1

Scleral Lens Supersession
General Session #8

Saturday, January 22nd, 2022 – 03.30-5.10pm EST

RESEARCH UPDATE

- Eef van der Worp BOptom, PhD
- Damien Fisher BAppSc(Optom)Hons, PhD, Grad Cert Oc Ther

CLINICAL PRACTICE

- Jason Jedlicka OD
- Gloria Chiu OD

2

3

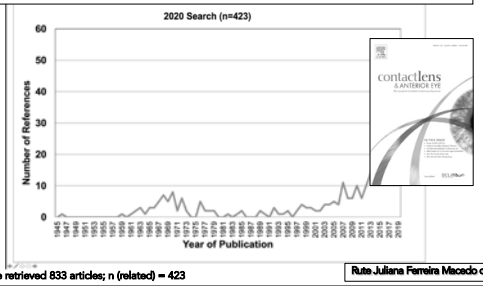
Disclosures

- Alcon/CIBA vision, Allergan/Abbott, Bausch + Lomb, Bausch + Lomb Specialty Vision Products, Contamac, Coopervision, David Thomas, Ercon, Eaglet-Eye, Eyescan, Hecht, Johhson & Johnson Vision Care, Marc'Ennovy, Microlens, NKL, Paragon Vision Science, Procornea, Soflex, Spectrum International, Truform, Ultravision, VST, Valley, X-Cel
- Educational Grant: Johnson & Johnson (the Netherlands)
- Educational Grant: Contamac – Generic Specialty Lens Ed.
- Educational Grant: B+L Boston – Scleral Lens Guide

Contamac

4

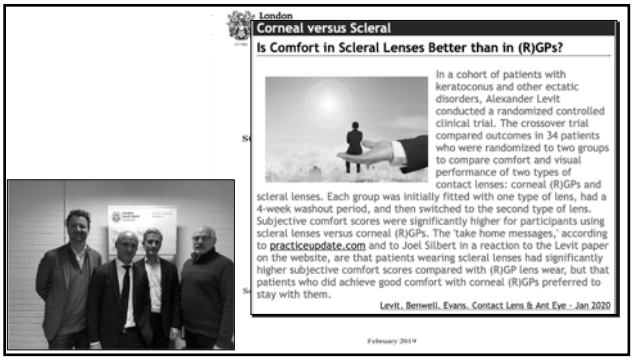
SCLERAL LENSES



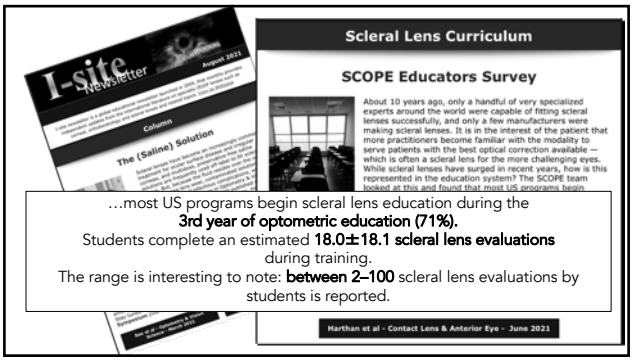
*Pubmed database retrieved 833 articles; n (related) = 423

