

Scleral Lenses:
A Solution for Challenging Ocular Conditions

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OAO Ophthalmic Medical Technology Meeting
March 10, 2023

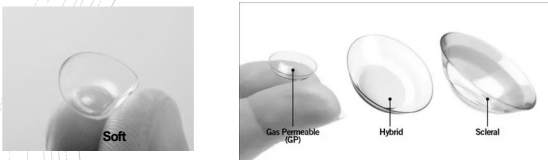
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Scleral Lens Learning Objectives:

- **What are they?**
- **How do they work?**
- **Who are they for?**
- **How can I help patients successfully wear these lenses?**

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Types of Contact Lenses



The diagram illustrates four types of contact lenses. On the left, a 'Soft' lens is shown on a finger. On the right, three lenses are shown: a 'Gas Permeable (GP)' lens, a 'Hybrid' lens, and a 'Scleral' lens. The GP lens is a small, thin disc. The Hybrid lens is larger and has a central GP area. The Scleral lens is the largest and flattest, designed to rest on the sclera.

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What makes it a Medical Contact Lens?


-  Contact lenses which are designed for medical or therapeutic reasons.
-  Corrects a medical condition of the eye, not just refractive error
-  Contact lenses can be considered "medically-necessary" if they improve patient's vision or comfort in a way that glasses cannot

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What Conditions Can Scleral Lenses Treat?



Irregular Astigmatism due to Irregular Cornea

- Keratoconus
- Pellucid marginal degeneration
- Post-surgical corneas: RK, LASIK, PRK, PK



Ocular Surface Disease

- Exposure keratitis
- Neurotrophic keratopathy
- Sjogren's Syndrome
- Grave's Disease
- Stevens-Johnson Syndrome
- Facial nerve palsy

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Normal eye

A single focal point on the retina results in a clear image

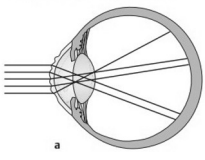
The cornea or lens surface are curved equally

Asigmatism

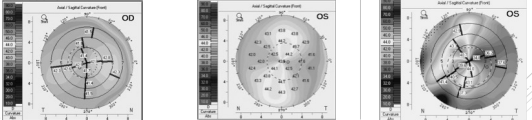
Multiple focal points result in blurry image

The cornea or lens surface is not curved equally

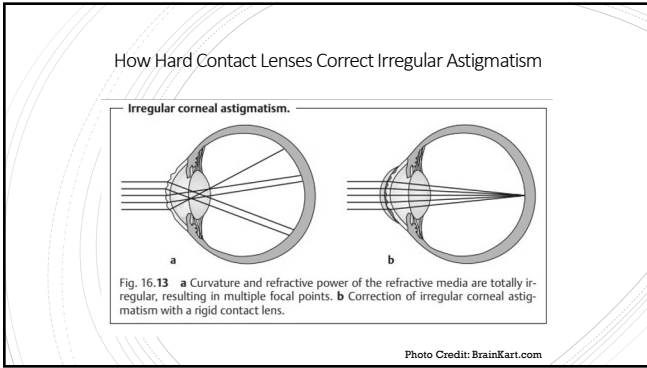
Irregular corneal astigmatism.



