

INTRAOPERATIVE ABERROMETRY ANALYSIS OF IRIS REGISTRATION-GUIDED FEMTOSECOND LASER CAPSULAR MARKS TO GUIDE TORIC IOL ALIGNMENT

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DISCLOSURES: Alcon-A,B, Allergan- B, Atia -A,B, Bausch + Lomb- A,B,C, Bruder Healthcare-A,B, Cassini- A,B,C, Dompé -A, C, ESWIN-A,B, Guardion Health Services-A,B, LENSAR -A,B, Ocuphire B, Rayner-A,B, Sight Sciences -B, Sun Pharmaceuticals-A,B, Tarsus-A, Viatris-A,B,C, Visiox-A,D, Zeiss-A, B

A=Consultant B=Speakers Bureau C=Research Funding D=Investor

INTRODUCTION

- Precise alignment of the toric IOL is vital to achieving the desired astigmatic correction.
- Conventionally, manual marking methods were used for toric IOL alignment.
 - However, these are prone to error due to smudging or dissolution of ink, broad or imprecise marks due to Bell's phenomenon or the cyclotorsion effect, and uncorrected parallax.¹
- Automated image-guided registration-based marking techniques have the potential to remove such errors.²
- A new approach to automated image-guided registration involves the construction of small capsular marks on the capsular rim during femtosecond laser capsulotomy.
- These capsular marks:
 - do not impact the strength or extensibility of the capsulotomy.
 - provide a visual guide to align the toric IOL intraoperatively.
 - help recognize postoperative toric IOL rotation and facilitate repositioning.

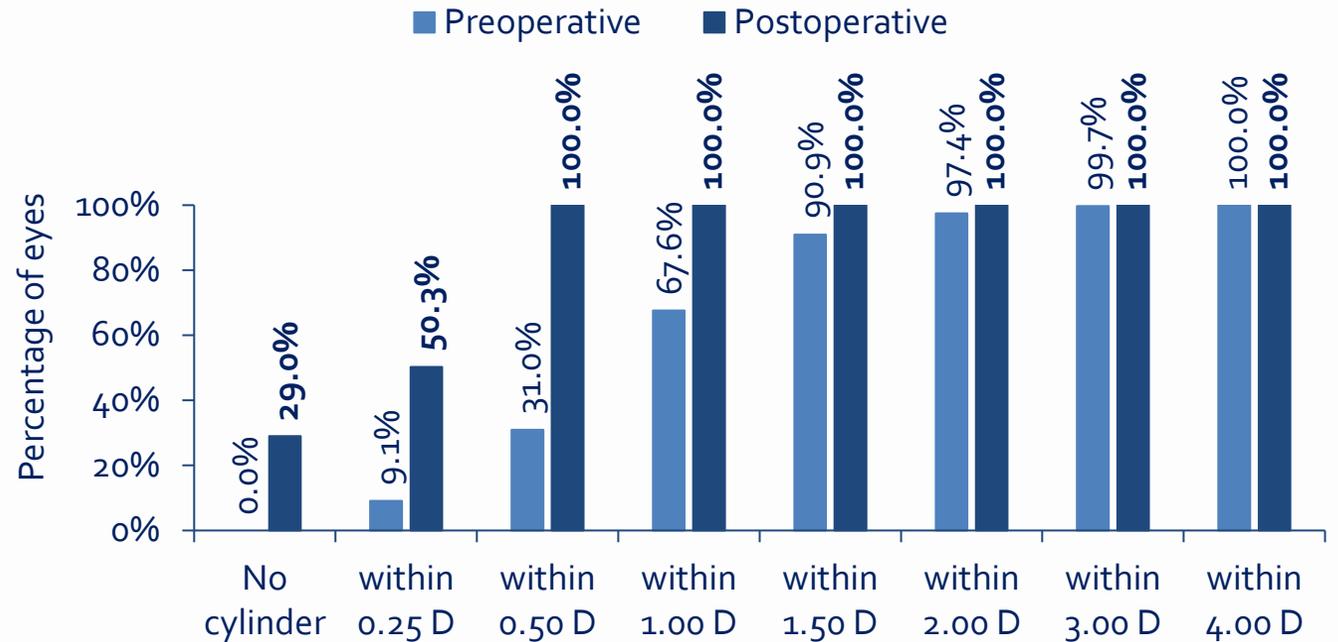
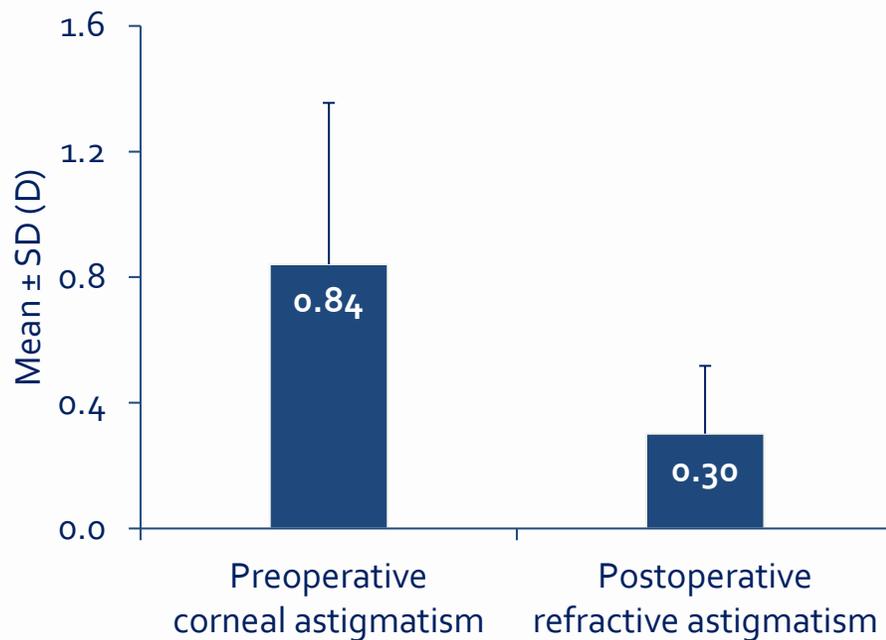
PURPOSE

