

Pre and Post Treatment Comparison between IPL and LipiFlow for Meibomian Gland Dysfunction

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ABSTRACT

A prospective clinical study was conducted on subjects with meibomian gland dysfunction. All the subjects were first provided with an Ocular Surface Disease Index (OSDI) questionnaire and further evaluation was done on the basis of tests such as TBUT, Schirmer's Test one (with topical anaesthesia) and LipiView. In consideration of the tests 50 subjects were selected and were divided into two groups in the account of the treatments they were going to receive. 25 subjects were given IPL treatment (Group-1) while the rest 25 were provided with Lipiflow treatment (Group-2). After 1 month of their respective treatments all the 50 subjects were evaluated again on the basis of the tests carried out in the pre evaluation. The post-evaluation after one month of follow-up showed a significant increase in LLT and a significant decrease of meibomian gland dropout in both groups. A notable increase of TBUT was seen in the Group-1 as well as Group-2. Pre and post Schirmer level remain almost unchanged in the subjects of both groups. Both treatments are equally effective in patients in meibomian gland dysfunction. The only difference is that IPL treatment is cost-efficient whereas Lipiflow treatment is time efficient.

Keywords: Meibomian Gland Dysfunction; Intense Pulsed Light, Ocular Surface Disease Index

INTRODUCTION

In this new era of technology as the demand for VDU screen is increasing so is the increase in the rate of eye-related issues that can be observed and one of the major eye-related issues in that most of the population is facing nowadays is a dry eye disorder. Dry eye disorder occurs either due to the inability of the lacrimal glands to produce required tears or due to the inability of meibomian glands to produce the required amount of oil to retain the tears on the eye surface. Dry eye due to meibomian gland dysfunction is one of the major growing disorders around the world that affects 46.2% to 69.3% of Asians and 3.5% to 19.9% of whites⁽¹⁾. Recent researches have also reported that the prevalence of dry eyes ranges from 5 percent to as high as 50 percent in different population across the world⁽²⁾.

Earlier patients having meibomian gland dysfunction were mostly advised to go for warm compresses or lubricating eye drops⁽³⁾ but being truly committed to the treatment and using the recommended regimen for a longer duration of time is not possible for most of the patients. Poor patient compliance is further complicated by the difficulty in delivering a therapeutic range of temperatures to the meibomian glands. To improve patient compliance, more convenient treatment modalities are necessary.

Day by day a large number of eyelid warming devices are coming into play for patient convenience and for providing a calibrated temperature^(4,5) but somehow a very little evidence is available about how good these particular devices are. So, recently two new treatments namely, Intense Pulsed Light (IPL) and Lipiflow have come

into play to treat the patients suffering from MGD. Both of these treatments aim to remove the blockage in the meibomian glands and help to improve lipid secretion. IPL mainly focuses on intense pulsation mechanisms while lipiflow follows thermal pulsation.

The tears film consists of three layers- Liquid (aqueous) produced by the lacrimal gland, Oil (Lipid) produced by the meibomian gland, Mucous like (Mucin) produced by goblet cells in the conjunctiva. Each component has a particular function. Any problems in the production of any of these three components can lead to Dry eye Disorder⁽⁶⁾. Several external factors can lead to dry eyes like computer use, menopause, aging, contact lens wear, smoking, medications (antihistamine, antidepressants) etc.⁽⁷⁾.

MATERIAL AND METHOD

Lipiview

LipiView is a non-invasive technique. It helps in obtaining an accurate picture of patient's tear film and is also helpful in measuring lipid content and gland loss. Lipiview is an in office procedure. The subject was instructed to look directly at a special light camera and blink normally. In this step Lipiview measures the Lipid layer thickness, partial blink and complete blink of the subject. In the second step that is gland imaging the examiner inverts the upper and the lower eye lid of the subject to capture the image of the meibomian gland and assesses the loss⁽⁸⁾.

Tear Breakup Time (TBUT)

Tear breakup time test is used to assess evaporative eye disease. To measure TBUT subject's eyes were instilled with Fluorescein and was advised to not blink while the observation was done under slit lamp using the broad beam of cobalt blue filter. The TBUT was recorded as the number of seconds that elapse between the last blink and the appearance of the first dry spot in the tear film. TBUT recorded greater

than 10 second as considered to be normal⁽⁹⁾.

