

Evaluation of Hinge Position on Corneal Sensation and dry Eye after Laser in Situ Keratomileusis (LASIK) in Thi-Qar Governorate

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Abstract

Purpose: This investigation planned to assess the impacts of Laser In Situ Keratomileusis (LASIK) with prevalent and nasal pivot areas on corneal sensation and dry eye condition. Planned randomized similar investigation was completed from February 2018 to December 2019. The subsequent term were preoperatively evaluated just as 1 week and 1,3,6 months postoperatively. This examination included 600 eyes of 420 patients (180 guys and 240 females), all patients went through LASIK medical procedure for rectification of nearsightedness as well as nearsighted astigmatism utilizing MEL 90 Excimer laser for stromal removal, Moria M2, SBK microkeratomers were utilized to make a prevalent and nasal pivoted folds. At the point when patients chose to have medical procedure, they were randomized to get nasal or predominant pivot medical procedure based on the randomization succession. Focal Cochet-Hat esthesiometry, Schirmer fundamental tear discharge test, tear film separation time (TBUT) were assessed preoperatively and at multi week, 1, 3, and a half year postoperatively. After medical procedure, the corneal sensation diminished essentially in both nasal-pivot and prevalent pivot folds at multi week however got back to gauge by half year. The Schirmer essential emission test esteems were not altogether changed postoperatively in the nasal pivoted and predominant pivoted eyes. TBUT diminished inconsequential at multi week and multi month postoperatively and recouped by 3 months after medical procedure in the two gatherings. There were no huge contrasts in all the abstract and target boundaries tried between nasal-pivoted and unrivaled pivoted folds whenever point. There is no intraoperative and postoperative inconveniences in everyone's eyes. There was a huge decrease in corneal sensation following LASIK in nasal and predominant gatherings. Sensation improved at untouched stretches and re-visitations of nearly, preoperative levels around a half year postoperatively. Related with the corneal denervation is a prompt postoperative increment in dry-eye as estimated by TBUT and schirmer test that improved utilizing oils and with ensuing visits.

Key words - cornea, corneal sensitivity, Schirmer test, dry eye disease, LASIK

Introduction

Dry eye sickness (DED) is an ordinarily experienced finding in ophthalmology, yet is ineffectively perceived, hard to characterize, and comes up short on a remarkable analytic test. The Worldwide Dry Eye Work Shop (DEWS) as of late characterized DED as "a multifactorial illness of the tears and visual surface that outcomes in manifestations of distress, visual aggravation, and tear film unsteadiness with expected harm to the visual surface. It is joined by expanded osmolarity of the tear film and aggravation of the visual surface¹. Laser-aided situ keratomileusis (LASIK) is a protected and powerful careful choice for treatment of refractive blunders²,

notwithstanding, dry eyes are a surprisingly successive result of LASIK medical procedure, with up to 95% of patients encountering indications of dry eyes after corneal refractive medical procedure³. Dry eye indications are genuinely regular in patients before LASIK. The pervasiveness of dry eye side effects preceding going through LASIK is assessed to be somewhere in the range of 38 and 75%^{4,5}. Post-LASIK, it has been broadly indicated that a dominant part of patients whines of dry eye manifestations, particularly in the early postoperative period^{3,6,8}. Following LASIK, 95% of patients report some dry eye indications³. Dry eye manifestations are accounted for in as high as 60% of patients multi month

