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Daily versus monthly disposable contact lens: Which is better for ocular surface physiology and comfort?

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ABSTRACT

Purpose: To investigate the effect of soft contact lenses (SCL) wearing modality and lens materials on the changes in conjunctival bulbar and limbal redness and conjunctival and corneal staining after two months of SCL wear. Comfort level was also analyzed.

Methods: In this longitudinal clinical trial, forty-seven neophyte myopic subjects were fitted with a monthly disposable lens (lotrafilcon-B or comfilcon-A or balafilcon-A) in one eye and a daily disposable lens (nelfilcon-A or stenofilcon-A or nesofilcon-A) in the other eye, randomly selected. Conjunctival bulbar and limbal redness and conjunctival and corneal staining were evaluated before and after lens wear. Effect of lens wearing modality and lens materials on these changes was also determined. Level of comfort was evaluated subjectively twice per day. Comfort level and reduction in end-of-day comfort were compared between different lens wearing modalities and materials.

Results: Bulbar and limbal redness and conjunctival and corneal staining were increased ($p < 0.001$) after lens wear, and changes were similar with daily and monthly disposable lens wear ($p > 0.05$). Limbal redness was associated with lens materials, and lotrafilcon-B induced the least among the studied lenses ($p < 0.05$). There was no significant association between the wearing modality and the average comfort level and reduction of end-of-day comfort ($p > 0.05$).

Conclusion: Two months of SCL wear increased conjunctival redness, conjunctival and corneal staining, which were not associated with the lens wearing modality. There was a reduction in end-of-day comfort, similar to daily and monthly lenses. The change in limbal redness and reduction in end-of-day comfort were associated with the characteristics of the lens material.

1. Introduction

Contact lenses (CL) wear can induce metabolic, mechanical and toxic effects on the ocular surface [1]. The metabolic effect is considerably related with the oxygen transmissibility (Dk/t) of the lens materials [2]. Mechanically, CL wear may affect corneal as well as conjunctival health, which depends upon the lens design and/or the lens material characteristics, such as Young's modulus [3]. Since soft contact lenses (SCL) may absorb different chemicals from the lens care solutions, toxic reactions can be induced when they are released on the ocular surface during wear [4]. Whatever may be the etiology of adverse effects of lens wear, they catalyze the inflammatory reaction, which is initially observed with conjunctival redness due to vasodilation and white blood cell migration.

Ocular redness is the principal sign of eye inflammation [5]. Generally, limbal redness indicates corneal problems while diffused bulbar redness indicates conjunctival problems. The majority of recent studies with silicone hydrogel lenses showed that ocular surface physiology is similar with and without lenses [6,7]. However, some studies pointed out that mechanical or inflammation related problems increase with silicone lenses in comparison to other hydrogel lenses [8,9]. Conjunctival physiology, including bulbar redness, limbal redness and staining, may be important factors for a successful CL wear; however, this area has not been extensively investigated.

Success in CL wear is determined by clear vision and comfort during full-time wear. With the availability of many lens designs and parameters, clear vision is easily maintained with proper lens selection. However, due to multifactorial etiology, comfort is always a challenge for CL wearers [10]. CL related discomfort might be due to the disruption of the tear film and the ocular homeostasis, which leads to increase tear evaporation, tear osmolarity, and as a consequence, a higher mechanical effect of the lens on the ocular surface [11]. It may also be related to lens movement, edge profile, dehydration, deposition, modulus and stiffness, surface wettability and lubricity and solution

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characteristics [12], and it diminishes or disappears after removing the lenses [13].

Currently, SCL are available for different wearing modalities, among these, daily and monthly disposable lenses are the most popular. Because wearing new lenses every day avoids the use of cleaning/storing chemicals, many clinicians prefer daily disposable lenses as the first choice. However, as far as the authors are aware, no studies have been done on the effect of lens wearing modality on the ocular surface physiology. Moreover, discomfort is one of the main factors of CL discontinuation [14,15], and recent studies show that end-of-day comfort in SCL wearers is lower than the comfort level just after insertion of the lenses [16–18]. The effect of lens wearing modality on the comfort level has also not been studied in the past.

