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Eef van der Worp optometrist PhD FAAO FIACLE FBCLA FSLs

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European Contact Lens and
Ocular Surface Congress

EUROPEAN CONGRESS
ON MYOPIA CONTROL

2 - 3
September
2022

Novotel tour billet

Paris - France



Disclosures

Bausch + Lomb Specialty Vision Products, Contamac, Coopervision, David Thomas, Ercon, Eaglet-Eye, Eyescan, Hecht, Johnson & 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: B+L Boston – Scleral Lens Guide
- Educational Grant: Contamac – Generic Specialty Lens Ed.

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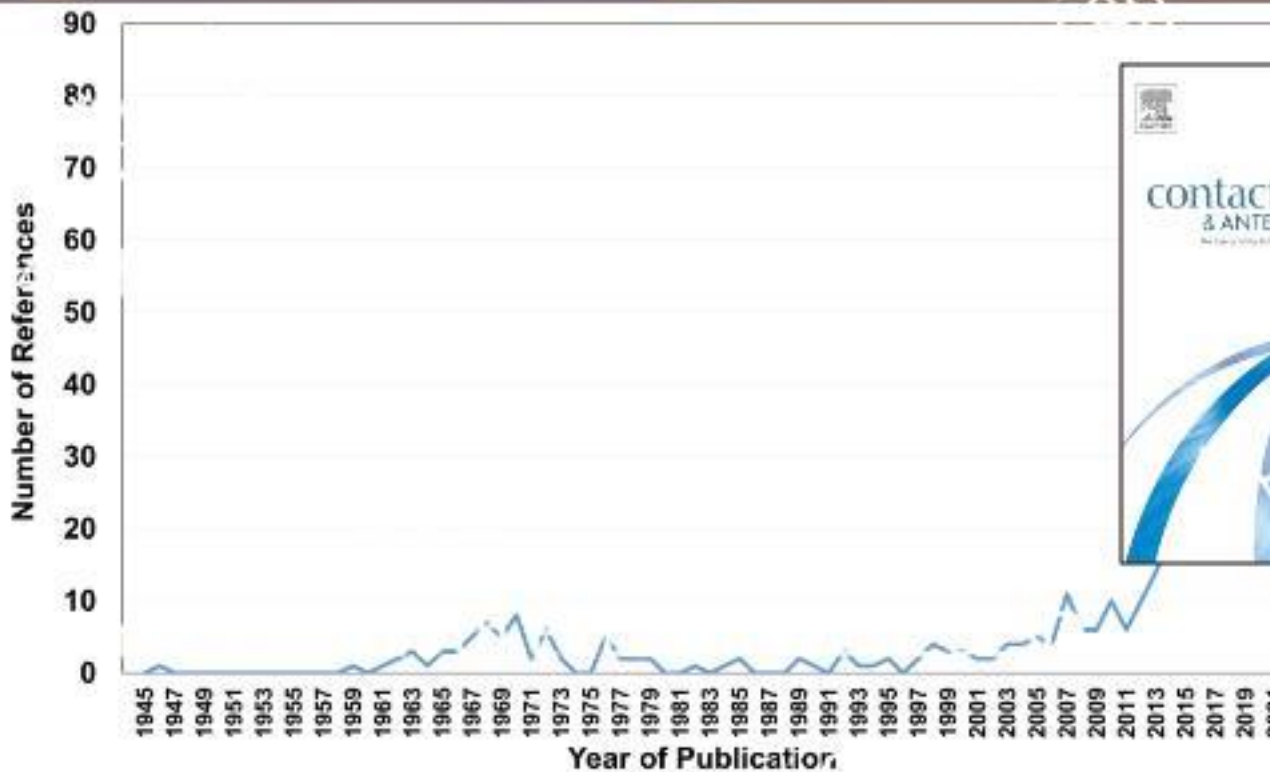
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OPHTHALMOLOGISTS





I-site Newsletter

December 2020

I-site newsletter is a global newsletter, educational in nature and launched in 2009 that monthly provides independent updates from the international literature on specialty (R)GP lenses and related topics. (View as Webpage)

Column

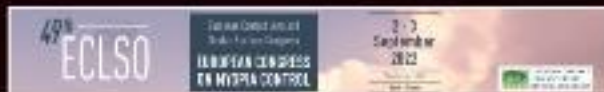
Sclerals: all CLEAR?



As described in the... have become... have...

...host... scleral lenses. This newsletter... Contact Lens Update... sclerals. This newsletter... topics out of all of these, but will... on a couple of main areas only - scleral lens... reservoir (post lens clearance) and fogging to... simply not enough space. And there is mo... the new year the British Contact Lens... ion (BCLA) is comprising a global consens... cs that will deliver evidence-based guidan... e to ensure the best possible care for patie... specially dedicated section in this. The Co... parts (CLEAR) will be published in the Mar... Contact Lens and Anterior Eye). The divi... he footsteps of two similar projects in the... a TFOS DEWS II report and the IMI white... rance on scleral lenses and their perform... k towards the future, and not get 'fogged... by this scleral lens tsunami as there is more besides sclerals and beyond scl... And I certainly hope we can meet 'live' again somewhere in 2021.

Eef van der Worp



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“Too BIG to Fail?”



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. It is long after 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 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. Ideal scleral lens fitting characteristics taught include central corneal diameters of 20.6±4.4 mm (range 15.1-31.0), limbal clearance of 62-74 microns (range 20-100), with a total sum of time of 1.5-2.5 hours per year of non-continuing education. Educators ranked in-person continuing education (51%) 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 them below in this newsletter. (Group & Editor's Note)

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



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Un guide pour l'adaptation des lentilles sclérales

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Leitfaden für die Anpassung von Sklerallinsen

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Priručnik za fitovanje skleralnih sočiva

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Руководство по подбору Склеральных Линз

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WALMIS The World of Contact Lenses

2010-2020
The Decade of SCLSO and SCLSO

Introduction & Scope Over the decades, the contact lens (CL) market has grown from a niche market to a global industry. The market is now dominated by scleral contact lenses (SCLs), which offer a new paradigm in vision correction. This report explores the market dynamics, challenges, and opportunities for SCLSO and SCLSO over the next decade.

Market Overview The global contact lens market is projected to reach a value of \$10 billion by 2020. SCLs are expected to account for a significant portion of this growth, driven by their superior comfort and visual quality. Key players in the market include Bausch & Lomb, CooperVision, and Johnson & Johnson.

Challenges & Opportunities The SCL market faces several challenges, including high manufacturing costs and limited distribution channels. However, there are also significant opportunities for growth, particularly in emerging markets and through digital health solutions.

Future Outlook The SCL market is poised for rapid growth over the next decade. Continued innovation in lens materials and manufacturing processes will drive the adoption of SCLs by a wider range of patients. Collaboration between industry and academia will be crucial for addressing the remaining challenges.

Conclusion The SCL market represents a transformative force in the contact lens industry. By addressing the challenges and leveraging the opportunities, stakeholders can ensure a successful and sustainable future for SCLSO and SCLSO.

Ed van der Worp



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Guida all' applicazione di lenti sclerali

Ed van der Worp

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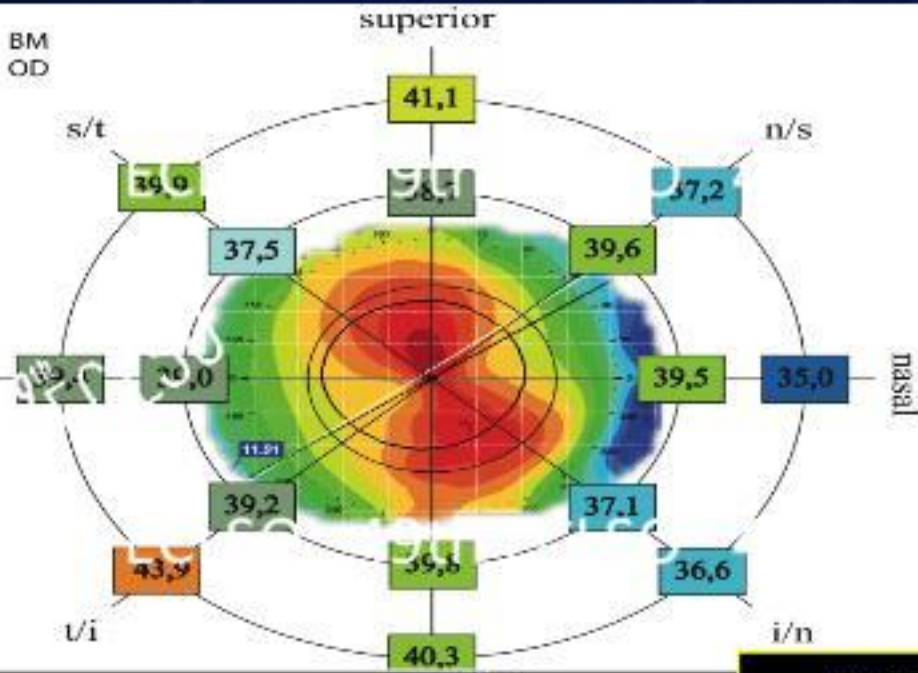
Handbook for fitting scleral lenses

