

Comparison between Autologous Serum Eye Drops and Punctal Occlusion for Treatment of Dry Eye Syndrome

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ABSTRACT

Background: Dried cornea condition characterized with misperception regarding eye coat because of slit insufficiency otherwise unreasonable vanishing that makes harm to dried surfaces also visual shell which related to manifestations regarding visual inconvenience.

Purpose: Comparing efficiency and safety of AS eye drops and Punctal occlusion for management of dry eye syndrome.

Patients and Methods: A prospective study was conducted in, (Al-Hussein and Bab-Elsheryia hospitals), a sum of 40 eyes of 40 patients suffering from Dry eye (24 males, 16 females) were recruited in this study. The first group contain 20 eyes that undergo AS eye drops. The 2nd group contain 20 eyes that undergo Punctal occlusion.

Results: The visual acuity in the first group before treatment was $3.5/9.3 \pm 1.91/9.2$ (mean \pm standard deviation) and after treatment in the second visit was $5.25/10 \pm 3.75/10$ ($P < 0.01$) with standard improvement 2 Snellen lines. In the second group visual acuity before treatment was $2.85/9.1 \pm 2.04/9.2$ and after treatment in the second visit was $4.65/9.2 \pm 4.37/10$, the normal increase is 3 visual letters. The VA become better in both groups

Conclusion: In summary, both two methods of management have similar efficiency in reducing discomfortable sensation in dry eyes, and almost have equivalent and improve in subjective symptoms. Punctal occlusion shows many benefits in conserving natural tears and enhancing tear quality and seemed to be better on tear film stabilization. AS eye drops and punctal occlusion improved BCVA

Keywords: Dry eye syndrome, Autologous serum eye drops, Punctal occlusion, Silicon plugs.

INTRODUCTION

Dried cornea condition characterized by means of confusion regarding eye coat because of slit insufficiency otherwise unreasonable vanishing that makes harm to dried surfaces also visual shell which related to manifestations regarding visual inconvenience ⁽¹⁾.

All studies proved occurrence regarding dried cornea increased over time, that it is more pervasive in women than in men as of late, reclassified dried cornea " multiple factor sickness regarding slit, visual shell shows outcomes regarding side effects, (counting unfamiliar eye feel dehydration otherwise bothering, consuming, bright affectability, hotness), optical aggravation, discharge crust over lashes, unsteadiness due to expected injury regarding visual coat ^(2,3).

The condition has been related to age, sex, Sjögren's disorder, joint inflammation, also expanded naturality regarding its component, irritation to visual coat expanded tear naturality, lead to visual coat aggravation, which is believed that cause focal component of dysfunctional tear syndrome. Precorneal slit assumes a basic function in shaping an efficient standard visual surface. Also, a Precarious slit affects optical surfaces. Hypothetically, management adding to the dry eye may viably increase practical BCVA for dysfunctional tear syndrome ^(4,5). Management of dry eye around 3 principle draws near – fake oil, wetting and

optical assurance, plugging is useful to lessen split waste, also against inflammatory decreasing supportive of fiery physiology of dry eye auxiliary regarding different components. dysfunctional tear syndrome is regularly partitioned into 2 kinds: lacking slit creation or evaporation. Inadequacy also tear creation additionally partitioned as 2 additional classes: dry eye disorder as immune system malady otherwise addition dry eye condition ^(6,7).

Content regarding blood looks like a precorneal film; all focuses were identical to special cases considering blood has nutrients. chemical changing development nutrient than is found regarding blood. Given that huge numbers of the basic parts are available with slit, utilization support of visual surface appears to be doable essentially dry eye. ⁽⁸⁾.

The basis regarding utilization for AS serum emerges transfer solid closeness toward serum, where it includes development aspect, nutrients, parts give important healthful elements for keeping up cells also diminish danger regarding defilement disease fix measures. Truth be told, person tears include factors, for example, epithelium development factor, given new nutrients and high movement and useful impacts ^(9,10).

Management with AS suggested to patients with a few visual surfaces unsettling influences, lack, inadequacy related illness, persevering imperfections, predominant, and postoperative dry eye incited.



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Individuals managed by twenty % near half have detailed abstract improvement in dry eye indications; examiners have additionally noted target dependent on fluorescein staining and consequences of break-up time tests ⁽¹¹⁾.

