Astigmatism correction and optimization of accuracy with a dual-pulse femtosecond laser during cataract surgery

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DISCLOSURES

Company Name	Relationship
Centricity Vision	C) Consultant/Advisor, L) Lecture Fees and R) Research/Grant Support
abbvie	C) Consultant/Advisor and S) Spouse/Partner
Ace Vision Group	C) Consultant/Advisor and O) Equity Owner/Investor
Bausch and Lomb	C) Consultant/Advisor and R) Research/Grant Support
BVI	C) Consultant/Advisor
Alcon	C) Consultant/Advisor
Hu-Med Technologies	C) Consultant/Advisor, O) Equity Owner/Investor and P) Patent/Royalty
iSense Therapeutics	O) Equity Owner/Investor
J&J	C) Consultant/Advisor and R) Research/Grant Support
New World Medical	R) Research/Grant Support
Spect Inc	C) Consultant/Advisor and O) Equity Owner/Investor
Tarsus Pharmaceuticals	C) Consultant/Advisor, O) Equity Owner/Investor and P) Patent/Royalty
Trefoil	C) Consultant/Advisor
Visus Therapeutics	C) Consultant/Advisor
Zeiss	C) Consultant/Advisor
LensAR	C) Consultant/Advisor
Greenman Vision Inc	C) Consultant/Advisor and O) Equity Owner/Investor
Horizon Surgical Systems Inc	O) Equity Owner/Investor

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INTRO

Arcuate keratotomy (AK) is a common method of reducing low-to-moderate levels of astigmatism at the time of cataract surgery.

The introduction of femtosecond laser technology to AK has improved the precision of incision parameters (arc length, diameter, and depth of incisions).

The LENSAR's ALLY femtosecond laser is a dual-pulse laser with 6 fixed Scheimpflug cameras that allow faster imaging.

The arcuate keratotomy planning software of the LENSAR laser system allows the surgeon to preprogram the preferred nomogram into the laser system.

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PURPOSE

To optimize surgeon surgically induced astigmatism and arcuate incisions with vector analysis with the ALLY Adaptive Cataract Treatment System (LENSAR, Orlando, FL) to ensure targeted outcomes.

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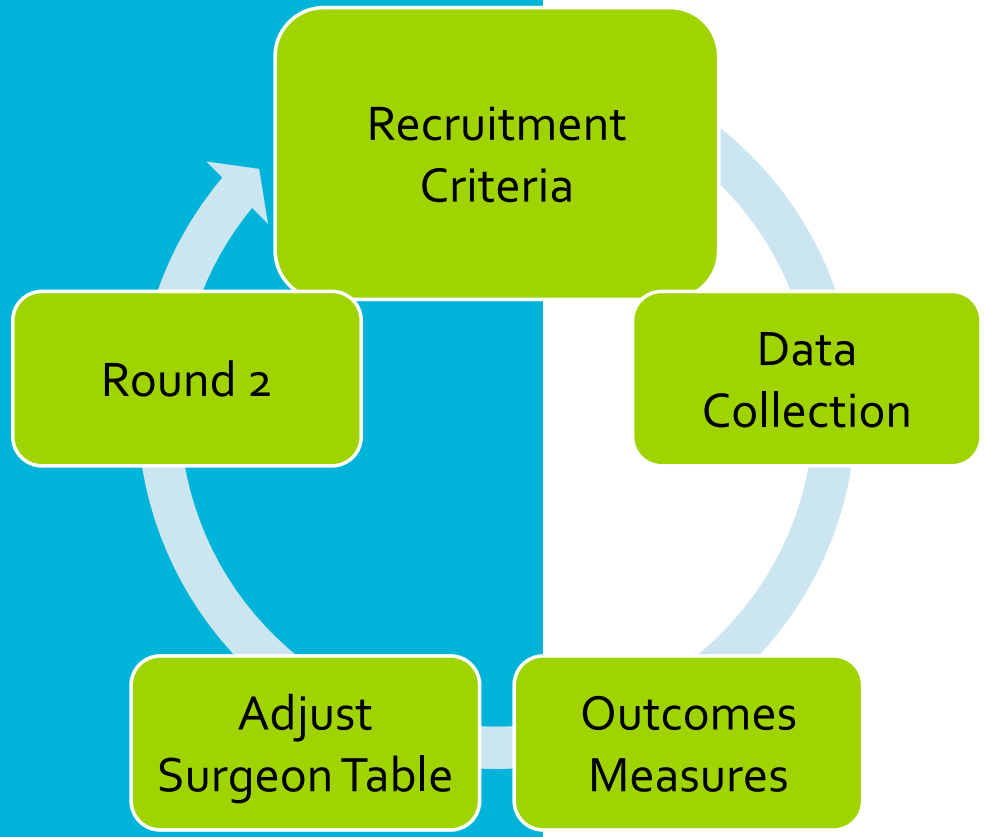
METHODS



