DIAGNOSTICS FOR THE RIGHT FIT


Tips to save you time in getting the optimal scleral lens fit. Part 1 of two parts.

BY TOM ARNOLD, OD, FSLS; AND JOSEPH A. JANES, OD, FAAO

As enthusiasm for fitting scleral contact lenses grows, we practitioners inevitably become aware of the complexity that comes with fitting some patients. Of course, more complex cases carry the potential need for more visits, longer chair time, additional lens exchanges, and even switching brands. Although we view multiple visits and lens tweaking as a commitment to superior care, patients may think otherwise, wondering why we can't seem to get it right. Thus, not only is getting the optimal fit as quickly and efficiently as possible more profitable, but it's also a practice builder. Part 1 of this two-part series covers the information-gathering stage of this process.

START WITH THE BASICS

Always start with a thorough case history and external examination. How long have patients been experiencing reduced vision? Have they had prior surgery such as radial keratotomy or LASIK? What have they been using for vision correction? If they have been wearing contact lenses, how many hours are they able to wear them? Have they experienced any complications? When did they last wear their lenses, and what solutions and drops, if any, did they use? Has wearing time decreased at all during the past several months? What are their expectations with regard to scleral lens fitting?

Next, find out if patients have corneal grafts, scars, neovascularization, guttae, or indications of a neurotrophic cornea. Look at the position of their eyelids and note any dermatochalasis, entropion, ectropion, chalazion, lagophthalmos, or Bell palsy. The lid margin must be clear of scale and collarettes. Evidence of meibomian gland dysfunction and seborrheic blepharitis are a concern because they may harbor bacteria. Assess meibomian gland function with an imaging system if you have access to one of these devices. If not, expressing the glands and grading the response with a cotton swab will suffice.

Contraindications to scleral lens wear may include filtering blebs that overhang the cornea, low (<600-800 cells/mm^2) endothelial cell count, uncontrolled glaucoma, and handling issues. Signs of active

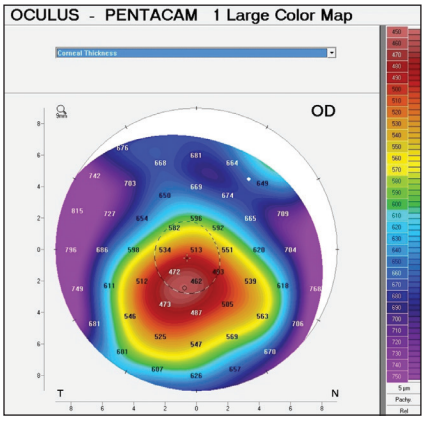

Figure 1. Global pachymetry.

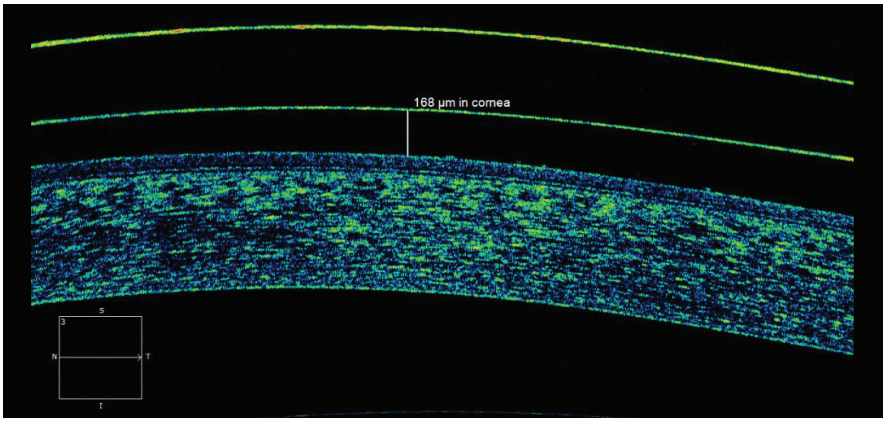

Figure 2. Central clearance as measured by OCT.

infection and/or inflammation should be treated at the time of the lens diagnostic session and the progress of therapy assessed when the lenses are dispensed.

