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SECO Contact Lens Summit:
The Contact Lens Journal Club

Moderator: Milton Hom, OD
Panelists: Jenn Harthan, OD
Ashley Wallace-Tucker, OD
Aaron Zimmerman, OD

Please Silence All Mobile Devices.

attendseco.com

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Milton Hom, OD

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Milton Hom, OD Disclosures

- AbbVie/Allergan
- Aperta Biosciences
- Bruder
- Surface Pharma
- Tarsus Pharma
- Tenpoint

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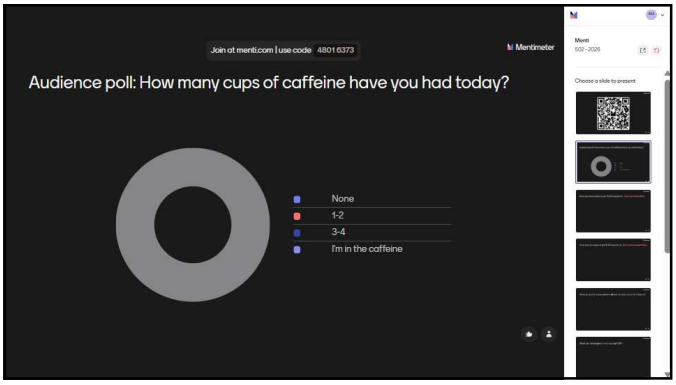
Audience poll

1. How many cups of caffeine have you had today?

A. None
B. 1–2
C. 3–4
D. I am the caffeine

5



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- **Agenda**
- **Introduction**
- **Rotating Journal Club Segments** (Each segment = 9 minutes total)
  - Aaron
  - Jenn
  - Ashley
  - Jenn
  - Ashley
  - Aaron
  - Ashley
  - Aaron
  - Jenn
- **Open Discussion & Audience Q&A**

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Aaron Zimmerman, OD, MS, FAAO

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Aaron Zimmerman, OD Disclosures

- Acuity International
- Alcon
- American Academy of Optometry
- American Optometric Association
- TearOptix
- Wolters Kluwer

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CLMK – Why am I interested?

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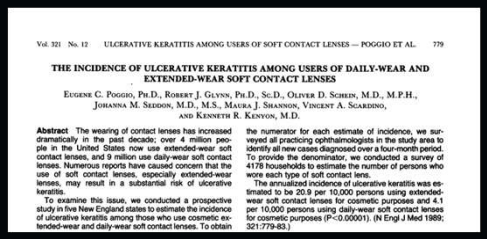
CL Microbial Keratitis 1987 Poggio, Schein et al



Vol. 321 No. 12 ULCERATIVE KERATITIS AMONG USERS OF SOFT CONTACT LENSES — POGGIO ET AL. 779

THE INCIDENCE OF ULCERATIVE KERATITIS AMONG USERS OF DAILY-WEAR AND EXTENDED-WEAR SOFT CONTACT LENSES

EUGENE C. POGGIO, PH.D., ROBERT J. GLYNN, PH.D., SC.D., OLIVER D. SCHEIN, M.D., M.P.H., JOHANNA M. SEDDON, M.D., M.S., MAURA J. SHANNON, VINCENT A. SCARDINO, AND KENNETH R. KENYON, M.D.

Abstract The wearing of contact lenses has increased dramatically in the past decade; over 4 million people in the United States now use extended-wear soft contact lenses, and 9 million use daily-wear soft contact lenses. Numerous reports have caused concern that the use of soft contact lenses, especially extended-wear lenses, may result in a substantial risk of ulcerative keratitis.

To examine this issue, we conducted a prospective study in five New England states to estimate the incidence of ulcerative keratitis among those who use cosmetic extended-wear and daily-wear soft contact lenses. To obtain the numerator for each estimate of incidence, we surveyed all practicing ophthalmologists in the study area to identify all new cases diagnosed over a four-month period. To provide the denominator, we conducted a survey of 4178 households to estimate the number of persons who wore each type of soft contact lens.

The annualized incidence of ulcerative keratitis was estimated to be 20.9 per 10,000 persons using extended-wear soft contact lenses for cosmetic purposes and 4.1 per 10,000 persons using daily-wear soft contact lenses for cosmetic purposes (P<0.00001). (N Engl J Med 1989; 321:779-83.)

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Methods

- 641 ophthalmologists from the NY, NH, RI, and VT were contacted and 612 participated
  - They were asked to report any case of ulcerative keratitis between June 1, 1987 and September 30, 1987
- Telephone survey of CL wearers age 12 years and older from individuals in ME, NH, RI, MA, VT (n=4187 interviews)
  - Performed to determine the % of the population wearing contact lenses

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Results

- 195 reported incidents
  - 137 cosmetic / refractive correction
    - Soft lens daily wear = 35%; Soft lens extended wear = 58%; RGP = 4%; Hard = 3%
  - 32 aphakia
  - 4 therapeutic
  - 22 reason not reported

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Geographic Area	Population	Daily Wear Soft Lenses		Extended Wear Soft Lenses		Hard Lenses		Gas Permeable	
		# Cases	% Wearing	# Cases	% Wearing	# Cases	% Wearing	# Cases	% Wearing
ME	989,000	5	3.55	13	2.27	1	0.92	0	0.92
MA									
Boston	2,435,000	19	5.77	27	1.22	2	0.76	3	0.61
Suburbs	2,424,000	8	4.61	27	1.55	0	0.81	0	0.35
NH	882,000	6	5.48	3	2.23	0	0.81	1	0.51
RI	836,000	6	4.49	7	1.81	0	1.34	0	0.48
VT	455,000	4	5.85	3	1.10	1	0.18	1	0.18
Total	8,021,000	48	--	80	---	4	---	5	---
Incidence per 10,000						**2.0** (0.0-4.4)		**1.0** (0.34-2.89)	
Relative Risk		1.00 Ref				**0.5** (0.15-1.65)		**1.00** (0.34-2.89)	

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Audience Poll (Word Cloud)

- What was the incidence per 10,000 wearers for:
  - Soft Lens Daily Wear?

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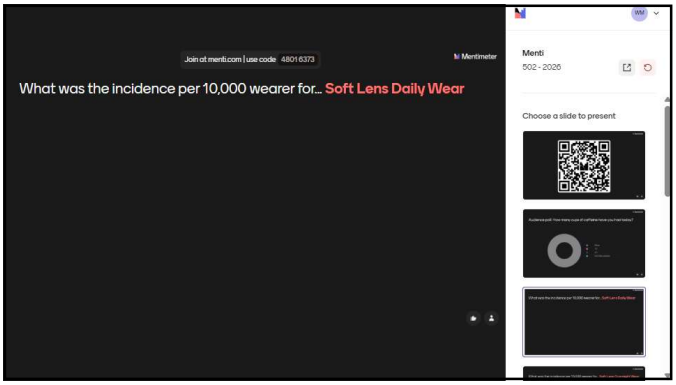

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Audience Poll (Word Cloud)

- What was the incidence per 10,000 wearers for
  - Soft Lens Overnight Wear?

