

# Meibomian Gland Alterations in Keratoconus Patients After Corneal Cross-Linking

Gamze Ozkan<sup>1</sup>, Semra Akkaya Turhan<sup>2</sup>

<sup>1</sup>Department of Ophthalmology, Marmara University School of Medicine, Istanbul, Türkiye

<sup>2</sup>Department of Ophthalmology, Acıbadem Mehmet Ali Aydınlar University School of Medicine, Istanbul, Türkiye

## Purpose

To evaluate the changes in the meibomian glands (MGs) and ocular surface parameters after corneal cross-linking (CXL) in keratoconus patients.

## Methods

Forty-eight eyes of 48 keratoconus patients that underwent epi-off CXL were included in this prospective study. Upper and lower lid MGs were assessed with non-contact meibography at preoperatively, 1st, 3rd, 6th, and 12th month after CXL. Uncorrected distance visual acuity (UCVA), corrected distance visual acuity (BCVA), spherical equivalent (SE), and corneal tomography findings (K1, K2, Kmean, and Kmax) were recorded at each visit. Ocular surface staining score (Oxford grade), ocular surface disease index (OSDI) questionnaire, and non-invasive tear break-up time (NI-TBUT) were evaluated at preoperatively and 12 months after CXL.

## Results

K1, K2, Kmean, and Kmax were decreased at post-operative 12th month compared to baseline UCVA, BCVA, and SE did not change between preoperatively and post-operative 12 months NI-TBUT showed similarity between pre-operative and 12 months values ( $p=0.180$ ), while OSDI scores significantly decreased ( $p<0.001$ ). MG loss in the upper and lower lids did not show significant difference compared to pre-operative values at any of the follow-up visits. (Table 1 and Figure 1)

## Conclusion

CXL treatment did not significantly affect the NI-TBUT and MGs morphology, while improving ocular symptoms.

Table 1. The meibomian gland morphological alterations at follow-ups

	Upper lid MG loss percentage	Lower lid MG loss percentage
Pre-operative	10.51±8.05	3.19±1.69
1st month	10.45±7.85	3.12±1.64
3rd month	10.80±8.10	3.08±1.56
6th month	10.84±8.17	3.14±1.65
12th month	10.53±7.96	3.11±1.58
p	0.121	0.117

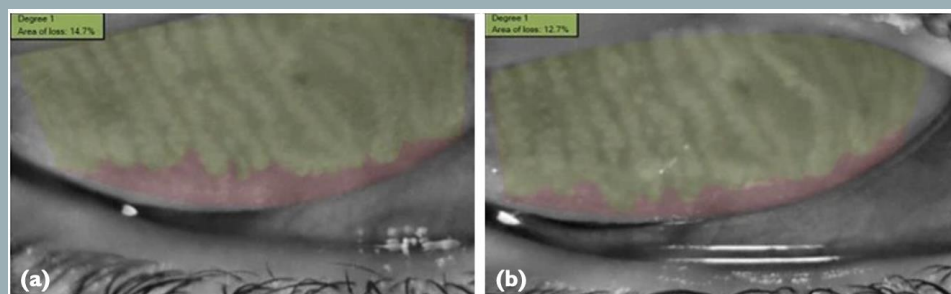


Figure 1. Representative images of meibomian glands in the upper lids of a patient obtained by meibography (a) before cross-linking and (b) 12 months after cross-linking.