Closure of the punctum doesn't enhance major side effects or impermanent embedded, of the influenced eye, Collagen plugs break down inside either out suddenly or are eliminated by a doctor. Clinicians typically prescribe silicone punctal plugs after an affected patient has found symptomatic relief with the collagen punctal. Like punctal occlusion, intracanalicular plugs also block tear drainage, though they act by blocking the canaliculus instead of the punctum ^(12, 13).

Punctal plugs are accepted to impede tear waste by blocking the puncta. The blockage is, therefore, proved to help to conserve the needed amount. Common well-known symptoms regarding impediment (flood of tears), restrained tear leeway, and desensitization of the corneal surface. Various plans and states of attachments have been created to expand their adequacy and to limit entanglements. Also, they are formed resembling a mushroom. The upper part encourages evacuation ^(14, 15).

The distance across the plug is various from type to type and will be in addition measurement. More current using substantial decrease infection bond also odds contaminations. Even fittings impermanent may last for a long time without complication. fittings are needed steps in preparation patient. Also, in some cases, they don't need expansion of canaliculi. Evacuation of these even canalicular attachments may demonstrate testing, at times ⁽¹⁶⁾.

As of late, diminished unstable BCVA gotten widely recognized objections saw through specialists an incredible. Flimsy eye contour unequipped for keeping up a smooth precorneal surface, which detrimentally affects visual capacity and may contrarily influence quiet personal satisfaction ⁽¹⁷⁾.

PATIENTS AND METHODS

A prospective study was conducted at (Al-Hussein and Bab-Elsheryia Hospitals), a sum of 40 eyes of 40 patients suffering from Dry eye (24 males, 16 females) were recruited in this study.

Ethical approval

The study was approved by the Ethics Board of Al-Azhar University and informed written consent was taken from each participant in the study. This work has been carried out following the Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

The first group of 20 eyes undergoes AS eye drops while the second group of 20 eyes undergoes Punctal occlusion. Group 1 included patients who have

any chronic diseases that do not respond to the standard treatment

All patient in group one undergoes AS eye drop 5 times per day for three months which is prepared by the following steps. Plasma was collected then left without anticoagulant. At the point when blood was molded, the blood is an extractor for disconnecting blood liquid from hard substances. After blood extraction, the blood preserved at disinfected compartment Its better preserved at 20% concentration, which relies upon the centralization of normal components in normal tears. AS better to be put away for under 30 days at 4°C. if uses, for 90 days can be taken care of at -20°C. It is critical that AS vials should be dodged light to avoid degradation of vitamin A. No further medication was used during the period of treatment.

All patients in the second group undergo punctal occlusion, by obstruction of the upper and lower punctum with silicone punctal plugs. patients set down on a level plane, at that point 27-gauge needle appended to tube with sterile ointment 0.2% arrangement at that point embedded 2–4 mm into every punctum, and lubricant pushed into the canaliculi and step by step pulling back indicator headed for fulfilling punctum with lubricant. Later once occlusion all were encouraged to close operated eyes for roughly 20 minutes. warmed expendable cover used to prevent spillage with squinting.

The used comparative grades for assessing are red-eye, burning sensation, photophobia, and blurred vision on a reviewed scale from 1 to 4 in which score 1 "no manifestation," score 2 "slight," score 3 "moderate," and score 4 "extreme."

Both groups are subjected to the following tests.

- Schirmer's test (abnormal value: ≤ 5 mm/minute),
- Visual acuity
- Tear film BUT (abnormal value: ≤ 5 seconds),
- Corneal fluorescein staining score

Follow up

To assess the efficacy of our study all patients in both groups went through follow-up assessments at 2 days, 14 days, 1 month, and 3 months postoperatively. At each follow-up examination, measurement of Schirmer's test, Visual acuity, Tear film BUT, and Corneal fluorescein staining was done compared with those obtained before using AS eye drop and punctal occlusion. Also, each subsequent visit remembered assessment of the occluded punctum in the second group through slit lamp to confirm good closure of the punctum.

Inclusion criteria

Inclusion criteria included: (i) age > 18 years old (ii) Tear film BUT ≤ 5 second, (iii) Schirmer's test ≤ 5 mm/minute),

Exclusion criteria

Exclusion criteria included: (i) Children <18 years old (ii) excessive corneal melting (iii) Recurrent corneal erosion syndrome (iv) Active infection of the ocular surface (v) Vitamin A deficiency.