Rute Juliana Ferreira Macedo de Araújo

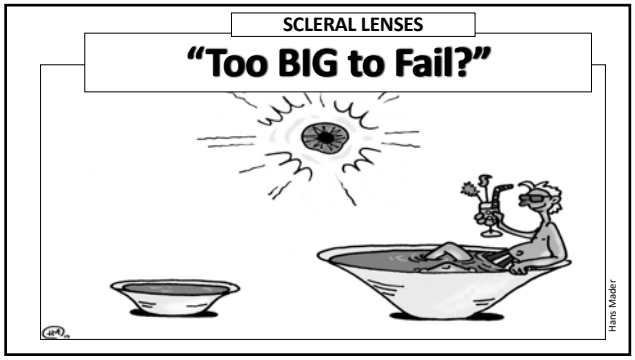
5



6


I-site newsletter
August 2021
Column
The (Saline) Solution
Scleral Lens Curriculum
SCOPE Educators Survey
About 10 years ago, only a handful of very specialized experts around the world were capable of fitting scleral lenses successfully, and only a few manufacturers were making scleral lenses. It is in the interest of the patient that more practitioners become familiar with the modality to serve patients with the best optical correction available — which is often a scleral lens for the more challenging eyes. While scleral lenses have surged in recent years, how is this represented in the education system? The SCOPE team looked at this and found that most US programs begin
…most US programs begin scleral lens education during the
3rd year of optometric education (71%).
Students complete an estimated 18.0±18.1 scleral lens evaluations during training.
The range is interesting to note: between 2–100 scleral lens evaluations by students is reported.
Harthan et al - Contact Lens & Anterior Eye - June 2021

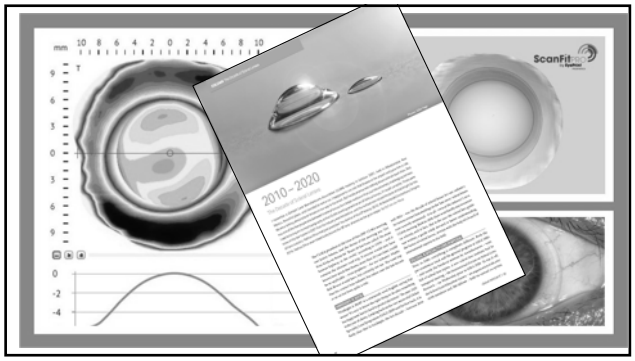
7


SCLERAL LENSES
"Too BIG to Fail?"
Hans Mader

8


Un guide pour l'adaptation des lentilles sclérales
Leitfaden für die Anpassung von Sklerallinsen
Guía para la adaptación de los lentes esclerales
Guia para Adaptação de Lentes Esclerais
Guida all'applicazione di lenti sclerali
2011
Priručnik za fitovanje skleralnih sočiva
Руководство по Подбору Склеральных Линз
スクレラルレンズの処方ガイド

