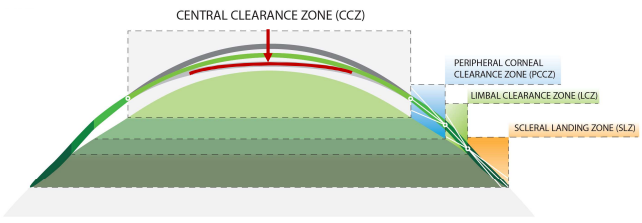


Fitting the Oblate Cornea

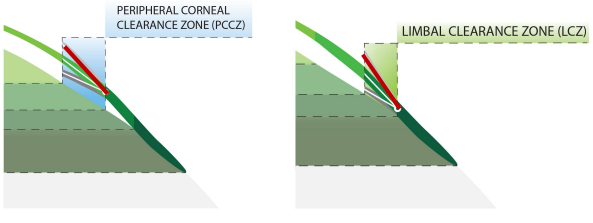
- **Reverse geometry lenses**
  - Corneal GPs
  - Scleral lenses
  - Custom SCLs



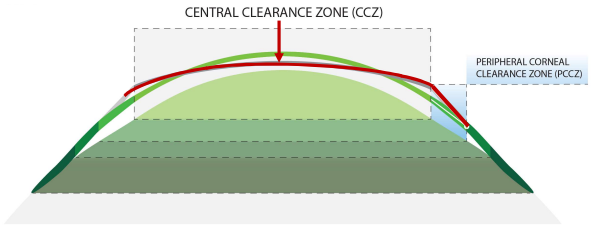
Designing a Reverse Geometry Scleral Lens



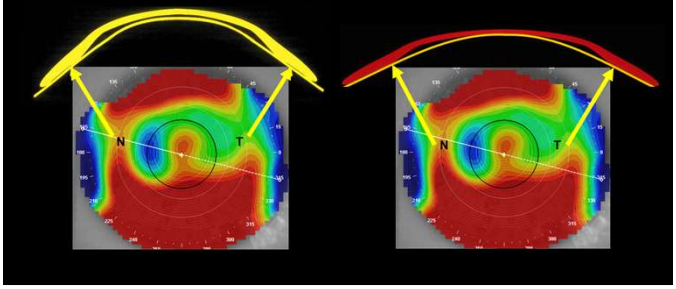
Peripheral Lens Adjustments



Reverse Geometry Scleral Lens Design



Reverse-Geometry Corneal GP Lens Fitting



65 YO Aphake Post-PKP

- "My vision in my right eye gets blurry if I wear my scleral lens for longer than a 3 hours a day."
- **Ocular Hx:** Traumatic injury to the right eye resulting in aphakia, UGH syndrome, and PKP
- Systemic Hx: Hypertension, hypercholesterolemia
- **Ocular Medications:** Timolol BID OD, latanoprost qhs OU

Contact Lens Evaluation

	Right Eye
VA	20/HM PH: 20/100+
Scleral Lens Parameters	3850 / 8.77 / +14.25 DS / 15.8 **VA:** 20/70+ **CT: ~650 um**
Fit	**Apical clearance:** 450 um Adequate peripheral clearance, thin limbal clearance nasally and superiorly Adequate edge lift

Scleral Lens Fits for an Oblate Cornea

- When we trial our diagnostic lens and decide that we want to flatten the base curve, we must remember our SAM-FAP rule
  - A reverse-geometry lens design = NO base curve change!

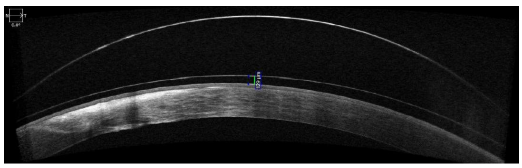
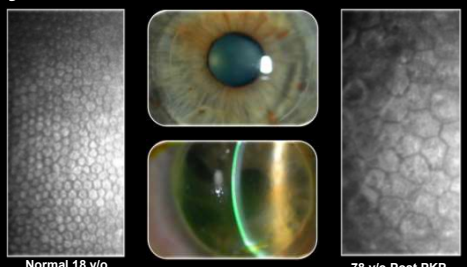


Image by Andy Nguyen, OD

Potential Contraindications for Scleral Lens Wear

- Glaucoma
  - IOP
  - Drainage devices and blebs
- Endothelial compromise
- Overnight wear

Clear PKP with Endothelial Dysfunction



Normal 18 y/o
3,065 cells/mm^2

78 y/o Post PKP
480 cells/mm^2

Exam Findings

Right Eye		Left Eye
Clean, no crusts/flakes	**Lids and Lashes**	Clean, no crusts/flakes
Palpebral: Clear, no injection **Bulbar:** Clear, no injection	**Conjunctiva**	**Palpebral:** Clear, no injection **Bulbar:** Clear, no injection
Epithelium: peripheral microcysts greatest superiorly and nasally **Stroma:** 1+ diffuse haze throughout the graft and thickening of cornea, tr neo 360 extending ~1mm into the cornea **Endothelium:** 1-2+ guttata	**Cornea**	Clear cornea, no defects
Deep and Quiet	**Anterior Chamber**	Deep and Quiet

Corneal Graft Edema

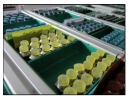
- **Potential causes:**
  - Hypoxia 2' to lens wear
  - Elevated IOP
  - Endothelial cell loss or dysfunction
  - Graft rejection or failure
- **Complications:**
  - Reduced BCVA
  - Bullae
  - Neovascularization

Guillon NC, Godfrey A, Hammond DS. Corneal oedema in a unilateral corneal graft patient induced by high Dk mini-scleral contact lens. Contact Lens Anterior Eye 2018; 41:458-462.
Severinsky B, Behrman S, Frucht-Pery J, et al. Scleral contact lenses for visual rehabilitation after penetrating keratoplasty: long term outcomes. Contact Lens Anterior Eye 2014; 37:196-202.