Ed van der Worp

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SCLERAL

TEMPORARILY



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NASAL FLATTER

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1* NON-ROTATIONALLY SYMMETRICAL

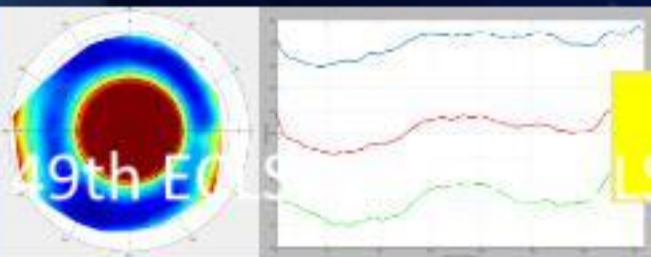
2* MORE IRREGULAR TOWARDS PERIPHERY

3* TANGENTIAL SHAPE CORNEO-SCLERAL PROFILE

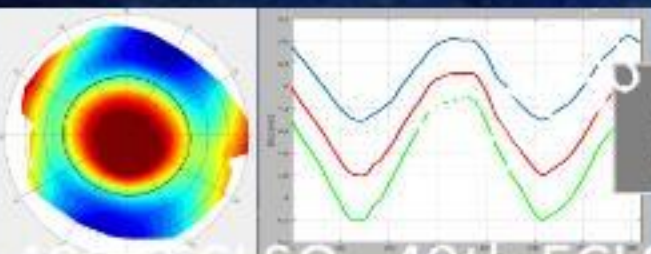


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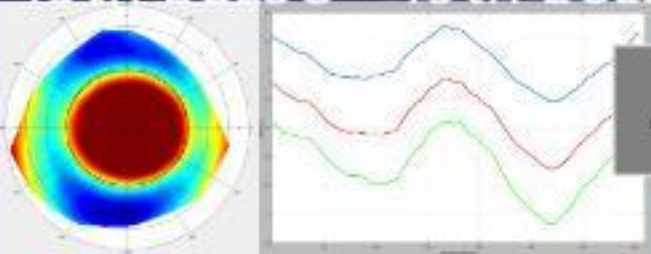
CLASSIFICATION



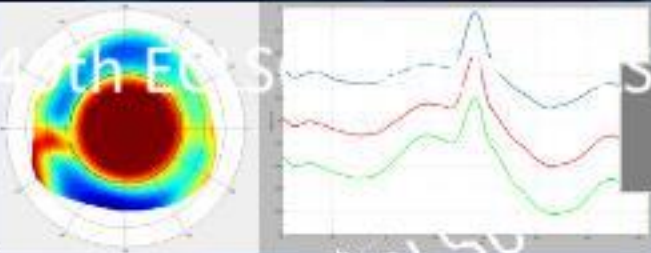
5.7%



28.6%



40.7%



26%

CONTACT LENS RESEARCH & SCIENCE

Original Research

QUALITATIVE ASSESSMENT OF SCLERAL SHAPE PATTERNS USING A NEW WIDE-FIELD OCULAR SURFACE ELEVATION TOPOGRAPHER: THE SSSG STUDY
 by Gregory DeNaeve, OD¹, Donald R. Sanders, MD, PhD², Eef van der Worp, OD³, Jason Jedlicka, OD⁴, Langis Michaud, OD⁵, Sheila Morrison, OD⁶

About the Authors

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Submitted August 25, 2017; Accepted November 5, 2017.

Abstract

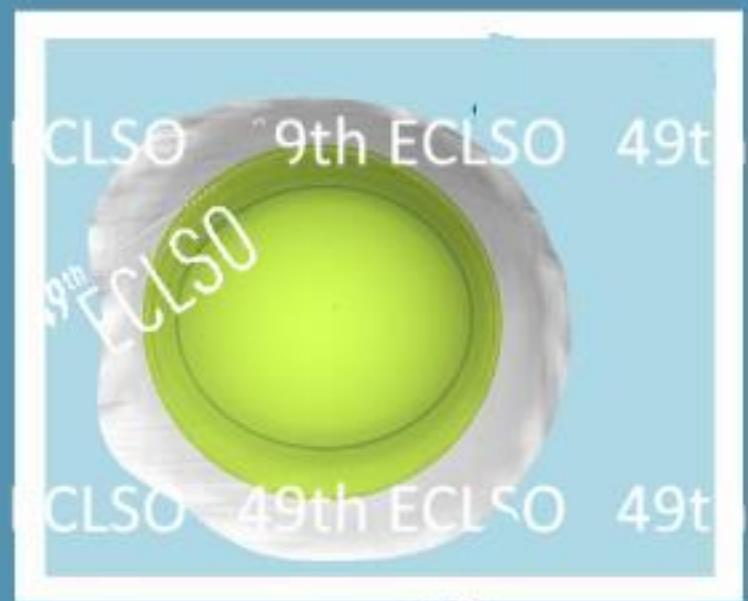
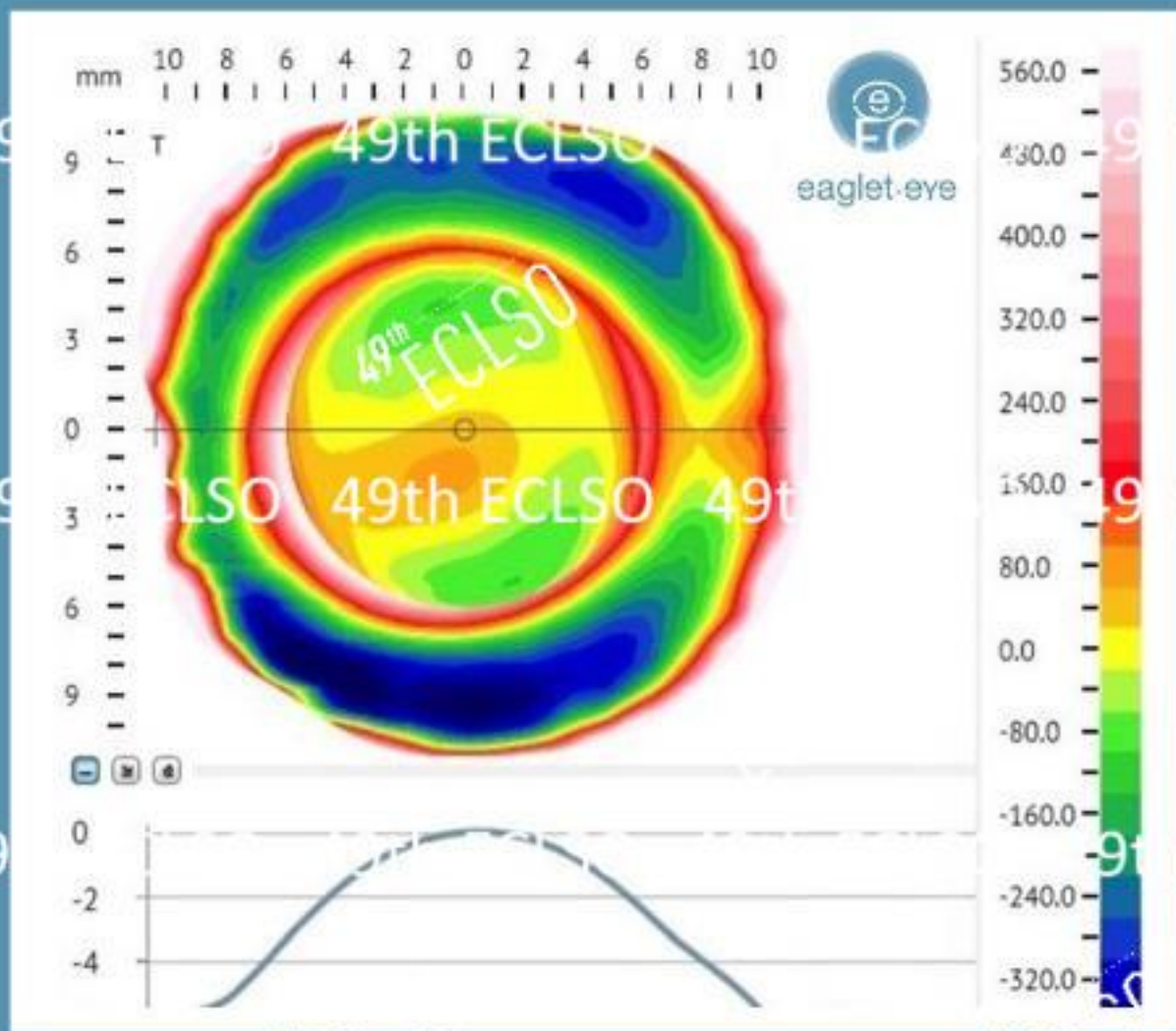
Background and Objective: Objective was to evaluate new findings regarding contact lens design (specifically, the novel wide-field elevation topography device and software) to provide a novel classification system for scleral shape.