Schirmer Test 1 (with Topical Anaesthesia)

Schirmer test 1 is performed to evaluate the baseline tear secretion of the subject. In this test the subject eyes were instilled with topical anaesthetic (proparacaine). Schirmer strips are then inserted at the junction of the middle and outer thirds of the lower lid. After 5 minutes the paper is removed and the amount of wetting was measured for both the eyes. Normal values were considered to be 15mm or more than 15 mm⁽¹⁰⁾. Schirmer test 1 is better than Schirmer test 2 for the assessment of MGD in the patients as it directly eliminates the possibility of reflex tearing.

PROCEDURE ADOPTED

Each subject was provided with OSDI questionnaire on basis of which their symptoms were scored and the subjects who have a score of more than 45.00 were selected and their further MGD examination was done on the basis of TBUT, Schirmer 1 and Lipiview (LLT, Meibomian gland drop out). Subjects who were diagnosed with MGD were accounted as the study population. All the subjects diagnosed with MGD were divided in two groups. Group one or IPL group consisted of subjects getting treated with 3-4 seating's of IPL on the basis of severity of MGD whereas Group two or Lipiflow group consisted of subjects who were treated with a single 12 minutes in- office procedure of lipiflow.

After completing their respective treatments Group 1 and Group 2 subjects were evaluated after a month follow up according to the same previously done procedures.

RESULTS

A total of 50 subjects were recruited with all of 50 equally divided into both IPL (Group-1) and Lipiflow (Group-2) groups (Table 1). All the subjects of both the

groups were evaluated after one month of their respective treatments (Figure 1). All the Pre and Post treatment parameters were taken into account and the analysis were done with paired t-tailed test using SPSS software.

Table 1- Gender Distribution in Group-1 and Group-2.

GROUPS	GENDER	NUMBER	PERCENTAGE
Group-1	MALE	10	40%
	FEMALE	15	60%
Group-2	MALE	11	44%
	FEMALE	14	56%

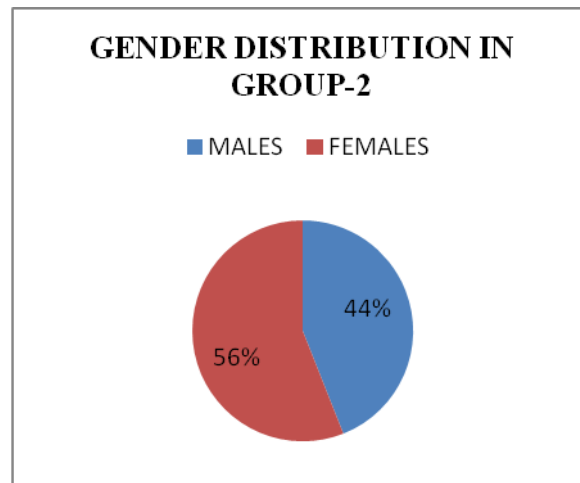
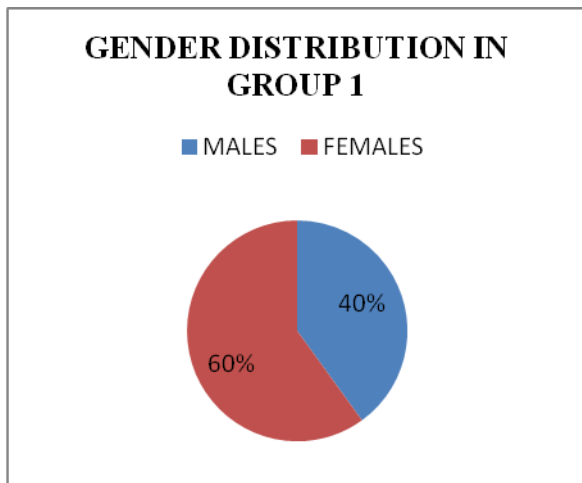


Fig.1 - Gender Distribution in Group-1 and Group-2.

