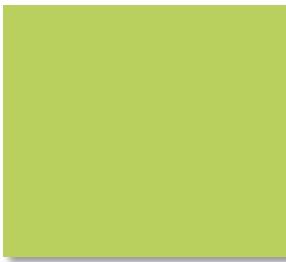


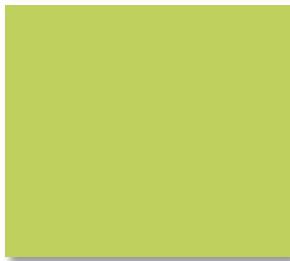
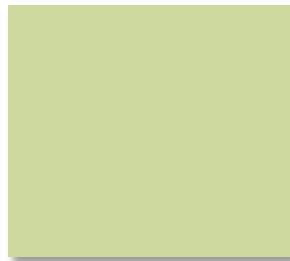
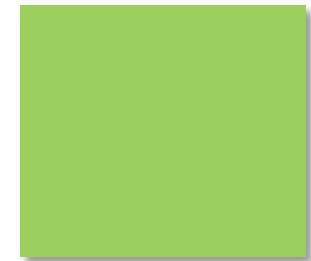


EUDES SYMPOSIUM: MEIBOMIAN GLAND DYSFUNCTION – QUO VADIS? **LID HYGIENE – WHY AND HOW?**

Elisabeth M. Messmer



EuDES
European
Dry Eye
Society



Consultant or speaker for the following companies

- Alcon Pharma GmbH
- DMG
- Dompé
- Kala
- Novartis
- Pharm-Allergan GmbH
- Santen GmbH
- Shire
- Sun
- Sifi
- Théa Pharma GmbH
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- Ursapharm Arzneimittel GmbH
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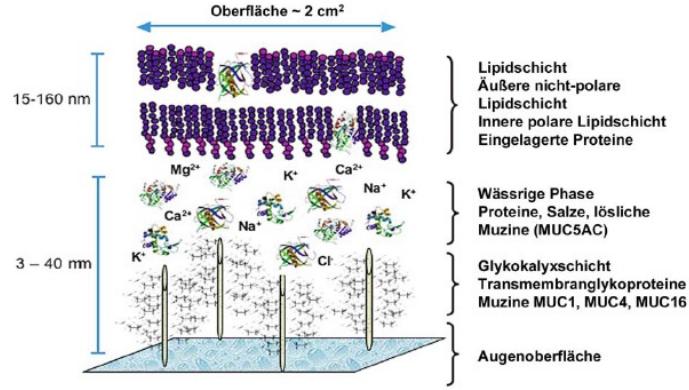
- Founded in 2020
- www.dryeye-society.com/
- Please become a member- It's for free!



- Meibomian gland dysfunction (MGD) is common, and often overlooked
- Biofilm, bacteria, demodex mites, and inflammation play a pathogenetic role
- Basic Treatments
 - ✓ Lid hygiene
 - ✓ Artificial tears with lipids
 - ✓ Topical/systemic antibiotics
 - ✓ „Professional“ lid hygiene
 - ✓ IPL



LID HYGIENE – WHY AND HOW



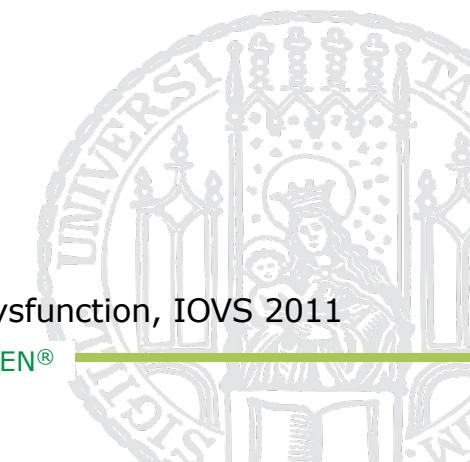
Meibum

- Lipids, proteins, nucleic acids
- Melting point 28-32° C
 - Released amount of lipid dependent on lid temperature!