- To validate toric IOL alignment by iris registration-guided femtosecond laser-assisted capsular marks with intraoperative aberrometry measurements.

METHODS

Study Design	Study Population	Study Procedure	Outcome Measures
Retrospective study.	Analysis of 352 eyes that underwent cataract surgery with a femtosecond laser and implantation of a toric IOL.	Toric IOL alignment <ul style="list-style-type: none">• performed using iris registration-guided capsular marks (LENSAR IntelliAxis-L, Orlando, FL).• Checked with intraoperative aberrometry (ORA, Alcon, Ft. Worth, TX).	Preop and postop astigmatism; proportion of astigmatism within 0.25, 0.50 and 1.00; postoperative MRSE, UDVA and CDVA.

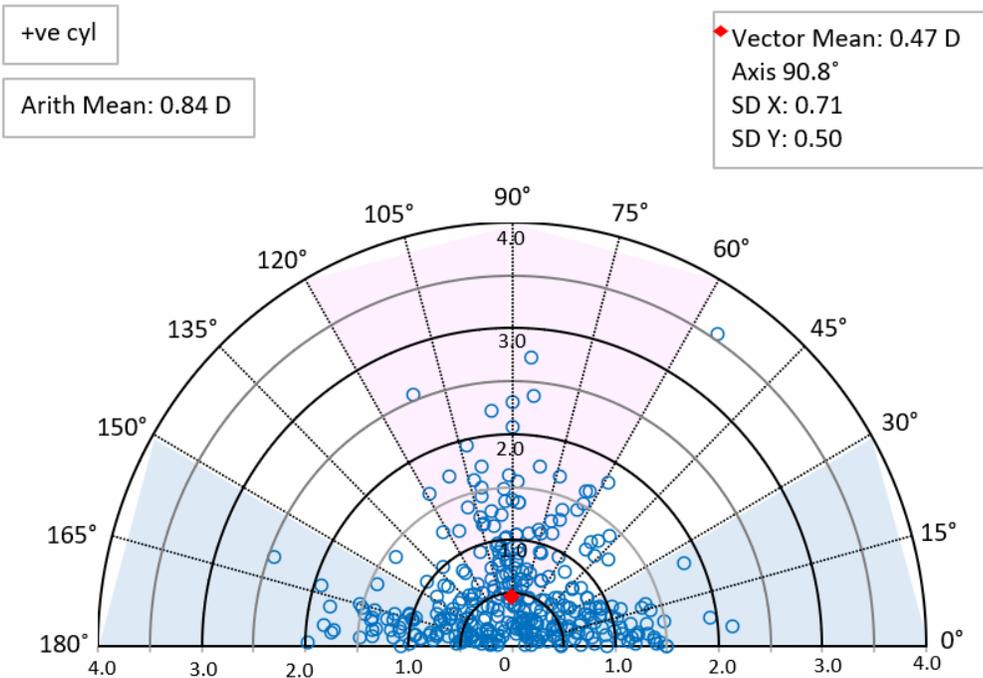
RESULT – ASTIGMATISM



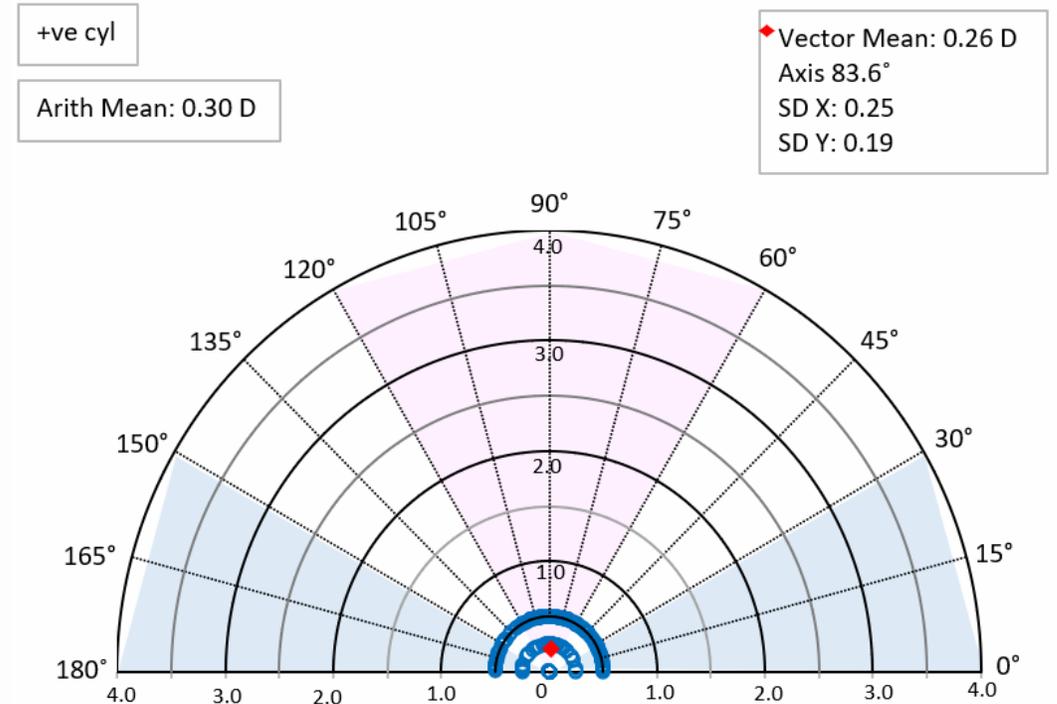
- There was a statistically significant **64.3%** reduction in mean astigmatism from 0.84 D at preop to 0.30 D postoperatively.
- All eyes achieved postoperative refractive cylinder within 0.50 D.

