

INTRODUCTION

- Hyperopia can be corrected by Laser In Situ Keratomileusis (LASIK). Treatment of mixed astigmatism with LASIK involves a bitoric approach that requires flattening of the cornea in one meridian and steepening of the other¹.

OBJECTIVE

- To Analyze LASIK outcomes for patients with astigmatism and moderate to high hyperopia using the Schwind Amaris 750 Laser Platform.

METHODS

- Retrospective analysis of outcomes was performed for LASIK on eyes with astigmatism and hyperopia at Clarity Laser Vision from January 21st, 2017, to June 17th, 2020, and was followed until January 2022
- There were 21 eyes involved in the study. Of the 21 eyes:
 - 13 eyes had a Pre-Op Sphere greater than 0 D but less than +2.50D (Mild Hyperopia)
 - 5 eyes had Pre-Op Sphere +2.50D or greater but less than +5.00D (Moderate Hyperopia)
 - 3 eyes had Pre-Op Sphere \geq +5.00D (High Hyperopia)

RESULTS

- Mean Post-operative Spherical Equivalent for all eyes was -0.12 D, -0.03 D, and -0.08 D for mild, moderate and high hyperopia (Table 1)
- There was a strong Coefficient of determination (R^2) value between intended and achieved refractive correction for all cases in the study ($R^2 = 0.9701$). This held for eyes with moderate to high hyperopic error as well as for mixed astigmatism (Figure 1)
- No patients required any enhancement to date
- 20 of 21 eyes (95.24%) had achieved BCVA of 20/20 or better
- 12 of 21 eyes (57.14%) had achieved BCVA of 20/15
- 3 eyes (14%) lost 1 line of BCVA from 20/15 to 20/20

