

INTRODUCTION

Myopia, commonly referred to as nearsightedness, is widely common vision abnormality in which distant objects appear blurry, and its prevalence is increasing globally [1]. Based on prevalence data and corresponding population trends, it can be predicted that 50% of the global population will be subject to myopia by 2050 [2], a substantial rise from the 27% in 2010 [2]. High myopia refers to an excessive degree of myopia and is designated in our presentation to an eye with -6D or worse of sphere (SPH). Individuals with high myopia have a greater incidence of numerous eye related complications including and not limited to glaucoma, cataracts, retinal tear, and myopic macular degeneration [3]. It is predicted that by the year 2050, high myopia will affect 9.8% of the global population [4]. LASIK (laser-assisted in situ keratomileusis) and PRK (photorefractive keratectomy) have both been used as efficacious treatment options in the treatment of myopia.

PURPOSE

The objective of the study is to compare outcomes of Transepithelial PRK (TransPRK) and LASIK for the treatment of eyes with high preoperative myopia.

METHODS

Retrospective comparative study of outcomes for eyes with high preoperative myopia for TransPRK and LASIK operations done from April 8th, 2017, to June 24th, 2020. All eyes had Schwind laser platform used. Eyes with a preoperative sphere of -6D or higher on manifest refraction and have provided postoperative data at least 5 months or later postoperatively were included in the study. 16 LASIK and 47 TransPRK operations satisfied the inclusion criteria and were included in the study.

	Number of Eyes	Mean (SD) Pre-Op Sphere	Mean (SD) Pre-Op Cylinder	Mean (SD) Pre-Op Spherical Equivalent
LASIK	16	-6.48D (0.63)	-0.58D (0.50)	-6.77D (0.58)
TransPRK	47	-6.63D (0.52)	-0.85D (0.70)	-7.06D (0.54)

RESULTS

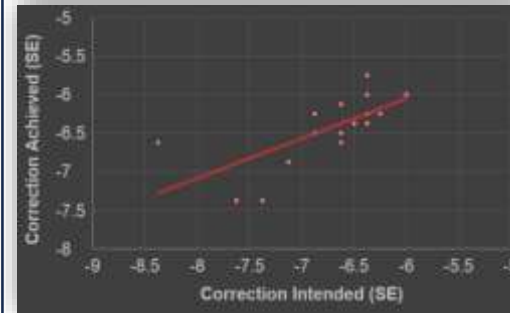
	Number of Eyes	Mean (SD) Post-Op SPH	Mean (SD) Post-Op CYL	Mean (SD) Post-Op SE
LASIK	16	-0.20D (0.49)	-0.23D (0.42)	-0.32D (0.43)
TransPRK	47	+0.07D (0.42)	-0.36D (0.32)	-0.10D (0.35)

Postoperative SPH:

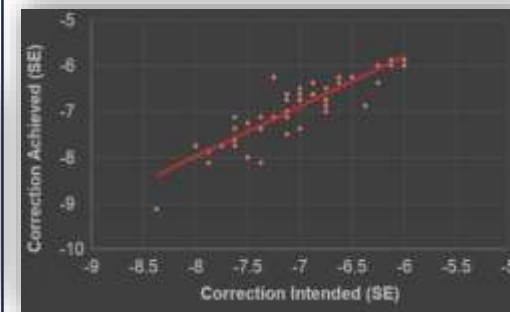
- The difference in mean postoperative SPH and CYL between the 2 procedures was found to be statistically insignificant (**p=2.1 and 2.1 respectively**) using independent sample t-tests
- 69% (11/16)** of the LASIK eyes achieved Post-Op SPH of **±0.25D or better**, in contrast to **74% (35/47)** of the TransPRK eyes (**p=0.82**)
- 94% (15/16)** of eyes that received LASIK were observed to have Post-Op SPH of **±0.75D or better**, as did **94% (44/47)** of eyes that received TransPRK (**p=1.0**)

Postoperative SE (Spherical Equivalent):

- The difference in mean Post-Op SE between the 2 procedures was found to be statistically insignificant (**p=2.1**)
- 81% (13/16)** of eyes that received LASIK were observed to have Post-Op SE of **±0.50D or better**, whereas **91% (43/47)** of eyes that received TransPRK (**p=0.89**)
- 94% (15/16)** of eyes the LASIK eyes achieved Post-Op SE of **±0.75D or better**, while this was the case for **96% (45/47)** of TransPRK eyes (**p=0.98**)



Regression analysis of the Correction Intended vs Correction Achieved in SE (Spherical Equivalent) for the 16 LASIK surgeries included within the study was observed to be statistically significant (**p=0.0033**)



Regression analysis of the Correction Intended vs Correction Achieved in SE (Spherical Equivalent) for the 47 TransPRK surgeries included within the study was observed to be statistically significant (**p=1.1E-14**)

Enhancement Rates:

- The enhancement rate observed for LASIK was **6.3% (95% Confidence Interval [CI] 0.0015-0.35)(1/16 operations)** and **2.1% (95% CI 0.00054 to 0.12) (1/47 operations)** for TransPRK
- The difference between the enhancement rates observed was found to be statistically insignificant (**p=0.42**)

Postoperative UCVA (Uncorrected Visual Acuity):

- 63% (10/16)** of the LASIK eyes and **57% (26/46)** of the TransPRK eyes had a UCVA of CF (Counting Fingers) or HM (Hand Movements) preoperatively
- All eyes in the study improved in UCVA with no lines of UCVA being lost in any eye**
- 75% (12/16)** of the LASIK eyes improved UCVA to **20/20 or better** postoperatively, in contrast to **89% (42/47)** of TransPRK eyes (**p=0.84**)
- 94%** of the eyes in the LASIK and TransPRK (**15/16 and 44/47 respectively**) groups achieved UCVA of **20/25 or better** postoperatively (**p=1.0**)

Postoperative BCVA (Best Corrected Visual Acuity):

- All eyes included within the study achieved postoperative BCVA of 20/20 or better**
- 4.3% (1/16)** of LASIK and **13% (6/47)** of TransPRK eyes lost a line of BCVA (**p=0.50**), all from 20/15 to 20/20

DISCUSSION

A meta-analysis by Yanyan Fu et al found LASIK to be safe, efficacious, and predictable for the treatment of high myopia [5]. A study by Jiafan Zhang et al observed good safety, efficacy, and predictability for the correction of high myopia with the use of Transepithelial PRK and LASIK [6]. Our results supported similar studies that demonstrated excellent refractive outcomes and safety for both TransPRK and LASIK.

CONCLUSION

Our study demonstrated proficient postoperative manifest refraction and safety for both LASIK and TransPRK in treating high myopia. High myopia alone is not a determining factor in favoring one procedure over the other.

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