Methods: The Scleral Shape Study Group (SSSG) collaborated with researchers to collect data from 117 eyes of presbyopic scleral lens patients utilizing a new topography device and software specifically designed to measure and map the scleral surface from 22 mm. Coordinates of radial points of highest, single-vertex meridians at a 14-mm diameter from the corneal center was generated for each eye. Scleral shape patterns were reviewed in all eyes and classified according to scleral characteristics.

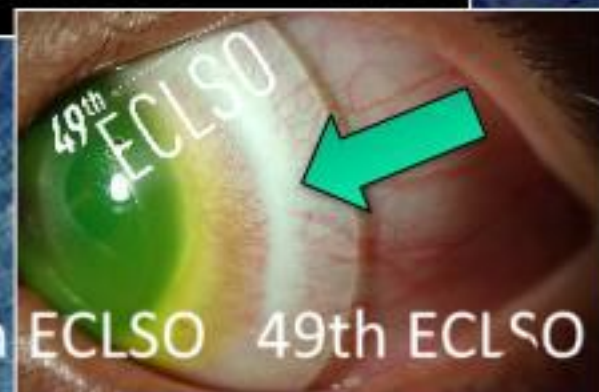
Results: Twelve eyes were excluded from the analysis due to incomplete data. Of the remaining 105 eyes, 6 (5.7%) of the plots were primarily spherical (Group 1) and 30 (28.6%) were primarily regular toric. Eighty-four (80%) of the plots were primarily irregular toric (Group 2). The irregular toric plots were further divided into 10 subgroups based on the degree of irregularity. The plots were further divided into 10 subgroups based on the degree of irregularity. The plots were further divided into 10 subgroups based on the degree of irregularity.

J Contact Lens Res Pract Optom 2018; November 4, 2017 © 2017

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BEYOND THE CORNEA



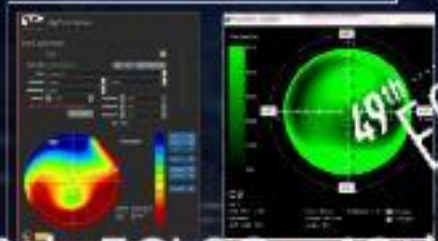
JAN PAUWELS



GREG DENAYER

Lets Move on – Use Micron!

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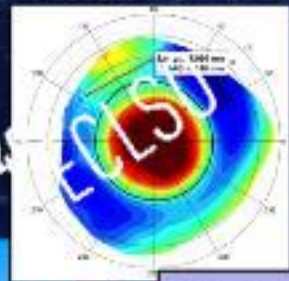


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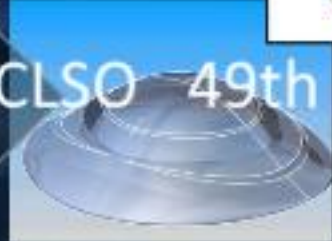
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~300 micron



15mm concentric circle
~ 300 micron

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I-site Newsletter



October 2022

I-site newsletter is a global educational newsletter FOR HEALTH CARE PROVIDERS launched in 2009, that monthly provides independent updates from the international literature on specialty rigid contact lenses such as corneal, orthokeratology and scleral lenses and related topics. [View as Webpage](#)

Column

The Good, the Bad and the Snugly



Scleral lenses have been in the spotlight a lot the last decade. And I mean a lot. Up to the point that there are only a few minor things that need further investigation it seems. The time of major innovation that we saw on an annual basis may be over now. In other words: there is not that much 'new' stuff anymore. At the same time, that is the 'good' part mentioned in the title as well: most of the insecurities we had, and kept me awake sometimes at night, have been 'solved'. We know quite a lot about the oxygen thing, enough to not have to worry about it too much anymore: most scleral lens devices, in non-comprised eyes and with the high Dk materials that we have today do not cause harm. What is left is nuisances (and sometimes more than that) like midday fogging, conjunctival prolapse and solution interactions.

The potential of intra-ocular pressure increase has been documented, and needs more work and attention - but does not seem to be a major game changer. The biggest advancement we have made in the last 10 years is probably the better understanding of ocular surface shape, with first the OCT-based instruments and now profilometry and scheimpflug imaging. Toric, quadrant specific and more complex assymetrical lens designs, up to the point of impression techniques - allow for a much better alignment of the lens with the ocular surface, and a 'snugly' fitting lens with many potential benefits. In the end that is extremely good news for the modality. It has grown up, is past the teething problems, and even past most of the teenage-grow-up phase issues. Maybe not the most sexy times - but it seems like we are entering a new era of a calm sea, and less 'wild-west'. I look forward to sailing there.

GOING BACKSTAGE

SCLERAL LENS FITTING

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GOING BACKSTAGE

SCLERAL LENS FITTING



CLEARANCE

Corneal Thickness

500 microns

Lens Clearance

100-300 microns

Lens Thickness = 250 microns

The recommended target central fluid reservoir thickness varies between lens manufacturers, ranging from approximately 300–500 μm immediately after application to 100–300 μm after settling

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

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**

scleral lens prescription and management. For more educational tools and resources, see item below in this newsletter. Image Rubén Rodríguez

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

CLEARANCE

FR THICKNESS

GUT Health Contact Lens and Visual Optics Laboratory

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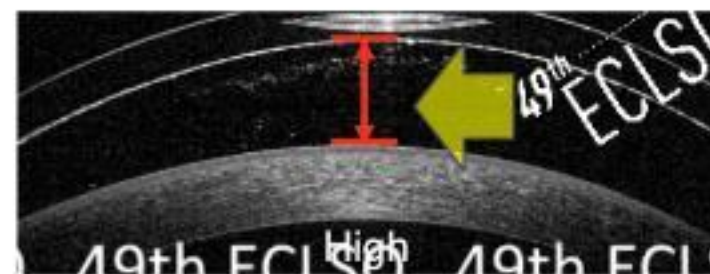
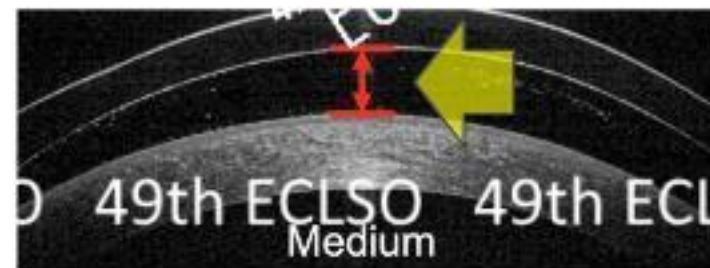
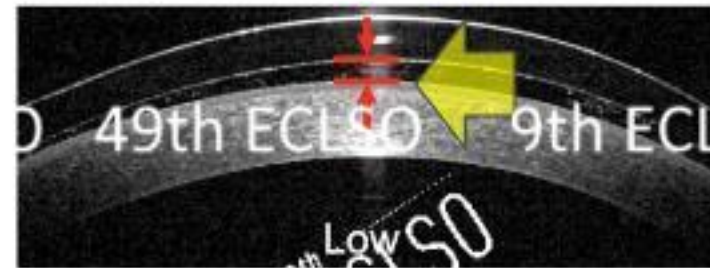


Figure 3.1 Example OCT images from one participant showing the central FR thickness for the low (group mean $144 \pm 7 \mu\text{m}$), medium (group mean $487 \pm 20 \mu\text{m}$) and high (group mean $726 \pm 17 \mu\text{m}$) conditions. The central FR thickness was measured between the anterior corneal 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.

LENS THICKNESS



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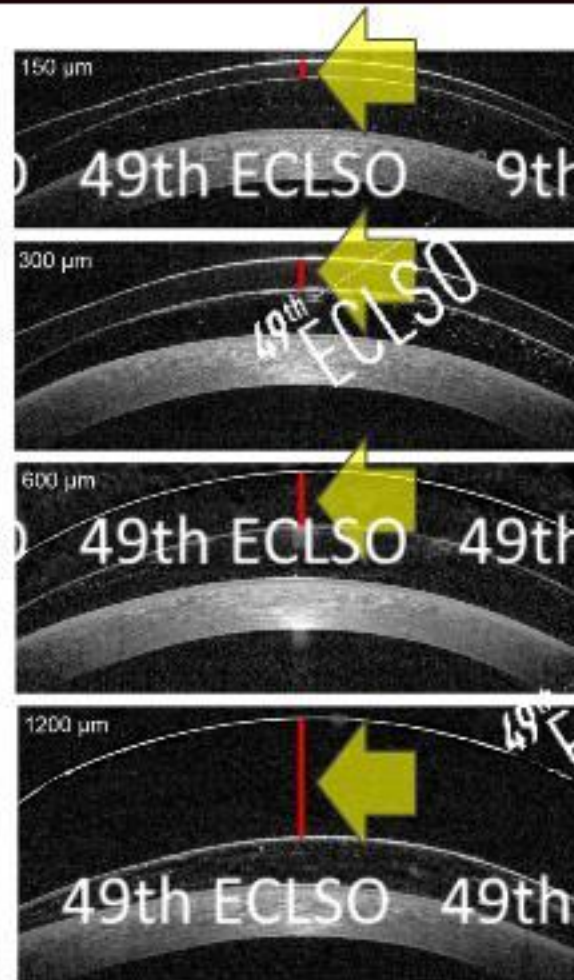


