

The LENSTAR LS 900 with the T-Cone Toric Surgery-Planning Platform: An All-in-One Solution for Toric IOL Implantation

Premium biometry, precise measurement of corneal astigmatism and axis location, and topography maps are keys for successful planning of toric IOL implantation. The LENSTAR with the T-Cone Topography Add-On provides all of these capabilities in a single device.

Achieving the best possible refractive outcomes is the aim of every cataract surgeon, and correction of corneal astigmatism is one key factor in this pursuit. With the increased availability of toric IOL models and cylinder power ranges, cataract surgery with toric IOL implantation is likely to become the standard of care for the correction of regular astigmatism. This trend is reflected in the annual surveys conducted by the ASCRS and ESCRS; of the members surveyed, more than 85% in the United States and more than 60% in Europe implant toric IOLs.¹

To achieve the best refractive outcomes with toric IOLs, precise biometry and measurement of corneal astigmatism and axis location, sophisticated planning of the procedure, and accurate transfer of the surgical plan to the operating room (OR) are key. With the T-Cone toric surgery-planning platform (Figure 1), the LENSTAR provides a sophisticated tool set for the cataract surgeon to plan the procedure on one device and in a single process.

ASTIGMATISM AND AXIS MEASUREMENT

The measurement of preoperative corneal astigmatism and axis location is crucial for accurate planning of toric IOL implantation. The LENSTAR's automated dual-zone keratometry (K) with 32 marker points on two concentric rings (2.3 and 1.65 mm in diameter) provides highly accurate axis and astigmatism measurements for planning toric IOL implantation. This was also



Figure 1. The LENSTAR LS 900 with the T-Cone topography add-on mounted. The planning platform for toric IOL implantation.

shown in a recent study by Gundersen et al,² in which more than 90% of patients achieved 20/25 or better BCVA after toric IOL implantation. This percentage is better than what has been reported with other optical biometers.³

With the T-Cone topography add-on, the LENSTAR provides K readings that are equivalent to those from dual-zone keratometry, now based on even more data.⁴ The radii of curvature and axis are derived from a best-fit ellipsoid to the Placido rings reflected from the cornea in the measurement area.

GREATER USABILITY AND SAFETY

T-Cone provides topography maps of the central 6-mm optical zone of the cornea for axial and tangential curvature and elevation (Figure 2).

Topography is essential in order to

confirm a patient's regular astigmatism and to double-check the axis location provided with the K readings. The LENSTAR with the T-Cone provides this information in a single measurement process on one device.

The success of toric IOL implantation depends on highly accurate preoperative measurements, the surgeon's knowledge of the surgically induced astigmatism (SIA), and IOL placement during surgery. Only if the SIA is known, then it is possible to optimize the incision location and IOL position to achieve minimum residual astigmatism. Several tools for SIA calculation are accessible on the Internet; Haag-Streit recommends the use of the calculator created by Warren E. Hill, MD, available at <https://sia-calculator.com/>.

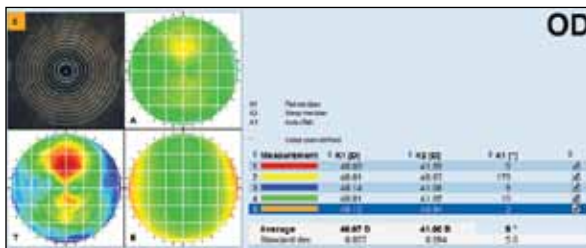


Figure 2. A screenshot of the topography map overview with the Placido image, the axial and tangential elevation maps, and the K readings summarized.

OPTIMUM TORIC IOL PLANNING

The T-Cone toric surgery-planning platform, available as an option on the LENSTAR optical biometer, provides precise preoperative measurements and allows sophisticated planning of toric IOL implantation on the LENSTAR. The EyeSuite IOL toric planner is also available as an option for the standard LENSTAR without the T-Cone.

Using the LENSTAR's advanced biometry and precise measurement of astigmatism and axis location, paired with information on SIA and the preferred incision location area, the EyeSuite IOL toric planner calculates the optimum cylinder power and orientation of the toric IOL and the incision location to achieve minimal residual astigmatism. Optimization of the incision position is based on vector analysis of the measured corneal astigmatism, the IOL cylinder powers available, and the SIA information. To maximize clinical outcomes, the optimization algorithm aims for the lowest possible matching IOL cylinder power, also improving the procedure's safety and minimizing the effect of toric IOL misalignment.

All proposed values may be reviewed and adapted by the user in the surgical planner, which displays the effect of changes in real time on a high-resolution image of the patient's eye taken during the LENSTAR's measurement acquisition process (Figure 3). Additionally, the user may draw lines to characteristic anatomic landmarks on the image, obtaining the angle measurement of the respective features and allowing intraoperative orientation.

The toric plan and surgery sketch may be printed and taken to the OR (Figure 4). For optimum usability of the sketch during surgery, all data printouts are provided right side up and upside-down for easy readability, independent of the surgeon's working position. As with every EyeSuite application, it is possible to network the software, which enables an IOL calculation station to be run on a computer in the OR; this further enables last-minute adaptations of the calculation and planned procedure to be made if necessary.

The toric surgery-planning platform may be used for any brand and type of toric IOL with the necessary input



Figure 3. A screenshot of the toric surgery-planning platform. All relevant information is available on the high-resolution image of the eye. The right side shows the optimization tab with the sine plot of the possible incision locations.

data available (IOL calculation constants, cylinder powers in the IOL and corneal plane, and recommended power ranges to correct given astigmatism).

CONCLUSION

With the LENSTAR and T-Cone toric surgery-planning platform, Haag-Streit provides surgeons with an integrated solution for sophisticated planning of toric IOL implantation. Based on biometry data of the whole eye and using the latest IOL calculation methodologies such as the Olsen formula, the EyeSuite IOL toric planner allows optimized planning of the entire surgical procedure, from incision placement, IOL orientation, and cylinder power choice to the selection of intraoperatively available landmarks on a high-resolution image of the eye and the surgical planning sketch. The LENSTAR LS 900 is an ideal choice for sophisticated cataract surgery. ■



Figure 4. A printout of the toric plan, ready to be used in the OR, with all available data in right side up and upside-down views to allow use of the sketch independent of the surgeon's operating position.

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3. Mendicute J, Irgoyen C, Aramberri J, et al. Foldable toric intraocular lens for astigmatism correction in cataract patients. *J Cataract Refract Surg*. 2008;34:601-607.
4. Haag-Streit AG. Study of Clinical Performance of Corneal Topography Measurement Using an Optical Biometer. In: *ClinicalTrials.gov* [Internet]. 2013. Available at: <http://clinicaltrials.gov/show/NCT01861925>. NLM Identifier: NCT01861925.