



Precision Biometry

Here's what you need to know to succeed as a refractive cataract surgeon.

In practice in southwest Florida where the population primarily consists of Medicare patients, and the environment is highly competitive. It's interesting to note that even though we're in a blue-collar area and our cataract surgery volume recently has dropped, the number of premium IOLs we're implanting actually has increased. Patients still want better optics and a better lifestyle in spite of the current financial crisis.

To provide patients with their best possible vision, I make use of the entire range of IOL options, which has expanded greatly over the years. Achieving good results was relatively easy when we were dealing with only standard monofocal lenses. We just needed the postoperative refraction to be in the ballpark. Now, we have aspheric lenses and the ability to tailor correction of spherical aberration. We have multifocals, which means we're not only targeting good distance vision but near as well. If we're off a foot or two at 20 feet, it can really move the near point in or out, which can make or break the results. It can be the difference between a happy patient and an unhappy patient. We also have toric lenses, for which each company is using its own calculation formula. Therefore, if we don't input the correct values right from the start, we could have more IOL surprises with the toric lenses than we would with standard monofocals.

All of the new lenses have different technical features that we need to take into account. So to hit our target outcomes, we need to think like refractive surgeons. Our mindset must be that good is not good enough. We need to utilize all of the available tools in pursuit of perfection. Each surgical plan should be customized for the patient's personality type, his lifestyle and his eyes.

To customize appropriately, we have to perfect the variables we can control. Otherwise, the new lenses put us on a path to failure and frustration. Chief among the variables under our control are keratometry, biometry and IOL calculations.

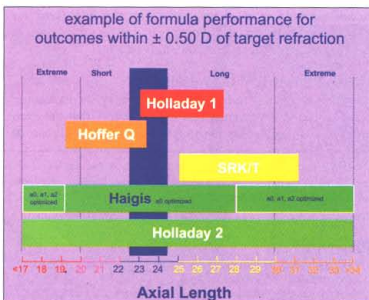


Figure 1. Unoptimized formulas for IOL calculations provide accuracy across a limited range of axial lengths.

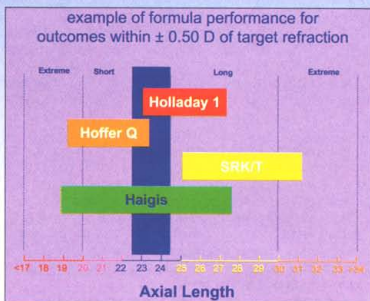


Figure 2. Simple optimization of IOL calculation formulas results in a regression to the mean. Accuracy is lost in the extremes of axial length.

Aim for Reproducible Keratometry

Primarily, keratometry drives our IOL calculations. Measuring K values accurately is nice, but since the ultimate goal is to optimize, it's best to use a method that's reproducible. Avoid using corneal topography values for some patients, keratometer values for others and IOL Master values for others. Use the same method so it's reproducible. For example, IOL Master Ks may not always be accurate, but they're reproducible. Therefore, as long as you optimize those Ks, you'll hit your target every time.

It's important to understand how a keratometer works. It measures the corneal curvature over a 3-mm ring, not over an area. Therefore, if the eye has symmetrical astigmatism, the instrument is finding a maximum and a minimum point. But if the eye has asymmetrical astigmatism, the instrument doesn't know. It attempts to find an average and produces a "best fit," which isn't necessarily the correct maximum and minimum points. Fortunately, most of the IOL formulas are based on an average.

It's also important to realize that all brands of keratometers aren't the same. They use different corneal refractive indices. When I began practicing here, we had an IOL Master just sitting in the corner, because its K values didn't match the ones being measured with our Haag Streit keratometer. That was because the IOL Master had a different corneal index of refraction in its setup menu. You need to make sure you're measuring apples to apples and oranges to oranges. Most corneal topography units also allow you to set the corneal refractive index to match the keratometers in your practice.

Use Latest Technology for Axial Length Measurement

Axial length is the other major variable used in IOL formulas. Because of measurement variability, you shouldn't use contact biometry to determine axial length. Instead, you should use immersion ultrasound, which is the gold standard, or the IOL Master.

Immersion ultrasound, which I perform with the Accutome

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