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Original Research

A comparative study of conventional versus side- cut femtosecond LASIK

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ABSTRACT:

Background: One of the most frequent adverse effects of LASIK surgery is dry eye. Up to 35% of patients experience symptoms that last for six months following LASIK, ranging from minor discomfort to severe pain, photophobia, and impaired visual acuity. The present study was conducted to compare conventional versus side- cut femtosecond LASIK. **Materials & Methods:** 50 patients with myopia of both genders were divided into 2 groups of 25 each. Group I patients underwent traditional 70-degree side cut using the 60 kHz IntraLase FS (Abbott Medical Optics, Santa Ana, CA) and group II, femtosecond-assisted LASIK using inverted 130-degree side cut using the 150 kHz IntraLaseiFS. In preoperative and postoperative months 1, 3, 6, and 12, CocheteBonnetaesthesiometry assessed corneal feeling. **Results:** CDVA (logMAR) was -0.15 and -0.15, manifest sphere was-4.61 and -4.60, manifest cylinder was +0.69 and +0.64, Manifest SE was -4.31 and -4.30, coma was 0.19 and 0.20, trefoil was 0.18 and 0.17, spherical aberration was 0.08 and 0.08 and RMS error was 0.33 and 0.33 in group I and II respectively. The difference was significant (P< 0.05). Corneal sensation score in group I and group II, preoperatively was 59.4 and 59.1, at 1 month was 14.2 and 15.3, at 3 months was 19.7 and 19.9, at 6 months was 43.1 and 43.5 and at 12 months was 56.4 and 57.1 respectively. The difference was significant (P< 0.05). **Conclusion:** In the first year following surgery, LASIK flaps with an inverted side cut are linked to a better recovery of corneal feeling than flaps with a standard side cut.

Keywords: LASIK surgery, photophobia, Myopia

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INTRODUCTION

One of the most frequent adverse effects of LASIK surgery is dry eye. Up to 35% of patients experience symptoms that last for six months following LASIK, ranging from minor discomfort to severe pain, photophobia, and impaired visual acuity.[1] Abnormal corneal sensation has been linked in numerous studies to post-LASIK dry eye. Neurotrophic corneal epitheliopathy results from cutting the LASIK flap because it damages corneal nerves and interferes with neurosensory feedback, which is necessary for the proper control of tear production, tear osmolarity, tear film stability, and blink reflex.[2]

Variations in LASIK method have been shown in previous research to either improve or aggravate the severity of dry eye complaints.[3] While nasal-hinge flaps have been linked to a decrease in postoperative dry eye, deeper laser ablation depths, thicker flaps, wider hinges, and superior-hinge flaps have all been linked to increased dry eye. When compared to flaps created with a microkeratome, LASIK flaps created using a femtosecond laser have been linked to longer tear break-up times and less dry eye.[4]

Some have suggested that inverted side-cut flaps result in better wound healing and improved apposition of severed nerves because of the biomechanical superiority of the cut. However, to the best of our knowledge, it is unknown whether improvements in theseparameters translate to clinical improvements in corneal sensation and dry eye symptoms.[5]The present study was conducted to compare conventional versus side- cut femtosecond LASIK.

MATERIALS & METHODS

The study was carried out on 50 patients with myopia of both genders. All gave their written consent to

participate in the study.
Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 25 each. Group I patients underwenttraditional 70-degree side cut using the 60 kHz IntraLase FS (Abbott Medical Optics, Santa Ana, CA)and group II,femtosecond-assisted LASIK using inverted 130-degree side cut using the 150 kHz IntraLaseiFS (Abbott Medical Optics). In preoperative and postoperative months 1, 3, 6, and 12, CocheteBonnetaesthesiometry (Luneau Ophthalmologia, Chartes, France) assessed corneal feeling (60 mm ¼ normal sensibility; <60 mm ¼ depressed sensation). Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Assessment of parameters

Parameters	Group I	Group II	P value
CDVA (logMAR)	-0.15	-0.15	1
Manifest sphere	-4.61	-4.60	0.98
Manifest cylinder	+0.69	+0.64	0.73
Manifest SE	-4.31	-4.30	0.97
Coma	0.19	0.20	0.82
Trefoil	0.18	0.17	0.94
Spherical aberration	0.08	0.08	1
RMS error	0.33	0.33	1