The aims of this study were to determine the effect of lens wearing modality on conjunctival bulbar and limbal redness and conjunctival and corneal staining after two months of SCL wear. The effect of lens wearing modality on ocular comfort and reduction in end-of-day comfort was investigated. Effect of lens materials on ocular surface physiology and comfort was also studied.

2. Methods

A longitudinal, contra-lateral study was conducted in neophyte CL wearers at the University of Minho, Portugal. Each subject signed a consent form after the study protocol was explained. This study obtained ethical approval from the Ethical Committee of the School of Science of the University of Minho, and followed the tenets of the Declaration of Helsinki.

The study was conducted on myopic subjects with astigmatism less than 1.00D, who had never worn CL. Subjects with previous history of ocular surgery, eye pathology and systemic disease, or those presenting ocular findings equal to or over grade 2 in the Efron grading scale were excluded. They should have commitment to follow the protocol of the study. A sample size of at least 15 eyes for each brand of CL was necessary to warrant the power of 0.99, to detect a difference of 0.5 unit in limbal or bulbar redness and conjunctival or corneal staining with a p value of 0.05 [3].

Each subject wore a monthly disposable lens (lotrafilcon B or comfilcon A or balafilcon A) in one eye and a daily disposable lens (nelfilcon A or stenofilcon A or nesofilcon A) in the other eye, selected randomly. Lens fitting was examined, and if any unacceptable fitting was detected due to unsuitable lens parameter, another lens was fitted from the study lens group. Lens details are presented in Table 1. Monthly disposable lenses were worn on a daily wear basis, that means lenses were removed during the night and replaced every month. OPTIFREE Puremoist multipurpose disinfecting solution (Polyquad 0.001% and Aldox 0.0006%, Alcon Laboratories, TX) was provided for cleaning, storing and disinfecting monthly disposable lenses. Daily disposable lenses were discarded after single use. All subjects were properly instructed on lens fitting and handling procedures. During the dispensing time, lenses and lens care products were provided for a one-month period. The subjects were instructed to come for the follow-up visit after one month, and lenses and lens care products were provided for the following month.

During the first week, the number of wearing hours per day and number of wearing days per week were flexible; however, after the second week, all subjects were instructed to wear lenses at least 5 days per week and 8 h per day [19]. There was no limit for the wearing period, but lens wear during sleep and swimming was not allowed.

Slit lamp evaluation was performed on the baseline visit, 1st month follow-up visit and 2nd month follow-up (final) visit by a contact lens expert. Anterior segment photography with slit-lamp was performed to help the grading score analysis. Conjunctival redness was observed with white light of the slit lamp. Bulbar redness and limbal redness grading were performed in four regions: nasal, temporal, superior and inferior. Conjunctival staining was observed in four regions within 2 mm from the limbus after the application of Lissamine Green (Green GloTM, HUB Pharmaceuticals, LLC, CA, USA) [20]. Corneal staining was examined with the application of 1% fluorescein (Fluorescein Strips, Chauvin Pharmaceuticals Ltd, Montpellier, France), cobalt blue light filter and a Wratten 12 barrier filter [20]. This was quantified in five areas: central, nasal, temporal, superior and inferior. Redness and staining were graded into 0–4 level according to the Efron grading scale in the nearest 0.1 units with 0 representing normal and 4 representing the worst [21]. To reduce bias in the examiner, grading was conformed with an observation of the photographs. The average values were used for the analysis. Examinations during each visit were performed after removing the lenses and at least 2 h after waking up to reduce the overnight physiological residual effect on the ocular surface. Similarly, to minimize the effect of diurnal variation on the ocular surface changes, every visit of each subject was scheduled for the same time of day, for example, for a patient whose baseline examination was performed at 9:00–10:00, the other follow-up examinations were also conducted at the same time of day and so on [22].

Subjective comfort level was evaluated on a grading scale of 0 to 100 with 0 being the least comfortable and 100 the most comfortable [7]. Subjects were provided with a sample survey form where they should register the level of comfort just after lens insertion and at the end-of-day (just before removing out the lenses) each day. Compliance with the protocol of the study was assured and reiterated in the subsequent visit. Each month, the morning comfort (the average morning comfort score for one month) and end-of-day comfort (the average score of evening comfort for one month) were calculated. The monthly comfort level was calculated as the average of morning comfort score and the end-of-day comfort score.

