Original Article

Taiwan J Ophthalmol 2019;9:100-103

Access this article online

Quick Response Code:

Website:
www.e-tjo.org

DOI:
10.4103/tjo.tjo_29_18

Lotrafilcon B with HydraGlyde moisture matrix or Samfilcon A: Contralateral comparison study for comfort

Nilay Yuksel, Derya Yaman

Abstract:

PURPOSE: The purpose of this study was to compare two new silicone hydrogel contact lens (CL) models of lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) using the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) test.

METHODS: This prospective study included 30 patients between the ages of 19 and 35 years. Lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) CLs were fitted on the right and the left eye of the patients, respectively. All of the patients have not used any CLs before. After 4 weeks, the CLs were compared by asking the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8) test.

RESULTS: The mean scores of CLDEQ-8, frequency and intense of discomfort, dryness, blurry vision, frequency of needing to blink eye, and removal of the CL were assessed. There was no statistically significant difference between two groups ($P > 0.05$).

CONCLUSION: The main reasons for CL discontinuation are dryness and discomfort. These two new CLs used new advanced technology have a good compliance among the first-time CL users.

Keywords:

Contact lens, comfort, Dry Eye, dryness, Questionnaire-8

Introduction

Myopia, affecting approximately one-third of the US population and over 90% of the population in some East Asian countries,[1] is the most prevalent refractive error and a public problem.

Contact lens (CL) use for refractive error is common among young and adults. It has been estimated that there are approximately 140 million wearers of CLs worldwide.[2] Despite the development of newer materials for soft CLs, discontinuation of CL wear due to several factors is still an important factor that limits the number of successful wearers.[3,4] The possible causes of CL intolerance are multifactorial (preexisting tear dysfunction and CL chemical features-CL wettability, and environmental factors such as humidity, temperature, and blink characteristics).[5,6] It is well known that ocular surface symptoms such as comfort-related problems and dryness which are common in some 30%–50% of lens wearers at the end of the day[7-9] are the main reasons for CL dropout.[10]

The 2013 Tear Film Ocular Surface Society Workshop on Contact Lens Discomfort described the 8-item Contact Lens Dry Eye Questionnaire (CLDEQ-8).[11] The CLDEQ-8 including several questions is a short form of the CLDEQ test that was designed to evaluate CLs such as discomfort, dryness, and blurry vision among CL wearers. The sum of scores of the test was related to the general opinion of lenses.

Department of Ophthalmology, Ataturk Training and Research Hospital, Ankara, Turkey

Address for correspondence:
Dr. Nilay Yuksel, Alacaatlı Mah. Sinpaş Inceklife, Menekse Konutları, No: 2/5, Incek, Ankara, Turkey.
E-mail: ozturk.nilay@gmail.com

Submission: 10-03-2018
Accepted: 17-06-2018

How to cite this article: Yuksel N, Yaman D. Lotrafilcon B with HydraGlyde moisture matrix or Samfilcon A: Contralateral comparison study for comfort. Taiwan J Ophthalmol 2019;9:100-3.

Lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) are two new CLs with different technologies that were introduced with the promise of comfort and good wettability.

As we know, there are no studies comparing these two new CLs. In this study, the aim is to compare two new CL models, lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) using the CLDEQ-8 test.

Methods

This prospective and single-blind study included 30 patients who were examined at the CL Unit of Ankara Ataturk Training and Research Hospital. Lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) CLs were fitted on the right eye and the left eye of the patients, respectively. Informed consent was obtained from all patients. The present study was approved by the Local Ethics Committee, and the study was conducted by the Declaration of Helsinki. Patients, included in this study were between the ages of 19 and 35 years, with myopic lens correction from − 0.50 D to − 6.0 D in each eye. All the patients have not used any CLs before. Patients with clear cornea and having no other ocular eye disease, spending at least 3 h each day using a computer or electronic device, and wearing the CLs which were started for this study for a minimum of 8 h per day during a month were included in this study (Registration No. 26379996/118).

All the patients were used the same CL solutions (Bio True Solutions-Bausch and Lomb).