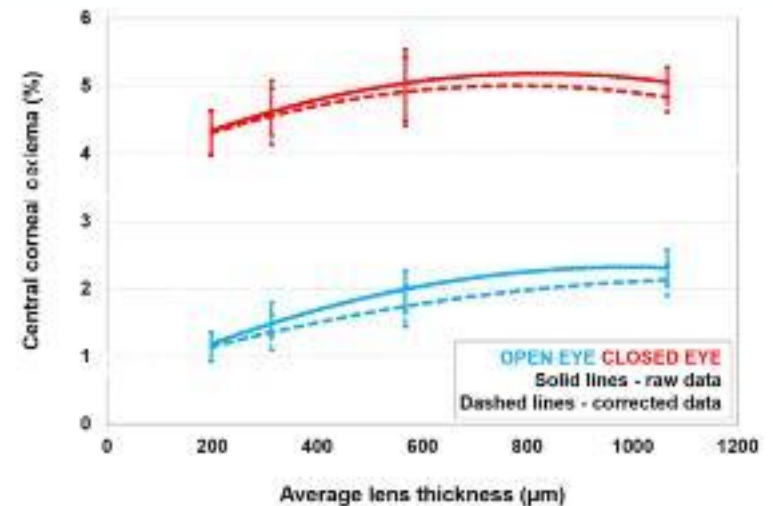
Figure 4.1 OCT images of scleral lenses with the various nominal centre lens thicknesses used in this experiment.

LENS THICKNESS

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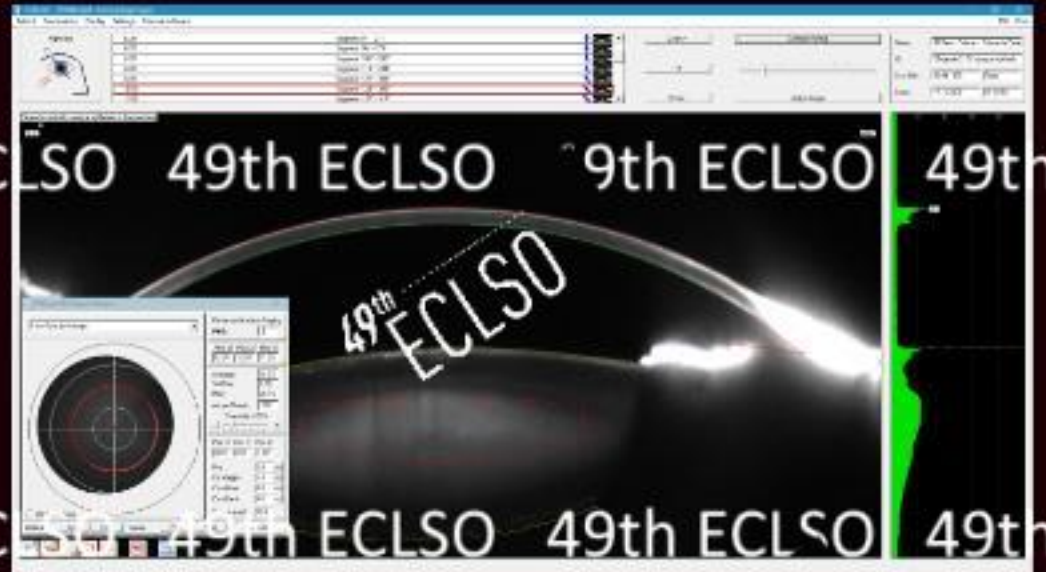
Interestingly, the magnitude of corneal oedema was similar for the 150, 300 and 600 µm thickness lenses (on average 0.6% difference between these lenses for the corrected oedema data under open and closed eye conditions), and only reached a statistically significant difference for the 150 and 1200 µm thickness comparison

4 Since the vast majority of modern scleral lenses ($Dk \geq 100$) would have a centre lens thickness of ≤ 300 µm, modifications to reduce the lens thickness from 600 µm to any lower value as thin as 150 µm, would be of limited clinical benefit in terms of reducing corneal oedema.

FENESTRATIONS



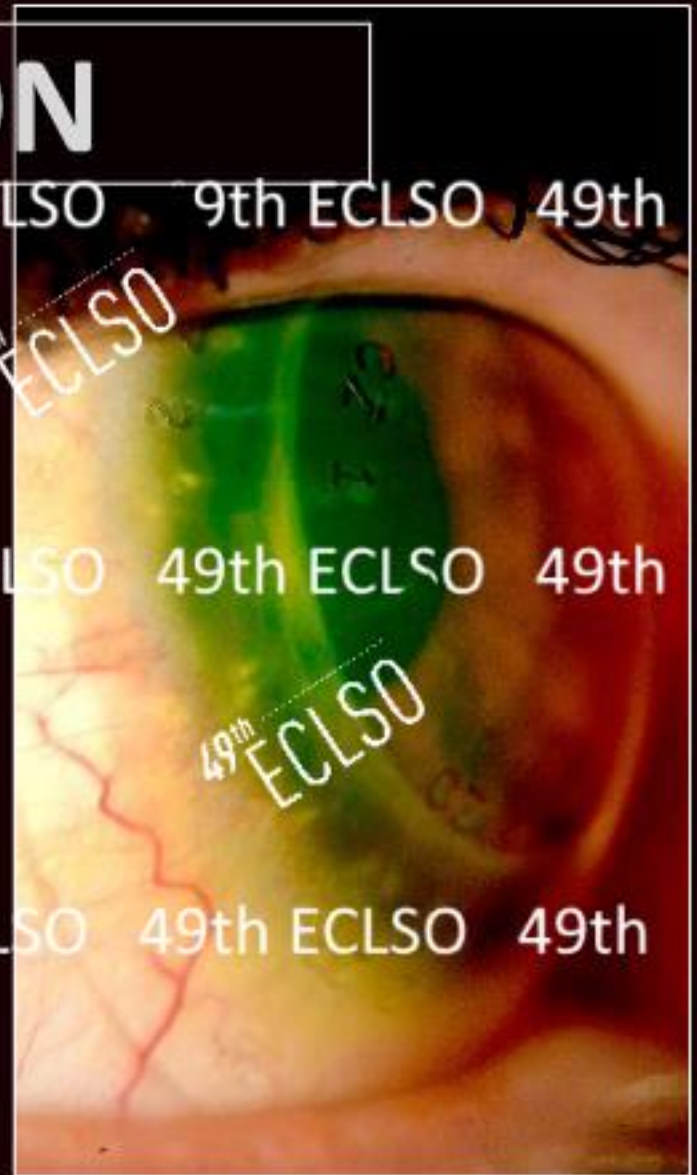
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In conclusion, on average, the **incorporation of a single 0.3 mm** diameter peripheral lens fenestration into a highly oxygen permeable scleral lens **did not significantly** reduce the magnitude of corneal oedema compared to a non-fenestrated scleral lens when controlling for initial central FR thickness.

DISCUSSION



Edward Carmona - Venezuela

Cesar Enoc Sandoval - Mexico

DISCUSSION

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CASE REPORT

Scleral Lens-Induced Corneal Edema After Radial Keratotomy

Thomas P. Arnold, MD, FRCO, and Stephen J. Vincent, PhD, FRCO, FRCO

Abstract: This case series examines the magnitude and regional variation in scleral lens-induced corneal edema in post-radial keratotomy (RK) eyes. Interferometry mapping was used to measure central thickness across the central 4 mm before and after scleral lens wear in one post-RK eye (female, age 64 years). Variations in corneal edema were examined as a function of distance from the scleral lenses (the 0.2-mm annulus and zone 0.7 to 1.05). The median central corneal thickness was 520 μm (interquartile range 1.01 to 1.02 mm, P=0.52) and increased to approximately 540 μm (range 1.01 to 1.11 mm) in the 2.7- to 3.0-mm annulus (P<0.001). Scleral lens-induced corneal edema in post-RK eyes was greatest in magnitude further from the scleral lenses and at the approximate location of corneal incisions.

