Scleral Lenses: Big lenses, Big innovations

Moderator: Ashley Wallace Tucker

Speakers: Muriel Schornack, Roxana Hemmati, Sheila Morrison, Jason Marsack

Scleral Lens Research Update: Muriel Schornack

1. Introduction
    a. Bibliometric summary
        i. Volume
        ii. Sources of origination
    b. Description of literature
        i. Case reports
        ii. Retrospective reviews
        iii. Prospective observational studies
        iv. Reviews of disease management
2. Areas of Interest
    a. Case reports
        i. Indications and outcomes of scleral lens wear
        ii. Ocular findings/complications associated with scleral lens wear
    b. Prescription and management practices
    c. Description of fitting characteristics
        i. Lens settling
        ii. Tear exchange
        iii. Mid-day fogging
        iv. Surface qualities
    d. Effects of scleral lenses on ocular parameters
        i. Cornea
        ii. Conjunctiva
        iii. Intraocular pressure
3. Future Opportunities
    a. Application of new technologies to scleral lens fitting
    b. Complication rates and risk factors
    c. Systematic assessment of outcomes of scleral lens wear
4. Conclusion
    a. Increasing activity in scleral lens research
    b. Scleral lens research as a percentage of all contact lens research
    c. Challenges of determining how best to leverage available research assets to support clinical care

Scleral lens uses beyond Keratoconus: Roxana Hemmati

1. Introduction

a. Scleral lens unique design
    i. Benefits of this design
b. Common scleral lens uses

2. Scleral lenses and ocular surface disease
    a. Corneal protection
    b. Understanding the underlying disease
        i. Disease process
        ii. Medications
            1. Scleral lenses for medication delivery
        iii. Collaborative care
    c. Why scleral lenses are beneficial in these conditions
    d. What fitting challenges you may have
        i. How to combat fitting challenges
    e. Cases
        i. Sjogrens, SJS, GVHD, OCP, Exposure keratopathy
3. Scleral lenses and non-healing epithelial defects
    a. When it's indicated
    b. Overnight wear
    c. Medications
        i. Scleral lenses for medication delivery
    d. Follow up schedule
    e. Cases
4. Scleral lenses and non-KCN corneal scarring
    a. Central vs. peripheral scars
        i. Density
    b. Types of corneal scars and underlying cause
    c. Cases
5. Scleral lenses and benign essential blepharospasm
    a. BEB and dry eye
    b. Treatment options
    c. Review study on blink rate with scleral lenses
        i. NaFl vs. no NaFl
6. Other scleral lens uses
    a. Scleral lenses for infants/children
    b. Scleral lenses and UV protection
    c. Scleral lenses and pterygia/pinguecula
    d. Scleral lenses and scleral buckles/post-retinal detachment
    e. Scleral lenses and myopia management

Technology Driven Scleral Lens Fitting: Sheila Morrison

A. Basis for lens design
    a. Diagnostic: (1) trial lens fitting sets or (2) NaFl deduction
    b. Measurement: (1) digital scans or (2) physical impressions

c. Lens design customization options

B. Scleral/conjunctival mapping tools overview
    a. OCT, extrapolation of Placido Rings, Scheimpflug Imaging , Profilometry, Molding
    b. Precision and measuring capabilities of different technologies
C. Decision making in clinical practice: good, better, best
        i. Translating vision science into successful clinical practice
        ii. Equipment availability, practitioner experience level, relationship with lab
        iii. Balancing cost versus time: creating the ideal patient experience
        iv. Ocular shape and pathology considerations: common ocular profiles
        v. Empirical design versus diagnostic lens fitting
            1. New patients versus existing gas permeable lens wearers
D. Case report: diagnostic, digital-scan, or impression mold?
    a. Ocular shape consideration emphasis: extreme corneal and scleral anomalies
    b. Ocular surface pathology considerations: testing for relief of pain with a scleral lens
    c. Fenestrations case report and use of digital technology to appropriately place fenestrations and also scanning tools to measure success of oxygen permeability (reduction of corneal edema in high risk patients).

Wavefront-Guided Lens Summary: Jason Marsack

1. Introduction to corneal ectasias – the clinical population with the most to benefit from wavefront-guided contact lenses.
2. Discussion on how ectasisas lead to elevated levels of ocular aberration in the eye.
3. Introduction to current standards for correcting ectatic corneas and the level of vision achieved with these corrections in diseased eyes
4. Discussion on the motivation for developing better corrections for highly aberrated eyes.
5. Basics of wavefront sensing as a tool to quantify the patient-specific level of aberration present in an eye.
    a. Wavefront error maps
    b. Point spread functions
    c. Zernike polynomials
    d. Summary wavefront metrics
    e. Use of image simulation to understand the optical consequence of high levels of aberration.
6. Definition of custom wavefront guided contact lenses from clinical measurements and wavefront measurements.
7. Clinical methods necessary to prescribe wavefront-guided contact lenses
8. Methods to manufacture custom wavefront-guided contact lenses
9. Reporting the optical and visual results associated with custom wavefront-guided contact lenses
    a. Wavefront-guided soft contact lenses

    b. Wavefront-guided scleral contact lenses
    c. Template-based contact lenses
10. Current clinical limitations that hamper wide-spread availability of wavefront-guided contact lenses in the modern contact lens clinic
11. Potential benefits of wavefront-guided contact lenses to the modern contact lens clinic.