New technology allows pursuit of better astigmatism correction

One surgeon explains how the Cassini TCA has changed her preoperative work-up

P. Dee Stephenson, MD

> **Management of astigmatism during cataract surgery is critical to allow the best outcomes. This month, P. Dee Stephenson, MD, FACS, ABES, FSEE, discusses her technique for managing astigmatism. We hope you enjoy the discussion.**
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Toricity is the elephant in the room. It is an aberration that affects depth of focus, makes patients spectacle dependent and is a critical factor in modern day cataract surgery. In fact, it is fundamental to all refractive cataract surgery. If you want to correct presbyopia, you need to correct astigmatism to allow spectacle independence. We know, based on a database of more than 6,000 cases, that 50% to 52% of those patents have at least 0.75 D of cylinder and that 22% have 1.5 D or greater of astigmatism. We also know that 51% have with-the-rule astigmatism anteriorly and 87% have with-the-rule astigmatism posteriorly. This is the most important information when improving patient outcomes and satisfaction.

My goal has always been to make patients happy with less stress for me in the OR. The Cassini Total Corneal Astigmatism functionality (TCA, i-Optics) has upped my game and made my life easier. Over the last year, I have changed my preop work-up. Preoperatively, I use the IOLMaster 700 (Carl Zeiss Meditec), iTrace (Tracey Technologies) and Cassini TCA, and in the operating room, I use ORA with VerifEye+ (Alcon), along with Lensar Streamline with iris registration from Cassini and automatic cyclotorsion adjustment. Of course, my safe zone is when the preop information is confirmed with the intraoperative information.

The Cassini differentiates from a crowded space of corneal measuring devices. First, it uses patented multicolored LED point-to-point ray tracing to provide a GPS-like analysis of the cornea along with high-resolution images utilized for surgical guidance. There are a total of 679 LEDs; 224 red, 224 green, 224 yellow and seven white. The unique measuring principle enables highly accurate and repeatable measurements of the total corneal astigmatism. The second major difference is Cassini measures the posterior cornea using second Purkinje reflections and provides a total corneal astigmatism measurement. This information has been an incredible addition to my armamentarium. The multicolored LED coverage is equal across the entire cornea, leaving no space for central scotoma. The accurate axis and magnitude of astigmatism play a vital part in the correct selection and positioning of a toric IOL. I go into surgery feeling every patient has a customized plan vs. simply applying a population-based nomogram.

I did a retrospective study to compare corneal astigmatism measurements in normal eyes preoperatively using the IOLMaster and the Cassini TCA to determine if Cassini TCA data better correlates to intraoperative aberrometry when compared with anterior data.

Keratometric measurements were taken with each device. The axis and magnitude of astigmatism measurements were analyzed. Predicted surgically induced astigmatism was factored in when comparing preoperative to intraoperative measurements. The Pearson correlation coefficient calculated between the preop topography measurements and intraoperative aberrometry (ORA) is described on the next page.

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Figure 1. Case study implantation in 66-year-old man with astigmatism

1 = Perfect correlation
0.7 = Strong correlation
0.5 = Moderate correlation
0.3 = Weak correlation

The Cassini TCA axis correlation compared with ORA was 0.96. The IOLMaster axis correlation compared with ORA was 0.92. The Cassini TCA magnitude correlation compared with ORA was 0.72. The IOLMaster magnitude correlation compared with ORA was 0.56.

I then analyzed 21 eyes that were plano sphere and retrospectively compared lens selections from ORA, Cassini TCA, Cassini anterior and IOL Master to determine which devices provided the best recommendations.

RESULTS

Results revealed postop prediction residual cylinder within 0.5 D as follows:

Cassini: TCA: **90.5%**
ORA: **90.5%**
Cassini anterior: **85%**
IOLMaster: **81%**

We know that correcting residual corneal astigmatism to less than 0.5 D will lead to great visual benefits. My pursuit to correct astigmatism is on its way to the holy grail. To match my preop plan with my intraop plan will close this circle, and Cassini TCA is helping me get there.

REFERENCES

Koch DD, et al. J Cataract Refract Surg. 2012;doi:10.1016/j.jcrs.2012.08.036.
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