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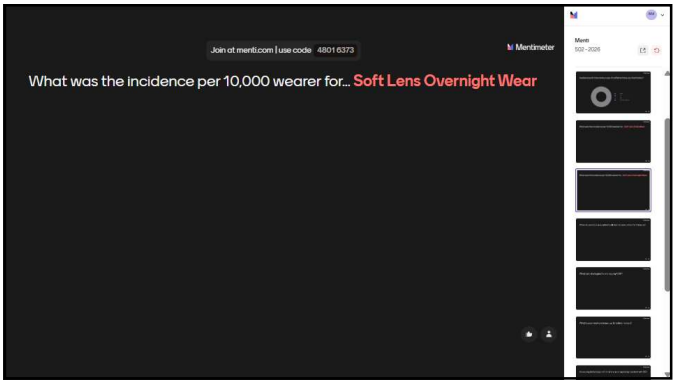

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Geographic Area	Population	Daily Wear Soft Lenses		Extended Wear Soft Lenses		Hard Lenses		Gas Permeable	
		# Cases	% Wearing	# Cases	% Wearing	# Cases	% Wearing	# Cases	% Wearing
ME	989,000	5	3.55	13	2.27	1	0.92	0	0.92
MA									
Boston	2,435,000	19	5.77	27	1.22	2	0.76	3	0.61
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RI	836,000	6	4.49	7	1.81	0	1.34	0	0.48
VT	455,000	4	5.85	3	1.10	1	0.18	1	0.18
Total	8,021,000	48	--	80	---	4	---	5	---
Incidence per 10,000		4.1 (2.9-5.2)		20.9 (15.1-26.7)		2.0 (0.0-4.4)		1.0 (0.34-2.89)	
Relative Risk		1.00 Ref		5.15 (3.47-7.65)		0.5 (0.15-1.65)		1.00 (0.34-2.89)	

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CLMK – Netherlands 1996

- 440 OMDs (379 provided information)
  - 92 cases of MK
    - 17 DW GP
    - 63 DW Soft
    - 12 EW Soft
- Population Data
  - Phone surveys from 1994 to 1997
  - Dutch population aged 12 or older was 13,188,000
    - 639,000 GP wearers, 713,000 DW Soft, 24,000 EW Soft

Lancet 1999;354:181-85

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CLMK Incidence – Netherlands

Lens Type and Wearing Pattern	Incidence of Keratitis per 10,000 (95% CI)	Poggio et al
Daily Wear GP	1.1 (0.6-1.7)	1.0
Daily Wear Soft	3.5 (2.7-4.5)	4.1
Extended Wear Soft	20.0 (10.3-35.0)	20.9

Lancet 1999;354:181-85

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Microbial Keratitis proposed mechanisms 1980s – 1990s

- Heavy focus on oxygen transmissibility, weakened corneal defense mechanisms, microbial contamination

Conclusions from 1996 *Cornea* from Dr. Liesegang:

"The CL Industry needs to develop CLs with improved oxygen transmission to maintain a healthy corneal surface."

"Alternatively, the development of a truly daily disposable CL with good corneal tolerance may obviate many risks of CL wear"

Cornea 1997;1693):265-273

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Then what happened in 1999 – 2000?

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Incidence of MK with 30 Day CW of SiHy 2002 – 2003 (Schein et al.)

- 131 Practices identified that prescribed N&D lenses for 30 days CW
- 6,245 individuals participated
  - 4,999 completed at least 12 months of lens wear = 5,561 person years
    - 2 Participants with CLMK with ≥ 2 lines of VA loss; Incidence of 3.6 / 10,000
    - 8 Participants with CLMK with no vision loss; incidence of 14.4 / 10,000

All MK = 18.0 (8.5 – 33.1)

4,292 wore lenses for 3 or more weeks (all MK = 5); incidence = **11.6** (3.7-27.3)
1,260 wore lenses less than 3 weeks (all MK = 5); incidence = **39.7** (12.7-92.8)

Ophthalmology 2005;112:2172–2179

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Australia Oct 1, 2003 – Sept 30, 2004

- 636 CMDs participated
  - 285 eligible MK cases


The Incidence of Contact Lens–Related Microbial Keratitis in Australia

- Population Estimate
  - 35,914 individuals were interviewed by phone (1,798 CL wearers)
  - Overall population 13.5 million
    - ~650,000 to 681,000 CL wearers

Ophthalmology 2008;115:1655-1662

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CLMK Incidence – Australia

Ophthalmology 2008;115:1655-1662

Lens Type	Any Presumed MK Per 10,000 (95% CI)	Severe MK Per 10,000 (95% CI)	MK with > 2 Lines of VA Loss Per 10,000 (95% CI
DW GP	1.2 (1.1-1.5)	1.2 (1.1-1.5)	0.0 (0.0-0.0)
Hydrogel (soft)			
Pure DW	1.9 (1.8-2.0)	1.1 (1.1-1.2)	0.4 (0.4-0.4)
Pure DW DD	2.0 (1.7-2.4)	0.5 (0.5-0.6)	0 (0.0-0.0)
Occ O/N	2.2 (2.0-2.5)	1.8 (1.6-2.0)	0.2 (0.2-0.2)
Overnight Wear	**19.5** (14.6-29.5)	13.3 (10.0-20.1)	4.0 (2.9-6.6)
Silicone Hydrogel (SH)			
Pure DW	11.9 (10.0-14.6)	8.0 (6.7-9.8)	1.1 (0.9-1.4)
Occ O/N	5.5 (4.5-7.2)	5.3 (4.3-6.9)	1.6 (1.2-2.1)
Overnight Wear	**25.4** (21.2-31.5)	16.9 (14.1-20.9)	2.8 (2.3-3.5)
Any Lens Type	**4.2** (3.4-5.5)	2.7 (2.2-3.5)	0.6 (0.5-0.7)

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Pathogenesis – Fleiszig & Evans

- Four Step Model
  - Lens interferes with microbial clearance
  - Bacteria evade toll-like receptors and resist inherent defenses
    - Ex. MyD88 and IL-1R (*Pseudomonas* can evade these)
  - Bacteria cross the basement membrane
    - Physical barrier
  - Enter the stroma

- Hypoxia:
  - May lead to more severe outcomes
  - not required for infection
  - SiHy and hydrogels have same incidence of CLMK

OVS 2010;87:225-232; Progress in Retinal and Eye Research 76 (2020) 100804

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Norway Jan 1, 2018 – Dec 31, 2020

- Severe CLMK cases from Oslo University Dept of Ophthalmology
  - 42 cases of severe CLMK


Incidence, risk factors, and patient characteristics in severe contact lens-related microbial keratitis

- Population
  - 919,844 in the Oslo metropolitan area (Norwegian data 2019)
  - 16% of the population was estimated to wear CLs

Acta Ophthalmologica 2025;103:289-294

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Norway 2018 – 2020

Type of Contact Lens	Incidence per 10,000 Wearers	Stapleton et al (2008) Incidence > 2 Lines of VA Loss
Extended Wear	**2.52**	**2.8 to 4.0**
All Types of Lenses	0.95	0.6 (0.5-0.7)
Extended Wear lenses, Daytime Only	0.76	1.1 (0.9-1.4) (SH daily wear)
Daily Disposables	**0.62**	0 (0.0-0.0)

Possible explanations for incidence discrepancy:
- Narrow inclusion criteria in this study; only patients on fortified antibiotics
  - The incidence cannot be directly compared

Acta Ophthalmologica 2025;103:289-294

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Szczotka-Flynn et al 2024 Eye & Contact Lens 2024;50: 461–466

- 2018 to 2021
  - 153 CLMK cases (14 sites) and 158 high risk controls (all from UH)

- Univariate analysis between cases and controls = no associations
- Multivariate when controlling for SiHy and DD lenses = no associations

- Cases only analysis (adjusted for age, sex, smoking):
  - SiHy vs Non-SiHy OR = 3.15; 95% CI (1.28–7.72)
  - DD vs Non-DD OR = 0.26; 95% CI (0.11–0.60)
- Multivariate
  - SiHy vs non-SH OR = 1.58; 95% CI (0.52–4.76)
  - DD vs reusable OR = 0.32; 95% CI (0.11–0.89)

3- to 4-fold increased risk of severe CLMK with reusable lenses

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DD Lenses and Microbial Contamination[1]

Isolate	DD CLMK Cases (n=55)	Reusable CLMK Cases (n=200)	P
Culture Negative	65%	50%	0.063
Gram Positive	16%	14%	Not Significant
Environmental	20%	**37%**	**0.018**
Gram negative	18%	**32%**	**0.046**
Pseudomonas	6%	**27%**	
Acanthamoeba	0	3%	
Fungi	2%	2%	

Szczotka-Flynn[2] et al – "DD lenses likely reduce severity of disease by eliminating accumulating bioburden within storage containers used during reusable lens wear"