Observe the corneal profile from the side as the patient gazes straight ahead. Because the scleral lens will be resting on the conjunctiva, a careful evaluation of this membrane is important. Does it conform to the sclera, or is there redundant tissue? Is the conjunctiva edematous, or does it show signs of inflammation? Signs of hyperkeratosis, pinguecula, or pterygium must be evaluated and measured for position and size. Finally, determine the horizontal visible iris diameter (HVID). These simple steps do not require expensive equipment, yet they can help you to narrow the scleral lens choices immediately, saving you from resorting to random guessing.

Be sure to evaluate the iris for defects. Grade and be alert for reduced vision from early cataract formation. Using a wavefront analyzer, assess the distortion created by the crystalline lens. Review patients' systemic health and note any vascular disease (eg, hypertension, diabetes, and blood disorders); collagen vascular disease (eg, systemic lupus, rheumatoid arthritis, scleroderma, fibromyalgia); inflammatory disorders (eg, multiple sclerosis, hyperthyroidism, and Crohn disease); hypothyroid conditions, especially Hashimoto thyroiditis; and allergic hypersensitivity to environmental antigens, especially those found in their working environment. Review all prescribed and over-the-counter medications and supplements and look out for those that may reduce tear function, decrease blink frequency, and/or affect the eyelids.

GET TECHNICAL

Scleral lens fitting has taught us a lot about corneal shape and has thus changed the way we look at topography. Axial maps display topographic corneal curvature and provide the optical power of the cornea, showing us the areas of greatest curvature. Tangential maps provide more detailed descriptions. When fitting scleral lenses, however, elevation data are even more useful. Knowing the location and elevation of the highest and lowest points on the cornea helps us to select the sagittal depth of the first trial lens. The goal is to clear the

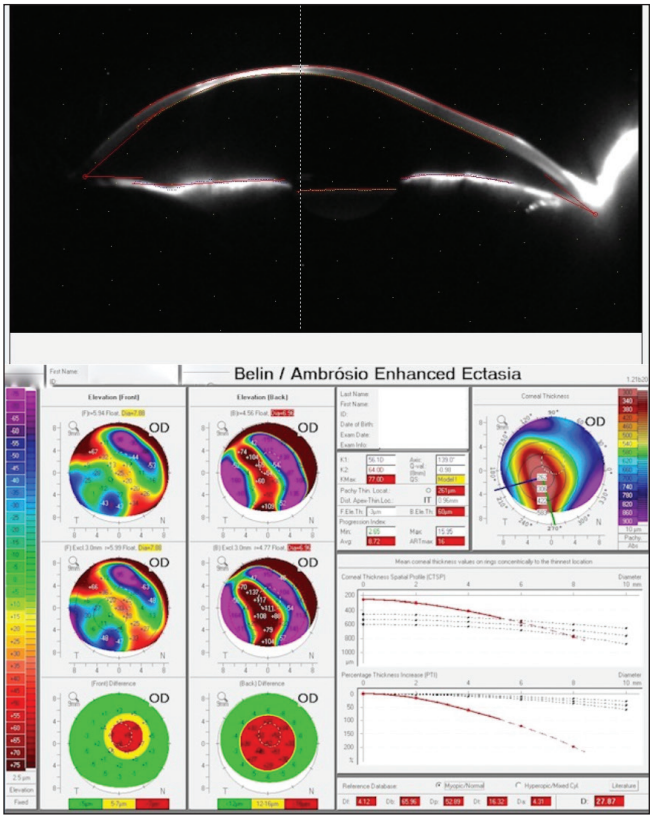

Figure 3. A case of advanced keratoconus, as shown with Belin/Ambrósio analysis.

highest point on the cornea in a patient with keratoconus, for example, without excessive clearance over surrounding areas. The opposite would be true in a patient with a history of refractive surgery, in whom the oblate shape of the cornea would create more clearance over the apex but would necessitate steeper peripheral curves. Learning to interpret and use elevation maps is essential to getting the right fit.