after LASIK^{3,7}. Post-LASIK dry eye typically tops in the initial barely any months after medical procedure, and afterward side effects start to improve in by far most of patients at 6 a year after medical procedure. Corneal refractive specialists additionally report dry eyes as the most widely recognized intricacy of LASIK⁹. Keratorefractive methods, for example, outspread keratotomy, photorefractive keratectomy and LASIK produce restricted harm of stromal nerves and the corneal sub-basal plexus prompting transient gentle to serious epithelial modifications related dry eye and additionally neurotrophic wonders¹⁰. There are various hypotheses concerning how LASIK adds to the pathophysiology of dry eyes. The principle proposed cause is iatrogenic corneal nerve harm. LASIK disturbs both the thick sub-basal nerve plexus and stromal corneal nerves in the production of the foremost stromal fold and excimer laser removal of the cornea. Microkeratome is the fundamental instrument needed to make a uniform and a homogeneous corneal fold by cutting over the stromal corneal lamellae. Loss of conjunctival flagon cells has likewise been recognized after LASIK, likely because of direct harm from the pull gadget utilized during making of the LASIK fold¹¹. Harm to the challs cells happens with both microkeratome-and femtosecond laser-made folds¹²⁻¹³. Postoperative fiery changes may likewise add to post-LASIK dry eyes¹⁴. LASIK-initiated change fit as a fiddle may influence the connection between the eyelids and visual surface and lead to anomalous tear appropriation during squinting^{3,15}. Diminished corneal sensation can add to the advancement of LASIK actuated dry eye by influencing the useful unit created by the visual surface, trigeminal nerve, mind stem-facial nerve-lacrimal organ hub liable for diminished tear creation^{10,14}. In view of these perceptions, corneal affectability can possibly fluctuate as per the area and width of the LASIK fold pivot. A few investigations feature that LASIK can cause supported brokenness of the coordinated visual surface/lacrimal organ useful unit, bringing about incessant dry eye¹⁴. In 2001, 2003 and 2004 studies of individuals from the American Culture of Waterfall and Refractive Specialists, they all found that the most widely recognized entanglement of LASIK was dry eye^{9,16,17}. LASIK isn't the main corneal methodology that may influence tear creation, as in 2002, Kessler et al found that there was transient dry eye following Intact position, however the tear film

quality was reestablished inside multi week of medical procedure^{18,43}.

Materials & Methods

In this planned, randomized, similar investigation, LASIK was performed to 600 eyes of 420 patients (180 guys and 420 females). At the point when patients chose to have medical procedure, they were randomized to get nasal-or predominant pivot medical procedure based on the randomization succession.

This investigation was performed at Nasiriya specific Eye place, Branch of Ophthalmology, in Thi-qar governorate in the period between February 2018 to December 2019. LASIK systems were performed by one specialist. The examination up-and-comers were chosen from the people that were going to requesting careful remedy of vision. Result measures were assessed at multi week, multi month, 3 months, and a half year after the medical procedure.

Incorporation models:

- Age: over 18 years of age.
- Myopia: under 9.0 D and astigmatism of under 2.0 D.
- Scotopic understudy size not in excess of 6 mm.
- Corneal thickness more than 500 um estimated by ultrasonic pachymetry.
- Normal visual status checked by cut light assessment and fundus assessment.
- Basic Schirmer test with => 15 mm.
- Corneal sensation run between 50-60 mm estimated by Cochet–Hood esthesiometer.
- Intraocular pressure (IOP) <20 mmHg

The patients were arranged haphazardly into two gatherings

Gathering 1 (nasal pivots):

It included 300 eyes of 220 patients (respective in 80 cases and one eye 140 cases) for whom a nasal pivoted fold LASIK was performed

Gathering 2 (prevalent pivots):

It included 300 eyes of 200 patients (respective in 100 cases and one eye 100 cases) for whom a predominant pivoted fold LASIK was performed

Preoperative assessment:

- Measurement of the BCVA, communicated in the terms of Snellen graphs in

the type of decimal sharpness.

- Slit light assessment.
- IOP estimation utilizing Goldmann applanation tonometry.

- Fundus assessment

- Corneal sensation: Corneal sensation was estimated at the focal cornea utilizing Cochet Hood esthesiometer.

- Schirmer test: A Schirmer test (Essential emission test) was performed by putting Schirmer test strips estimating 35 mm x 5 mm size after establishment of a drop of effective sedation over the lower cover edge at the intersection of the parallel and center thirds, for 5 minutes

- Tear film separation time (TBUT): The TBUT was assessed 1 moment after the infero fleeting bulbar conjunctiva was contacted with a sodium fluorescein strip.