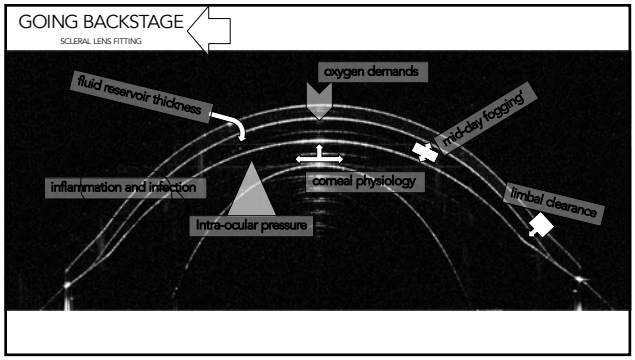
9


ScanFit
2010 - 2020

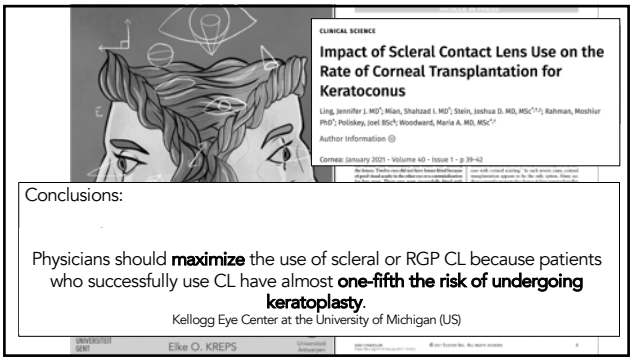
10


Tip of the EYES-berg

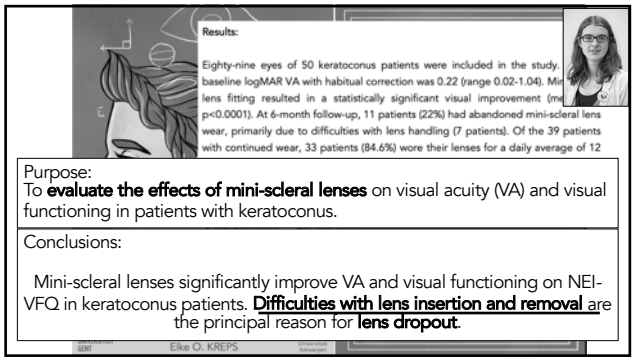
11


GOING BACKSTAGE
SCLERAL LENS FITTING
oxygen demands
fluid reservoir thickness
'mid-day fogging'
inflammation and infection
corneal physiology
limbal clearance
Intra-ocular pressure

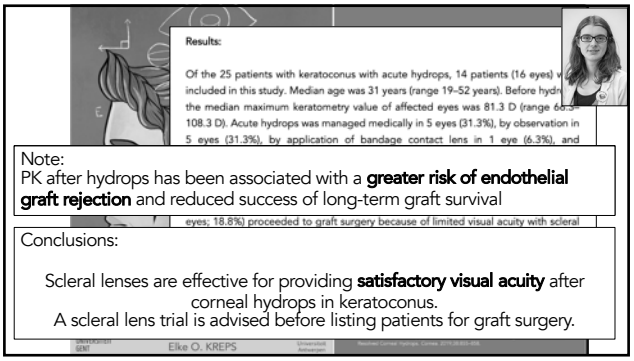
12



13

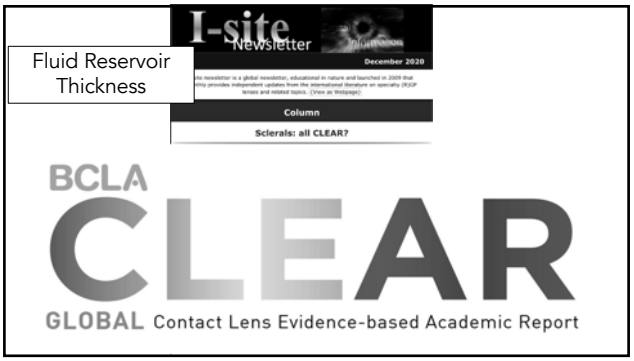


14

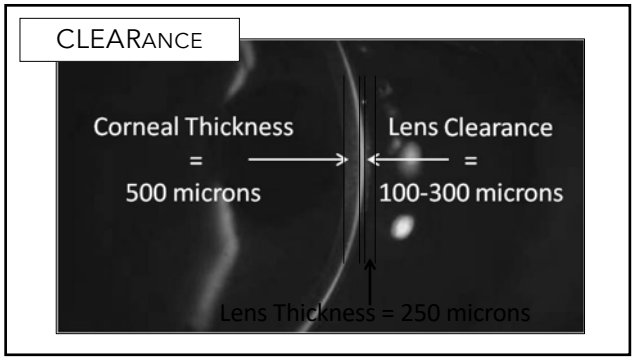


15

16



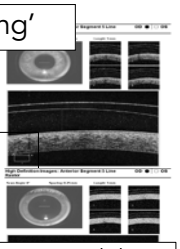
17



18

CLEARANCE

'Settling'



- ***Initial*** central clearance 300 to 500µm
- Settling 100-200µm
  - Kaufmann - 109 micron (8h)
  - Pacific University - 127 micron (8 h)
  - Mountford - 146 micron (30 days)

- The reduction in central vault follows an exponential decay, with ~50 % of the total settling observed after 30 min of lens wear, which stabilises after ~2– 4 h

19

The Impact of a Scleral Lens on the Eye

by

Maria K Walker

A dissertation submitted to the Vision Science Department,
College of Optometry
in partial fulfilment of the requirement for the degree of

