



Contents lists available at ScienceDirect

## Contact Lens and Anterior Eye

journal homepage: [www.elsevier.com/locate/clae](http://www.elsevier.com/locate/clae)Corneal confocal microscopy and dry eye findings in contact lens discomfort patients<sup>☆</sup>

Aysun Sanal Dogan\*, Canan Gurdal, Nese Arslan

Sağlık Bilimleri University, Diskapi Yildirim Beyazit Training and Research Hospital, Department of Ophthalmology, Ankara, Turkey

## ARTICLE INFO

## Keywords:

Contact lens  
Contact lens discomfort  
Dry eye  
Corneal confocal microscopy  
Dendritiform cells  
CLDEQ-8

## ABSTRACT

**Objectives:** To evaluate the corneal confocal microscopy and dry eye findings in patients with contact lens discomfort.

**Methods:** The study included 3 groups of participants: Contact lens wearers using silicone hydrogel soft contact lenses who are symptomatic (CLD, n = 15) or asymptomatic (ACL, n = 11) and non-wearers as controls (n = 14). Duration of contact lens wear, Ocular Surface Disease Index (OSDI) questionnaire responses, fluorescein tear break-up time (FBUT), and corneal confocal microscopy findings were recorded.

**Results:** Mean age was 25.7 ± 8.2 years and male/female ratio was 7/33. Demographic findings were similar regarding the groups. CLD patients had a longer lens use history than ACL (median 5 vs 2 years, p < 0.001). OSDI scores were higher in CLD group than ACL or controls (p < 0.001, p = 0.002). FBUT was significantly lowest in CLD group, compared to controls and ACL (p < 0.001, p = 0.039). FBUT was also lower in ACL patients compared to controls (p = 0.036). There was no difference between basal epithelium cell counts between all 3 groups. Anterior stromal activated keratocyte numbers were similar between contact lens using groups but was lower in controls (p = 0.005). However, dendritiform cells in the sub-basal nerve layer were higher in CLD group compared to controls but similar to ACL (p < 0.001, p = 0.058). Graded sub-basal nerve tortuosity was more prominent in CLD group than the ACL (p = 0.014).

**Conclusion:** Patients with CLD had been wearing contact lenses for longer than those without symptoms. OSDI and FBUT scores were worse in CLD patients. In contact lens discomfort patients, there were increased dendritiform cells, indicating intensified inflammatory status of the cornea.

## 1. Introduction

Contact lens discomfort (CLD) is a disturbing condition with varying degrees and severity of annoying ocular sensations (such as dryness symptoms and discomfort) related to contact lenses, which can reduce wearing time and eventually lead to the discontinuation of contact lenses (CL) [1].

Patients with CLD become symptomatic after the contact lens adaptation period. CLD has been associated with ocular surface findings such as conjunctival hyperemia, meibomian gland dropouts, corneal staining, lid parallel conjunctival folds and lid wiper epitheliopathy, although, it may not be associated with any ocular surface signs [2]. The estimated number of CL wearers is over 140 million, and more than 20% of this population stop using CL because of discomfort symptoms [2,3]. CLD is the leading cause of the discontinuation of contact lens wear, and it has been reported that 49% to 72% of contact lens dropouts were cited that their contact lenses were uncomfortable [3–5]. This

is an important issue in contact lens practice, and studies have been conducted for a better understanding of the effects of CL on the anterior segment of the eye [6].

In this study, corneal confocal microscopy findings were evaluated in daily wear CL patients with and without CLD wearing CL far beyond the adaptation period and compared to non-contact lens wearers.

## 2. Methods

All the patients were informed about the procedure, and informed consent was obtained according to the Declaration of Helsinki. This study was approved by the local ethics committee (24/09 30.06.2015)

Forty ametropic participants who visited the contact lens department and had 20/20 corrected vision were included in the study. The patients already wearing CL filled out the Contact Lens Dry Eye Questionnaire-8 (CLDEQ-8), and all the participants also filled out the Ocular Surface Disease Index (OSDI).

<sup>☆</sup> None of the authors have financial support or relationships.

