How to Enhance Your Scleral Lens Practice

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Author’s Bio
Melissa Barnett, OD, FAAO is a Principal Optometrist at the UC Davis Medical Center in Sacramento. She specializes in anterior segment disease and specialty contact lenses. Dr. Barnett lectures and publishes extensively on topics including dry eye, anterior segment disease, contact lenses, corneal collagen cross-linking and creating a healthy balance between work and home life for women in optometry. She serves on the Board of Women of Vision (WOV), Gas Permeable Lens Institute (GPLI) and The Scleral Lens Education Society (SLS). Dr. Barnett is a spokesperson for the California Optometric Association and has appeared on several television shows. In her spare time she enjoys cooking, yoga and spending time with her husband, Todd Erickson, also an optometrist, and two sons, Alex (7) and Drew (5).

Scleral lenses have changed many of my patients’ lives, enabling them to see clearly with a comfortable lens option. Now that scleral lenses have been in existence for multiple years, I would like to share a few clinical pearls of scleral lens fitting. We are so fortunate to have multiple designs of scleral lenses that are available at this time. With newer technology, the scleral lens experience for both the doctor and patient has improved.

Meet Charles, a 74-year-old Caucasian male referred by a corneal specialist for a contact lens fitting of the right eye. He complained of dryness in the morning. Charles wore a soft bandage contact lens extended wear in the right eye. Past history included an eyelid tumor of the upper right eye lid status post resection with lagophthalmos and corneal exposure. Corneal scarring was present in the right eye. Pseudophakia was present in both eyes. If scleral lenses were not successful, a penetrating keratoplasty of the right eye was planned.

Medical history was significant for diabetes. Systemic medications included aspirin, glyburide, metformin, multiple vitamin and Omega-3 fish oil.

Visual Acuity without correction was 20/400 in the right eye (improved to 20/100 with pinhole) and 20/20 -2 in the left eye.

Manifest refraction of -2.25+3.25x070 in the right eye provided 20/100. Sim Keratometry readings with topography in the right eye: 48.49 / 013 / 39.20 / 103. Irregular astigmatism was present in the right eye.

Examination revealed rosacea in both eyes. The right upper eyelid was notched with an absence of a portion of the eyelid. There was a stable punctal plug on the right lower eyelid.

A corneal scar extending from 11:00 to 5:00 with extension into the visual axis was present in the right eye. Neovascularization extending into the visual axis was also visible in the right eye. No epithelial defect was present. The anterior chamber was deep and quiet. Normal intraocular pressures were present in both eyes. A posterior chamber intraocular lens was observed and appeared stable. The optic nerve, macula and peripheral retina were all within normal limits.

A contact lens fitting was commenced after the bandage contact lens for the right eye was removed without any complications. A scleral lens was fit in order to treat the ocular surface and irregular astigmatism. The scleral lens fitting was successful with good initial fit, vision and comfort of the lens. Charles was able to insert and remove the scleral lens without any complications. A scleral lenses (Acculens) was fit in Boston X0₂ material (B+L) with a
16.5mm diameter. Lens parameters were OD 40.50D base curve (BC), 16.5mm overall diameter (OAD), 9.50mm optical zone diameter (OZD), +3.25D power, sag 4.55.

Best corrected visual acuity in the right eye was 20/40-2. At the scleral lens dispense and training appointment two weeks later, Charles reported good vision and comfort with the scleral lens. Visual acuity remained stable at 20/40-2. Insertion and removal training was performed without difficulty.

Discontinuation of the soft bandage contact lens for overnight wear was discussed with Charles. An initial trial of discontinuation of the bandage contact lens (both day and night) was started. Charles was informed to restart nighttime bandage contact lens wear if any dryness or irritation occurred during the day. Lubricant ointment was used at nighttime.

Two weeks later at the follow up visit, Charles reported good vision and improved comfort with the scleral lens worn during the day. No bandage contact lens was used at night and no complaints of dry eyes were present either day or night. Best-corrected visual acuity remained at 20/40-2 in the right eye with no over-refraction. Charles was wearing the lens for five hours at the time of examination with an average wearing time of 14 hours. Clear Care and non-preserved 0.9% sodium chloride inhalation solutions were used.

Scleral lens fit of the right eye demonstrated good central apical clearance. Less clearance was present nasal and temporal, however the lens was cleared the entire cornea. Peripheral blanching was present in the nasal quadrant only. No sebaceous tear debris was present.

Upon removal of the lens, the eyelid appeared unchanged. The cornea demonstrated trace inferior punctate epithelial keratopathy without microcystic edema in either eye. There was no evidence of a conjunctival impression ring.

Charles was instructed to continue scleral lens wear during the day with the same solutions. Evening lubricant ointment was continued without a bandage contact lens. Six months later, Charles has continued wearing his scleral lens successfully.

Martha, a 58-year-old Caucasian female presented with a history of dry eyes.