Optimizing Oxygen Transmission in Scleral Lenses

- High Dk materials
- Lower apical clearance
- Shorter intervals of wear
- Fenestrations
- Decrease center thickness if possible

High Dk Materials



– Hexafocon A	Dk = 100
– Hexafocon B	Dk = 141
– Roflufocon D	Dk = 100
– Roflufocon E	Dk = 125
– Tisilfocon A	Dk = 180
– Tisilfocon A UV Filter	Dk = 163
– Paflufocon D	Dk = 100

Fenestrations in Scleral Lenses

- May decrease atmospheric pressure beneath the lens
- Easier lens removal
- Increased O2 permeability and tear flow

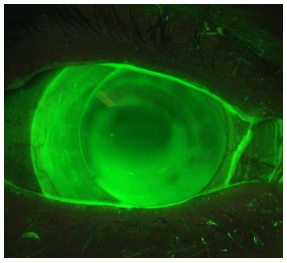
59 YO Male with Penetrating Keratoplasty

- CC: “I want to improve my vision. I heard about scleral lenses and came here to try them.”
- Monocular patient with PKP and glaucoma OD
- Ocular prosthetic OS

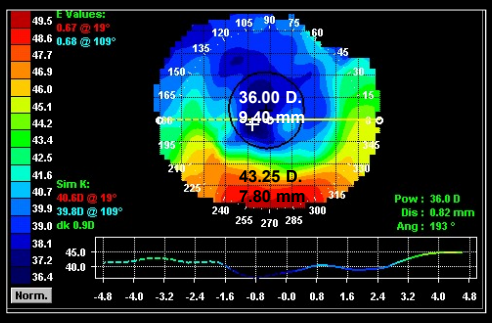
Scleral Lens Trial

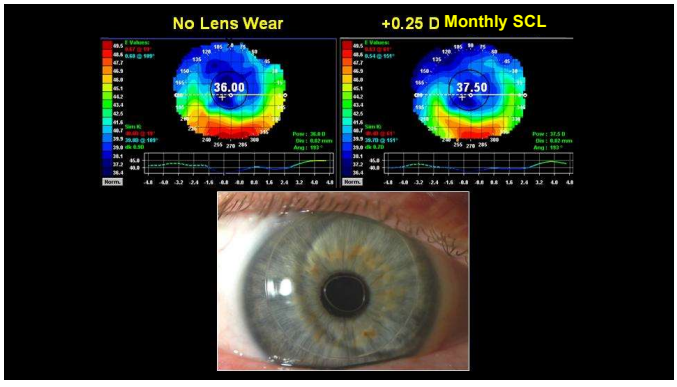
- Trialed scleral lenses in the highest Dk material
- Minimized the apical clearance to improve oxygen permeability
- Ensured no impingement on the blood vessels or the tube shunt

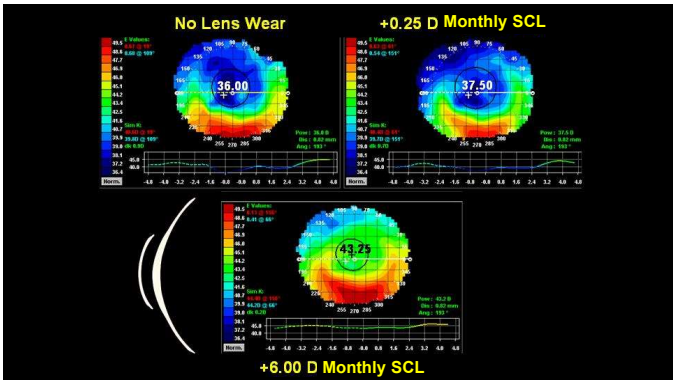
Final CL Fit

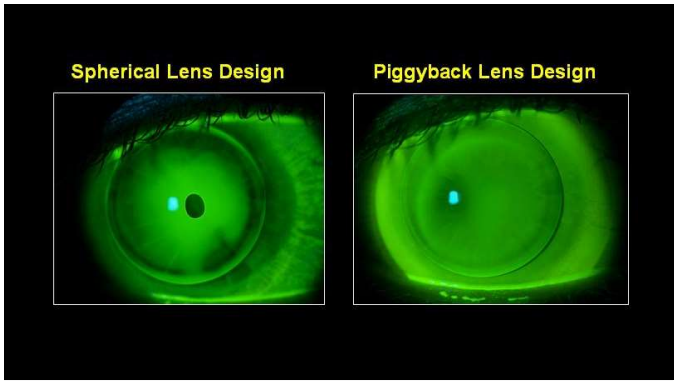


Post-RK Cornea



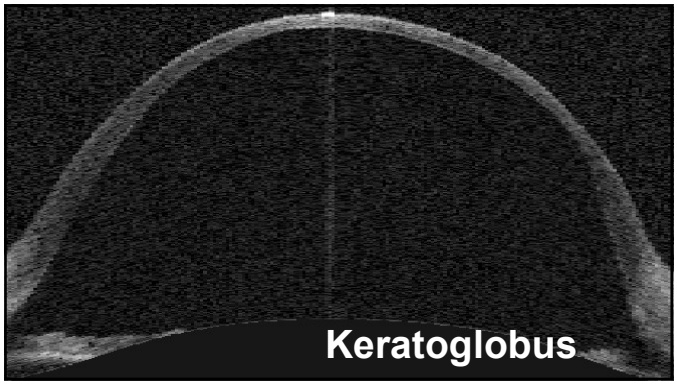






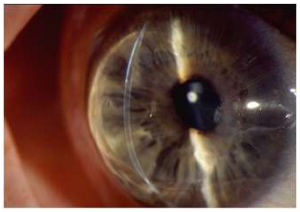
The FLC: Oblate Corneas

- Reverse-geometry lenses may provide the most optimal fit
  - Corneal GPs, scleral lenses, and custom SCLs
  - Monitor regularly for physiologic complications
- Off-the-rack soft contact lenses may not always be successful on a post-refractive surgery cornea
  - Corneal topography, HVID, and over-refraction provide a great understanding of how a SCL will fit



48 YO Male with Keratoglobus

- Followed for keratoglobus in both eyes
  - Managed with a custom SCL piggyback system
- **CC:** "I have discomfort with the soft lens in my left eye."
- Systemic health: unremarkable
- No allergies or medications, social history is unremarkable

