



Comparison of Two Brands of LASIK Work Stations in Achieving the Best Desired Therapeutic Result in LASIK Surgery – A Retrospective Study

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ABSTRACT

Aim of this study is to compare the effectiveness of the two leading brands of the LASIK (Laser in situ Keratomileusis) work stations in treating the refractive status of the patients selected for the study, and to know whether one work station is better than the other. The brand names of the LASIK work stations are not mentioned, to protect the interest of the respective companies. Materials and methods consisted of 61 eyes operated by first author in Brand 1 LASIK work station and another set of 61 eyes operated by second author in Brand 2 LASIK work station. The cases chosen are operated from January 2012 to January 2016. The results thus obtained after LASIK surgery, were tabulated and compared. The results yielded same and comparable results in both the LASIK work stations.

Relevance of the study

The awareness of the LASIK procedure to get rid of glasses is becoming more and more popular among the patient community. It thus becomes an inevitable choice for a prudent ophthalmologist to master the technique of LASIK surgery. When an ophthalmologist desires to learn the technique of LASIK surgery, it becomes cumbersome for this ophthalmologist to decide as to which LASIK work station is good for him, to start his practice as a LASIK surgeon. The information provided by the manufacturing companies may not be of great help for him to draw a conclusion in deciding the brand. Here in our study we have compared the procedure and results of LASIK surgery done under two

leading brands of LASIK work stations, the data of which will be useful in decision-making for the aspiring LASIK surgeons.

Aim

Aim of the study is to find out whether one brand of LASIK work station is better than the other brand of LASIK work station and to enlighten whether both the brands are similar to each other in delivering the therapeutic results in LASIK surgery.

Materials and Methods:

Materials consisted of patients who walked into the outpatient departments of first and the second authors from January 2012 to January 2016.

The first author has treated 61 eyes by using Brand 1 LASIK work station which has one brand of microkeratome which takes a superior flap and one brand of excimer laser to treat the refractive errors. The second author has operated on one more set of 61 patients with Brand 2 LASIK work station having a different brand of microkeratome which takes a nasal flap and a different brand of excimer laser was used to treat the refractive errors in these patients. Both the authors were trained under a common senior Ophthalmologist who is a well known LASIK surgery expert. Both the authors were trained in the year 1999. There are no clinically significant differences in the protocols and procedures followed in managing LASIK cases in these two authors who did the study. Both myopic and hypermetropic patients were treated. The cases selected were exclusively with refractive errors. Other associated ocular lesions in general, and corneal lesions in particular were ruled out in these patients. All the patients who had keratoconus were excluded from the study. Only the cases which had sufficient thickness of the cornea were selected for the study. The other exclusion criteria were patients under 20 years, pregnant ladies, extremely large pupils, very high myopia with or without myopic degenerative changes

All the patients in the study were examined thoroughly by standard ophthalmological examination, including examination for dry eye. The refractive errors were determined both by autorefractometry and manual refraction methods. Subjective verification of the refractive power and clinical verification were done before establishing the accurate refractive powers of these patients. Keratometry values were calculated by autokeratometers. Pachymetry was done to calculate the thickness of the cornea in each case. Corneal Topography were done to understand the corneal contour and to help in ruling out the presence of keratoconus in each case. After analyzing all the data obtained, the suitability of the patients for LASIK were confirmed and only suitable candidates were chosen for the study. Other routine criteria like sufficient thickness of cornea, stabilisation of the

power and age of the patient being more than 20 years were also taken as criteria for including them in our study.

The LASIK surgeries were performed for these patients under topical anaesthesia. In brand 1 work station the microkeratome used created a superior flap, while in brand 2 the microkeratome created a nasal flap. In both the groups, before taking a flap, the microkeratome and vacuum unit are assembled and tested to ensure proper function. The manufacturer's recommendations in using the microkeratome were meticulously followed before proceeding with this step in both the brands. A steady translation speed was maintained to avoid creating irregularities in the stromal bed. The flap is then reflected towards the hinge and the superficial stroma dried sufficiently with sponge. Patients were asked to look at a target light while the Excimer laser is being delivered on the corneal tissue.

After this procedure which normally lasts from 10-45 seconds depending on how much correction is needed, the corneal flap is placed back in its original position. The lasered surface is thoroughly rinsed and cleaned and later the flap is allowed to dry and adhere for one to two minutes.

Patients were asked to come for follow up on first postoperative day, first postoperative month, second postoperative month and finally on the third postoperative month.

The parameters used to compare results of two brands were, vision better than 6/9, stabilization of vision, per-operative irregular flap and its implication on postoperative healing pattern, postoperative healing of flap healing in other cases.