The eyes were particularly dry status post blepharoplasty for the upper and lower eyelids of both eyes. Martha complained of red, burning, tearing, and photophobic eyes since her surgery. Ocular history was also significant for a posterior subcapsular cataract in the right eye. She previously wore soft contact lenses (both daily and two week replacement lenses). Ocular medications included topical cyclosporine 0.05% one to two times a day and bottled artificial tears one to two times a day. However, there was no improvement with eyedrops.

Medical history was significant for recurrent herpes simplex virus. Medications taken were estradiol, progesterone and Valtrex.

Visual Acuity with glasses was 20/25+1 in the right eye (improved to 20/20+1 with pinhole) and 20/40-2 in the left eye (improved to 20/25+1 with pinhole).

Manifest refraction of -10.25+1.00x160 in the right eye enabled 20/20-2. Manifest refraction of -8.50+0.75x091 in the left eye enabled 20/20-2.

Sim Keratometry readings with topography read

"OD 42.35 / 065 / 42.24 /155
OS 42.72 / 098 / 41.82 / 008"
Irregular astigmatism was present in the right eye. Regular astigmatism was present in the left eye.

Slit lamp examination revealed 1+ meibomian gland dysfunction in both eyes. Conjunctival staining (2+) and chemosis (1+) was present in both eyes. Reduced tear meniscus was present in both eyes. Corneal staining was visible in both eyes, right eye worse than the left. Tear break up time was 2 seconds in the right eye and 4 seconds in the left eye. Normal intraocular pressures were present in both eyes. Trace nuclear sclerosis was present in both eyes. The right eye had a posterior subcapsular cataract. Optic nerves and maculae were normal in both eyes.

Scleral lenses (Acculens) were fit in Boston XO2 material (B+L) with a 16.5mm diameter in both eyes. Lens parameters were OD 41.00D base curve (BC), 16.5mm overall diameter (OAD), 9.50mm optical zone diameter (OZD), -8.00D power, sag 4.63 and OS 41.00D BC, 16.5mm OAD, 9.5mm OZD, −6.50D power, sag 4.63.

Visual acuity in each eye was 20/20-1. An over-refraction of +0.25 was present in the right eye. No over-refraction was present in the left eye. Binocular vision without an over-refraction was 20/15.

Both lenses exhibited good central apical clearance. Less clearance was present superior nasal, however each lens cleared the cornea in each eye. The lenses fit well peripherally without blanching. There was no evidence of sebaceous tear debris or surface debris on either lens.

Martha noticed “tremendous improvement” with ocular dryness. She no longer experienced dry eye symptoms while wearing scleral lenses. She was happy with the vision and comfort with the scleral lenses. With the lenses on, no artificial tears were needed. However, without lenses, Martha continued using non-preserved artificial tears and cyclosporine 0.05% twice a day.
Scleral lenses are also a fantastic option for patients who have irregular corneas and glaucoma, and even more so if ocular surface disease compromises the ocular surface in such patients.

A history of glaucoma surgery, including trabeculectomy, shunt, stent, or glaucoma implant, may complicate the fitting of scleral lenses due to the resulting irregular conjunctival surface. The conjunctiva may be elevated or uneven in the area in which the glaucoma surgery was performed. Also, excessive pressure or rubbing over tube shunts or valves may compromise intraocular pressure and lead to conjunctival and/or tube erosion, which can increase the risk of further complications (i.e., endophthalmitis). A notch in the scleral lens can be created to avoid both pressure on the conjunctiva and contact with the surgical area.

Constance, a 58-year-old Hispanic female was referred for a contact lens examination. She was experiencing irritated eyes with her current hybrid contact lens and had reverted back to a soft lens for the left eye. She complained of poor vision, especially at distance when driving at night. She also reported double vision when reclining, but not in straight-ahead gaze.

Her medical history was significant for diabetes, hypertension, hypothyroidism, and sleep apnea. Systemic medications included insulin, metformin, glimepiride, lisinopril, hydrochlorothiazide, levothyroxine, and escitalopram. In addition to glaucoma, ocular history was significant for dry eye in both eyes. Ocular medications were Alphagan (Allergan) and Cosopt (Merck) b.i.d. OD.

The right eye had a stable intraocular lens. A cataract was present in the left eye. Primary open angle glaucoma was present in both eyes. Of note, Constance underwent a Baerveldt glaucoma implant six months prior to the examination.

Following the glaucoma implant, she developed a right hypertropia and alternating exotropia. This is not uncommon, as persistent restrictive strabismus may occur with glaucoma drainage implants due to scarring between the rectus and oblique muscles (Schwartz et al, 2006).
Entering vision in the right eye was 20/50+2 without correction and 20/50-2 in the left eye with a soft contact lens.

Anterior segment examination revealed a stable glaucoma drainage device implant located superior temporal in the right eye with a bleb over the plate. The tube was well covered and visible in the anterior chamber. Both eyes exhibited corneal staining (1+ inferior punctate epithelial keratopathy). The posterior chamber intraocular lens was stable in the right eye. Mild nuclear and cortical sclerosis was present in the left eye. Intraocular pressures were OD 25mmHg and OS 21mmHg at 1:57pm. Optic nerve examination revealed vertical elongation of the disc with peripapillary atrophy. Myopic degeneration was present in both eyes.