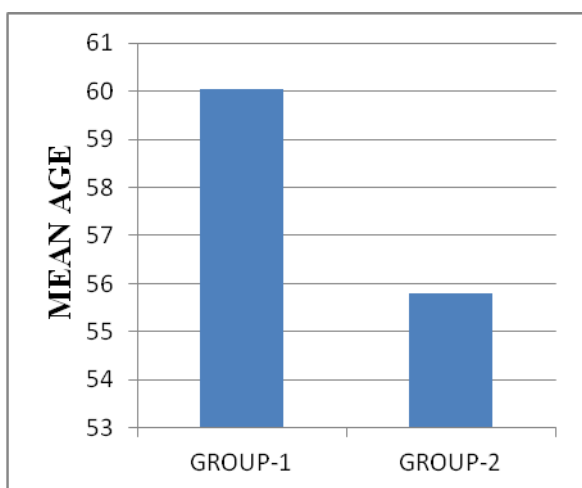


Fig. 2- Mean Ages in Group-1 and Group-2.

The mean age of subjects who underwent IPL treatment was 60.04 ± 10.25 and 53.36 ± 11.51 for subjects who underwent Lipiflow treatment (Figure 2).

TBUT

The Pre and Post treatment evaluation in Group-1 showed significant increase in TBUT values in both eyes with p value 0.03 in right eye and 0.012 in left eye. Similar increase in TBUT is observed in Group-2 with p value 0.010 in right eye and 0.002 in left eye (Figure 3 and Table 2).

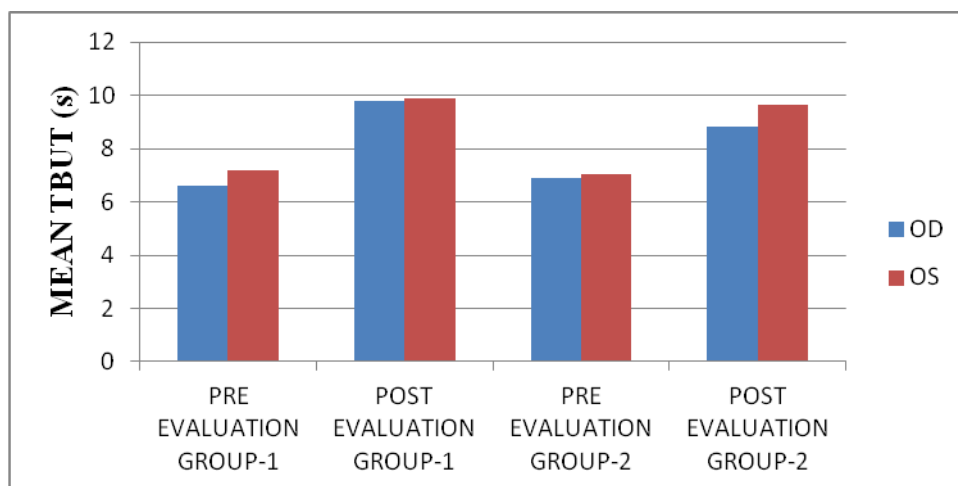


Fig.3- Pre and Post Mean Value of TBUT in Group-1 and Group-2

Table 2- Pre and Post mean and p-value of TBUT in Group-1 and Group-2

	Group-1			Group-2		
	PRE MEAN±SD	POST MEAN ±SD	P-VALUE	PRE MEAN±SD	POST MEAN ±SD	P-VALUE
OD	6.6±2.2	9.8±2.13	0.03	6.9±2.55	8.8±1.95	0.010
OS	7.16±2.36	9.9±1.57	0.012	7.04±3.21	9.6±2.68	0.002

SCHIRMER TEST 1

Pre and Post evaluation of Group-1 showed increase in Schirmer value in right eye with no increase in left eye whereas

Group-2 showed no significant difference in Schirmer test. Even though there is an increase in mean Post Schirmer values in both the groups (Figure 4 and Table 3).