Report of the International Workshop on Meibomian Gland Dysfunction, IOVS 2011

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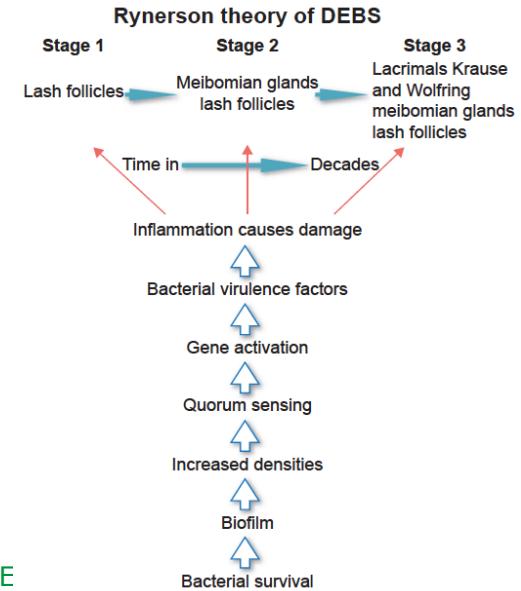
AUGENKLINIK



- Dry Eye Disease is the late manifestation of blepharitis – „Dry Eye Blepharitis Syndrome (DEBS)“
- Responsible: bacteria in biofilm of the lid margin

- Exotoxins, cytolytic toxins, super-antigens
- Inflammation
- Dry Eye Disease

Rynerson JM et al. Clin Ophthalmol 2016; 10:2455-2467



BACTERIOLOGICAL PROFILE OF OCULAR SURFACE FLORA IN MGD

- 201 MGD patients, 84 age/gender-matched controls
- Samples from conjunctiva and MG secretion
- Aerobic and anaerobic cultures

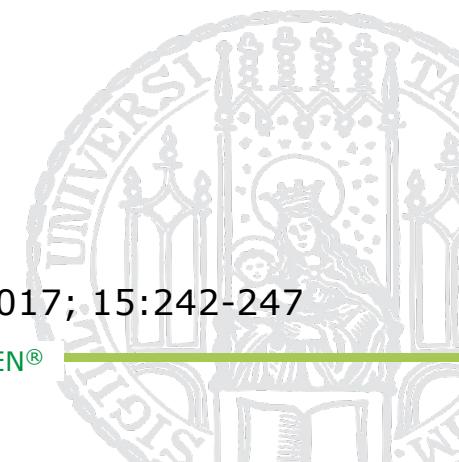
Meibum Aerobes Anaerobes

- | | | |
|-------------|-------|-----------------|
| ■ Controls: | 36.9% | 10.7% |
| ■ MGD: | 75.6% | 34.3% (p<0.001) |

Conjunctiva

- | | | |
|-------------|-------|-----------------|
| ■ Controls: | 44.0% | 10.7% |
| ■ MGD: | 64.7% | 30.8% (p<0.001) |

Zhang SD et al. Ocul Surf 2017; 15:242-247



BACTERIAL ASPECTS OF CHRONIC BLEPHARITIS

- Bacteria release lipolytic exoenzymes including fatty wax esterases, cholesteryl esterases, and triglyceride lipases
- Abnormalities in the free fatty acid component of the meibomian secretions
- Different bacteria may contribute to the expression of disease in all forms of chronic blepharitis



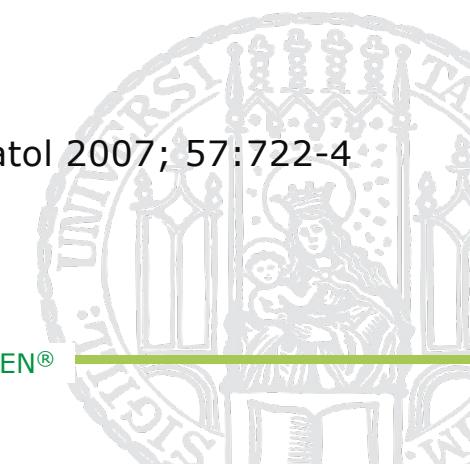
McCulley JP et al. Trans Ophthalmol Soc UK 1986; 105:314-8