Differential corneal staining, bulbar redness, limbal redness and conjunctival staining were calculated deducting the baseline values from the final values. As values in right and left eyes were not correlated ($p > 0.05$), data from both eyes were used in the analysis. Statistical Package for Social Sciences (SPSS 22) was used for the analysis of the data. Descriptive data were expressed as a mean with standard deviation (SD). The Kolmogorov-Smirnov test was applied to determine the normality of the data. Parametric tests and non-parametric tests were applied to detect the statistical relation in normally distributed and other variables respectively. Adjusted *p*-values were used in the necessary cases. The Wilcoxon signed rank test was used to

Table 1
Characteristics of the contact lenses used in the study.

	Lotrafilcon B	Comfilcon A	Balafilcon A	Stenofilcon A	Nelfilcon A	Nesofilcon A
Company	Alcon	Cooper Vision	Bausch & Lomb	Cooper Vision	Alcon	Bausch & Lomb
Brand name	AirOptix Aqua	Biofinity	Purevision2	MyDay	Dailies AquaComfort	Biotrue
Water content (%)	34	48	36	54	69	78
Thickness (mm)	0.08	0.08	0.07	0.08	0.10	0.10
Base curve/diameter (mm)	8.6/14.2	8.7/14.5	8.6/14	8.4/14.2	8.7/14	8.6/14.2
Oxygen Permeability (barrer)	110	128	91	80	26	42
Modulus (MPa)	1.2	0.75	1.1–1.25	0.4	0.89	0.49
Oxygen Transmissibility (10^{-9} (cm ml O_2)/(sec ml mmHg))	137.5	160	130	100	26	42

determine the changes in conjunctival bulbar/limbal redness, conjunctival staining and corneal staining before lens wear and after two months of lens wear. The Wilcoxon signed rank test was applied to test the difference in comfort level at different points of time. One-way ANOVA was performed for the multiple comparisons. A p value less than 0.05 was considered as statistically significant.

3. Results

Forty-seven myopic subjects participated in this study, and the mean age was 24.3 ± 4.1 years. Out of 94 eyes (mean refractive error −1.86 ± 1.54D, range −0.50D to −5.50D), lenses were worn in the following way: lotrafilcon B: 16 eyes, nelfilcon A: 16 eyes, comfilcon A: 15 eyes, stenofilcon A: 15 eyes, balafilcon A: 16 eyes and nesofilcon A: 16 eyes. One-way ANOVA did not show a significant difference in baseline physiological signs and refractive errors among the groups of different lens wearers ($p > 0.05$).

After two months of CL wear, bulbar and limbal redness increased significantly ($p < 0.001$). Increase in redness was found higher in the temporal and nasal side in comparison to the superior and inferior regions ($p < 0.05$). Corneal staining also increased significantly ($p < 0.001$). It was higher on the inferior region in comparison to other regions ($p < 0.05$), and all the other regions presented similar staining ($p > 0.05$). Similarly, conjunctival staining increased significantly ($p < 0.001$) after lens wear. Table 2 presents the changes in grades, observed in the ocular surface physiology.

As shown in Table 3, no significant differences were observed in changes in conjunctival limbal and bulbar redness, and corneal and conjunctival staining between daily and monthly disposable lenses ($p > 0.05$).

Table 4 shows the results obtained in ocular physiology for each lens material. On multiple comparisons, increase in bulbar redness was found similar with different lens wear ($p = 0.49$), while the increase in limbal redness was found to be dependent upon lens types ($p = 0.049$). Lotrafilcon B induced less limbal redness than that of balafilcon A ($p = 0.018$), nesofilcon A ($p = 0.024$) and comfilcon A ($p = 0.047$). Neither the increase in corneal staining nor the increase in conjunctival staining was associated with the lens materials ($p > 0.05$).

As presented in Fig. 1, comfort score increased on the second month in comparison to that of the first month with each lens material ($p > 0.05$). The comfort (average score of morning and end-of-day and first and second month) was not associated with the lens wearing modality ($p = 0.6$).