DOCTOR OF PHILOSOPHY
in Physiological Optics

Chair of Committee: Rachel R. Redfern, OD, PhD
Committee Member: Jan PG. Bergmanson, OD, PhD
Committee Member: Alan Bunra, PhD
Committee Member: Langis Michaud, OD, MSc

University of Houston

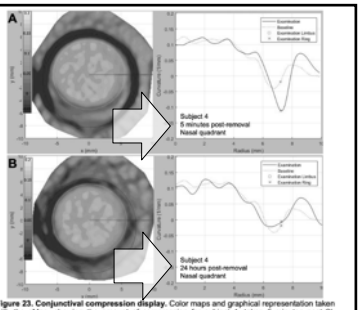


Figure 23. Conjunctival compression display. Color maps and graphical representation taken with the sMap, showing the amount of compression for subject 4, taken 5 minutes post-SL removal (A), as well as after 24 hours post-removal (B). A cross-section of the map (red line) is shown in graph form to compare the measured curvature to the baseline. For each subject, the compression ring was at a slightly different location, so the ring was manually aligned for each subject.

20

The Impact of a Scleral Lens on the Eye

by

Maria K Walker

A dissertation submitted to the Vision Science Department,
College of Optometry
in partial fulfilment of the requirement for the degree of

DOCTOR OF PHILOSOPHY
in Physiological Optics

Chair of Committee: Rachel R. Redfern, OD, PhD
Committee Member: Jan PG. Bergmanson, OD, PhD
Committee Member: Alan Bunra, PhD
Committee Member: Langis Michaud, OD, MSc

University of Houston

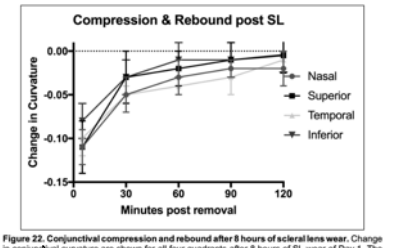
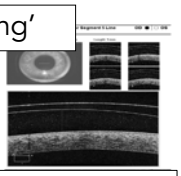


Figure 22. Conjunctival compression and rebound after 8 hours of scleral lens wear. Change in conjunctival curvature are shown for all four quadrants after 8 hours of SL wear of Day 1. The timepoint 0 measured started from 5 minutes post removal up and go up to 120 minutes post-removal. Curvature was significantly different from baseline in all quadrants (Dunn's multiple comparisons test) until 90 minutes post-SL removal. Eyes were approximately 90-95% rebounded back to baseline curvature after 120 minutes post-SL removal.

21

CLEARANCE

'Settling'



- Tendency to overestimate vault with NaFl (Yueng Sorbara 2018)
- Without NaFl - particularly low reservoir thickness (Fuller 2016)
- Visibility NaFl limited (limbus)
- Use lens centre lens thickness (not cornea)
  - But lens thickness variation ±100 µm

22

Scleral Lens Curriculum

SCOPE Educators Survey

Ideal scleral lens fitting characteristics taught include:

- central **corneal** clearance 206±44 microns (range 150–350)
- ***limbal*** clearance of 62±24 microns (range 20–100)
- a maximum of one clock hour or less of **conjunctival vascular compression.**

one clock hour or less of conjunctival vascular compression. Educators ranked in-person continuing education (61%) followed by contact lens laboratory consults (22%) as the two most important sources of information on best practices in scleral lens prescription and management. For more educational tools and resources, see item below in this newsletter.

Harthan et al - Contact Lens & Anterior Eye - June 2021

23

CLEARANCE

Influence of the Amount of Limbal Clearance

This study by Debby Yeung et al is an objective and subjective evaluation of the clinical performance of scleral lenses with varying limbal clearance (LC) in keratoconus patients. Lenses with varying limbal clearance with 50µm interval were fitted, and worn during a 2-week period. Participants reported greater comfort achieved with high LC. No difference in limbal and bulbar hyperemia was found, as well as similar perilimbal staining and negative corneal staining. In conclusion the authors stated that the amount of LC may play an important role in subjective performance in scleral lenses but does not impact the degree of hyperemia in either the limbal or bulbar region. Although low LC might result in more compression-related changes to ocular surface, high LC is associated with greater comfort and greater edematous changes. Limbal zone designs in scleral lenses might affect the integrity of the limbal epithelial tissue as a result of a combined hypoxic and compression-related etiology.