RESULT – SINGLE ANGLE POLAR PLOTS

Preoperative



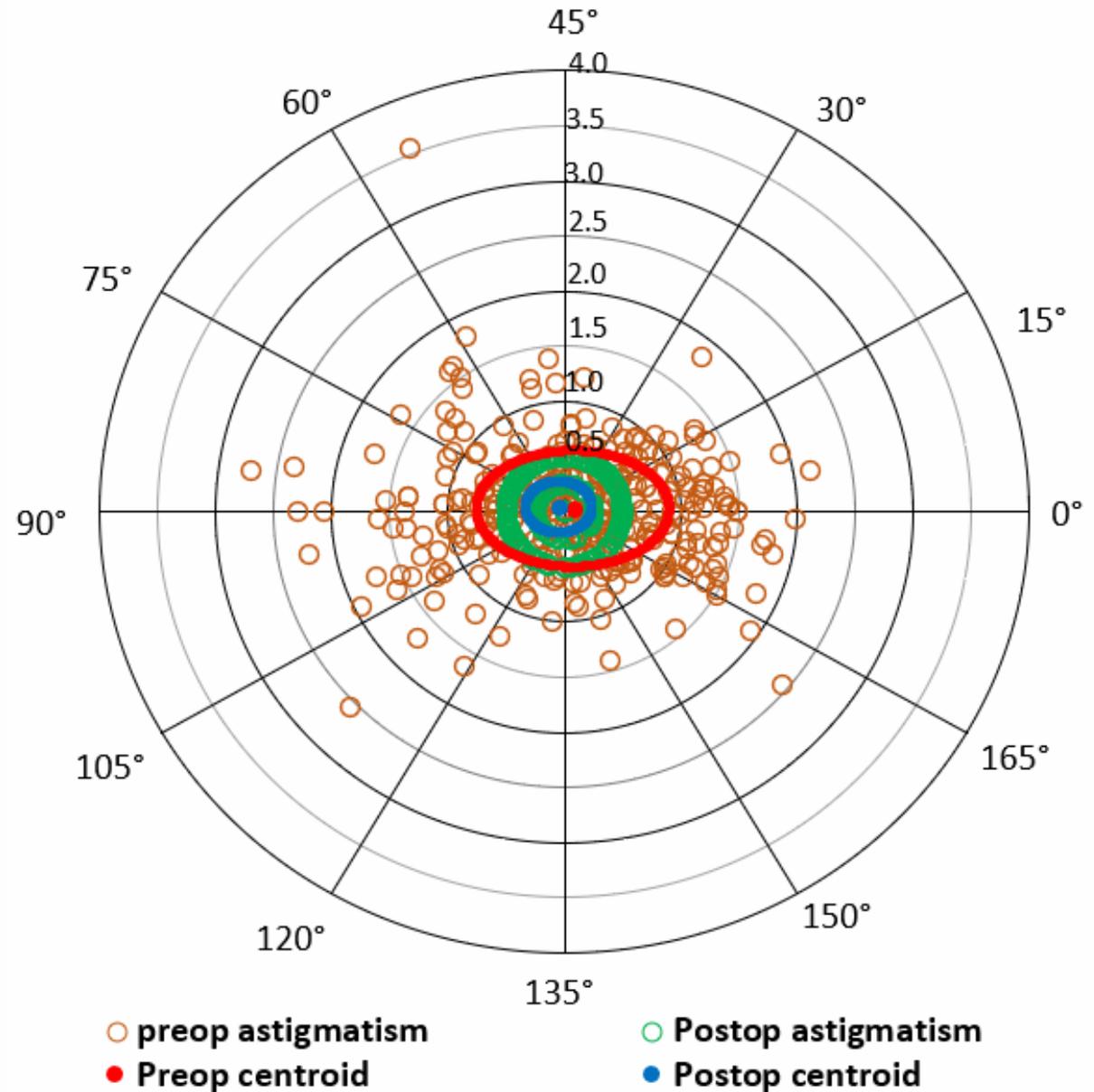
Postoperative



- Vectoral mean of astigmatism decreased from 0.47 D preoperatively to 0.26 D postoperatively.