There was a significant reduction in the end-of-day comfort score in comparison to the score just after lens insertion ($p < 0.001$). The decrease in end-of-day comfort was not related with the level of comfort just after lens insertion ($p = 0.4$). Fig. 2 compares the comfort score just after lens insertion and end-of-day comfort for the different lens wearing modality. No significant association between reduction in end-of-day comfort and the lens wearing modality was observed as daily and monthly lenses had similar values ($p > 0.05$).

However, this reduction in end-of-day comfort was highly affected by the characteristics of the lens material. It was highest in comfilcon A lens wearers, followed by balafilcon A and nesofilcon A lens wearers ($p < 0.05$), while nelfilcon A did not induce a statistically significant reduction in comfort level throughout the day [Table 5]. Fig. 3 shows the reduction in end-of-day comfort with different lens materials comparing the first and second month ($p < 0.05$).

Table 3
Increment in ocular surface physiology grading with two-month contact lens wear with the different wearing modality. Standard deviation is presented with the mean score.

Wearing modality	Daily	Monthly	p values
Bulbar redness	0.41 ± 0.33	0.42 ± 0.34	0.9
Limbal redness	0.38 ± 0.35	0.38 ± 0.33	0.9
Corneal staining	0.38 ± 0.25	0.41 ± 0.29	0.7
Conjunctival staining	0.36 ± 0.39	0.39 ± 0.34	0.7

4. Discussion

In this study, corneal and conjunctival physiological changes induced by two months of SCL wear and its association with the lens wearing modality was investigated. Moreover, the effect of the lens wearing modality on ocular comfort was also studied. Subjects were neophytes, so there would not be any influence from previous CL wear in physiological changes.

4.1. Bulbar redness

The increase in bulbar redness was statistically significant after two months of CL wear. However, the mean change was 0.5 grade (Table 2), and it is not clear whether it is clinically meaningful or not. CL wear had a stronger impact on the temporal and nasal side than on the superior and inferior region, which may be due to higher evaporation of tears on these exposed parts of the conjunctiva [22]. Earlier studies [3,23] also found an increase in bulbar redness due to short-term CL wear.

4.2. Limbal redness

Limbal redness can represent an indicator of hypoxia due to lens wear, and in the present study, it was observed an increase after CL wear. Papas proposed that to avoid limbal redness completely, oxygen transmissibility on the peripheral lens should be of about 125 units [24]. Some of the lenses used in this study have central Dk/t superior to 125 units; however, none of them have peripheral Dk/t over 125, as the Dk/t is significantly lower in the peripheral region of minus lenses than in the central region [25]. In agreement with the present findings, Carole et al. also found a similar increase in limbal redness after two weeks and after four weeks of SCL wear [3]. Long-term limbal redness can facilitate corneal neovascularization [26].

4.3. Corneal staining

Corneal staining was found to be increased during the two months of CL wear. Corneal staining may be associated with lens and lens care product combination [19] or lens fitting [27]. Consistent with a study conducted by Nichols et al., corneal staining was higher in the inferior corneal region in comparison to the other regions [28]. Higher staining on the inferior cornea may be related to incomplete blinking and drying of the inferior cornea [29,30].

Table 2
Changes in ocular surface physiology due to two-month soft contact lens wear [SD: standard deviation].

	Baseline score ± SD [Range]	Final score ± SD [Range]	Change ± SD [Range]	P values
Bulbar redness	0.3 ± 0.2 [0.0 to 1.5]	0.8 ± 0.4 [0.2 to 2.1]	0.5 ± 0.3 [−0.5 to 1.5]	< 0.001
Limbal redness	0.4 ± 0.3 [0.0 to 1.5]	0.8 ± 0.4 [0.2 to 2.1]	0.4 ± 0.3 [−0.5 to 1.4]	< 0.001
Corneal staining	0.3 ± 0.2 [0.0 to 1.0]	0.7 ± 0.3 [0.2 to 1.6]	0.4 ± 0.2 [−0.1 to 1.2]	< 0.001
Conjunctival staining	0.3 ± 0.2 [0.0 to 1.1]	0.7 ± 0.3 [0.2 to 1.5]	0.4 ± 0.3 [−0.4 to 1.5]	< 0.001

Table 4
Increase in ocular surface physiology grading by two months of soft contact lens wear with different lens materials, [Conj. = conjunctival, mean scores are presented with standard deviation (SD) and p values are presented in brackets].

