Cataract

**Difficult Power Calculation**

*BY SHERI ROWEN, MD*

**CASE PRESENTATION**

A 52-year-old black male was referred to my center from a low vision clinic in Baltimore, for a cataract surgery evaluation. The patient had been born prematurely. His right eye had no useful vision, and his left eye was nearly legally blind. The patient had worn extremely thick glasses all of his life and had always been self-conscious about his appearance. He finally had been fitted with contact lenses (-31.00-D OD and -30.00-D OS) several years ago, and his visual acuity was better than ever before. During the past 2 years, the patient had noticed a decline in his vision, and he was having trouble performing daily activities, including reading. His visual acuity was hand motion bilaterally without correction, hand motion with correction in his right eye, and 20/100 with correction in his left eye.

The patient showed no improvement with refraction, nor was the autorefractor able to pick up any signal. I possessed no information on his visual acuity before cataract, but the patient stated that the vision in his right eye had been the same, virtually useless. Notably, upon examination, he had clear corneas and cataracts bilaterally. His right eye had 4+ white nuclear sclerosis with 3+ cortical changes, and his left eye had 3+ white nuclear sclerosis and 2+ cortical changes.

The patient’s retinas showed signs of pathological myopia with large areas of retinal pigment epithelial atrophy and peripapillary atrophy. The maculas appeared thinned and stretched.

Of note were the measurements for the planned IOL implantation (Figure 1).

**HOW WOULD YOU PROCEED?**

1. What IOL or IOLS would be the best choice for the patient’s right and left eyes?
2. What would be the best way to measure his power requirements?
3. What options for visual correction would you consider?
4. What reasonable outcome would you expect?

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**Figure 1.** The IOLMaster (Carl Zeiss Meditec Inc., Dublin, CA) calculation produced a lens power result, for the right eye, that is not commercially available. Note the high minus lens required to attain emmetropia. The left eye required a -13.50-D lens.
SURGICAL COURSE
The surgery proceeded fairly routinely; I performed a topical and clear corneal procedure. The patient received a minimal amount of intravenous sedation. I prepped and draped his right eye first. Using a Diamatrix diamond knife (Diamatrix Ltd., The Woodlands, TX), I entered the eye by making a small sideport incision. Next, I instilled unpreserved 1% lidocaine in the anterior chamber and filled the eye with Viscoat (Alcon Laboratories, Inc., Fort Worth, TX). I then created a 2.5-mm uniplanar incision temporally in the clear cornea and carried it through the stroma until I entered the anterior chamber. I created a continuous curvilinear capsulorhexis and hydrodissected the cortex with a Chang hydrodissector (Katena Products, Inc., Denville, NJ).

I removed the cataract with a chop technique and the phaco handpiece. I used the I/A handpiece to extract the cortex and a silicone tip polisher to clean the capsule. Then, I instilled Provisc (Alcon Laboratories, Inc.) and, without difficulty, inserted a -4.00-D AQ5010V lens (STAAR Surgical Company, Monrovia, CA) with a cartridge into the bag. Finally, I removed the Provisc and ensured that the incision was watertight without sutures.

I performed an identical procedure on the patient’s left eye 2 weeks later.

OUTCOME
Surprisingly, the patient’s uncorrected vision stabilized at 20/80 OD and 20/50+1 OS. This outcome was better than I had ever expected based on the patient’s preoperative measurements and vision. The patient functions at work without spectacles, which he uses for long distances only. His final refraction is -7.75 + 2.50 X 110 with 20/60 BCVA OD. His refraction is -4.50 + 0.75 X 73 with 20/40 BCVA OS. The patient is ecstatic. When I tried to add correction for near vision, he was dissatisfied, but appreciated the improvement with distance correction. In this case, the conservative option worked: to leave him as is and have him use glasses for distance vision as needed.

DISCUSSION
This patient was a very unassuming young man who would have been grateful for anything that improved his vision sufficiently to allow him to continue to be a productive member of society.

Based on the IOLM aster calculations, I concluded that there was no lens currently manufactured that could correct his severe level of myopia. I did not have the option of immersion biometry at the time, a modality that I believe would have yielded the best measurement for this patient. Although I considered piggybacking two STAAR -4.00-D lenses to achieve a closer correction to the predicted values, my concern was that the patient might require additional correction to what these two lenses could offer, and their use might limit my surgical options in the future. I thought the patient might be a good candidate for an ICL (STAAR Surgical Company) placed over the -4.00-D lens once the former becomes available. It was impossible to predict how the patient’s new visual focal point would work for him, because his preoperative vision never functioned well enough for him to judge what would be appropriate in his career as a building maintenance worker. I therefore chose the somewhat conservative route and selected the highest minus lens on the market for both eyes. This turned out to be an excellent choice, because his functional vision has been totally restored and dramatically improved with this intraocular procedure. I have also found this effect in ICL patients, in whom the elimination of the minification problem of high myopia creates an outstanding improvement in BCVA. In this case, the patient uses his residual myopia for the maintenance work he does, and, because of his visual magnification at near distance, he does not require reading glasses. His functional distance vision is excellent in both eyes, even the one that was previously considered amblyopic. He can now wear normal glasses for distance and is learning to drive for the first time in his life.

Sheri Rowen, M D, is the Medical Director of the Eye & Cosmetic Surgery Center at Mercy Medical Center and the Rowen Laser Vision & Cosmetic Center in Baltimore. She holds no financial interest in any product or company mentioned herein. Dr. Rowen may be reached at (410) 332-9500 or (410) 821-5333; sherirowen@comcast.net.

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