FINANCIAL DISCLOSURES

In the past year, Dr. Walker has received research funding or honoraria from the following for-profit companies:
- Alcon Laboratories
- ABB Optical
- Bausch Health Specialty Vision Products

Scleral lens indications: advanced considerations

- Managing more advanced conditions:
  - Ectasias: Keratoconus, PMD, post-LASIK ectasia, Post-surgical; Ocular surface disease
  - Discussion of underlying diseases
  - Case series today:
    - Keratoconus (2 patients)
    - Presbyopia (1 patient)
    - Ocular surface disease (1 post-herpetic infection)
  - Complications: hydrops, edema, visual quality, bubbles

Scleral Lens Complications

Overview of Scleral Lens Fitting Technique

- Central clearance zone: goal is to vault over the cornea
- Limbal clearance zone: goal is to align (barely vault)
- Scleral landing zone: best when even and smooth landing

Keratoconus: Case 1

- Patient LC, age 17
- Referred from America’s Best on 8/24/21
- Pt reports that 1 month ago, was traveling and woke up with hazy, slightly painful eye
  - Saw an urgent care OD out of state – told he had Kc and hydrops OS
  - Was prescribed 3 drops – unknown, finished last week
  - Took a photo to share with his friends &
Initial exam 8/24/21
- Never worn any contact lenses or glasses
- OD has been blurry in the past but more noticeable over the past year

- Prior to SL wear
  - Mild stromal haze

- Small peripheral epithelial scar

- Horizontal striae

- Initial exam 8/24/21
  - Reports no pain, but hazy vision OS worse than before the incident
  - Currently not taking any drops
  - Very interested in getting a contact lens to improve vision OS
  - Nervous about prospect of needing corneal transplant
OS

- Corneal hydrops
- No C3 user for now
- Treatment started:
  - Prednisolone acetate 1% BID
  - Muro 128 QPM and as desired (not more than 6x per day)

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OS – first visit
- 1 month post hydrops
  - Photophobic
  - (+) edema
  - (+) probable scarring
  - VA: 20/300
  - IOP: 13 (OU)

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- 1 month post hydrops
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OD: SCLERAL LENS FITTING

- Front surface toric
- SAG: 5.04
- PWR: -3.25 - 1.75 x 165
- DIA: 14.8
- BC: 7.46
- Material: Hexa 100
OD: SCLERAL LENS FITTING
Dispensed 9/30/21

New Lens (Trial 2):
- Front surface toric
- SAG: 5215
- PWR: -4.25 -1.75x165
- DIA: 16.8
- BC: 7.30
- Material: Hexa 100

Health of right eye
1 month SL wear

OD: SCLERAL LENS FOLLOW-UP

Final Lens (Trial 2):
- Front surface toric
- SAG: 5215
- PWR: -4.25 -1.75x165
- DIA: 16.8
- BC: 7.30
- Material: Hexa 100

10/14/21

FINAL VISIT
OD: WEARING SL FOR 2.5 MONTHS
OS: HYDROPS 5 MONTHS AGO

Health of right eye
- 2 months SL wear

FINAL VISIT
OD: WEARING SL FOR 2.5 MONTHS
OS: HYDROPS 5 MONTHS AGO

11/18/21
OS: hydrops f/u
- Continued to treat with Pred 1%, tapering at the end and finishing after 11/18/21

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OS: hydrops f/u
- Continued to treat with Pred 1%, tapering at the end and finishing after exam on 11/18/21

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Keratoconus:
Case 2
- Patient JM, age 35
- University Eye Institute (UH) patient - LEE 2018
- Pt reports broken lens OD, had good comfort, fit and vision with SL OU; wearing lenses >10y
- Wears 16h per day, uses Clearcare and ScleralFil
- Manifest spec Rx:
  - OD: -3.00- 3.00x082 20/40
  - OS: -1.00- 4.00x017 20/100

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Initial exam 9/7/21
- Presenting SL OS:
  - Toric prolate lens
  - PWR: -3.00
  - BC: 6.4
  - SAG: 5650
  - DIA: 16.0
  - Landing zone: flat 4 x steep 1 (150um difference)
  - VA: 20/40 (typical)
- Re-ordered habitual OS, increased SAG OS, set for patient to pick up lenses without dispense and return for f/u in 2 weeks

