

# Comparison of the Enhancement Rates Of Astigmatism Correction With Toric IOLs Aligned Using IntelliAxis Refractive Capsulorhexis vs. ORA

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**T**oric intraocular lens (IOL) implantation at the time of cataract surgery yields excellent results for correcting preexisting corneal astigmatism. One key to success is the precise alignment of the toric IOL on the exact astigmatism axis. This is essential when it comes to achieving optimum results and, ideally, spectacle independence.

However, precisely placed marks have remained a lingering challenge that can impact these results. The LENSAR® Streamline® IV technology with IntelliAxis Refractive Capsulorhexis® (IntelliAxis) increases accuracy and precision through its ability to create a pair of capsular marks on the capsular rim during capsulotomy. These are used to guide the precise alignment of the IOL by way of iris registration transferred wirelessly to the laser. This will eliminate the potential for parallax error and allows for postoperative confirmation of the alignment.

Intraoperative aberrometry (ORA) allows the surgeon to perform real-time pseudophakic refraction and position the toric IOL to the suggested position until “No Rotation Recommended” (NRR). However, the use of IntelliAxis introduces even more precision into the process—and decreases the margin of error.

Whereas traditional marks made with ink can fade or smudge, these custom marks remain in place, allowing for a level of predictability that previously was not possible.

## Preventing Refractive Surprises

In general, toric IOLs provide excellent refractive outcomes, but refractive surprises may occur that can lead to patient dissatisfaction. Ocular surface abnormalities, such as dry eye disease, epithelial basement membrane dystrophy, and Salzmanns’ degeneration, are out of the surgeon’s control.

It is imperative to maximize the ocular surface account and not ignore posterior corneal astigmatism—but also get the IOL on the correct axis. Surgeons need to account for intraoperative cyclorotation and understand that preoperative markings or ORA readings may be inaccurate.

## IntelliAxis vs. ORA:

### A Comparison of Surgeries

Previous studies have documented the visual and refractive outcomes with toric IOLs aligned using femtosecond laser image-guided iris registration versus ORA. In a recent informal study conducted in my practice, enhancement and second-procedure

rates and refractive outcomes were compared with toric IOLs aligned with IntelliAxis versus ORA.

The study also looked at an economic analysis and the cost of performing the enhancements for the practice.

The practice—Eye Surgeons of Indiana—had used ORA for 100% of toric IOL alignments until the IntelliAxis was adopted in May 2018. IntelliAxis has been used for 100% of its toric cases since its adoption at that time.

Performing a retrospective chart review of case records, the study only looked at healthy eyes, same surgeons, and cases with no financial barriers for a second procedure. Patients who were dissatisfied and had residual astigmatism of greater than half a diopter and chose to undergo a second surgery were analyzed for the enhancement rate.

The need for enhancement was guided by patient’s satisfaction and not an objective visual acuity criterion. The included patients ranged in visual acuity from 20/20 to 20/100. Patients who had a VA of 20/30, and satisfied and patients who were primarily spherical, were excluded.

The IntelliAxis group had femtoassisted surgery, OPD-III was used for topography and iris registration,

FIGURE 1. ECONOMIC ANALYSIS: INTELLIAXIS vs ORA

<b>Incur tangible and intangible costs to both the patient and the surgeon:</b> <ul style="list-style-type: none"> <li>• Additional Time and Resources: Tech and Diagnostic</li> <li>• Increased Chair Time for the Surgeon</li> <li>• Increased Patient Inconvenience</li> <li>• Patient Discouragement</li> </ul>		<b>Direct costs: all patients elected for astigmatism "package"</b> <ul style="list-style-type: none"> <li>• LVC ( PRK or Lasik).....\$1,000</li> <li>• IOL Rotation .....\$700</li> <li>• Asigmatic Keratotomy.....\$200</li> </ul>	
<b>Current Annual Surgical Volume</b>		<b>734 Toric IOL Cases per Year</b>	
<b>Difference in Enhancement Rates</b>		<b>△ = - 5.7% IntelliAxis-L vs ORA</b>	
<b>Average Enhancement Cost per Eye</b>		<b>\$1,319 per Enhancement<sup>1</sup></b>	
<b>Cost Savings per Year</b>		<b>\$55,182</b>	
<b>Cost Savings per Toric Case</b>		<b>\$75.18</b>	

<sup>1</sup> The model assumes an equal distribution of enhancement techniques employed for vision correction.

and the IOLs were aligned on the capsular marks. There were 1,018 eyes analyzed in this group between July 2018 and December 2019.

The ORA group underwent manual surgery, ORA, and the IOLs were aligned until the "NRR" endpoint was reached. There were 773 surgeries in this group between January 2016 and December 2018.

Pre-enhancement refractive data was similar in both the ORA and IntelliAxis groups. Both groups showed comparable values of spherical equivalent and astigmatic cylinder before undergoing enhancement procedures.

Primary endpoint results concluded that 7.1% of patients in the ORA group required a second procedure or enhancement, while only 1.4% required this in the IntelliAxis group.

In each group, the majority of patients requiring an enhancement procedure received laser vision correction.

Although inconvenient, postenhancement visual acuities were excellent in both groups.

### An Economic Analysis of IntelliAxis vs. ORA

The study also did a comprehensive review of the economic effect that second procedures and enhancements had on patients and practices.

The need for second procedures and enhancements can be a matter of both tangible and intangible costs to patients and surgeons.

When alignment is not precise and enhancement procedures are necessary, additional time and resources are required, including increased chair time for the surgeon and additional time in the OR.

Upon chart review, it is noted that each enhancement averages \$1,319, translating to a cost savings of \$55,182 per year with IntelliAxis.

But most significant, there is also an increase in patient discouragement when a second procedure is necessary. There is naturally downtime in between first and second procedures, during which the patient is unhappy with their results. They must also schedule follow-ups and deal with the inconveniences associated

with undergoing a second procedure.

### A Win for All

In conclusion, toric IOL alignment using automated image-guided iris registration of the LENSAR's Streamline IV with IntelliAxis may reduce the need for enhancement procedures and increase patient satisfaction as compared with toric IOL alignment guided with ORA.

A reduction in the enhancement rate can represent significant time and cost savings for the practice. In addition, a reduction in the proportion of patients who require enhancement procedures can also improve overall efficiency for the practice.

In the end, it is a win for both the patient and the practice when enhancement and secondary procedure rates are reduced using the LENSAR IntelliAxis.