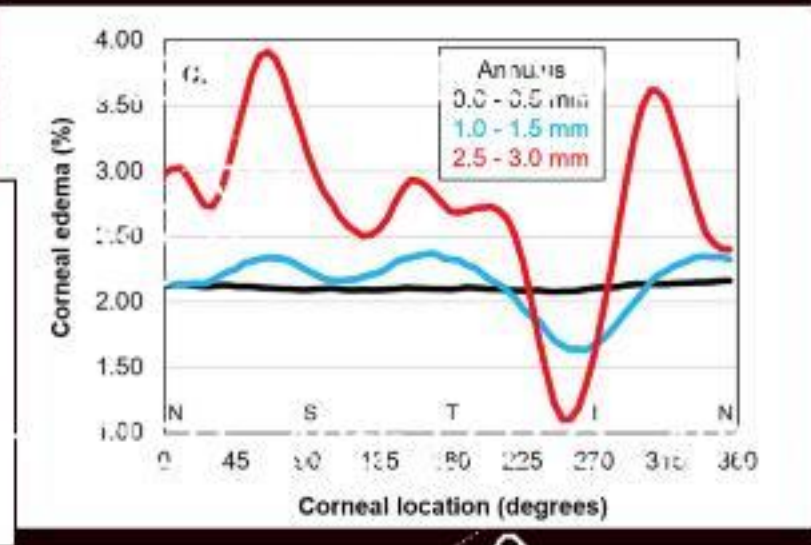
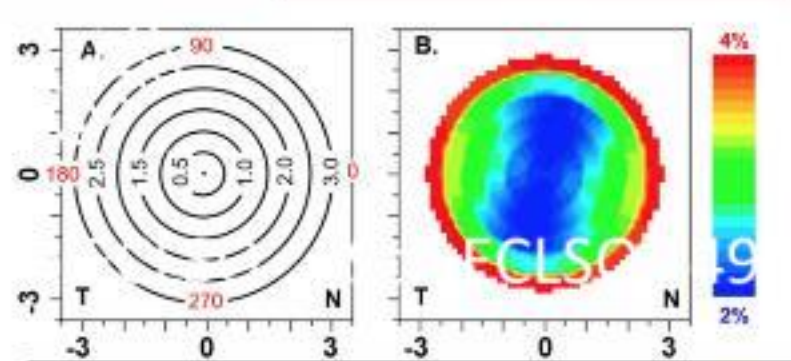
Key Words: Scleral lens—Contact lenses—Radial keratotomy
 Eye & Contact Lens 2021;47:575-577

Radial keratotomy (RK) is a surgical procedure in which a radial pattern of partial thickness corneal incisions is done to flatten the central cornea to correct astigmatism. The total number of incisions typically varies between 4 and 16 depending on the magnitude of astigmatism, with deeper and more central incisions producing a greater flattening effect.¹ This procedure was particularly popular throughout the 1980s before the introduction of laser refractive surgical tools as laser-assisted in situ keratomilectomy.

After RK, many patients become hyperopic because of central flattening of the central cornea and when cornea irregularly curved (topographic and postoperative irregularity).² Owing to this irregularity, fluctuations in refractive error and irregular contact adaptation, it can be challenging to provide stable vision with spectacles after RK, and it may not be possible to obtain an acceptable soft or contact rigid contact lens fit due to the oblique anterior corneal shape. Consequently, scleral lenses are an ideal optical correction after RK because they can provide stable vision despite marked corneal irregularity and the posterior fluid reservoir provides constant corneal hydration.³

The corneal thickness and keratometry readings reported in this paper are from a single patient with a post-RK eye. When a scleral lens is worn, the corneal thickness and keratometry readings are affected. The corneal thickness and keratometry readings are affected by the presence of the scleral lens. The corneal thickness and keratometry readings are affected by the presence of the scleral lens.

When a scleral lens is worn, the corneal thickness and keratometry readings are affected. The corneal thickness and keratometry readings are affected by the presence of the scleral lens. The corneal thickness and keratometry readings are affected by the presence of the scleral lens.



From the Montreal Eye Clinic (T.P.A.), Saint-Luc, QC, and Contact Lens and Vision Laboratory (S.J.V.), Saint-Joseph and Vision Services, Centre for Vision and Eye Research, Queensland University of Technology, Brisbane, Australia (both authors).
 Received July 20, 2021.
 DOI: 10.1097/ECL.0000000000000000

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.



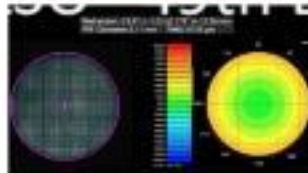
Find out the latest in global
2022. Visit our website for the
rigid contact lenses such

LSO 49th ECLSO 49th ECLSO Technology in Contact Lens Practice

This newsletter features a 'technology in contact lens practice update' - from ocular surface shape (previous item) to higher-order aberration in sclerals to axial length considerations in ortho-k.

49th ECLSO Sclerals

Fluid Reservoir Thickness & Aberrations



To investigate the effect of varying the fluid reservoir thickness (FR) of scleral lenses in keratoconic eyes, 40 eyes were fitted with a scleral lens device having three different FR thicknesses in this study from India. The mean (\pm SD) values of central FR thickness for low, standard and high FRs were 300 ± 195 , 544 ± 21 and 1145 ± 239 microns, respectively.

Statistically significant improvements in visual performance were seen with different FR thickness lenses. Post-hoc testing showed better distance vision for low- and standard-FR lenses compared to high-FR lenses, and lenses with standard FRs showed better contrast sensitivity compared with those having low and high FRs. A statistically significant reduction of higher-order root mean square aberrations was found with all FR thickness lenses compared to baseline, but no significant difference was noted between lenses. A moderate positive correlation was observed between higher-order aberrations and distance vision for low-FR lenses. FR thickness should be considered an important factor to provide better vision in keratoconic eyes, the paper concludes.

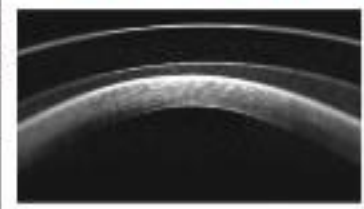
Bafakrishnan et al - Ophthalmic & Physiological Optics - Jan 2022

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Optical Impact of Reservoir Thickness



This pilot study conducted in Spain looked at the effect on refraction and optical quality of an increase in the corneal clearance after fitting scleral lenses in healthy subjects. The fluid reservoir thickness varied from 418 ± 112 to 706 ± 120 and 990 ± 117 microns, respectively, in this study. Significant changes were detected in the spherical equivalent and high-order

aberrations (HOAs), especially coma and spherical aberration, with increased sagittal heights. Increasing reservoir thickness leads to more myopic refractive error and to increases in different ocular HOAs. The authors noted that this aspect should be considered when fitting sclerals, especially multifocal designs.

Villa et al - J Clin Med Clin - June 2022 (PDF, open access)

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SCLERAL LENS FITTING

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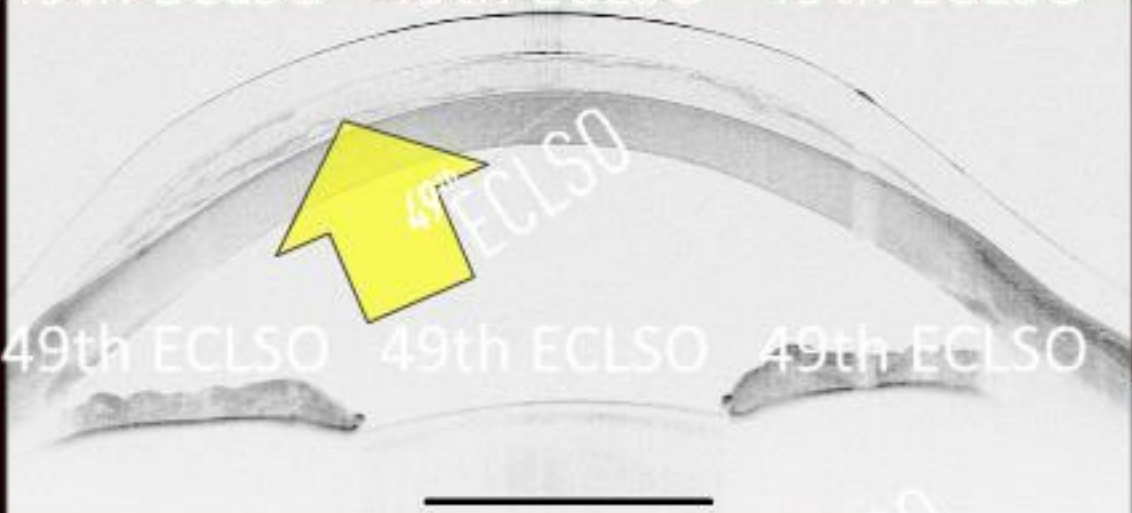
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FOGGING

