

## Curbing Demodex Blepharitis: Meet The Mitey Challenge

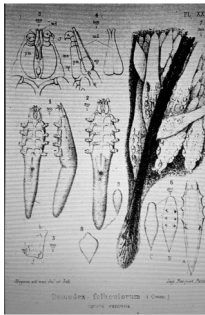
Ben Gaddie, O.D. FAAO  
Gaddie Eye Centers  
Louisville, KY  
[ibgaddie@me.com](mailto:ibgaddie@me.com)

1

## Disclosures Dr. Ben Gaddie last 24 months

- Consultant:
  - Alcon
  - AbbVie
  - Bausch and Lomb
  - Tarsus
  - Harrow
  - Topcon
  - Orasis

2

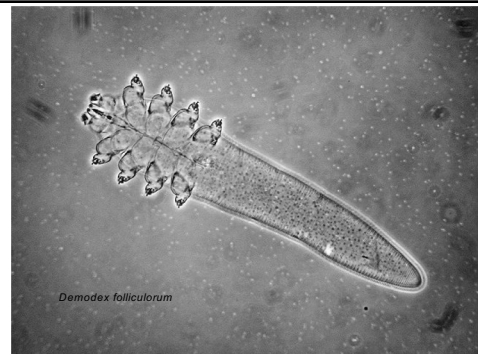


### HANDBOOK OF MEDICAL ENTOMOLOGY

Dr. WM. A. RILEY, Professor of  
Insect Morphology and  
Parasitology, Cornell  
University  
Dr. O. A. JOHANNSEN,  
Professor of Biology, Cornell  
University