- Obstruction of the glandular orifices in MGD may create low-oxygen environment
- Facilitates the growth of anaerob bacteria
- *P. acnes* produce glycocalyx polymer → increases stickiness of sebum and leads to more plugging and comedone formation in acne. May be similar for MGD

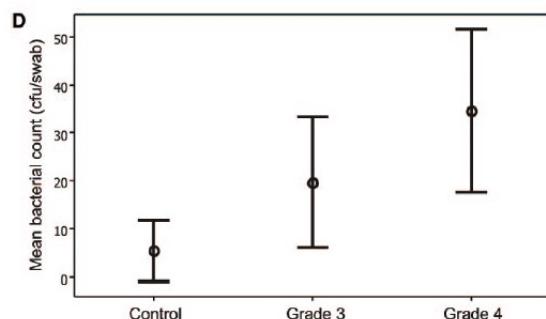
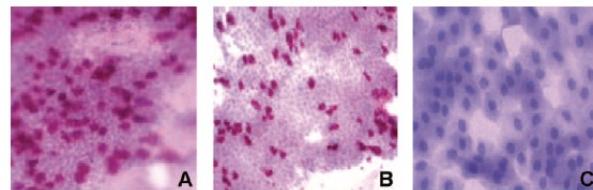


Burkhart CG et al. J Am Acad Dermatol 2007; 57:722-4

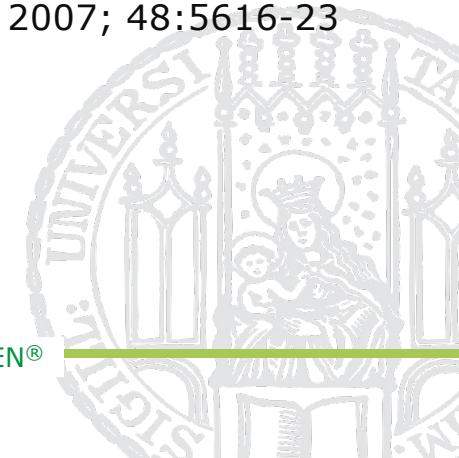


POSSIBLE PATHOGENETIC MECHANISMS OF BACTERIA IN MGD/DED

- Toxins or proteases of bacteria may damage epithelial cells of glands and lead to gland atrophy¹
- Increased bacterial flora is associated with reduced goblet cell density²



1. Zhang SD et al. Ocul Surf 2017; 15:242-247
2. Graham JE et al. IOVS 2007; 48:5616-23



HYPERTINFESTATION - DEMODEX

- 229 Patients with ocular discomfort (\varnothing 56 years, 75% female)
- Prevalence of Demodex mites in eye lashes
- Association to DED and lid margin/meibomian gland changes
 - Demodex mite (mostly *D. folliculorum*) in **40.2%** of patients
 - Demodex significantly associated with
 - Older age
 - Increased symptoms
 - More cylindrical scales (sleeves)
 - Lower quality of meibum



Rabensteiner DF et al. Am J Ophthalmol 2019; 204: 7-12

Hot compresses and lid massage



LID HYGIENE – MY RECOMMENDATION

- Morning and evening
- Hot moist compresses x 5 minutes
- Lid massage at upper and lower lid towards lid margin, eyes closed, dry/moist cotton tip
- No baby shampoo
- +/- lid hygiene aids (warming masks, red light, massage aids etc.)
- +/- tea tree oil



