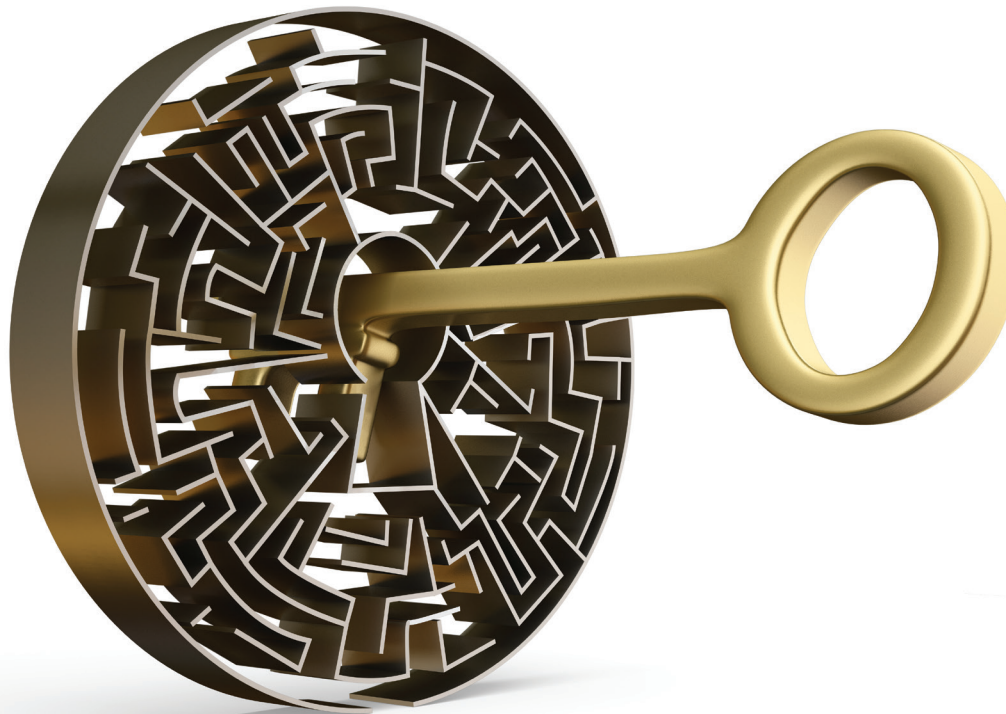




CRACKING THE SCLERAL AND HYBRID LENS INSERTION PUZZLE



A review of assistive techniques.

BY FAYIZ MAHGOUB, OD

Scleral and hybrid lenses are among the most powerful tools in the eye care provider's arsenal. These therapeutic devices can be truly life-changing for patients with ocular surface disease and corneal diseases, dystrophies, and degenerations, but they're useless if a patient can't or won't wear them. One study followed 95 patients over their first 12 months of scleral lens wear and found that 27% of participants dropped out, citing difficulty with lens handling as the main reason (35%).¹

These results suggest that lens insertion is a significant obstacle for many of our patients who need these medically necessary lenses. Although there is a natural learning curve associated with lens insertion, prolonged difficulty with this process constitutes an undue burden on patients. Despite receiving in-office training, some patients spend 30 minutes or more inserting their lenses each morning and sometimes another 30 minutes halfway through the day if they experience fogging.

For others, difficulty with lens insertion leads to compromised independence, as they are forced to rely on a family member or caregiver for help. A greater financial burden is also incurred by these patients, as they consume larger quantities of preservative-free saline, which can be costly. Practices are negatively affected as well, because extended patient training consumes staffing resources and reduces practice efficiency, and lens dropout leads to loss of revenue.

Lens-specific factors that can make insertion challenging include large lens diameters and the need to maintain an adequate level of insertion solution in the lens bowl during insertion to prevent air bubbles, which can cause visual disturbances and discomfort. Patient-specific factors that can contribute to insertion challenges include a smaller-than-average interpalpebral opening, a strong blink reflex, and fine motor impairments of the hands or neck, which we often see in patients with Parkinson disease, arthritis, or stroke.