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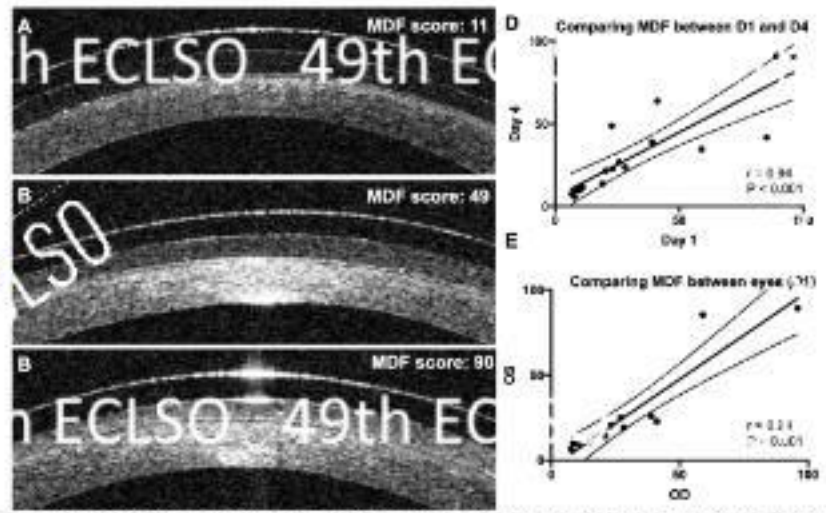
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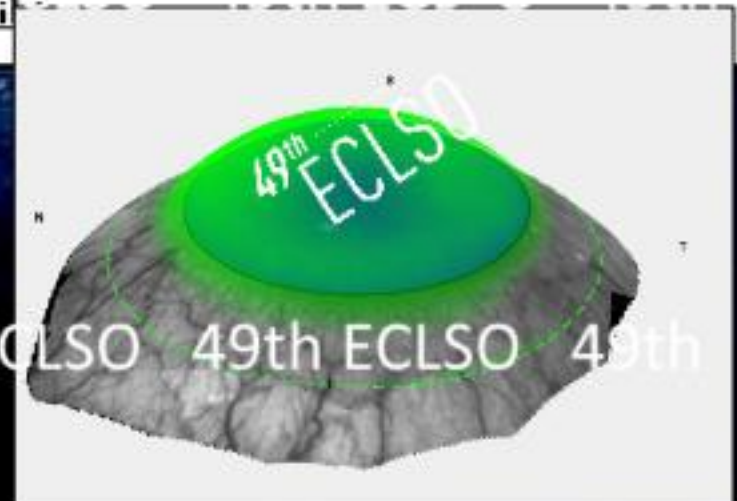
FOGGING

- Fluid reservoir debris (midday fogging) is commonly encountered (in 26–46% of patients)
- The exact aetiology and composition of this particulate matter is unknown.
- Reservoir debris has been linked with leukocytes, lipids, and external tear film debris
- Hallmark symptom is **blurry vision** that is often described as looking through “fog”
- Occurring immediately after application or after several hours of wear.



4 Recommendations for mitigating the effects of debris accumulation include:

- **Decrease** corneal clearance
- Improve **landing zone alignment**
- **Treating** underlying ocular surface disease including allergies and dry eye disease
- Using a more **viscous** application fluid
 - A new filling solution that closely mimics the composition of the natural tears reported improvements in comfort and VA, **no significant change in particulate matter** in the post-lens fluid reservoir.
- **Lens removal and reapplication, once or sometimes twice daily**



Toric Scleral Lens

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GOING BACKSTAGE

SCLERAL LENS FITTING

INFLAMMATION
& INFECTIONS

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CLEAR - Scleral lenses

Melissa Barnett^{1,2}, Claudine Cooney³, David Pado⁴, Karen Lee⁵, Lengji Michael⁶, Giancarlo Montesi⁷, Daf van der Worp⁸, Stephen J. Vincent⁹, Maria Walker¹⁰, Randeep Bhatia¹¹, Philip B. Morgan¹²

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ARTICLE INFO

KEYWORDS
Contact lenses
Scleral lens
Microbial keratitis
Severe adverse events

ABSTRACT

Scleral lenses are a type of contact lens that sits on the sclera and vaults over the cornea. They are used to correct refractive error and to manage ocular surface disease. This review explores the evidence for the use of scleral lenses in the management of ocular surface disease. It discusses the advantages and disadvantages of scleral lenses and provides a summary of the current literature. The authors conclude that scleral lenses are a safe and effective option for the management of ocular surface disease in certain patients.

1. Introduction

The over a century, scleral lenses have been used for refractive and therapeutic indications in a wide range of ocular conditions [1-3]. They also provide a visual solution when numerous other optical corrections have failed and can only be used for contact lenses [4-6]. This review explores the evidence for the use of scleral lenses in the management of ocular surface disease. It discusses the advantages and disadvantages of scleral lenses and provides a summary of the current literature.

2. Scleral lens

The first scleral lens was described in 1857 by the ophthalmologist, John D. Cooper [7]. It was made of glass and was used to correct refractive error. Scleral lenses are now made of a variety of materials, including rigid gas permeable (RGP), hydrogel, and silicone hydrogel. They are used to correct refractive error and to manage ocular surface disease.

Abbreviations: RGP, rigid gas permeable; OCT, optical coherence tomography; PMMA, poly(methyl methacrylate); HEMA, hydroxyethyl methacrylate.
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https://doi.org/10.1016/j.cla.2021.03.008

Available online 28 March 2021
0194-4155/2021 Published by Elsevier Ltd on behalf of British Contact Lens Association

COMPLICATIONS

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8.2 Severe Adverse Events

It is unclear at this point whether the oxygen permeability of current materials used to manufacture ScCL is sufficient (see section 4.2). In addition, the tear stagnation behind these lenses might contribute to higher rates of adverse events such as microbial keratitis, especially considering the already compromised status of most of the corneas. Rosenthal and Croteau reported the occurrence of four cases of microbial keratitis in patients wearing the Boston Scleral lens on an extended wear basis⁷. Compliance has also been reported to be a factor in the development of microbial keratitis.

MICROBIAL KERATITIS

rehabilitation series of five patients in a US Army burn unit who suffered severe ocular burns, the authors reported two cases of microbial keratitis related to *Pseudomonas* and MRSA.⁵⁰ However, this is considered a non-standard situation in which many other comorbidities are implicated. The occurrence of adverse reactions in uncompromised eyes wearing ScCL has not been commonly reported in the peer-review literature.

HYDROGEN PEROXIDE

+ POVIDONE-IODINE

NON-SELECTIVE

Lens Care Solutions

Bradley, Sicks, Pucker note in a review article that modern multipurpose disinfecting solutions (MPS) with high-molecular-weight preservatives, including polyquaternium-1 (PQ-1) and biguanides (PHMB), are generally effective against bacteria, but minimally effective against fungi, and are not effective against Acanthamoeba. Hydrogen-peroxide (H₂O₂) solutions are effective against all common ocular microbes, including Acanthamoeba, and they have been proven safe with proper compliance. Povidone-iodine (P-I) solutions have shown to be safe and effective too. H₂O₂ or P-I solutions are preferred for any patients who may expose their lenses to water because they are the only solution categories effective against Acanthamoeba, the authors state. For a review of Antiviral Effect of Solutions Against Coronavirus, **Yasir, Vijay, Willcox** evaluated the antiviral potential of five MPS against coronavirus. They found here too that oxidative contact lens disinfecting solutions (i.e., H₂O₂ and P-I) provide superior antiviral activity against a coronavirus surrogate of SARS-CoV-2, unless the full regimen test (rub, rinse, disinfect) is used in the MPS category.



I-site Newsletter



I-site newsletter is a global educational newsletter launched in 2009 providing independent updates from the international literature on specialty contact lenses, orthokeratology and scleral lenses and related topics.

Tapping into the Water Issue



At a recent meeting of the national association for patients with corneal disease I was lecturing on the potential corneal and scleral (R)GPs. At the same time, while summing up all the benefits, I mentioned the Acanthamoeba, and tap water issue. Not sure if they were convinced. Maybe I wasn't persuasive enough, but I could not get through to them, it felt. Until one patient stood up, and reported that she was suffering from an Acanthamoeba keratitis (AK). Sounded bad. Real badly. This happened as a result of tap water use in (soft) lens wear. I could rest my case. But the point is, that contact lenses can be a friend, and a foe at the same time, which makes it a tough topic. Of relevance surely for rigid lens modalities too, especially since it is customary to rinse lenses and cases with tap water. Much attention in our specialty lens field goes to the

fitting process, the ocular surface shape, the indication range, etc - but a large part of the success, and failure, of specialty lenses relies on contact lens solutions, hygiene, and handling. More on this at **GSLs 2022**: with experts in the field like Marc Bullimore, Pauline Cho, Melissa Barnett and James Wolffsohn - a true global panel. Can ECAs apply the basic lens care and instructions for standard lenses to specialty lenses? Or are there special considerations?

Preventable Disease

National organizations including, but not limited to, the BCLA, AAO and the Australian CCSA have issued such stickers to help us remind contact lens wearers not to use tap water in any part of the care regimen.

HANDLING

corneal infection is largely a preventable disease.

Photo by Day Boid on Unplash

CLEAR Podcast 2 - Contact Lens Complications - Oct 2021

Scleral Lenses

Conjunctival Microbiota in Scleral Lenses



Not much is known about scleral lens wear when it comes to infection rates. The BCLA CLEAR paper on scleral states that a small number of case series suggest that microbial keratitis (MK) is often in scleral lens wearers. Frequency may be small but grows in wearers comp.



get some indication on the conjunctival microbiota, investigators obtained cultures from the lower fornices in 20 patients wearing scleral and in 25 healthy controls. After 24-48 h of incubation at 37°C, the growth of different colonies of bacteria was identified. The most commonly observed microorganisms were Staphylococcus epidermidis and Staphylococcus aureus in both groups; but scleral lens users were found to have a higher rate of culture negativity in comparison to the healthy controls, suggesting that scleral lens wear can have a significant effect on the conjunctival microbiota.