Sung J et al. The Ocul Surf 2018; 16:77-83

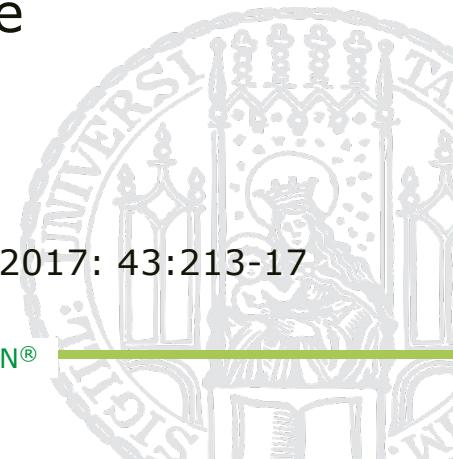
Gao YY et al. Cornea 2007; 26:136-43

Cheung IMY et al. Contact Lens Ant Eye 41; 2018:513-517

LID HYGIENE – ADHERENCE AND PERSISTENCE

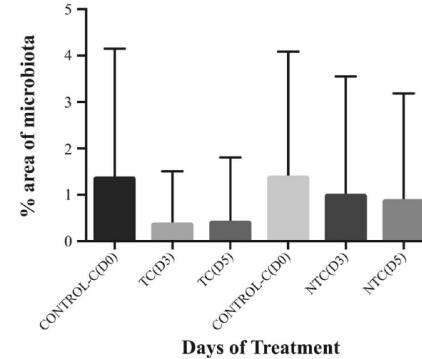
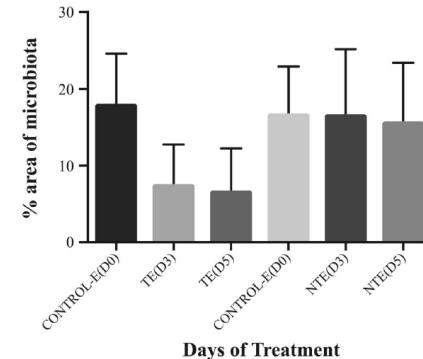
- Cross-sectional study; Miami Veterans Affair Hospital
 - 211 patients (94 male, 60% white)
 - Clinical examination, recommendation for hot compresses and lid massage
 - 6 weeks later telephone call from ophthalmologist: Compliance? Subjective improvement? (answered by 91% of patients)
-
- „Compliance“ with lid hygiene **55%**
 - Patients adherent to therapy: 63.5% subjective complete improvement, 28.8% partial improvement
 - Clinical signs not associated with compliance

Alghamdi YA at al. Eye & Contact Lens 2017: 43:213-17



LID HYGIENE PREOPERATIVELY

- Microbiota in lid margin significantly reduced (58% D3, 63% D5; $p=0.001$)
- Microbiota in conjunctiva significantly reduced (72% D3, 69% D5)
- Reduction of microbes comparable to prophylactic topical antibiotics



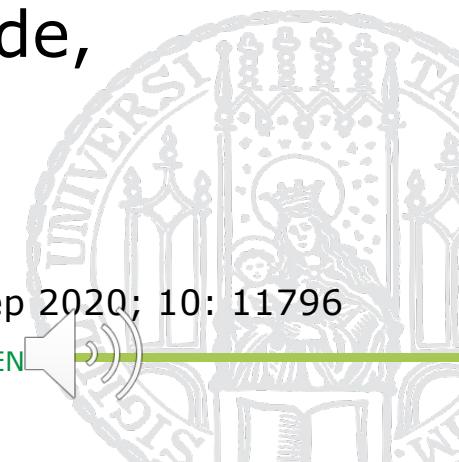
Peral A et al. Eye & Contact Lens 2016; 42: 366-370