LASIK was performed utilizing the MEL 90 Excimer laser was utilized for stromal removal. The laser in situ keratomileusis (LASIK) technique included mechanical fold readiness utilizing a microkeratome, either a direct kind with a solitary utilize 90 µm head to make a nasal pivot or a turning type with a solitary

utilize 90 µm head to make a predominant pivot.. All patients were inspected an hour postoperatively to check fold adherence. All patients were analyzed at the first postoperative day and the first week to avoid the chance of early postoperative intricacies. At that point, customary follows up visits were done at 1, 3 and a half year postoperatively. In each subsequent visit, the corneal sensation, TBUT and Schirmer trial of the patients eyes were estimated. The preoperative and postoperative information of each gathering were investigated independently. At that point, information of the 2 gatherings were contrasted and one another.

Results

A forthcoming, similar investigation was performed on 600 eyes of 420 patients, 180 guys and 420 females. The mean age for the patients was 25.50± 4.67 years old (rang 19-38 years of age). No intraoperative inconveniences happened in our patients. We isolated the patients into 2 separate gatherings as indicated by pivot fold position (Nasal and Unrivald):

Consequence of gathering 1 (Nasal Pivot)

This gathering included 300 eyes of 220 patients (100 guys and 120 females). The mean age for these patients at the hour of medical procedure was 26.01± 4.96 years old (range19-38 years of age). The underlying examination was with a critical measurable contrasts of the corneal sensation, Schirmer test that will in general be non-noteworthy with term of follow-up headway, while the examination of Yet at pre-usable evaluation and (first week, first month, third month and sixth month) as an events of correlation were non-huge, where the connection were of frail kinds with addition of follow up an ideal opportunity for the three markers of intrigue (corneal sensation, TBUT and Schirmer test) (Table1)

Table 1: The differences in parameters before operation and 1week, 1, 3, and 6 months after operation of nasal group.

		Mean	Range	N	Std. Deviation	Correlation	Significance	Paired t test	P value*
corneal sensation	Preoperative-nasal	55.07	50-60	300	3.162				
	After 1 week-nasal	30.87	20-40	300	4.864	.068	.240	24.838	.0001
	preoperative-nasal	55.07		300	3.162				
	After 1 month-nasal	30.32	25-35	300	3.655	-.037-	.528	25.309	.0001
T BUT	preoperative-nasal	7.88	7-10	300	.823				
	After 1 week-nasal	6.31	4-8	300	1.225	-.011-	.845	1.732	.065
	preoperative-nasal	7.88		300	.823				
	After 1 month-nasal	7.14	6-9	300	.896	.014	.804	.874	.465
Schimmer	preoperative-nasal	7.88		300	.823				
	After 3 month-nasal	7.57	7-9	300	.708	.052	.374	.430	.544
	preoperative-nasal	18.92		300	1.419				
	After 6 month-nasal	8.05	7-10	300	.984	-.042-	.464	-.021-	.025
Schimmer	preoperative-nasal	18.92	17-21	300	1.419				
	After 1 week-nasal	13.43	12-16	300	.980	-.021-	.716	5.691	.001
	preoperative-nasal	18.92		300	1.419				
	After 1 month-nasal	15.61	13-19	300	1.800	.117	.042	3.552	.032
Schimmer	preoperative-nasal	18.92		300	1.419				
	After 3 month-nasal	16.33	15-18	300	.957	-.050-	.392	2.792	.042
	preoperative-nasal	18.92		300	1.419				
	After 6 month-nasal	17.67	15-20	300	1.420	.093	.108	1.471	.321

*p Value <0.05 was statistically significant. TBUT: tear film break up time

Corneal Sensation

The mean preoperative Corneal Sensation in this gathering was 55.07 mm ± 3.16. Decrease of the sensation happened at the postoperative period to be 30.87 ± 4.86 at the finish of the primary week, 30.32 ± 3.65 toward the finish of the principal month, 41.05 ±

3.56 at the end of the third month, lastly 49.82 ± 4.03 at sixth month follow-up(Fig.1). The adjustments in the mean corneal sensation during the subsequent period were factually critical (p< 0.001 at the 1week, 1and 3 months and 0.045 at a half year). The most extreme increase of corneal sensation was seen toward the finish

of the subsequent period. This was because of mending of the nerve fiber (Tab. 1).