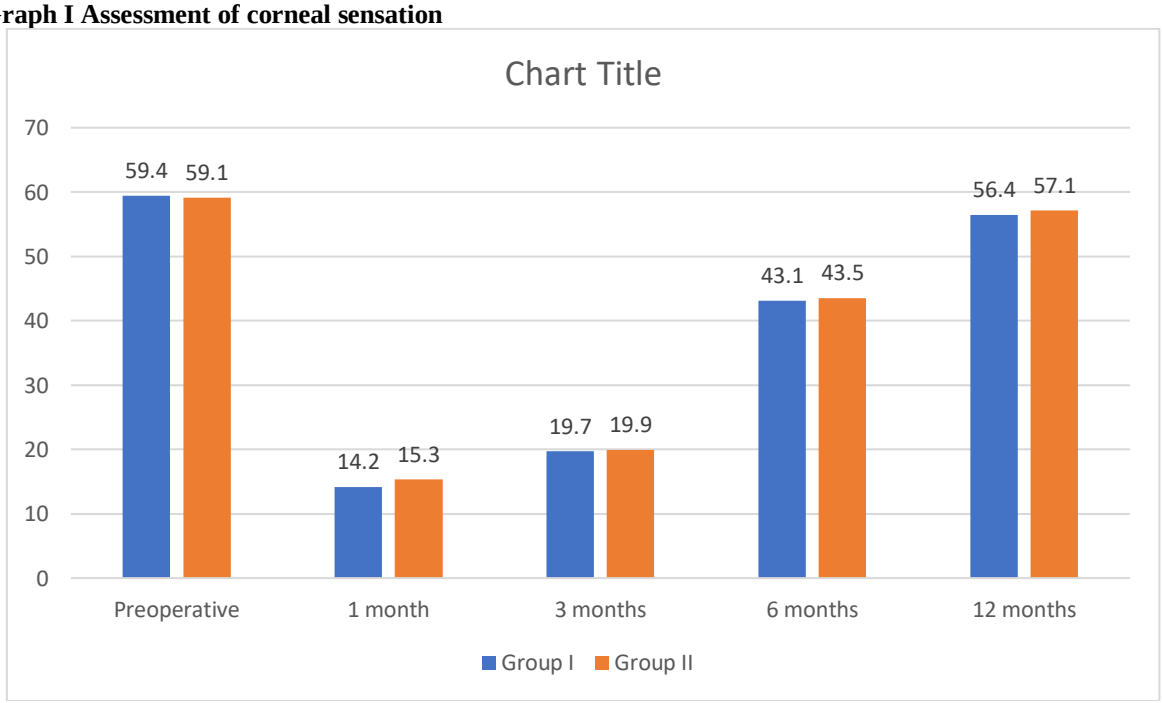
Table I shows that CDVA (logMAR) was -0.15 and -0.15, manifest sphere was -4.61 and -4.60, manifest cylinder was +0.69 and +0.64, Manifest SE was -4.31 and -4.30, coma was 0.19 and 0.20, trefoil was 0.18 and 0.17, spherical aberration was 0.08 and 0.08 and RMS error was 0.33 and 0.33 in group I and II respectively. The difference was significant (P< 0.05).

Table II Assessment of corneal sensation

Corneal sensation	Group I	Group II	P value
Preoperative	59.4	59.1	0.16
1 month	14.2	15.3	0.02
3 months	19.7	19.9	0.05
6 months	43.1	43.5	0.05
12 months	56.4	57.1	0.01

Table II, graph I shows that corneal sensation score in group I and group II, preoperatively was 59.4 and 59.1, at 1 month was 14.2 and 15.3, at 3 months was 19.7 and 19.9, at 6 months was 43.1 and 43.5 and at 12 months was 56.4 and 57.1 respectively. The difference was significant (P< 0.05).

Graph I Assessment of corneal sensation



DISCUSSION

Myopia, commonly known as nearsightedness, is a refractive error of the eye. It occurs when the eye is too long relative to its focusing power, or the cornea has too much curvature, causing light entering the eye to focus in front of the retina instead of directly on it.[6] As a result, distant objects appear blurry, while close objects can be seen clearly.[7]Symptoms of Myopia include blurry vision when looking at distant objects, such as road signs or the television screen, squinting to see distant objects more clearly, eye strain or headaches, especially after reading or looking at close-up work for extended periods.[8]Causes of Myopia are genetic factors, environmental factors and changes in the shape of the eye.[9,10]The present study was conducted to compare conventional versus side-cut femtosecond LASIK.

We found that CDVA (logMAR)was -0.15 and -0.15, manifest spherewas -4.61 and -4.60, manifest cylinder was +0.69 and +0.64, Manifest SE was -4.31 and -4.30, coma was 0.19 and 0.20, trefoil was 0.18 and 0.17, spherical aberration was 0.08 and 0.08 and RMS error was 0.33 and 0.33 in group I and II respectively. Kung et al[11]compared corneal sensation and self-reported dry eye symptoms after femtosecond-assisted LASIK with conventional versus inverted side cuts. A total of 120 eyes in 60 participants with myopia were selected. Preoperative corneal sensation as measured by mean CocheteBonnetaethesiometry was equal between the inverted and conventional side cut groups but was better in eyes with an inverted side cut compared with a conventional side cut at all postoperative months (inverted vs. conventional: 1 month, 14.5 vs. 13.2 mm; 3 months, 24.9 vs. 18.4 mm; 6 months, 51.2 vs. 42.6 mm; 12 months, 59.8 vs. 58.3 mm; all P 0.02). None of the subjective dry eye parameters demonstrated statistically significant differences between the groups at any time point.

We observed that corneal sensation score in group I and group II, preoperatively was 59.4 and 59.1, at 1 month was 14.2 and 15.3, at 3 months was 19.7 and 19.9, at 6 months was 43.1 and 43.5 and at 12 months was 56.4 and 57.1 respectively. Donnenfeld ED et al[12]investigated the effect of hinge width on corneal sensation and dry-eye syndrome after laser in situ keratomileusis (LASIK).Fifty-four patients at least 18 years of age had bilateral LASIK with a narrow nasal hinge microkeratome flap in 1 eye and a wider nasal hinge microkeratome flap in the other eye. In all eyes, the flaps were 160 microm in thickness with a diameter of 9.5 mm. Masked Cochet-Bonnet esthesiometry was performed in the central cornea preoperatively and at 1 week and 1, 3, and 6 months. Dry eye was evaluated at the same intervals by lissamine green corneal and conjunctival staining, Schirmer test with anesthesia, and tear-film breakup time.Corneal sensation was significantly reduced from preoperative levels through 6 months in the narrow-hinge group and through 3 months in the wider-hinge group (P< or =.002). The mean corneal sensation was greater in corneas with a wider hinge flap than in those with a narrow hinge flap at all postoperative examinations; the difference was significant at 1 and 3 months (P< or =.002). The loss of sensation was greatest at 1 week and improved at all subsequent examinations. Overall, dry-eye signs and symptoms were greatest immediately postoperatively and improved at subsequent intervals.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that in the first year following surgery, LASIK flaps with an inverted side cut are linked to a better recovery of corneal feeling than flaps with a standard side cut.

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