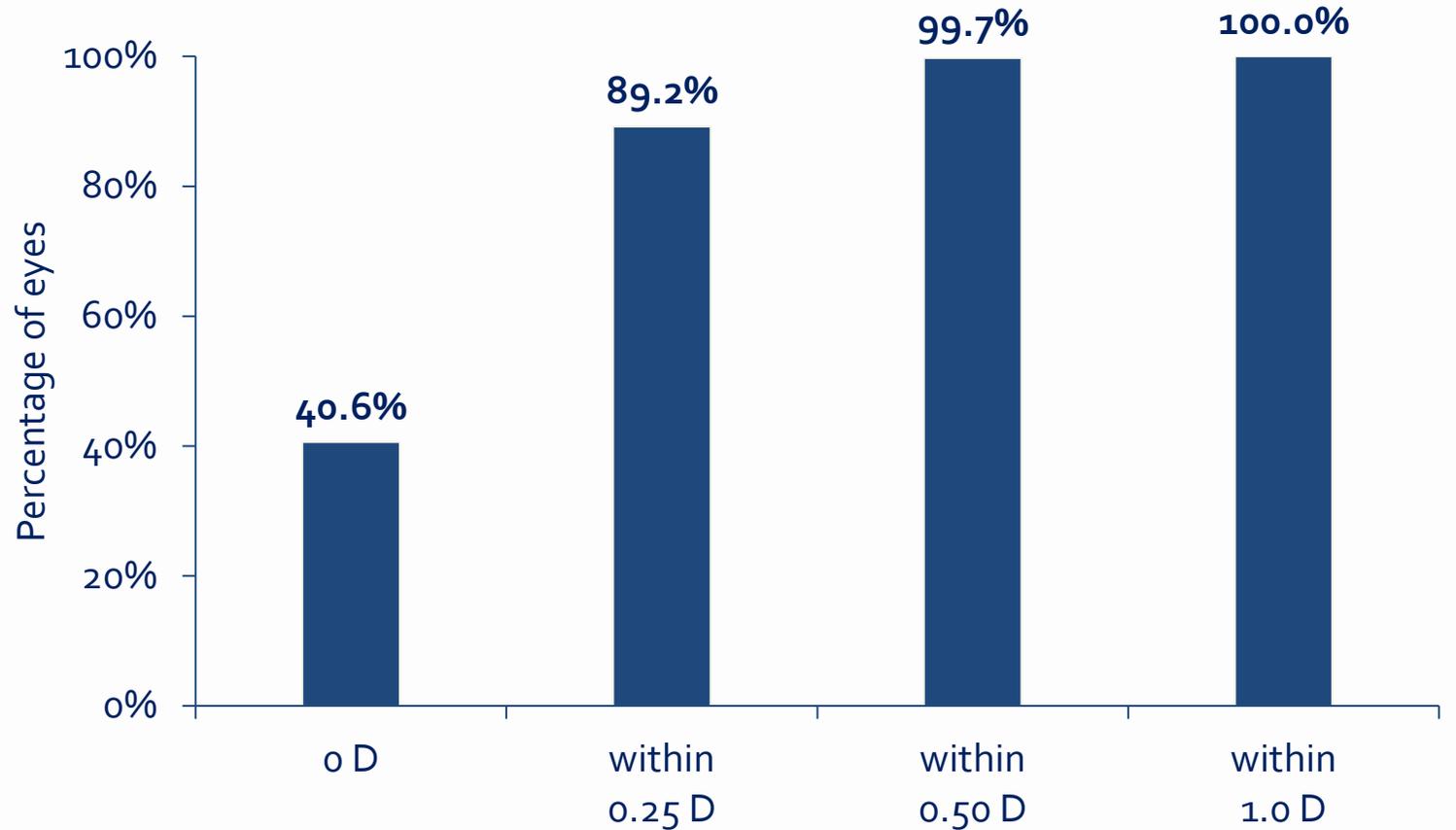
RESULT – DOUBLE ANGLE VECTOR PLOT

- The centroid of postop astigmatism was closer to 0.0 D and had a smaller vectoral standard deviation (represented by ellipse).

