Review of Cornea & Contact Lenses

A How-To Guide: Scleral GP Lens Care

From non-preserved saline solutions to eliminating bubbles before insertion, gas-permeable lenses have their own rules for successful wear.

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The resurgence of scleral gas-permeable contact lens fittings can be considered one of the most noteworthy contact lens developments in the past two years. With the advent of newer, more oxygen-permeable GP materials, the hypoxia that previously plagued the frequent use of this modality has been virtually eliminated. In addition, industry's new manufacturing technologies have improved reproducibility and reduced cost, which have contributed to greater usage.

Because the reemergence of these lenses has been so recent, many of the frequently cited textbooks do not provide detailed instructions on proper handling and care. And what's more, practitioners are divided on the issue. In a recent survey of experienced scleral lens fitters, 72% of optometrists prescribed GP solutions for lens storage vs. 48% who chose peroxide and 17% who recommended soft contact lens solutions (respondents were allowed to select more than one option). In addition, 72% recommended non-preserved saline solution for lens insertion, compared to 22% who preferred GP solutions, 7% who chose soft lens solutions, 7% who preserved with saline and 28% who answered "other" (primarily artificial tear supplements).[1]

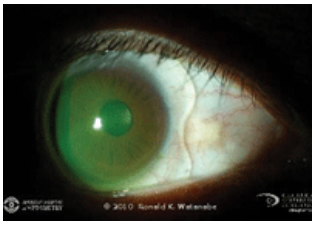
This article will provide tips on how to handle and care for scleral GP lenses.

What are Scleral Lenses?

By definition, scleral gas-permeable contact lenses measure 12.5mm to 25mm in diameter. They are then further subdivided into three categories: corneo-scleral, mini-scleral and large-scleral (*see Table 1*).[2]

To provide a healthy, stable fit, scleral lenses are intended primarily to rest on the sclera, bridging over the cornea and bathing it in tears (*figure 1*). As a result, they can provide tremendous refractive, fit and comfort benefits for patients with keratoconus, keratoglobus, pellucid marginal degeneration, post-LASIK ectasia, post-transplantation and irregular astigmatism.

However, due to their large diameters and the manner in which they are fit, scleral lenses require very specific handling and care instructions.

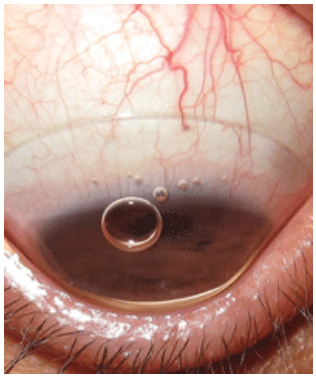


1. Mini-scleral lens with a nasal notch on a keratoconus patient who had discomfort due to a pinguecula.

Handling Guidelines

Scleral contact lenses need to be filled with solution prior to application. Although still considered off-label in the United States, most experienced scleral lens fitters (per the Scleral Lens Solution Survey) recommend non-preserved saline solution for this purpose.[1,3,4] Because there is minimal tear exchange behind a scleral lens, the solution that is placed inside the lens prior to insertion must remain in contact with the cornea over the course of the day.

Therefore, it is important to prevent exposing the cornea to preservatives or buffers that may induce allergic or hypersensitivity reactions.[4] However, you must instruct patients to avoid soaking their lenses overnight in non-preserved saline due to the risk of microorganism growth and subsequent eye infection.[5,6] Also, be sure to educate patients on the potential for contamination within a bottle of non-preserved saline. This type of solution needs to be disposed prior to the expiration date and/or if the tip of the bottle comes in contact with any surface.



To eliminate the contamination risk entirely, many practitioners recommend off-label use of unit-dose artificial tears or 0.9% NaCl inhalation/irrigation non-preserved saline in 3ml or 5ml vials.[3,4] The latter is free of preservatives and buffers, and can be purchased online or at most pharmacies.[3,4]

One of the most challenging aspects of scleral lens fitting and wear is the presence of air bubbles that commonly enter a lens upon insertion (*figure 2*). To avoid this, here are some helpful tips:

- Teach your patient to insert the lens into the eye with the face parallel to the ground.
- Instruct the patient to fill the entire lens to the edge or rim.[3,5,7,8] This ensures that there will be enough fluid remaining if there is any spillage during application.
- For the patient who consistently loses solution prior to insertion, have him or her partially or completely fill the lens with a high-viscosity

