

INTRODUCTION

- Transepithelial PRK (TransPRK) is a laser refractive surgery similar to traditional PRK but contrasts in a significant way. The TransPRK technique removes the corneal epithelium itself allowing the surgeon to not make contact themselves¹.
- SBK (Sub-Bowman's Keratomileusis) is a form of LASIK that utilizes an ultra-thin flap for ablation². A study by Zhang et al observed SBK to be an effective operation in the treatment of myopic astigmatism³.
- Astigmatism is an eye condition due to a defect in the curvature of the cornea. It can cause blurred vision at any distance. Astigmatism is measured using cylinder (CYL) and axis. Moderate astigmatism range is starting from 1.00D to 2.00D and high astigmatism is greater than 2.00D⁴.

OBJECTIVE

To compare outcomes of TransPRK to SBK for patients with moderate to high preoperative astigmatism using the Schwind Amaris 750 Laser Platform

METHODS

- Retrospective analysis of moderate to high astigmatism patient outcomes for TransPRK and SBK at Clarity Laser Vision from January 21st, 2017, to June 17th, 2020.
- With regards to TransPRK:
 - 233 TransPRK operations occurred on eyes with Pre-Op astigmatism of $\geq 1.00D$
 - We collected 5+ months Post-Op data on 199 eyes
- With regards to SBK:
 - 118 SBK operations occurred on eyes with Pre-Op astigmatism of $\geq 1.00D$
 - We collected 5+ months Post-Op data on 60 eyes

RESULTS

Post-Op CYL and SE:

- 93.47% of eyes that underwent TransPRK achieved a Post-Op CYL of -0.75 or better, in contrast to 91.67% (55/60) for SBK ($p=0.155$)
- 93.47% of the eyes that received TransPRK achieved a Post-Op SE of ± 0.75 or better, as opposed to 93.33% (56/60) for SBK ($p=0.075$)

Post-Op Manifest Spherical Error (SE)

- Mean Post-op SE was $-0.19 D$ for TransPRK versus $-0.26 D$ for SBK (Table 1)
- Coefficient of Determination (R^2) was 0.97 for TransPRK vs 0.99 for SBK (Figure 1 and 2)

