

# OPHTHALMOLOGY 360°



## REFINING REFRACTIVE OUTCOMES OF CATARACT SURGERY

Survey results demonstrate variability in ophthalmologists' attitudes regarding surgically induced astigmatism.

BY CYNTHIA MATOSSIAN, MD

*Welcome to another edition of "Ophthalmology 360." This is a monthly column put together by the members of the Cornea, External Disease, and Refractive Society (CEDARS) and the American Society of Progressive Enterprising Surgeons (ASPENS). As cataract surgery continues to evolve, and as outcomes continue to improve, many surgeons now consider themselves refractive cataract surgeons. Targeting emmetropia and spectacle independence has moved to the forefront. Surgeons are now paying closer attention to a previously overlooked component: surgically induced astigmatism (SIA). Neutralizing SIA is critical to obtaining the best outcomes. This month, Dr. Cynthia Matossian discusses her method for addressing SIA. We hope you enjoy the discussion.*



— Section Editor Kenneth A. Beckman, MD



Not that long ago, the topic of SIA was much more commonly discussed in the context of cataract surgery. As more and more ophthalmologists started to think about cataract surgery as a refractive procedure, surgeons became increasingly aware of how the size, shape, and location of their incisions and the maneuvers they performed in the OR could affect the shape of the cornea and thus the refractive outcome. With the introduction of microincisional techniques, refinements in instruments, and the advent of laser cataract surgery, there seems to be less emphasis placed on SIA today. In addition, because the use of intraoperative aberrometry automates many of the steps that require an SIA calculation, some surgeons may believe it is unnecessary to perform the latter.

SIA remains as relevant today as it did just a few years ago, however, despite technological advances. I could even make the case that SIA is more important than ever before;

because the instruments and technologies surgeons use in the OR increase the chances of hitting the refractive target accurately, consistently, and precisely, a greater emphasis must be placed on the quality of the resulting vision. Moreover, not every surgeon has access to intraoperative aberrometry.

Mitigating the effect of SIA in cataract surgery reduces the potential for a refractive surprise, and understanding one's SIA may be even more important for patients being considered for a toric implant. Because the goal of refractive cataract surgery is to minimize residual cylinder, the ophthalmologist needs to consider SIA, which may compound the refractive error or negate the effect of the implant. Many of the formulae used for toric power calculation and axial alignment use SIA; in addition, some of the nomograms for arcuate incisions require the operator to input his or her SIA.

To ensure that patients have the best chance of achieving the desired refractive outcome, ophthalmic surgeons may

need to rethink the importance of SIA. Accounting for SIA in presurgical calculations, especially in toric IOL patients, may be the final step in achieving the desired outcome.

### SURVEY RESULTS

I was curious to learn how some of my colleagues were using SIA in their own surgeries, so I conducted a short survey of the CEDARS-ASPENS membership. I was able to collect answers from 22 top anterior segment surgeons. Although these are admittedly small numbers, I found the results rather interesting, because they show a range of attitudes with regard to SIA and variety in how these individuals measure the outcomes of their surgeries.

The first interesting finding was that only 17 respondents said they use a personalized SIA measure. Presumably, some of the “no” responses reflect surgeons who use wavefront aberrometry during their surgeries. It is equally plausible that some people may be using an assumed amount of SIA.

Those who were using a personalized SIA figure calculated it in a variety of ways. Five surgeons used an online calculator (the survey specifically asked about use of [www.siacalculator.com](http://www.siacalculator.com)). Seven specified a different approach, ranging from the use of spreadsheets, pre- versus postoperative topographies, retrospective data analysis, Holladay software (Holladay Consulting), and intraoperative aberrometry (the surgeon specifically mentioned the ORA System [Alcon]).

In my practice, I calculate the SIA for each eye, because I feel this approach increases accuracy. Anecdotally, many surgeons who calculate SIA for the patient’s left and right eyes report variance in the numbers. Among the survey respondents, 41% said they calculated SIA for each eye, and 58% did not. Interestingly, in the former group, there were differences in the reported measure. One surgeon, for example, reported an SIA of 0.23 D OD versus 0.52 OS. Those who said they use a combined SIA reported a range of 0.10 D to 0.40 D.

I also asked surgeons how often they optimize their SIA: 25% said they did it once a quarter, 8% said biannually, and 66% said they did the calculations once a year. Some interesting comments were provided with responses to this question. One surgeon reported always optimizing the SIA with aberrometry, and another optimizes the SIA upon enacting any change in incision size or methodology.

### CONCLUSION

The results of my survey are far from definitive, but they show that there are still many schools of thought on the importance of SIA, how it is measured, and how frequently it should be recalculated.

My view is that SIA amounts should be optimized frequently, but it is really only useful to do so when all the other surgical variables are consistent. If the surgeon is continually tinkering with incision size or architecture, changing instruments, or placing the patient in different positions, the

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accuracy of the SIA calculation will suffer. Once the surgeon is comfortable with his or her technique, it is worthwhile to evaluate and re-evaluate SIA to add statistical power to the calculation.

I also think it is valuable to measure SIA separately for right and left eyes. As one respondent to the survey demonstrated, there can be important intereye differences; although it may not reach the level of statistical significance, the variance can be clinically significant. Even the small numbers reported can influence the choice of a toric implant or a limbal incision, or it could mean a difference in the power of the toric IOL selected.

Intraoperative aberrometry does provide a means by which to avoid using SIA calculations in patients receiving a toric IOL. Although technology is a safety net, it may not be a good idea to let it do all the work. I would argue that evaluating SIA using pre- and postoperative keratometry values, regardless of whether aberrometry is used, will provide a more complete understanding of how accurately the refractive outcome is achieved.

If nothing else, I would hope this survey encourages anterior segment surgeons to think about the importance of SIA in their own practices. As ophthalmologists strive to attain greater accuracy, even small amounts of SIA can have an important effect on their ability to deliver quality postsurgical vision. ■

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