Table1-Salient features of two brands of LASIK Work Stations

Particulars	Brand 1 LASIK Station	Brand 2 LASIK Station
Excimer Laser ablation type	Scanning spot	Scanning spot
Beam Profile	Top hat/ Truncated Gaussian	Gaussian
Beam Size in mm	2	0.68
Average Fluence- mJ/cm X Cm	120	200
Pulse frequency(Hz)	100	400
Eye Tracker sampling rate	240	400
Optical Zone	6.0 mm	4.5 to 8mm
Treatment Zone	7mm	5.2 to 8.7mm
FDA Approval Year	2000	2003
Microkeratome	Superior flap	Nasal flap
Microkeratome suction rings	8.5 to 9.5mm	9.0mm to 9.5mm
Flap Thickness	140microns	110microns
Blade oscillation in rpm	15000	4000-20000
Flap diameter in mm	10.5	8.5, 9, 9.5 and 10
Forward speed in mm /sec	variable	1.4 to 4
Motors1 or 2	2	2

Other parameters included recurrence or regression of the power, post-operative symptoms of glare, and time taken for stabilisation of glare.

Results

Age and sex distribution of the patients in our study in brand1 LASIK work station and brand 2 work station were as follows;

In brand 1 LASIK work station, 16 eyes were of male patients , who were subjected to LASIK surgery while, the number of female eyes was 45. The patients between 20 years to 30 years were 49 eyes , patients aged between 31 years to 40 years were 8 eyes and above 40 years 4 eyes. In brand 2 LASIK 19 eyes were of male patients, while 42 eyes belonged to the females. The patients between 20

years to 30 years were 42 eyes , patients aged between 31 years to 40 years were 11 eyes and above 40 years 8 eyes.

In brand 1 LASIK work station, 10 eyes had refractive power up-to 3Dioptres, 35 eyes had the power ranging from 3D to 6D, and 16 eyes above 6D of refractive error.

In brand 2 LASIK work station, 15 eyes had refractive power up-to 3Dioptres, 37 eyes had the power ranging from 3D to 6D, and 9 eyes above 6D of refractive error.

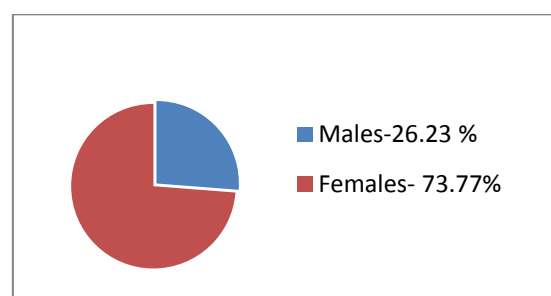


Figure 1- Sex distribution in Brand 1 LASIK

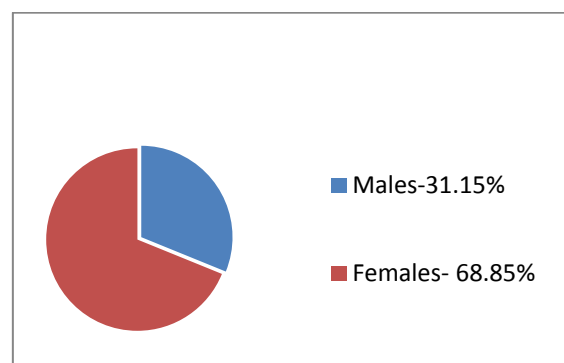


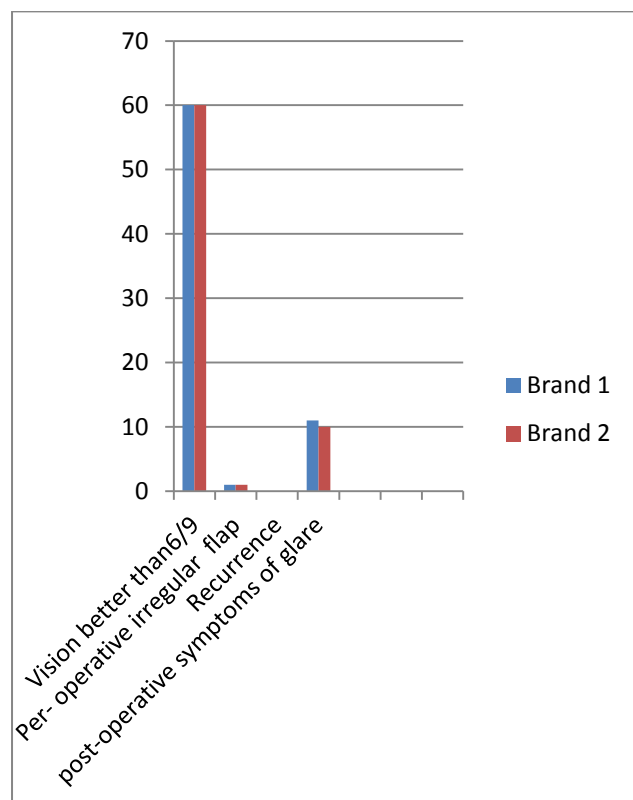
Figure 2-Sex distribution in Brand 2 LASIK

