Sclerals:
Go Big or Go Home

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I have no financial disclosures.

Objectives

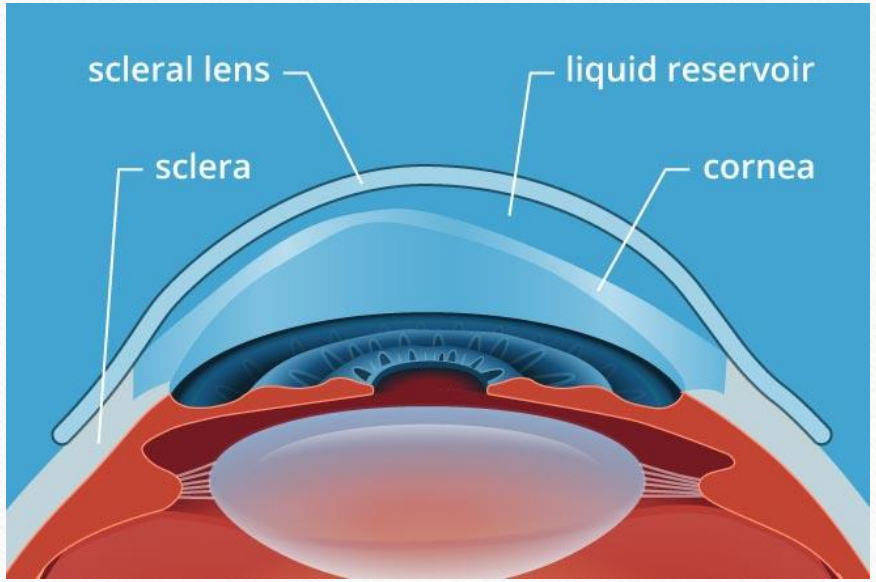
- Learn the basics of scleral contact lenses
- Identify patients that will benefit from scleral contact lenses
- Common issues with sclerals and how to troubleshoot

What is a scleral?

- Definition: Any rigid gas permeable contact lens that entirely vaults the cornea and has landing zones solely on the sclera.

Type	OAD	Fitting Relationship
Corneal	8.5-12.0mm	Corneal bearing
Mini-Scleral	15.0-18.0mm	Scleral bearing with min corneal clearance
Full Scleral	18.1-24mm	Scleral bearing and max corneal clearance

Scleral vs. RGP



Which patients would benefit?

- Normal corneas
  - Dry eyes
  - High ametropia
  - RGP comfort failures
  - Active lifestyle or dirty work environments
- Irregular corneas
  - Keratoconus/PMD
  - Intacs
  - Cornea scars
  - Severe dry eyes
    - Exposure keratitis, host-graft disease, Sjogrens, Steven-Johnsons, ocular pemphigoid
  - Post-refractive ectasia
    - S/P LASIK, RK, PRK

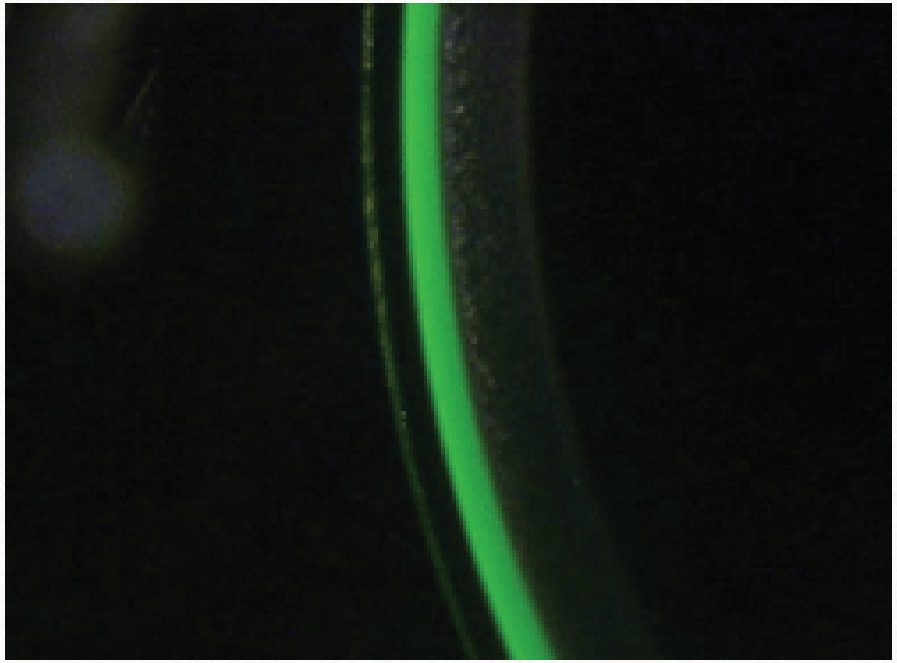
How to find a good fit?