1. PLoS ONE 12(8): e0181343. https://doi.org/ 10.1371/journal.pone.0181343; 2. Eye & Contact Lens 2024;50: 461–466

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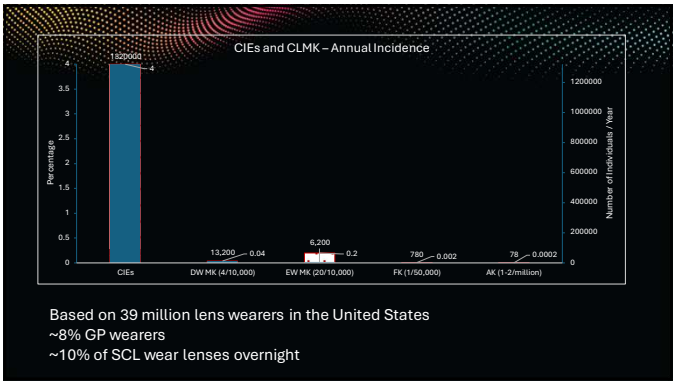

Based on 39 million lens wearers in the United States
~8% GP wearers
~10% of SCL wear lenses overnight

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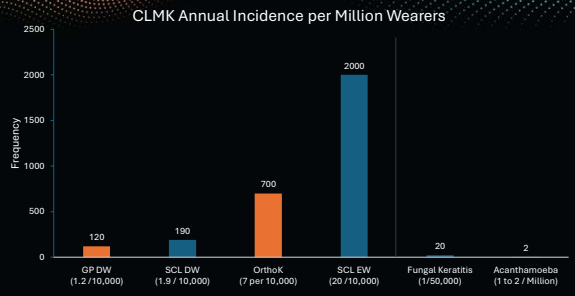

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Summary

- CLMK incidence is the same today as it was in 1989
- Frequent replacement lenses decrease risk of severe MK and therefore risk of vision loss
- Continue to prescribe single use lenses as often as possible
  - Requires compliant use by patient

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DISCUSSION

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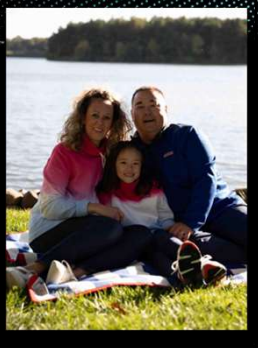

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Jenn Harthan, OD Disclosures

- AbbVie/Allergan
- Alcon
- Art Optical
- Bausch + Lomb
- Contamac
- Epion
- Euclid
- GP Lens Institute
- International Keratoconus Academy
- Metro Optics, Inc.
- Tarsus

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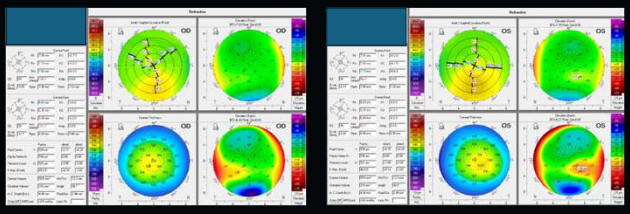
23-year-old male presents with complaints of blurry and distorted vision



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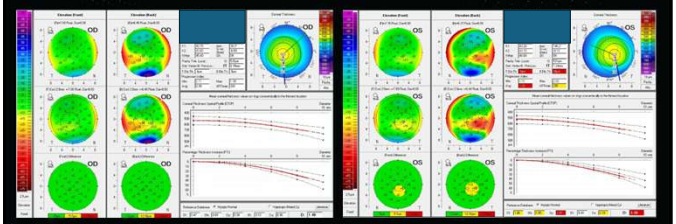

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Global Consensus on Keratoconus and Ectatic Diseases

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Why was this memorable?

- Lack of consensus on how to diagnose AND manage KCN and corneal ectatic diseases.
- Advent of corneal tomography has increased the ability to diagnose disease at a much earlier stage.
- **MANDATORY Findings to Diagnose Keratoconus (need 2):**
  - Abnormal <u>POSTERIOR</u> Ectasia
  - Abnormal Corneal Thickness <u>DISTRIBUTION</u>
  - <u>CLINICALLY</u> Non-Inflammatory Corneal Thinning

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What did I learn?

- Corneal **tomography** is much more **sensitive and specific** for compared to corneal topography.
- The previously accepted 1/2000 prevalence of keratoconus is **outdated.**
  - Prevalence is **much** higher, particularly when evaluating more recent publications.
- Central pachymetry is one of the **least** reliable indicators of keratoconus.

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Audience Poll: (Word Cloud)

When do you have your patients with keratoconus return for follow up?

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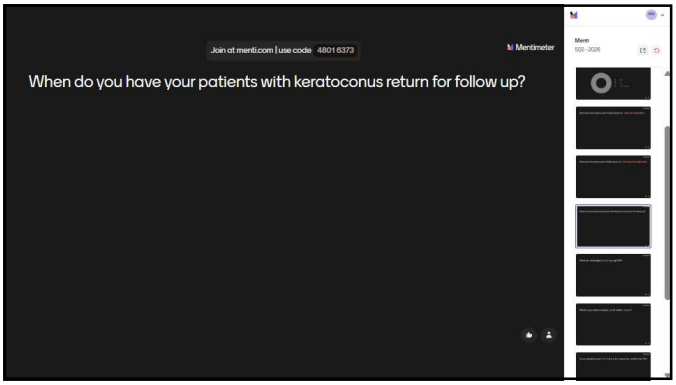

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Practical Tips

- When managing corneal pathology, particularly for early diagnosis and monitoring of progression, corneal tomography, *not* topography is essential.
- Monitor for KC progression based on age.
  - Needed for insurance documentation for corneal crosslinking approval.
  - The younger the patient, return to clinic more often.

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Ashley Wallace-Tucker, OD, FAAO, FSLS

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Ashley Wallace-Tucker, OD Disclosures

Bausch + Lomb
CooperVision
Topcon
Visionary Optics

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Breakthrough CooperVision MiSight® 1 Day Contact Lens for Childhood Myopia Coming to the United States in 2020 | CooperVision

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Why was this memorable?

- This news release changed the trajectory of myopia control in my practice and in the entire country
- Up to this point, only off label options were available for managing myopia patients
  - Orthokeratology
  - Atropine
  - Soft bifocals
  - Executive bifocals
- It validated years of clinical trial work and energized the profession - pushing practices, manufacturers, and educators to prioritize myopia management.

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Poll: Do you consider Myopia Management Standard of Care?

- Yes
- No
- Maybe

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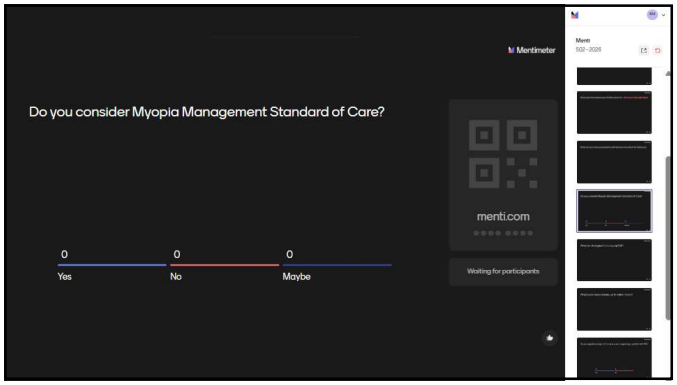

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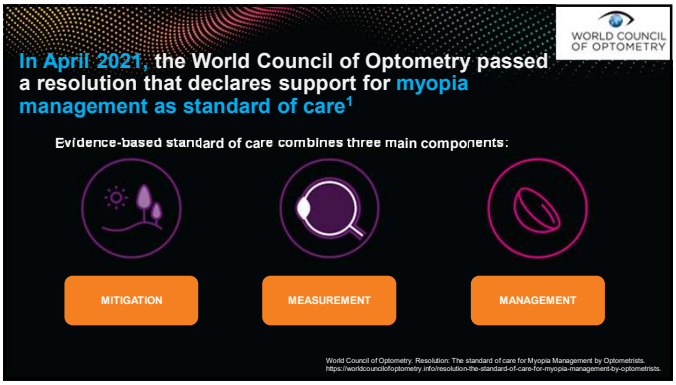

