

## **Efficacy of Repeated LipiFlow Treatment for Obstructive Meibomian Gland Dysfunction**

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**[Purpose]** LipiFlow (TearScience, Morrisville, NC) is a device for treatment of meibomian gland dysfunction (MGD) based on warming and massage of the eyelid. Given that we found that some MGD patients treated with a single application of LipiFlow did not show improvement in their symptoms, we evaluated the clinical efficacy of repeated LipiFlow treatment in such individuals.

**[Methods]** Among 30 patients with obstructive MGD subjected to a single application of LipiFlow, 10 individuals (7 women and 3 men; mean age  $\pm$  SD,  $48.4 \pm 16.4$  years; age range, 30 to 88 years) who did not show improvement in their subjective symptom score, lid margin findings (such as plugging, vascularity, and irregularity), and meibum grade 3 months after initial application of LipiFlow were enrolled in the present study. For examination of the effects of repeated LipiFlow treatment, LipiFlow was applied to both eyes of each subject three times every months. We evaluated the clinical parameters in right eye such as lid margin abnormalities, the thickness of the lipid layer of the tear film, tear film breakup time, meibum grade, epithelial disorders, meiboscore (as determined by meibography), and the Schirmer test value as well as the subjective symptom score before the initial application of LipiFlow and 1 month after each treatment application.

**[Results]** The study subjects included 5 individuals with MGD combined with aqueous-deficient dry eye, 5 individuals with a history of contact lens wear, and 6 individuals with extensive damage to MG morphology. The subjective symptom score was significantly improved ( $P = 0.006$ ) after the second application of the study treatment. Furthermore, the subjective symptom score, lipid layer thickness, tear film breakup time, and meibum grade were significantly improved after the third application ( $P < 0.001$ ,  $P < 0.001$ ,  $P < 0.001$ , and  $P = 0.019$ , respectively).

**[Conclusions]** LipiFlow treatment requires repeated application to show efficacy in some MGD patients. Such repeated application is thus a promising option for treatment of refractory MGD.