Tear Break-Up Time (TBUT)

The mean preoperative BUT in this group was 7.88 seconds ± 0.82. At the end of the 1st postoperative week the mean BUT reduced to be 6.31 ± 1.22, at the end of the 1st postoperative month the mean BUT was 7.14 ± 0.89, at the 3rd month was 7.57 ± 0.70. Finally at the end of the 6th postoperative month the mean TBUT improved to 8.05 ± 0.98 (Fig.1). The changes in the mean BUT were statistically non-significant at 1 week, 1 and 3 months (p= 0.065, 0.465, 0.544 respectively) and statistically significant at the end of the 6th month (p=0.025) (Tab.1)

Schirmer Test

Measurably critical decay in the mean Schirmer test happened at the all postoperative period. The mean preoperative Schirmer test in this gathering was 18.92 mm ± 1.41 Toward the finish of the first postoperative

month the mean Schirmer test diminished to 13.43 ± 0.98 At the first month was 15.61 ± 1.80. Toward the finish of the third postoperative month, the mean Schirmer test became 16.33 ± 0.95. At last, toward the finish of the sixth month the mean Schirmer test was 17.67 ± 1.41 (Fig. 1). All the adjustments in the mean Schirmer test were factually noteworthy (p=0.001 ,0.032 ,0.042 at first week 1,3 months individually) and non-critical 0.321 at half year (Tab. 1). Statistically critical weakening in the mean Schirmer test happened at the all postoperative period. The mean preoperative Schirmer test in this gathering was 18.92 mm ± 1.41 Toward the finish of the first postoperative month the mean Schirmer test diminished to 13.43 ± 0.98 At the first month was 15.61 ± 1.80. Toward the finish of the third postoperative month, the mean Schirmer test became 16.33 ± 0.95. At last, toward the finish of the sixth month the mean Schirmer test was 17.67 ± 1.41 (Fig. 1). All the adjustments in the mean Schirmer test were measurably noteworthy (p=0.001 ,0.032 ,0.042 at first week 1,3 months separately) and non-critical 0.321 at half year (Figure1).

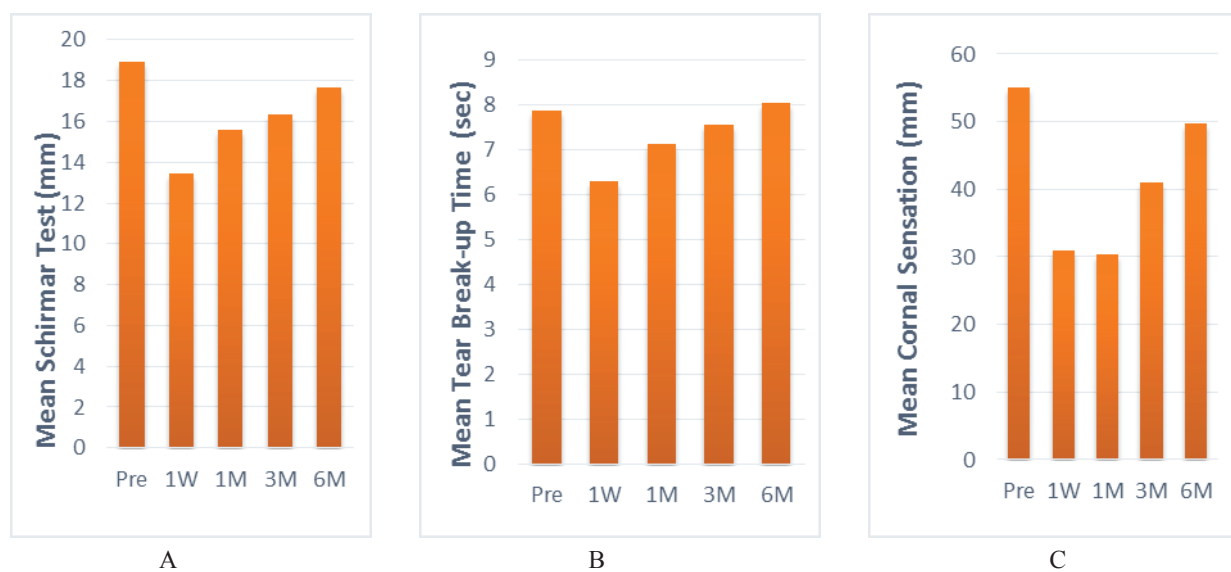


Figure 1: Change in A. mean corneal sensation, B. mean tear film break up Time, and C. mean Schirmer Test with time in the nasal Group