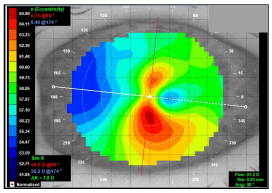


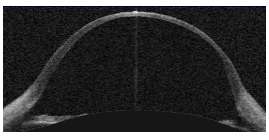
Anterior Segment Evaluation

Right Eye		Left Eye
Tr crusts/flakes	**Lids and Lashes**	Tr crusts/flakes
Palpebral: Tr papillae inferiorly, tr injection **Bulbar:** Clear, no injection	**Conjunctiva**	**Palpebral:** tr papillae inferiorly, tr injection **Bulbar:** Clear, no injection
Significant global thinning, (+) ~0.75 mm of corneal neovascularization, (+) tr vertical striae, (+) mild stromal scarring outside of the visual axis	**Cornea**	Significant global thinning, (+) ~0.75 mm of corneal neovascularization, (+) tr vertical striae, (+) mild stromal scarring outside of the visual axis
Deep and Quiet	**Anterior Chamber**	Deep and Quiet

Keratoglobus

- A rare, ectatic condition that presents early in life
- Diffuse global stromal thinning and extreme protrusion of the cornea
  - Thinning up to 1/5 of the normal corneal thickness!
- Normal corneal diameter
- Potential associations with connective tissue disorders





Why a Piggyback System?

- Unable to manufacture a scleral lens with an adequate sagittal depth!

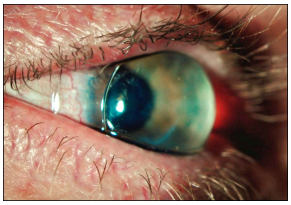
Physiologic Reasons for PBS

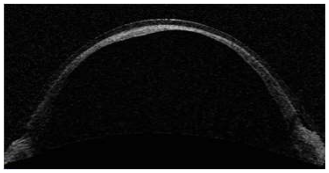
- Thin and delicate corneal tissue
- Negative pressure under a scleral lens may have the potential to induce an increase in IOP, acute hydrops, or progression of ectasia
- Risk of corneal perforation with minor trauma in keratoglobus
- Sometimes with significant ectasia, we require a CL with a deeper sagittal depth
  - Increase sagittal depth by increasing overall lens diameter, increasing OZD, or steepening the base curve

Right Eye CL Evaluation

Corneal GP: Cell GP/56.00D/-15.50D/11.0mm
SCL: HydroKone/5.80mm, 6.00mm BC/plano/15.0mm

BCVA: 20/30-2





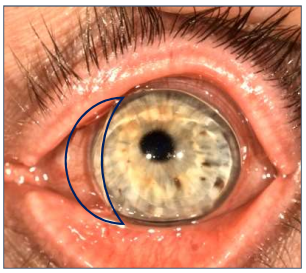
Left Eye CL Evaluation

Corneal GP: Cell GP/56.00D/ -19.25D/11.0mm

SCL: HydroKone/5.00mm, 6.20mm BC/PLANO/15.5 mm

BCVA: 20/25

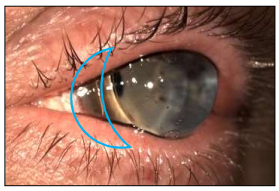
Significant fluting of lens edge, greatest nasally and mild edge lift superiorly

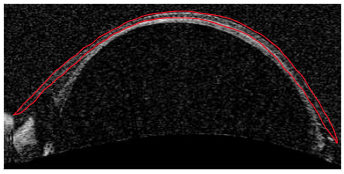


New Left Eye Lens Parameters

Corneal GP: Cell GP 56.00D BC/-19.25D PWR/ 11.0mm
New Hydro Kone SCL: 5.00mm, 6.00mm BC/plano/15.5/**CT 0.20mm**

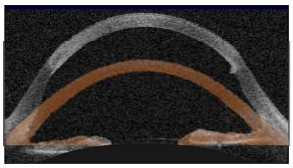
BCVA: 20/25

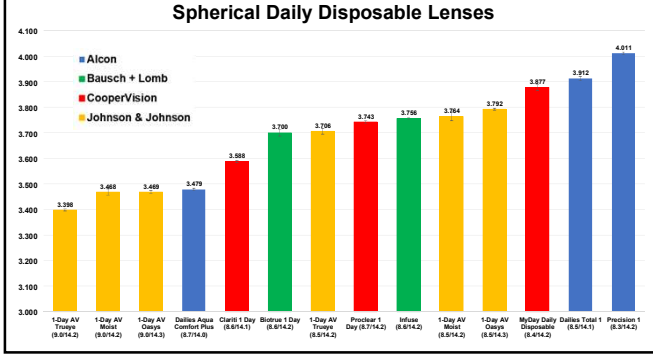




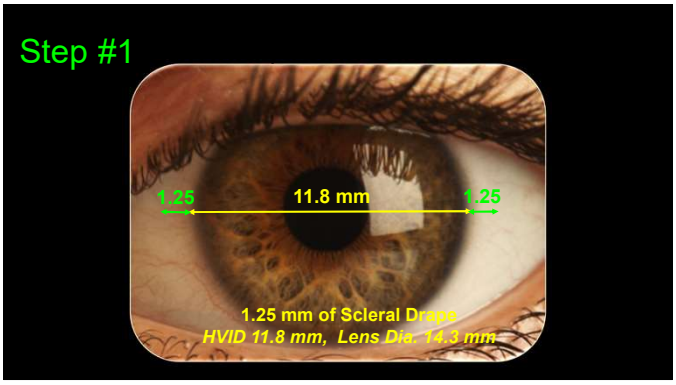
The FLC: Keratoglobus

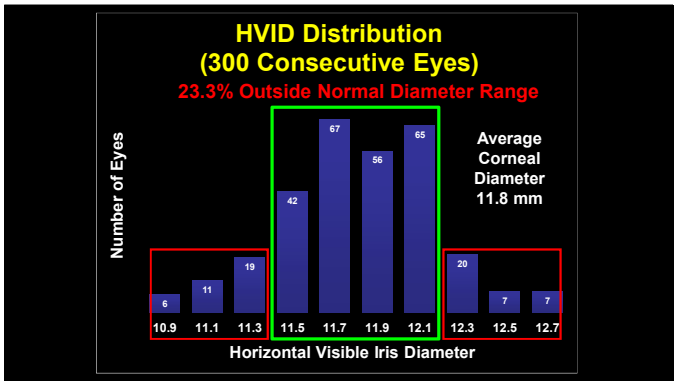
- Keratoglobus is rare, but corneal transplants are not!
  - Up to 11% of patients who have keratoplasty for KCN may develop recurrent ectasia about 20 years post-surgery
- Similar to keratoglobus, the sagittal depth of these corneas may require a custom SCL PBS when a scleral lens fit is unsuccessful

