STATE BOARD OF OPTOMETRY
2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834
P (916) 575-7170 F (916) 575-7292 www.optometry .ca.gov

Continuing Education Course Approval Checklist

Title: PROSE/Specialty Contact Lenses

Provider Name: UCSF c/o Dr. Jane Kuo

☑Completed Application
Open to all Optometrists? ☑Yes ☐No
Maintain Record Agreement? ☑Yes ☐No

☑Correct Application Fee

☑Detailed Course Summary

☑Detailed Course Outline

☑PowerPoint and/or other Presentation Materials

☐Advertising (optional)

☑CV for EACH Course Instructor

☑License Verification for Each Course Instructor
Disciplinary History? ☐Yes ☑No

OPTOMETRY

STATE BOARD OF OPTOMETRY
2450 DEL PASO ROAD, SUITE 105, SACRAMENTO, CA 95834
P (916) 575-7170 F (916) 575-7292 www.optometry.ca.gov

CONTINUING EDUCATION COURSE APPROVAL APPLICATION

$50 Mandatory Fee

FEES PAID

Pursuant to California Code of Regulations (CCR) § 1536, the Board will approve continuing education (CE) courses after receiving the applicable fee, the requested information below and it has been determined that the course meets criteria specified in CCR § 1536(g).

In addition to the information requested below, please attach a copy of the course schedule, a detailed course outline and presentation materials (e.g., PowerPoint presentation). Applications must be submitted 45 days prior to the course presentation date.

Please type or print clearly.

Course Title	**Course Presentation Date**
PROSE/Specialty Contact Lenses	02/05/2017

Course Provider Contact Information

Provider Name

Karen (First) Lee (Last) Lai Yin (Middle)

Provider Mailing Address

Street 1827 22nd Ave **City** San Francisco **State** CA **Zip** 94122

Provider Email Address karen.lee2@ucsf.edu

Dr. Jane Kuo is the provider

Jane.Kuo@ucsf.edu

Will the proposed course be open to all California licensed optometrists?	☑ YES ☐ NO
Do you agree to maintain and furnish to the Board and/or attending licensee such records of course content and attendance as the Board requires, for a period of at least three years from the date of course presentation?	☑ YES ☐ NO

Course Instructor Information

Please provide the information below and attach the curriculum vitae for each instructor or lecturer involved in the course. If there are more instructors in the course, please provide the requested information on a separate sheet of paper.

Instructor Name

Karen (First) Lee (Last) Lai Yin (Middle)

License Number CA 14681 TLG	**License Type** Optometrist
Phone Number (808) 4297-7386	**Email Address** karen.lee2@ucsf.edu

I declare under penalty of perjury under the laws of the State of California that all the information submitted on this form and on any accompanying attachments submitted is true and correct.

Signature of Course Provider *Date* 01/06/2017

Title: PROSE/Speciality Contact Lens: Prescribing for the Irregular Cornea

Presenter: Karen Lee, OD FAAO

Summary:
For the everyday practitioner, fitting specialty lenses can be intimidating; however, there is a large population of keratoconic patients and post-surgical irregular corneas that benefit from specialty contact lenses. This course utilizes a series of video based cases to discuss the thought process behind fitting irregular corneas.

Presenter: Karen Lee, OD

Learning objectives:

1) Understand

those patients most appropriate for each lens modality.

2) Optimizing clinical outcomes for patients with corneal irregularities such as keratoconus.

3) Discuss the strategies for fitting post cornea transplant patients.

Video Grand Rounds: Keratoconus Management- “Large to Small, Fit Them All”

I. Fitting an irregular cornea

A. A brief overview on contact lenses available commercially

1. Corneal gas-permeable contact lens
2. Cornea-limbal contact lens
3. Hybrid lens
4. Mini-scleral gas permeable contact lens
5. Scleral gas permeable contact lens

II. Case Studies

A. Patient RR

1. Keratoconus moderate stage, slit lamp findings and corneal topography map
2. Thought process behind corneal gas permeable lens selection
3. Demonstration video of apical touch
4. Thought process for GP fitting
5. Corneal Cross Linking-update
6. Clinical Pearls

B. Patient LW

7. Keratoconus severe stage, slit lamp findings and corneal topography map
8. Thought process behind corneal gas permeable lens selection
9. Demonstration video of dimple veiling secondary to excessive midperipheral clearance
10. Thought process and SCL selection for piggybacking
    a. Consider piggybacking for: Poor lens centration / decentered cone apex; Poor lens comfort; especially for first-time GP wearers; Persistent corneal staining; especially three and nine staining
    b. High Dk ie. silicone hydrogel materiał
    c. Base curve selection: Steeper can be better
    d. Low powered lens: Only 20.9% of soft piggyback lens power transmitted
11. What to look for in a piggyback lens system:

. Soft lens edge fluting: Low modulus vs High modulus

a. Independent movement of SCL from corneal GP

12. Demonstration video of successful piggyback lens system
13. Clinical Pearls

C. Patient CD

1. Keratoconus severe stage, slit lamp findings and corneal topography map
2. When to switch from a small corneal GP lens to an intralimbal GP lens
3. Demonstration video of poor intralimbal GP lens fit
4. Demonstration video of successful intralimbal lens fit
5.

D. Patient DW
    1. When to refer for surgical intervention (penetrating keratoplasty, deep anterior lamellar keratoplasty, corneal cross-linking, thoughts on intacts)

a. Post-surgical fitting principles
b. Australian Graft Registry findings
    2. History of PKP OS secondary to KCN
    3. Presented with a poorly fitting corneal GP lenses OS, refit with a 16.0mm scleral GP lens
    4. Demonstration video of scleral lens fit exhibiting lens drop
    5. Demonstration video of centered scleral lens
    6. Monitor for corneal edema and neovascularization

E. BostonSight PROSE for corneal edema

F. BostonSight PROSE for persistent epithelial defects

Prescribing for Irregular Corneas: Video Grand Rounds

Karen Lee, OD, FAAO, FSLS

Case #1

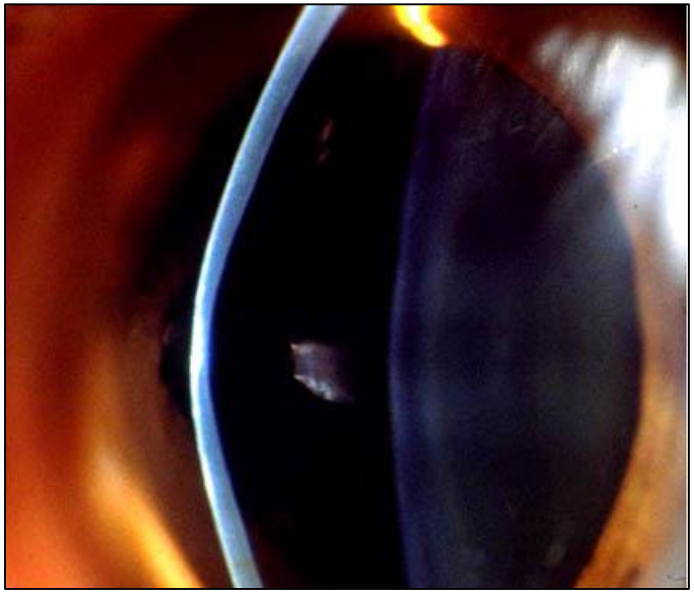
Patient RR – 24yo Hispanic Female

- CC: distance blur OU
  - Onset: 4+ months ago
  - Gradually worsening
  - Denied eye rubbing
  - No improvement with soft contact lenses or spectacles

- cc VA (specs) OD PH OS PH
- POHx: keratoconus OU
- FOHx: unremarkable

Patient RR – Slit Lamp Findings

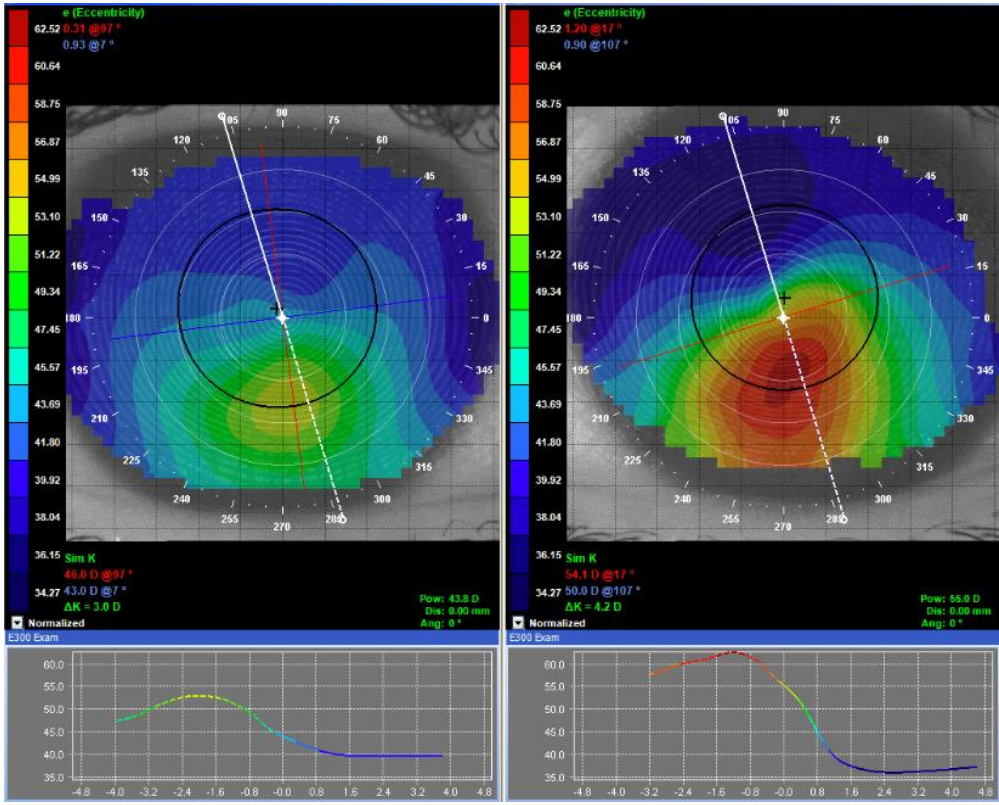
- (-) Vogt's striae OU
- (-) Fleischer's ring OU
- (-) scarring OU
- (+) mild stromal thinning OS



http://www.pacificu.edu/optometry/ce/courses/15167/images/Slide23.jpg

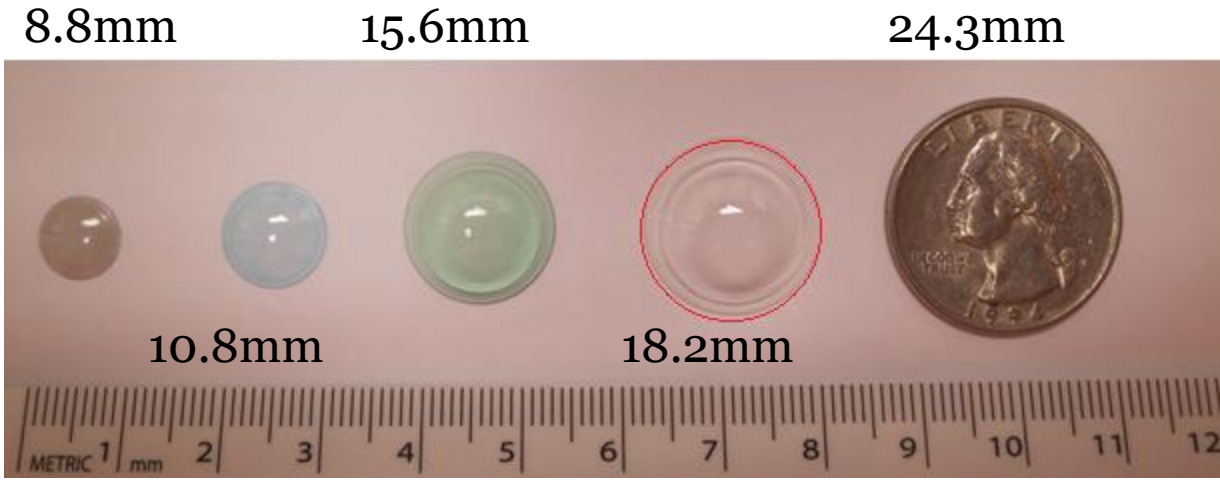
Patient RR – Corneal Topography

- OD sim K
  - 43.00@007 / 46.00@173
- OS sim K
  - 50.00@107 / 54.10@073



Contact Lenses for Managing Keratoconus

- Corneal gas-permeables (GPs)
- Intralimbal GPs
- Scleral GPs
- Soft CLs
- Hybrid Lenses
- Soft Lens Piggybacking