Superior Hinge

This gathering included 300 eyes of 200 patients (80 guys and 120 females). The mean age for these patients at the hour of medical procedure was 26.01 ± 4.96 years old (range:19-38 years of age). There was huge factual

contrasts for the examination of the corneal sensation, TBUT and Schirmer test at pre-employable evaluation and (first week, first month, third month and sixth month) as an events of correlation, where the connection were of feeble sorts with addition of follow up an ideal opportunity for the three pointers of intrigue (corneal

sensation, TBUT and Schirmer test) (Table 2)

Table 2: The differences in parameters before operation and 1week, 1, 3, and 6 months after operation of superior group

		Mean	Range	N	Std. Deviation	correlation	significant	Paired t test	P Value*
Corneal sensation	preoperative-superior	54.67	50-60	300	3.865				
	After 1 week-superior	25.33	10-35	300	7.192	.010	.866	29.99	.001
	preoperative-superior	54.67	25-35	300	3.865				
	After 1 month-superior	30.67		300	3.596	-.020-	.729	77.965	.001
Corneal sensation	preoperative-superior	54.67	35-45	300	3.865				
	After 3 month-superior	41.33		300	3.405	-.023-	.688	44.325	.001
	preoperative-superior	54.67	40-55	300	3.865				
	After 6 month-superior	46.17		300	3.584	-.099-	.088	26.650	.001
TBUT	preoperative-superior	8.60	7-10	300	.954				
	After 1 week-superior	6.33	5-8	300	1.077	.003	.955	27.337	.001
	preoperative-superior	8.60	6-9	300	.954				
	After 1 month-superior	7.33		300	.871	.028	.627	20.190	.001
TBUT	preoperative-superior	8.60	7-9	300	.954				
	After 3 month-superior	7.93		300	.773	-.058-	.318	20.113	.001
	preoperative-superior	8.60	7-9	300	.954				
	After 6 month-superior	7.87		300	.807	.056	.329	10.463	.001
Schirmer	preoperative-superior	18.47	16-21	300	1.457				
	After 1 week-superior	13.87	12-16	300	1.206	-.124-	.031	39.771	.001
	preoperative-superior	18.47	13-20	300	1.457				
	After 1 month-superior	15.20		300	1.603	.032	.587	26.543	.001
Schirmer	preoperative-superior	18.47	16-18	300	1.457				
	After 3 month-superior	16.73		300	.574	.061	.290	19.584	.001
	preoperative-superior	18.47	16-19	300	1.457				
	After 6 month-superior	17.47		300	.719	-.023-	.686	10.563	.001

p Value <0.05 was statistically significant. TBUT: tear film break time*

Corneal Sensation

The mean preoperative Corneal Sensation in this gathering was 54.67 mm ± 3.86. Decrease of the sensation happened at the postoperative period to be 25.33 ± 7.19 toward the finish of the principal week, 30.67 ± 3.59 toward the finish of the primary month, 41.33 ± 3.40 toward the finish of the third month, lastly 46.17 ± 3.58 at sixth month follow-up. (Fig. 2) The adjustments in the mean corneal sensation during the subsequent period were factually noteworthy (p=0.001, 0,001, 0,001, 0,001 at the 1week and 1month, 3 months and a half year individually). The greatest increase of corneal sensation was seen toward the finish of the subsequent period. This was because of mending of the nerve strands (Table2)

Tear Break-Up Time (TBUT)

The mean preoperative TBUT in this predominant gathering was 8.60 ± 0.95 . Toward the finish of the first postoperative week the mean Yet decreased to be