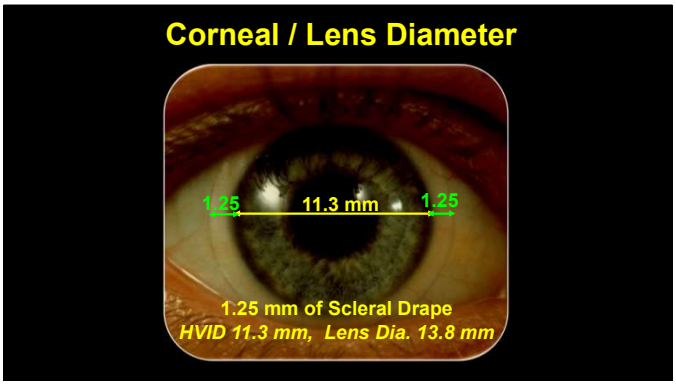


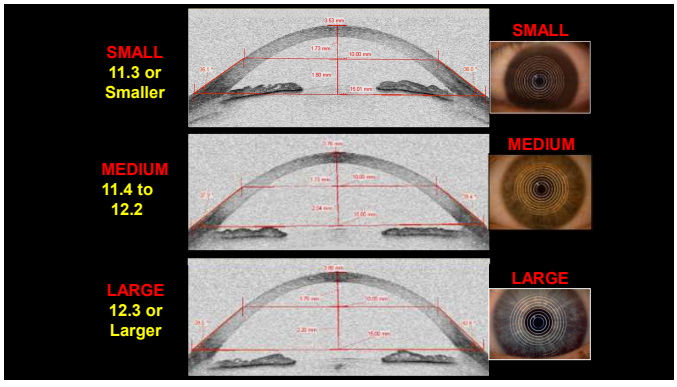


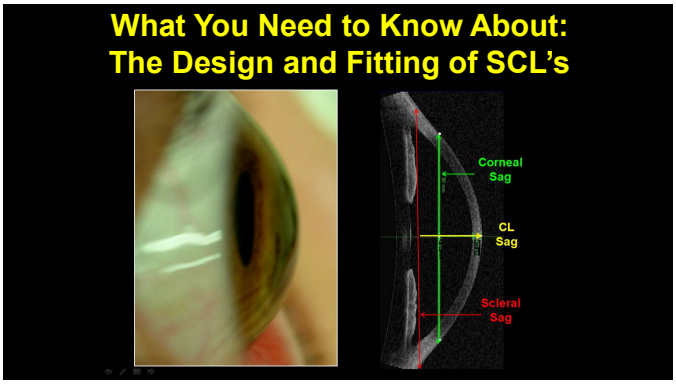
What about the "Not so Funny-Looking Cornea?"







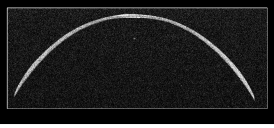




What are the sagittal heights of our currently available soft contact lenses?

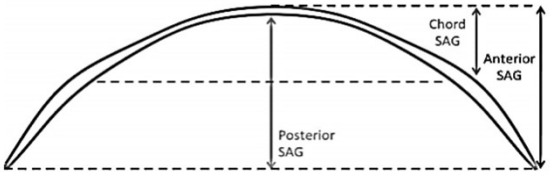
Optimec is830

Ben Coldrick PhD.
Head of Technical Development
Optimec Limited
Malvern,
Worcestershire UK



Sagittal Height (SAG)

Is calculated as the distance (in microns) from the base line of the lens the posterior apex at the geometric center of the lens.

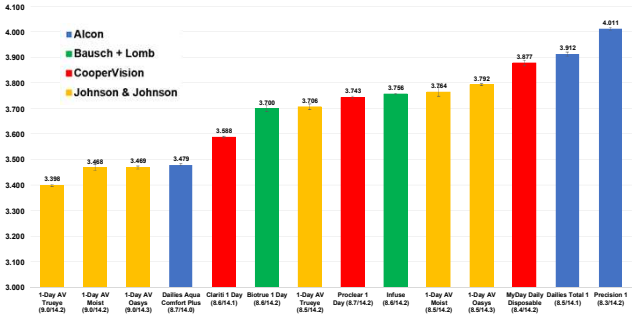


Daily Disposable SCLs

Spherical Lens Designs (-3.00DS)

Alcon	B + L	Cooper Vision	J&J
Total1 8.5 / 14.1	Biotrue 1 Day 8.6 / 14.2	MyDay 8.4 / 14.2	1 Day Oasys 8.5 / 14.3 9.0 / 14.3
Precision1 8.3 / 14.2	Infuse 8.6 / 14.2	Clariti 8.6 / 14.1	1 Day Moist 8.5 / 14.2 9.0 / 14.2
Dailies Aqua Comfort Plus 8.7 / 14.0		Proclear 1 Day 8.7 / 14.2	Trueye 8.5 / 14.2 9.0 / 14.2

Spherical Daily Disposable Lenses

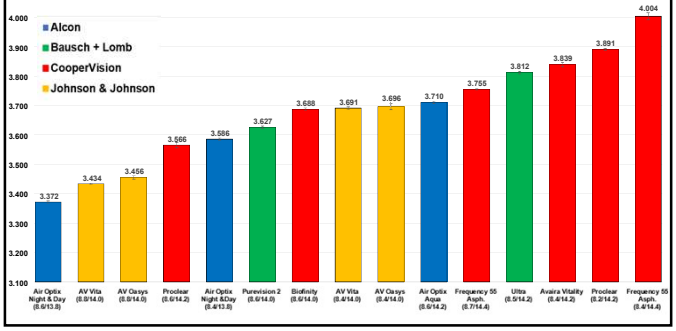


Reusable SCL's

Spherical Lens Designs (-3.00DS)