- Single site 2 surgeons
- For optimization purposes, only eyes with no history of refractive surgery or VA limiting pathology >20/40
- Included pre-op data, 4-6 week post op data, MR and keratometry, Pre and post op astigmatism, post op MRSE, and UDVA

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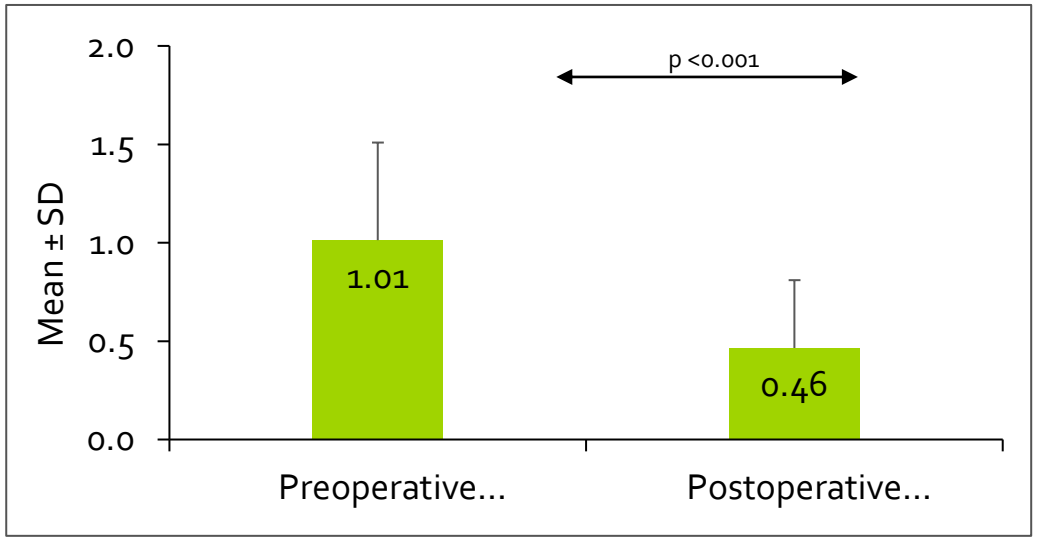
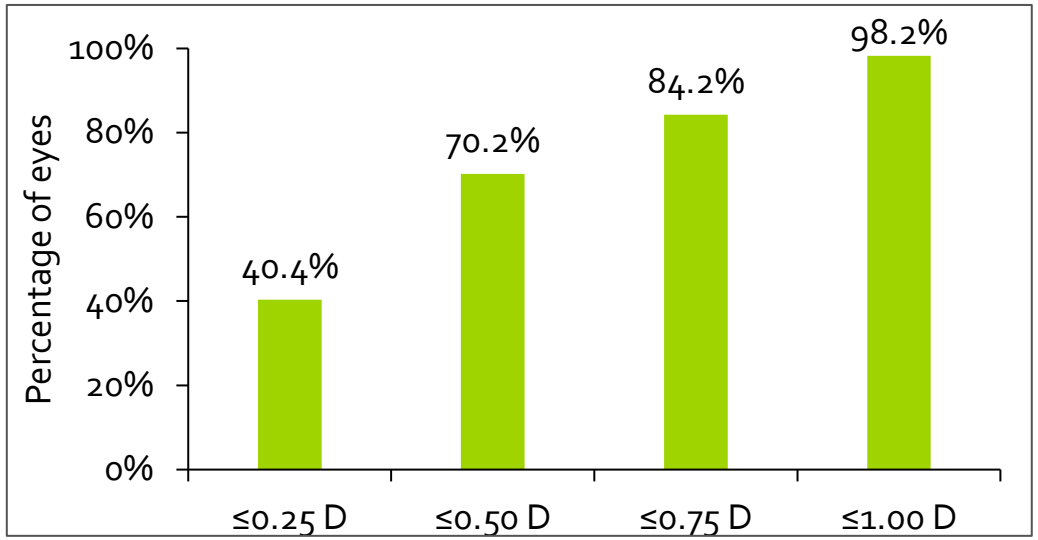
Preop Corneal vs Postop Refractive Astigmatism