Dogan et al - Contact Lens & Ant Eye - April 2021

GOING BACKSTAGE

SCLERAL LENS FITTING

IOP

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Contents lists available at ScienceDirect

Contact Lens and Anterior Eye

journal homepage: www.elsevier.com/locate/clae



Intra-ocular pressure variation associated with the wear of scleral lenses of different diameters

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4 **These results suggest that, as evaluated with a non-standard transpalpebral methodology, IOP during scleral lens wear may be increased in average by 5 mm Hg, regardless of the lens diameter. More work is needed to confirm if practitioners should be warned when using SL on populations at risk for glaucoma.**



I-site Newsletter

October 2020

Get the newsletter, a great reference, education in your hand published bi-monthly. It's a monthly journal, news articles, papers from the international community on glaucoma, IOP issues and related topics.

Column

A (W)hole New Perspective



Sometimes unexpectedly new light is shed on apparently insoluble mysteries. By simply being smart and creative, in the scleral lens world, it has been hypothesized for half a century that intraocular pressure (IOP) could be elevated during scleral lens wear. The main caveat, and why the question runs for such a long time, is that you cannot measure IOP during lens wear. You can take the lens off, but that would alleviate the possible mechanism behind the cause of potential IOP rise. So any 'before' and 'after' lens wear analysis has its obvious limitations. An alternative way of measuring IOP through the world, as you've been spoiled on this, is to do it, may be by using a tonometer, but it's a poor fit to the method through the world is valid. The boys from Queensland, Samuel Cheung, Michael Collins and Stephen Vincent came up with a really smart and simple alternative. Why not put a hole in the lens? Through a central 4 mm fenestration, the IOP could be measured directly. They found the IOP to be risen by up to 4 mmHg during lens wear, compared to immediately before and after lens wear. Still, there is room for speculation: the investigators hint that temporary compression of the ocular surface beneath the sclera lens may potentially be responsible for the IOP rise, which would artificially elevate IOP measurement. That would be a whole different perspective.

Dr Vincent Collins

Cheung, Collins, Vincent - Cont Lens Ant Eye 2020

ARTICLE IN PRESS

Check for updates

Original Research Article

Cont Lens Anterior Eye

Journal homepage: www.elsevier.com/locate/clea

The impact of short-term fenestrated scleral lens wear on intraocular pressure

Samuel S. Cheung, Michael J. Collins, Stephen J. Vincent

Journal of Glaucoma, Volume 30, Number 10, October 2021

ABSTRACT

Purpose: To assess the impact of short-term fenestrated scleral lens wear on intraocular pressure (IOP) during lens wear.

Methods: IOP measurements before, during, and after a 2-hour period of lens wear, and the resulting change in IOP, were recorded in 10 eyes of 10 patients with glaucoma.

Results: During the wearing of the fenestrated scleral lens, the mean IOP increased from 15.0 ± 3.1 mmHg to 18.6 ± 4.1 mmHg. The mean change in IOP was 3.6 ± 2.2 mmHg. The mean IOP after lens removal was 15.3 ± 3.4 mmHg.

Conclusions: Short-term fenestrated scleral lens wear significantly increases IOP during lens wear.

Keywords: fenestrated scleral lens, intraocular pressure, glaucoma, scleral lens wear

Introduction

In the scleral lens world, it has been hypothesized for half a century that intraocular pressure (IOP) could be elevated during scleral lens wear. The main caveat, and why the question runs for such a long time, is that you cannot measure IOP during lens wear. You can take the lens off, but that would alleviate the possible mechanism behind the cause of potential IOP rise. So any 'before' and 'after' lens wear analysis has its obvious limitations. An alternative way of measuring IOP through the world, as you've been spoiled on this, is to do it, may be by using a tonometer, but it's a poor fit to the method through the world is valid. The boys from Queensland, Samuel Cheung, Michael Collins and Stephen Vincent came up with a really smart and simple alternative. Why not put a hole in the lens? Through a central 4 mm fenestration, the IOP could be measured directly. They found the IOP to be risen by up to 4 mmHg during lens wear, compared to immediately before and after lens wear. Still, there is room for speculation: the investigators hint that temporary compression of the ocular surface beneath the sclera lens may potentially be responsible for the IOP rise, which would artificially elevate IOP measurement. That would be a whole different perspective.

Table 1

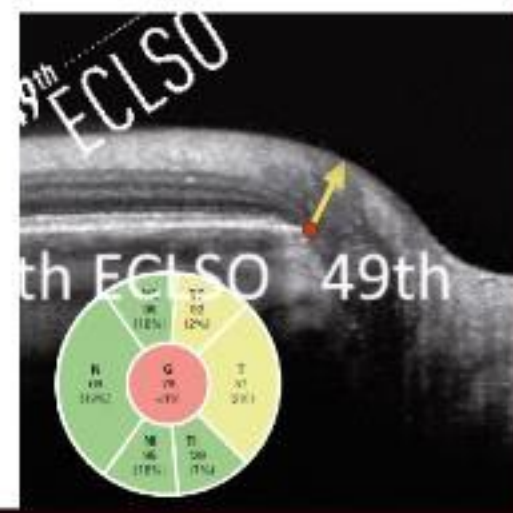
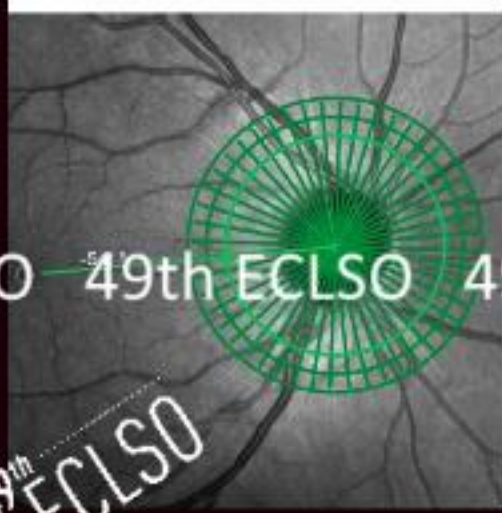
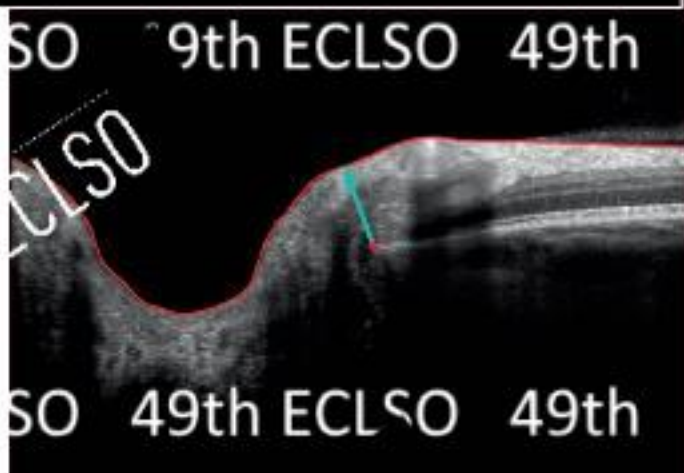
The mean IOP (mmHg) at each time point, and the mean change in IOP (mmHg) relative to the pre-lens insertion condition. P-value is the Bonferroni corrected post-hoc comparison with the pre-lens insertion IOP.

	Mean ± SD	Mean change ± SD	p-value
Pre-lens insertion	15.0 ± 3.1	-	-
During lens wear	18.6 ± 4.1	3.6 ± 2.2	< 0.001
Post-lens removal	15.3 ± 3.4	0.3 ± 1.6	0.55



OPTIC NERVE HEAD MORPHOLOGY

An alternative approach to investigate the physiological impact of scleral lens wear rather than just the direct potential rise in IOP, is to examine changes in optic nerve head morphology that are sensitive to acute changes in IOP using OCT imaging. Walker et al. (2020) found minimal effect on IOP homeostasis in healthy adult eyes or optic nerve head morphology in healthy adult eyes using the non-scleral lens wearing eye as a control [276]. Conversely, Samaha and Michaud (2020) observed a 5-mmHg increase in IOP after 6 h of lens wear and a small but significant reduction in Bruch's membrane opening minimum rim width using OCT, but only after complete lens settling [284].