After 4 weeks, the CLs were compared by asking the CLDEQ-8 test. CLDEQ-8 test consists of five questions related to the CL which was used. This test is useful to assess the frequency and severity of CL-related disorders, dryness, and blurred vision with scores that grade each response. A lower CLDEQ-8 score shows less CL-related symptoms and good CL compliance.

Statistical analysis

Statistical analysis of the data obtained in this study was performed using the Statistical Package for Sciences (SPSS) software for Windows, version 20 (SPSS Inc., Chicago, IL, USA) program. Continuous variables were analyzed using Kolmogorov–Smirnov test for normal distribution. Independent-samples *t*-test was used to compare the mean of the two groups, which provided the normal distribution assumption and the homogeneous variance. The *P* value for statistical significance was accepted as <0.05.

Results

Characteristics of the CLs are summarized in Table 1.

The mean age of the patients was 24.7 ± 4.3 (19–35). Refraction error is similar between eyes of each patients, and the mean value of myopic refractive error was 2.1 ± 0.7 in both eyes. Characteristics of the subjects are summarized in Table 2.

The mean scores of CLDEQ-8 in lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) group were 6.8 ± 6.4, in samfilcon A (Bausch and Lomb Ultra®) group was 5.1 ± 4.8. There was no statistically significant difference between two groups (*P* = 0.25). Comparison of CLDEQ-8 scores between lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) groups is summarized in Table 3.

Discussion

The problems about using CL are related to discomfort such as dryness and end of the day discomfort.[5,9,12] CL surfaces that do not have constant wettability during the day cause blurring and discomfort. A wettable CL supports spreading of a stable tear film over the lens, reducing dryness symptoms, and blurring.

CL-related dry eye is accepted in the evaporative category according to the 2007 Dry Eye Workshop.[13] According to the environment exposures, rapid rotation of siloxane groups in silicone hydrogel lens materials is an important problem. This migration makes lens surfaces hydrophobic and reduces wettability of the surface.[14,15] This causes heterogeneity of tear film spreading and reduced CL

Table 1: Characteristics of the contact lenses

	Samfilcon A	Lotrafilcon B with HydraGlyde moisture matrix
Lens material technology	Moisture seal technology	Smart shield technology
Water content	46%	33%
Oxygen transmission	163 Dk/t	138 Dk/t
Base curve	8.5 mm	8.6 mm
Diameter	14.2 mm	14.2 mm
Center thickness	0.07 mm at−3.00 D	0.08 mm at−3.00 D
Spherical power	+6.00 D-−12.00 D	+8.00 D-−12.00 D

Table 2: Characteristics of the patients

Parameters	Subjects (*n*=30)
The mean myopic refraction error	2.1±0.7 D (−0,50/−3.75 D)
The mean age of the patients	24.7±4.3 (19-35)
Female/male (*n*)	20/10

Table 3: Comparison of contact lens dry eye questionnaire-8 scores between lotrafilcon B with HydraGlyde moisture matrix (Air Optix Plus HydraGlyde®) and samfilcon A (Bausch and Lomb Ultra®) groups

CLDEQ-8 test	Lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®)	Samfilcon A (Bausch and Lomb Ultra®)	*P**
Frequency of discomfort	0.8±0.1	0.6±0.1	0.33
Intense of discomfort	0.4±01	0.2±0.1	0.39
Frequency of dryness	0.6±0.1	0.4±0.1	0.31
Intense of dryness	1.0±0.2	0.6±0.1	0.18
Frequency of blurry vision	0.6±0.1	0.4±0.1	0.57
Intense of blurry vision	0.7±0.2	0.4±0.1	0.29
Needing to blink eye	1.0±0.2	0.8±0.1	0.42
Needing removal of CL	1.5±0.2	1.5±0.2	0.90
Mean scores of CLDEQ-8	6.8±6.4	5.1±4.8	0.25

