Scleral Lenses in One Hour or Less

Introduction / Learning Objectives

While Board-Certified Florida opticians may only fit soft contact lenses without the direct supervision of a doctor, being familiar with the fitting techniques and being able to troubleshoot other types of contacts like hard and gas-permeable makes an optician even more valuable to his or her eyecare practice. Being an expert when it comes to scleral lenses takes your practice of opticianry to an even higher level.

Scleral contact lenses have become an increasingly popular option for patients with a variety of ocular conditions. These lenses are designed to rest on the sclera, the white part of the eye, rather than the cornea, which can help to improve comfort and vision for patients with irregular corneas or other ocular conditions that prevent them from wearing traditional contact lenses. Scleral lenses are large-diameter gas-permeable lenses that create a fluid reservoir between the lens and the cornea, which can improve comfort and provide a smooth optical surface. They are indicated for a range of ocular conditions, including keratoconus, irregular corneas, and dry-eye syndrome, among others. However, fitting scleral lenses is a complex process that requires specialized knowledge and training. Proper lens selection, fit, and care are essential for ensuring optimal outcomes and minimizing the risk of complications. This continuing education (CE) module will provide a comprehensive overview of scleral contact lenses, including their design, indications, fitting process, and potential complications. The module will also explore the history of scleral lenses, the role of scleral lenses in managing ocular conditions, and the latest developments in scleral lens research and technology.

After completing this one-hour, technical contact lens module, a participant will be able to:

1. Identify the indications for scleral contact lenses and explain how they differ from traditional contact lenses.
2. Describe the steps involved in the fitting process for scleral lenses, including lens selection, diagnostic fitting, and follow-up care.
3. Explain the potential complications associated with scleral lenses and describe strategies for managing and minimizing these complications.
4. Discuss the history of scleral lenses and how they have evolved over time to become an important treatment option for patients with a range of ocular conditions.
5. Evaluate the advantages and disadvantages of scleral lenses compared to other types of contact lenses and other treatment options for ocular conditions.
6. Analyze current research and emerging technologies related to scleral lenses and their potential impact on the field of optometry and ophthalmology.

History / Pioneers

The history of scleral lenses can be traced back to the late 1800s when the first glass scleral shells were used to treat corneal opacities and ocular surface diseases. However, these early scleral shells were not well-tolerated by patients due to their heavy weight and poor oxygen permeability.

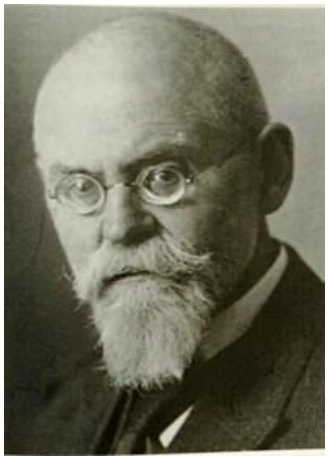
In the early 20th century, the development of plastic materials paved the way for the creation of more comfortable and oxygen-permeable scleral lenses. The first modern scleral contact lens was invented by the French ophthalmologist, Dr. Dallos, in the 1930s. This lens was made from polymethyl methacrylate (PMMA) and had a diameter of 20mm. The lens was designed to rest entirely on the sclera, providing a stable platform for vision correction.

Throughout the 20th century, scleral lenses continued to evolve with the development of new materials and designs. In the 1950s and 1960s, RGP materials were introduced, which provided better oxygen permeability and improved comfort. The advent of computer-aided design and manufacturing (CAD/CAM) in the 1990s further improved the accuracy and reproducibility of scleral lens designs.

Today, scleral lenses are a widely recognized and accepted treatment option for a variety of ocular conditions. They are available in a range of designs and sizes, including mini-sclerals, corneo-sclerals, and full sclerals. Ongoing research and innovation in the field of scleral lenses continue to improve the safety, comfort, and efficacy of these lenses for patients.