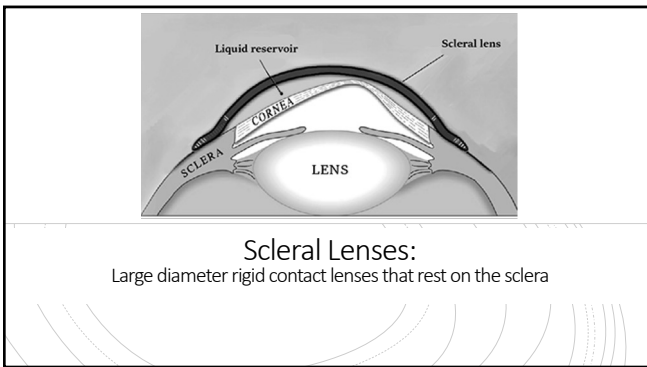
ALL ABOUT VISION



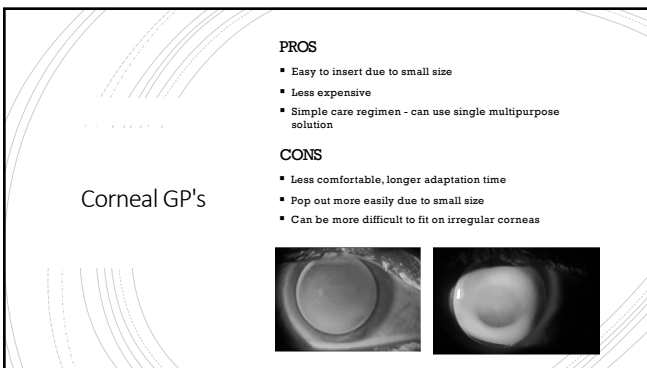
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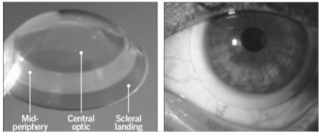


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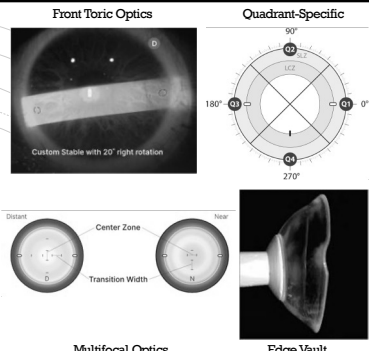
Scleral Lens Advantages:



- More comfortable
- Stable on the eye
- Can fit a wide variety of irregular corneas
- Many customization options

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Scleral Lens Customization Options




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Case 1: Advanced Keratoconus OU

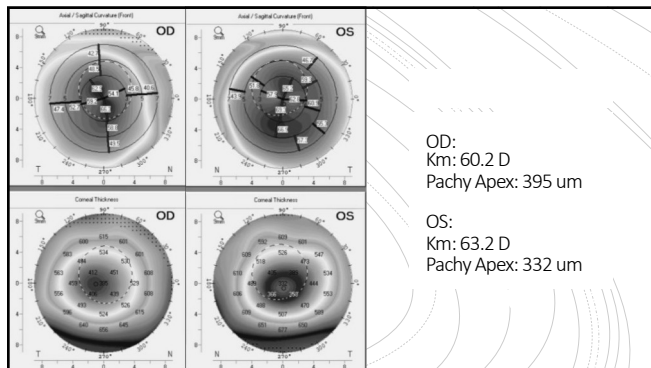
- 35yo Male referred to Devers Cornea Clinic due to progression in both eyes
- **Pertinent Ocular History:**
 - 2016 Diagnosed with keratoconus
 - CXL OU in Spokane
- Per referral notes, patient has failed CXL and contact lenses, has been referred here for possible DALK/ PK

▪ **Wearing Rx:**

Right	-18.00	+7.25	091	20/200
Left	-16.75	+4.75	065	20/400-



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Advanced Keratoconus

EyeFoundry.org

PLAN:

- Recommend DALK LE – scheduled for 9/2022
- Possible that RE can be fitted with scleral, monitor for progression, DALK if unable to fit in contact.

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Medical Contact Lens Evaluation

- Previously wore soft torics. Tried sclerals in 2016, but discontinued due to pain
- Has DALK scheduled in September OS, but desires to be fit with a CL OU in the interim.