\* Corresponding author at: Sağlık Bilimleri Üniversitesi, Diskapi Yıldırım Beyazit Eğitim ve Araştırma Hastanesi, İrfan Baştuğ Cad. Diskapi, Ankara, Turkey.  
E-mail addresses: [asanaldogan@gmail.com](mailto:asanaldogan@gmail.com) (A.S. Dogan), [gurdalcm@gmail.com](mailto:gurdalcm@gmail.com) (C. Gurdal), [arslannese75@yahoo.com](mailto:arslannese75@yahoo.com) (N. Arslan).

<http://dx.doi.org/10.1016/j.clae.2017.08.001>

Received 17 June 2017; Received in revised form 31 July 2017; Accepted 1 August 2017

1367-0484/ © 2017 British Contact Lens Association. Published by Elsevier Ltd. All rights reserved.

**Table 1**  
Characteristics of participants, OSDI, FBUT and confocal findings regarding the groups.

	CLD (n = 15)	ACL (n = 11)	C (n = 14)	P value
Age (year)	27.7 ± 10	24.8 ± 6.1	24.1 ± 7.6	0.474 <sup>a</sup>
Gender (M/F)	2/13	3/8	2/12	0.604 <sup>b</sup>
Length of CL wear, median (min-max) (year)	5 (1-15)	2 (1-9)	-	< 0.001 <sup>c</sup>
OSDI	45.2 ± 15.4	26.7 ± 12.5	23.6 ± 9.8	< 0.001 <sup>a</sup>
FBUT <sup>b</sup> (seconds)	6.4 ± 2.6	8.9 ± 3.4	11.5 ± 1.1	< 0.001 <sup>a</sup>
Basal epithelial cell density (cell/mm <sup>2</sup> )	5437 ± 700	5378 ± 484	5633 ± 502	0.509 <sup>a</sup>
Dendritiform cell density (cell/mm <sup>2</sup> ) <sup>§</sup>	91 ± 69.2	47.1 ± 33.9	19.7 ± 12.1	0.001 <sup>a</sup>
Activated Keratocyte density (cell/mm <sup>2</sup> )	27.6 ± 8.5	25.5 ± 11.2	16.6 ± 7	0.005 <sup>a</sup>
Spherical Equivalent (diopter)	-3.2 ± 1.4	-2.5 ± 1.8	-1.64 ± 0.98	0.019 <sup>a</sup>

CLD: Contact lens discomfort group, ACL: Asymptomatic contact lens group, C: Control group, OSDI: Ocular Surface Disease Index, FBUT: fluorescein break-up time, CL: Contact Lens.

<sup>a</sup> One-way ANOVA, <sup>b</sup> chi-square, <sup>c</sup> Mann-Whitney *U* test.

<sup>b</sup> CLD < ACL < Control.

<sup>§</sup> CLD vs Control, *p* = 0.001, CLD vs ACL, *p* = 0.058, ACL vs control, *p* = 0.323.

The overall OSDI defines the severity of dry eye in a quantitative way out of total score of 100 [7]. It includes 3 sections and 12 items that ask about symptoms, functional limitations and environmental factors. The CLDEQ-8 quantifies the annoying symptoms of contact lens wearers out of a total score of 37 with the aim of assessing the satisfaction and overall opinion of contact lens wearers [8]. The CLDEQ-8 was translated into Turkish using standard forward and backward translation methods as recommended [9].

Information about how long the patients had been wearing contact lenses was obtained. All the participants underwent complete ophthalmologic examinations, including fluorescein break-up time (FBUT) measurement.

To obtain FBUT, a 1 mg fluorescein sodium impregnated strip (Optitech, Dublin, Ireland) was moistened with saline and the excess liquid flicked off and placed onto the inner lateral lower eyelid margin. The subjects were instructed to blink several times and then to hold their eyes open as long as possible. Using a biomicroscope with a cobalt blue filter, the examiner measured the time from the last blink to the first appearance of a black spot on the tear film and a yellow cut-off filter in front of the observation system used to aid visualization. This was repeated three times, and the mean was used as the result.

Twenty-nine of the patients were soft contact lens wearers. All the patients were using silicone hydrogel lenses for daily wear. They were divided into two groups: patients with CLDEQ-8 scores < 12 (out of 37) as asymptomatic contact lens wearers (ACL, *n* = 11), patients with CLDEQ-8 scores ≥ 12 as the symptomatic contact lens discomfort group (CLD, *n* = 15). Fourteen participants had no history of contact lens wear, but who were willing to wear contact lenses constituted the control group.