There have been many pioneers in the field of scleral lenses who have made significant contributions to the development and evolution of these lenses over the years. Here are some of the most notable pioneers and their contributions:

August Mueller: August Mueller was a German ophthalmologist who is widely considered to be the father of scleral lenses. He invented the first scleral contact lens in 1888, which was made of glass and designed to rest on the sclera to treat corneal opacities. (Pictured below)



Joseph Dallos: Joseph Dallos was a French ophthalmologist who is credited with inventing the first modern scleral contact lens in the 1930s. His lens was made of PMMA and had a diameter of 20mm. He designed the lens to rest entirely on the sclera, providing a stable platform for vision correction.

Vincent F. DeCenzo: Vincent F. DeCenzo was an American optometrist who developed one of the first scleral lens designs for keratoconus in the 1960s. His lens, known as the DeCenzo lens, had a large diameter and was designed to provide uniform corneal compression to improve vision in patients with keratoconus.

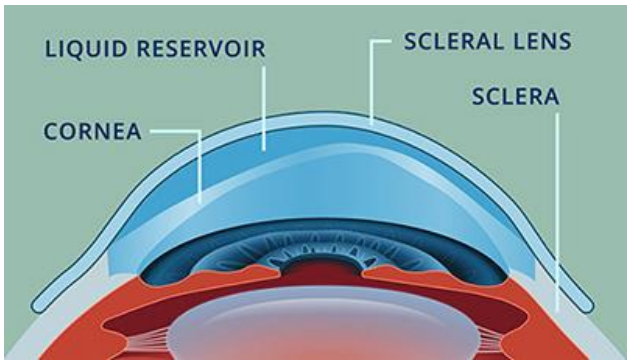
John Mountford: John Mountford is an Australian optometrist who has made significant contributions to the development of scleral lenses over the years. He is known for his work on corneo-scleral lenses, which have a combination of corneal and scleral clearance, and his development of scleral lens fitting protocols.

Patrick Caroline: Patrick Caroline is an American optometrist and scleral lens expert who has contributed to the development of scleral lens fitting techniques and lens designs. He is known for his work on mini-scleral lenses, which have a smaller diameter than traditional scleral lenses, and his contributions to the development of scleral lens fitting software.

These pioneers, along with many others, have played a crucial role in advancing the field of scleral lenses and improving the quality of life for patients with a variety of ocular conditions. Their contributions continue to inspire and inform the work of clinicians and researchers in the field today.

Design of Scleral Lenses

Scleral contact lenses are designed to rest on the sclera, the white part of the eye, rather than the cornea. These lenses have a large diameter (typically between 14 and 24mm) and are made from rigid gas permeable (RGP) materials, which provide excellent optical quality and allow oxygen to pass through the lens to the cornea. The design of scleral lenses is intended to create a fluid reservoir between the lens and the cornea, which can improve comfort and provide a smooth optical surface for improved visual acuity.



The specific design of a scleral lens can vary depending on the patient's ocular condition, corneal shape, and other factors. Some common design features of scleral lenses include:

Diameter: Scleral lenses are available in a range of diameters, typically between 14 and 24mm. The diameter of the lens is selected based on the size of the patient's cornea and sclera, as well as the desired amount of clearance between the lens and the cornea.

Vault: The vault is the amount of space between the back surface of the lens and the front surface of the cornea. The vault is designed to create a fluid reservoir between the lens and the cornea, which can improve comfort and provide a smooth optical surface. The amount of vault needed can vary depending on the patient's corneal shape and the severity of their ocular condition.

Peripheral curves: The peripheral curves of a scleral lens are designed to provide a stable fit and prevent lens movement on the eye. The shape and number of peripheral curves can vary depending on the patient's scleral shape and the desired amount of lens stability.

Landing zone: The landing zone is the area of the lens that rests on the sclera. The landing zone should be designed to distribute the weight of the lens evenly across the sclera, which can improve comfort and prevent lens decentration.

Thickness: The thickness of a scleral lens can vary depending on the patient's prescription and the desired optical performance. Thicker lenses may be needed for patients with high prescriptions or irregular corneas, while thinner lenses may be suitable for patients with mild refractive errors.

Material: Scleral lenses are typically made from RGP materials, which provide excellent optical quality and allow oxygen to pass through the lens to the cornea. Some newer scleral lens materials, such as silicone hydrogel, may offer improved comfort and oxygen permeability.