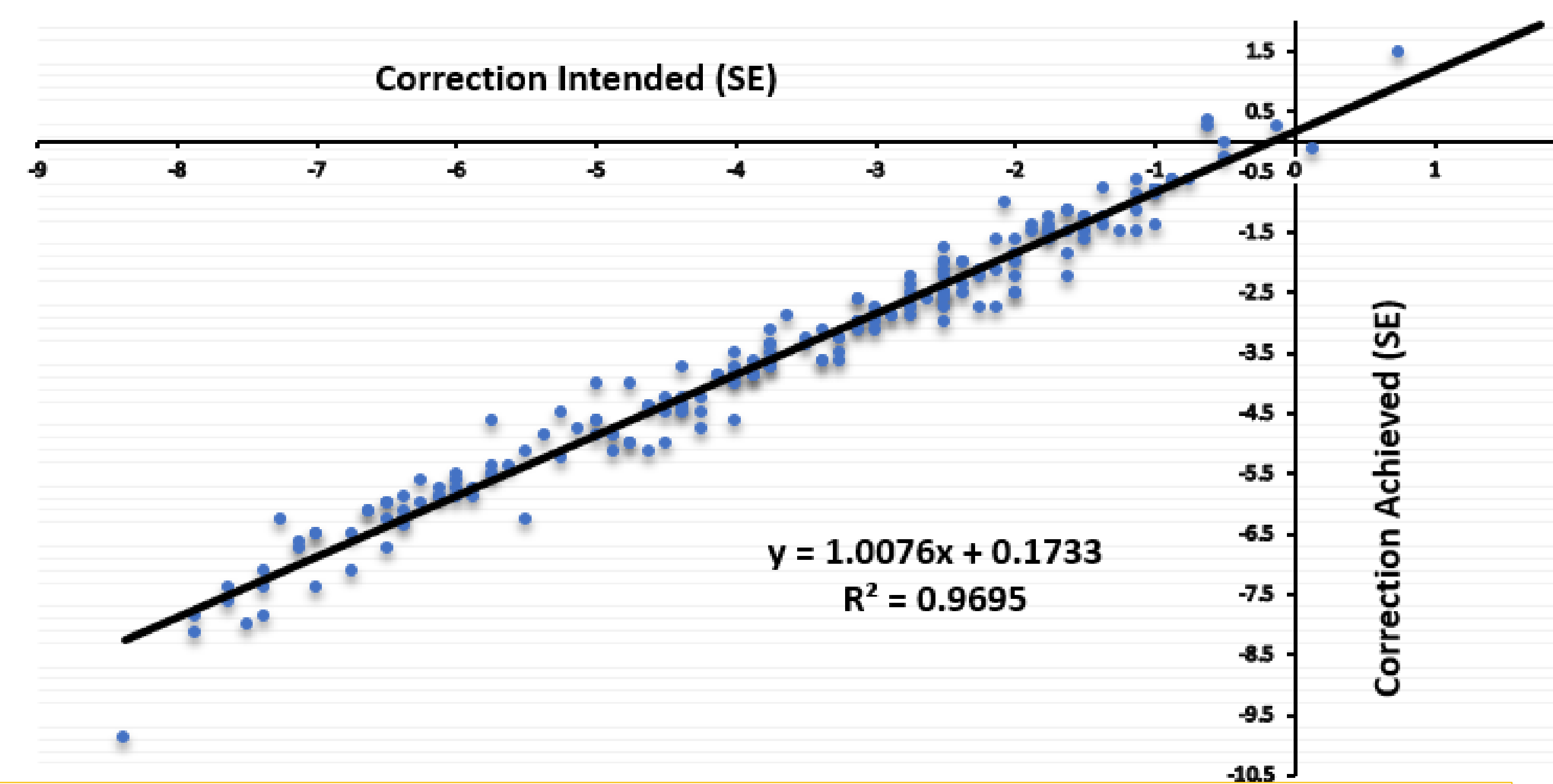
Enhancement Rates:

- The enhancement rate for eyes that underwent TransPRK was **1.29%** (95% confidence interval [CI] 0.00266-0.03763) (3/233 operations) in contrast to **3.39%** (95% CI 0.00924-0.08679) (4/118 operations) for SBK. The enhancement rate difference of **2.10%** was found to be statistically insignificant (P -value = 0.1877).

Table 1: TransPRK vs SBK Pre-Op to 5+ Months Post-Op CYL (cylinder) and Spherical Equivalent (SE) Values