ROLE OF PRE-/POSTOPERATIVE LID HYGIENE IN MGD PATIENTS

Randomized clinical trial

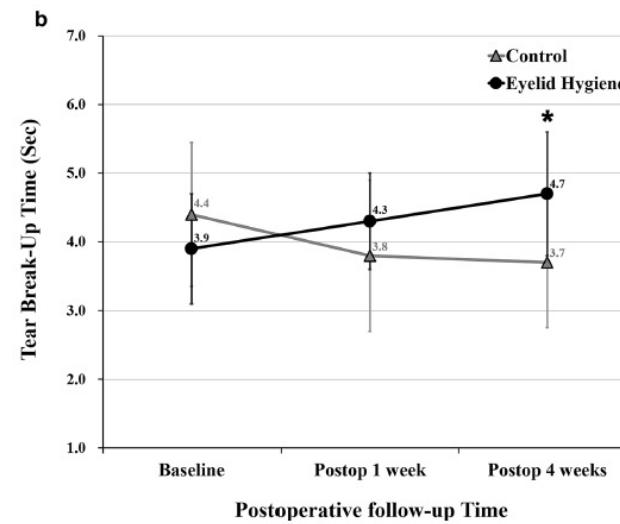
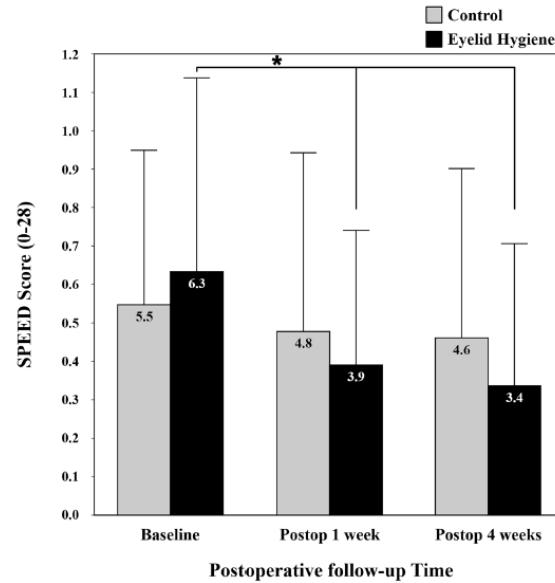
- 69 Patients with obstructive MGD presenting for cataract surgery randomly assigned into:
 - Eye lid hygiene group (2x/d x 10 days, 3 days preop until 7 days postop) vs
 - Control group (no lid hygiene)
- ✓ SPEED questionnaire, anterior blepharitis grade, meibum quality/quantity at baseline, d7, d28

Eom Y et al. Sci Rep 2020; 10: 11796

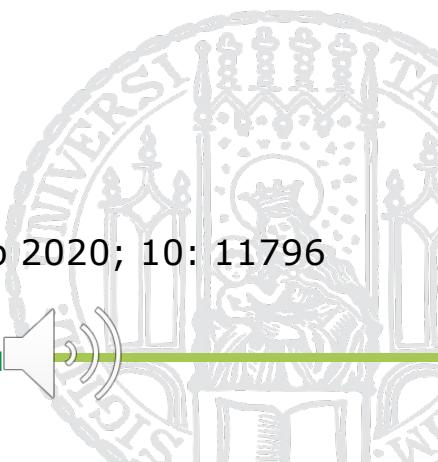


ROLE OF PRE-/POSTOPERATIVE LID HYGIENE IN MGD PATIENTS

- Significantly better postoperative subjective symptoms and objective signs of MGD