Recommended treatment included nonpreserved artificial tears, frequent breaks when reading and using a computer, good water intake, and daily omega-3 fatty acid intake. Due to elevated intraocular pressure in the right eye, an appointment was scheduled with her glaucoma surgeon.

Medical management and options were discussed, and the patient was fit with Maxim Scleral (Acculens) lenses in Boston XO₂ material (B+L). Lens parameters were OD 46.00D base curve (BC), 15.0mm overall diameter (OAD), 8.00mm optical zone diameter (OZD), +0.50D power, sag 4.35, 4mm notch (to insert superior temporal) and OS 46.00D BC, 15.4mm OAD, 8.00mm OZD, −13.00D power, sag 4.46 (intermediate/near). The right lens was targeted for distance, the left lens for intermediate/near to eliminate diplopia. A superior temporal notch was made in the right scleral lens (Figure x).

Visual acuity at distance was 20/30 OD, 20/30+2 OS, 20/25-2 OU, and the patient had good computer and near vision, with J1+ OS and J1+ OD at near. The patient reported incredible comfort with the scleral lenses. Both lenses fit well with good central apical clearance and good peripheral alignment. No blanching was present in either eye. The scleral lens notch was correctly positioned superior temporal in the right eye and did not touch the glaucoma implant. The patient was able to wear the lenses for 15 hours each day. Intraocular pressures checked multiple times during a three-month period ranged from 16mmHg to 18mmHg in each eye.

With scleral lenses, it is possible to fit inside of conjunctival abnormalities by decreasing the lens diameter or to fit over abnormalities by increasing the lens diameter. Alternatively in this case, it is possible to go around the abnormality by putting a notch in the lens. In cases of glaucoma surgeries or implants, it may be beneficial to avoid the abnormality altogether and to create a notch in the scleral lens. Scleral lens notches are also advantageous when there are other types of conjunctival abnormality such as an elevated pinguecula or conjunctival cyst.

Putting a notch in a scleral lens may sound complicated, but it is not. The first step is to measure the size (both height and width) of the conjunctival abnormality using a slit beam. Next, measure the height and width of the conjunctival abnormality while the scleral lens is on the eye. Then, mark the scleral lens with a permanent (e.g., Sharpie) or dry erase marker while the lens is on the eye. Next, measure the tracing on the lens after removing it from the eye. Finally, call the laboratory consultant to discuss the plan and send the lens to the laboratory.

When inserting the lens, it is important to place it on the eye with the correct orientation. Make sure to inform the staff person who is training the patient on scleral lens application and removal, as well as the patient, about the need for proper lens orientation.
References


CE@Home January/February Questions
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Answer the following 10 questions to the best of your ability. To receive CE credit, please fax in your answers to 916-448-1423 or mail them to California Optometric Association, Attn: CE, 2415 K Street, Sacramento, CA 95816. Answers are due March 15, 2015. Test submissions are entered every Friday; transcripts are available every Saturday morning.

1. The clinical use of scleral GP CLs is:
   a. Increasing
   b. Decreasing
   c. Remaining stable
   d. Dangerous

2. Pseudophakia is a
   a. Contra-indication for scleral GP fitting
   b. Indication for scleral GP fitting
   c. Neither an indication or a contra-indication for scleral GP fitting
   d. Complication of scleral GP fitting

3. Glaucoma valves are:
   a. An absolute contra-indication for scleral GP fitting
   b. Indication for scleral GP fitting
   c. Neither an indication nor a contra-indication for scleral GP fitting
   d. A complication to scleral GP fitting

4. Indications for scleral GP fitting include all the following, EXCEPT:
   a. Severe dry eye
   b. Irregular corneal astigmatism
   c. Myopia
   d. Presbyopia

5. Scleral GP fitting is:
   a. Challenging
   b. Similar to fitting soft lenses
   c. Similar to fitting rigid GP lenses
   d. Similar to fitting bifocals

6. Corneal surgeons are often:
   a. Skilled at fitting scleral GP lenses
   b. Knowledgeable about referring patients for scleral GP fitting
   c. willing to fit scleral GP lenses themselves
   d. critical about scleral GP lenses

7. Types of dry eye treated with scleral GP lenses include all the below, EXCEPT:
   a. Auto-immune dry eye
   b. Exposure dry eye
   c. Blepharitis related dry eye
   d. Lacrimal insufficient dry eye

8. Patients fitted with scleral GP lenses for eye disease are often:
   a. Sad
   b. Enthusiastic
   c. Intolerant
   d. Angry

9. Scleral GP lens practice is
   a. Part of normal contact lens practice
   b. Part of general comprehensive eye practice
   c. Speciality contact lens practice
   d. Part of soft lens practice

10. All the below is true about a post-penetrating keratoplasty patient, EXCEPT:
   a. Might be a candidate for a scleral GP lens
   b. Would never be a candidate for a scleral GP lens
   c. Might be a candidate for a simple GP lens
   d. Might be a candidate for a hybrid lens