Safety criteria

The appearance of any side effects correlated with the AS eye drops such as viral, bacterial infection, or severe eye irritation were monitored. Also, any side effects related to surgical intervention, including excessive watering, corneal ulcers whole or incomplete displacement regarding the plug, and plug extrusion were monitored.

RESULTS

In the first group, 20 patients were managed using Autologous serum, (14 males, 6 females). The average age was 37.5 ± 15.36 (from 18–75 years). In the second group, 20 patients were managed using a punctual plug (12 male, 8 female) the mean age was 56.53 ± 15.59 (from, 25–80 years) (**Table 1**).

Table 1: Difference between both groups regarding age and gender

	Group 1	Group 2
No of eyes	20 eyes	20 eyes
Age (mean \pm SD)	37.5 ± 15.36 years	56.53 ± 15.59 years
Gender:		
Male	14 (70%)	12 (60%)
Female	6 (30%)	8 (40%)

The first group consisted of 20 patients with chronic eye diseases, 6 of them were suffering from neurotrophic keratopathy and 10 patients had keratoconjunctivitis sicca while 4 patients were post Lasik. The second group consisted of 20 patients with chronic eye diseases, 5 of them were suffering from neurotrophic keratopathy and 9 patients had keratoconjunctivitis sicca while 6 patients were post Lasik. (**Figure 1**).