Table 2- Category of patients according to extent of power

Category of Patients	Brand LASIK 1	Brand LASIK 2
A (Refractive Power up to 3D)	10	15
B (Refractive Power from 3 to 6D)	35	37
C (Refractive Power above 6D)	16	09
Total	61 eyes	61 eyes

Table 3- Age Distribution of Patients in the study

Age of Patient	Brand LASIK 1	Brand LASIK 2
Age from 20 to 30 years	49 eyes	42 eyes
Age from 31 to 40 years	08eyes	11 eyes
Age above 40 years	04eyes	8 eyes
Total	61 eyes	61 eyes

**Figure 3-** X-Axis Parameters, Y-Axis number of patients

In Brand 1 LASIK work station, the vision was 6/6 in all the 60 eyes of total 61 eyes operated, while only one eye had post-operative 6/9. Similar result was seen in the Brand 2 Lasik work station with again 60 eyes of 61 eyes operated having 6/6 vision while one eye had 6/9.

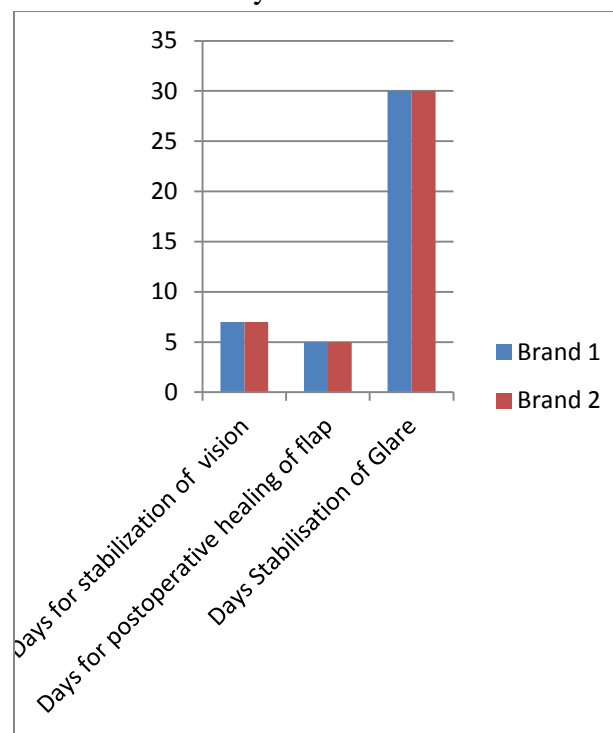
Even-though the vision was 6/6 in 98.4% of the cases in both the groups twelve hours after the surgery, the exact stabilisation was seen after 7 days after the surgery in both the groups.

Postoperative stabilisation and healing of flap was seen after 5 days in both the groups. Per-operative irregular flap was seen in one case in each group. There were no cases of recurrence in both the groups.

Post-operative glare was complained by 11 patients in group 1, while 10 patients complained of glare in group 2. The glare disappeared after three months in both the groups.

Discussion

The meticulous investigative methods followed, the proper case selection, motivated and co-operative patients are the factors, which played a major role in a commendable success in both the LASIK work stations in our study.

**Figure 4-** X- Axis Parameters, Y-Axis Number of days

It can be noticed that in 98.4% of the cases in both the groups there was best desired therapeutic result in both the groups. In only one case in Brand 1 work station and one case in Brand 2 work station there was postoperative vision of 6/9 observed. This was due to high order aberration in these patients, and selection of brand of LASIK work station in no way played any role in this deficiency observed in our study.

Per-operative irregular flap observed in both the cases were due to the limited palpebral fissure width which hindered the flap removal process, and it was not due to the error in any of the microkeratomes used in group1 or group 2. Both the authors had the experience of handling microkeratome which takes superior flap and the other one which takes nasal flap. No clinically significant differences could be quoted between both the types of microkeratomes. Recurrence of refractive error was not observed in both the groups on the third postoperative month.

There was no significant difference in the number of patients who complained of glare in both the groups. 11eyes in group1 had postoperative glare, while 10 eyes had glare in group 2. The post-operative glare disappeared after three months in all the patients in both the groups.

Complete healing of the flap occurred in 5 days in both the groups. There was no difference in this parameter also in both the groups.

Conclusion

After carefully observing the results obtained in Brand 1 LASIK work station and Brand 2 LASIK work station, our study categorically, concluded that there are no differences between these two brands of the LASIK work stations. Even-though this conclusion cannot be generalised for other LASIK work stations, as both the authors are not familiar with other LASIK work stations, our study helped us to understand that there is no major difference between these two leading LASIK work stations. Our study proved that probably the selection of the case, meticulous preoperative work up and dexterity in surgery are more important in the success of

LASIK cases than the brand of LASIK work station per-se.

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