Alcon	B + L	Cooper Vision	J&J
Air Optix Aqua 8.6 / 14.2	Purevision 2 8.6 / 14.0	Biofinity 8.6 / 14.0	Acuvue Oasys 8.4 / 14.0 8.8 / 14.0
Air Optix Night & Day 8.4 / 13.8 8.6 / 13.8	Ultra 8.5 / 14.2	Proclear 8.6 / 14.2 8.2 / 14.2	Acuvue Vita 8.4 / 14.0 8.8 / 14.0
		Frequency 55 Asphere 8.7 / 14.4 8.4 / 14.4	
		Avaira Vitality 8.4 / 14.2	

Reusable Lenses: Spherical

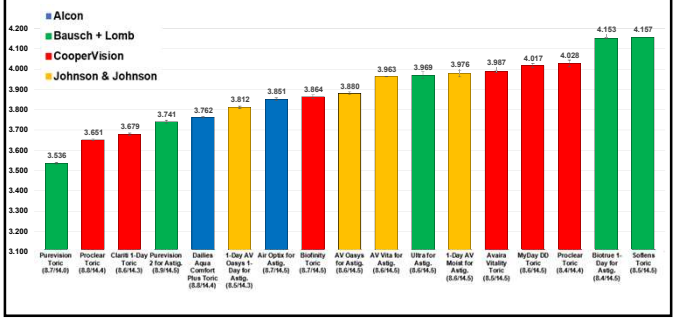


Toric SCL's

All Lenses -3.00 -0.75 x 180

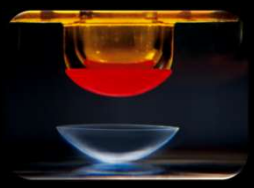
Alcon	B + L	Cooper Vision	J&J
Air Optix for Astigmatism 8.7 / 14.5	Ultra for Astigmatism 8.6 / 14.5	Clariti 1-Day Toric 8.6 / 14.3	1-Day Acuvue Moist 8.5 / 14.5
Dailies Aqua Comfort Plus Toric 8.8 / 14.4	Purevision 2 Astigmatism 8.9 / 14.5	MyDay Toric 8.6 / 14.5	1-Day Acuvue Oasys 8.5 / 14.3
	Purevision Toric 8.7 / 14.0	Avaira Vitality Toric 8.5 / 14.5	Acuvue Vita 8.6 / 14.5
	Biotrue for Astigmatism 8.4 / 14.5	Biofinity Toric 8.7 / 14.5	Acuvue Oasys 8.6 / 14.5
	Soflens Toric 8.5 / 14.5	Proclear Toric 8.4 / 14.4 8.8 / 14.4	

Toric Lenses: Daily Disposable and Reusable



Additional lens properties *(beyond sagittal depth)* that can influence the physical fit of a specific SCL.

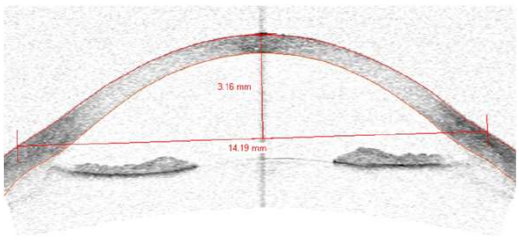
- Material modulus (hardness / stiffness)
- Material elasticity
- Anterior lens design
- Lens thickness
- Hydration/wettability
- Specific gravity



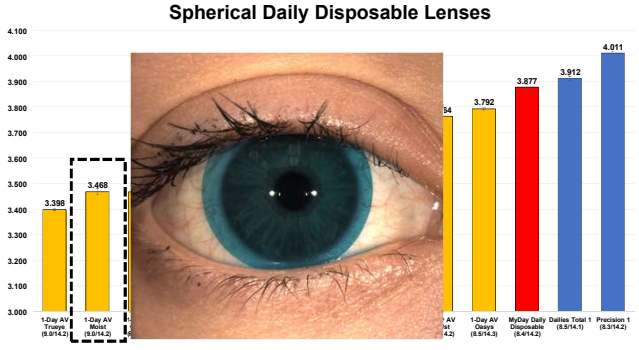
Using the Sagittal Depth Charts

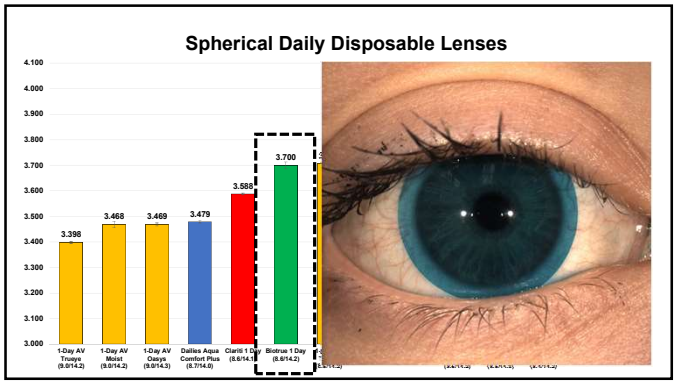
- Lenses with a **more shallow** sagittal depth are located toward the **left side** of the chart.
- Lenses with a **deeper** sagittal depth are located toward the **right side** of the chart.