- Use corneal topographer
  - Computerized contact lens fitting
- Fitting with trial lens set
- Using anterior segment OCT

Sag height vs. Base curve

- Choose your diameter
  - Normal corneas and small HVID = mini scleral
  - Irregular corneas and larger HVID = full scleral
- Adjust your sag height until you see about 200-300 microns
  - Important: Sclerals settle over time (50-200 microns).
  - Measure your sag height with fluorescein, optic section, and white or cobalt blue light
    - Compare the ratio of the tear reservoir to either 1) lens thickness or 2) cornea thickness

Scleral in the Slit Lamp

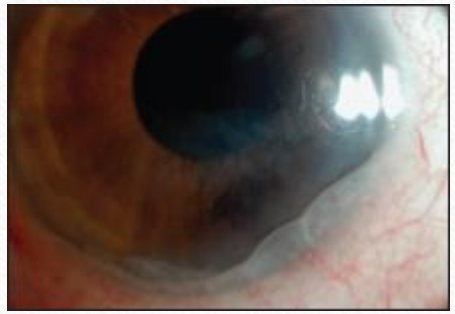


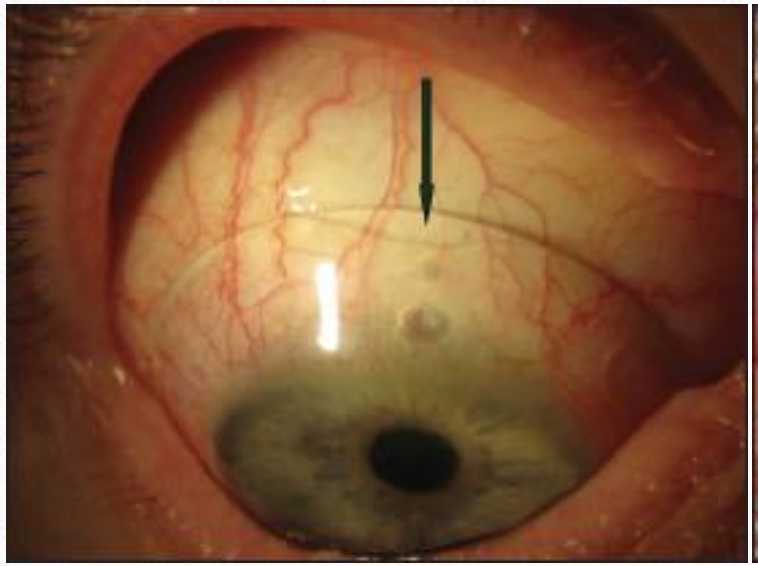
Love the Limbus

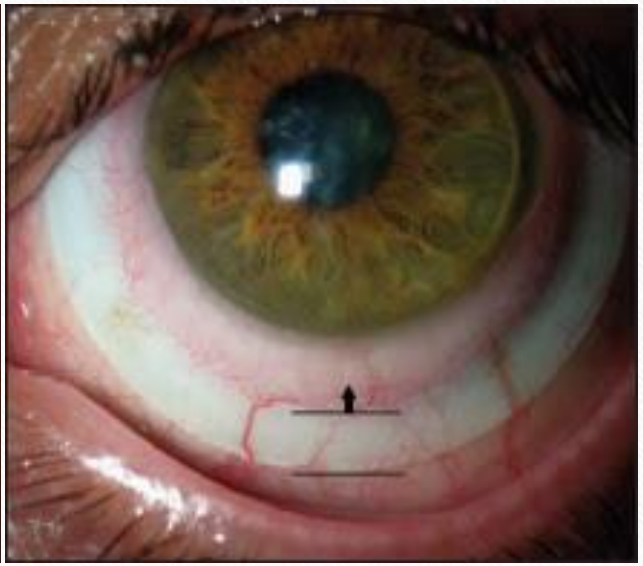
- Preserve the health the limbal stem cells to prevent discomfort, neovascularization, and keratitis
  - Aim for about 50 micron clearance