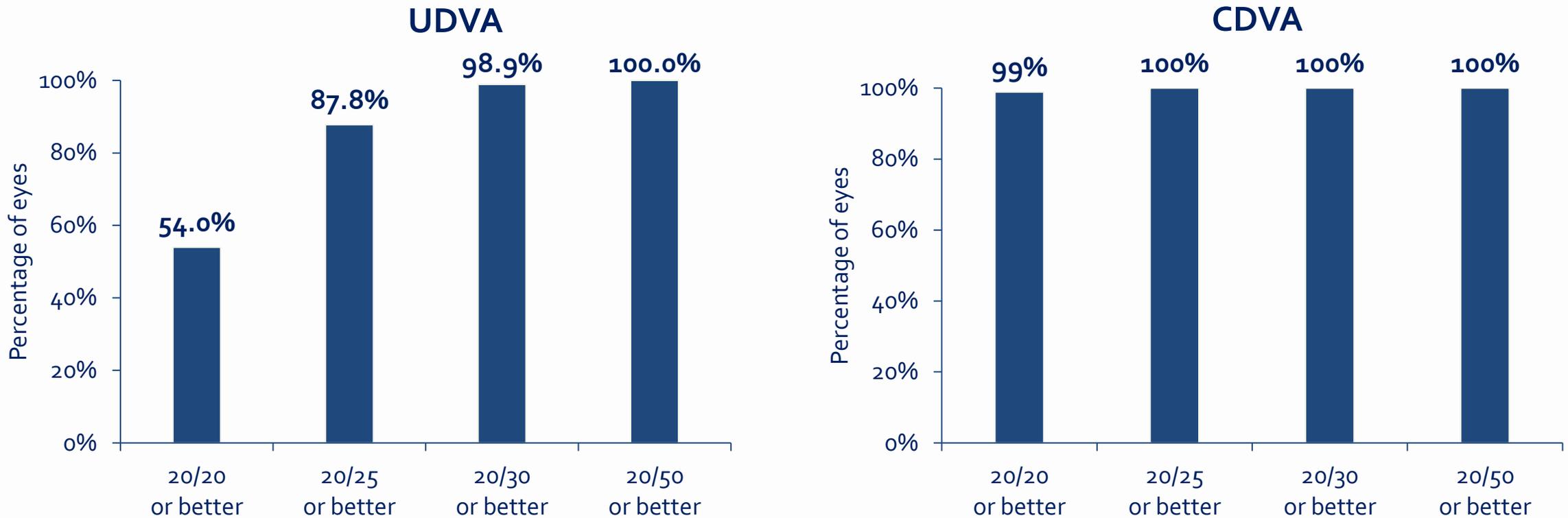


RESULT – MRSE

- The mean postoperative MRSE was 0.15 ± 0.15 D and 99.7% of eyes achieved MRSE within 0.50 D.