Cracking this puzzle—that is, making insertion of these lenses efficient for all patients—comes down to three things: tools, training, and practice. The need for patients to practice lens insertion has always



TABLE. Levels of Lens Insertion Techniques: Pros and Cons

	PROS	CONS
Level 1	The patient does not need to purchase, clean, or store any assistive devices.	Requires the most dexterity and can take the longest to master. Patients may find it difficult to hold their lids open while simultaneously balancing the lens.
Level 2	The tools used are readily available and relatively inexpensive.	Requires a fair amount of dexterity. Patients may find it difficult to hold their lids open while simultaneously balancing the lens.
Level 3	Allows better eyelid control than the lower-level techniques. The lens stabilization and light target provided by lens stands helps reduce spillage of lens insertion solution, which reduces the occurrence of air bubbles. Allows insertion in fewer attempts, saving time and conserving saline solution, which can be costly.	Purchasing the tools used in this technique creates an additional expense to the patient.
Level 4	Surgical tape is readily available and relatively inexpensive.	Peeling the tape off the eyelids after insertion may be irritating to sensitive eyelids.



Figure 1. The original DMV Scleral Cup grasps the scleral lens for insertion, removal, and centering functions.

been obvious, but the tools and training techniques are always evolving and improving. Practices that fit these lenses should stay up to date with new tools and insertion techniques and regularly update their protocols as improved options become available.

CHALLENGE ACCEPTED

This article provides a summary of lens insertion techniques that have been shown to be particularly effective. They are categorized into



Figure 2. The EZi Lens Applicator ring works with mini-scleral and hybrid lenses 13 mm and smaller.

four levels, with level 1 intended for patients who have the least difficulty with lens insertion, and level 4 intended for patients who have the most difficulty. The assistive tools mentioned here are all commercially available. Each level has pros and cons, as described later in this article (Table). The following is an example of how we can use a logical approach to match each patient with an appropriate insertion technique.

First, the person providing the lens insertion training should select



Figure 3. The Chio lens applicator is a handheld medical device that prevents eye injuries and bubble formation while ensuring a gentle removal process.

the initial insertion technique based on what they feel is within reach given the patient's dexterity, medical history, and lens wear history. If a patient is initially successful with the first technique they are trained on, they can be trained on a lower level technique that involves less use of assistive devices. However, if the patient is not initially successful with the first technique they are trained on and does not make consistent improvement, they should be trained on a higher-level technique



Photo courtesy of Karen Carrasquillo, OD, PhD, FAOD, FSCS, FBOA, Boston Sight.



Figure 4. The See-Green System Light & Stand.

that offers the level of assistance that they need.

LEVEL 1: INSERTION WITHOUT ASSISTIVE DEVICES

These techniques involve the patient using only his or her fingers to hold and apply the lens to the eye. The most popular variations of this approach are the one-finger, two-finger, and tripod techniques.

The *one-finger technique* involves pressing the cap of an eyedrop bottle against the pad of the index finger to create a small circular indentation that is used to stabilize the lens.² In the *two-finger technique*, the index and middle fingers of the dominant hand are brought together and the lens is supported in the groove between the two fingers. In the *tripod technique*, the index finger, middle finger, and thumb of the dominant hand are brought together and the lens is supported by the tips of the three fingers. For all three techniques, the patient holds his or her eyelids open by using two fingers on the hand that is not supporting the lens or one finger from each hand while bringing the lens to the eye.

LEVEL 2: INSERTION WITH HANDHELD ASSISTIVE DEVICES

For these techniques, a handheld lens applicator is used to support the lens and apply it to the eye. A wide

Photo courtesy of Augmented Vision Labs.



Figure 5. The S5 Inserter features hands-free lens stabilization, which provides the user with two free hands to hold their eyelids open, helping to counter the human blink reflex.

variety of applicators can be used, including the original DMV Scleral Cup (DMV Corporation; Figure 1), the DMV Vented Scleral Cup (DMV Corporation), the DMV Luma-Serter Plus (DMV Corporation), the EZi Lens Applicator ring (EZi Company; Figure 2), and the Chio (Cliara; Figure 3) lens applicator. Additionally, a size 8 O-ring (0.175 mm; found in hardware stores) or an orthodontic ring can be placed on the pad of the patient's finger and used to create a support base for the lens.³ Lid control can be achieved by using two fingers on the hand that is not grasping the applicator or one finger from each of the patient's two hands.

LEVEL 3: INSERTION WITH THE HELP OF LENS STANDS

Examples of lens stands include the See-Green System Light & Stand (Dalsey Adaptives; Figure 4), the S5 Inserter (Augmented Vision Labs; Figure 5), and the S5 Mini (Augmented Vision Labs; Figure 6). These assistive devices allow the

Photo courtesy of Augmented Vision Labs.