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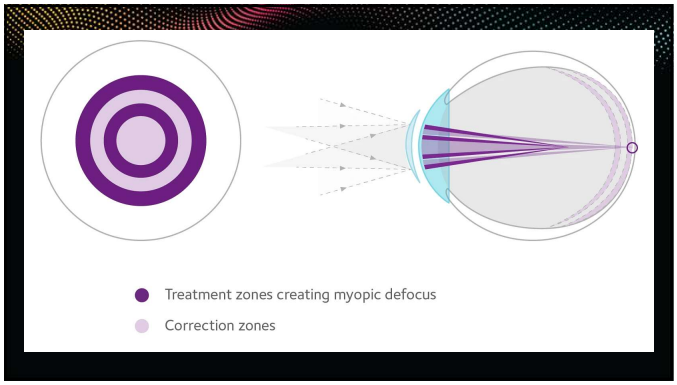

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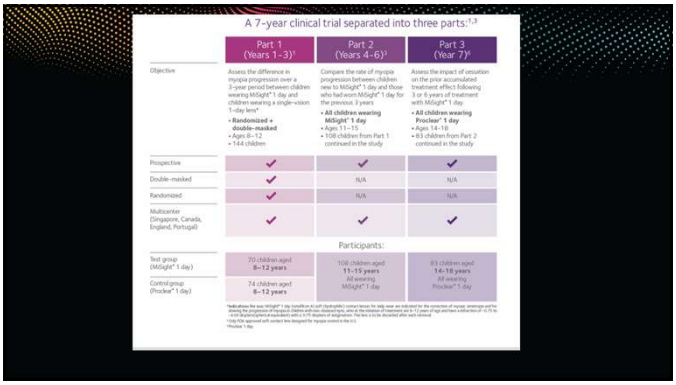

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Helped me refine my protocol

- Easier staff delegation
- No complicated explanations
- Easier to replicate across multiple doctors
- Less clinical complexity

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Industry momentum accelerated...

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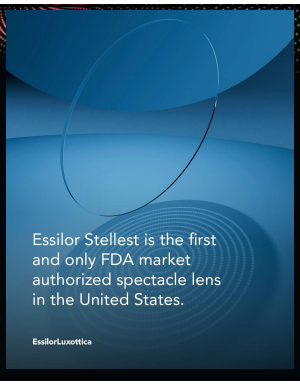

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Practical Tips

- Lead With FDA-Approval in Parent Conversations
  - Parents gain confidence when you say: "This is the first and only FDA-approved soft contact lens for slowing myopia progression in children."
  - Position it as a validated medical treatment, not just another contact lens.
- This lens is a great entry point into myopia management
  - Fit just like any other soft lens
  - No special equipment required to get started

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Midday Fogging (MDF)
Jenn Harthan, OD

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70-year-old male with chronic progressive external ophthalmoplegia (CPEO)

- Referred for scleral lens fitting by ophthalmology
- Developed ocular complications including dry eye, corneal ulceration, HSV keratitis, and corneal infiltrates.
- Previous ocular treatments included:
  - artificial tears
  - antibiotic ointments
  - punctal plugs
  - amniotic membranes
  - bandage contact lens for corneal melt
- Systemic history was remarkable for skin cancer, prostate cancer, stage 3 lymphoma, mitochondrial disorder, and a pacemaker for heart issues

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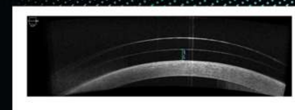
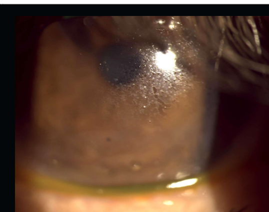
Fit with Scleral Lenses



Improved vision, corneal staining, and regressed the corneal neovascularization and opacification.



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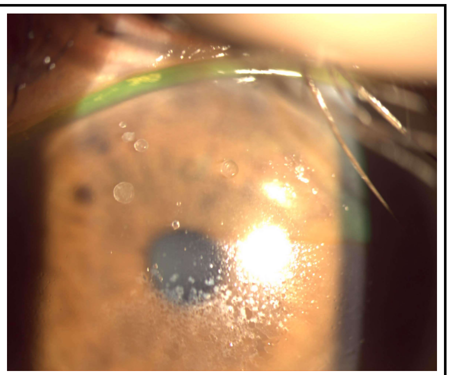

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Clinical and Epidemiologic Research

Nonpolar Lipids Contribute to Midday Fogging During Scleral Lens Wear

Maria K. Walker,[1] Laura S. Bailey,[2] Kari B. Basso,[2] and Rachel B. Redfern[1]

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Why was this memorable?

- Midday fogging (MDF) is a commonly reported problem in scleral lens wearers.
  - Reported as high as 56%
  - May contribute to blurry vision and unknown physiological effects to the ocular surface
- The scleral lens fluid reservoir ranges from 100-1000 microns in depth depending on the condition for which scleral lenses are fit.
- Lack of understanding and consensus among what contributes to MDF.
  - This study demonstrated that nonpolar lipids likely contribute to MDF.

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What did I learn?

- Midday fogging with scleral lens wear is a poorly understood phenomenon
  - Has multiple factors contributing to its occurrence
- Nonpolar hydrophobic lipids contribute to MDF in addition to epithelial cells, proteins, inflammatory markers and debris

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Audience Poll: (Word Cloud)
What are strategies for managing MDF?

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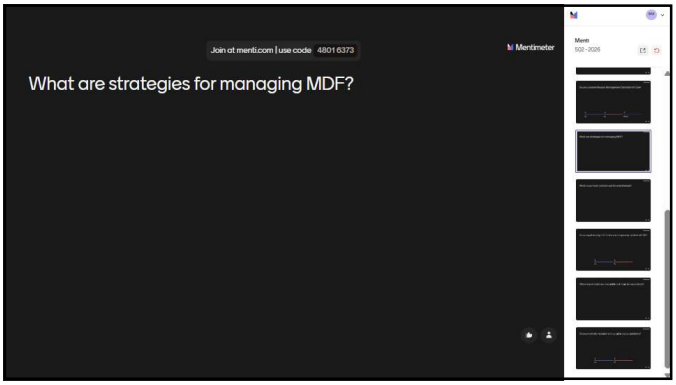

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Practical Tips

- Beneficial to proactively discuss MDF with SL patients
  - Along with troubleshooting options for managing MDF
- Multiple factors likely contribute to subjective reports of midday fogging with SL wear
  - May not be due to the SL fit alone
- Proactive aggressive management of ocular surface disease is necessary to minimize MDF
- Use of AS-OCT can be helpful in determining severity and type of debris in the SL FR in patients who complain of MDF

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DISCUSSION

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Therapeutic Uses of Scleral Lenses for OSD
Ashley Wallace-Tucker, OD, FAAO, FSLS

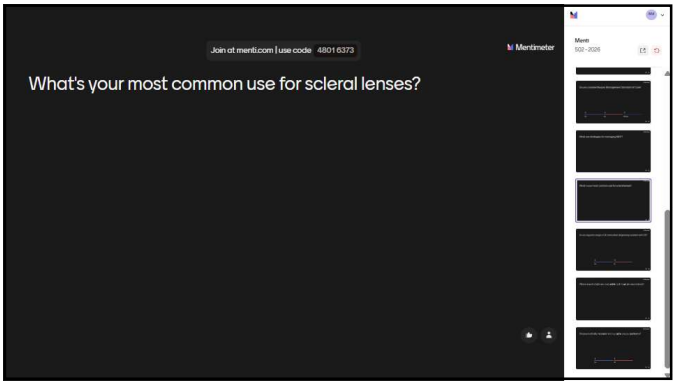
77

Therapeutic uses of scleral contact lenses for ocular surface disease: patient selection and special considerations

78

Audience poll: (word cloud):
What's your most common use of scleral lenses?