**P* value is calculated by independent-samples *t*-test. CLDEQ-8=Contact lens dry eye questionnaire-8, CL=Contact lens

compliance through the day.[14-16] Reduced tear breakup time due to the increased tear evaporation related to CL wear is associated with increased tear and lens osmolality, which may exacerbate dryness symptoms.[16-18] In addition, reversible changes in corneal and conjunctival inflammation were shown in patients who wear soft CL which may be related to dryness symptoms.[19]

Advanced lens design and surface treatments with plasma or internal wetting agents have improved CL comfort and vision.[20-22]

New technology with the addition of EO45BO10 (HydraGlyde), poly (oxyethylene), and poly (oxybutylene), the material is used in lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde®) CLs. This material targets internal and external siloxane groups resulting in maintenance of low wetting angle (<10°) with improved wettability.[23] Smart shield Technology-plasma treatment of the surface in the lotrafilcon B lenses improve deposit resistance and increase the wettability of the lens.[23,24] Lotrafilcon B with HydraGlyde moisture matrix (Air Optix plus HydraGlyde ®) CL has 33% of water content in the monthly silicone hydrogel category.

Another new technology, consisting of two-phase reaction, is used in the samfilcon A (Bausch and Lomb Ultra®) CLs.[25] In phase 1, a unique combination of short and long chain silicone polymers makes a flexible silicone matrix with channels for oxygen transmission. In phase 2, polyvinylpyrrolidone (PVP) which is a high water affinity material and makes the lens containing water everywhere on the lens not just at its surface.[25] PVP wraps around the silicone polymer to make the surface and polymer hydrophilic. As a result of Moisture Seal technology, samfilcon A (Bausch and Lomb Ultra®) CLs, having 46% of water content in the monthly silicone hydrogel category, keep moisture all the day and provide a smooth optical surface to help prevent dehydration blur.

There are several studies evaluating CL comfort using CLDEQ-8 test.[26-28] In this study, we used the CLDEQ-8 test to evaluate the CL-related symptoms of the two newly produced CLs in the same CL wearer's. The lower CLDEQ-8 scores in our study indicated that these two new CLs using two different technologies have an effect on improving the CL-related disorders such as discomfort and dryness.

The main limitation of our study is small sample size. Furthermore, it would be better to assess and compare the corneal and conjunctival cytological changes after wearing these two new CLs and carry out on the patients, who discontinued CLs using before because of dryness and discomfort.

Conclusion

Comfort and clear vision without dryness are main factors of CL wear satisfaction. A wettable CL surface is essential to reduce friction and surface deposition with improving optical quality and comfort. Although longer follow-up is required, it seems that both of these new CLs may be good options for the first-time CL users. New studies with CLs using two novel technologies are needed in patients who have CL-related discomfort and dryness.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interests of this paper.