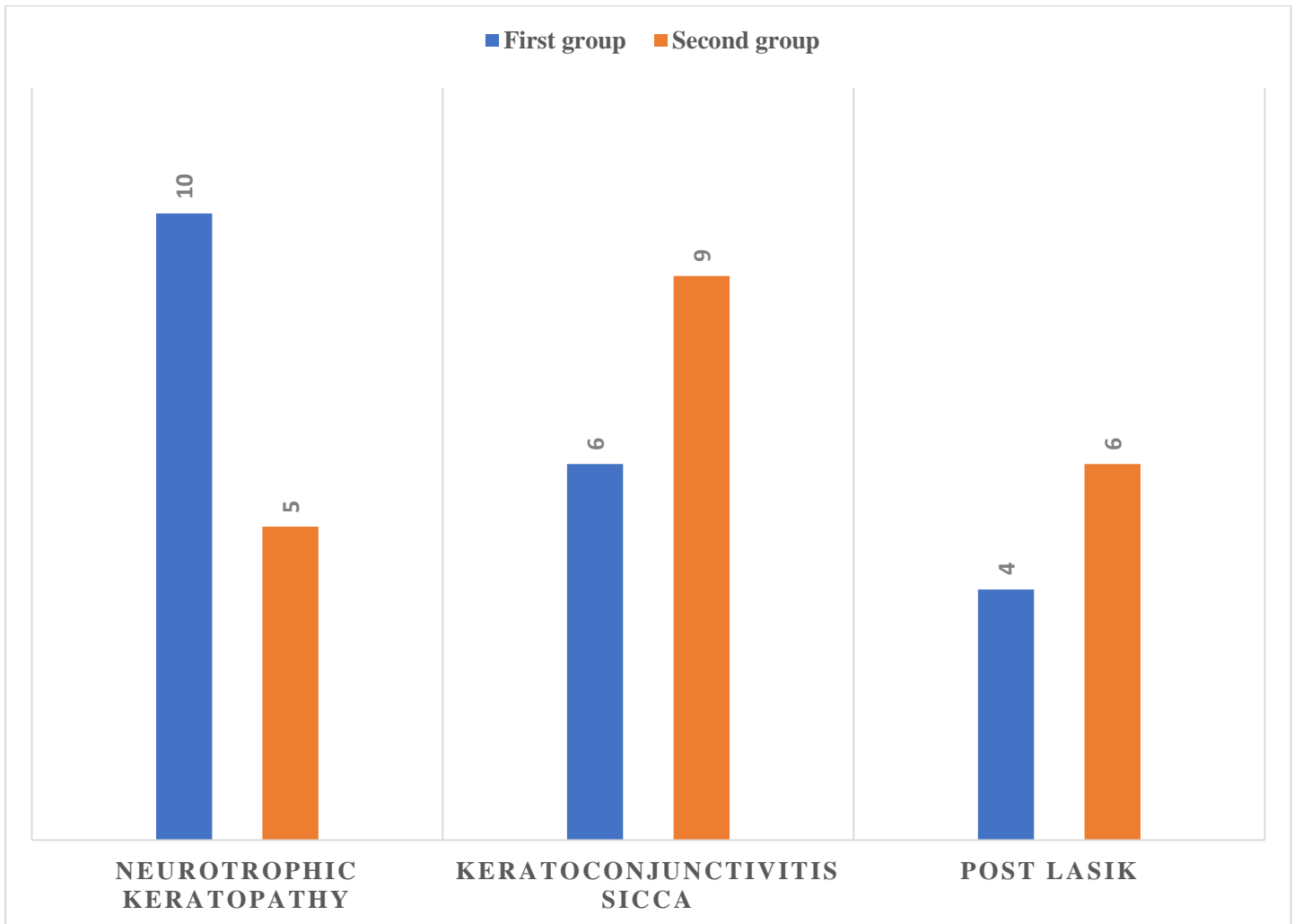


Figure 1: causes of dry eye in both groups

Visual acuity

The visual acuity in the first group before treatment was $3.5/9.3 \pm 1.91/9.2$ (mean \pm standard deviation) and after treatment in the second visit was $5.25/10 \pm 3.75/10$ ($P < 0.01$) with standard improvement 2 Snellen lines. In the second group visual acuity before treatment was $2.85/9.1 \pm 2.04/9.2$ and after treatment in the second visit was $4.65/9.2 \pm 4.37/10$, the normal increase is 3 visual letters. The VA become better in both groups. (Table 2)

Table 2: Difference between improvement of VA for both groups

	1st Group AS serum eye drop	2nd Group Punctual plug
Visual acuity	$3.5/9.3 \pm 1.91/9.2$	$2.85/9.1 \pm 2.04/9.2$
	$5.25/10 \pm 3.75/10$	$4.65/9.2 \pm 4.37/10$
Improvement	2 Snellen lines.	3 Snellen lines.

Fluorescein stain

Corneal superficial erosions with fluorescein stained presented in 10 patients, five in both groups. and 1 month later, staining was still demonstrated at 3 patients in the first group and 2 patients in the second group, and after 3 months we found that cornea in all groups has no defect.

Schirmer I test

Before any procedure, the value of Schirmer’s analysis was 13.2 ± 5.13 mm group [1], 8.02 ± 3.61 mm regarding group [2]. 14 days later Schirmer analysis value improved to 15.3 ± 8.12 mm in 1st group, 15.01 ± 4.28 mm in 2nd group There is marked progress in the group [2]. There was moderate improvement in group [1] ($P = 0.063$, $t = -1.855$) before and after using AS Eye drops and in group [2] there was marked improvement before and after punctual plug ($P < 0.01$, $t = -6.195$). also, there was a variance in results between both groups after management ($t = -3.186$, $P = 0.022$) (Table 3).