On the edge…

- Check for blanching
- Check for edge lift
- Conjunctival prolapse







CASE #1: Keratoconus/PMD

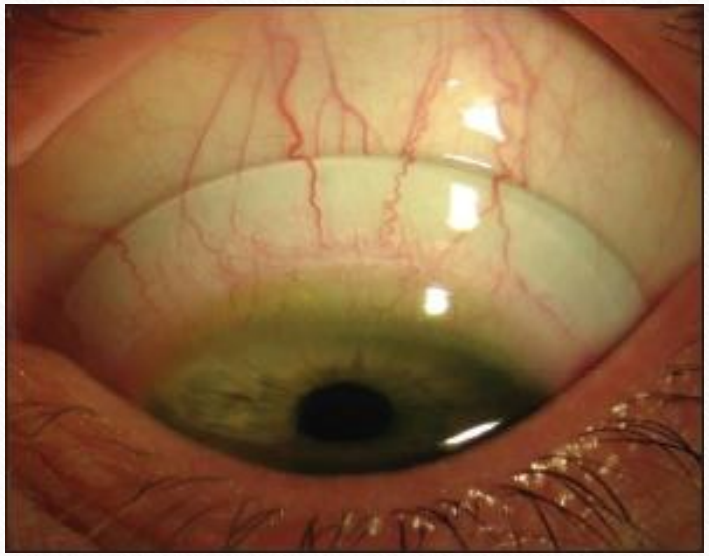
- T.M/24 year old male
- Ocular history:
  - Keratoconus that was diagnosed in 2011
  - S/P corneal crosslinking in 2012
  - Patient was referred because he had tried RGPs previously but failed due to comfort and lenses popping off. So he has been wearing glasses ever since.

T.M. Exam Findings

- VA with glasses:
  - OD: 20/80 and OS: CF @ 1ft
  - IOP:
  - OD: 16mmHg OS: 14 mmHg
- Pupils
  - PERRLA
- SLE
  - OD:
    - Cornea: Inferior steepening/thinning with scarring
  - OS:
    - Cornea: Inferior steepening/thinning with scarring
- Posterior Segment: Normal OU

T.M. Contact Lens Fitting

- OD: Jupiter Scleral/BC: 48.75/ OAD: 18.2/ OZ: 8.2/ PWR: -8.12/ PC1: 7.3x2.0/ PC2: 9.0x1.0/ PC3: 12.5x1.5/ PC4: 14.5x0.5
- OS: Jupiter Scleral/BC: 50.75/ OAD: 18.2/ OZ: 8.2/ PWR: -10.87/ PC1: 7.1x2.0/ PC2: 9.3x1.0/ PC3: 12.5x1.5/ PC4: 14.5x0.5
- BCVA with CL:
  - OD: 20/30, OS: 20/30



CASE #2: Exposure/Neurotrophic Keratitis

- M.R./10 year old male
- Medical History:
  - Ganglial glioma in 08/2016 with recurrence and multiple resections in 2017.
  - S/P left posterior fossa cranioplasty resulted in 7th nerve palsy, impaired 6th nerve palsy, and neurotrophic keratitis
- Ocular history:
  - Exposure keratitis with gold weight eyelid implant on 05/22/2018

M.R. Exam Findings

- VA with glasses:
  - OD: 20/20- and OS: 20/100- PHNI
- IOP:
  - OD: 13mmHg OS: 9 mmHg
- Pupils
  - PERRLA
- SLE
  - OD: Normal findings
  - OS:
    - Lid: 3mm lagophthalmos, gold weight in place, moderate Bell's reflex, good lower lid position
    - Conj.: Trace injection
    - Cornea: Large inferior stromal scarring with vascularization, no epi defect
    - Lens: Clear
- Posterior Segment: Normal OU

M.R. Contact Lens Fitting

- OS: Jupiter Scleral/BC: 40.00/ OAD: 18.2/ OZ: 8.2/ PWR: -1.00/ PC1: 8.6x2.0/ PC2: 8.8x1.0/ PC3: 12.0x1.5/ PC4: 14.25x0.5
- BCVA with CL: 20/50