Patient RR – Corneal GP Lens Fitting

- Mild-moderate keratoconus
  - Reasonably centered cone on topography
- Choosing the first trial lens
- Find the “steepest” trial lens BC that barely touches the apex of the cone

CLEK Study Group

Factors predictive of corneal scarring

1.

2.

3.

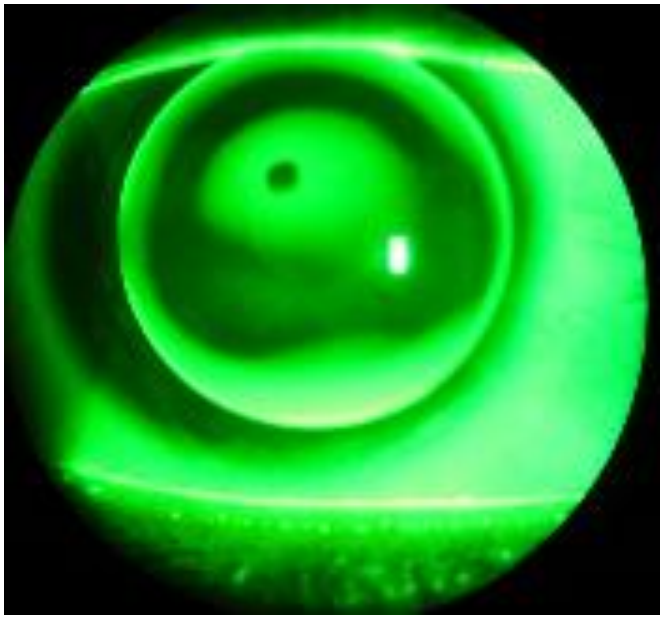
4.

First Corneal GP NaFl Pattern OD

GP parameters: CLEK 45.00 (7.50) / -1.87 / 8.6 OAD / 6.3 OZD

DVA: 20/25

SCOR: pl-0.50x105 20/20

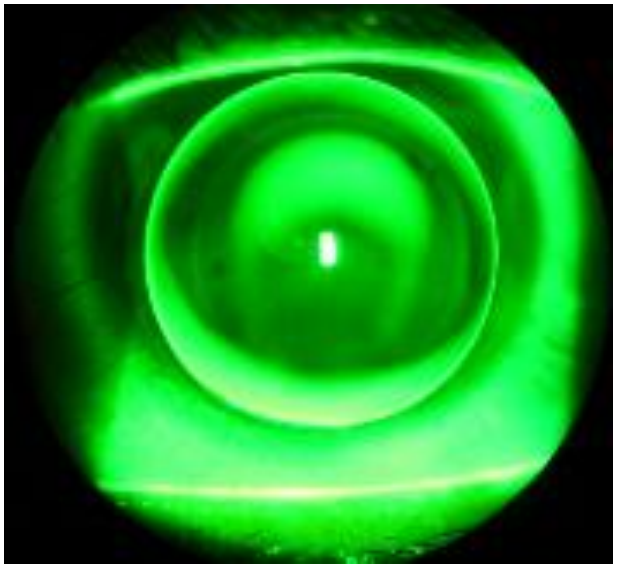


First Corneal GP NaFl Pattern OS

GP parameters CLEK 49.50 (6.82) / -5.00 /8.6 OAD / 6.3 OZD

DVA: 20/30

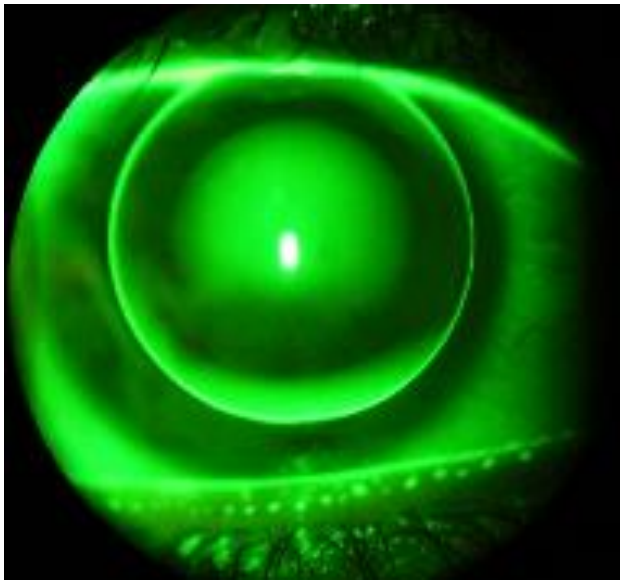
SCOR: -0.25-0.25x173 20/30



Final Corneal GP NaFl Pattern OD

GP parameters CLEK 44.62 (7.56) / -1.75 / 8.6 OAD / 6.3 OZD

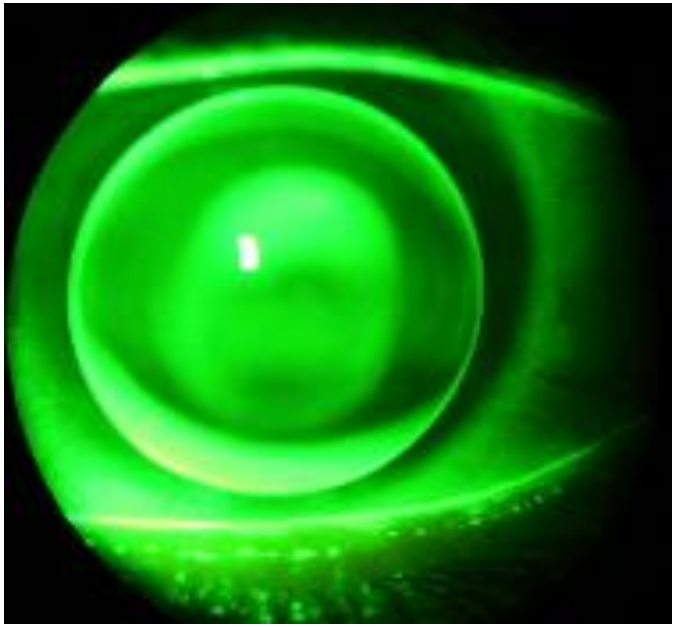
DVA: 20/20-



Final Corneal GP NaFl Pattern OS

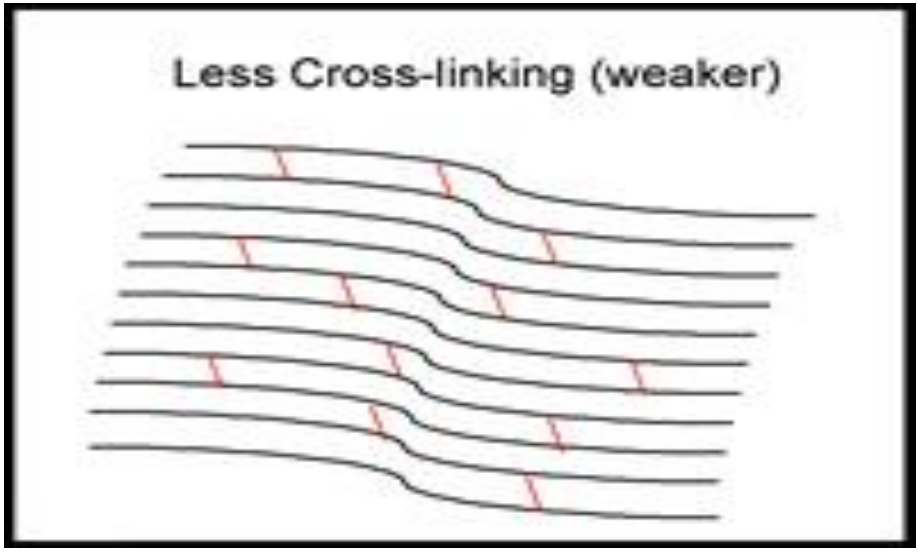
GP parameters CLEK 49.87 (6.77) / -5.37 / 8.6 OAD / 6.3 OZD

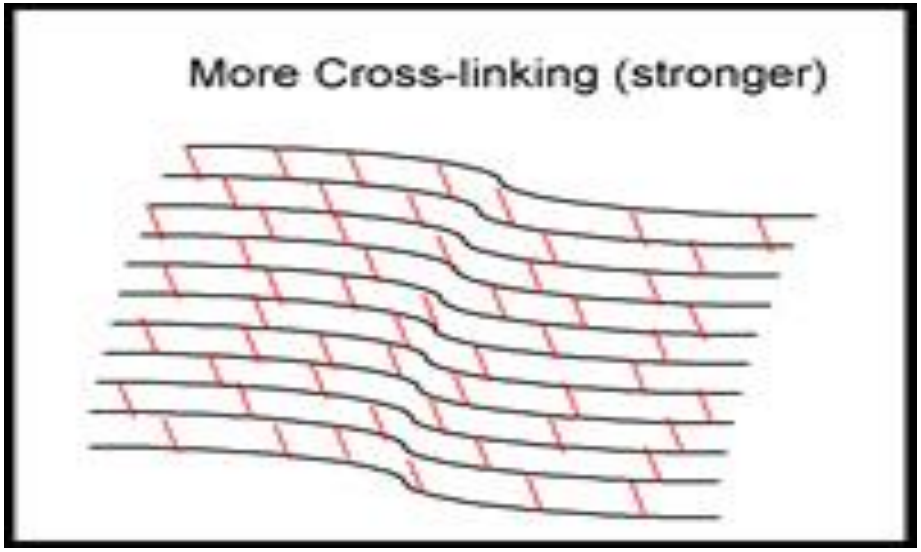
DVA: 20/25+2



Corneal Cross-Linking Referral?