Yeung et al - OVS 2020

24

CLEARANCE

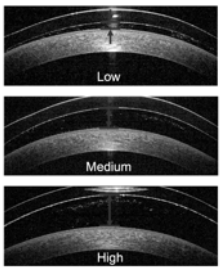
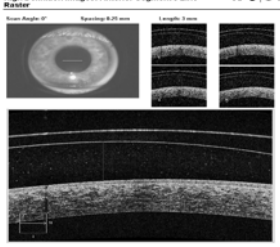


Figure 3.1 Example OCT images from one participant showing the central FR thickness for the low (group mean 144 ± 7 µm), medium (group mean 487 ± 20 µm) and high (group mean 726 ± 17 µm) conditions. The central FR thickness was measured between the anterior corneal surface and the back surface of the scleral lens along the normal to the tangent of the corneal apex, as indicated by the red arrows.

25

CLEARANCE

Recommendations



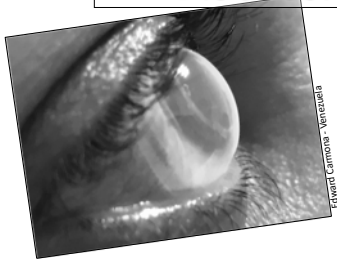
- clearance
  - 200 micron
- material
  - Dk 150 >
- center thickness
  - 250 micron

Université de Montréal

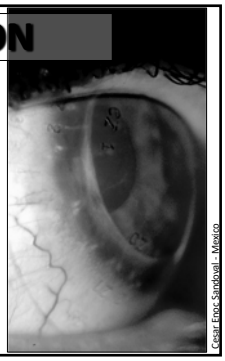
Contact Lens & Anterior Eye 35 (2012) 266–271

26

DISCUSSION



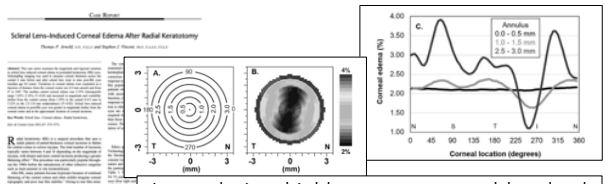
Edward Cummins - Venezuela



Cesar Enos-Sandoval - Mexico

27

DISCUSSION



In conclusion, highly oxygen permeable scleral lens wear induces central corneal edema in post-RK eyes which increases in magnitude further from the corneal center and at the approximate location of corneal incisions.

28

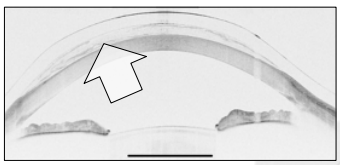
GOING BACKSTAGE

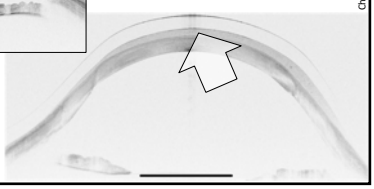
SCLERAL LENS FITTING

FOGGING

29

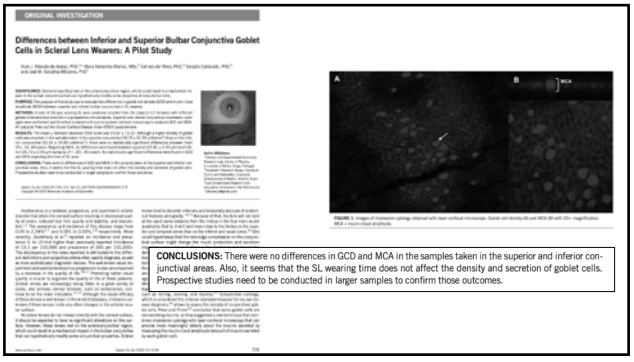
FOGGING





Charles Vervaet – Oculenti Rotterdam NL

30



ORIGINAL INVESTIGATION

Differences between Inferior and Superior Bulbar Conjunctiva Goblet Cells in Scleral Lens Wearers: A Pilot Study