79



80

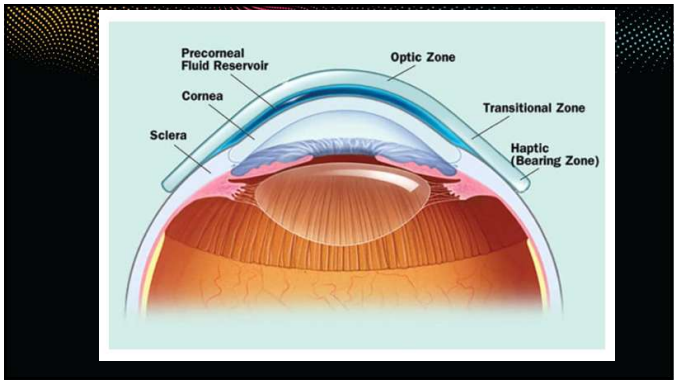

Therapeutic uses of scleral contact lenses for ocular surface disease: patient selection and special considerations

81

Why was this memorable?

- This publication systematically reframed scleral lenses as therapeutic rather than purely optical devices - a turning point in how many of us perceive and discuss their role.
- It compiled evidence supporting scleral use in conditions like Sjögren's syndrome, graft-vs-host disease, exposure keratopathy, neurotrophic keratitis, and persistent epithelial defects - broadening their clinical scope.

82



83

What did I learn?

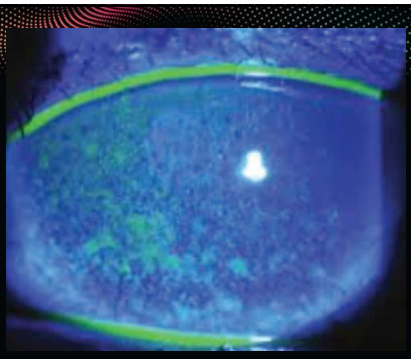
- That scleral lenses offer a customizable, protective, and therapeutic environment - especially valuable in severe ocular surface disease.
- To shift from viewing scleral lenses solely as tools for corneal irregularities to front-line treatment devices in OSD
- That such evidence-based positioning empowers us to communicate the real, functional benefits of sclerals to patients and insurance partners alike.

84

Ideal Candidates

- **Patients who are symptomatic with signs of ocular surface disease**
- Patients with neurotrophic conditions who have signs of ocular surface disease
- Patients with keratoneuralgia or neuropathic pain who have symptoms of dry eye without signs of ocular surface disease

85



86

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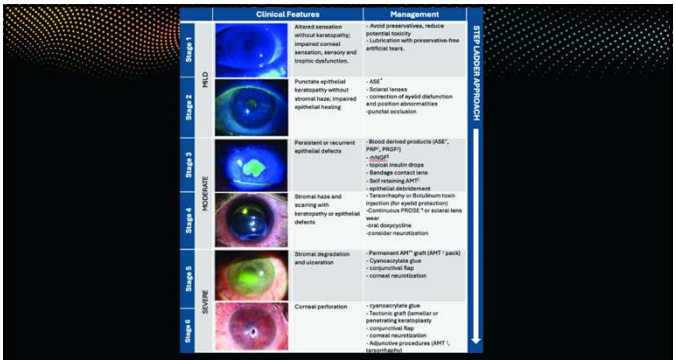
87



Font CS, Cortina MS. Neurotrophic keratopathy: Update in diagnosis and management. Indian J Ophthalmol. 2025 Apr 1;73(4):483-495.

88

Ideal Candidates

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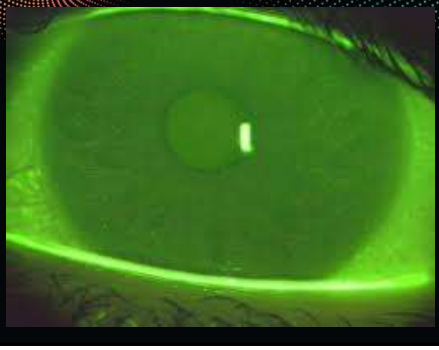
89

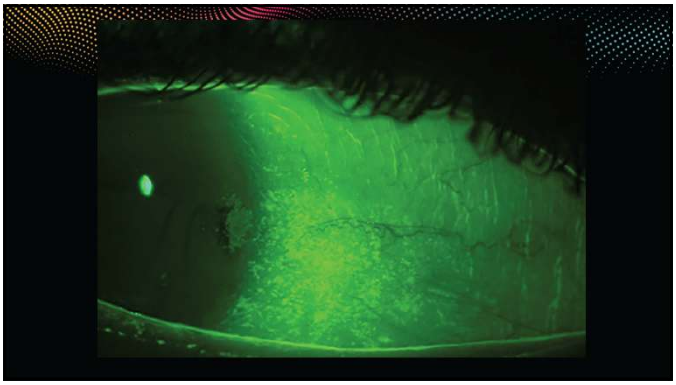


90

Initial Lens Selection:

- **Diameter**
  - **Large enough to completely clear and vault the cornea and limbal area.**
  - **Often dependent on the surface area of the ocular surface that needs rehabilitation**
- Toric haptics likely required
- Clearance
  - Minimal but complete corneal clearance
- High Dk materials

91



92

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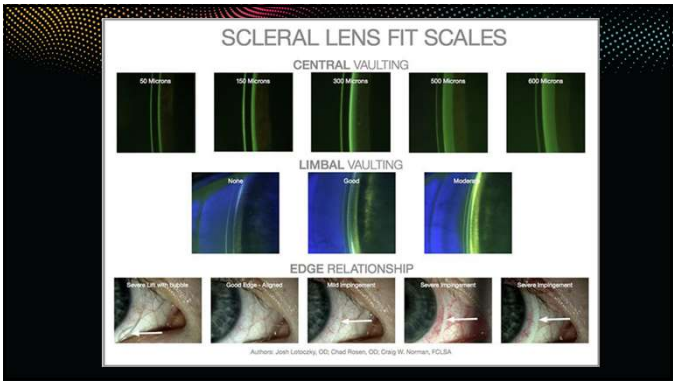
93



94

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- Clearance
  - Minimal but complete corneal clearance
- **High Dk materials**

95

Proposed Fitting Model

"Another model of fitting proposed by Michaud et al stated that the postlens tear layer should be no >200 microns in order to avoid corneal edema using a high-Dk (>150) lens with a maximum central thickness of 250 microns."

96

Poor Lens Wetting/Fogging

- Patients with OSD are at a greater risk
- Treat MGD aggressively
- Surface treatments/coatings
- Alcohol based cleaner along with H2O2 overnight cleaner
- Eye wash in the AM if using overnight gel
- Recommendation for toric haptics to reduce tear film debris formation
- More viscous PF filling solution

97

Follow-up Care

- More frequent follow-up is warranted
- Must understand the underlying disease process and determine whether the patient's symptoms at follow-up examination are due to the disease process or due to the lens fit.

98

Practical Tips

- Broaden Your Scleral Lens Indications
  - Beyond keratoconus, seriously consider sclerals for Sjögren's, exposure keratopathy, neurotrophic keratitis, and other OSDs.
- Emphasize Therapeutic Value
  - Position sclerals as a medical treatment, not just for refractive correction
  - Can aid in discussions with insurance or referring physicians.