CXL In Theory





http://eyeexcellence.com/images/cross.gif

CXL Candidates

- Recommended age range:
- Recommended corneal thickness:
- Maximum keratometric readings:

CXL Contraindications

-
-
- Severe eye dryness
- Pregnancy or nursing
-
- Systemic collagen pathology
- Concomitant autoimmune diseases

A Randomized Controlled Trial of Corneal Collagen Cross-liking in Progressive Keratoconus: Preliminary Results

Three ways to define progression:

1. Increase in on manifest refraction by ≥
2. Increase in (sim K or manual) ≥
3. Decrease in of best-fitting contact lens by >

A Randomized Controlled Trial of Corneal Collagen Cross-liking in Progressive Keratoconus: Preliminary Results.

Main outcomes at 36 months

1. Average Kmax flattening of in treatment group
2. Average Kmax steepening of in control group
3. correlation between baseline Kmax and change in Kmax
   - Greatest improvement when baseline Kmax ≥
4. correlation between age of enrollment and change in Kmax in control group

Avedro Receives FDA Approval

- Photrexa Viscous, Photrexa and KXL system

- Remove corneal epithelium
- Apply Photrexa Viscous drops
  - 1 drop every 2 minutes for 30 minutes
  - Check for yellow flare in anterior chamber
    - If no flare instill another drop every 2 minutes for an additional 2-3 drops and recheck for yellow flare, repeat as necessary

- Once flare is observed perform pachymetry
  - If less than 400um instill 2 drops of Photrexa every 5-10 seconds until corneal thickness increases to at least 400 um

- Expose to KXL ultraviolet (UVA) light for 30 minutes
  - Apply 1 drops of Photrexa Viscous every 2 minutes

Avedro Receives FDA Approval

- Amount reduction in Kmax at month 12
  - Study 1: Study 2:

- Most common adverse reactions
  1.
  2. Punctate keratitis
  3. Corneal striae
  4.
  5.
  6. Reduced VA or blurred vision

Common CXL Questions

"Natural" corneal cross-linking?

- : oxidative deamination reaction
- : glycation

Which eye to start with?

Epi on?

- Biomechanical effect of the standard procedure
- One study found no cross-linking effect

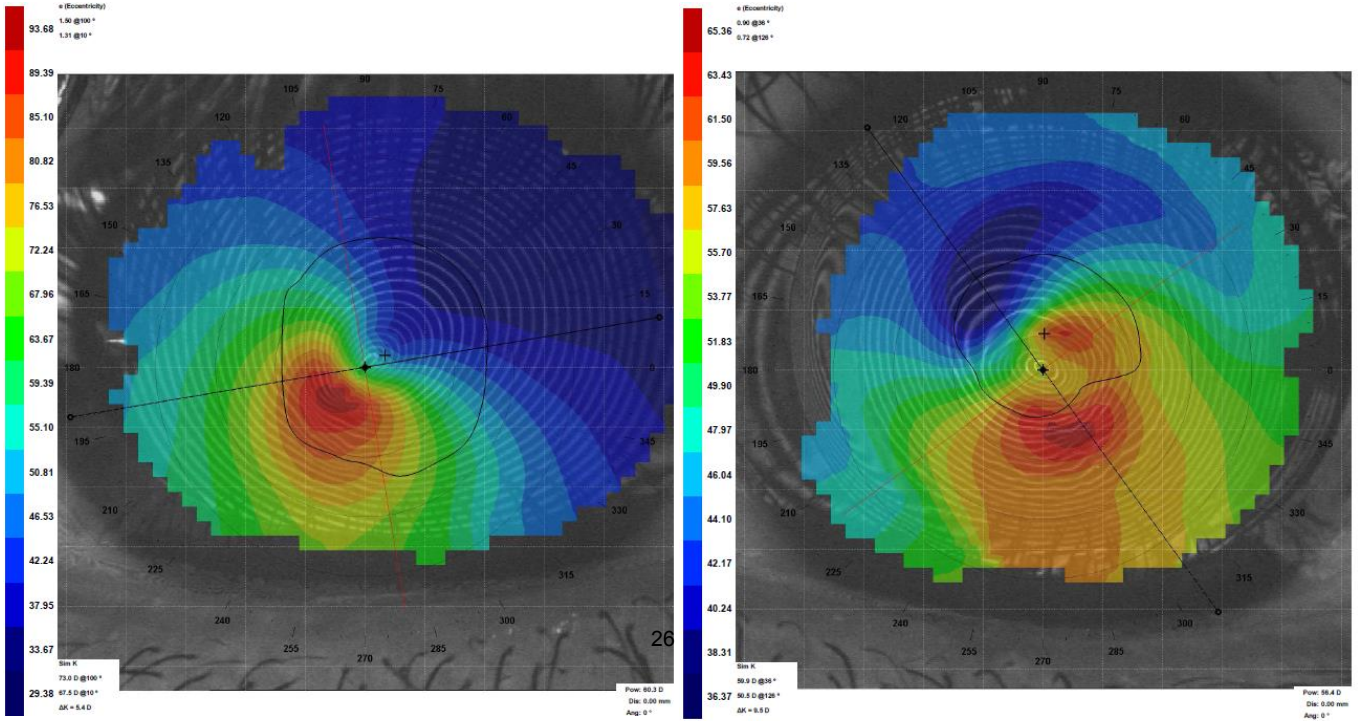
Patient RR - Clinical Pearls

- Keratoconus does NOT lead to blindness!
- **Flat**-fitting lenses will lead to scarring; so will vigorous eye rubbing
- Contact lenses will NOT slow down or reverse KCN progression – goal is to provide best vision correction
- Support for patients: National Keratoconus Foundation
  - http://www.nkcf.org/

Case #2

Patient LW – 35yo African-American Female

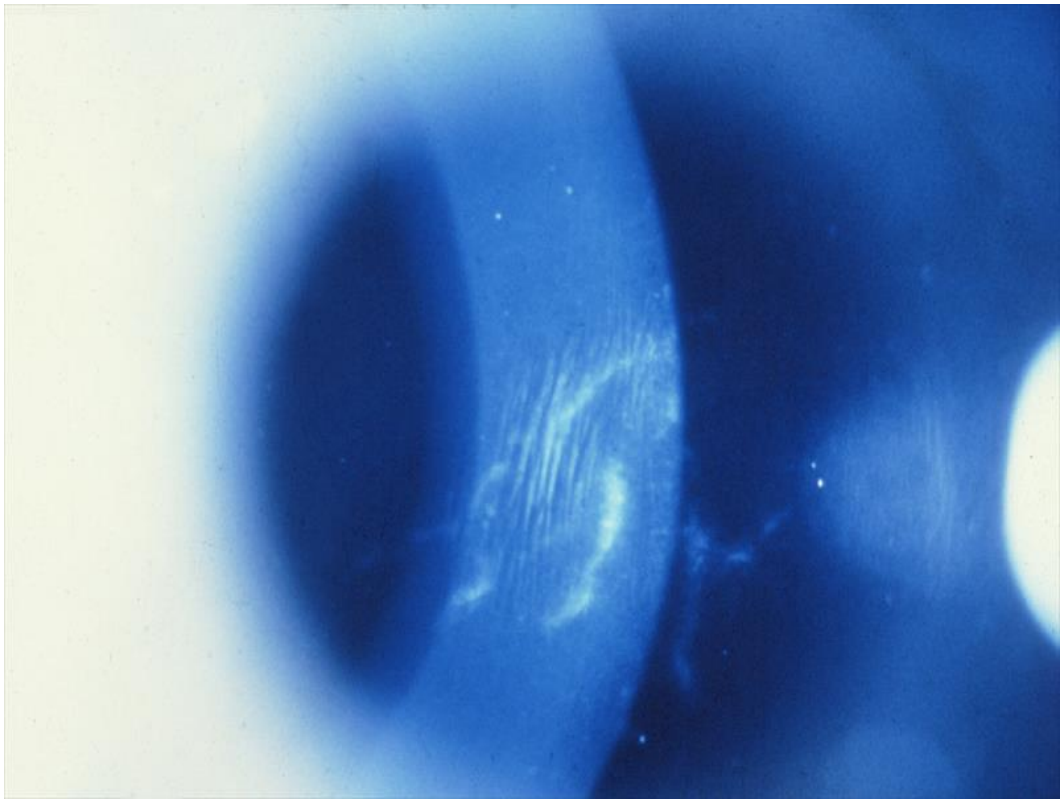
- CC: blurred vision, lost habitual corneal GP lenses, would like a new pair
- POHx: keratoconus OU (Dx at age 25)
- FOHx: unremarkable



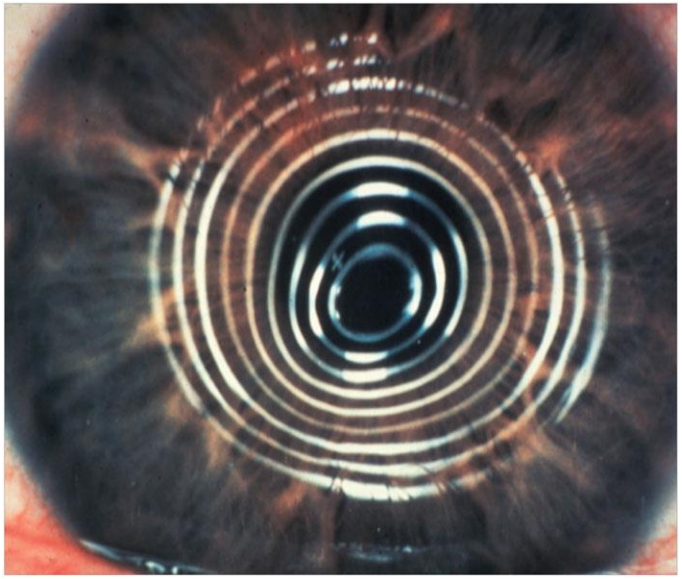
Patient LW – Clinical Findings

- OU (+) KCN / (+) Vogt's striae / (+) central apical scarring

- sc VA
  - OD: 20/1000
    - PH: 20/150
  - OS: 20/1250
    - PH: 20/125



Patient LW



- Sim K's
  - OD: 67.5 @ 010 / 73.0 @ 100
  - OS: 50.5 @ 126 / 59.9 @ 036

- Lenses ordered and dispensed
  - OD CLEK 65.50 (5.15) / -25.25 / 8.8 OAD / 6.0 OZD
  - OS CLEK 58.00 (5.82) / -16.50 / 8.8 OAD / 6.2 OZD

Photo courtesy of Barry Weissman, OD, PhD

Corneal Cross-Linking Referral?