2. Bubbles can enter a scleral lens upon insertion if not enough fluid is used to fill it. (Photo: Greg DeNaeyer, OD)

individual-use artificial tear—its increased thickness helps prevent spillage.[7]

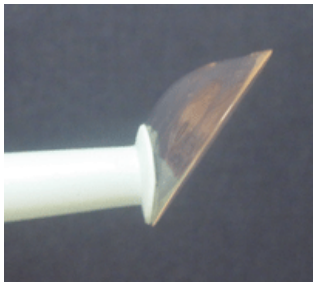
Care Instructions

Table 1. Scleral Lens Categories and Lens Diameters	
Corneo-scleral:*	12.5mm to 15.0mm
Scleral:**	15.0mm to 25.0mm
Mini-Scleral:	15.0mm to 18.0mm
Large-Scleral:	18.0mm to 25.0mm

*other names: corneal-limbal, semi-scleral, limbal
**other name: haptic

Scleral lenses are prescribed primarily for daily wear and should be cleaned and disinfected nightly. Cleaning typically is performed manually with a daily cleaner that is suitable for GP lenses, such as Boston Cleaner (Bausch + Lomb), Boston Advance Cleaner (Bausch + Lomb), Opti-Free Daily Cleaner (Alcon) or Optimum Extra Strength Cleaner (Lobob). Less abrasive agents (e.g., Optimum Extra Strength Cleaner) or an isopropyl alcohol-based cleaner (e.g., Sereine Extra-Strength Daily Cleaner [Optikem International]) may be preferred for high-Dk materials. The cleaner then needs to be completely rinsed off with non-preserved saline solution. Keep in mind, the FDA recommends that tap water not be used for this rinsing due to its association with Acanthamoeba keratitis.

Disinfection is achieved by using a GP conditioning/disinfection solution, such as Boston Advance Comfort Formula Conditioning Solution (Bausch + Lomb), Boston Conditioning Solution (Bausch + Lomb) or Sereine Wetting & Soaking Solution (Optikem International). For patients who are minimal depositors, a multipurpose GP solution such as Boston Simplus Multi-Action Solution (Bausch + Lomb), Menicon Unique pH (Menicon), Opti-Free GP (Alcon) or Optimum C/D/S (Lobob) may be used for both cleaning and disinfection.



3. Patients may use a plunger—placed on the edge of a scleral lens to release the negative pressure—to facilitate lens removal from the eye. (Photo: Greg DeNaeyer, OD)

Heavy depositors may require periodic protein removal with Boston One-Step Liquid Enzymatic Cleaner (Bausch + Lomb), Opti-Free Supra-Clens (Alcon) or Progent (Menicon). Previously available in the United States for in-office use only, Progent is now FDA approved for patients to use at home.

Sensitive patients also may need to rinse the lens with non-preserved saline prior to application. While this removes any residual solution and its preservatives, it also has the potential to diminish wettability. Alternatively, they could use Clear Care (Alcon) for cleaning and disinfection. For GP lenses, Clear Care's indication includes a digital rubbing step. Scleral lenses with 16.00mm diameters or less fit well into the Clear Care lens basket.

For lenses from 16mm to 30mm, a larger case may be purchased online from the Dry Eye Zone.8 Keep in mind, these cases do not include a catalytic neutralization disc, but one may be easily transferred from a Clear Care case. None of the other currently-available hydrogen peroxide -based products are indicated for use with GPs.

Table 2 offers general contact lens educational resources for patients and staff. Remember to consult each individual manufacturer for specific care recommendations.

Table 2. Contact Lens Education Websites
www.contactlenses.org
www.allaboutvision.com/contacts/contact_lenses.htm
www.contactlenssafety.org
www.bausch.com/en/Eye-concerns/Wearing-Contact-Lenses/Wearing-and-Caring-for-Contact-Lenses
www.meniconamerica.com/consumer/lens-care-dos-and-donts

Scleral gas permeable contact lenses offer many benefits to our patients, and good handling and care is vital to their ultimate success.

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3. DeNaeyer G. Personal communication from Jul 29 to Aug 4, 2011 and on Nov 2, 2011.
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7. Gromacki SJ. Handling and care of scleral GP contact lenses, part 2. CL Spectrum. 2012;28(1):19. Available at: www.clspectrum.com/articleviewer.aspx?articleid=106545. Accessed November 2012.
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