Overall, the design of scleral lenses is a complex process that requires careful consideration of the patient's ocular condition, corneal shape, and other factors. The goal of the design process is to create a lens that provides optimal fit, comfort, and visual acuity for the patient. A well-designed scleral lens can improve the quality of life for patients with a range of ocular conditions and help to restore their vision and comfort.

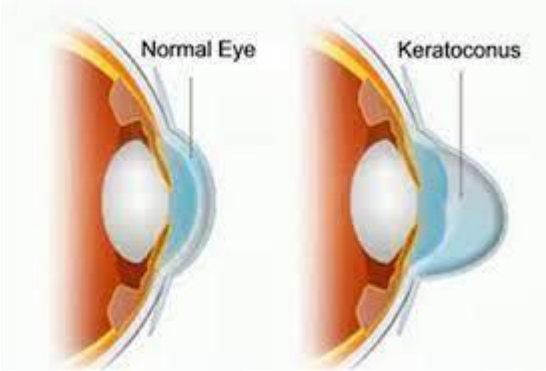
Indications for Scleral Contact Lenses

Scleral contact lenses are indicated for a variety of ocular conditions, including:

Irregular corneas: Scleral lenses can be used to correct vision in patients with irregular corneas, such as those with keratoconus (see below), pellucid marginal degeneration, corneal ectasia, corneal scarring, or other corneal dystrophies. Scleral lenses can provide better visual acuity and

improved comfort compared to other forms of vision correction, such as glasses or standard contact lenses.

Keratoconus: Keratoconus is a progressive eye disease that causes thinning and bulging of the cornea, resulting in distorted and blurred vision. It typically begins in adolescence or early adulthood and affects both eyes, although one eye may be more severely affected than the other. The exact cause of keratoconus is unknown, but it is thought to be related to genetic factors and abnormal collagen structure in the cornea. It is more common in individuals with a family history of the disease, as well as those with allergies and other conditions that cause chronic eye rubbing.



Symptoms of keratoconus may include blurred vision, increased sensitivity to light, glare, and halos around lights, and distorted vision that cannot be corrected with glasses. In the early stages of the disease, glasses or soft contact lenses may be used to correct vision. However, as the disease progresses, and the cornea becomes more irregular, rigid gas permeable (RGP) or scleral contact lenses may be needed to provide adequate vision correction.

Scleral lenses are a particularly useful option for patients with keratoconus because they provide a smooth optical surface and can correct irregular astigmatism. The fluid reservoir created by scleral lenses can also help to protect the cornea and reduce discomfort caused by corneal sensitivity.

In some cases, surgical intervention may be necessary to treat keratoconus. Corneal collagen cross-linking is a minimally invasive procedure that uses ultraviolet light and a photosensitizing agent to strengthen the cornea and slow the progression of the disease. In more advanced cases, a corneal transplant may be necessary to restore vision.

Patients with keratoconus should be monitored regularly by an eye care professional to monitor the progression of the disease and adjust treatment as necessary. Early intervention can help to slow the progression of the disease and preserve vision over time.

Dry eye syndrome: Scleral lenses can help to improve vision and reduce symptoms in patients with severe dry eye syndrome. The fluid reservoir created by the lens can help to protect the ocular surface and improve tear film stability, while the RGP material of the lens can reduce evaporation and maintain moisture.

Ocular surface disease: Scleral lenses can be used to protect the ocular surface and promote healing in patients with ocular surface disease, such as recurrent corneal erosions, corneal ulcers, or graft-versus-host disease.

Post-surgical or post-traumatic corneas: Scleral lenses can be used to correct vision and improve comfort in patients who have undergone corneal surgery, such as corneal transplant or photorefractive keratectomy (PRK), or who have suffered ocular trauma.

High refractive error: Scleral lenses can be used to correct high refractive errors that cannot be adequately corrected with glasses or traditional contact lenses.

Cosmetic reasons: Scleral lenses can also be used for cosmetic reasons, such as to change the appearance of the eye or to provide a more natural-looking iris for patients with congenital iris defects.