CONCLUSIONS: There were no differences in GCD and MCA in the samples taken in the superior and inferior conjunctival areas. Also, it seems that the SL wearing time does not affect the density and secretion of goblet cells. Prospective studies need to be conducted in larger samples to confirm those outcomes.

31

Ocular Surface Temperature During Scleral Lens Wearing in Patients With Keratoconus

Conclusion:
Scleral contact lens seems not to modify the ocular surface temperature despite the presence of the tear film stagnation under the lens.

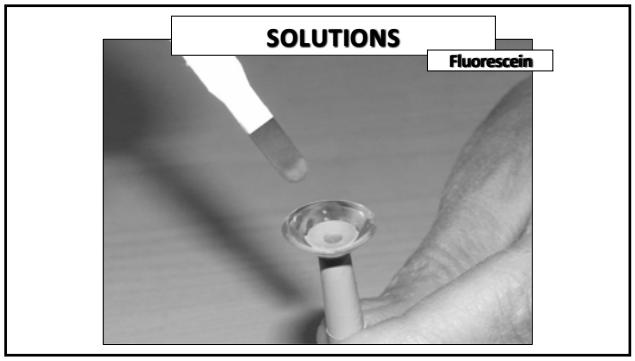
32

TEAR EXCHANGE

Do Soft Lens Fitting Characteristics Predict Post-Lens Tear Mixing?
Tan Truong, OD; Andrew Graham, MS; Justin Kwan, BA; James Esposito, BA; Carol Hsiao, OD; Meng C. Lin, OD, PhD
Clinical Research Center, University of California, Berkeley, School of Optometry

Tear mixing underneath contact lenses:
- 22-35 min range for a variety of soft lenses
- 3-5 min RGP lenses
- Scleral lenses?

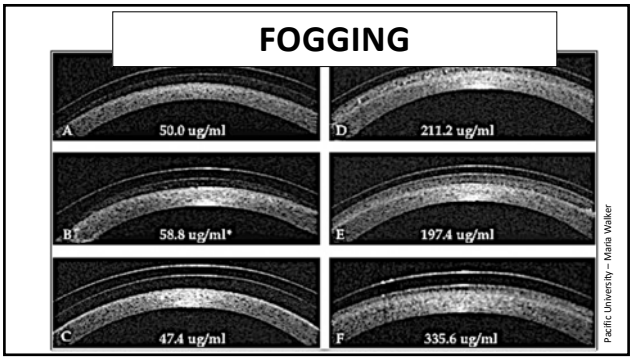
33



SOLUTIONS

Fluorescein

34

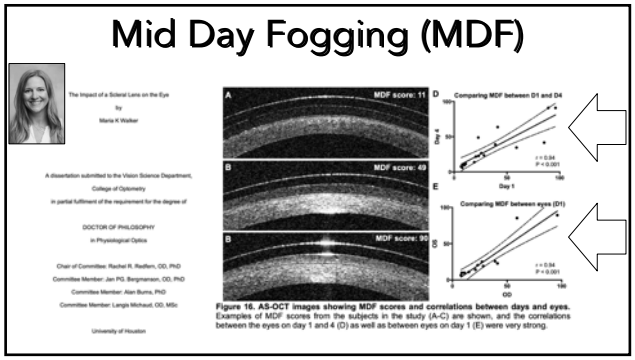


FOGGING

A 50.0 ug/ml
D 211.2 ug/ml
B 58.8 ug/ml*
E 197.4 ug/ml
C 47.4 ug/ml
F 335.6 ug/ml

Pacific University – Maria Walker

35



Mid Day Fogging (MDF)