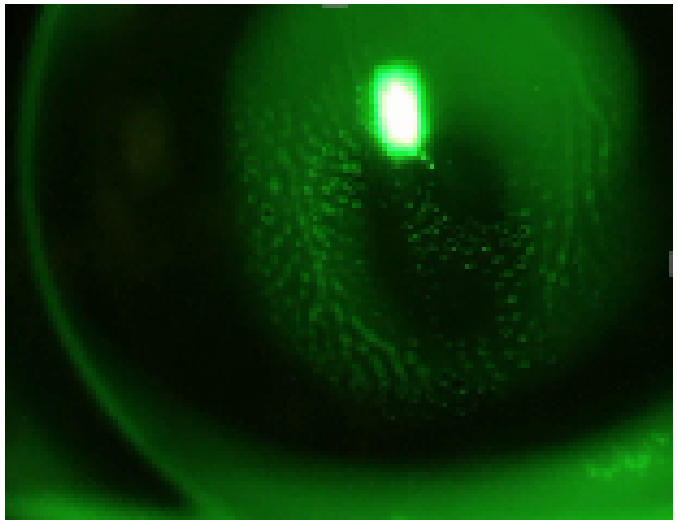
First pair of lenses dispensed…

One Week Follow Up

“Not All Dimples Are Cute” -Dr. Brooke Messer

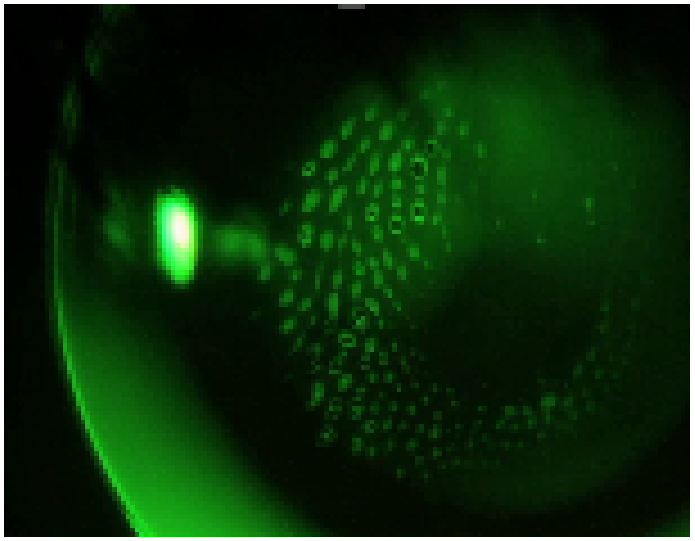
- CC:
- Modifying factors:

OD



DVA: 20/30-

OS

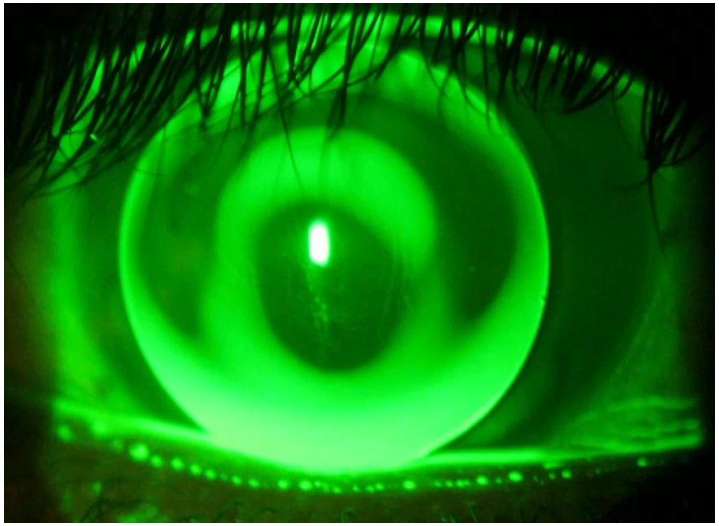


DVA: 20/60-

Later on in the exam….

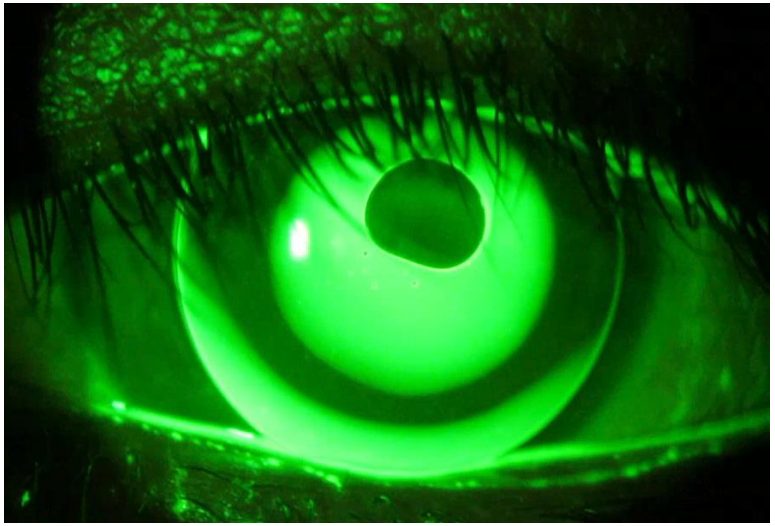
OD 65.50 (5.15) / -25.25 / 8.8 OAD / 6.0 OZD
OS 58.00 (5.82) / -16.50 / 8.8 OAD / 6.2 OZD

OD



Steep K: 73.0 @ 100

OS



Steep K: 59.9 @ 036

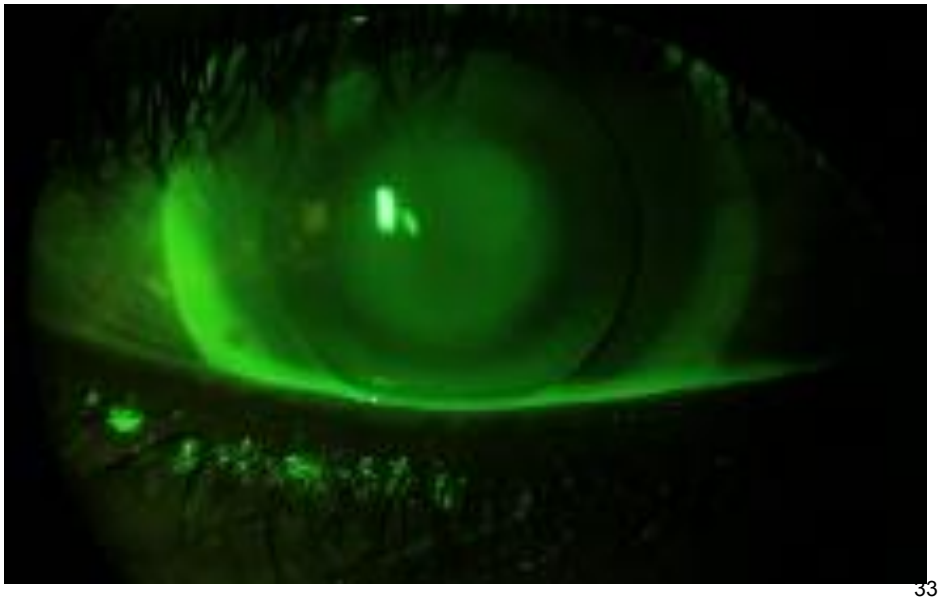
Options?

- Adjust corneal GP parameters
- Intralimbal lenses?
- Scleral lens fitting?
- Piggyback with soft lenses

Goodbye, Dimples!

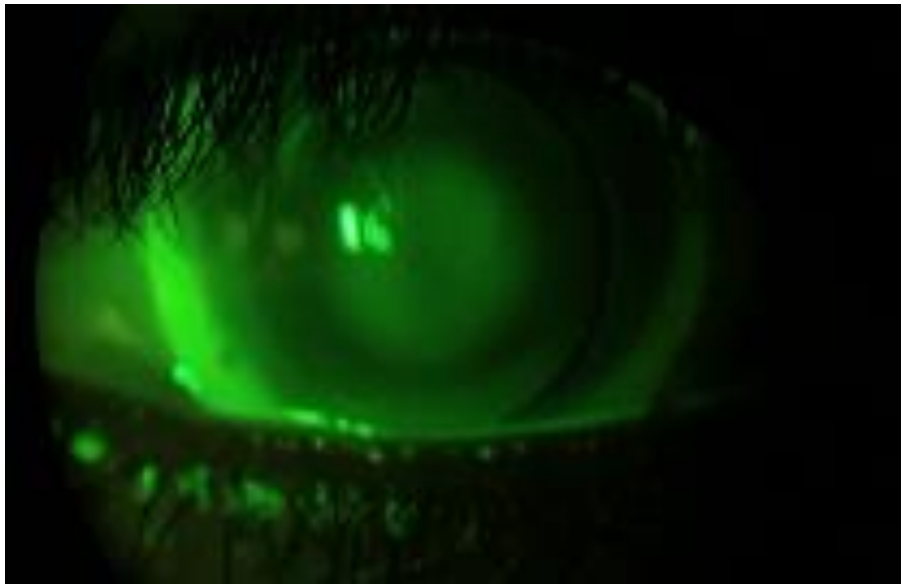
- Piggybacking OU
  - Air Optix Aqua Night & Day 8.4 / 13.8 /+0.25ds