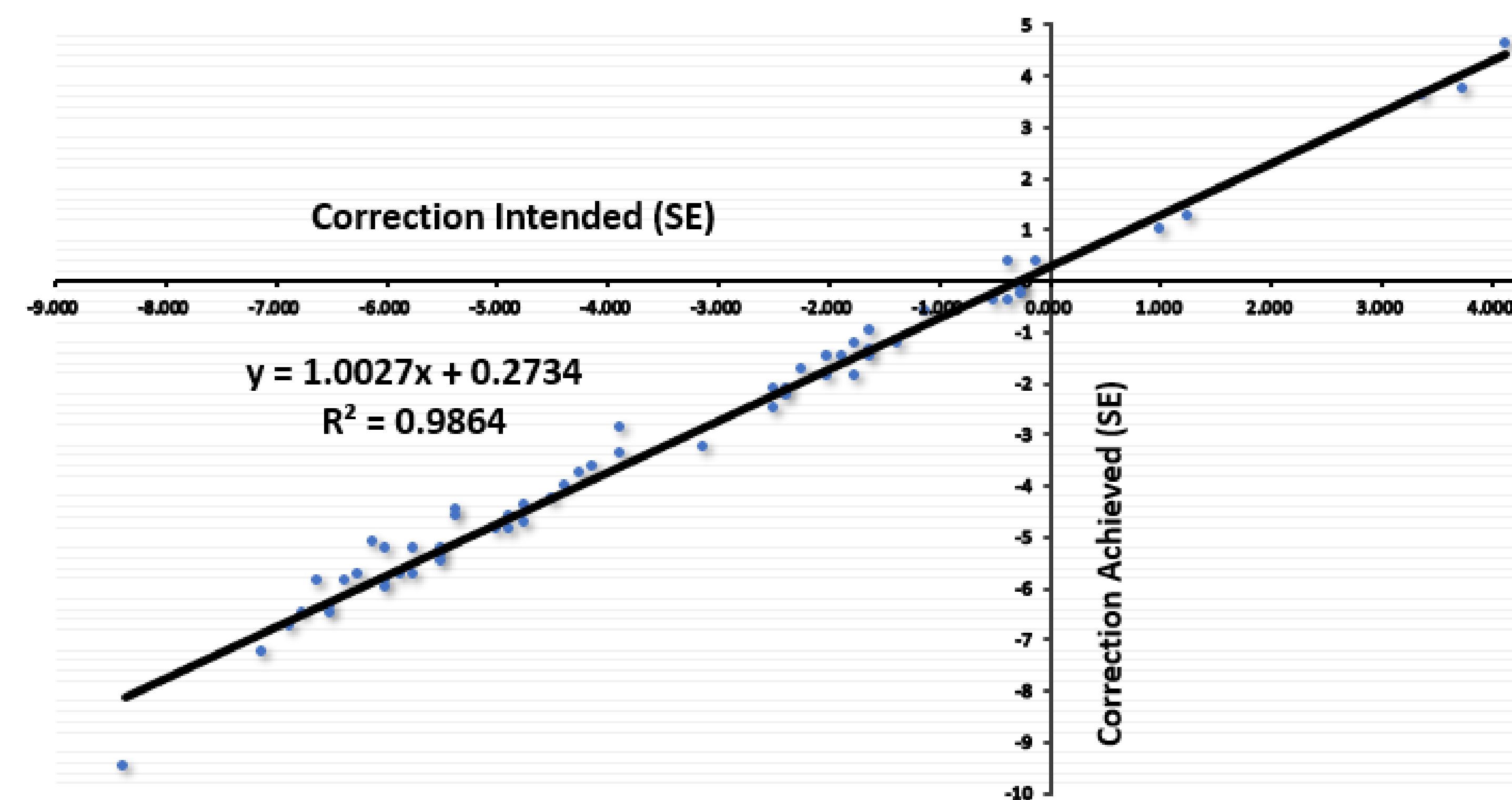
	Mean Pre-Op CYL (\pm SD)	Mean Post-Op CYL (\pm SD)	Average Improvement in CYL	Mean Pre-Op SE (\pm SD)	Mean Post-Op SE (\pm SD)	Average Improvement in SE
TransPRK	-1.71D \pm 0.79	-0.31D \pm 0.32	1.40D	-3.71D \pm 2.03	-0.19D \pm 0.40	3.52D
SBK	-2.20D \pm 1.17	-0.36D \pm 0.39	1.84D	-3.33D \pm 2.85	-0.26D \pm 0.33	3.07D
Difference		0.05D				0.45D

Figure 1: TransPRK Regression Model



Regression analysis of Correction Intended vs Correction Achieved in the 199 TSA operations included in the study was observed to be statistically significant (P -value = 1.51E-151).

Figure 2: SBK Regression Model



Regression analysis of Correction Intended vs Correction Achieved in the 60 SBK operations included in the study was observed to be statistically significant (P -value = 7.28E-56).

DISCUSSION

- In a study from Diogo de Ortueta et al, Transepithelial PRK used on patients with moderate to high astigmatism resulted in preoperative astigmatism being reduced to subclinical values⁵.
- A study by Reitblat et al observed a favorable post-operative outcome in SE of patients with high-grade preoperative astigmatism with both Femto LASIK and TransPRK⁶.
- Our results supported similar studies that demonstrated excellent refractive outcomes and stability with both TransPRK and SBK.
- There was a trend towards a better Coefficient of Determination (R^2) with SBK compared to TransPRK.
- There was a higher rate of regression noted in our study with SBK compared to TransPRK.

CONCLUSION

Both TransPRK and SBK demonstrated excellent postoperative outcomes in patients with moderate to high astigmatism using the Schwind Amaris 750. Astigmatism alone is not a factor in favouring one technique over another.

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