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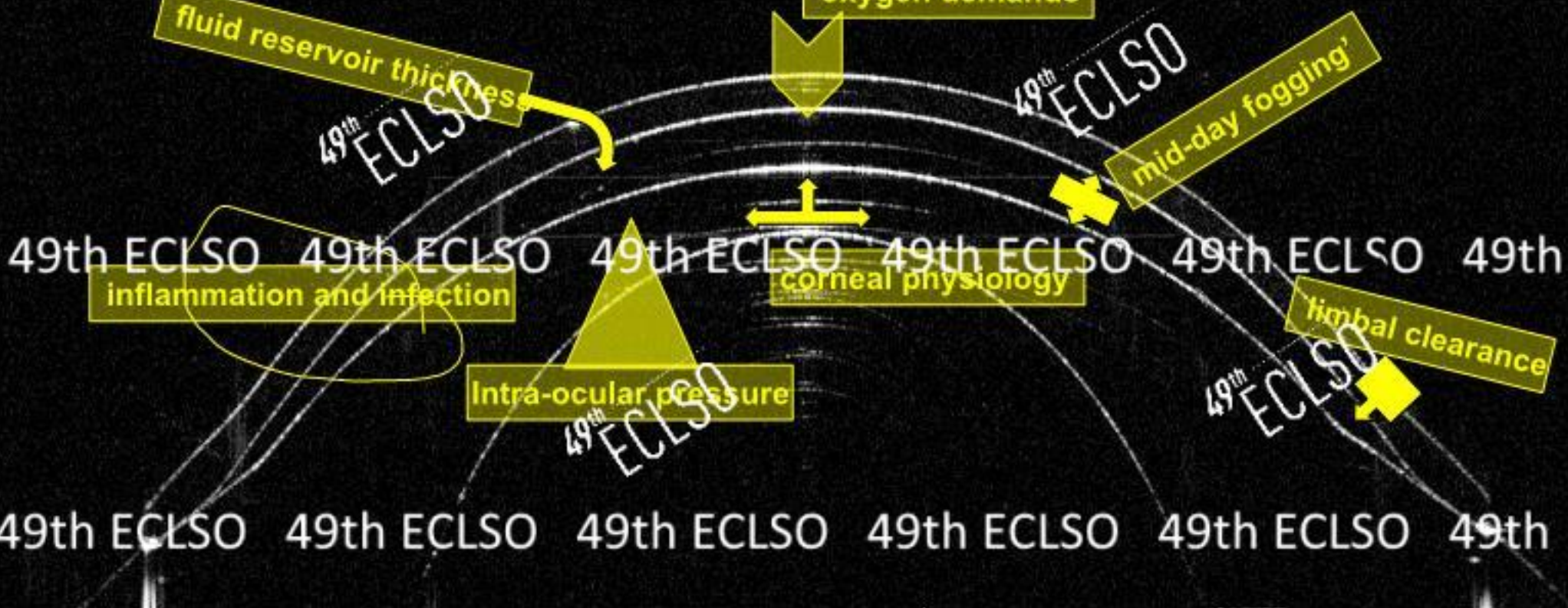
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GOING BACKSTAGE

SCLERAL LENS FITTING



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Ocular Impression-Based Scleral Lens With Wavefront-Guided Optics for Visual Improvement in Keratoconus

Gelles, John D. O.D.; Chung, Brian O.D.; Akilov, Sarah B.S.; Kriss, Sydney D.D.; Hirsh, Gina B.S.; Greenstein, Steven A. M.D.; Chung, Daniel B.S.; Herish, Yitzhak S. M.D.

Author Information @
Eye & Contact Lens: Science & Clinical Practice: July 29, 2022 - Volume - Issue -
10.1097/ECL.0000000000000922
doi: 10.1097/ECL.0000000000000922

Higher-Order Aberrations

Wavefront-Guided Optics for Visual Improvement in Keratoconus with Sclerals

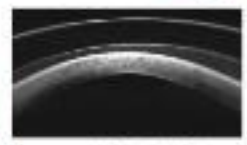
John Gelles and Yitzhak Herish at the Corneal and Contact Lens Eye Institute/Morish Vision Group in Teaneck, NJ (USA) are working on a system of wavefront-guided optics on custom ocular impression-based scleral lenses, to see if visual improvement can be gained in keratoconus patients. In this paper they describe a case of a 28-year-old keratoconus patient who had previously failed with traditional diagnostically fit scleral lenses. Using a system that includes a video matrix on the impression-based scleral lens and a wavefront aberrometer with pupil and dot registration software, a wavefront-guided custom lens was created. When compared with a traditional lens with standard optics, the wavefront-guided lens reduced the right and left contact lens visual acuity. This technology is a point in time success and in v...



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When compared with a impression lens with standard optics, the wavefront guided lens reduced the total higher-order root mean square by 67% and 64% in the right and left eye, respectively. This resulted in a 2-line improvement in best-contact lens visual acuity for both eyes.

Quadrant-Specific Versus Spherical Haptic Scleral Lenses



Tear exchange, intra-ocular pressure, and scleral lens wear characteristics: is there a difference in any of these variables for quadrant-specific versus spherical haptic scleral lens designs? Investigators at the Mayo (USA) compared scleral lens specific (study lens) with lens) landing zone lens in

Seven participants (eight eyes) wore each of two lenses. Visual acuity was not different between the study lens and habit lens. Contrast sensitivity (1.3% under the study lens and 1.6% habit lens). IOP did not change after 2 hr of wear for either lens did not change during wear of either lens. The fluorescein concentration under the study lens did not change after 2 hr (2.5% initial concentration) compared to the habit lens (2.5% initial concentration) under the habit lens. There was no significant difference in lens comfort was habit lens (4.0) and study lens (5.0), respectively, and statistically significant). In conclusion: spherical or quadrant-specific landing zones provide good IOP or corneal thickness. However, tear exchange may be better under quadrant-specific lenses, although fluorescein concentration may be the same as tear film exchange per se. The quadrant-specific lenses provide greater patient comfort than the spherical landing zone lens.

The fluorescein concentration under the study lens did not change after 2 hr (99% of initial concentration) but decreased to 46% of initial concentration under the habitual lens: a statistical significant difference. Lens comfort was better with the study lens (5.0 vs. 4.0, respectively, and statistically significant)..

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The Good, the Bad and the Snugly



Scleral lenses have been in the spotlight a lot of late months. And I was a bit. Up to the point that there are

Scleral Lens Indication Range

Role of Therapeutic Contact Lenses in Management of Corneal Disease

The potential of micro-organisms to work and interact with the immune system is a subject of increasing interest. The understanding of ocular immunity for an infectious disease is a complex process. The immune system is a complex system of cells and molecules that work together to defend the body against infection. The immune system is a complex system of cells and molecules that work together to defend the body against infection.

Yvonne Wang and Deborah Jacobs respectively of the Department of Ophthalmology at Yale School of Medicine and Glaucoma and Eye at Harvard Medical School recently had a review on the topic of the therapeutic contact lenses in management of corneal disease. There be active research in the use of contact lenses in the management of keratoconus, including (mini-)scleral lenses, custom impression-based lenses and wavefront-guided scleral lenses, the article states. Recent contact lenses for ocular surface disease were primarily reviews, ref case reports or case series, with publications on contact lens use in epithelial defects, graft-vs.-host disease, limbal stem cell deficiency neurotrophic keratitis. And there are recent publications on advanced gluing contact lenses. In summary the authors state that corneal should be aware of current advances in the field of contact lens use in corneal ectasia and ocular surface disease.

Wang, Jacobs - Curr Opin Ophthalmol - July 2022

There continues to be active research in the use of contact lenses in the management of keratoconus, including mini-scleral lenses, custom impression-based scleral lenses and wavefront-guided scleral lenses.

Limbal Stem Cell Deficiency

This case series assesses the outcomes of fitting limbal stem cell deficiency (LSCD) patients with a scleral lens device. Five eyes of four patients (all female), with an age range of 21 to 80 years were fitted with a scleral lens with diameters ranging from 16 to 18.5 mm. Follow-up ranged from 11 to 29 months. The tolerated wear times ranged from 3.5 to 10h daily. Four eyes showed improved best-corrected visual acuity and unchanged LSCD staging as per consensus. Three of these eyes had stage 3 and one had stage 1 diseases. The fifth eye had worse vision and recurrence of stage 4 wing-resected conjunctival limbal allograft transplant despite the treatment. In conclusion the authors state that the scleral lens can be a viable treatment for LSCD, including severe cases, because symptom relief and improve vision. Its customizability is beneficial troubleshooting issues with fitting, as demonstrated in this study.

Qiang et al - Eye & Contact Lens - Aug 2022

Terrien Marginal Degeneration

This retrospective case series study of patients with advanced advanced Terrien marginal degeneration looked at six eyes in four patients. All patients attempted at least one other contact lens modality lens fit prior to this fitting. Some patients had corneal co-morbidities such as pseudopterygium and pseudoleuk that contributed to intolerance to previous lenses and warranted extra considerations in the fitting process. With the scleral lens device used in this study, visual acuity improved in all six eyes. Patients with structural corneal degeneration achieved improved vision, comfort, and lens tolerance. The eyes had non-corneal ocular co-morbidities that limited the efficacy of the scleral lens device. Another eye discontinued lens wear because of limbal stem-cell disease progression necessitating a limbal stem-cell transplant. In summary: the scleral lens device used in this study can be an effective option to improve vision and comfort for patients with advanced Terrien marginal degeneration who are intolerant to first-line therapeutic contact lens modalities, even in the presence of other corneal comorbidities - the authors state.

Wong et al - Eye & Contact Lens - Aug 2022

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