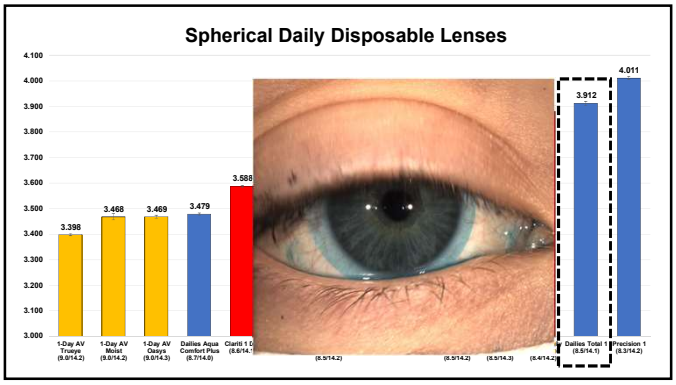
Ocular sag 3160 microns
HVID 11.8 mm



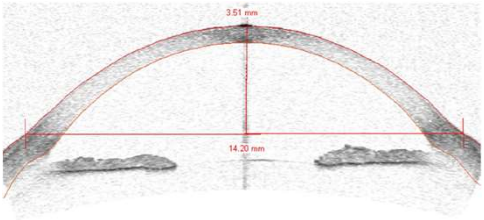
Spherical Daily Disposable Lenses



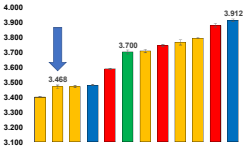


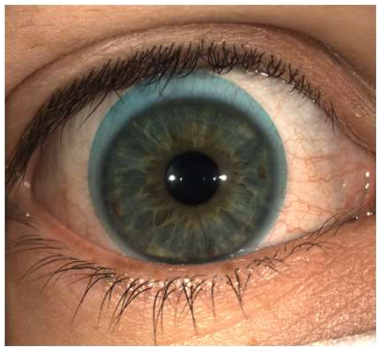


Ocular sag 3510 microns
HVID 12.25 mm

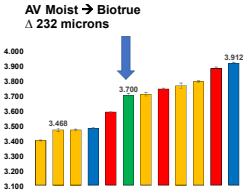


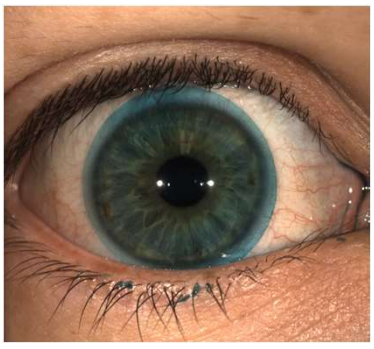
AV Moist
9.0 / 14.2



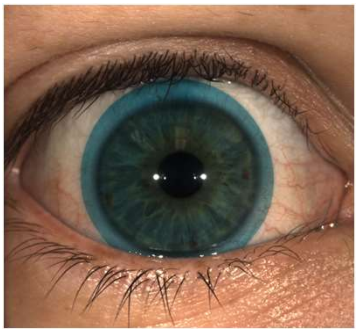


Biotrue
8.6 / 14.2

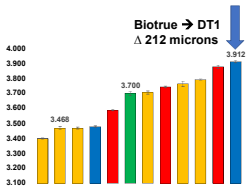




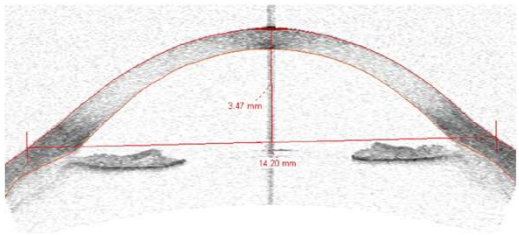
Biotrue for Astigmatism
8.4 / 14.5



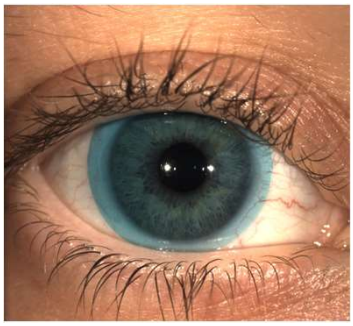
Dailies Total 1
8.5 / 14.1

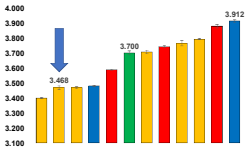


Ocular sag 3470 microns
HVID 11.4 mm

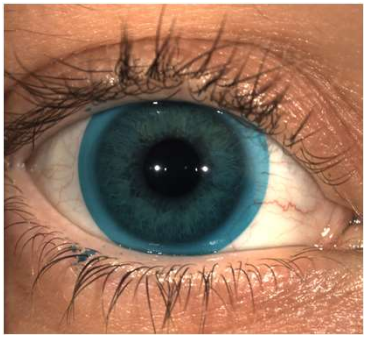


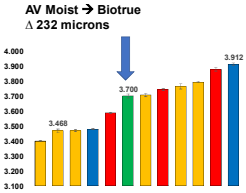
AV Moist
9.0 / 14.2



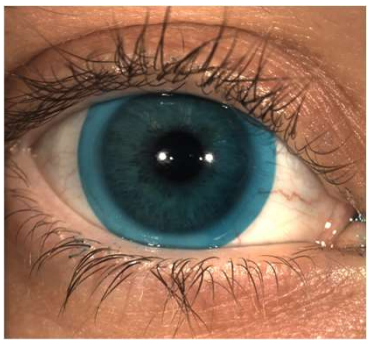


Biotrue
8.6 / 14.2

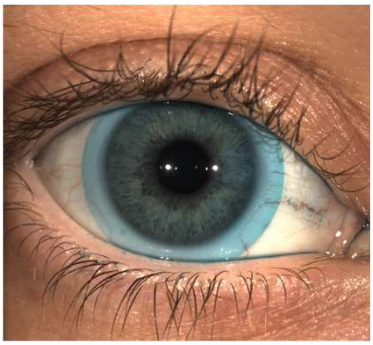


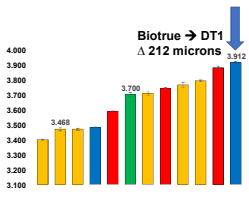


Biotrue for Astigmatism
8.4 / 14.5

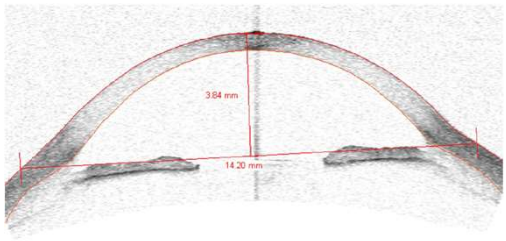


Dailies Total 1
8.5 / 14.1

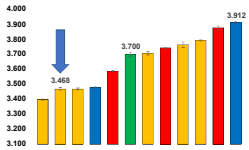


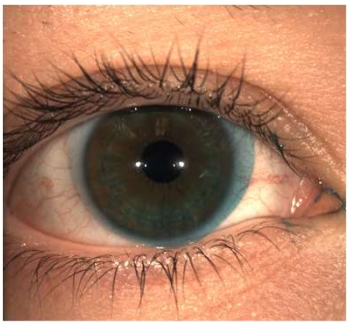


Ocular sag 3840 microns
11.3 HVID

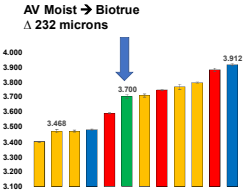


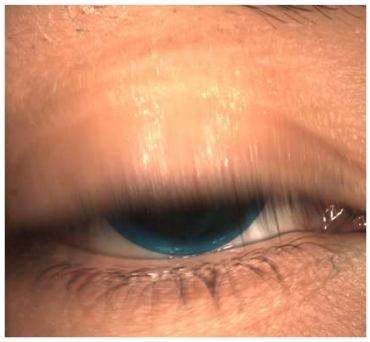
AV Moist
9.0 / 14.2



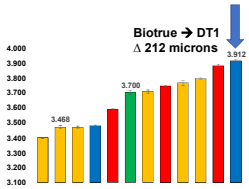


Biotrue
8.6 / 14.2

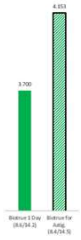


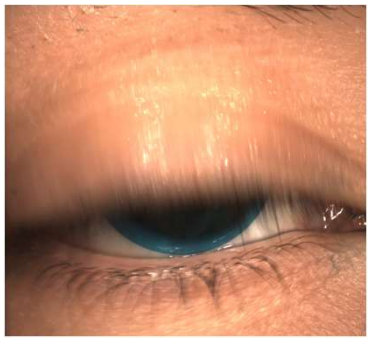


Dailies Total 1
8.5 / 14.1

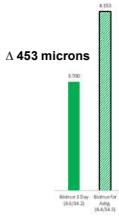


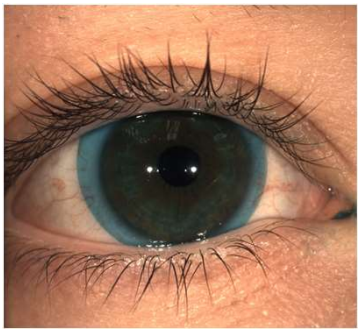
Biotrue
8.6 / 14.2



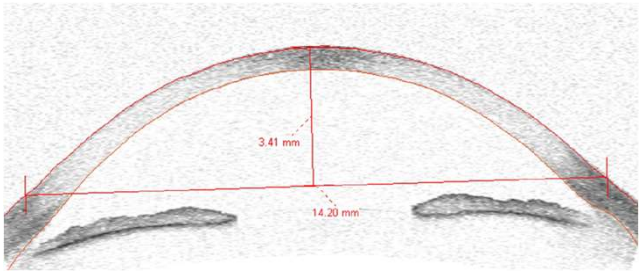


Biotrue for
Astigmatism