The development of tomography filled a need to define the cornea more accurately (Figures 1-4). It uses a camera system based on Scheimpflug photography rather than on reflection-based Placido imagery. Tomography gives us a 3D image of a solid object, true elevation data (not extrapolated), and global

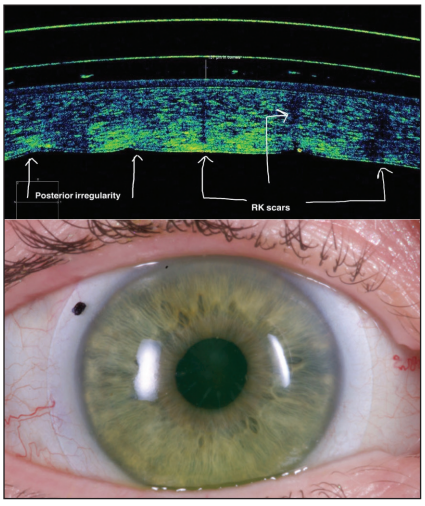

Figure 4. Post-RK with endothelial perforations.

pachymetry, all of which has two major benefits in accurate scleral lens fitting.

First, we know the true height of the cornea, which, after factoring in lens clearance, helps us to select that first trial lens. Second, with pachymetry readings from multiple points on the cornea, we can monitor keratoconic progression and detect signs of edema from hypoxia. Additionally, carefully watching the thinnest points of the cornea tells us whether a patient is a candidate for CXL or is at risk of hydrops. Scheimpflug images also quantify levels of corneal scarring, which scatters light and thus degrades the optical image. This effect is not the same as that of higher-order aberrations, and it is not ameliorated by scleral lenses.

Using the information gathered thus far, counsel patients on realistic expectations for BCVA. The next step is selecting a trial lens.

TRIAL TIME

Your first consideration is the patient's HVID. A commonly accepted guideline is that the overall lens diameter should be 1.0 mm to 1.5 mm larger than the HVID on both sides. Some experts add an extra millimeter to account for the width of the limbus. To accommodate the normal range of corneal diameters, it is helpful to have at least two fitting sets on hand. A third set may be useful as your practice grows and you manage more complex cases. The first of your sets may range from 14.6 mm to 15.4 mm in diameter, and your second set might range from 15.8 mm to 17.0 mm in diameter. Ectatic eyes such as those found with table-top or proud grafts or those with keratoglobus may require even larger lenses, which is when having a third set of larger lenses would come in handy.

To be as efficient as possible, our office relies heavily on its support staff. See *Today's Vision Sugar Land Trial Lens Protocol* for a look at how our staff assists with fitting trial lenses. After determining the diameter, the clinician may choose the lens design that best fits the sclera and vaults the cornea correctly. Follow the fitting guide or rely on your experience to choose the first diagnostic lens.

THE NEXT STEP

Once trial lenses have been evaluated, it is time for you to compose the design and order the lenses. Prepare yourself, because the unexpected is about to begin, along with the challenging task of obtaining a successful fit and wear. Part 2 of this article will explain how to identify the difficult areas that must be addressed in order to enable patients to wear scleral lenses successfully. ■

TODAY'S VISION SUGAR LAND TRIAL LENS PROTOCOL

1. The practitioner selects a trial lens for the patient's first eye.
2. A staff member cleans the lens, fills a bowl with sterile saline, and dips a fluorescein-impregnated strip into the solution to help the clinician determine the depth of the corneal and limbal vault.
3. The staff member assists the patient with lens insertion.
4. The staff member checks for bubbles and signs of corneal touch.
5. A handheld cobalt-blue flashlight is used to assess clearance.
6. If the patient is comfortable, then a lens is inserted into the other eye and the procedure is repeated.
7. The patient then returns to the examination room, where the practitioner performs a quick slit-lamp assessment.
8. Next, the assistant reviews the practice's wearer's agreement, follow-up schedule, and warranties with the patient.
9. The assistant then performs an automated overrefraction and obtains OCT measurements of central clearance and landing zones.
10. Lastly, the patient returns to the examination room with the doctor to check the overrefraction and to complete the lens evaluation pertaining to central vault, the midperiphery, limbal clearance, and landing zone in each quadrant.

Meticulous documentation of the steps above is necessary to assess the initial design and anticipate complications that may become apparent after several hours of wear.

TOM ARNOLD, OD, FSLS
- Owner, Today's Vision Sugar Land, Sugar Land, Texas
- Program Chair, International Congress of Scleral Contacts
- blindtex52@gmail.com
- Financial disclosure: None

JOSEPH A. JANES, OD, FAAO
- Optometrist, Today's Vision Sugar Land, Sugar Land, Texas
- jj@jajanes.com
- Financial disclosure: None