6.33 ± 1.07 , toward the finish of the first postoperative month the mean Yet was 7.33 ± 0.87, at the third month was 7.93 ± 0.77. At last, toward the finish of the sixth postoperative month, the mean TBUT improved to 7.87 ± 0.809 (Fig.2) . The adjustments in the mean TBUT were factually critical at 1week, 1,3 and a half year (p=0.001 , 0.001 , 0.001, 0.001 respectively) (Table 2)

Schirmer Test

The mean preoperative Schirmer test in this gathering was 18.46 mm ± 1.45 . Toward the finish of the first postoperative week the mean Schirmer test diminished to be 13.86 ± 1.20. At the 1st month it was 15.20 ± 1.60 . Toward the finish of the third postoperative month, the mean Schirmer test got 16.73 ± 0.57. At last, toward the finish of the sixth month the mean Schirmer test was 17.46 ± 0.71 (Fig.2). All the adjustments in the mean Schirmer test were measurably huge (p=0.001 , 0.001 , 0.001 and 0.001 at multi week, 1,3 and a half year separately) (Figure2)

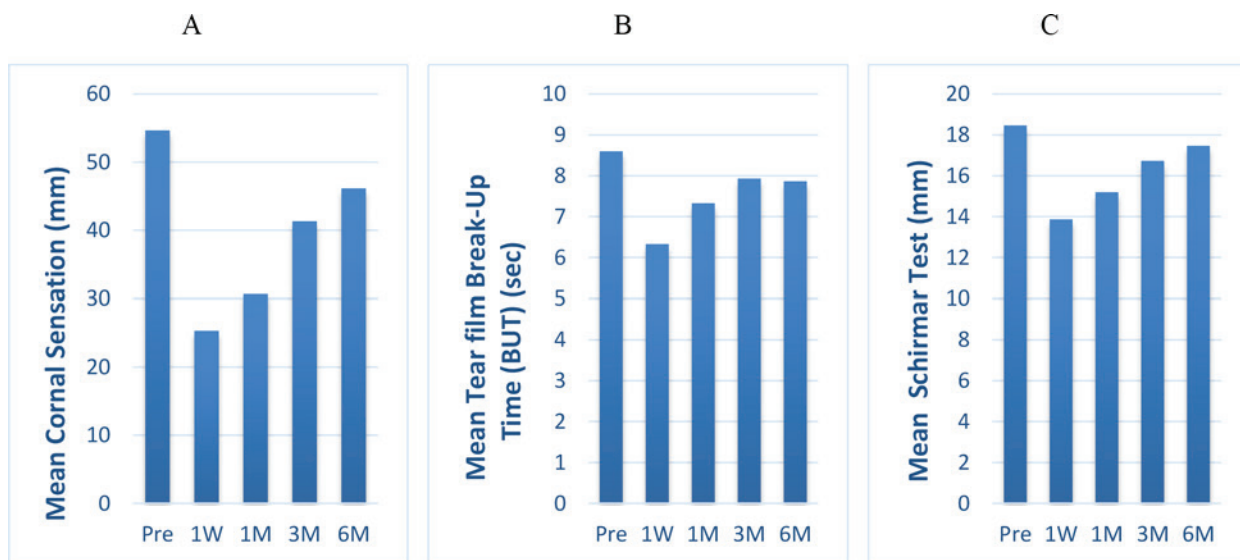


Figure 2: Change in A. mean of corneal sensation, B. mean tear film break up time, C. mean Schirmer test with time in the superior Group

Comparison between the results of the 2 groups

The two gatherings had been looked at with respect to the accomplished improvement in the corneal sensation, tear film separation time lastly the Schirmer test. There was no noteworthy measurable contrasts for the examination of the two gatherings at preoperative

time, the corneal sensation show distinction at first week and sixth month, TBUT and Schirmer test at evaluation of the first month, and third month show huge contrasts while sixth month follow up show no huge distinction, where the relationship were of powerless sorts with addition of follow up an ideal opportunity for the three markers of intrigue (corneal sensation, Yet and Schirmer

test) (Figure3)