Tear film BUT

Before any procedure, the mean BUT In the first group was 7.41 ± 2.1 . Two weeks after the regular use of AS eye drops there was a significant improvement and in the second visit became 4.32 ± 1.1 s ($P < 0.01$, $t = -7.95$). In the second group the mean BUT was 6.41 ± 1.8 s and two weeks after punctual plug insertion, the BUT was significantly improved to 3.22 ± 1.4 s ($P < 0.01$, $t = 14.85$). Also, between the two groups, there was no significant change in posttreatment improvement ($P < 0.01$, $t = -3.74$) (Table 3).

Table 3: Difference between Schirmer’s test and Tear film BUT before treatment and in the second visit in both groups

	Group 1 AS serum eye drop		Group 2 Punctual plug	
	Before treatment	Second visit	Before treatment	Second visit
Schirmer I test	13.2 ± 5.13	15.3 ± 8.12	8.02 ± 3.61	15.01 ± 4.28
P-values	$(P = 0.063, t = -1.855)$		$(P < 0.01, t = -6.195)$	
Difference between the two groups	$(t = -3.186, P = 0.022)$			
Tear film BUT	7.41 ± 2.1	4.32 ± 1.1 s	6.41 ± 1.8 s	3.22 ± 1.4 s
P-values	$(P < 0.01, t = -7.95)$		$(P < 0.01, t = 14.85);$	
Difference between two the groups	$(P < 0.01, t = -3.74).$			

Subjective Warning sign

There was more improvement in (burning, red-eye, photophobia, and blurred vision) earlier and later after management for all patients.