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Emergency Visit:
9/16/21
- Pain OD started two days ago
- Tear mixing with saline and then slit lamp help
- + photophobia
- Had prolapsed lens OD two days ago - not wearing the lenses when presenting for the visit
- Reported lenses made things more comfortable OD
- Tel: 303-003
- Scleral lens wear
- Tel: 747
- Patient info: address 76 776
- Room 72 B - 2nd Floor 08
- OD: Collodion lens over destroyed

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Follow-up:
9/21/21
- Patient reports everything is “back to normal”
- Compliant with drops
- Not taking all day out of lenses as recommended, but must on contact lens
- Started contacts again:
  - Wear: 20/30 - 030 - 20/08 OS
  - Tear drops:
    - Continue with Telodex until 12/14
    - Reduce Pred to BID on 9/25
    - Continue with Tobradex as needed - do not put in SL

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Follow-up: 10/5/21
- Reports complete “resolution”
- Compliant with drops
- Wore lenses almost full-time, tried to limit at night and weekends
- Vision: 20/20 OD; 20/40 OS
- Updated treatment plan

Final Follow-up: 10/19/21
- Resolved hydrops
- Vision: 20/20 OD; 20/40 OS
- Discontinue all drops
- Continue with scleral lenses

Optical metrology of a center-near multifocal design.
- Minimal movement/rotation and are very stable
- Simultaneous vision multifocal designs are necessary
- Majority center-near designs, but some labs offer center-distance designs
- Optical placement highly customizable

Multifocal lens case example
- 44 yo white female
- Denied LASIK 1y ago due to dryness
- Strongly interested in presbyopic option
- OD: +0.75 –4.25 x 175
- OS: -0.25 -3.00 x 007
- First lens design: bitoric translating bifocal GPs
- Second lens design: MF sclerals

Multifocal lens case example
- 15.4 mm diameter
- Plano power (7.67 base curve)
- +1.00 OD, 1.5 mm near zone, dec 0.5mm SN
- +1.25 OS, 1.5 mm near zone, dec 0.5mm SN
- Both lenses made with tonic landing for stabilization
- VA distance 20/20, near 20/30
- Monocular 20/30 OD; 20/20 OS
Post-transplant SL fitting

- Patient IB
  - 69yo HM
  - Monocular patient (OS)
  - Corneal transplant (injury) early 2020
  - Taking Prednisolone acetate 1% QPM
  - DM type II, HTN
  - Presented for SL fit 04/2021

Monitoring signs of a poor response to SL wear

- Lens - monitoring clearance over sutures
- IOP - monitoring effect of Pred + SL
- Monitoring neo, edema for signs of hypoxia and risk of infection

Post-transplant SL fitting

Patient IB - IOP tracking

- 4/21/21: 8mm Hg (GAT)
- 6/29/21: 17mm Hg (iCare)
- 9/9/21: 15mm Hg (iCare)
  - 10mm on GAT 15 min later

Neurotrophic keratopathy

- Patient SW, 70yo WM
- Post-herpetic NK - OS only
- Fitted with 14.8 dia SL (tried 15.4+ - unable to apply)
- ClearCare for disinfection, MPS conditioner
  - PF application solution: polyethylene glycol 400 (0.4%), propylene glycol 0.3% (Cystar®)
Neurotrophic keratopathy

- Wearing lenses for 6 months
- C/o blur, redness, discomfort after several hours of lens wear
- Specular microscopy
  - OD: 3390 cells/mm
  - OS: 3389 cells/mm

Specular microscopy data:
- OD: 2220 cells/mm
- OS: 3389 cells/mm

Management of Edema with SL

- Diffusion through lens and tears
- Lens thickness (SAM/FAP)
- Lens Dk (lost ROI after 100?)
- Tear reservoir thickness (Fisher 2020)
- Application solution?

Take home:
- Make lens with Dk > 100 and thickness < 400
- Fluid reservoir about 200 um

Neurotrophic keratopathy corneal edema management

- Increased Dk to 200 (fluid reservoir thickness unchanged)
- Fluid reservoir thickness ~ 300

- 100 um clearance
- 200 Dk lens
- Removes if any s/s of swelling

Complication: bubbles
Neurotrophic keratopathy

- d/c lens wear
- Treat w/broad spectrum Antibiotics and RTC every few days until healed
- Returned to SL wear when resolved

Summary and Conclusions

Thank you, and please feel free to email with any questions: mkwalker@central.uh.edu