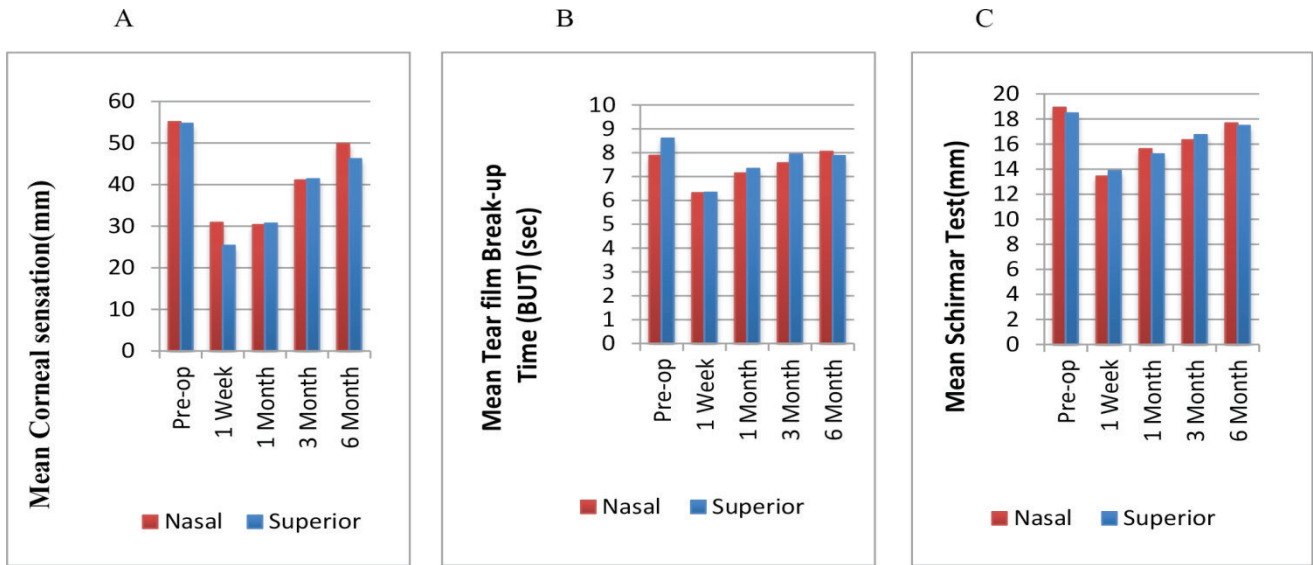


Figure 3: Change in A. mean of corneal sensation, B. mean Tear film Break up time, C. mean Schirmer test with time in both nasal and superior groups

All eyes had no intraoperative and postoperative flap complications.

Discussion

Laser-aided situ keratomileusis (LASIK) is one of the most generally performed refractive methodology with superb visual results. Dry eye disorder is one of the most regularly observed inconveniences after LASIK, with most patients creating probably some mellow dry eye indications postoperatively¹⁹. In LASIK medical procedure, a corneal fold is made, interfacing a corneal tissue pivot with the remainder of the cornea, at that point just the corneal stroma is removed utilizing the excimer laser. A microkeratome is utilized to make a corneal fold in LASIK. One of the major perceived inconveniences of this medical procedure is dry eye. LASIK has been accounted for decline in corneal affectability, tear film flimsiness, diminished watery tear creation and epitheliopathy of the cornea and conjunctiva^{8,14,15,20-23}. Lasik methods went smooth and unremarkable. Descending uprooting of the fold was appeared in seven instances of the nasal gathering, which was overseen promptly with amazing visual result toward the finish of our subsequent period. Unfamiliar body and consuming sensation were appeared in the early postoperative period in 100 patients in the nasal and 120 patients in unrivaled gatherings which vanished later in all patients, no other postoperative difficulties were accounted for. No