In Group [1] red eye reported 44% on the 1st appointment: 75% represented with score four, 25% had score 3. In group [2] 46% of patients were presented with red-eye at the 1st appointment: 65% had score 4 and 35% had score 3. In group [1] red-eye during follow up (3 months) was score 1 in 40%, score 2 in 60%. Regarding the second group, red-eye during follow up (3 months) was score 1 in 45%, score 2 in 55%, recovery was reported three grades was improved to 40%, two grades improved to 55%, and one grade improved to 5%. Total eyes become better. standard improvement was $3.41 \pm$

1.35 grades in the first group, 3.01 ± 1.81 grades in the second group (Table 4).

Regarding group [1] Photophobia presenting in 55% of patients at the 1st visit: 65% had score 4 and 25% had score 3 and 10% had score 2. In group [2] 70% of patients were present with Photophobia at the 1st visit: 55% had grade 4 and 25% had score 3 and 20% had score 2. In group [1] Photophobia during follow up (3 months) was score one in 80% and score two in 15%, and score 3 in 5%. In group [2] Photophobia during follow up (3 months) was score one in 85% score two in 15% All eyes become better. The average improvement was 2.77 ± 3.51 grades in the 1st group and 2.21 ± 1.91 grades in the second group (Figure 2)

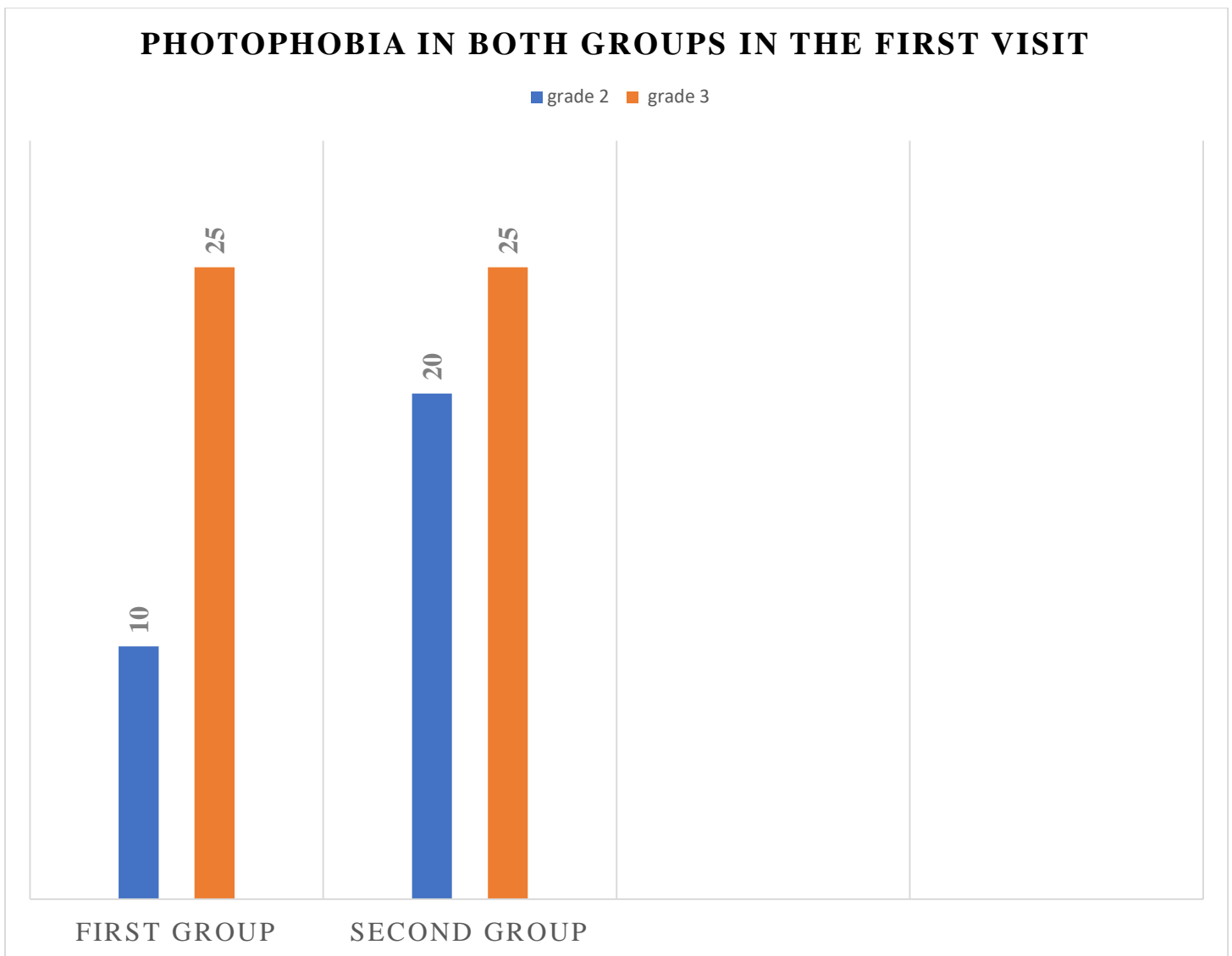


Figure 2: photophobia in both groups in the first visit

In group [1] burning was presented in 75% of patients at the Ist visit: 80% had score 4 and 12% had score 3 and 8% had score 2. In group [2] 75% of patients were presented with burning at the Ist visit: 65% had score 4 and 25% had score 3 and 10% had score 2. In group [1] burning during follow up (3 months) was score one in 65%, score two in 35%. In the 2nd group burning during follow up (3 months) was score one in 60%, score two in 40%. progress was reported three grades in 55%, two grades in 35%, and one grade in 10%. everyone becomes better. with standard enhancement 3.53 ± 2.51 grades in the first group and 3.21 ± 1.91 grades in the second group (Table 4).

In group [1] Blurred vision was presented in 80% of patients at the Ist visit: 78% had score 4 and 10% had score 3 and 12% had score 2. In group [2] 65% of patients were presented with Blurred vision at the Ist visit: 58% had score 4 and 35% had score 3 and 7% had score 2. In group [1] Blurred vision during follow up (3 months) was score one in 70% and score two in 20%, and score three in 10%. In group [2] Blurred vision during follow up (3 months) was score one in 75%, score 2 in 25%. everyone became better, with a standard enhancement of 4.53 ± 3.49 grades in the first group and 4.21 ± 2.91 grades in the second group (figure 3) (Table 4).

