The Beginner's Guide to Fitting Scleral Contact Lenses

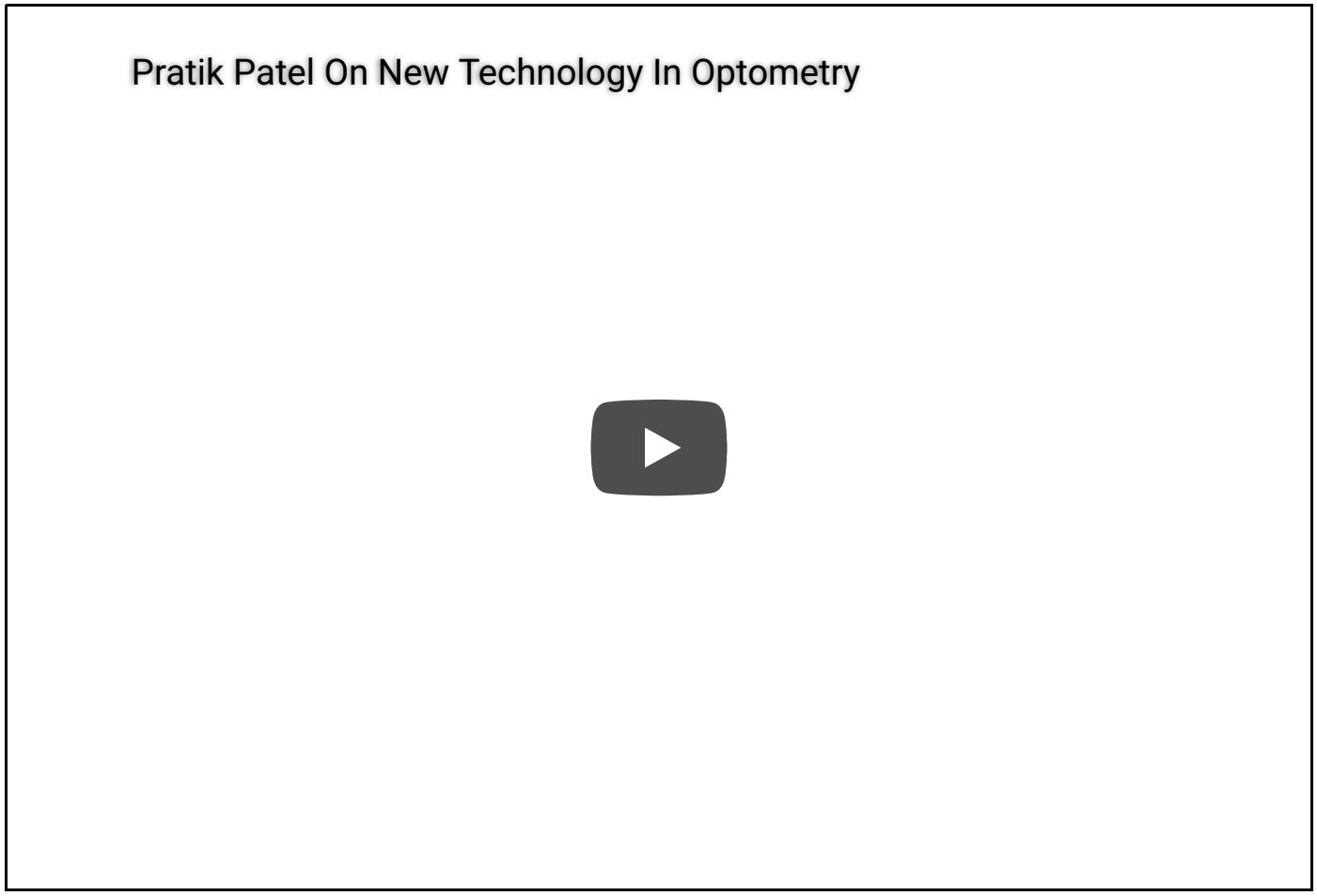
I remember being an unsure student in contact lens clinic presented with the task of inserting a scleral contact lens for the first time on a fellow student while a group of my peers hovered around me to observe (no pressure, right?).

I clumsily fumbled around with positioning the lens on the plunger, filling it with solution and inserting the dye, then squatting to the floor and shakily raising the lens toward the eye only to miss and send the lens and its contents all over the floor.

After multiple unsuccessful tries, feeling like a failure, I decided I hated scleral lenses and was never going to touch one again. After remembering that scenario, it’s interesting that I have now found joy in fitting these lenses, mostly because they can help bring sight back to individuals who have often been struggling with their vision for a long time.

In the past, it seemed that scleral lenses were reserved only for irregular corneas but have since evolved as a wonderful treatment for a variety of ocular conditions.

There are a number of new technologies on optometry's horizon! Scleral lenses are just one example. Watch this video to see Pratik Patel, OD's perspective!



