Service Alert: Planned Maintenance beginning July 25th

Most services will be unavailable for 24+ hours starting 9 PM EDT. Learn more about the maintenance.

An official website of the United States government Here's how you know

National Library of Medicine
National Center for Biotechnology Information

Log in

PubMed

Search

Advanced User Guide

Save Email Send to Display options

Observational Study > Eye Contact Lens. 2016 Mar;42(2):99-107.
doi: 10.1097/ICL.0000000000000166.

Long-Term (3 Year) Effects of a Single Thermal Pulsation System Treatment on Meibomian Gland Function and Dry Eye Symptoms

Jack V Greiner [1]

Affiliations + expand

PMID: 26222095 DOI: 10.1097/ICL.0000000000000166

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

PubMed Disclaimer

Similar articles

Long-term (12-month) improvement in meibomian gland function and reduced dry eye symptoms with a single thermal pulsation treatment.
Greiner JV.
Clin Exp Ophthalmol. 2013 Aug;41(6):524-30. doi: 10.1111/ceo.12033. Epub 2012 Dec 14.
PMID: 23145471 Clinical Trial.

A single LipiFlow® Thermal Pulsation System treatment improves meibomian gland function and reduces dry eye symptoms for 9 months.
Greiner JV.
Curr Eye Res. 2012 Apr;37(4):272-8. doi: 10.3109/02713683.2011.631721. Epub 2012 Feb 10.
PMID: 22324772 Clinical Trial.

Clinical Trial of Thermal Pulsation (LipiFlow) in Meibomian Gland Dysfunction With Preteatment Meibography.
Zhao Y, Veerappan A, Yeo S, Rooney DM, Acharya RU, Tan JH, Tong L; Collaborative Research Initiative for Meibomian gland dysfunction (CORIM).
Eye Contact Lens. 2016 Nov;42(6):339-346. doi: 10.1097/ICL.0000000000000228.
PMID: 26825281 Free PMC article. Clinical Trial.

LipiFlow for the treatment of dry eye disease.
Pucker AD, Yim TW, Rueff E, Ngo W, Tichenor AA, Conto JE.
Cochrane Database Syst Rev. 2024 Feb 5;2(2):CD015448. doi: 10.1002/14651858.CD015448.pub2.
PMID: 38314898 Free PMC article.

Which treatment works better for Meibomian Gland Dysfunction: LipiFlow or intense pulsed light? A systematic review and network meta-analysis.
Chen KY, Chan HC, Chan CM.
Photodiagnosis Photodyn Ther. 2025 Jun;53:104630. doi: 10.1016/j.pdpdt.2025.104630. Epub 2025 May 11.
PMID: 40360035

See all similar articles

Cited by

The photothermal effect of intense pulsed light and LipiFlow in eyelid related ocular surface diseases: Meibomian gland dysfunction, Demodex and blepharitis.
Li H, Huang L, Fang X, Xie Z, Xiao X, Luo S, Lin Y, Wu H.
Heliyon. 2024 Jun 28;10(13):e33852. doi: 10.1016/j.heliyon.2024.e33852. eCollection 2024 Jul 15.
PMID: 39040313 Free PMC article. Review.

Performance of a Translucent Activator for LipiFlow Vectored Thermal Pulse (VTP) Treatment of Meibomian Gland Dysfunction.
Hu JG, Dang VT, Chang DH, Goldberg DF, McKinnon C, Makedonsky K, Laron M, Ji L.
Clin Ophthalmol. 2022 Mar 30;16:963-971. doi: 10.2147/OPTH.S354738. eCollection 2022.
PMID: 35386613 Free PMC article. Clinical Trial.

Thermal Pulsation with or without Dexamethasone Intracanalicular Insert for Meibomian Gland Dysfunction: A Prospective, Masked Trial.
Dierker DS, Hauswirth SG.
Clin Ophthalmol. 2022 May 12;16:1477-1485. doi: 10.2147/OPTH.S359719. eCollection 2022.
PMID: 35585875 Free PMC article.

A single vectored thermal pulsation treatment for meibomian gland dysfunction increases mean comfortable contact lens wearing time by approximately 4 hours per day.
Blackie CA, Coleman CA, Nichols KK, Jones L, Chen PQ, Melton R, Kading DL, O'Dell LE, Srinivasan S.
Clin Ophthalmol. 2018 Jan 17;12:169-183. doi: 10.2147/OPTH.S153297. eCollection 2018.
PMID: 29398904 Free PMC article.

Non-pharmaceutical treatment options for meibomian gland dysfunction.
Arita R, Fukuoka S.
Clin Exp Optom. 2020 Nov;103(6):742-755. doi: 10.1111/cxo.13035. Epub 2020 Jan 13.
PMID: 31943385 Free PMC article. Review.

See all "Cited by" articles

Publication types

> Observational Study
> Research Support, Non-U.S. Gov't

MeSH terms

> Adult
> Aged
> Dry Eye Syndromes / etiology
> Dry Eye Syndromes / metabolism
> Dry Eye Syndromes / therapy*
> Eyelid Diseases / complications
> Eyelid Diseases / metabolism
> Eyelid Diseases / therapy*
> Female
> Humans
> Hyperthermia, Induced / methods*
> Longitudinal Studies
> Male
> Meibomian Glands / metabolism
> Middle Aged
> Prospective Studies
> Severity of Illness Index
> Tears / metabolism
> Visual Acuity

Related information

Cited in Books
MedGen

LinkOut - more resources

Full Text Sources
Ovid Technologies, Inc.
Wolters Kluwer

Other Literature Sources
scite Smart Citations

Medical
MedlinePlus Health Information

FULL TEXT LINKS
Full Text

ACTIONS
Cite
Collections
Permalink

PAGE NAVIGATION
Title & authors
Abstract
Similar articles
Cited by
Publication types
MeSH terms
Related information
LinkOut - more resources

NCBI Literature Resources MeSH PMC Bookshelf Disclaimer

The PubMed wordmark and PubMed logo are registered trademarks of the U.S. Department of Health and Human Services (HHS). Unauthorized use of these marks is strictly prohibited.

FOLLOW NCBI

Connect with NLM

National Library of Medicine
8600 Rockville Pike
Bethesda, MD 20894

Web Policies
FOIA
HHS Vulnerability Disclosure

Help
Accessibility
Careers

NLM | NIH | HHS | USA.gov