With a statistically significant reduction in mean astigmatism from preop to postop, 70.2% of the eyes achieved postoperative cylinder within 0.5 D.

RESULTS

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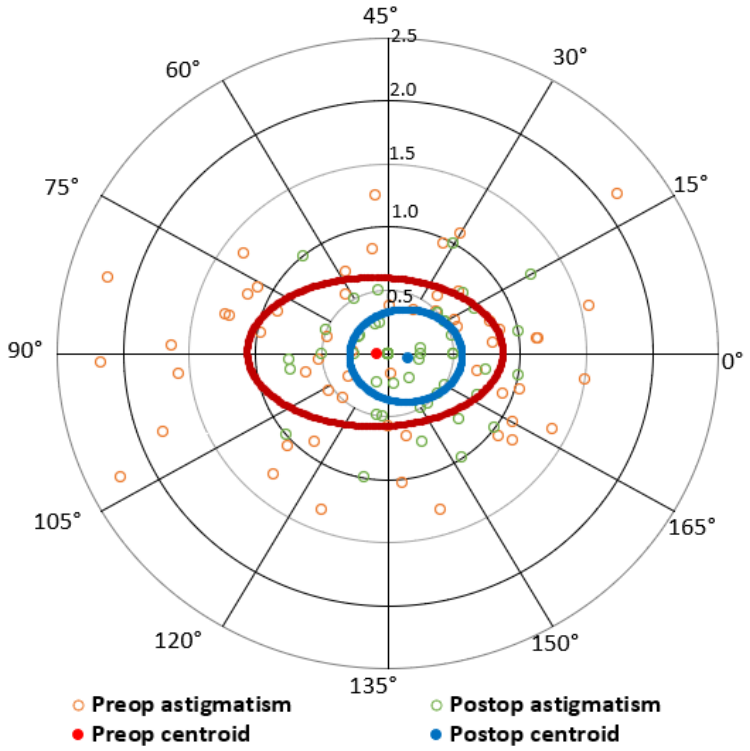
Double Angle Vector Plot



- The centroid of postop astigmatism was closer to 0.0 D and had a smaller vectoral standard deviation (represented by an ellipse).
- Blue centroid illustrates under correction of against-the-rule
- Surgeon table will be adjusted to accordingly