Eom Y et al. Sci Rep 2020; 10: 11796



LID HYGIENE – TREATMENT OF DEMODEX BLEPHARITIS

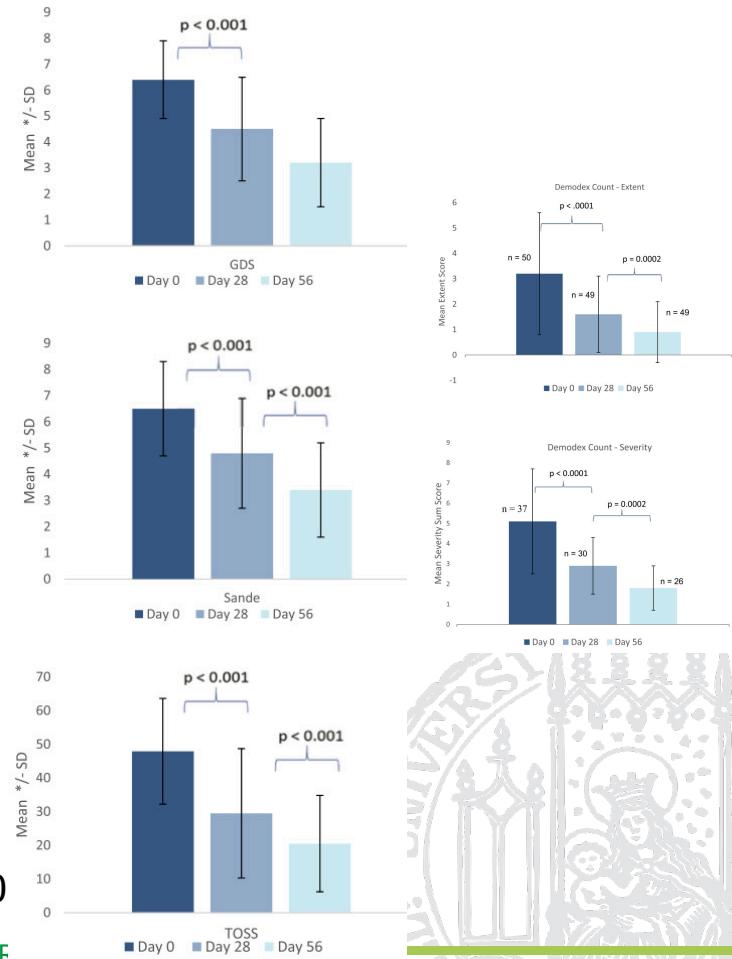
- 50 patients with demodex blepharitis
- Lid hygiene with eyelid wipes impregnated with 2.5% **terpinen-4-ol** (T4O) & 0.2% hyaluronic acid x 4 weeks
- Maintenance eyelid cleansing wipes (4 weeks)
- ✓ Symptoms assessed by „Global ocular discomfort score“, adapted TOSS, SANDE score (d28, d56)
- ✓ Ocular signs of blepharitis, Demodex mite counts
- ✓ Questionnaires for overall treatment performance, treatment satisfaction, tolerability

Jacobi C et al. Curr Eye Res 2022,47: 352-360

LID HYGIENE – TREATMENT OF DEMODEX BLEPHARITIS

- All global ocular discomfort symptoms/disease specific symptoms significantly improved ($p<0.001$)
- Signs of blepharitis significantly improved ($p<0.0001$)
- Demodex count significantly reduced ($p<0.001$)
- Therapeutic effect was maintained or even improved during the maintenance period until day 56

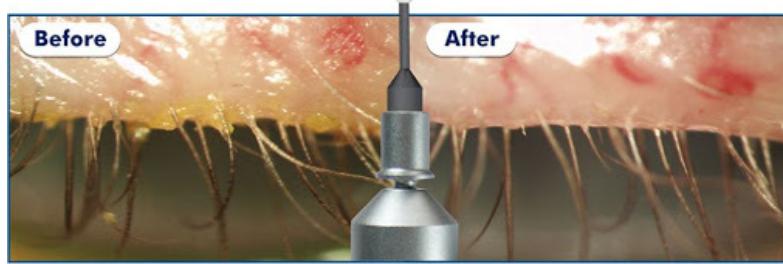
Jacobi C et al. Current Eye Research, 2022, 47:3, 352-360



„Professional lid hygiene“

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AUGENKLINIK





MIKROBLEPHARO-EXFOLIATION

[https://www.bon.de/produkte/trockenes-auge/
blephex-fuer-die-blepharitis-behandlung-
lidreinigung.html](https://www.bon.de/produkte/trockenes-auge/blephex-fuer-die-blepharitis-behandlung-lidreinigung.html)