OD



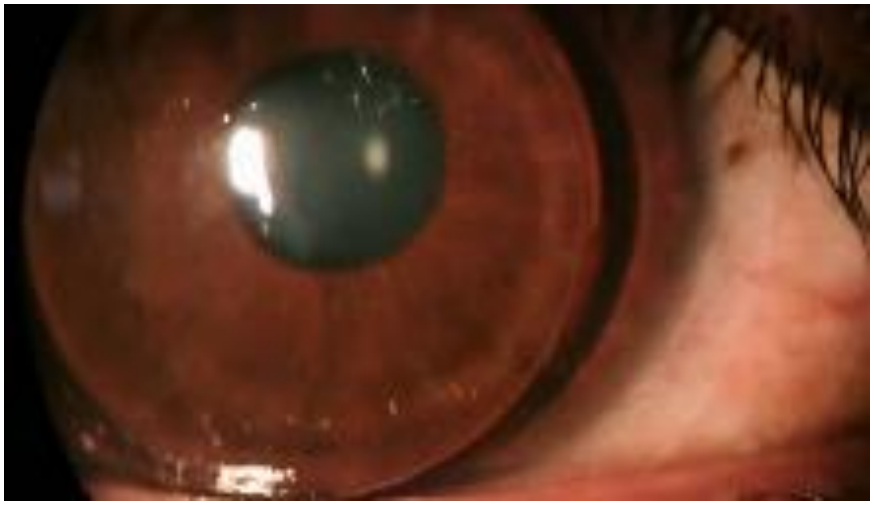
DVA: 20/30+

OS



DVA: 20/25+

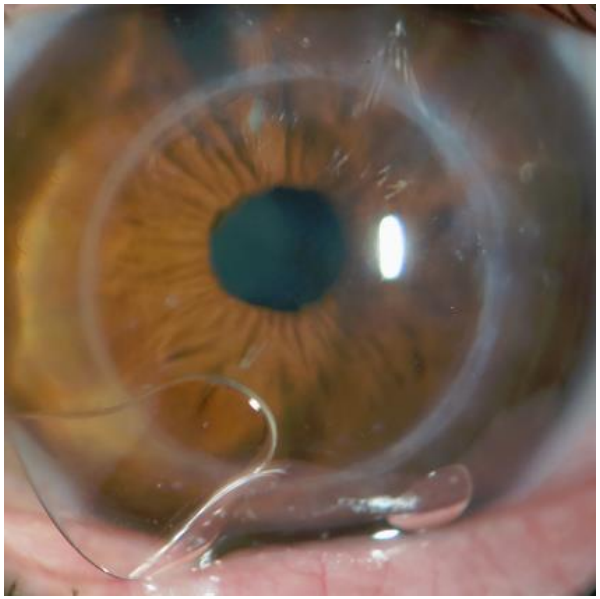
Piggybacking

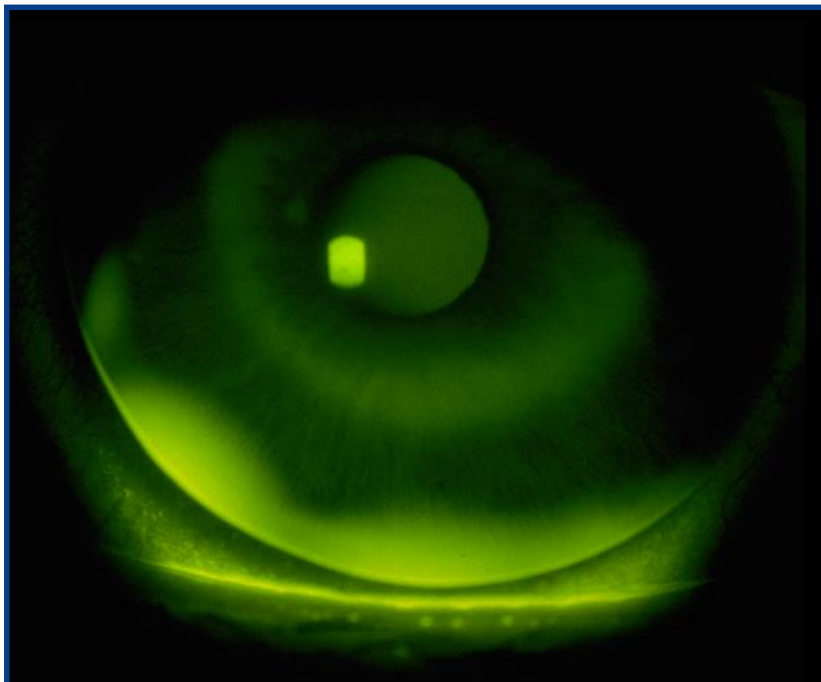


- **Lens selection**
  -
  - Replacement schedule
  -
  - Silicone hydrogel vs hydrogel
- **Only of lens power transmitted**
- **What to look for:**
  - Edge fluting
  - Independent movement of SCL from corneal GP

Soft Contact Lens Fluting

- Modulus Low vs High
  - : 0.72MPa
  - Air Optix Aqua N&D: 1.4MPa
- Base curve
  - can be better

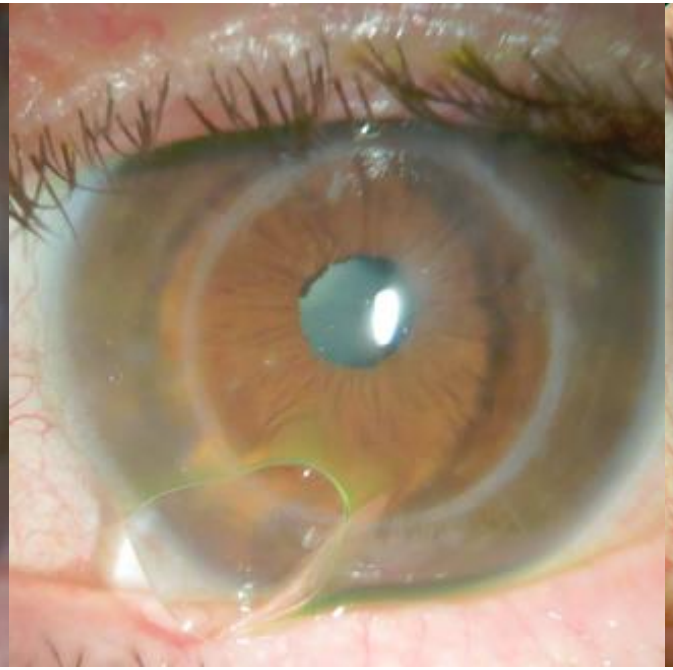


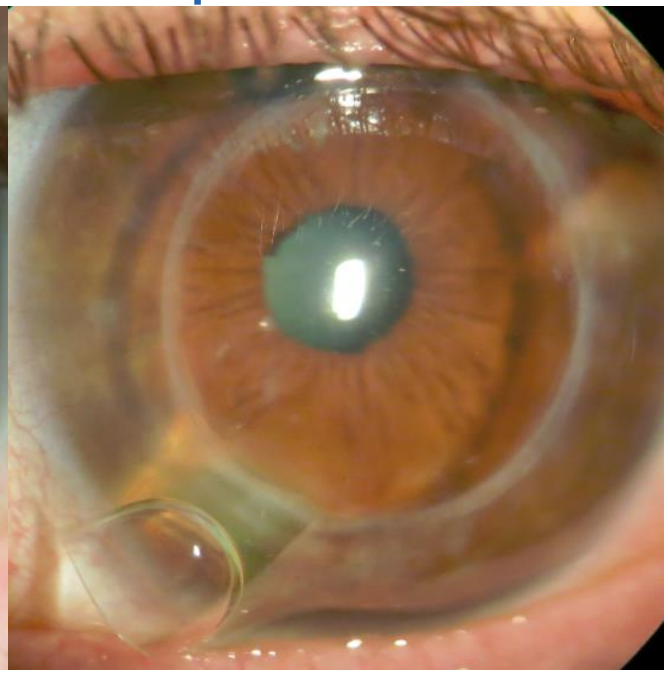


Soft Contact Lens Fluting

Air Optix Aqua
N&D: 1.4MPa

Acuvue Oasys: 0.72MPa
8.4mm BCR





Acuvue Oasys: 0.72MPa
8.8mm BCR

Patient LW – Clinical Pearls

- Dimples are NOT cute!
- Consider piggybacking for:
  - Poor lens centration / decentered cone apex
  - Poor lens comfort; esp for first-time GP wearers
  - Persistent corneal staining; esp 3-9 staining
- SCL selection for piggybacking:
  - Low powers; do not have to refit or change power
  - High Dk ie. silicone hydrogel
  - Independent lens movement from corneal GP lens

Case #3
Patient PA- 67 yo African American Female

- CC: Blurred vision OU and discomfort with current corneal GP lenses x1 year, constant and stable
- PHOx: Pellucid marginal degeneration OU (x20 years)
- FOHx: Unknown

Patient PA- Clinical Findings

- OU : (+)PMD/ (+)apical thinning/ (+)corneal scarring

- sc VA OD: 20/200; ph 20/40(+2)
- sc VA OS: 20/150; ph 20/30(+1)

Patient PA

- Topography

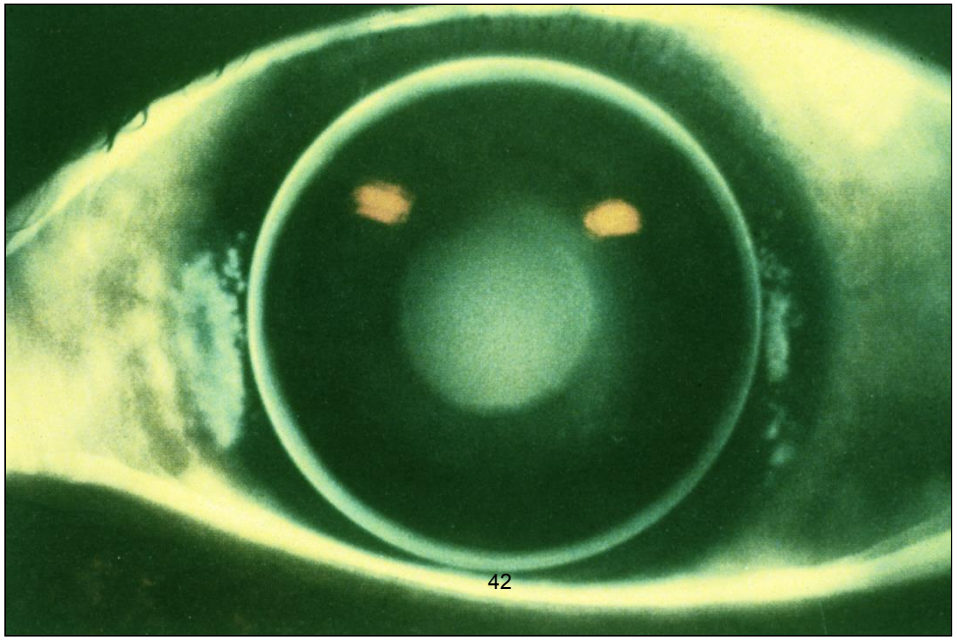
- Lenses ordered

Benefits of intra-limbal GP designs?

- Improve comfort
- Enhance lens centration
- Stabilize visual acuity
- Modifiable peripheral curve system
- Reduce corneal desiccation and prevent 3 & 9 staining

When to jump ship…

- Consider increasing OAD when:
  - Lens ejection problems
  - Lens decentration
  - 3 and 9 staining
  - Poor vision due to small OZD



Current corneal GP evaluation

- OD:

- OS:

Patient PA: 2 week CL follow-up

- OD:

- OS:

GP Classification

		Bearing
Corneal		Bears entirely on the cornea
Corneo-scleral		Lens bears on the cornea and sclera
Scleral	Mini-scleral Up to 6mm larger than pts HVID	Lens bears entirely on the sclera
	Large-scleral Greater than 6mm larger than pts HVID	

Table adapted from Scleral Lens Education Society

Case #4
Patient RL: 36 yo Hispanic Male

CC: Blurred vision OU
Currently wearing soft lenses but vision is blurred, wore GPs in the past but D/C'd due to recurrent erosions