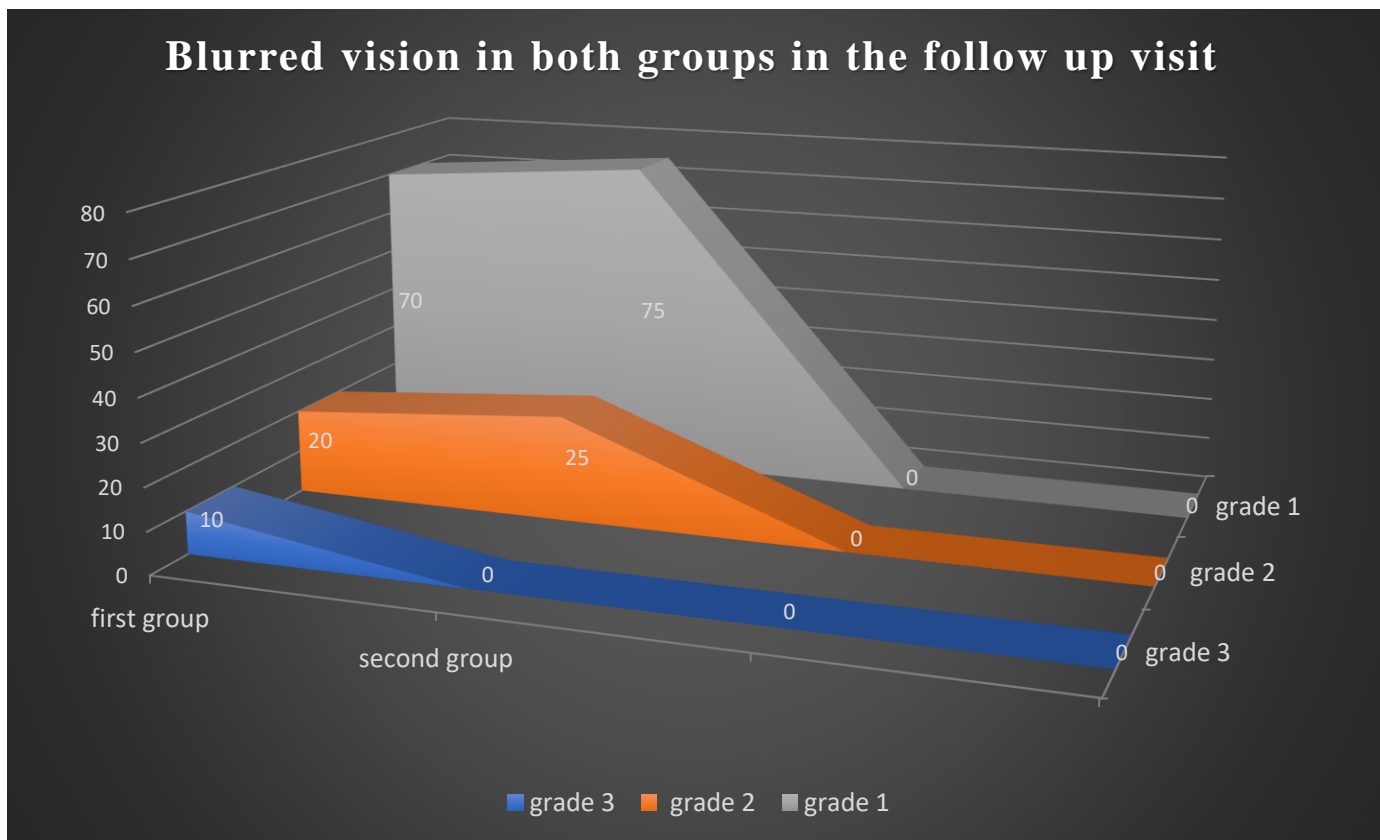


Figure 3: blurred vision in both groups in the follow up visit

Symptoms Improved

After 3-months postoperatively, (burning, red eye, blurred vision, and photophobia) of all patients regarding both groups become markedly better

Complication

None of any patients in both groups devolved unaffected or unexpected complications, or complained of excessive watering also there were no intraoperative complications in the second group.

Table 4: Comparison between subjective symptoms in both groups in first and follow up visits

	Group 1 AS serum eye drop		Group 2 Punctual plug	
	First visit	Follow up visit	First visit	Follow up visit
Red-eye	75% score 4 25% score 3	40% score 1 60% score 2	65% score 4 35% score 3	45% score 1 55% score 2
Average improvement	3.41 ± 1.35 (P < 0.01)		3.01 ± 1.81 (P < 0.01)	
Burning	80% score 4 12% score 3 8% score 2	65% score 1 35% score 2	65% score 4 25% score 3 10% score 2	60% score 1 40% score 2
Average improvement	3.53 ± 2.51 (P < 0.01)		3.21 ± 1.91 (P < 0.01)	
Photophobia	65% score 4 25% score 3 10% score 2	80% score 1 15% score 2 5% score 3	55% score 4 25% score 3 20% score 2	85% score 1 15% score 2
Average improvement	2.77 ± 3.51 (P < 0.01)		2.21 ± 1.91 (P < 0.01)	
Blurred vision	78% score 4 10% score 3 12% score 2	70% score 1 20% score 2 10% score 3	58% score 4 35% score 3 7% score 2	75% score 1 25% score 2
Average improvement	4.53 ± 3.49		4.21 ± 2.91	

DISCUSSION

Our study included 40 eyes separated as coming. The first group of 20 eyes underwent AS eye drop while the second group of 20 eyes underwent punctal occlusion. The follow-up period was 3 months.

Although both groups in our study reported marked improvements in dry eye discomfort after the exact period of treatment, resulted that no differences between the two groups were detected. Our outcomes noted that the 2 types of management had similar efficacy for reducing ocular discomfort.

The present results noted that the use of AS eye drop is efficient to relieve the discomfort sensation that occurred from dry eyes when topical dry eye medications fail. It also shows that AS eye drop can be a better alternative to punctal plugs as it showed less discomfort and better patient satisfaction.