There are three main indications for scleral lenses:

1) Visual Improvement

- Corneal Ectasia/Irregular Corneal Astigmatism *(Keratoconus, PMD, Post Corneal Transplant, Trauma, RK)*
- Corneal Degenerations
- Refractive Errors *(High Myopia/Hyperopia/Astigmatism, Unsuccessful RGP/SCL Wear)*

2) Corneal Protection

- Exposure Keratitis/Ocular Surface Disease *(Dry Eye, Sjogren's, Persistant RCE, Neurotrophic Keratopathy, Incomplete Lid Closure)*
- Trichiasis/Entropion

3) Cosmetics/Sports

- Hand painted for atrophia bulbi
- Glare reduction for aniridia/albinism
- Active water sports

Furthermore, there are three main benefits to scleral lenses versus traditional RGPs:

1) Increased Comfort

- No bearing on the sensitive cornea, the weight of the lens rests on the sclera

2) Decreased Corneal Distortion

- No bearing on the cornea reduces mechanical stress on the tissue

3) Larger Optic Zone

- More forgiving if the lens de-centers

I also find that it is beneficial to attempt a scleral lens fitting before referring a patient for a corneal transplant.

Even when medically successful and without complication, many patients will still need a specialty contact lens to restore vision post-transplant because of irregular or high astigmatism.

Therefore, ruling out a successful scleral fit first is important.

Furthermore, in my relatively short time fitting scleral lenses on my own, I have found that it is not as difficult as I once perceived.

Although the process may be tedious, I recommend fitting diagnostically

with a fitting set. This will allow you to determine the best initial fit and power, anticipate adjustments needed to the standard size and peripheral curve of the lens, and enable you to order the best lens the first time (which will save chair time and reduce the number of reorders later on).

When fitting diagnostically, the most time consuming step is the insertion and removal of the different lenses. However, training a technician to assist with the I&R will save you time and make these sometimes lengthy fittings manageable within your daily schedule.

Here is my rookie approach to fitting scleral lenses:

1) Look at the K's

I use the patient's keratometry readings to determine my starting point. Each set will have a fitting guide which will recommend a lens to begin the process. Currently I average the patient's K's and then go one lens flatter.

For example:

K's = 46.75/43.50 @ 095

Avg K = 46.75 + 43.50 = 90.25/2 = 45.125 -> ~7.5 BC

One step flatter in the fitting set is 7.7 BC – this is where I would begin.

2) Determine the best central fit

Using the above lens and making sure to add preservative free saline and fluorescein to the bowl, insert the lens on the patient's eye.

Raise the patient high in the chair, cover the patient's lap with paper towels, have the patient bend over and position his or her face parallel with the floor, and give a fixation target.

I find it works best to have the patient firmly hold their upper lid while you hold their lower lid with one hand and the plunger/lens in the other.

Also, almost overflowing the bowl with preservative-free saline will help avoid bubbles upon insertion. If you do get a bubble on insertion, make sure to remove the lens and reinsert.

After the lens is in, using an optic section and white light, evaluate the central fit. We want the lens to vault the entire cornea for maximum comfort. **Usually I shoot for about 300 microns of clearance initially, as the lens will settle about 100-150 microns throughout the day.** You can use the cornea for comparison (average corneal thickness is around 550 microns) or if known, you can use the center thickness of the lens for comparison.

If the clearance is too little, move to a steeper lens, or if too much, move to a flatter lens until the appropriate clearance is obtained.

3) Evaluate the secondary and peripheral curves

When evaluating the secondary (mid-peripheral) curve, check to make sure the limbus is vaulted. When evaluating the peripheral curve, check for conjunctival drag or blood vessel impingement which would suggest a tight fit.

Furthermore, difficulty removing the lens may also indicate a tight fit.

You want adequate edge lift to avoid impingement and allow tear exchange without inducing lens awareness or discomfort caused by edge standoff.

4) Look at the refraction

The same patient with the above K readings had the following refraction:

-1.50 -6.00 x 098

From the above K's we know that this patient has about 3.75D of corneal astigmatism. Since the refraction is showing 6.00D of astigmatism, we know that not all of the astigmatism is corneal. This knowledge is useful during the over-refraction.

5) Over-refract

If there is no residual astigmatism, spherical over-refract the lens to BCVA. If a decent amount of residual astigmatism is present, anticipate the need for a sphero-cylindrical over-refraction for BCVA.

6) Order the lens

Easy! Call up the lab and order the lens. Tell them which base curve gave the best fit, the over-refraction, and any modifications to size or peripheral curves. A relationship with your lab consultant is beneficial. Ask for their advice if anything is unusual about the particular patient or fit.

7) Follow-up

Schedule follow-ups for as late in the day as possible in order to evaluate the lens once it has completely settled on the eye. At follow-ups I ask the patient about any comfort or visual concerns, evaluate the fit, and over-refract to ensure the power is correct. Make adjustments to the fit/power as necessary.

And there you have it! This is a basic approach to fitting scleral lenses that you can tweek with time and experience. Remember to be patient with the process. Practice makes perfect!

Sources:

Eef van der Worp. A Guide to Scleral Lens Fitting. College of Optometry Pacific University.<http://commons.pacificu.edu/cgi/viewcontent.cgi?

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