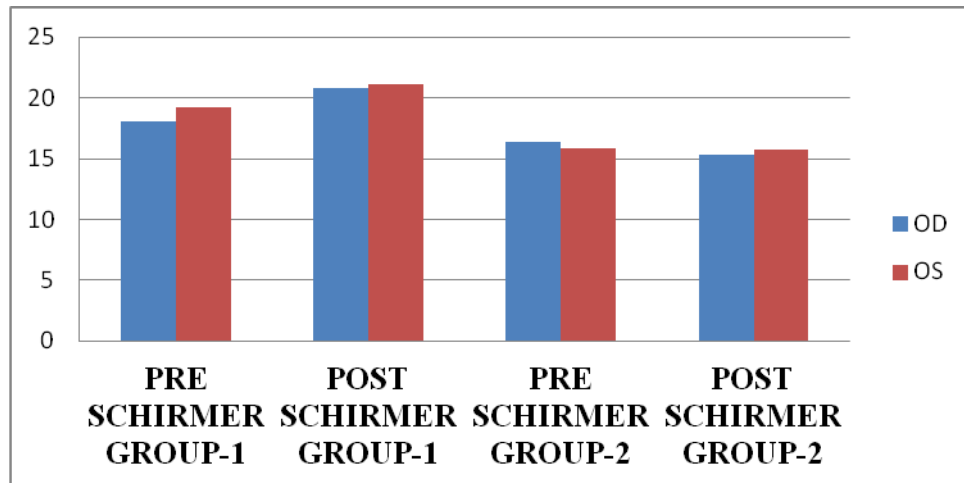


Fig.4- Pre and Post Mean Value of Schirmer in Group-1 and Group-2.

Table 3- Pre and Post mean and p-value of Schirmer test 1 in Group-1 and Group-2

	GROUP-1			GROUP-2		
	PRE MEAN±SD	POST MEAN ±SD	P-VALUE	PRE MEAN±SD	POST MEAN ±SD	P-VALUE
OD	18.08±9.33	20.8±7.29	0.010	16.4±10.2	15.3±7.47	0.31
OS	19.2±9.52	21.16±7.29	0.069	15.8±8.72	15.7±6.05	0.91

LLT

A significant increase is noted in LLT in both the groups with p-value < 0.001 in both the groups. This directly indicates

the increase in the level of lipids production in the patients of both the groups (Figure 5 and Table 4).

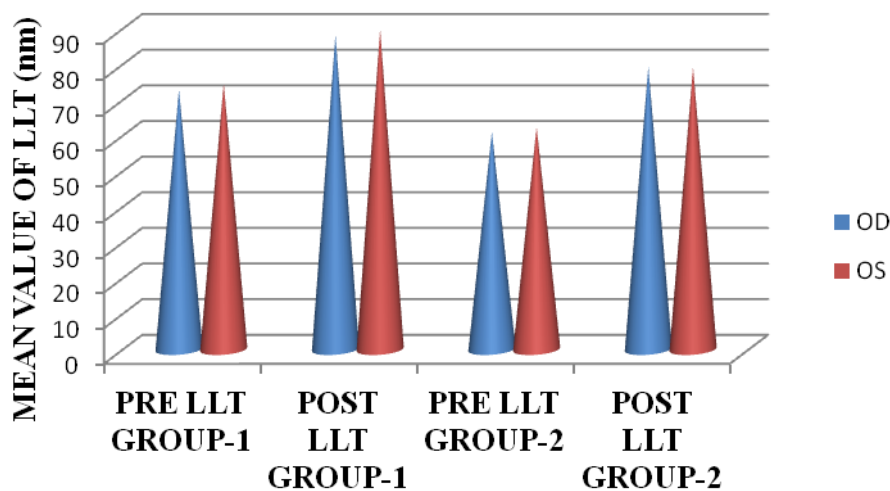


Fig.5- Pre and Post Mean Values of LLT in Group-1 and Group-2.

Table 4- Pre and Post mean and p-value of LLT in Group-1 and Group-2.

	GROUP-1			GROUP-2		
	PRE MEAN±SD	POST MEAN ±SD	P-VALUE	PRE MEAN±SD	POST MEAN ±SD	P-VALUE
OD	72.92±20.7	88.2±12.4	>0.001	61±14.8	79.28±15.03	>0.001
OS	74.64±19.8	89.68±11.5	>0.001	62.44±15.2	79.2±12.5	>0.001

MGD DROPOUT

Pre and Post MGD drop out values were significantly decreased in both the Groups with p-value <0.001. Giving a direct

indication of the efficiency of both the treatments in liquidifying the blockage present in the glands (Figure 6 and Table 5).