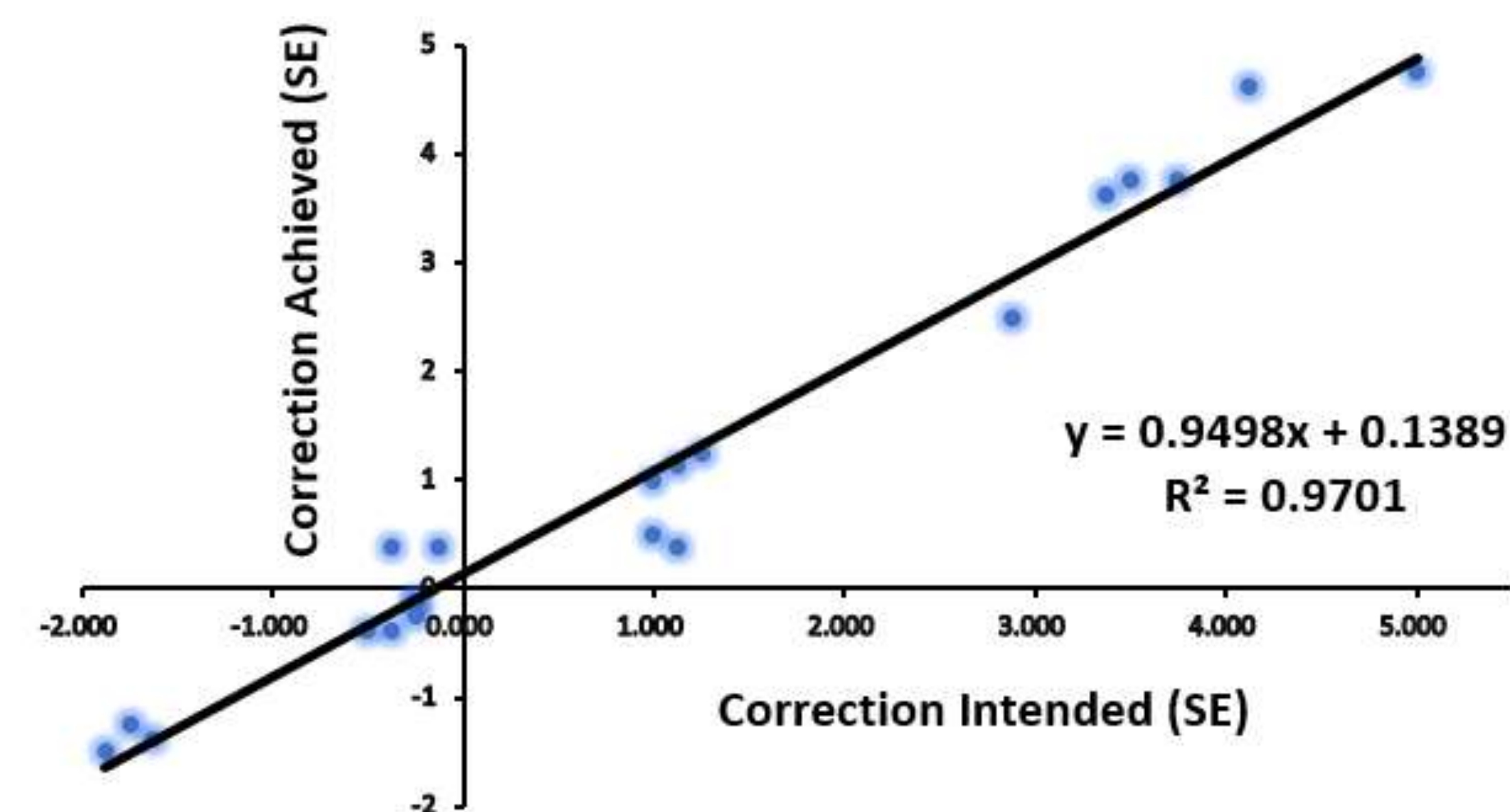
CONTACT INFORMATION

Dr. Ahmed Al-Ghoul, MD: dr.alghoul@claritylaservision.com
Muhammad Tariq: M.Tariq1@nuigalway.ie

Table 1: 5+ Months Post-LASIK SPH (sphere) and Spherical Equivalent (SE) Values for Eyes with Hyperopia and Astigmatism

Pre-Operative Sphere Range	Mean Pre-Op Sphere (\pm SD)	Mean Post-Op Sphere (\pm SD)	Mean Pre-Op CYL (\pm SD)	Mean Post-Op CYL (\pm SD)	Mean Pre-Op SE (\pm SD)	Mean Post-Op SE (\pm SD)
Pre-Op Sphere 0 to +2.50D	+0.69D \pm 0.45	0.00D \pm 0.42	-2.02D \pm 1.43	-0.23 \pm 0.25	-0.32D \pm 0.97	-0.12D \pm 0.39
Pre-Op Sphere +2.50 D to +5.00D	+3.20D \pm 0.70	+0.15D \pm 0.30	-1.60D \pm 1.08	-0.35D \pm 0.37	+2.40D \pm 1.06	-0.03D \pm 0.23
Pre-Op Sphere \geq +5.00D	+5.17D \pm 0.12	+0.17D \pm 0.42	-1.75D \pm 0.89	-0.50D \pm 0.41	+4.29D \pm 0.52	-0.08D \pm 0.31

Figure 1: Regression Model for Eyes with Pre-Op Astigmatism and Hyperopia and provided data 5+ Months Post-Op (n = 21)



Regression analysis of Correction Intended vs Correction Achieved in the 21 LASIK operations that occurred on eyes with Pre-Op astigmatism and hyperopia was observed to be statistically significant (P-value = 6.11176E-16).

DISCUSSION

- Previous literature suggests that regression rates in the first 6 -12 months for patients with moderate to high hyperopia can be as high as 30%². This was not our experience with the Schwind Amaris platform. We believe this is due to the ablation profile beam that is used with the laser system that effectively reduces regression that is historically noted with other excimer lasers.
- While loss of one line of BCVA has been reported in other publications with Hyperopic treatment, none of our patients lost BCVA that was less than 20/20. It is important to mention that risk to patients when offering Hyperopic treatment³.
- It is worth noting that the predictability of vision correction was consistently strong regardless of the magnitude of hyperopic correction. The weakness of our study relates to the small sample size.

CONCLUSION

LASIK is an efficacious treatment option for patients with astigmatism and mild to high levels of hyperopia using the Schwind Amaris 750. The low rate of enhancement (0.00%) is supportive of the use of LASIK in hyperopic and astigmatic eyes.

REFERENCES

- Moshirfar M, Durnford K, Megerdichian A, Thomson A, Martheswaran T, West W Jr, et al. Refractive outcomes after LASIK for the treatment of mixed astigmatism with the Allegretto WaveLight EX500. *Ophthalmol Ther*. 2022;11(2):785-95.
- Alio et al, Laser in situ keratomileusis for high hyperopia (>5.0 diopters) using optimized aspheric profiles: efficacy and safety. *J Cataract Refract Surg*. 2013 Apr; 39(4): 519-27
- Gauthier-Fournet L, Penin F, Arba Mosquera S. Six-month outcomes after high hyperopia correction using laser-assisted in situ keratomileusis with a large ablation zone. *Cornea* [Internet]. 2019 [cited 2022 May 6];38(9):1147-53. Available from: <https://pubmed.ncbi.nlm.nih.gov/31169605/>

ACKNOWLEDGEMENTS

Many thanks to the exceptional staff at Clarity Laser Vision