CASE #3: S/P RK

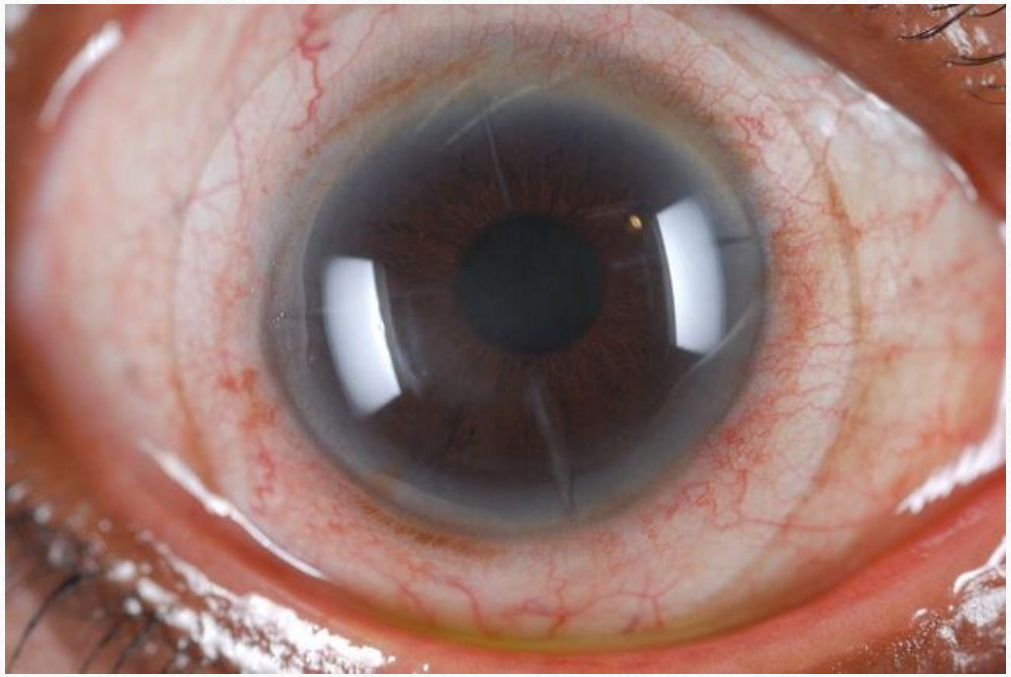
- J.M./73 year old female
- History of RK and AK OU
- Patient was fitted with SCL toric by an outside optometrist but was never happy with her vision or CL fit. So she has been using her glasses ever since.

J.M. Exam Findings

- VA with glasses:
  - OD: 20/50- and OS: 20/70- PHNI
- IOP:
  - OD: 13mmHg OS: 12 mmHg
- Pupils
  - PERRLA
- SLE
  - OD:
    - Cornea: 6 RK cuts with irregular epithelium
  - OS:
    - Cornea: 8 RK cuts, AK incision at 1 o'clock and 7 o'clock, mild injection with encroachment inferior
- Posterior Segment: Normal OU

J.M. Contact Lens Fitting

- OD: Jupiter Scleral/BC: 40.00/ OAD: 15.6/ OZ: 8.6/ PWR: +1.25/ PC1: 8.6x1.7/ PC2: 8.7x0.9/ PC3: 12.7x0.5/ PC4: 14.25x0.4
- OS: Jupiter Scleral/BC: 38.00/ OAD: 15.6/ OZ: 8.6/ PWR: +3.75/ PC1: 9.0x1.7/ PC2: 8.7x0.9/ PC3: 12.7x0.5/ PC4: 14.25x0.4
- BCVA with CL:
  - OD: 20/20
  - OS: 20/25