PMHx
- ?Herpes

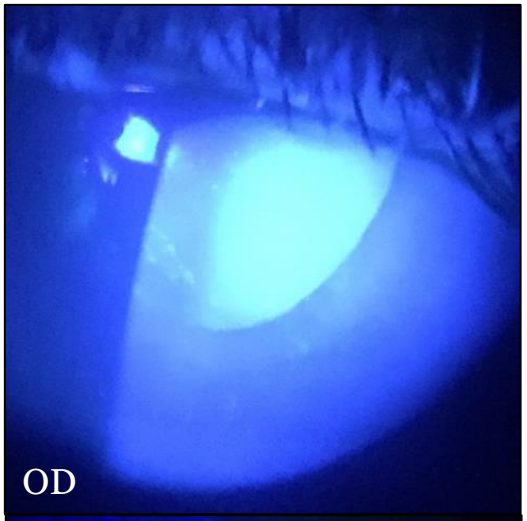
VAs sc
OD: 20/100
OS: 20/100

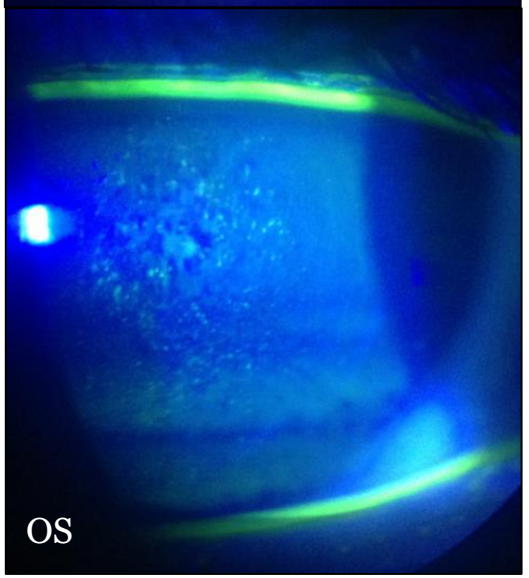
Ocular Meds
- Valtrex 1g PO BID

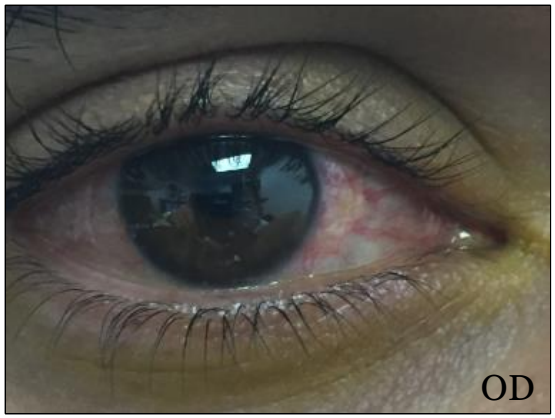
POHx
- Keratoconus
- Pingueculae OU

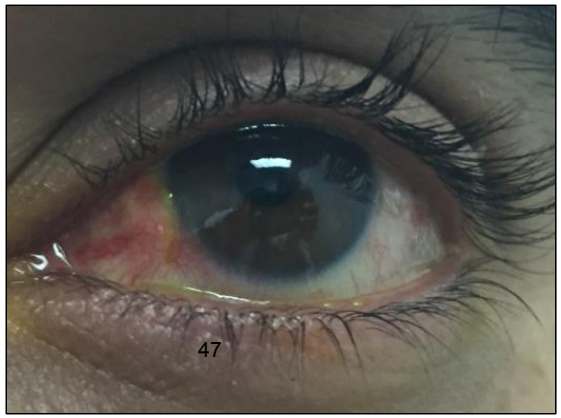
Significant Slitlamp Findings

- Pinguecula OS>OD
- Anterior stromal haze OU
- SPK OS, early dendrites?
  - Culture negative for herpes





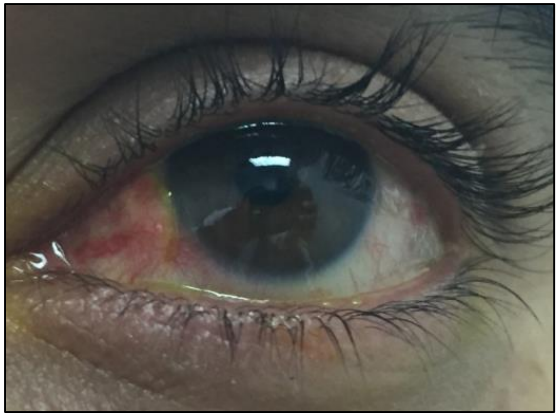




Pingueculae

- Common, non-cancerous growth of the conjunctiva

- Exact etiology is unknown
  - Long-term sunlight exposure
  - Eye irritation



- No treatment is needed in most cases
  - Frequent lubrication may prevent irritation
  - Consider removal for comfort or cosmetic reasons

- Patient history is key!

Scleral Lens Fitting

OD

- Trial lens:
  - OAD: 16.0 / BCR: 48.00D Pwr: -3.00
  - CT: 350um
- SCOR
  - -3.50 20/30

OS

- Trial lens parameters
  - OAD: 16.0 / BCR: 51.00D Pwr: -4.50
  - CT: 350um
- SCOR
  - -7.25 DS 20/25-2

Initial Scleral Lens Assessment OU

- Settling time 20 min
- 1.5 center thickness apical clearance
- temporal limbal clearance
- nasal limbal clearance
- Haptics were snug by the pingueculae OS>>OD

First Pair of Lenses Ordered

OD

- OAD: 16.0 / BCR: 48.00D / -6.50 / increased limbal clearance and flattened outer haptics

OS

- OAD: 16.0 / BCR: 51.00D / -12.12 / increased limbal clearance and flattened outer haptics and

Scleral Lens Dispensing Appointment

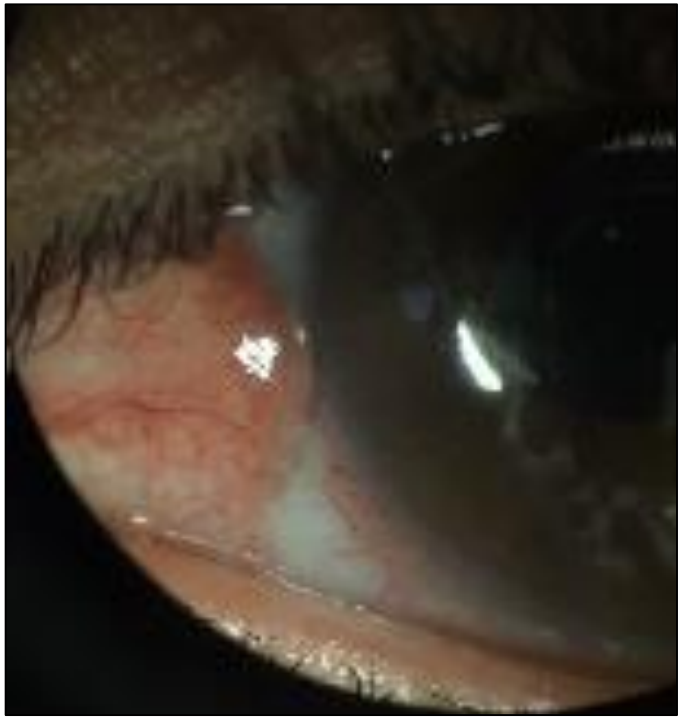
OD

- DVA: 20/20-2
- SCOR: pl DS
- Central fit is great
- Impingement over pinguecula

Scleral Lens Dispensing Appointment

OS

- DVA: 20/25-3
- SCOR: +1.00 DS 20/20
- Central fit is great
- Notch is not large enough



Second Pair of Lenses Ordered

OD

- OAD: 16.0 / BCR: 48.00D / -6.50 /

OS

- OAD: 16.0 / BCR: 51.00D / -11.12 /

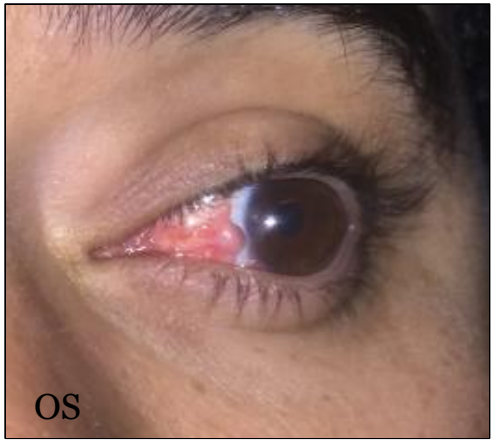
Two Week Scleral Lens Follow Up

CC: Pt notes great improvement in vision
-eyes get red and irritated with lenses
-no problems with application and removal

cc DVA (sclerals):
-OD: 20/20-
-OS: 20/25-3

AWT: all waking hours
WTT: 4h

OS: Questionable corneal staining has resolved, severe impingement near pinguecula with staining



Second Pair of Scleral Lenses

Parting Words

Pt reports great improvement in vision
-no problems with comfort or injection

DVA cc (sclerals):
-OD: 20/20-
-OS: 20/20

No signs of corneal or conjunctival staining OU

RTC 3-6 months for cornea check

Case # 5
Patient DW: 41 yo Caucasian Male

CC: Ocular discomfort OS
-Currently wearing GPs, no problems OD, lens ejection and discomfort especially when eye is dry OS

PMHx
- None

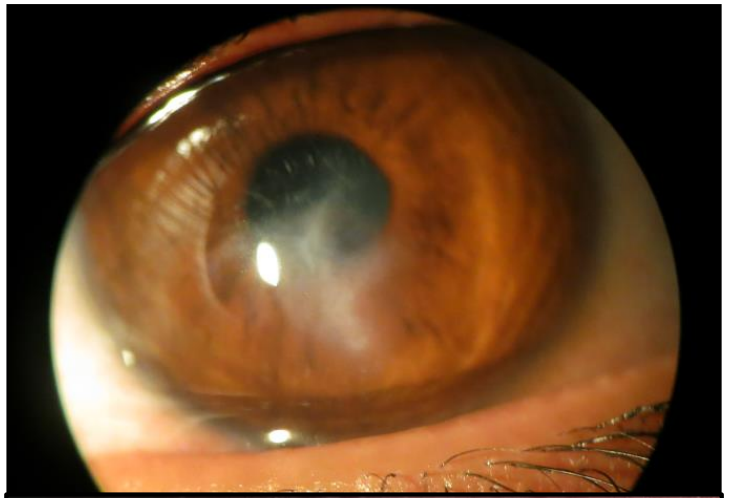
Ocular Meds
- Zaditor BID OU

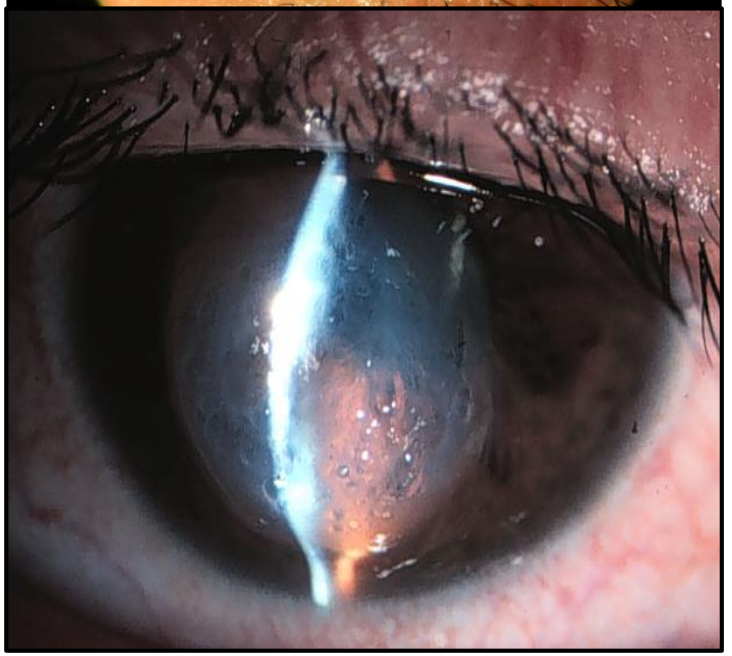
VA cc (GPs)
OD: 20/20-2
OS: 20/20-2

POHx
- Keratoconus
- PKP OS

When to Refer for a Corneal Transplant

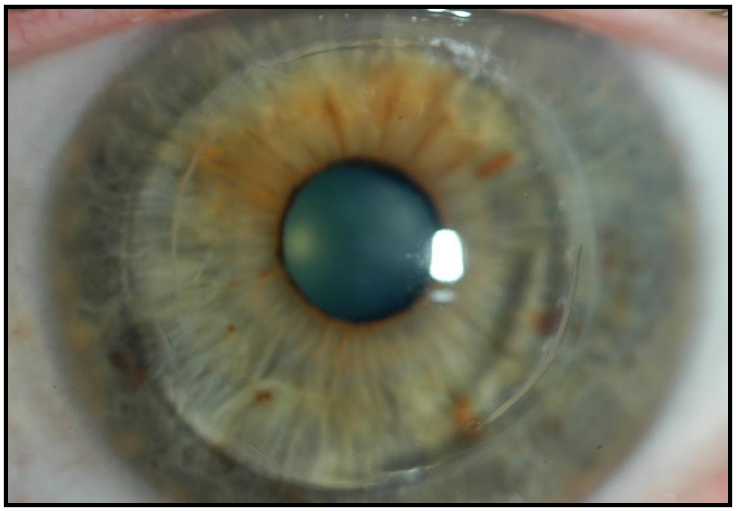
-
-
-
- Pt education is key!