8.4 / 14.5

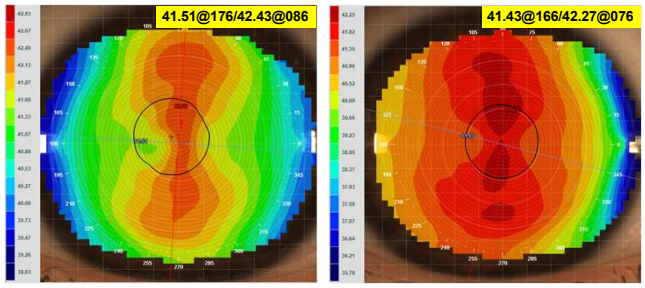




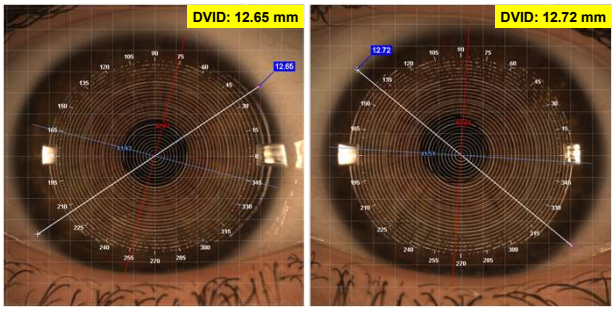
A Case for Custom Soft Contact Lenses



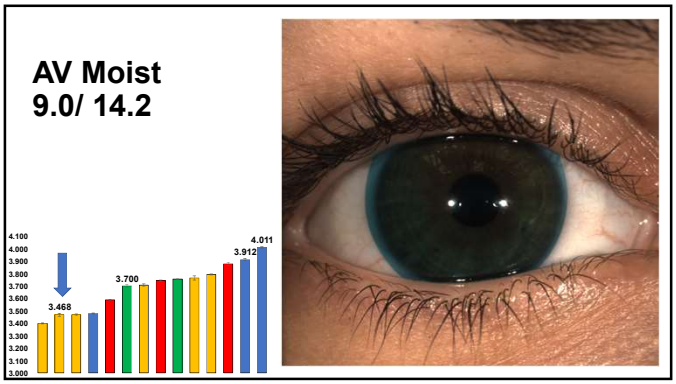
Corneal Topography



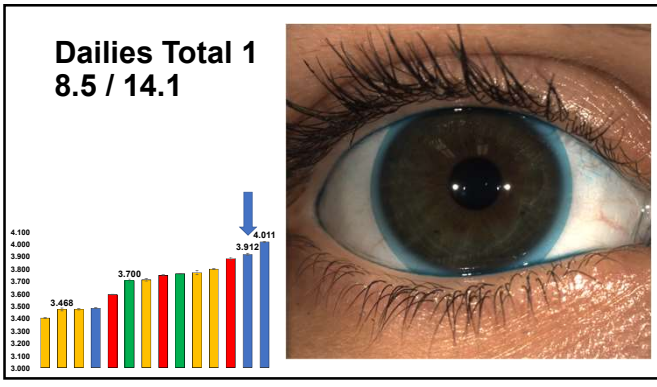
HVID



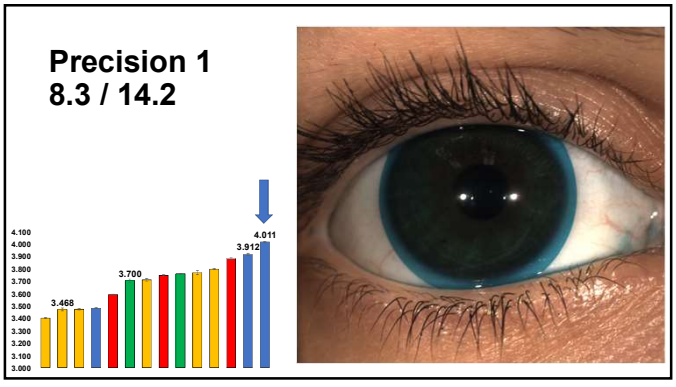
AV Moist
9.0/ 14.2



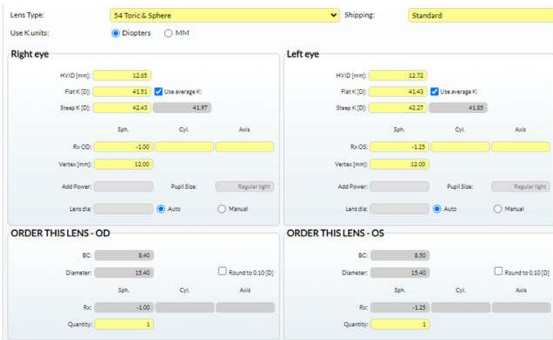
Dailies Total 1
8.5 / 14.1



Precision 1
8.3 / 14.2



Arc Length Calculator


Lens Type: 54 Toric & Sphere
Shipping: Standard
Use K units: Diopters MM

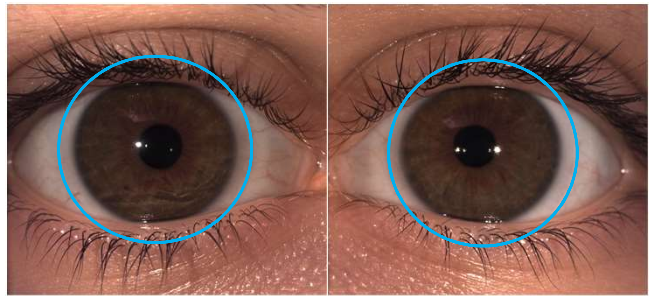
Right eye
HVID [mm]: 12.65
Flat K [D]: 41.51 Use average K:
Steep K [D]: 42.43 41.97
Sph. Cyl. Axis
Rx OD: -1.00
Vertex [mm]: 12.00
Add Power: Pupil Size: Regular light
Lens dia: Auto Manual

Left eye
HVID [mm]: 12.72
Flat K [D]: 41.43 Use average K:
Steep K [D]: 42.27 41.85
Sph. Cyl. Axis
Rx OS: -1.25
Vertex [mm]: 12.00
Add Power: Pupil Size: Regular light
Lens dia: Auto Manual

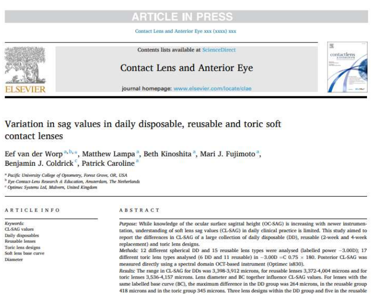
ORDER THIS LENS - OD
BC: 8.40
Diameter: 15.40 Round to 0.10 [D]
Sph. Cyl. Axis
Rx: -1.00
Quantity: 1

ORDER THIS LENS - OS
BC: 8.50
Diameter: 15.40 Round to 0.10 [D]
Sph. Cyl. Axis
Rx: -1.25
Quantity: 1

Final Custom SCL



Sagittal Depth Charts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journal homepage: www.elsevier.com/locate/clae

Variation in sag values in daily disposable, reusable and toric soft contact lenses

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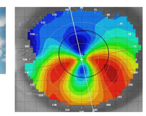
ARTICLE INFO

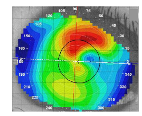
Keywords:
CL-SAG values
Daily disposables
Reusable lenses
Toric lens designs
Soft lens base curve
Diameter