References

1. Smith MJ, Walline JJ. Controlling myopia progression in children and adolescents. Adolesc Health Med Ther 2015;6:133-40.
2. Cavanagh HD, Robertson DM, Petroll WM, Jester JV. Castroviejo lecture 2009: 40 years in search of the perfect contact lens. Cornea 2010;29:1075-85.
3. Doughty MJ, Fonn D, Richter D, Simpson T, Caffery B, Gordon K, *et al.* A patient questionnaire approach to estimating the prevalence of dry eye symptoms in patients presenting to optometric practices across Canada. Optom Vis Sci 1997;74:624-31.
4. Richdale K, Sinnott LT, Skadahl E, Nichols JJ. Frequency of and factors associated with contact lens dissatisfaction and discontinuation. Cornea 2007;26:168-74.
5. McMonnies CW. Incomplete blinking: Exposure keratopathy, lid wiper epitheliopathy, dry eye, refractive surgery, and dry contact lenses. Cont Lens Anterior Eye 2007;30:37-51.
6. Craig JP, Willcox MD, Argüeso P, Maissa C, Stahl U, Tomlinson A, *et al.* The TFOS international workshop on contact lens discomfort: Report of the contact lens interactions with the tear film subcommittee. Invest Ophthalmol Vis Sci 2013;54:TFOS123-56.
7. Young G, Veys J, Pritchard N, Coleman S. A multi-centre study of lapsed contact lens wearers. Ophthalmic Physiol Opt 2002;22:516-27.
8. Chalmers RL, Begley CG. Dryness symptoms among an unselected clinical population with and without contact lens wear. Cont Lens Anterior Eye 2006;29:25-30.
9. Pritchard N, Fonn D, Brazeau D. Discontinuation of contact lens wear: A survey. Int Contact Lens Clin 1999;26:157-62.
10. Young G. Why one million contact lens wearers dropped out. Cont Lens Anterior Eye 2004;27:83-5.
11. Chalmers RL, Begley CG, Moody K, Hickson-Curran SB. Contact lens dry eye questionnaire-8 (CLDEQ-8) and opinion of contact lens performance. Optom Vis Sci 2012;89:1435-42.
12. Sulley A, Young G, Hunt C. Factors in the success of new contact lens wearers. Cont Lens Anterior Eye 2017;40:15-24.
13. Lemp M, Baudouin C, Baum J, Dogru M, Foulks GN, Kinoshita S, *et al*. The definition and classification of dry eye disease: Report of the definition and classification subcommittee of the ınternational dry eye workshop. Ocul Surf 2007;5:75-92.
14. Ketelson HA, Meadows DL, Stone RP. Dynamic wettability properties of a soft contact lens hydrogel. Colloids Surf B Biointerfaces 2005;40:1-9.
15. Stahl U, Willcox MD, Naduvilath T, Stapleton F. Influence of tear film and contact lens osmolality on ocular comfort in contact lens wear. Optom Vis Sci 2009;86:857-67.
16. Tomlinson A, Cedarstaff TH. Tear evaporation from the human eye: The effects of contact lens wear. J Br Contact Lens Assoc 1982;5:141-7.
17. Korb DR. Tear film-contact lens interactions. Adv Exp Med Biol 1994;350:403-10.
18. González-Méijome JM, Parafita MA, Yebra-Pimentel E, Almeida JB. Symptoms in a population of contact lens and noncontact lens wearers under different environmental conditions. Optom Vis Sci 2007;84:296-302.
19. Willcox MD. Is there a role for inflammation in contact lens discomfort? Eye Contact Lens 2017;43:5-16.
20. Wygladacz K, Hook D, Steffen R, Reindel W. Breaking the cycle of discomfort. Contact Lens Spectr 2014;29:23-30.
21. Read ML, Morgan PB, Kelly JM, Maldonado-Codina C. Dynamic contact angle analysis of silicone hydrogel contact lenses. J Biomater Appl 2011;26:85-99.
22. Scheuer CA, Burke SE. Contact lens wetting and biocompatibility. Contact Lens Monthly; 2012. p. 18-21.
23. Young G. Exploring the relationship between materials and ocular comfort and health. Contact Lens Spectrum. Available from: http://www.visioncareresearch.com/pdfs/CLS%2007%20Comf%20&%20Material.pdf. [Last accessed on 2018 Aug].
24. Available from: www.accessdata.fda.gov/cdrh_docs/pdf16/k160609.pdf. [Last accessed on 2018 Aug].
25. Hoteling AJ, Nichols WF, Harmon PS, Conlon SM, Nuñez IM, Hoff JW, *et al.* Characterization and quantitation of PVP content in a silicone hydrogel contact lens produced by dual-phase polymerization processing. J Biomed Mater Res B Appl Biomater 2018;106:1064-72.
26. Pult H, Purslow C, Berry M, Murphy PJ. Clinical tests for successful contact lens wear: Relationship and predictive potential. Optom Vis Sci 2008;85:E924-9.
27. Siddireddy JS, Vijay AK, Tan J, Willcox M. The eyelids and tear film in contact lens discomfort. Cont Lens Anterior Eye 2018;41:144-53.
28. Chalmers RL, Keay L, Hickson-Curran SB, Gleason WJ. Cutoff score and responsiveness of the 8-item contact lens dry eye questionnaire (CLDEQ-8) in a large daily disposable contact lens registry. Cont Lens Anterior Eye 2016;39:342-52.