Lens materials	Conj. bulbar redness ± SD [p]	Conj. limbal redness ± SD [p]	Corneal staining ± SD [p]	Conj. Staining ± SD [p]
Lotrafilcon B	0.31 ± 0.41 [0.008]	0.23 ± 0.40 [0.042]	0.32 ± 0.26 [0.000]	0.31 ± 0.34 [0.003]
Comfilcon A	0.51 ± 0.24 [< 0.001]	0.49 ± 0.27 [< 0.001]	0.55 ± 0.36 [< 0.001]	0.53 ± 0.37 [< 0.001]
Balafilcon A	0.45 ± 0.32 [0.001]	0.49 ± 0.26 [< 0.001]	0.35 ± 0.16 [< 0.001]	0.33 ± 0.28 [0.004]
Nelfilcon A	0.33 ± 0.27 [< 0.001]	0.28 ± 0.24 [0.001]	0.35 ± 0.32 [0.001]	0.33 ± 0.38 [0.001]
Stenofilcon A	0.50 ± 0.36 [< 0.001]	0.41 ± 0.44 [0.003]	0.46 ± 0.22 [< 0.001]	0.51 ± 0.47 [0.001]
Nesofilcon A	0.43 ± 0.36 [0.002]	0.48 ± 0.33 [< 0.001]	0.34 ± 0.18 [< 0.001]	0.23 ± 0.19 [0.002]

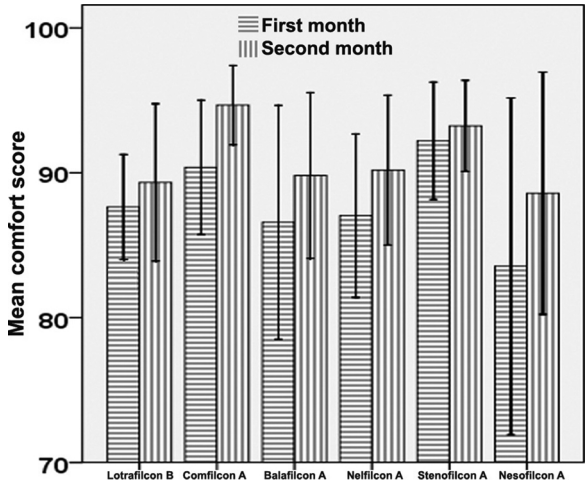

Fig 1. Average comfort score during first and second month with different lens materials (error bars represent the 95% confidence interval of each variable).

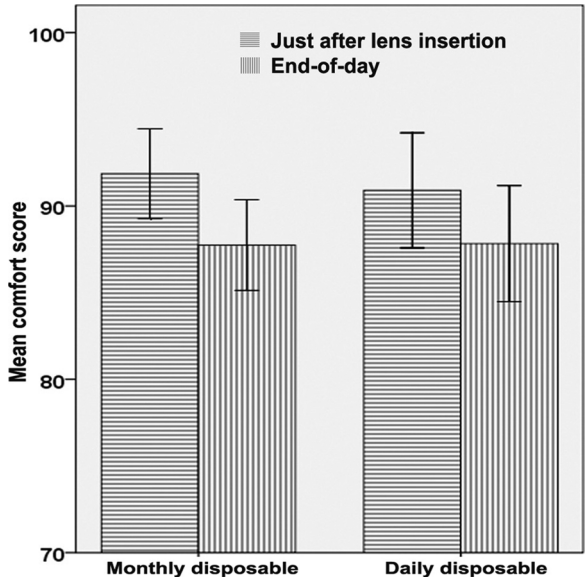

Fig. 2. Comfort score during just after lens insertion and end-of-day by different lens wearing modality (error bars represent the 95% confidence interval of each variable).