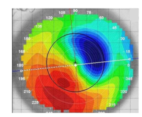
ABSTRACT

Purpose: While knowledge of the ocular surface sagittal height (OC-SAG) is increasing with newer instrumentation, understanding of soft lens sag values (CL-SAG) in daily clinical practice is limited. This study aimed to report the differences in CL-SAG of a large collection of daily disposable (DD), reusable (2-week and 4-week replacement) and toric lens designs.
Methods: 12 different spherical DD and 15 reusable lens types were analysed (labelled power −3.00D); 17 different toric lens types analysed (6 DD and 11 reusable) in −3.00D =C 0.75 × 180. Posterior CL-SAG was measured directly using a spectral domain OCT-based instrument (Optimec is830).
Results: The range in CL-SAG for DDs was 3,398-3,912 microns, for reusable lenses 3,372-4,004 microns and for toric lenses 3,536-4,157 microns. Lens diameter and BC together influence CL-SAG values. For lenses with the same labelled base curve (BC), the maximum difference in the DD group was 264 microns, in the reusable group 418 microns and in the toric group 345 microns. Three lens designs within the DD group and five in the reusable

Final Thoughts







- Utilize your topography to guide you in determining the appropriate contact lens option for a patient
- Scleral lenses are great options for patients with irregular corneas
  - Utilize consultation to help you optimize your lens designs
  - Eg. Reverse geometry scleral lenses, ordering high Dk materials, and other lens adjustments
- Consider your other specialty lens options like piggyback systems, custom soft contact lenses, and corneal GPs

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Q&A