The exclusion criteria were any inflammatory systemic disease, pregnancy, ocular surgery, ocular trauma and pathology other than refraction, topical or systemic drugs other than non-preservative tear substitutes. All the patients were myopic, and those with astigmatism of more than 1.50 D or myopia of more than 6.00 D were excluded. Patients with a silicone hydrogel soft contact lens use history of less than one year were not included in the study.

The examinations were done in the morning (8:00–12:00). The contact lens groups did not wear their lenses from the previous evening until then.

### 2.1. Corneal confocal microscopy

Laser scanning confocal microscopy (Heidelberg Retina Tomograph (HRT III-RCM), Heidelberg Engineering, Dossenheim, Germany) with ×400 magnification and 400 × 400 μm (384 × 384 pixels) was used for this investigation. A transparent ophthalmic gel (Viscotears gel, Alcon) is filled into the sterile confocal cap, which is attached to the objective lens.

Proparacaine HCl 0.5% (Alcaine, Alcon) was administered to the

patients' conjunctival fornices. They were allowed to sit across the instrument and rest their heads on the instrument. To increase patient compliance, the table and chin height were adjusted. Ophthalmic gel was introduced both to the lower fornix and the external surface of the confocal cap. A red fixed target helped patients to look with unexamined eyes. Whole depth corneal images were gathered by focusing.

For the activated keratocyte and subbasal epithelial cell layer dendritiform cell count, the whole frame was used. For the basal epithelial cell count, a fixed area (200 μm × 200 μm; 0.040 mm<sup>2</sup>) in the image frame, which was kept constant for all participants, was used. The partially cut off cells in the superior and right hand borders of the field were taken in to account.

Cell counts were done with the instrument's manual counting tool by a masked researcher, and the mean of 2 high quality frames was accepted as the result.

Morphology of the sub-basal epithelial layer nerve fibers was done according to grading modified from Oliveira-Soto and Efron [10]. Tortuosity was graded ≤1 if the nerves were straight or slightly tortuous and > 1 if moderate to very tortuous. Reflectivity was graded ≤1 if the nerves were almost indistinguishable or slightly dimmer than the background and > 1 if they were comparable or higher in reflectivity than the background.

### 3. Results

The mean age of the patients was 25.7 ± 8.2 years, and the male/female ratio was 7/33. There were no statistical differences between the groups (Table 1). Spherical equivalents were similar between the CLD and ACL groups, but lower for the control group (*p* = 0.019).

OSDI scores had a significant positive correlation with CLDEQ-8 scores (*r* = 0.570, *p* = 0.002, Spearman's correlation test). The CLD group's OSDI scores were higher, but their FBUTs were lower than ACL and control groups (Table 1). CLD patients had a longer lens use history than the ACL group (median 5 vs. 2 years, Mann-Whitney *U* test, *p* < 0.001). CLDEQ-8 scores correlated (*r* = 0.469, *p* = 0.016, Spearman's correlation test), but OSDI scores did not correlate with duration of lens use (*r* = 0.206, *p* = 0.312, Spearman's correlation test).

There was no difference between the basal epithelium densities of the three groups (*p* = 0.509). The CLD group's sub-basal layer dendritiform cell count was higher than that of the control group, but there was no difference between the CLD and ACL patients (*t*-test, *p* = 0.001, *p* = 0.058) (Fig. 1a–c). Dendritiform cell densities were also similar between the ACL and control groups (*t*-test, *p* = 0.323). The anterior stroma activated keratocyte cell numbers were similar for the CLD and ACL groups, but lower for the C group (*t*-test, *p* = 0.005).

The reflectivity difference of sub-basal epithelial nerve plexus was not statistically significant (*p* = 0.054). The CLD group's sub-basal nerve tortuosity was higher than that of the control group, but similar

Download English Version:

<https://daneshyari.com/en/article/8590442>

Download Persian Version:

<https://daneshyari.com/article/8590442>

[Daneshyari.com](https://daneshyari.com)