Corneal Graft Indications

- Fuchs endothelial dystrophy ( )
- Keratoconus ( )
- Bullous keratopathy ( )
- 2nd or 3rd graft ( )
- Scars or corneal dystrophies ( )



Australian Graft Registry (2012)

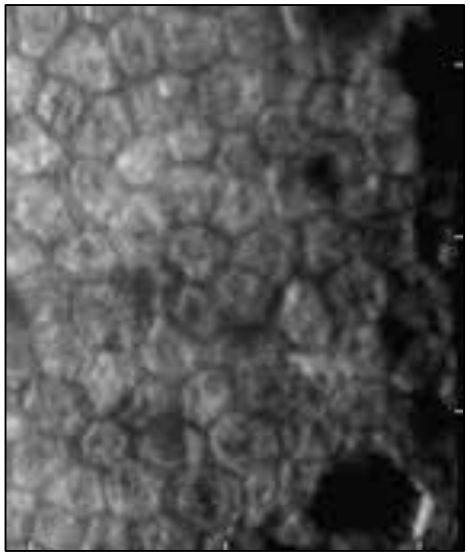
- of endothelial cells are lost, despite a successful surgery

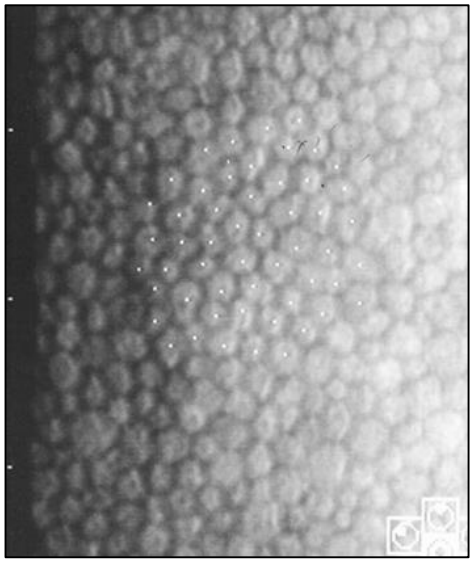
- Graft survival
  - PK: 63.5 months – median 84 months
  - EK: 28 months – median 38 months

- Rejection rate:
  - at 5 years
  - Often occurs in the first year

Sweat the Details

- Graft status
  - Endothelial cell count
    - NOT considered if < cells/mm²
  - Age of graft
- Corneal proile
  - Prolate vs oblate
  - Irregularity indices
  - Protrusion areas
- Presence of stitches
- Contact lens history





Post-Graft Fitting Principles

1. High oxygen permeability (highest Dk material)
2. Minimize lens center thickness and apical clearance
3. Reverse geometry design
4. Vault over graft-host junction and stitches

Clinically Significant Findings

Slitlamp

- OD: Subclinical KCN
- OS: Clear graft, frond of neovascularization at 12

Pachymetry OS: 658, 667um

Spectral microscopy OS: 761 cells/mm2

IOP OS: 12 mmHg GAT

Habitual GP OS

- Parameters: 10.8 / 8.6/ 7.26 / -5.50 / reverse curve

- Fit: Apical touch with midperipheral pooling and excessive edge lift inferiorly

Trial Scleral Lens Fit OS

- Parameters:
  - OAD: 16.0 / BCR: 7.18 (47.00) / Pwr: -2.50
- SCOR: -7.25 DS 20/20
- Fit: 1 ct AC, nasal MP touch due to lens drop / 360 LC / EL at 12 and 6 when centered

First Scleral Lens Ordered OS

- Parameters:
  - OAD: 16.0 / BCR: 7.18 (47.00)/ Pwr: -8.75 / 2D toric haptic
- SCOR: 0.00 DS 20/20
- Fit:

Significant Findings Two Week F/U

Wear time today:

Slitlamp

- OS:

Pachymetry OS:

IOP OS: mmHg GAT

Scleral Lens Fit Post Settling

Second Scleral Lens Ordered OS

- Parameters:
- SCOR:
- Fit:

Monitor CLOSELY

- Corneal edema
  - 50um of swelling is considered significant
  - Determine adequate wearing schedule
- Neovascularization
- Any signs of rejection or failure

Scleral contact lenses for visual rehabilitation after penetrating keratoplasty: Long term outcomes

Boris Severinsky[a,*], Shmuel Behrman[b], Joseph Frucht-Pery[a], Abraham Solomon[a]

[a] Department of Ophthalmology, Hadassah University Hospital, Jerusalem, Israel
[b] Microlens Ltd., Tel-Aviv, Israel

- Retrospective study of 33 patient records over 5 year period
- 31 eyes fit with a scleral lens
  - patients discontinued lens wear due to discomfort
  - patients developed microbial keratitis
  - patients developed graft rejection
  - Total failure rate:

Therapeutics Beneath a Scleral Device

- BostonSight PROSE device is considered a prosthetic device
- Promising results in the treatment of persistent epithelial defects
- One to two drops of non-BAK preserved fourth-generation fluoroquinolone into the tear chamber prior to device application
- Two devices designed one for daytime wear and one for nighttime wear

Treatment of Refractory Persistent Corneal Epithelial Defects: A Standardized Approach Using Continuous Wear PROSE Therapy

Jessica B. Ciralsky, MD, Kristin Ow Chapman, MD, Mark I. Rosenblatt, MD, PhD, Priyanka Sood, MD, Ana G. Alzaga Fernandez, MD, Michelle N. Lee, OD, and Kimberly C. Sippel, MD

Treatment of Persistent Corneal Epithelial Defect With Extended Wear of a Fluid-ventilated Gas-permeable Scleral Contact Lens

PERRY ROSENTHAL, MD, JANIS M. COTTER, OD, AND JULES BAUM, MD

Dry Eye and Ocular Surface Disease

Management strategies for persistent epithelial defects of the cornea

Lee R. Katzman, MD; Bennie H. Jeng, MD*

SCLERALS FOR OSD

Scleral Lenses for Severely Diseased Eyes

The eyes that can benefit the most from scleral lens wear are often the most difficult to fit.

BY KAREN CARRASQUILLO, OD, PHD, FAAO, & GREGORY W. DENAEYER, OD, FAAO

Questions?

Dr. Karen Lee karen.lee2@ucsf.edu
Dr. Rutvi Doshi
Dr. Susan Kovacich

References

- Wittig-Silva, C., Chan, E., Islam, F. M., Wu, T., Whiting, M., & Snibson, G. R. (2014). A Randomized, Controlled Trial of Corneal Collagen Cross-Linking in Progressive Keratoconus. *Ophthalmology, 121*(4), 812-821. doi:10.1016/j.ophtha.2013.10.028

- Vinciguerra P, Albé E, Frueh BE, Trazza S, Epstein D. Two-year corneal cross-linking results in patients younger than 18 years with documented progressive keratoconus. Am J Ophthalmol. 2012;154(3):520-6.

- Vinciguerra P, Albè E, Trazza S, Seiler T, Epstein D. Intraoperative and postoperative effects of corneal collagen cross-linking on progressive keratoconus. Arch Ophthalmol. 2009;127(10):1258-65.

References

- Michaud et al. Contribution of soft lenses of various powers to the optics of a piggy-back system on regular corneas. Cont Lens Anterior Eye. 2013;36(6):318-23

- van der Worp E. A Guide to Scleral Lens Fitting [monograph online]. Scleral Lens Education Society; 2010. Available from: http://commons.pacificu.edu/mono/4/

- Williams, K. A., Lowe, M. T., Keane, M. C., Jones, V. J., Loh, R. S., & Coster, D. J. (n.d.). The Australian Corneal Graft Registry 2012 Report. Retrieved August 1, 2016, from http://dspace.flinders.edu.au/xmlui/handle/2328/25859

- Severinsky, B., Behrman, S., Frucht-Pery, J., & Solomon, A. (2014). Scleral contact lenses for visual rehabilitation after penetrating keratoplasty: Long term outcomes. *Contact Lens and Anterior Eye, 37*(3), 196-202. doi:10.1016/j.clae.2013.11.001

References

- Ciralsky, J. B., Chapman, K. O., Rosenblatt, M. I., Sood, P., Fernandez, A. G., Lee, M. N., & Sippel, K. C. (2014). Treatment of Refractory Persistent Corneal Epithelial Defects: A Standardized Approach Using Continuous Wear PROSE Therapy. *Ocular Immunology and Inflammation, 23*(3), 219-224. doi:10.3109/09273948.2014.894084

- Rosenthal, P., Cotter, J. M., & Baum, J. (2000). Treatment of persistent corneal epithelial defect with extended wear of a fluid-ventilated gas-permeable scleral contact lens. *American Journal of Ophthalmology, 130*(1), 33-41. doi:10.1016/s0002-9394(00)00379-2

- Katzman, L. R., & Jeng, B. H. (2014). Management strategies for persistent epithelial defects of the cornea. *Saudi Journal of Ophthalmology, 28*(3), 168-172. doi:10.1016/j.sjopt.2014.06.011

- Carrasquillo, K., & Denaeyer, G. (2015, October 1). Scleral Lenses for Severely Diseased Eyes. Retrieved August 01, 2016, from http://www.clspectrum.com/articleviewer.aspx?articleID=113322

Karen L. Lee, OD, FAAO, FSLS

1827 22nd Ave
San Francisco, CA 94122
cell: 808.429.7386

Residency Training

Cornea and Contact Lens Resident, Southern California College of Optometry (SCCO), Fullerton, CA

July 2013 to June 2014

- Fit irregular corneas, such as: keratoconus, pellucid marginal degeneration, Terrien's marginal degeneration, post-surgical corneal ectasias, and post-corneal transplant.
- Managed irregular corneal conditions with corneal gas permeable contact lenses, scleral contact lenses, and specialty soft contact lenses.
- Performed pediatric contact lens examinations/fits for aphakia, high ametropia, anisometropia, and amblyopia.
- Conducted ocular prosthetic examinations, including fitting, modification and polishing of reform eyes, scleral shells and tinted contact lenses.
- Gained exposure to corneal and refractive surgery at University of California-Irvine Ophthalmology Department, observing surgeries and pre/post-operative care.

Education— Professional

Doctor of Optometry, Indiana University School of Optometry (IUSO), Bloomington, IN

Graduated with Honors, May 2013

Clinical Externships

Third Year Clinical Rotation:

Primary Care Optometry Rotation
Bloomington Clinics, February through May 2012
Todd Peabody, OD, FAAO, Supervising Faculty
- Performed comprehensive eye examinations.

