MANAGING KERATOCONUS WITH SCLERAL LENSES

Advances in technology have driven significant improvements in patient care and outcomes.

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Scleral lenses have become a cornerstone in the management of keratoconus. They now offer a new approach to a condition that has been traditionally challenging to correct with other optical solutions. These lenses, characterized by their large diameter that vaults over the cornea and rests on the sclera to create a smooth optical surface that effectively mitigates corneal irregularities, have experienced significant evolution in both design and application to enhance the visual acuity of patients with keratoconus.¹

Studies have demonstrated that scleral lenses provide patients a markedly improved mean logMAR visual acuity compared with traditional glasses and rigid gas permeable lenses.² This advancement has not only broadened the scope of visual rehabilitation for patients with keratoconus, but has also paved the way for more practitioners to get involved in their care.

ADVANCES IN SCLERAL LENS TECHNOLOGY

Over the past decade, scleral lens technology has undergone transformative improvements in design, material, manufacturing technology, and fit, which has significantly affected the treatment of keratoconus. These advances are not just incremental; they represent a paradigm shift in how scleral lenses are used to enhance patient outcomes.

Design
Recent innovations in scleral lens design have been driven by a deeper understanding of the optical and physiological challenges of managing keratoconus. For instance, the introduction of customizable front-surface eccentricity and toricity directly addresses the unique higher-order aberrations seen in keratoconus.³,⁴ Other design advances involve better alignment with the ocular shape, including sector-specific and purely custom zones. Practitioners can now accommodate the most extreme variations in landing zones, improving comfort and stability without compromising corneal integrity.⁵
Material
The evolution of scleral lens materials from PMMA to silicone hydrogel represents a leap forward for corneal health. Hyper Dk materials mark another significant advance, offering unparalleled oxygen permeability to promote corneal health in our patients with keratoconus, reduce the risk of corneal edema, and support extended wear times without compromising comfort or vision.

Manufacturing
The adoption of computer-assisted design and manufacturing technologies has ushered in a new era of precision in scleral lens production. These technologies allow the fabrication of lenses that are custom-molded to the wearer’s unique ocular surface topography, offering an unprecedented level of fit customization. The precision afforded by these systems, coupled with 3D ocular surface imaging techniques, enables practitioners to design lenses that address the specific needs of patients with keratoconus, tailoring the fit to each eye’s unique contours.

Fitting
Technological advances have refined the fitting and customization of scleral lenses for keratoconus, emphasizing precision. Adjustable diameters and curvatures, informed by ocular surface mapping through profilometry, allow tailored fits. Diagnostic kits streamline the selection process, reducing adjustment needs. OCT enhances this precision by visually assessing the lens fit in real time, ensuring optimal corneal and limbal clearance. These innovations collectively improve patient satisfaction and visual outcomes, marking a significant leap in keratoconus management.

At a Glance
- Over the past decade, scleral lens technology has undergone transformative advances, significantly improving the treatment of keratoconus.
- These innovations collectively improve patient satisfaction and visual outcomes, marking a significant leap in the management of this condition.
- Selecting the right candidates and meeting challenges head-on is critical.

Assessing Patient Suitability
Although a thorough ocular examination is essential to determine the suitability of a patient for scleral lens wear, this is not the only factor. Understanding the patient’s lifestyle, manual dexterity, and ability to adhere to lens care protocols are also important considerations.

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Patent Selection and Management
In the management of keratoconus with scleral lenses, the selection of appropriate candidates and their ongoing care should be the main focus. Not every patient with keratoconus is an ideal candidate for scleral lenses; thus, careful consideration must be given to various clinical factors. Selecting patients with keratoconus for scleral lenses involves assessing the severity of the condition, the shape and topography of the cornea and sclera, and the patient’s overall ocular health. Ideal candidates are those who have advanced keratoconus with significant corneal irregularities that cannot be adequately corrected with glasses or conventional contact lenses. Additionally, patients with keratoconus who have previously experienced discomfort or poor vision with other lenses may greatly benefit from a switch to scleral lenses.

Management Strategies
Once a patient is deemed suitable for scleral lenses, effective management strategies are key to ensuring successful outcomes. This includes regular follow-up appointments to monitor the fit of the lenses, the health of the ocular surface, and the progression of the keratoconus. Adjustments to the lens fit or prescription may be necessary over time, and ongoing patient education on lens care and handling is crucial.

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CHALLENGES AND SOLUTIONS

Managing keratoconus with scleral lenses, while highly effective, comes with its own set of challenges. Addressing these challenges is crucial to ensure patient comfort, optimize visual outcomes, and maintain ocular health.

Handling and Application

The larger size of scleral lenses and the unique method required for their insertion can make their handling and application daunting, especially for new wearers. It would behoove practitioners to provide comprehensive training sessions for their patients, using tools such as insertion and removal aids. Educational materials, including videos and step-by-step guides, can also assist patients in becoming proficient in lens handling.

Lens Care and Maintenance

Proper lens care and maintenance are vital for preventing ocular infections and ensuring lens longevity. However, patients may struggle with the meticulous cleaning and storage requirements. Clear instructions on lens care, including the use of appropriate cleaning solutions and storage practices, should be provided. Regular reinforcement of these practices during follow-up visits can help maintain compliance.

Comfort and Adaptation

Some patients may initially find wearing scleral lenses uncomfortable or experience issues with dryness or lens awareness. Ensuring an optimal lens fit is key. Additionally, recommending lubricating drops or adjusting the wearing schedule can aid in the adaptation process. For persistent discomfort, modifying lens parameters may help.

Financial Considerations

The cost of scleral lenses, including the necessary care products, can be a barrier for some patients. Practitioners can discuss financing options or insurance coverage with patients. Providing information on patient assistance programs or alternative funding sources can also be beneficial.

Lens Fit

Keratoconus is a progressive condition, and changes in the shape of the cornea may necessitate adjustments in lens fit over time. Thus, regular monitoring through follow-up appointments is essential. Using corneal topography and other imaging techniques can help detect changes in corneal shape, allowing timely adjustments to the lens fit for an overall better outcome.

SUCCESS WITH SCLERALS

Scleral lenses represent a major advance in keratoconus management, offering enhanced visual acuity, comfort, and corneal protection. Their evolving technology and customization make them a preferred option for many. For eye care professionals, keeping abreast of new innovations is essential. These lenses not only provide a nonsurgical alternative to treatment, but also significantly improve patient quality of life, symbolizing progress in optometric care and offering hope to those with the condition.


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