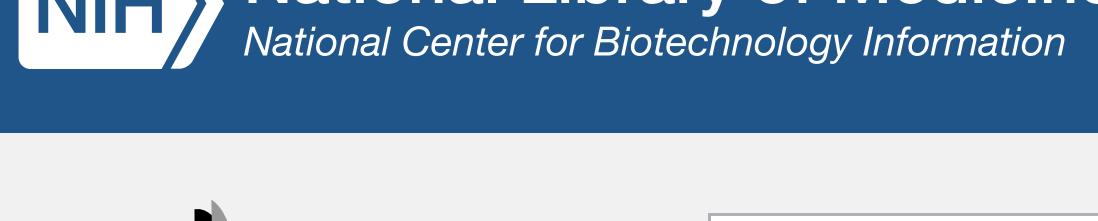


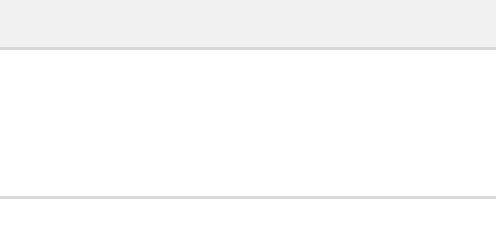
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### Abstract

**Purpose:** The present study examined the long-term (3 years) effects of a single (12 min) thermal pulsation system (TPS) treatment on symptomatic patients with evaporative dry eye disease (DED) secondary to meibomian gland dysfunction (MGD).

**Methods:** In this prospective, cohort, observational, single-center study design, signs (meibomian gland secretion [MGS] scores and tear film breakup time [TBUT]) and symptoms (Ocular Surface Disease Index [OSDI] and Standard Patient Evaluation of Eye Dryness [SPEED] questionnaires) were determined in 20 patients (40 eyes) with MGD and dry eye symptoms at baseline (BL), 1 month, and 3 years post-TPS treatment using LipiFlow.

**Results:** Meibomian gland secretion scores increased from BL ( $4.5 \pm 0.8$ ) to 1 month ( $12.0 \pm 1.1$ ,  $P \leq 0.001$ ). Improvement persisted at 3 years ( $18.4 \pm 1.4$ ) relative to BL ( $P \leq 0.001$ ). Meibomian gland secretion scores in all regions of the lower eyelid were improved over BL at 1 month (nasal [ $P \leq 0.001$ ], central [ $P \leq 0.001$ ], temporal [ $P \leq 0.01$ ]) and 3 years (nasal [ $P \leq 0.001$ ], central [ $P \leq 0.001$ ], temporal [ $P \leq 0.001$ ]). TBUT increased from BL ( $4.1 \pm 0.4$ ) to 1 month ( $7.9 \pm 1.4$ ,  $P \leq 0.05$ ) but was not significantly different than BL at 3 years ( $4.5 \pm 0.6$ ,  $P > 0.05$ ). The OSDI scores decreased from BL ( $26.0 \pm 4.6$ ) to 1 month ( $14.7 \pm 4.3$ ,  $P \leq 0.001$ ) but returned to BL levels at 3 years ( $22.5 \pm 5.4$ ,  $P > 0.05$ ). The SPEED scores decreased from BL ( $13.4 \pm 1.0$ ) to 1 month ( $6.5 \pm 1.3$ ,  $P \leq 0.001$ ), and this improvement persisted at 3 years ( $9.5 \pm 1.6$ ,  $P \leq 0.001$ ).

**Conclusions:** Thermal pulsation may be a uniquely efficacious treatment option for DED secondary to MGD in that a single 12-min procedure is associated with significant improvement in MGS and SPEED scores for up to 3 years.

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