Current Contact Lens Rx (Trial Lens)

	Brand	Base Curve	Diameter	Sphere	Lens	Addl. Specs	Over-Sphere	Over-Dist VA
Right	Custom Stable	41.00	15.8	+0.00			+3.00	20/40-
	Ette							
Left	Custom Stable	43.00	15.8	-2.00			Plano	20/40-2
	Ette							

- Lenses ordered based on diagnostic fitting set:

Current Contact Lens Rx #2 (Ordered)

	Brand	Base Curve	Diameter	Sphere	Lens	Addl. Specs	Over-Sphere	Over-Dist VA
Right	Custom Stable	44.00	15.8	+2.00	Optimum Extra - Clear			
	Ette - Prolate							
Left	Custom Stable	46.00 (7.34)	15.8	-5.00	Optimum Extra - Blue	+1 CCZ		
	Ette - Prolate							

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Medical Contact Lens Evaluation: Visit #2

- Patient returns for lens dispense and insertion/removal training
- **Good News:** Successful training!
- **Bad News:** Lenses have central touch, unable to dispense

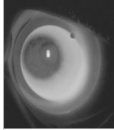


Photo Credit: Christine Sirdt

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Medical Contact Lens Evaluation: Visit #3

- New lenses fit well; dispensed to patient
- Patient asked corneal specialist about delaying his surgery, since it is only 1 month away
- Response from corneal specialist:
 "If you are able to be fit with scleral lenses, I would strongly suggest considering delaying your transplant indefinitely. A contact lens is much safer than a corneal transplant. Additionally, most patients who have a corneal transplant will still need a contact lens for their best vision."

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Medical Contact Lens Evaluation: Visit #4

- Doing well in the lenses, getting used to them
- Ordered lenses with over-refraction, shipped directly to patient
- Return in 1 month for follow-up

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Medical Contact Lens Evaluation: Visit #5

- Doing very well with the scleral lenses
- Planning on a career change now that his vision has improved: got accepted into pharmacy technician program
- Return in 6 months for follow-up
- Postpone corneal transplant indefinitely

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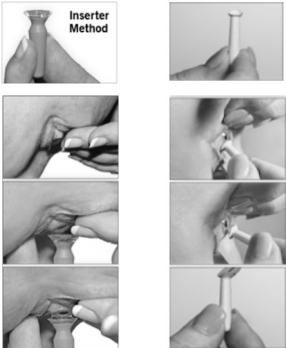
Scleral Lens Challenges:

- Concern for corneal hypoxia
- More difficult to insert
- Patients need to keep track of 2 different care solutions and insertion/removal tools

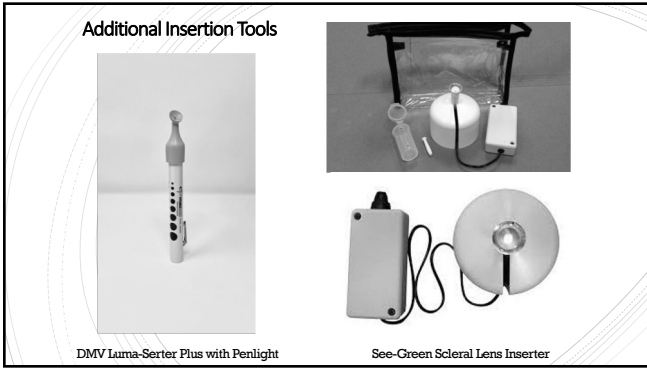


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Scleral Lens Insertion and Removal



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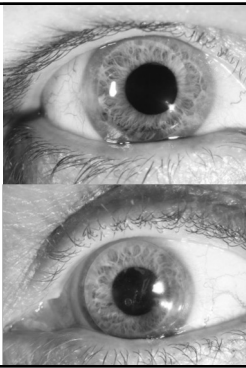
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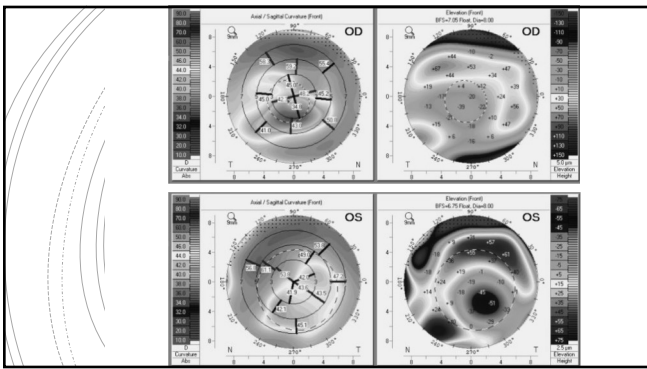
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Case #2: Fitting Lenses after Corneal Transplant