The Impact of a Scleral Lens on the Eye
by
Maria K Walker

A dissertation submitted to the Vision Science Department, College of Optometry
in partial fulfilment of the requirement for the degree of
DOCTOR OF PHILOSOPHY
in Physiological Optics

Chair of Committee: Rachel R. Redfern, OD, PhD
Committee Member: Jan PG. Bergmanson, OD, PhD
Committee Member: Alan Burns, PhD
Committee Member: Langis Michaud, OD, MSc

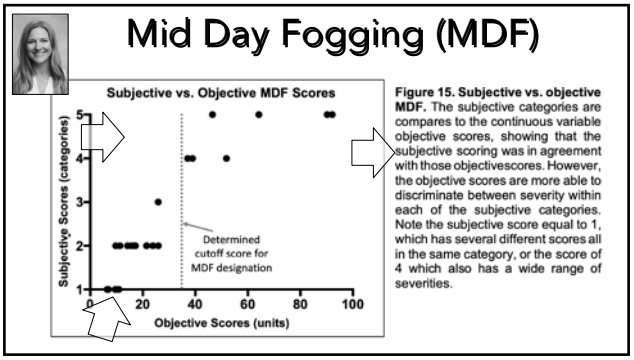
University of Houston

MDF score: 11
MDF score: 49
MDF score: 90

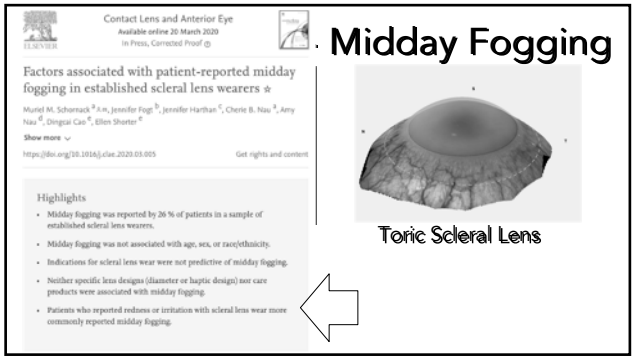
Comparing MDF between D1 and D4
Comparing MDF between eyes (D1)

Figure 16. AS-OCT images showing MDF scores and correlations between days and eyes. Examples of MDF scores from the subjects in the study (A-C) are shown, and the correlations between the eyes on day 1 and 4 (D) as well as between eyes on day 1 (E) were very strong.

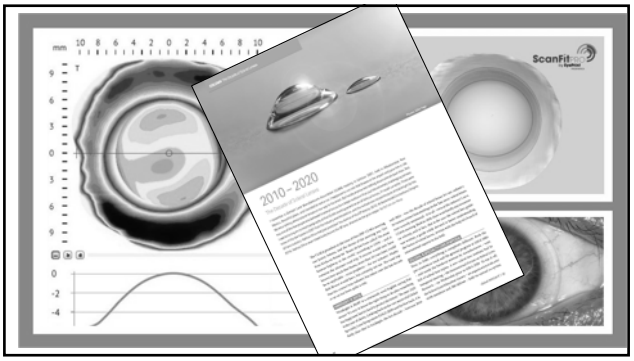
36


Mid Day Fogging (MDF)
Subjective vs. Objective MDF Scores
Subjective Scores (categories)
Objective Scores (units)
Determined cutoff score for MDF designation
Figure 15. Subjective vs. objective MDF. The subjective categories are compares to the continuous variable objective scores, showing that the subjective scoring was in agreement with those objectivescores. However, the objective scores are more able to discriminate between severity within each of the subjective categories. Note the subjective score equal to 1, which has several different scores all in the same category, or the score of 4 which also has a wide range of severities.

37


Contact Lens and Anterior Eye
Available online 20 March 2020
In Press, Corrected Proof
Factors associated with patient-reported midday fogging in established scleral lens wearers
Highlights
Midday Fogging
Toric Scleral Lens

38


2010 - 2020
ScanFit

39


GOING BACKSTAGE

40