Contraindications for Scleral Contact Lenses:

While scleral contact lenses are generally safe and well-tolerated, there are some contraindications that may prevent a patient from being able to wear these lenses. Some contraindications include:

Inability to insert or remove the lenses: Patients who are unable to insert or remove the lenses due to physical or cognitive limitations may not be suitable candidates for scleral lenses.

Severe lid or conjunctival disease: Patients with severe lid or conjunctival disease, such as severe blepharitis or ocular cicatricial pemphigoid, may not be able to tolerate the use of scleral lenses.

Severe ocular pain or discomfort: Patients with severe ocular pain or discomfort may not be able to tolerate the use of scleral lenses, even with proper fitting and care.

Severe allergies: Patients with severe allergies to contact lens materials may not be able to tolerate the use of scleral lenses.

Poor hygiene or compliance: Patients who are unable or unwilling to follow proper lens care and hygiene protocols may not be suitable candidates for scleral lenses.

Uncontrolled systemic or ocular disease: Patients with uncontrolled systemic or ocular disease**,** such as uncontrolled diabetes or glaucoma, may not be able to tolerate the use of scleral lenses.

It is important for eye care professionals to carefully evaluate patients for indications and contraindications before recommending scleral lenses as a treatment option. A comprehensive eye exam and assessment of the patient's medical history and lifestyle can help to determine whether scleral lenses are a suitable option and ensure the best possible outcomes for the patient.

The Scleral Lens Fitting Process

The fitting process for scleral contact lenses is more complex than the fitting process for traditional contact lenses. It typically involves several steps to ensure that the lenses are comfortable and provide optimal vision for the patient. These steps include:

Evaluation: The first step in the fitting process is to evaluate the patient's ocular condition and determine whether scleral lenses are a suitable option. This may involve a comprehensive eye exam, corneal topography, and other diagnostic tests.

Lens selection: Once the decision has been made to fit the patient with scleral lenses, the next step is to select the appropriate lens design and size. This will depend on the patient's ocular condition, corneal shape, and other factors.

Diagnostic fitting: A diagnostic fitting involves placing a trial lens on the patient's eye to assess the fit and comfort. The fit is evaluated using a slit lamp biomicroscope, and adjustments may be made to the lens design or size as needed.

Final fitting: Once the diagnostic fitting has been completed, the final lenses are ordered and fitted to the patient. The lenses may need to be adjusted further to ensure optimal fit and comfort.

Follow-up: Follow-up appointments are necessary to ensure that the patient is adapting well to the scleral lenses and to monitor any potential complications or changes in the ocular condition. The follow-up schedule may vary depending on the patient's individual needs.

How to Place and Remove Scleral Lenses: Placing and removing scleral lenses can be intimidating for new wearers, but with practice and proper instruction, it can become a routine and easy part of daily life. Here are the steps for placing and removing scleral lenses:

Placing Scleral Lenses:

1. Wash your hands thoroughly with soap and water and dry them with a clean towel.
2. Fill the bowl of the scleral lens with a preservative-free saline solution or artificial tears.
3. Hold the lens in your non-dominant hand with your index finger and thumb and use your other hand to hold down your lower eyelid.
4. Place the bowl of the lens on the white part of your eye (sclera), and slowly release your eyelid.
5. While looking down, use your finger to slowly push the lens up onto your eye. This may take a few tries to get it right.
6. Blink several times to help center the lens on your eye.

Removing Scleral Lenses:

1. Wash your hands thoroughly with soap and water and dry them with a clean towel.
2. Look up and use your index finger and thumb to pull down your lower eyelid.
3. Use your index finger to gently press the lower edge of the lens and break the seal.
4. Look down and use your thumb to gently lift the edge of the lens off your eye.
5. Slowly remove the lens from your eye, taking care not to drop it or damage it.