- 55 yo Female
- Keratoconus s/p PK OU
- s/p CEIGL OU, recently completed OD
- Evaporative Dry Eye - treated with Prokera prior to CE OD
- Currently wearing piggyback lens OS only
- Reports GP's were starting to rub on her transplant, so switched to piggyback about 2 years ago



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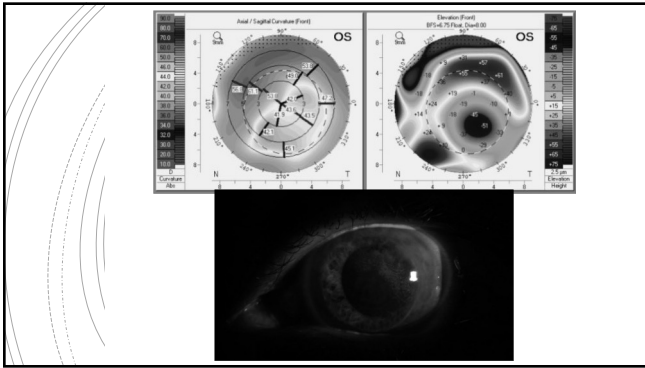


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Exam Findings:

- **Visual Acuity:**
 - OD sc 20/70 -
 - OS cc (contacts) 20/60 +2
- **Cornea:**
 - OD: PK, no sutures. Coarse 3+ PEE horizontal across midline. TBUT: 4 secs
 - OS: PK, no sutures. 2+ NaFl staining superior and inferonasal midperiphery corresponding to areas of greatest elevation on topography, staining at 3:00 and 9:00 periphery over small nodules. TBUT: 3 secs

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Scleral Lens Fitting

- Good Candidate due to irregular cornea with complications from current lens modality in the left eye, also has evaporative dry eye
- BCVA with scleral lens fitting set in office:
 - OD: 20/25, OS: 20/25-2
- Trial Lens Fit:
 - OD: 200um at narrowest superonasal, 500um central, 1000um inferior
 - OS: Light touch superior midperiphery, 400um central, 600um inferior

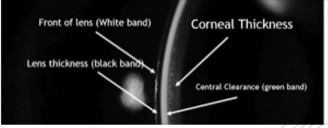
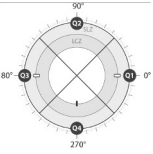


Photo Credit: Review of Cornea and Contact Lenses

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Scleral Lens Order and Outcome:

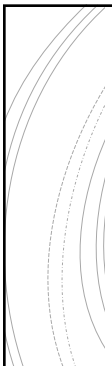
- Ordered quadrant-specific lens design
- Ordered with Hydra-PEG coating due to dry eye
- Successful insertion/removal training, despite having multiple sclerosis, which has affected sensation in her fingers
- After a few remakes, achieved good comfort, vision, and fit



At recent follow-up 4 years after initial fitting:

- VA with scleral lenses: OD: 20/25 +1 OS: 20/20 -2
- Keratitis has completely resolved

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Take Home Points:

- Scleral lenses can treat a wide variety of ocular conditions, including irregular corneas and ocular surface disease
- For patients with irregular astigmatism, scleral lenses can provide much clearer vision than glasses
- Scleral lenses can sometimes correct a patient's ocular condition without surgery, which spares them from the associated risks
- Scleral lenses are highly customizable
- For the right patient, they can be life-changing
