SCLERAL CONTACT LENSES 10 YEARS AFTER : WHERE ARE WE TODAY ?

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Lenght :   1h00

ABSTRACT

Don Ezekiel pioneered modern scleral lenses in 1983 and, since then, many other practitioners around the world endorsed this technology to restore their patient's vision or to treat ocular surface diseases. After all those years, no one would seriously challenge all of the benefits associated with scleral lenses. They were so successful that some eyecare professionals are now looking at fitting normal cornea patients whenever other options fail to meet their demands.

Before jumping in this adventure, this lecture aims to look at the past 10 years, from a theoretical point of view, with a summary of prominent articles that are now constituting the evidence-based approach in scleral lens field. It will also presents results from the clinical research field, trying to define what was learned over the years. However, many questions remain unanswered: they will be discussed. Finally, authors will identify clinical conditions where scleral lenses may not be considered as an optimal solution. They will conclude that scleral lens fitting should be made on a positive benefit/risk approach.

KEY WORDS   Scleral lenses, ocular surface disorders, irregular corneas, lens-related complications

LEARNING OBJECTIVES

At the end of this lecture, attendees will be able to:

1) Understand the benefits of using scleral lenses to restore vision or to treat ocular surface disorders
2) Appreciate the potential limits of scleral lens technology or its related side-effects
3) Adopt a benefit/risk approach before fitting scleral lenses, especially on normal cornea patients

OUTLINE

A) Introduction
    1.0 A look at the past
        1.1 Scleral lens technology evolution over the years
        1.2 What differentiates modern scleral lenses

    2.0 Scleral lens basic fitting principles: a quick review
        2.1 Vault over the cornea, including the limbus
        2.2 Landing on the conjunctiva
        2.3 Tangential vs base-curve designs: why is this important ?
        2.4 Important lens parameters and how they interact together

    3.0 Scleral lens clinical applications
        3.1 Ocular Surface disease
        3.2 Irregular corneas
        3.3 Regular corneas

B) What did we learn in the past ten years ?

    1.0 A literature review : theoretical principles
        1.1 Clinical indications
            1.1.1   Irregular cornea
            1.1.2   Normal cornea
            1.1.3   Eye disease

        1.2 Design and fitting
            1.2.1   Optimal parameters
            1.2.2   Improving fitting
            1.2.3   Oblate vs Prolate
            1.2.4   Presbyopic correction

        1.3 Theoretical models
            1.3.1   Oxygen delivery to the cornea
            1.3.2   Lens stabilization on the eye
            1.3.3   Daily vs extended wear

2.0 A literature review: the clinical experience

    2.1 In vivo studies

        2.1.1   Corneal and conjunctival anatomy

            2.1.1.1 Best way to evaluate/measured it

            2.1.1.2 Vs ocular surface chord

            2.1.1.3 Influence on lens design

        2.1.2   Lens settling

            2.1.2.1 Viscous vs non-viscous solutions

            2.1.2.2 Larger vs smaller diameter

        2.1.3   Corneal Hypoxic stress

            2.1.3.1 Epithelial level

            2.1.3.2 Stromal swelling

            2.1.3.3 Blebs

            2.1.3.4 Impact on leukocytes production – reservoir debris

    2.2 Care and Handling

        2.2.1   Case reports from the literature

            2.2.1.1 Optimal solution for the reservoir

            2.2.1.2 Optimal care system

        2.2.2   Surface deposits

        2.2.3   Coating and lens surface treatment

    2.3 Complications /related side-effects

        2.3.1   Visual acuity: residual astigmatism

            2.3.1.1 Nature – etiology

            2.3.1.2 Should we increase lens thickness ?

            2.3.1.3 High order aberrations : the main factor / compensation

        2.3.2   Tear reservoir debris (fogging)

        2.3.3   Hyperemia/ compression

        2.3.4   IOP

C) CLINICAL CONDITIONS WHEN SCLERAL LENSES MAY NOT BE OPTIMAL

1.0 Keratoconus with BCVA > 20/30 in glasses

    1.1 Hybrids, small GPs are less associated with visual disturbance vs sclerals

2.0 Corneal graft with low endo cell counts

    2.1 Hypoxic stress

3.0 Unilateral correction

    3.1 Variable from patient to patient- more difficult to get use to the lens

4.0 Blebs/highly irregular surface

    4.1 Inidcations for imprints ?

D) Conclusion
  1.0 Every patient is different: need to define clearly his needs
  2.0 There are some risks associated with scleral lens wear : do not underestimate them
  3.0 Importance of balancing risks vs benefits
  4.0 Fitting scleral lenses, when R/B ratio is favorable, is a rewarding experience for both the patient and the practitioner.