intraoperative troubles or entanglements were accounted for in the two gatherings as all. Our examination showed stamped decline in corneal sensation toward the finish of the first week postoperative with $p = 0.001$ which is going to arrive at factual hugeness level-between the two gatherings. Corneal sensation continuously improved through first and third months to reach practically approach the preoperative levels toward the finish of the sixth month in the two gatherings. Corneal sensation was at a higher clinical level everywhere on over the subsequent period in the nasal pivot bunch contrasted with the predominant pivot gathering despite the fact that, there was no noteworthy measurable contrasts for the correlation of the two gatherings at preoperative time, the corneal sensation show distinction at first week and sixth month, TBUT and Schirmer test at evaluation of the first month, and third month show critical contrasts while sixth month follow up show no huge contrast. Throw et al found that corneal sensation has gotten back to approach preoperative levels by 3 weeks after LASIK. This degree of return of corneal sensation is likely a helpful degree of recuperation to permit corneal security by the sensation-instigated squint and tearing reflexes²⁰. This watched time is generously shorter than the recently announced time 9.3 months²⁴. Donnenfeld et al showed a huge decrease in corneal

impression that didn't re-visitation of preoperative levels even by a half year in eyes with prevalent pivot folds, though there was full recuperation at a half year in the nasal pivot gathering ,additionally they detailed that mean corneal sensation was more noteworthy in corneas with a nasal-pivot fold contrasted and corneas with an unrivaled pivot fold at all postoperative visits ($P < 0.001$). The loss of sensation was most prominent at multi week and indicated improvement at each resulting time stretch as long as a half year. By and large, dry eye signs and indications were most noteworthy during the quick postoperative period and improved at all ensuing time stretches ²⁵. Kumano et al demonstrated that the diminishing in corneal affectability in patients with a nasal pivot was fundamentally more prominent than in those with a prevalent pivot at 1 and 3 months postoperatively despite the fact that there was no critical distinction between the gatherings at 6, 9, and a year after surgery ²⁶. In 2005, Vroman et al found a noteworthy distinction in nasal corneal affectability just at multi month, with better sensation in the nasal pivot group ²⁷. Nassaralla et al have arrived at a resolution that pivot area and fold thickness seem to assume a part in the pace of recuperation of corneal affectability after LASIK, with quicker recuperation related with more slender folds and a nasally found hinge ²⁸. Notwithstanding, in our examination we exhibited that the pace of recuperation was comparative in the two gatherings in spite of the fact that we didn't utilize the fold thickness as a looking at point as we made the fold thickness consistent in all instances of the two gatherings. The microkeratome cuts off a large portion of the nerves that course from the limbus to innervate the stroma and epithelium in the focal cornea. This may create a neurotrophic epitheliopathy that could cause diminished tear ^{14,23, 25,26,29, 30}. Ordinary tear work is fundamental for keeping up corneal capacity and structure. Dry eye has become an undeniably very much reported inconvenience following LASIK. Various potential etiologies clarifying the presence of this complexity have been proposed, including harm of the chollis cells by the weight produced by the attractions ring, modification of the corneal ebb and flow influencing tear strength, and prescriptions that can actuate transient dry-eye symptoms ¹⁰. In our investigation, we performed TBUT and Schirmer tests to equitably decide the distinction in tear-film security in both pivot gatherings. Despite the fact that, the mean preoperative

Yet was 7.87 sec. what's more, 8.60 sec. in the nasal and unrivaled gatherings separately which is moderately low scores, there was no any clinical indications or indications of dry eye preoperatively. The outcomes indicated that in spite of the fact that tear creation and capacity seemed to diminish in the two gatherings, there was no factual essentialness contrast was seen between both nasal and prevalent pivot gatherings. Lee and Joo additionally looked at pivot area and dry-eye signs. They found a noteworthy. decline in TBUT at 2 months in the predominant pivot bunch contrasted and the nasal-pivot group ³¹.

Conclusion

There was a huge decrease in corneal sensation following LASIK in nasal and predominant gatherings. Sensation improved at untouched stretches and re-visitations of nearly, preoperative levels around a half year postoperatively. Related with the corneal denervation is a prompt postoperative increment in dry-eye as estimated by TBUT and Schirmer test that improved utilizing oils and with ensuing visits.

Ethical Clearance: Taken from the ethical committee of Faculty of Medicine, University of Thi-Qar, Iraq.

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Conflict of Interest: The authors declare that there is no conflict of interest.

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