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DISCUSSION

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Corneal Infiltrative Events
Aaron Zimmerman, OD, MS

101

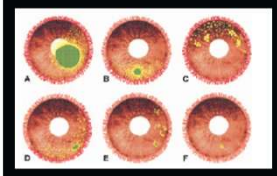
Early Career

- Differentiating conditions and learning how to manage them
- Learned that combination medications often were superior to simply treating with antibiotics

102

Cornea 2003;22(5):435-442

Clinical Characterization of Corneal Infiltrative Events Observed with Soft Contact Lens Wear

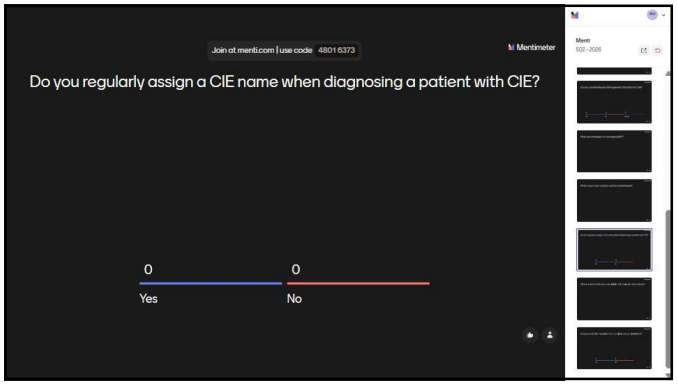


103

Audience Poll:
Do you regularly assign a CIE name when diagnosing a patient with a CIE?

1. Yes
2. No

104



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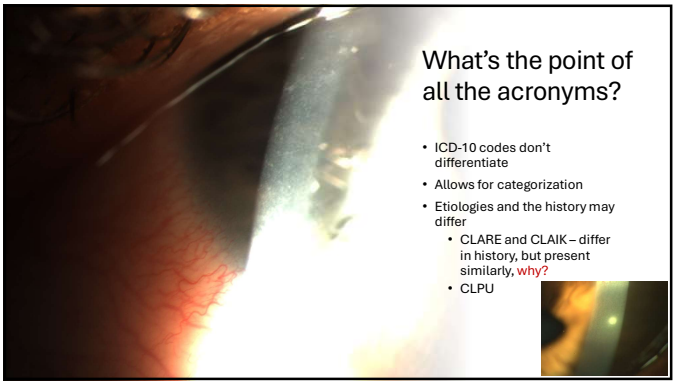


106

Observational Study – OSU Student Health Center

Contact Lens Corneal Inflammatory Events in a University Population

- Prospective and retrospective data for a 1 year period
- Findings:
  - Prospective: 84 non-CIEs, 76 CIEs
  - Retrospective 88 CIEs
  - Univariate Analysis:
    - Age (younger at higher risk)
    - Education level
    - Case replacement
    - Re-use/Top off solution
    - Overnight wear
    - Lens care solution*
      - Not what we set out looking for

OVS 2016;93:42-49

107

Adjudicated CIEs – OSU Student Health Center

	Unilateral				Bilateral			
	CLPU	IK	Phylct.	Mixed	CLPU	IK	Phlyct.	Mixed
PHMB	4	13	2	0	0	7	1	0
PQ-1/MAPD	**13**	**23**	**9**	**6**	**2**	**42**	**7**	**3**
Peroxide	2	3	1	2	0	2	0	0
Daily Disposable	3	2	1	0	0	1	0	0
Multiple*	5	3	0	0	0	6	1	0
Total	27	44	13	8	2	58	9	3

*Multiple: Participants reported using multiple care solutions
CLPU = contact lens peripheral ulcer; IK = infiltrative keratitis; Phlyct = phlyctenular like response; Mixed = mixed CIE presentation

75% of the bilateral cases involved PQ-1/MAPD

108

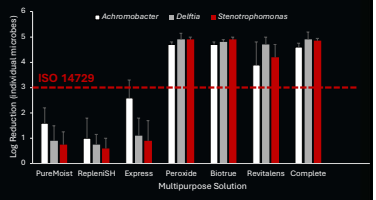
Multivariate Analysis

- Age (p<0.001)
- Interaction between Extended Wear and Lens Care Solution
  - If Daily Wear
    - PQ-1/MAPD p=0.011; 95% CI = 18.4 (1.9–173.9)
    - PHMB p=0.87; 95% CI = 1.29 (0.19–12.9
    - Peroxide Reference
  - If Extended Wear
    - PQ-1/MAPD p=0.74; 95% CI = 1.4 (0.2–8.7)
    - PHMB p=0.88; 95% CI = 1.2 (0.2–8.8)
    - Peroxide Reference
  - Extended Wear vs Daily Wear
    - PQ-1/MAPD p=0.69; 95% CI = 0.8 (0.2–2.6)
    - PHMB p=0.006; 95% CI = 10.0 (2.0–51.2)
    - Peroxide p=0.082

109

PQ-1/MAPD and CIEs

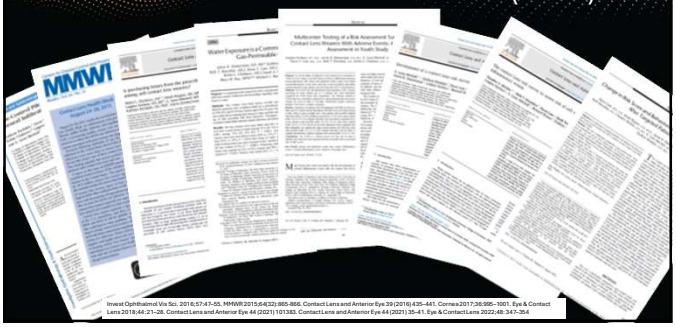
- What might explain this?
  - One theory – tight senofilcon A lenses
  - CIE - associated isolates
    - *Achromobacter xylosoxidans*
    - *Delftia acidovorans*
    - *Stenotrophomonas maltophilia*



Clin Ophthalmol 2025;19:519-526; Clin Exp Optom 2017;100(4):357-364

110

Contact Lens Assessment in Youth (CLAY)



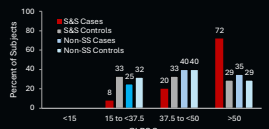
Invest Ophthalmol Vis Sci. 2016;57:47-55. MMWR 2015;64(32):865-866. Contact Lens and Anterior Eye 39 (2016) 435–441. Cornea 2017;36:995–1001. Eye & Contact Lens 2018;44:21-28. Contact Lens and Anterior Eye 44 (2021) 101383. Contact Lens and Anterior Eye 44 (2021) 35-41. Eye & Contact Lens 2022;48:347-354

111

CLAY – Several Findings

	ORACL [1] (aOR)	Red Eye Lite[2] aOR (95% CI)
Non-Daily Disposable	9.51	--
Two-Week[†]		4.3 (1.2-12.0)
Monthly[†]		2.2 (0.7-6.3)
Overnight Wear	4.84	5.8 (2.2-15.2)
MPSolution	4.62	--
Previous Red Eye	3.27	--
Internet Purchase	--	2.8 (1.4-5.9)
Replace when a problem	--	2.4 (1.1-5.1)
Re-Use Solution	--	2.5 (1.1-5.6)

- CLAY – SCORE[3]
  - Attempted to use the CLAY CLRS to develop a threshold score

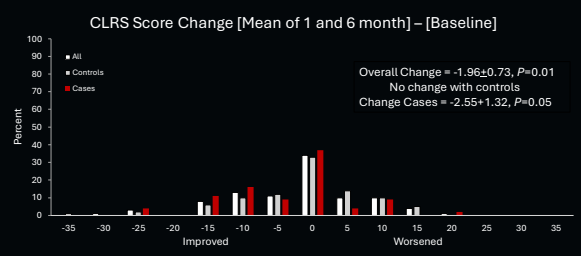


Best Cut Point was a Score of 50
ROC = 72% Specificity & 71% Sensitivity

1. Invest Ophthalmol Vis Sci. 2016;57:47-55. 2. Eye & Contact Lens 2018;44: 21–28. 3. CLAE 2021;44:35-41

112

Did targeted education improve later CLRS scores?