4.4. Conjunctival staining

Conjunctival staining has not been extensively studied, unlike corneal staining. In the current study, it was found a significant increase in conjunctival staining after CL wear. This may be due to thin post-lens tear film in the peripheral lens region around the limbus, lens material characteristics or lens design. Moreover, conjunctival staining may be due to the reaction of conjunctival tissue with lens care products. Jones et al. [19] suggested that, due to the higher thickness on the periphery

Table 5
Decrease in end-of-day comfort with different lens materials [SD: standard deviation, bold p values show the statistically significant changes].

Lens materials	Decrease in end-of-day comfort ± SD	P values
Lotrafilcon B	3.0 ± 5.1	**0.036**
Comfilcon A	5.2 ± 6.4	**0.007**
Balafilcon A	4.2 ± 4.2	**0.004**
Nelfilcon A	2.0 ± 6.1	0.238
Stenofilcon A	3.6 ± 6.6	**0.049**
Nesofilcon A	3.7 ± 4.6	**0.017**
Total	3.6 ± 5.5	< **0.001**

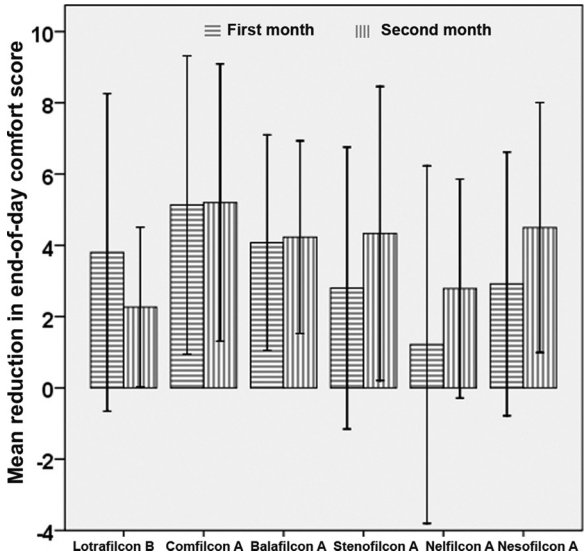

Fig. 3. Reduction in end-of-day comfort during first and second month of lens wear with different lens materials (error bars represent the 95% confidence interval of each variable).

in myopic CL, peripheral lens absorbs higher portion of the lens care product chemicals or blister package solution which is then released onto the ocular surface. Although conjunctival staining below grade 2 in the Efron grading is considered clinically non-significant [31], it may affect the level of comfort in CL wearers. Consistent with the findings in the present study, Maldonado-Codina et al. found significant conjunctival staining after two and four weeks of lens wear [3].

4.5. Ocular surface physiology and CL wearing modality

Effect of the wearing modality on the ocular surface is an emerging topic of discussion. There is not a clear indication whether daily disposable lenses or other frequent replacement (biweekly or monthly disposable) lenses are better for ocular surface health. In the current study, no significant differences were observed in ocular surface physiology changes with wearing modality since there were similar changes with daily and monthly disposable lenses. In contrary to the

current study, Nichols et al. found that daily disposable lenses induce less corneal staining in comparison to other lens wearing modalities [28]. They suggested that daily wear monthly replacement lenses absorb lens care products during cleaning or storage, and release those components onto the ocular surface during wear. In the present study, daily disposable lenses were worn after taking out directly from the blister package, and it is possible that chemicals, like borate, present in the blister package solution may induce an allergic response in some patients [4].

4.6. Ocular surface physiology and CL materials

It is known that metabolic activity of the ocular surface is related to the oxygen transmissibility of the lenses [2]. However, in the current study, there was no association of bulbar redness, conjunctival staining and corneal staining with lens materials. This may be because conjunctival bulbar redness and conjunctival and corneal staining may be dependent upon the material characteristics of the lenses, such as Young modulus, coefficient of friction, and lens edge design rather than only Dk/t. It is known that oxygen flux is more representative on oxygen supply to the ocular surface than Dk/t [32], and the change in oxygen flux is very small after the increase in Dk/t from 25 units [33].