Tips for Success:

- Always use a preservative-free saline solution or artificial tears to fill the bowl of the lens before placing it on your eye.
- Make sure your hands are clean and dry before handling your lenses.
- Use a mirror or ask a friend or family member for assistance if you are having trouble placing or removing your lenses.
- If you experience discomfort or difficulty with placing or removing your lenses, contact your eye care professional for assistance.
- Always store your lenses in a clean, dry, and secure case when not in use.
- By following these steps and practicing regularly, placing and removing scleral lenses can become a quick and easy part of your daily routine.

Potential Complications

Scleral contact lenses are generally safe and well-tolerated, but there are some potential complications that can occur. These include:

Discomfort: Some patients may experience discomfort or irritation when wearing scleral lenses, especially during the initial adaptation period. This can usually be managed with proper lens fit, lubrication, and education.

Lens fogging: Scleral lenses can fog up due to condensation, which can impair vision. This can be managed with proper lens care, anti-fog solutions, and education.

Corneal edema: Corneal edema, or swelling of the cornea, can occur in some patients who wear scleral lenses. This is usually due to poor lens fit or over-wearing the lenses. Corneal edema can lead to vision impairment and discomfort and should be promptly addressed.

Infection: Like all contact lenses, scleral lenses can increase the risk of eye infections if not properly cared for. Patients should be educated on proper lens hygiene and care to minimize the risk of infection.

Epithelial ingrowth: Epithelial ingrowth occurs when the epithelial cells of the cornea grow under the lens and adhere to the surface of the lens. This can cause discomfort, irritation, and corneal scarring. Epithelial ingrowth is rare but can occur in some patients who wear scleral lenses.

Managing Potential Problems with Scleral Contact Lenses

While scleral contact lenses are generally safe and well-tolerated, there are some potential problems that can arise. Here are some strategies for managing these potential problems:

Discomfort: Discomfort with scleral lenses can often be managed with proper lens fit, lubrication, and education. The lens may need to be adjusted to improve fit or reduce pressure on the conjunctiva or sclera. Lubricating drops or ointments can also help to reduce discomfort and improve lens movement. Education on proper lens insertion, removal, and handling can help to reduce discomfort and improve lens wear over time.

Lens fogging: Lens fogging can be managed with proper lens care, anti-fog solutions, and education. Patients should be advised to avoid exposure to steam or heat sources that can cause condensation on the lens. Anti-fog solutions can be applied to the lens to help prevent fogging. In some cases, removing and reinserting the lens can help to clear the fogging.

Corneal edema: Corneal edema can be managed by optimizing lens fit and reducing lens wear time. Patients may need to switch to a smaller diameter lens or increase the amount of clearance between the lens and the cornea to reduce pressure. The clinician may also

recommend reducing the number of hours the lens is worn each day to allow the cornea to recover.

Infection: Infection can be minimized by educating patients on proper lens hygiene and care. Patients should be advised to wash their hands thoroughly before handling the lenses, clean and disinfect the lenses daily, and avoid wearing the lenses while swimming or in other high-risk environments. Symptoms of infection should be promptly addressed with topical or systemic antibiotics as appropriate.

Epithelial ingrowth: Epithelial ingrowth can be managed by monitoring the patient's corneal health and performing regular check-ups. If epithelial ingrowth is detected, the lens should be removed, and the area examined. In some cases, the ingrowth may need to be removed surgically. Education on proper lens care and hygiene can help to reduce the risk of epithelial ingrowth.

Lens dislocation: Lens dislocation can be minimized by ensuring proper lens fit and educating patients on proper lens handling. Patients should be advised to avoid rubbing their eyes or engaging in activities that could cause the lens to dislodge. In some cases, the lens may need to be refitted or adjusted to improve stability.

Deposits and debris: Deposits and debris can be managed with proper lens care and hygiene. Patients should be advised to clean and disinfect the lenses daily and avoid exposing the lenses to products or environments that could cause buildup. In some cases, the lens may need to be replaced more frequently to reduce the buildup of deposits and debris.

Overall, managing potential problems with scleral lenses requires a comprehensive approach that includes proper lens fit, education, and care. Regular follow-up appointments with a qualified eye care professional are essential for monitoring the health of the eyes and ensuring that any problems are promptly addressed. Patients should also be educated on the signs and symptoms of potential problems and advised to seek care as needed. By working together, eye care professionals and patients can optimize outcomes and ensure the best possible vision and comfort with scleral contact lenses.

