In the prescribing of soft contact lenses, their soft pliable nature affords them the ability to fit over a broad range of corneal shapes and sizes, and with modern manufacturing techniques, power can be precisely manufactured in a range of parameters. However, it is when the corneal profile and/or patient’s refractive error fall outside the range of commodity lenses that a custom soft contact lens becomes necessary.

With a wide range of material choices and technologically advanced lathing techniques, custom soft contact lens manufacturers are able to create an incredible range of options for our patients. The practitioner can essentially order any base curve, power, and diameter needed, as well as control the center thickness and optic zone of the lens, in order to precisely prescribe for the patient. The practitioner has the ability to vary the material independent of the other parameters, unlike with regular commodity lenses.

This broad range of parameter and material selection can become overwhelming. By closely examining the patient’s central keratometry values and horizontal visible iris diameter (HVID), the practitioner can more closely approximate the appropriate base curve and diameter. In analyzing those anatomic features that control the overall sagittal height of the eye (Figure 1) as it relates to the soft contact lens fit, it is the corneal diameter that has the greatest impact, and the central corneal curvature follows.

The average corneal diameter is 11.8mm, which is the diameter commodity lenses are based off of for their intended fit. Once the patient’s cornea falls outside the 11.8mm HVID, the fit of the commodity soft contact lens may suffer. Consideration for a custom soft contact lens design would be appropriate.

One clinical tip off of corneal mismatch is minimal or excessive limbal extension of the overall soft lens diameter as compared to the patient’s limbus. Several techniques to measure visible iris diameter (corneal diameter) may be employed and include corneal topography, a slit lamp reticule, and a PD ruler. The more accurate the measurement of corneal diameter and central keratometric reading, the better the practitioner is able to arrive at an appropriate base curve and diameter to match that particular patient’s anterior segment. The SpecialEyes Arc Length Calculator intends to do just that (Figure 2). It treats the cornea as an “arc” and assumes the curvature across that arc is the central corneal curvature, and the area over which that curve extends is the corneal diameter. The calculator measures the distance across the arc and converts that into a contact lens “arc” with a base curve and diameter larger than the visible iris diameter to ensure centration and comfort.

Also built within the calculator is a vertex calculator to put the manifest refraction at the plane of the cornea for appropriate contact lens power.

Other parameters that may be varied within a custom soft lens design include the optic zone and material thickness. The ability to vary optic zone is particularly helpful for those patients who experience flare and halos with their soft lenses. The custom soft lens manufacturer may independently increase the optic zone of the lens in an attempt to limit flare and halos. In addition, central thickness of the material may be increased in order to approximate the tear lens effect found beneath a rigid contact lens, and is useful for those patients with irregular astigmatism. This increased central thickness is a core design feature of many modern custom soft lenses for keratoconus as it increases the “regularity” of the cornea.

In conclusion, those patients in our practice with unusually large or small, flat or steep corneas and unique refractive errors are typically those who struggle the most in commodity soft contact lenses. It is these patients that have the most to gain from the integration of custom soft contact lenses and in my experience, are the most rewarding to help. Custom soft lens patients tend to become lifelong loyal patients and are happy to refer their friends and family to us because we are the ones who “figured it out!”