However, limbal redness was found to be associated with lens materials. It was found that comfilcon A lens wear induced higher limbal redness than other lenses while lotrafilcon B induced the least. Comfilcon A is a lens with the highest oxygen permeability among the lenses used in this study. The larger diameter of the lens and higher Young modulus may be related to conjunctival redness. This indicates that the etiology of ocular surface physiology changes is multifactorial depending upon lens design, material characteristics, and lens parameters rather than the oxygen permeability. From Table 4 it is clear that, although oxygen permeability is the smallest and lens thickness is the highest, nelfilcon A induced small changes in all the physiological signs. Jara et al. also found different physiological changes with different lens materials [34]. Another interesting finding of this study was that the changes were higher with comfilcon A and stenofilcon A lens wear (Table 4), and both these lenses have the same centre thickness and are silicone hydrogel lenses manufactured by the same company, and contain similar water content. This may indicate that lens manufacturing method and design may affect ocular surface physiology.

4.7. Ocular comfort and lens wearing modality

Comfort level was evaluated after lens insertion and at the end-of-day, and their association with lens wear modality and lens materials was determined. Average comfort level, among all the studied lenses, was found to be similar with both daily disposable lenses and monthly disposable lenses. This supports the conclusions drawn by Martin et al. [35], who also did not find any relationship between comfort level and lens solution. Comfort increased during the second month in comparison to the first month of lens wear. This might be due to adaptation or familiarity with the lenses during initial follow-up periods [7].

End-of-day comfort decreased when compared to the comfort level just after lens insertion with all lenses, and it may be related to an increase on the ocular surface temperature [36], a decrease in pre-lens tear break-up time during lens wear [37,38], change in tear osmolarity [39], or changes in diurnal variation of tear function [40,41]. This finding confirms the results of previous studies which have also shown that comfort decreases with time during the day [17,18]. An interesting finding of this study is that the reduction in end-of-day comfort was not associated with the lens wearing modality. It implies that reduction in end-of-day comfort was similar with daily disposable and monthly disposable daily wear lenses. The reduction in end-of-day comfort was found to be dependent upon the lens materials. It was highest with comfilcon A and lowest with nelfilcon A lenses. Maldonado-Codina et al. [12] did not find an effect of the manufacturing process on the level of comfort, but in the current study, the lenses manufactured by the same company had similar changes in end-of-day comfort. Papas et al. did not get any improvement with the insertion of a new pair of CL during the afternoon of the same day [42]. This indicates that reduction in end-of-day comfort may be due to the process happening on the ocular surface due to the lenses rather than by the CL themselves [40,41].

In this study, no correlation of decrease in end-of-day comfort was found with the comfort level just after lens insertion. This shows that reduction in end-of-day comfort may be higher even in the subjects where initial comfort is higher and vice-versa. To achieve and maintain a long lasting successful CL wear, not only a better initial comfort, but also the maintenance of comfort during the whole day is an important factor.

This was an unmasked and a quantitative study which may lead to some human error or bias [43]. The biasness of the assessment in ocular surface physiology grading was tried to reduce by the confirmation of grading score with slit lamp photographs. Analyzing data of both eyes may be one of the limitations of the study because there may be some sympathetic effect on the fellow eye [44]. Armstrong reviewed more than two hundred articles and found that about two-thirds of the studies had used data of one eye only while one-third of the studies had used data of both eyes [45]. It was suggested that two-eye data can be analyzed incorporating eyes as a ‘within subjects’. In the current study, data of two eyes were used because, as mentioned previously, there was no correlation in change in ocular surface physiology between two eyes. Moreover, average values of physiological changes were used in the analysis of this study. Such type of grading strategy does not emphasize on clinical importance. For example, when inferior corneal staining score is grade 4 and that of each other region is grade 0, the average would be 0.8, which is clinically insignificant. Grading strategy applying maximum zone score emphasizes more clinical significance than an average score strategy; however, Begley et al. did not get a significant difference between different grading methods [29]. Recently some researchers have proposed a 0–6 score for grading corneal and conjunctival staining [46]. Moreover, an objective automated analysis of corneal staining by analyzing slit-lamp photographs may be a good quality assurance tool in multicenter clinical trials [47].

In conclusion, changes in ocular surface physiology and comfort score were similar with daily and monthly wear modalities. The increase in conjunctival limbal redness and reduction in end-of-comfort were associated with lens material characteristics. CL practitioners are advised to recommend lenses according to material characteristics rather than wearing modality.

Conflict of interest

None.

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