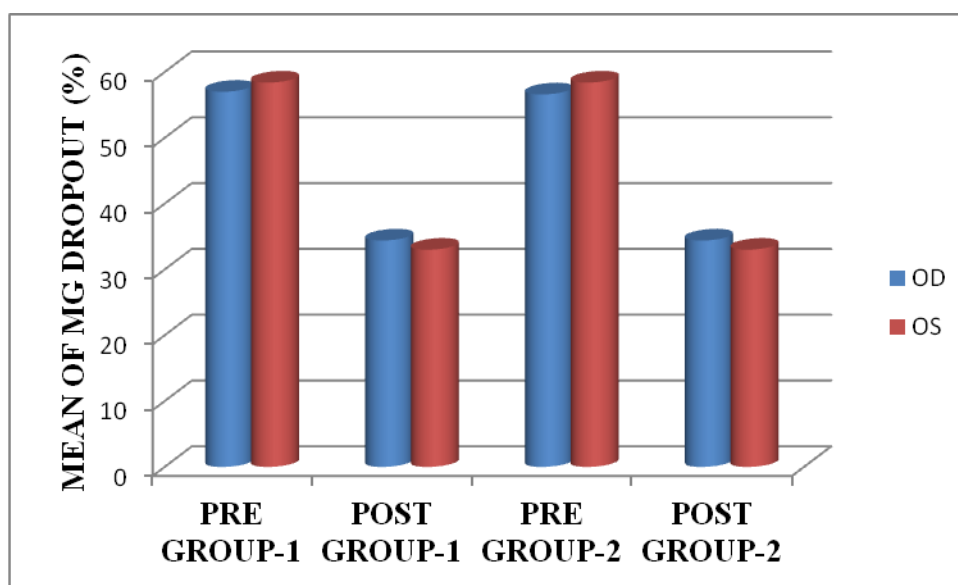


Fig.6- Pre and Post Mean Values of MGD Dropout in Group-1 and Group-2.

Table 5- Pre and Post mean and p-value of MGD Dropout in Group-1 and Group-2

	GROUP-1			GROUP-2		
	PRE MEAN±SD	POST MEAN ±SD	P-VALUE	PRE MEAN±SD	POST MEAN ±SD	P-VALUE
OD	57±22.6	34.4±14.9	<0.001	56.6±18.9	34.4±14.9	<0.001
OS	58.4±21.8	33±16.7	<0.001	58.4±21.8	33±16.73	<0.001

DISCUSSION

A number of studies have been conducted so far to evaluate the effects of IPL and lipiflow on the patients suffering from MGD. Though most of the studies proved them to be effective individually and in comparison to other available options there isn't any particular comparative study to observe the effectiveness of these two in comparison to one another.

In this study IPL and Lipiflow both proved out to be beneficial treatments for patients with MGD. Though, MGD is not totally curable but 3-4 seating of IPL and 1 seating of lipiflow in 6 months can be effective. The results showed significant increase in TBUT in both the groups with increase in LLT and decrease in meibomian gland dropout. Both of these treatments

showed effect on the lipid production but the schirmer test results of patients showed no difference indicating that they have no effects on aqueous production of the eyes.

In a similar fashion, studies conducted⁽¹¹⁾ highlighted an improvement in TBUT in patients was observed who were treated by lipiflow whereas in contrary study done⁽¹²⁾ showed no significant change in TBUT in patients treated with lipiflow. Study⁽¹³⁾ resulted improvement in schirmer levels for patients treated with lipiflow whereas in this study no significant changes in schirmer test was noted. Study carried out by⁽¹⁴⁾ on IPL treatment showed similar results in patients with Improvement in TBUT whereas study conducted by⁽¹⁵⁾ resulted in no improvement in TBUT. Similarly on the contrary of this study⁽¹⁶⁾

showed no change in LLT after getting treated by IPL.

In this study the effects of both these treatments were observed to be effective but the fact that the cost of 3-4 seating's of IPL is much lower than lipiflow cannot be terminated most of the population of India is below poverty line or in middle class who can't afford to pay that much for that population IPL could be a better and affordable option than lipiflow. Lipiflow does proved to be less time consuming and as much as effective as IPL which could be play as an advantage for individuals who can afford the treatment and don't have the time to come for regular visits. In respect to 3-4 seating of IPL; Lipiflow's one seating can efficiently provide the same results to the patients. This study only evaluated the outcomes of lipiflow and IPL after 6 months further studies can be carried out to evaluate the outcomes after 1 year or so and can also take in account a larger population.

CONCLUSION

Both treatments are equally effective in patients with meibomian gland dysfunction. The only difference is that IPL treatment is cost-efficient whereas lipiflow treatment is time-efficient. Looking at the socio- economic status in India IPL can be more beneficial for hospitals where most of the patients come from a middle-class background and Lipiflow can be helpful in patients who want to go for immediate treatment and can afford the price for it.

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