Popular Brands of Scleral Lenses:

There are several brands of scleral lenses available on the market. Here are some commonly prescribed brands:

BostonSight: BostonSight scleral lenses are custom designed for each patient based on detailed measurements of the eye. The lenses are made of high-oxygen-permeable material and feature a unique landing zone design for improved comfort and stability.

Zenlens: Zenlens scleral lenses are designed for patients with irregular corneas, including those with keratoconus and post-surgical corneas. The lenses are made of high-oxygen-permeable material and feature a large diameter for improved visual acuity and comfort.

PROSE: PROSE (Prosthetic Replacement of the Ocular Surface Ecosystem) scleral lenses are custom-designed for patients with severe ocular surface disease, including those with Stevens-Johnson syndrome and severe dry eye syndrome. The lenses are designed to protect the ocular surface and promote healing.

Empowered Sclerals: Empowered Sclerals lenses are custom designed for each patient using digital scanning technology. The lenses feature a unique landing zone design for improved comfort and stability and are made of high-oxygen-permeable material.

Jupiter: Jupiter scleral lenses are designed for patients with irregular corneas, including those with keratoconus and pellucid marginal degeneration. The lenses are made of high-oxygen-permeable material and feature a unique design for improved comfort and stability.

Ampleye: Ampleye scleral lenses are designed for patients with a wide range of refractive errors, including high astigmatism and presbyopia. The lenses are made of high-oxygen-permeable material and feature a large diameter for improved visual acuity and comfort.

It is important for eye care professionals to work closely with their patients to select the best scleral lens brand and design for their specific needs. Customized lenses can provide the best possible fit and visual acuity for each patient.

Additional Resources:

The Scleral Lens Education Society: The Scleral Lens Education Society is a non-profit organization dedicated to promoting scleral lens education and providing resources for eye care professionals and patients. Their website offers a range of resources, including videos, case studies, and a directory of scleral lens providers. (*sclerallens.org*)

The American Academy of Optometry: The American Academy of Optometry is a professional organization for optometrists. They offer a range of resources for eye care professionals, including continuing education courses, webinars, and a research library. They also host an annual meeting where the latest research and clinical updates on scleral lenses are presented. (*aaopt.org*)

The Contact Lens Society of America: The Contact Lens Society of America is a professional organization for contact lens practitioners. They offer a range of resources for eye care professionals, including webinars, continuing education courses, and a publication dedicated to contact lens research and clinical updates. (*clsa.info*)

The Global Specialty Lens Symposium: The Global Specialty Lens Symposium is an annual meeting dedicated to specialty contact lenses, including scleral lenses. The meeting brings together leading experts in the field to share the latest research and clinical updates on scleral lenses and other specialty lenses.

The International Keratoconus Academy: The International Keratoconus Academy is a non-profit organization dedicated to promoting education and awareness of keratoconus, a common indication for scleral lenses. Their website offers a range of resources for patients and eye care professionals, including videos, case studies, and a directory of keratoconus specialists. (*keratocunusacademy.com*)

Contemporary Scleral Lenses: Theory and Application (Melissa Barnett and Lynette Johns). Bentham Science Publishers (November 6, 2017) – 505 pages

These resources can provide valuable information and support for eye care professionals and patients interested in scleral contact lenses.

Conclusion

Scleral contact lenses are an increasingly popular option for patients with a variety of ocular conditions, including keratoconus, irregular corneas, and dry eye syndrome. These lenses are designed to rest on the sclera, providing a fluid reservoir between the lens and the cornea, which can improve comfort and vision. The fitting process for scleral lenses is more complex than for traditional contact lenses and involves several steps to ensure optimal fit and comfort. While scleral lenses are generally safe and well-tolerated, there are some potential complications that can occur, including discomfort, lens fogging, corneal edema, infection, and epithelial ingrowth. Proper patient education, lens hygiene, and follow-up care are essential for minimizing the risk of complications and ensuring the best possible outcomes for patients who wear scleral lenses.