Fourth Year Clinical Rotations:

Binocular Vision, Pediatrics, Disease, and Contact Lens Rotation
Bloomington Clinics, May through July 2012
Susan Kovacich, OD, FAAO, Supervising Faculty
- Performed comprehensive eye examinations, contact lens fittings, pediatric examinations and vision therapy sessions.
- Designed treatment plans for various binocular vision abnormalities.

Primary Care and Low Vision Rotation
Indianapolis Eye Care Center-IUSO, August through October 2012
Bradley Sutton, OD, FAAO, Supervising Faculty
- Performed comprehensive eye examinations, contact lens fittings and low vision examinations.

- Performed and interpreted Optical Coherence Tomography (OCT), Humphrey Visual Field (HVF) and Fundus Photography.

Specialty Contact Lens Rotation

North Suburban Vision Consultants, Ltd. October, 2012 to January 2013
S. Barry Eiden, OD, FAAO

- Implemented and interpreted data using Pentacam, Konan Specular Microscope, Optos, QuantifEye, and NOVA-VEP.
- Assessed various specialty contact lens fits including Synergeyes, KeraSoftIC, NovaKone, Duette, Onefit Cone, SO2Clear and Emerald Ortho-K lenses.
- Taught insertion, removal, and lens care for soft and rigid contact lenses.

Hospital and Disease Rotation

VA Hudson Valley Healthcare System, February to May 2013
Jean Jung, OD, MS, FAAO

- Performed comprehensive eye examinations in geriatrics and primary care on active service personnel, dependents and veterans.
- Diagnosed, co-managed, and treated ocular diseases including glaucoma, age-related macular degeneration, diabetic retinopathy and anterior segment conditions.

Education—Undergraduate

Bachelor of Science, University of California-Los Angeles

Major: Physiological Science, December 2007
Minor: East Asian Languages and Linguistics, December 2007

Relevant Work Experience

BostonSight PROSE Provider

University of California, San Francisco, March 2015 to Present

- Fitting irregular corneas, such as: keratoconus, pellucid marginal degeneration, Terrien's marginal degeneration, post-surgical corneal ectasias, and post-corneal transplant.
- Managing irregular corneal conditions with PROSE devices, corneal gas permeable contact lenses, scleral contact lenses, and specialty soft contact lenses.

Associate Optometrist

Ala Moana Advanced Eye Clinic, July 2014 to February 2015

- Treated and managed patients with glaucoma and other anterior segment pathologies.
- Diagnosed various retinal conditions in addition to primary care eye examinations.

Assistant Instructor Contact Lens I

Indiana University School of Optometry, 2011 to 2012

- Supervised students in gas permeable and soft lens selection, assessment, and fitting.
- Guided students through lens care, handling, and modification.

Assistant Instructor Vision Science III

Indiana University School of Optometry, 2011 to 2012

- Explained how to diagnose and manage common binocular vision anomalies.
- Demonstrated the use of various vision therapy equipment.

Assistant Instructor Systems Approach to Biomedical Sciences

Indiana University School of Optometry, 2010 to 2012

- Assisted students in identifying histological structures in normal and pathological tissue samples.

Optometric Intership

Drs. Kubo, Takaki, and Ishikawa
Honolulu, HI 2008 to 2009

- Gathered patient data using HVF, OCT, and Fundus Photo Camera.
- Managed office billing, insurance, and scheduling.

Carolyn Wong OD
Santa Monica, CA, 2006 to 2007

- Administered peripheral field testing (FDT N-30-1/C-20-1).
- Utilized Optomap Imaging.

Academic Publications and Presentations

Publications

Lee K, Nguyen D, Edrington TB. "Old-School GP Problem Solving." *Contact Lens Spectrum*. 2013;28(10):14.

Lee K, Messer B, Edrington TB. "Correcting Scleral Contact Lens Residual Astigmatism." *Contact Lens Spectrum*. 2014;34(4).

Lee K, Nguyen D, Weissman B, Edrington T. "Calculated *In Situ* Tear Oxygen Tension Under Hybrid Contact Lenses." *Eye and Contact Lens*. 2015:41(2).

Posters

"Minimizing Pterygial Visual Disturbance with Scleral Contact Lenses: A Case Report." **Lee K**, Edrington TB.

- Poster Presentation at the American Academy of Optometry, Seattle, WA. October 2013.

"BostonSight PROSE - A Great Option for a Complicated Eye." Lee K.

- Poster Presentation at the Global Specialty Lens Symposium, Las Vegas, NV. January 2017.

Lectures and Presentations

Grand Rounds Lecturer: "Worms in the Eye OH MY!." June 2012.

- Prepared an original PowerPoint lecture on parasitic ocular infections.
- Discussed different parasitic organisms, ocular findings and treatments.

Grand Rounds Lecturer: "Atypical Peripheral Retinal Findings." March 2013.

- Prepared an original PowerPoint lecture on peripheral retinal abnormalities.
- Discussed various abnormal peripheral ocular findings, presentations, and treatments.

Soft Toric Lens Workshop Instructor: Southern California College of Optometry. July 2013.

- Aided in fitting process and assessment of soft toric contact lenses.
- Mentored students in lens design and proper lens selection.

Multifocal Workshop Instructor: Southern California College of Optometry. August 2013.

- Aided in fitting process and assessment of soft multifocal contact lenses.
- Mentored students in proper lens selection and decision-making process.

Paragon Sponsored Lecturer: “Paragon Corneal Refractive Therapy (CRT) Certification.” **Lee K**, Nguyen D. September 2013.

SCCO Continuing Education Program: “Orthokeratology: Prescribing and Patient Care.” **Lee K**, Nguyen D. December 2013.

SCCO Continuing Education Program: “Scleral Lens Workshop.” **Lee K**, Nguyen D. December 2013.

Contact Lens Laboratory Instructor: “Corneal Curvatures and Lid Eversion.” **Lee K**, Nguyen D. December 2013.

Adventures in Science Lecturer: “Animal Eyes and Illusions.” **Lee K**, Nguyen D. January 2014.

SCCO Continuing Education Program: “Corneal Disease Grand Rounds .” **Lee K**, Nguyen D, Weissman B. April 2014.

SCCO Continuing Education Program: “Prescribing for Irregular Corneas.” **Lee K**, Nguyen D, Edrington T. April 2014.

Contact Lens II Lecturer: “Foundations of Scleral Lens Fitting.” **Lee K**, Nguyen D. June 2014

American Academy of Optometry: “Myopia Control for the Busy Practitioner.” **Lee K**, Nguyen D, Marsden H. November 2014.

American Academy of Optometry: “Myopia Control for the Busy Practitioner.” **Lee K**, Nguyen D, Marsden H. November 2015.

American Academy of Optometry: “Scleral Lens Fitting: Easy as 1-2-3.” **Lee K**, Woo S. November 2015.

Proctor Foundation Invited Guest Speaker: “Prosthetic Replacement of the Ocular Surface Ecosystem.” Lee K. April 2016.

Scleral Lens Education Society Invited Guest Speaker, New York, NY: “Scleral Lens Fitting.” Lee K. April 2016.

Vision by Design Invited Guest Speaker, Scottsdale, AZ: “Scleral Lens Fitting: Easy as 1-2-3.” **Lee K**, Toabe M, Walker M, Lipson M. April 2016.

UCSF Optometry Department Invited Guest Speaker: “Fundamentals of Scleral Lenses verses PROSE.” Lee K. June 2016.

Building Your Practice with Specialty Contact Lenses, Houston, TX: “Scleral Lens Patient Selection and Fitting.” **Lee K**, Walker M. July 2016.

Building Your Practice with Specialty Contact Lenses, Houston, TX: “Scleral Lens Management: Troubleshooting and Video Grand Rounds.” **Lee K**, Walker M, Bennett E. July 2016.

Building Your Practice with Specialty Contact Lenses, Houston, TX: "Scleral Case Grand Rounds." **Lee K**, Walker M, Bennett E. July 2016.

American Academy of Optometry: "Scleral Lens Fitting: Easy as 1-2-3." **Lee K**, Barnett M, Lipson M, Toabe M. November 9, 2016.

American Academy of Optometry: "Scleral Lens Fitting: Easy as 1-2-3." **Lee K**, Lipson M, Toabe M. November 11, 2016.

American Academy of Optometry: "Specialty Lenses Video Grand Rounds." **Lee K**, Doshi R, Kovacich S. November 12, 2016.

Upcoming Lectures

University of California, San Francisco: "Primary Care Grand Rounds." Lee K. December 15, 2016.

University of California, San Francisco: "Introduction to Contact Lenses." Lee K. January 19, 2017.

Los Angeles County Optometric Society: "Case presentation-panel/audience discussion on Scleral Lenses." **Lee K**, Chiu G, Kwan J. January 22, 2017.

Scleral Lens Education Society Invited Guest Speaker, Costa Mesa, CA: "Scleral Lens Fitting." Lee K. March 12, 2017.

Awards and Honors

Scholarships

Residency Travel Grant to American Academy of Optometry's Meeting October 2013

Hawaii Optometric Association Scholarship 2013

AOSA TVCI Travel Grant and Essay Competition Finalist 2013

Educational Opportunity Fellowship Recipient 2011 to 2013

Robert W. Bumbleberg Scholarship 2012

Awards and Honors

George Mertz Contact Lens Residency Award 2014
- "To promote the practice and development of the field of contact lenses by providing incentive and support to talented optometric residents who demonstrate a passion and commitment to practice, research, and education."

Graduated with Honors from Indiana University School of Optometry 2013

Vistakon Clinical Excellence in Contact Lens Patient Care Award 2013
- "To recognize outstanding student clinicians who have demonstrated excellence in contact lens patient care during their optometric education."

Winner 21st American Optometric Association (AOA) Varilux Optometry Student Bowl 2012

- "The top student from each school and college of optometry answered optometry-related questions while their fellow classmates energetically cheered them on."

Jack Bennett Humanitarian Award 2012
-"This award recognizes distinguished contributions in service to humanity and the profession of optometry."

Optometry Student of the Month August 2012

Gold Key International Optometric Honor Society 2012 to 2013
- "To recognize optometry students who demonstrate leadership to their class, college, and profession."

VSP Award Finalist 2012
- "Students selected to receive the scholarship demonstrated clinical excellence and expressed a great desire to pursue a career in private practice."

Beta Sigma Kappa International Optometric Honor Society 2010 to 2013

Leadership and Volunteer Experience

Scleral Lens Education Society Public Education Chair 2015-2016

Special Olympics World Games 2014

IUSO AOCLE Group Tour Guide June 2012

Volunteer Optometric Service to Humanity (VOSH), Treasurer 2011to 2012

Optometric Private Practice Club, Treasurer 2011to 2012

Special Olympics of Hawaii Vision Screening May 2010 & 2011

VOSH Guanajuato, Mexico Service Trip March 2011 & 2012

Membership in the Following Organizations

Scleral Lens Education Society, Fellow and Public Education Chair 2014 to present

American Academy of Optometry, Fellow 2015 to present

Hawaii Optometric Association, Member 2012 to present

American Optometric Association, Member 2010 to present