RESULTS

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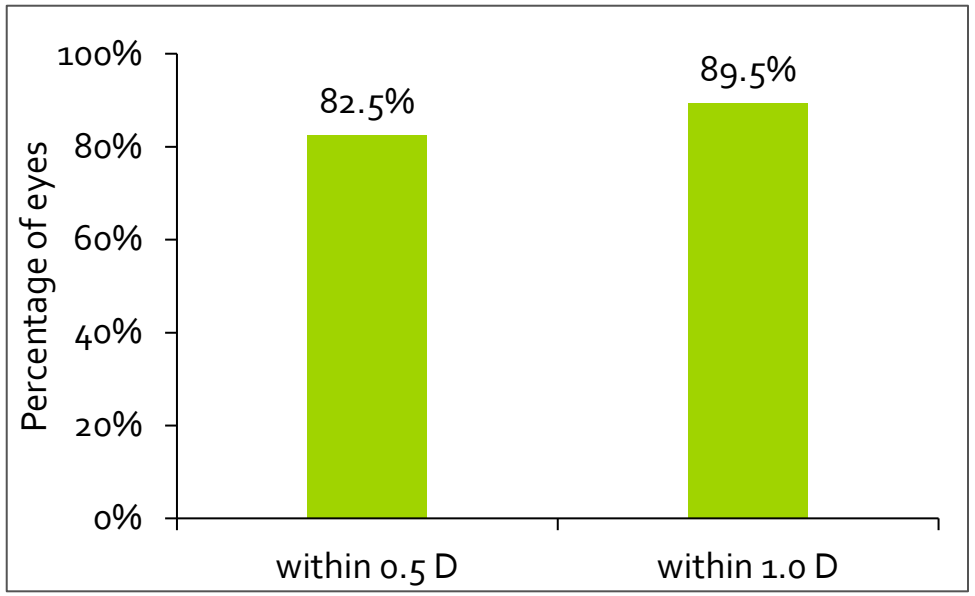
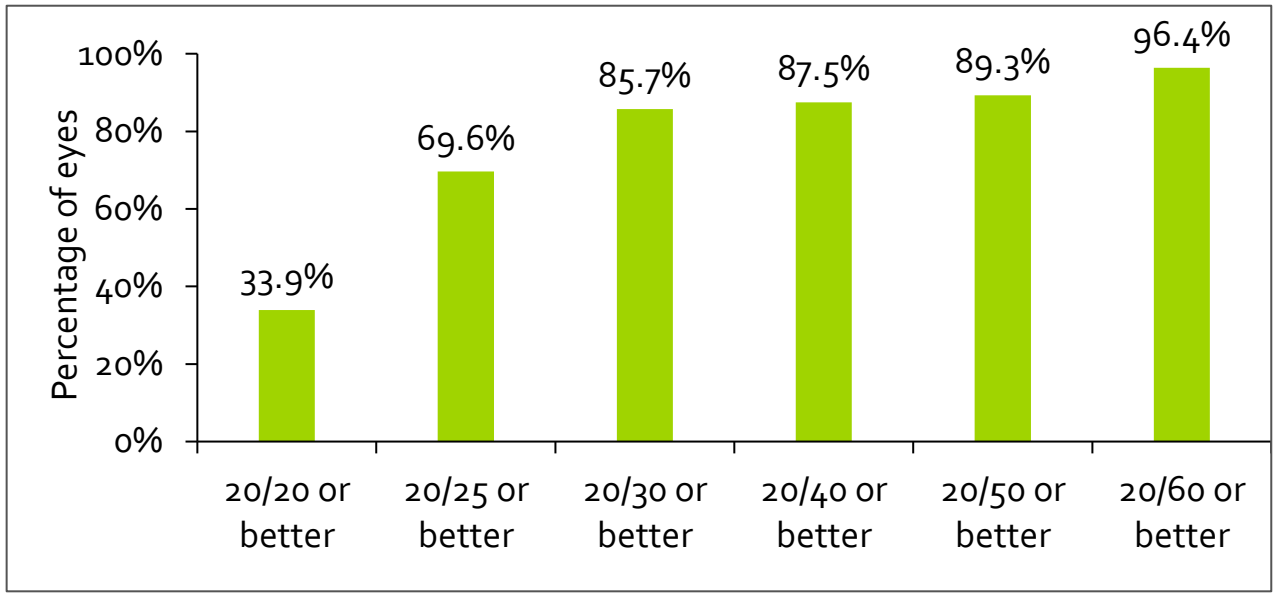
Postop MRSE vs Postop UDVA

Mean: -0.20 ± 0.80 D



Mean: 0.16 ± 0.25 logMAR



Postoperatively, 82.5% of eyes had MRSE within 0.5 D, and 85.7% achieved UDVA of 20/30 or better.