Case #4: S/P Corneal Transplant

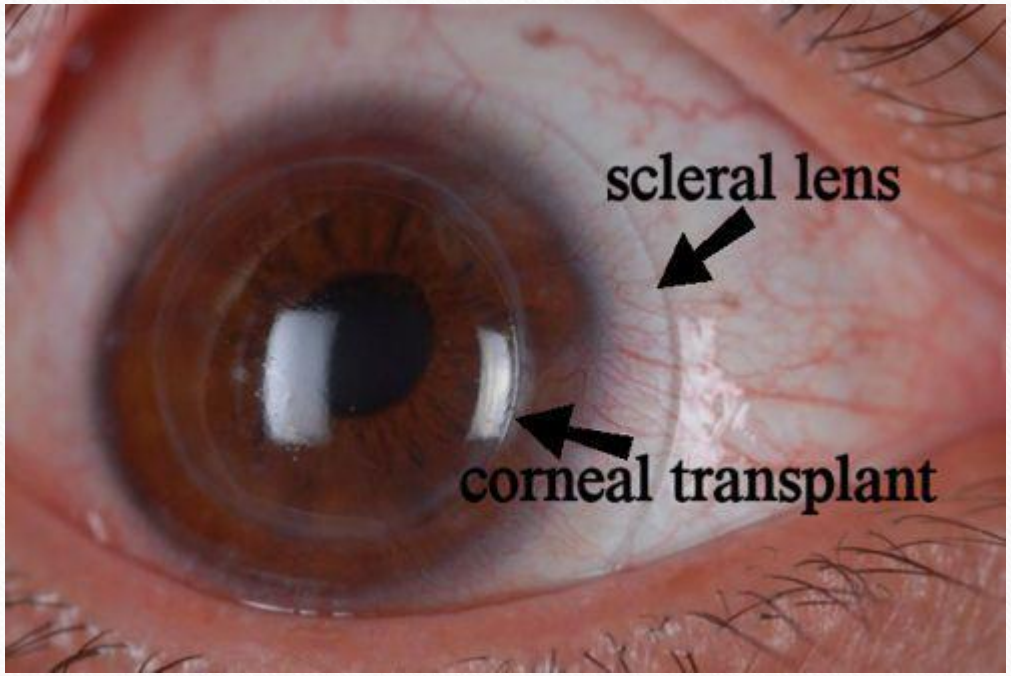
- R.S./74 year old male
- H/o PKP OU (4x OD and 5x OS due to rejection). Stable grafts per corneal specialist as of June 2018.
- Patient complaining of blurry, distorted, and double vision. R.S. was given prism glasses by an his current OD for his double vision but that did not help.
- Referred to our adult strabismus/neuro-ophthalmologist, who decided that there was no palsy, neuromuscular, or strab component to his double vision. Advised to take prisms out of glasses and seek CL fitting.

R.S. Exam Findings

- VA with glasses:
  - OD: 20/40- PHNI and OS: 20/40 PHNI (but doubled)
- IOP:
  - OD: 10mmHg OS: 10 mmHg
- Pupils
  - PERRLA
- SLE
  - OD:
    - Cornea: PK with no sutures; clear graft
    - PCIOL
  - OS:
    - Cornea: PK with running sutures; mild vessels in periphery
    - PCIOL
- Posterior Segment: Normal OU

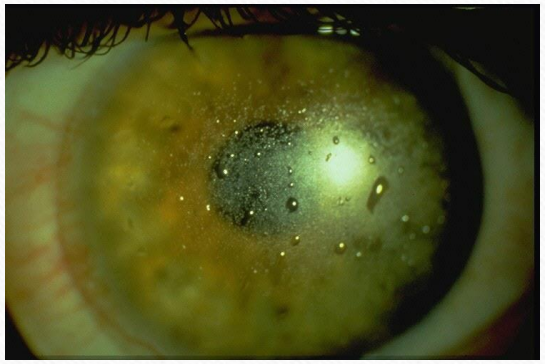
R.S. Contact Lens Fitting

- OD: Jupiter Scleral/BC: 44.75/ PWR: +0.75DS/ OAD: 18.2/ OZ: 8.2/ PC1: 8.0x2.0/ PC2: 9.0x1.0/ PC3: 12.5x1.5/ PC4: 14.5x0.5
- OS: Jupiter Scleral/BC: 46.00/ PWR: -2.50DS/ OAD: 18.2/ OZ: 8.2/ PC1: 7.7x2.0/ PC2: 8.7x1.0/ PC3: 12.5x1.5/ PC4: 14.5x0.5BCVA with CL:
  - OD: 20/25
  - OS: 20/25



Troubleshooting 101

- Poor wetting and deposits
  - Proper education with make-up, soaps, lotions, and cleaning
  - Hydra-PEG coating
  - Plasma treatment
- Bubbles
  - Proper A&R training
  - Use of stability devices
    - SeeGreen by Dalsey Adaptives
    - O-Ring