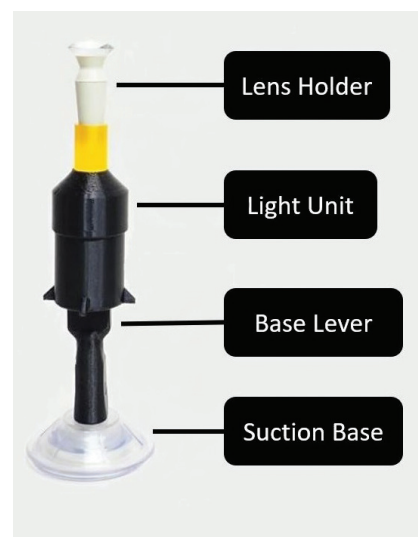


Figure 6. The compact design of the S5 Mini is convenient for use at home and on the go and is optimized for lens insertion while seated.

patient to place the lens on a lens applicator supported by a stand. As a result, patients have two free hands to hold their eyelids open as they bring their eye to the lens. The devices also use an LED light in combination with a vented lens applicator that creates a light target to help guide the patient's eye toward the center of the lens. The S5 Inserter is optimized for lens insertion while standing and features an adjustable height. The See-Green System Light & Stand and the S5 Mini are optimized for lens insertion while seated and have a fixed height.

LEVEL 4: MANGOUB PROTOCOL FOR ADHESIVE-ASSISTED EYELID RETRACTION

In this technique, an adhesive product is applied to enable patients to gain better control of the eyelids during lens insertion. It may be particularly helpful for patients who have a condition affecting fine motor control of the hands (eg, arthritis, Parkinson disease, stroke). It can also be helpful for patients who have a strong blink reflex that makes it difficult to maintain good control of the lids. A lens stand is necessary for this



Figure 7. Place hypoallergenic, water-resistant adhesive product close to the patient's eyelashes but not touching them.

technique in order for the patient to insert the lenses without the help of a second person.

Procedure

Step No. 1: Select a suitable adhesive product, such as surgical tape or adhesive patches. The product should be certified safe for contact with human skin. It should also be hypoallergenic and water-resistant, which can be helpful if excessive tearing occurs. A product that meets these criteria and is readily available is 3M Transpore Surgical Tape (3M). Special care should be taken to review the ingredients used in the tape or adhesive product you are using to ensure that the patient does not have a known allergy to any ingredient.

Step No. 2: Dampen a piece of tissue with water or saline and use it to wipe the upper and lower eyelids to remove excess skin oils.

Step No. 3: Peel off a strip of surgical tape about 3 inches in length and fold it onto itself to create a tab.



Figure 8. Pull the adhesive tabs in opposite directions to open the eyelids. Patients using this technique will need to use a lens stand if they want to insert their lenses without the help of a second person.

Step No. 4: Unroll an additional 1/8th inch section of tape and cut it with a pair of scissors. (Although surgical tape is easy to tear by hand, doing so transfers the natural oils found on our fingers to the tape, making it less sticky. For this reason, it is important to use scissors to cut the tape.)

Step No. 5: Adhere the exposed section of tape to the eyelid (Figure 7). The tape should be placed as closely as possible to the eyelashes without touching them.

Step No. 6: Repeat steps 3 through 5 for the other eyelid.

Step No. 7: The patient or doctor grasps the tabs and pulls them in opposite directions to open the

eyelids (Figure 8). If the tape becomes separated from the eyelid and you suspect that it is due to the presence of skin oils on the lids, use an alcohol wipe to carefully clean the area of the lid that you want the tape to adhere to. Pay special attention not to let alcohol get into the eye, as that would cause a chemical burn.

DON'T LET PATIENTS STRUGGLE OR DROP OUT OF LENS WEAR

Scleral and hybrid lenses can be truly life-changing for patients because of their ability to offer unmatched performance and comfort. No patient should have to give up on the benefits of these wonderful devices due to issues with lens insertion. Additionally, patients shouldn't have to choose between lens dropout and continuing to suffer through a stressful and time-consuming lens insertion experience. Cracking the lens insertion puzzle is about providing our patients with more effective, compassionate care and improving their quality of life. I hope these tools and techniques empower you to do just that. ■

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