Final Assessment

1. What is the primary difference between scleral contact lenses and traditional contact lenses?

A. Scleral lenses are larger in diameter

B. Scleral lenses rest on the sclera instead of the cornea

C. Scleral lenses are made of soft material instead of rigid gas permeable (RGP)

D. Scleral lenses are designed for cosmetic purposes only

2. What is the purpose of the fluid reservoir created by scleral lenses?

A. To prevent the lens from rubbing against the cornea

B. To improve comfort and provide a smooth optical surface

C. To reduce lens movement on the eye

D. To reduce the weight of the lens

3. What is the most common indication for scleral contact lenses?

A. Keratoconus

B. Dry eye syndrome

C. Irregular astigmatism

D. Myopia

4. Which of the following is a contraindication for scleral contact lenses?

A. Mild allergies to contact lens materials

B. Severe lid or conjunctival disease

C. Low refractive error

D. Ability to comply with proper lens hygiene and care

5. What is the fitting process for scleral lenses?

A. Diagnostic fitting followed by immediate dispensing

B. Immediate dispensing without a diagnostic fitting

C. Dispensing without any follow-up appointments

D. Diagnostic fitting followed by multiple follow-up appointments for adjustments

6. Which of the following is a potential complication associated with scleral lenses?

A. Discomfort

B. Lens transparency

C. Corneal thickness

D. Pupil size

7. What is the optimal range for the diameter of a scleral lens?

A. 5-10mm

B. 10-14mm

C. 14-24mm

D. 24-28mm

8. What is the landing zone of a scleral lens?

A. The area of the lens that rests on the cornea

B. The area of the lens that rests on the sclera

C. The area of the lens that creates a fluid reservoir

D. The area of the lens that provides optical correction

9. What is the purpose of the peripheral curves of a scleral lens?

A. To provide optical correction

B. To create a fluid reservoir

C. To improve lens movement on the eye

D. To reduce lens thickness

10. Which of the following is a potential complication associated with scleral lenses?

A. Lens transparency

B. Corneal thinning

C. Epithelial ingrowth

D. Reduced corneal curvature

11. What is the most common cause of lens fogging with scleral lenses?

A. Over-wearing the lenses

B. Improper lens fit

C. Exposure to heat or steam

D. Lack of proper lens care and hygiene

12. What is the recommended interval for replacing scleral lenses?

A. Every 1-2 years

B. Every 6-12 months

C. Every 3-6 months

D. Every 1-3 months

13. What is the most common cause of corneal edema with scleral lenses?

A. Over-wearing the lenses

B. Improper lens fit

C. Exposure to heat or steam

D. Lack of proper lens care and hygiene

14. Which of the following is a potential complication associated with scleral lenses?

A. Reduced corneal curvature

B. Corneal abrasion

C. Reduced intraocular pressure

D. Reduced pupil size

15. Which of the following is a potential complication associated with scleral lenses?

A. Corneal warpage

B. Reduced intraocular pressure

C. Reduced corneal thickness

D. Reduced tear production

16. What is the purpose of the vault in a scleral lens?

A. To create a fluid reservoir

B. To reduce lens thickness

C. To prevent the lens from rubbing against the cornea

D. To provide optical correction

17. Which of the following is a potential complication associated with scleral lenses?

A. Reduced corneal sensitivity

B. Reduced corneal curvature

C. Increased tear production

D. Increased intraocular pressure

18. What is the recommended cleaning solution for scleral lenses?

A. Tap water

B. Saline solution

C. Hydrogen peroxide solution

D. Soap and water

19. Which of the following is a potential complication associated with scleral lenses?

A. Corneal thinning

B. Reduced intraocular pressure

C. Increased corneal thickness

D. Increased corneal curvature

20. Which of the following is a contraindication for scleral contact lenses?

A. Mild refractive error

B. Severe ocular pain or discomfort

C. Ability to comply with proper lens hygiene and care

D. Mild lid or conjunctival disease

Answers:

1. B
2. B
3. A
4. B
5. D
6. A
7. C
8. B
9. C
10. C
11. C
12. C
13. B
14. B
15. A
16. A
17. C
18. C
19. A
20. B