We thank all our dedicated contributors to our clinical studies

When it comes to managing astigmatism, posterior cornea matters

- In Koch et al., anterior corneal measurements underestimated Total Corneal Astigmatism (TCA) by 0.22 D @ 180° and exceeded 0.50 D in 5% of eyes.

- Selecting toric IOLs based on anterior corneal measurements alone could lead to overcorrection in eyes that have WTR astigmatism and undercorrection in eyes that have ATR astigmatism.

Failing to take into account posterior corneal astigmatism (PCA) during cataract surgery may lead to incorrect estimation of total corneal astigmatism (TCA). Research has shown that selecting toric IOLs based on anterior corneal measurements could lead to over-correction in eyes that have with-the-rule astigmatism and under-correction in eyes that have against-the-rule astigmatism, but there seems to be a large variety in the relationship between anterior and posterior astigmatism.

What this means is that patients undergoing cataract surgery would benefit from individual measurements of the TCA (anterior and posterior) rather than using a generic nomogram. Cassini provides the personalized data that enables the ophthalmologist to create unique, personalized surgical plans for each and every patient. A study by Warren Hill demonstrated that over 50 percent of patients with cataract have anterior corneal astigmatism that falls within the range correctable by toric IOL, but nomogram estimates of PCA can lead to intra or post-operative refractive surprises. Taking into account the individualized measurements of TCA means that physicians are better able to select the most appropriate lens and axis for their patient, and provide better outcomes, which should ultimately lead to a higher volume of premium patients.

Accuracy of Cassini TCA measurements

Comparison of Placido disc combined slit-scanning topography (Orbscan), Optical low-coherence reflectometry (OLCR) (Lenstar) and Cassini Total Corneal Astigmatism (TCA) to manifest refraction in measuring pseudophakic eyes.

The objective of this study is to test the accuracy and reliability of Cassini Total Corneal Astigmatism (TCA) measurements.

The astigmatism from pseudophakic eyes was measured by Cassini TCA, Orbscan, Lenstar and subjective manifest refraction (WR) in 47 pseudophakic eyes of 39 patients. The astigmatic values obtained from all the methods were compared using power vector analysis.

Compared to manifest refraction, the centroid of Orbscan, Lenstar Cassini Anterior Sim K and Cassini TCA was (-0.57, 0.01), (-0.27, 0.10), (-0.29, 0.06) and (-0.10, 0) respectively.

In conclusion, Cassini TCA consistently reduced the error in corneal astigmatism compared to any other anterior only devices.

Precision of Cassini TCA measurements

Repeatability of Corneal Astigmatism Measurements (Magnitude and Axis) Evaluated With Cassini TCA.

The objective of this study is to test the accuracy and reliability of Cassini TCA measurements.

A total of 48 eyes with lower range astigmatism (0.82±0.45D) between 0.09DC to 2.03DC (based on Cassini anterior measurement) was recruited for the repeatability study. Of these patients, 21 were virgin corneas with astigmatism range of (0.69±0.32D) between 0.19DC to 1.20DC and 27 were post-refractive corneas with astigmatism range of (0.92±0.51D) between 0.09DC to 2.03DC. Cassini TCA shows good repeatability in these lower range subjects especially for postrefractive corneas. This may be of particular interest for toric intraocular lens planning.
The contribution of the posterior cornea to the Total Cornea Astigmatism

Accurate measurement of corneal astigmatism in cataract patients is crucial for achieving optimum postoperative uncorrected visual acuity and patient satisfaction, especially with the implantation of Toric IOLs. Reported clinical outcomes using measurement of anterior corneal astigmatism alone appear suboptimal\(^1\)-\(^3\). Research suggests that devices measuring anterior cornea only, overestimate the required toric IOL cylinder when the patient has with-the-rule (WTR) anterior corneal astigmatism, underestimate required IOL power when the patient has against-the-rule (ATR) anterior corneal astigmatism\(^4\). When it comes to individual patients, the contribution of the posterior cornea to the Total Corneal Astigmatism remains unpredictable, especially for post-refractive corneas. Below are some compelling patient examples that do not fit a nomogram and where Cassini TCA measurement could help to avoid a refractive surprise.

**WTR cornea case.**
TCA is higher than Anterior astigmatism

**WTR remain the same.**
TCA is lower than Anterior astigmatism only

**Post-refractive oblique astigmatism case.**
TCA is lower than Anterior astigmatism only

**Post-refractive oblique astigmatism case.**
TCA is higher than Anterior astigmatism only

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Cassini Specifications

**True Axis**
- Multicolor LED imaging technology combined with 2nd Purkinje imaging technology.
- Anterior Axis repeatability within 3 degrees.

**True Magnitude**
- Diopter range 4.00D – 171.00D (Anterior)
- Display K-values per zone 3/5/7/9mm (Anterior)
- Keratometric indices display in D (diopters) or mm (millimeters)

**True Capture**
- Auto Capture with joystick positioning
- Measurement Quality Factor parameter
- Auto pupil detection
- Topographic indices - E (shape factor), e (eccentricity), Q (asphericity), p (Bom factor)
- Keratoconus indices - SAI (Surface Asymmetry Index), SRI (Surface Regularity Index)

**True Accuracy**
- Submission accuracy due to color LED triangulation technology < 0.8μm (Anterior)

**True Technology**
- External Color Photography
- Anterior/Topographic maps - Axial, Refractive, Tangential, Elevation, Corneal Aberrations, Recorded color HD external color photography
- Multiple color spectrum options
- Incorporated patient management program
- USB, Direct print, PDF, JPG, 3rd party output connectivity
- Masque and photopic pupillometry

For more information:
Cassini USA • usa@i-optics.com • +1 888 660 6965
Cassini International • info@i-optics.com • www.i-optics.com