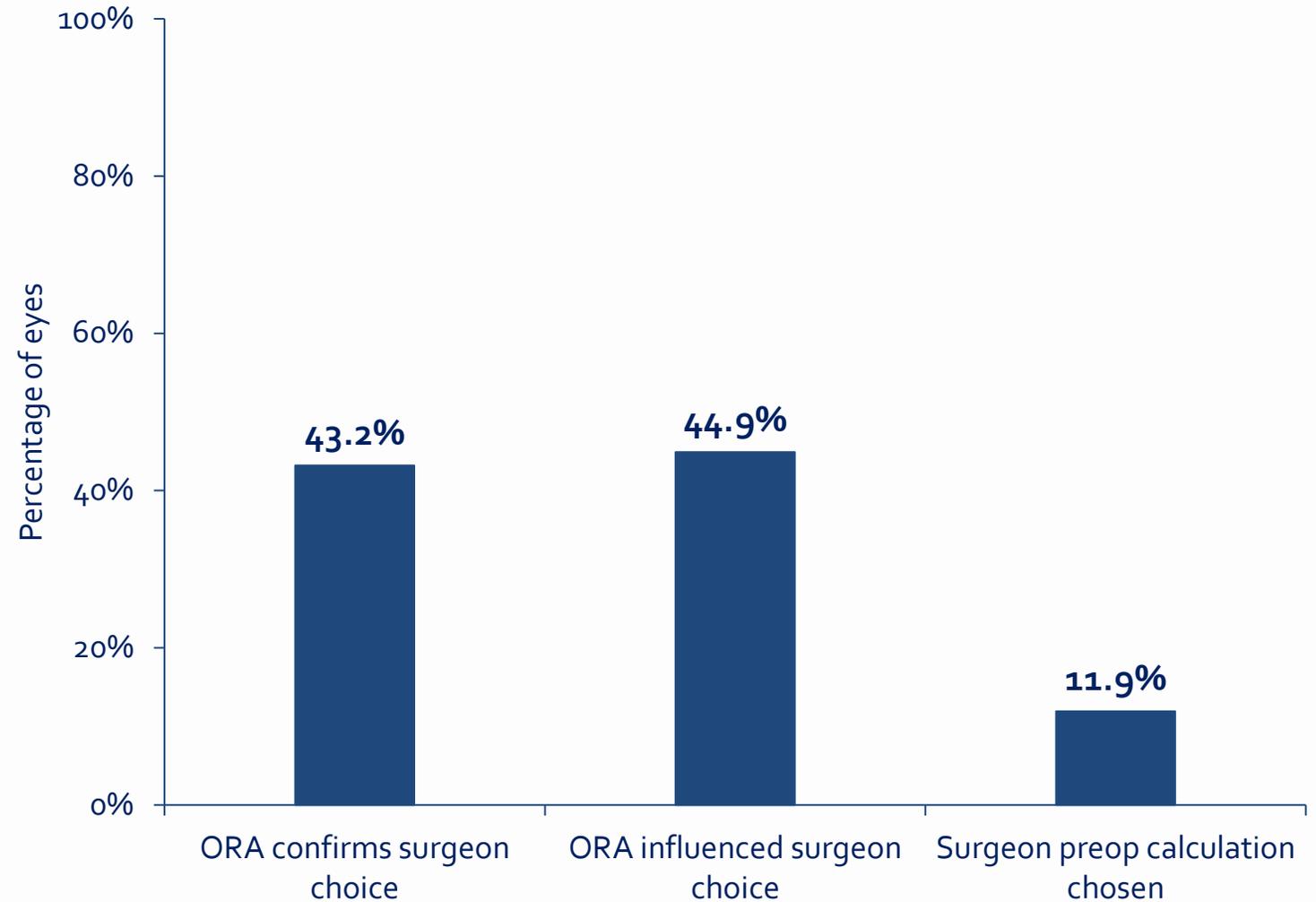
RESULT – UDVA and CDVA



- Mean postoperative UDVA was 0.05 ± 0.07 logMAR, and CDVA was 0.00 ± 0.02 logMAR.
- All eyes achieved a CDVA of 20/25 or better, and 99% of eyes achieved a UDVA of 20/30 or better.

RESULT – ORA

- For the final IOL power implanted, ORA confirmed the preoperative IOL power calculations in 43.2% of cases, and in 44.9% of cases, ORA influenced the surgeon's choice. In 12% cases, the IOL power implanted was based solely on the preoperative IOL power calculation.



DISCUSSION

- Refractive capsulorhexis (LENSAR IntelliAxis-L) combines the advantages of a femtosecond laser capsulotomy with a one-step visual guide for intraoperative toric IOL alignment as well as postoperative assessment of rotational stability.⁴
- With IntelliAxis capsular marks, concern regarding parallax is practically eliminated because the plane of the anterior capsule is very close to the plane of the IOL.³
- Excellent postoperative astigmatic outcomes in the present study are attributed to the precise alignment of the toric IOL using IntelliAxis capsular marks.
- The alignment of toric IOL using IntelliAxis-L guided capsular marks was in agreement with the pseudophakic Intraoperative aberrometry measurement.

CONCLUSION

- Femtosecond laser-assisted cataract surgery and implantation of toric IOL guided by iris registration-guided capsular marks were effective in reducing pre-existing corneal astigmatism in cataract patients yielding excellent visual and refractive outcomes.