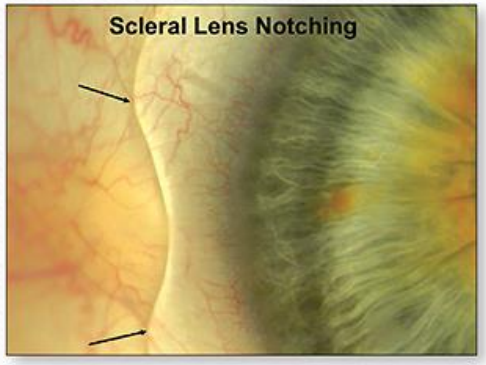


Troubleshooting 101 (cont'd)

- Red eyes
  - Check edges for impingement
    - Back surface toric haptics
  - Check limbal clearance and sag height
  - Sensitivity to filling solutions and cleaning solutions
- Blurry vision
  - Significant over-refraction?
    - F1 Toric/Multifocals/Over contact glasses
  - Bubbles
  - Dryness and wettability
  - Cornea edema

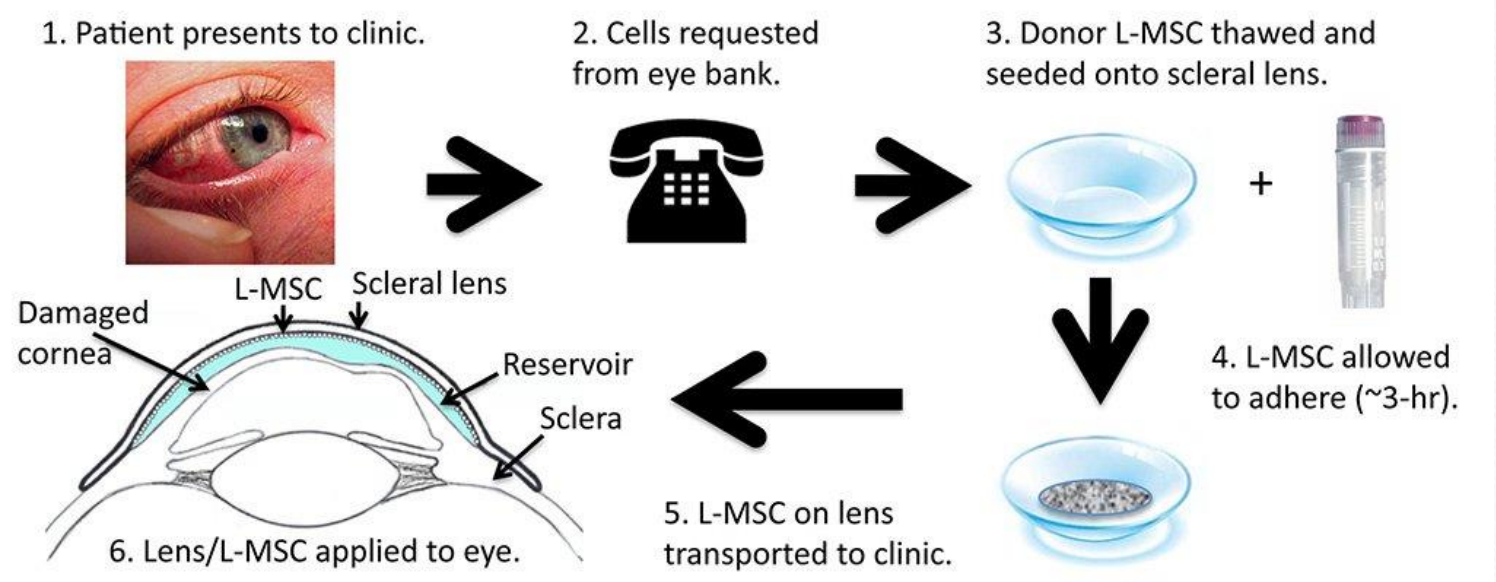
Other considerations

- Notched sclerals
- Flexure
- Cleaning Solutions and Filling Solutions
  - Hydrogen peroxide solutions
  - LacriPure and Bausch & Lomb Scleralfil
  - Addipak (0.9% sodium chloride solution)
- 3D printing



In recent news…

- Limbal mesenchymal stromal cells laden scleral lenses to aid in cornea healing?



Take Home Messages

- Use sclerals as your first and last resorts
- Take time to educate your patients regarding care and expectation
- Find a lab and scleral fitting set that you are comfortable with
- Check cornea
- Have fun and be creative!

Thank You!

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