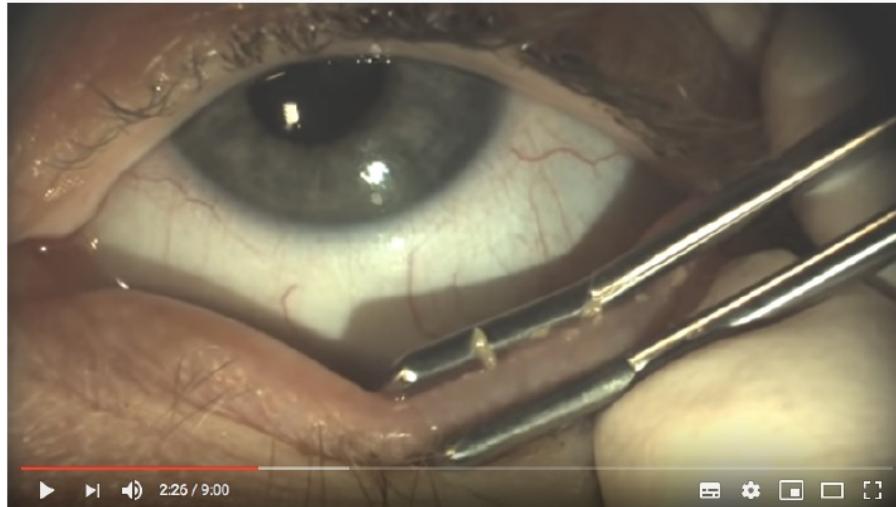
- Increase in TFBUT
- Improvement in meibomian gland function
- Reduction of blepharitis
- Decrease of MMP-9 in tear film
- Improvement in symptoms by 50%
- Improved contact lens wear comfort

Connor CG et al. ARVO 2015; 56: 4440; Connor CG et al. ARVO 2017; 58:498

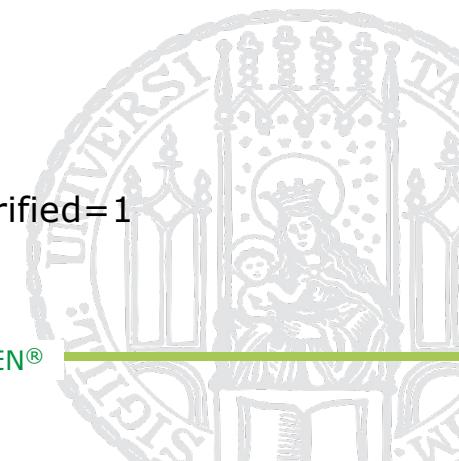
Narayanan S et al. ARVO 2019; 60:6368

Siddireddy JS et al. Optom Vis Sci 2019; 96: 187-199

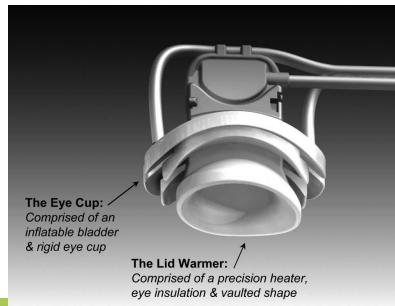
MEIBOMIAN GLAND EXPRESSION WITH TEARSE FORCEPS



https://www.youtube.com/watch?v=SozX1XOSEyE&has_verified=1



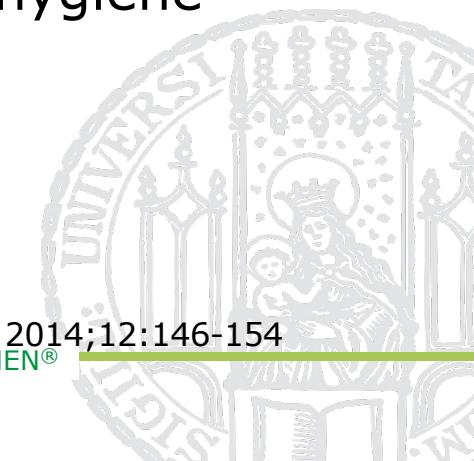
- Automated Thermodynamic Treatment for MGD
- Prospective randomized, observer-masked trial
- 40 patients
- Lipiflow Thermal Pulsation x 12 minutes vs. lid hygiene 2x/d x 3 months
 - Significant improvement of symptoms compared to baseline and compared to lid hygiene
 - Similar improvement of MG morphology, secretion, lipid layer and TFBUT after thermodynamic treatment and lid hygiene



Finis D et al. Ocul Surf 2014;12:146-154

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Lid hygiene why?

- Heating and massage of eye lids/meibomian glands facilitates release of meibum
- Lid massage/cleansing reduces biofilm, bacteria, and Demodex



Lid hygiene how?

- Lid warming, massage and cleansing by patient
- Professional lid hygiene offered by ophthalmologist