113

CLAY and Centers for Disease Control & Prevention

- 85 GP Wearers / 1056 SCL
  - Rinse lenses with water
    - 91% GP | 31% SCL
  - Swimming with lenses
    - 48% GP | 62% SCL
  - Showering with lenses
    - 67% GP | 86% SCL
  - Males more likely to store or rinse lenses in water
- Internet Purchasing and RFs?
- 968 Individuals
  - Where bought CLs?
    - 646 = ECP
    - 104 = Retail
    - 218 = Internet
  - Internet Purchases
    - Longer interval between eye exams
    - Could not identify any significant differences in CL practices compared to other purchase locations

Cornea 2017;36:995–1001; CLAE 2016;39:435-441

114

Largest Impacts – CLAY

- 1) Validated the CLRS
- 2)Consistently identified common CIE risk factors
- 3) Multipurpose solution may increase risk of CIE
- 4) Demonstrated that single use lenses are associated with lower risk of CIE development
- 5) Targeted education may improve compliance

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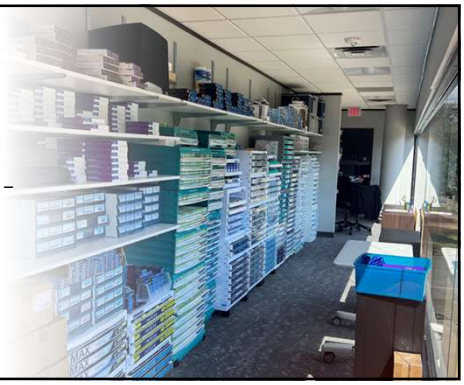
Contact Lenses as a Business Unit
Ashley Wallace-Tucker, OD, FAAO, FSLS

117

How We Made Contact Lenses a Million Dollar Business in Our Practice –

Review of Optometric Business



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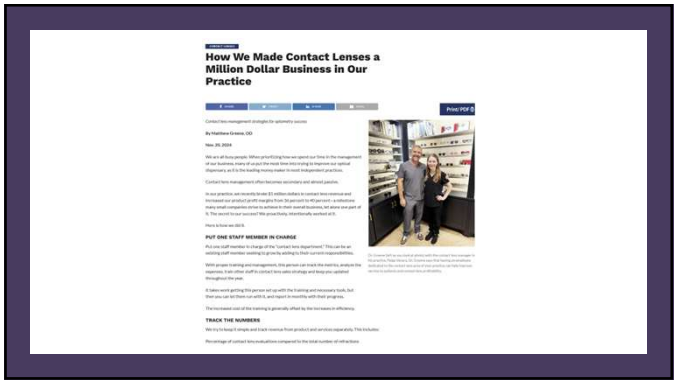

How We Made Contact Lenses a Million Dollar Business in Our Practice

PUT ONE STAFF MEMBER IN CHARGE

TRACK THE NUMBERS

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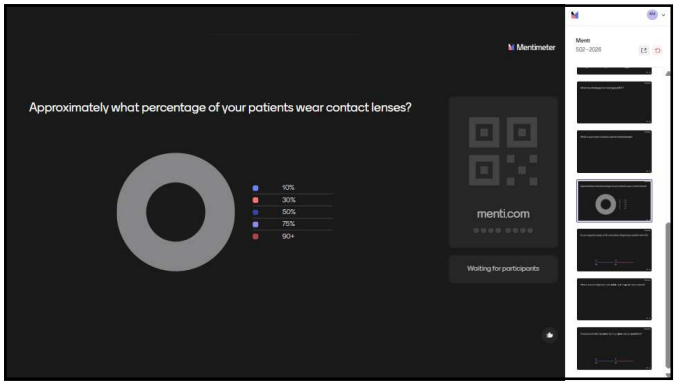
Poll: Approximately what percentage of your patients wear contact lenses?

- **10%**
- **30%**
- **50%**
- **75%**
- **90+%**

120



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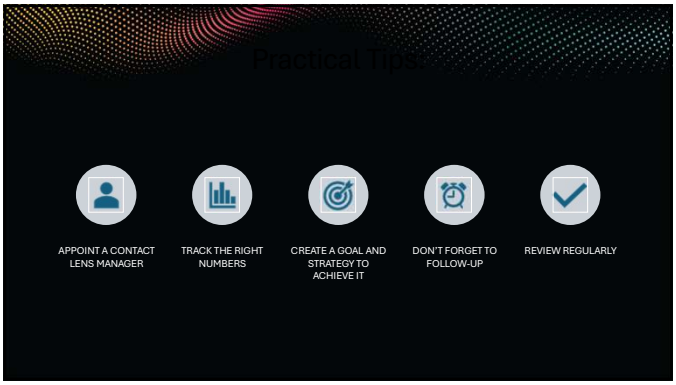

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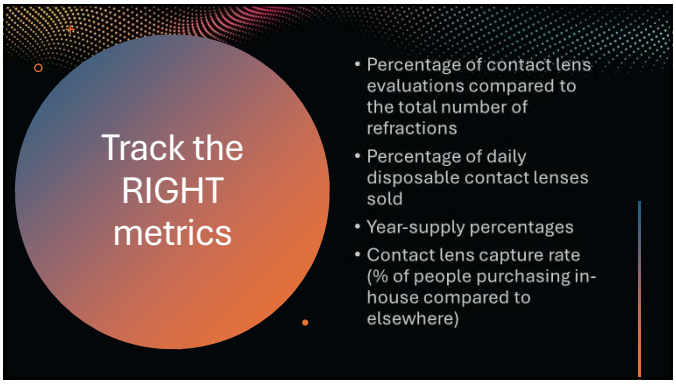

126

Create a GOAL and STRATEGIZE

- Be intentional about contact lens discussions with every eligible patient
- Give samples of daily disposables to weekly, biweekly and monthly wearers
- Use tools to show the patient the savings of buying in-house and taking full advantage of their VCPs and rebates offered
- Capitalize on technology to streamline communication and orders

127

Follow-ups

- Don't undervalue the VALUE
- Schedule at evaluation
- Delegate to manager or team member
- Encourage ordering during visit

128

Review & Adjust

- Review monthly
- Adjust quarterly if needed
- Empower the CL manager
- Get the ENTIRE team involved

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DISCUSSION

130

Ultraviolet Radiation (UV)
Aaron Zimmerman, OD, MS

131

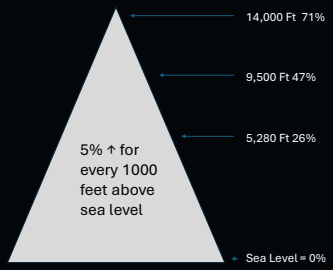
Eye and Contact Lens July 2011 – Volume 37 (Issue 4)

- Articles included:
  - Epidemiology of UV Exposure in Public Health
  - Mechanisms of UV induced immunosuppression
  - Ozone depletion and Solar UV Radiation
  - UV Phototoxicity to the Retina
  - UV and the Anterior Eye
  - The Role of UV in AMD
  - The role of UV in Cataract Formation

132

Influence in the Clinical Setting

- Keratitis
  - night clubs / water treatment
- Cataract
- AMD
- Contact lenses
  - Considerations for those:
    - regularly on the water
    - very active outdoors
    - mountain climbers / hikers
    - skiers



133

Teaching

- Ophthalmic lasers
- Excimer laser – refractive surgery
  - LASIK
  - PRK
  - LASEK
  - PTK

134

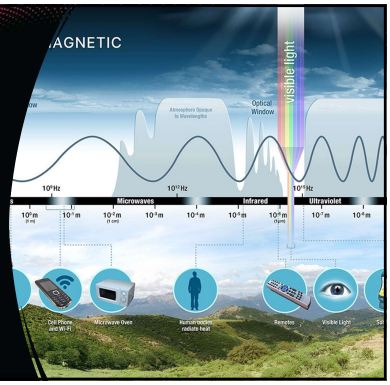
Standards

- ANSI Z87.1
- ASC Z80

135

Audience poll: (word cloud)

- Where does UV light end and visible light begin (in nanometers)?