Results

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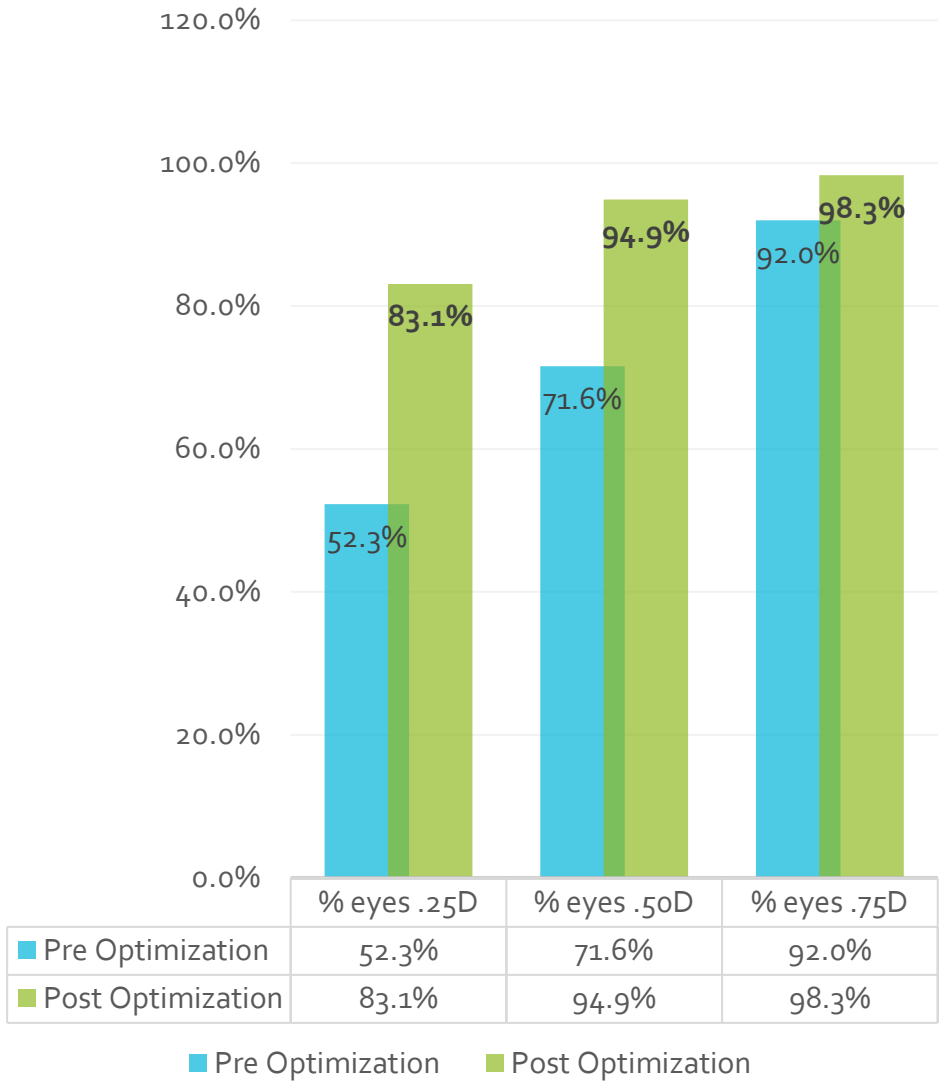

DeRojas Pre-optimization and post-optimization – Modified Wortz-Gupta

- 71.4% of eyes achieving refractive cylinder within 0.5 D using the Wörtz-Gupta formula pre-programmed into the laser.
- After optimization of the Wörtz-Gupta outcomes improved considerably, with 95% of eyes achieving residual refractive cylinder within 0.5 D.

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DISCUSSION

The Wörtz-Gupta formula is an AK nomogram developed specifically for femto laser AKs.

In the present study, ALLY femtosecond laser-assisted AKs created using the default Wörtz-Gupta formula resulted in good astigmatic outcomes. Adjustments to nomogram are needed to address under correction ATR.

Postoperatively, 70.2% of eyes achieved ≤0.50 residual refractive cylinder. Results are expected to improve with additional data collection and analysis. After adjusting.

- These outcomes are comparable to the preoptimization results achieved by De Rojas et al. (71.4% of eyes achieving refractive cylinder within 0.5 D) using the Wörtz-Gupta formula pre-programmed into the laser.
- When the Wörtz-Gupta formula was further optimized by De Rojas et al., outcomes improved considerably, with 95% of eyes achieving residual refractive cylinder within

Similar to the De Rojas study, optimizing the AK nomogram in the present study is also expected to further improve the outcomes.

THANKYOU