In our study, all patients in the first group who received AS eye drops were satisfied with their treatment in contrast to 25% of the patients in the second group who inserted punctal plug, because of the degrees to which they experienced discomfort sensation.

Concerning fluorescein staining, whole patients suffering from dry eye in the two groups were nearly healed following 3 months after management, affirming that the two types of management can restore corneal epithelial injuries brought about by dryness.

In our study in the second group, occlusion of both puncta show many benefits in conserving natural tears and enhancing tear quality, so it becomes more physiological. Punctual plug better to improve visual

acuity than AS Eye drops this concede with the result of **Gilbard et al.** (18).

Our study reported that all patients in both groups attained marked improvement in subjective symptoms, red-eye from 3.41 ± 1.35 to 3.01 ± 1.81, Burning from 3.53 ± 2.51 to 3.21 ± 1.91 photophobia from 2.77 ± 3.51 to 2.21 ± 1.91 and Blurred vision from 4.53 ± 3.49 to 4.21 ± 2.91

Ziakas et al. (19) reported that AS eye drops are mainly utilized in dealing with multiple visual disorders, for example, Sjogren's disease, recurrent corneal erosion, superior limbic keratoconjunctivitis, and neurotrophic keratopathy.

Regarding Tear film BUT for AS eye drops and punctual plug become much improved, however, it doesn't extend to the physiological range. in the second group occlusion of both punctum show, many benefits in increasing mean value after interference Improvement in both groups were not markedly different. Our study proved As Eye drops and punctual occlusion improve natural tears and enhance tear quality even though the second group seems to be slightly better at efficiency than the first group. This concedes with the result of **Weiqiang et al.** (20).

Our study reported the improvement in tear quality as determined by Tear film BUT in the first group from 7.41 ± 2.1 to 4.32 ± 1.1 s and Schirmer's test from 13.2 ± 5.13 to 15.3 ± 8.12 and in Schirmer I test there better than AS eye drop, proving that efficiency of the second group to preserve tear capacity more in the second group. This differs from **Tananuvat et al.** (21) who reported 20% AS was not related to critical progress in

tear film stability as estimated by Tear film BUT and Schirmer's 1 test.

BCVA become better in entire patients, in both groups in the first group improved from $3.5/9.3 \pm 1.91/9.2$ to $5.25/10 \pm 3.75/10$ and in the second group improved from $2.85/9.1 \pm 2.04/9.2$ to $4.65/9.2 \pm 4.37/10$ this was against **Ziakas et al.** ⁽¹⁹⁾ that reported no marked improvement in visual acuity. **Tananuvat et al.** ⁽²¹⁾ reported two cases of conjunctivitis and after cultures show no growth followed by the disappearance of symptoms. this does not concede with our studies that we did not report any undesirable outcomes or complications.

In our study in the second group, we didn't report any adverse effects which do not coincide with **Mansour et al.** ⁽²²⁾ who reported spontaneous plug loss in 6 cases from 28, and **Burgess et al.** ⁽²³⁾ who reported spontaneous plug loss in 6 cases from 20. In our study in both groups, we didn't report any epiphora cases this does not coincide in conjunction with **Burgess et al.** ⁽²³⁾ **Nava-Castaneda et al.** ⁽²⁴⁾ that stated 1 case in each study

Also, we didn't report any ocular irritation or foreign body sensation does not concede with **Burgess et al.** ⁽²³⁾ that reported 3 cases in the study. **Mansour et al.** ⁽²²⁾ reported 1 case had a local inflammatory reaction to silicone and one case had corneal melting and perforation.

Tai et al. ⁽²⁵⁾ reviewed the efficiency of insertion 312 siliconized punctal plugs in patients suffering from dry eye and they noted that 50.7% of them develop extrusion rate, and 6.9% develop conjunctival erosions with increased tearing. Patients in our study didn't develop any of these complications in 3 months.

CONCLUSION

In summary, both two types of management have similar efficiency in reducing discomfortable sensation in dry eyes and almost have equivalent and real improvement in subjective symptoms. Punctal occlusion shows many benefits in conserving natural tears and enhancing tear quality and seemed to be better on tear film stabilization. AS eye drops and punctal occlusion improved BCVA. Also, punctal occlusion have a better effect in improving visual acuity than AS eye drops.

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