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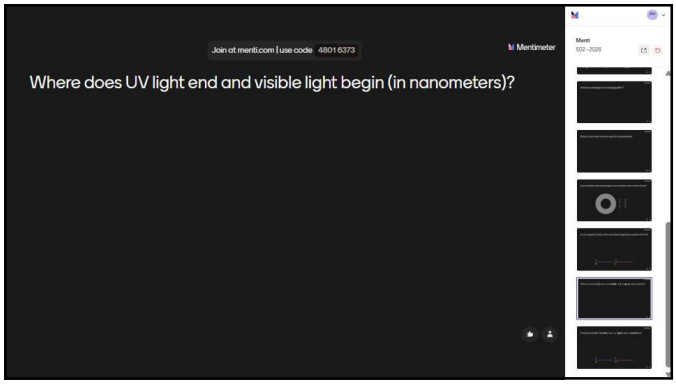
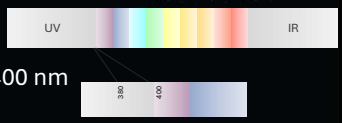


137

Believe it or not, a very contentious topic



- Industry = 380 nm
- Health Organizations = 400 nm
- Kids vs the elderly (cataract)
  - UV less than 380 nm is capable of reaching the retina in children
  - Brunescence of the crystalline lens absorbs UV and short visible wavelengths
  - Sliding scale during our lifetime of what is visible or not

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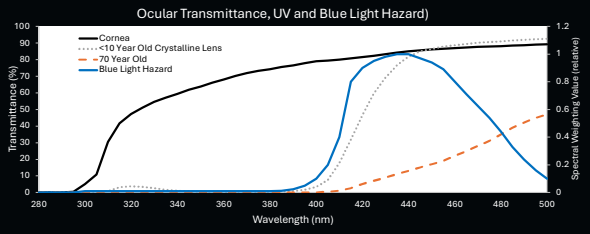
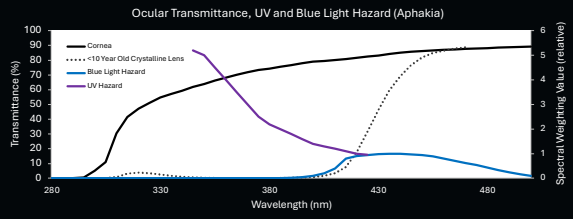
Ocular Transmission and "Blue Light Hazard"



1. International Commission on Illumination (CIE). CIE 203, 2012 ed. A Computerized Approach to Transmission and Absorption Characteristics of the Human Eye. Vienna, Austria: CIE; 2012. 2. International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP guidelines on limits of exposure to incoherent visible and infrared radiation. Health Phys 2013;105:74-96.

139

Ocular Transmission – Aphakia



1. International Commission on Illumination (CIE). CIE 203, 2012 ed. A Computerized Approach to Transmission and Absorption Characteristics of the Human Eye. Vienna, Austria: CIE; 2012. 2. International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP guidelines on limits of exposure to incoherent visible and infrared radiation. Health Phys 2013;105:74-96.

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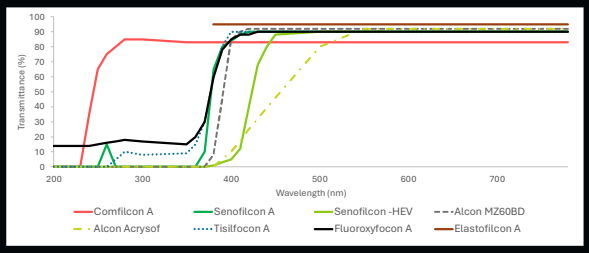
Transmission of Selected IOLs and Contact Lenses



https://reviewofoptometry.com/technologies-of-max-contact-lenses-address-a-lifetime-of-needs/; Cureus 16(6): e62093. DOI 10.7759/cureus.62093; Ophthalmology 2011;118:3–8; verbal communication B+L Dec 22, 2025; Acuity200_Package_Insert_06072021.pdf

141

Spectral Bands Task Force – Technical Report 2023

Aim: to establish a scheme to better describe wavelengths between 380 nm and 500 nm

Established a 3 –zone system for High Energy Visible (HEV) light; avoided using colors

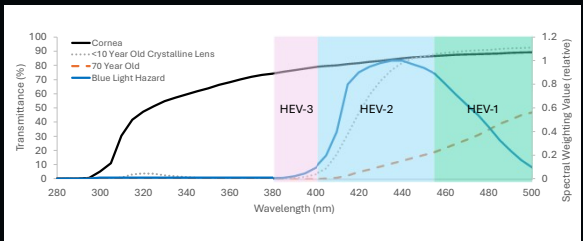
Did not make any medical claims

Will be referenced in the next ANSI Z80.3 (sunglass standard)

OVS 2024;101(4):176-178

142

High Energy Visible (HEV)



143

HEV – Take Home Points

- Circadian rhythm – blue light does have an effect
- AMD
  - Extremely difficult to determine over the course of a lifetime
  - Conflicting data: blue filtering IOLs vs non-blue filtering IOLs
    - No difference in AMD
- What if violet-blue is always blocked?
  - Disrupted sleep cycles, reduce mental and physical well-being, and one study demonstrated an increased risk of all-cause mortality
    - So some HEV exposure is necessary
- Employers, doctors, patients, regulators can use the HEV system to identify devices that will protect the end user from certain bands of the visible spectrum

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DISCUSSION

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Meibography
Jenn Harthan, OD

146

22-year-old presents with dry eye unable to wear contact lenses

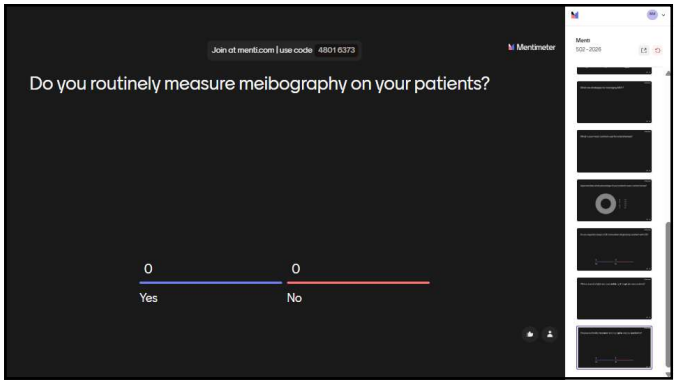
AS OCT VS KERATOGRAPH 5M

147

Audience Poll:
Do you routinely measure meibography on your patients?

1. YES
2. NO

148



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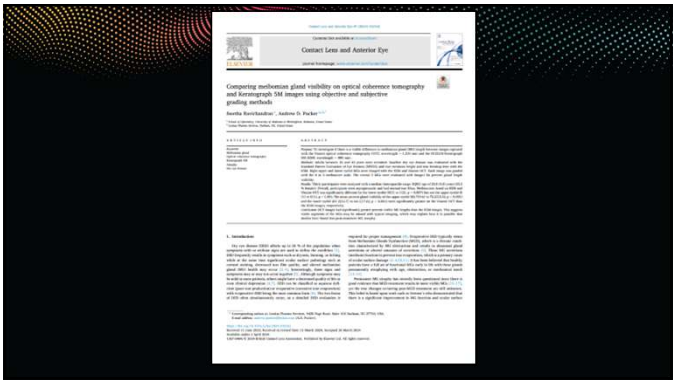

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Why was this memorable?

- Many patients with severe ocular surface disease or corneal irregularity need to wear specialty contact lenses for visual improvement and/or ocular surface rehabilitation.
- Utilizing multiple instruments for examination during specialty lens fitting can be time consuming for the practitioner and patient.
- Both the Keratograph 5M and AS-OCT were able to image the meibomian glands of the upper and lower eyelids in this study.
- The OCT (longer wavelength) imaged longer MGs compared to the Keratograph 5M.

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What did I learn?

- Traditionally, meibography has been performed in our clinic on a separate instrument, the Keratograph 5M
  - Has decreased exam flow efficiency and productivity during times of high clinic volume
- Utilizing AS-OCT to image the meibomian glands has improved clinic efficiency
  - Has also improved patient management for both contact lens and non-contact lens wearers

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Practical Tips

- Meibography is beneficial to perform for both symptomatic and asymptomatic patients
  - Including contact lens wearers to help with management
- Utilizing AS-OCT to image the meibomian glands can be very useful, particularly in scleral lens patients

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DISCUSSION & Q&A

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