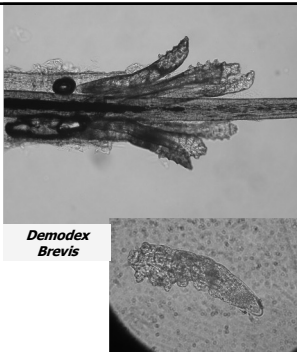
1915

3



*Demodex folliculorum*

4



*Demodex  
Brevis*

Slide courtesy of  
Scheffer Tseng, MD  
Ocular Surface Center  
Miami Florida

Epilated lash with attached  
*Demodex folliculorum*

*Demodex folliculorum*

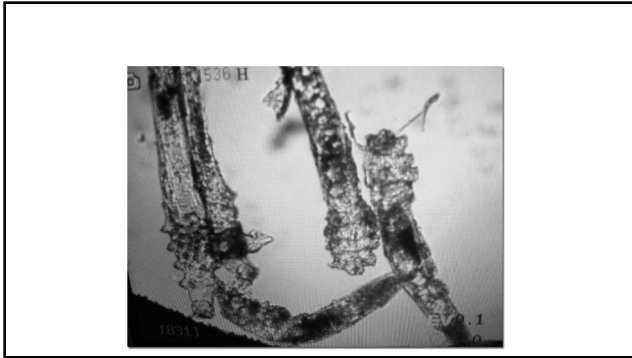


5

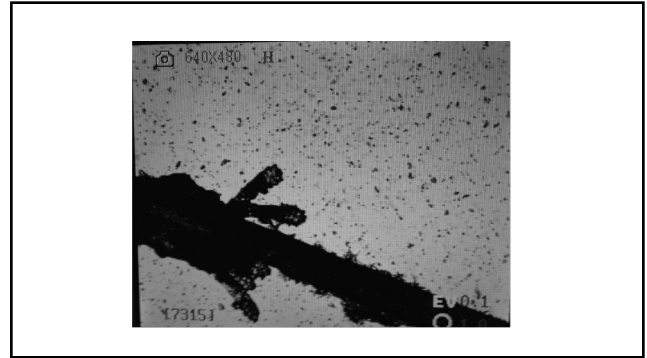


don't forget cover slips and slides

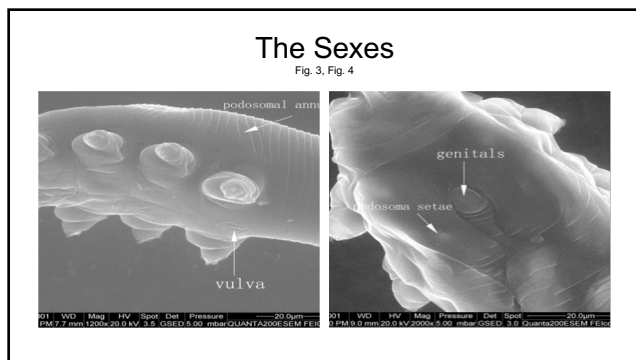
6



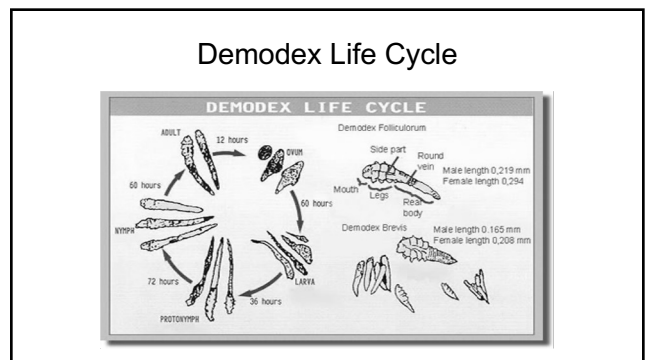
7



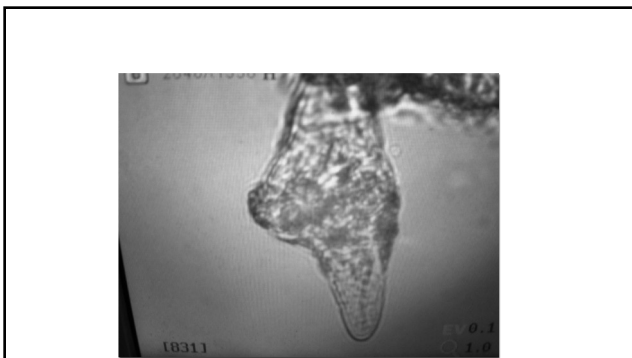
8



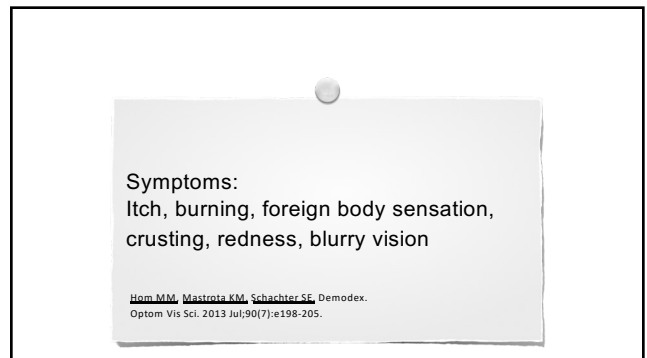
9



10



11



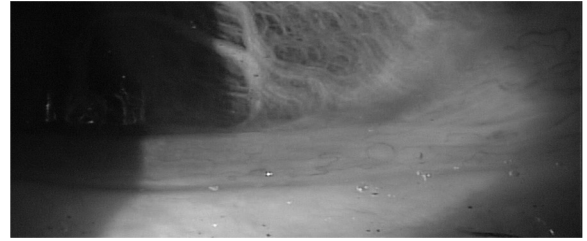
12

### Symptoms of Demodex

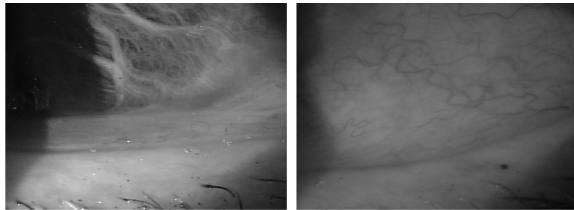
- Eyelid itching
- Ocular itching
- Facial itching
- Thickened, red lids seen
  - Personal observation: Exacerbated in PGA pts
- **Watering, often chronic**
- Eyelash loss
- Chronic redness of conjunctiva
- Coexists with OSD and MGD symptoms

13

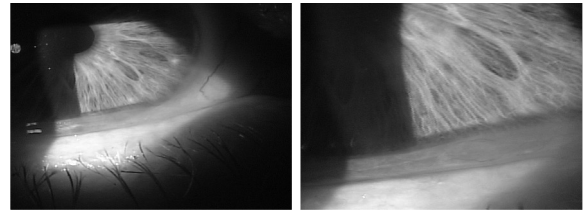
### Redundant Conjunctival Folds



14



15



16



17

## 2. Slit lamp evaluation

18

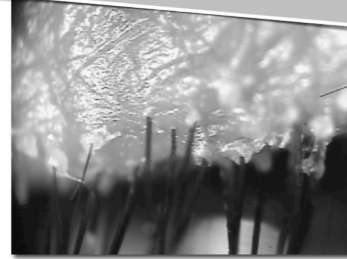
### Cylindrical dandruff

"Cylindrical dandruff was pathognomonic for the presence of demodex infestation."

Gao YY, Di Pascuale MA, Li W. et.al. High Prevalence of Demodex in Eyelashes with Cylindrical Dandruff. Invest. Ophthalmol. Vis. Sci. 2005;46(9):3089-3094.

19

### Cylindrical dandruff



20

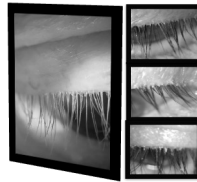
### Collarettes Are the Pathognomonic Sign of Demodex Blepharitis

Confirming the presence of collarettes can be used to confidently make a diagnosis

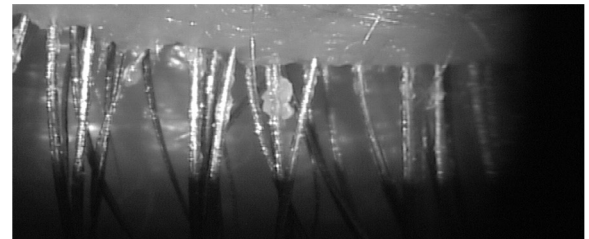
- In a clinical study, *Demodex* mites, detected via epilation, were found on 100% of lashes with collarettes
- In another clinical study, *Demodex* mites, detected via molecular technique (PCR), were found on 100% of lashes with collarettes

Collarettes are composed of mite waste and eggs

- Regurgitated undigested material combined with epithelial cells, keratin, mite eggs, and digestive enzymes, which cause irritation
- Translucent, waxy plugs typically at base of lashes

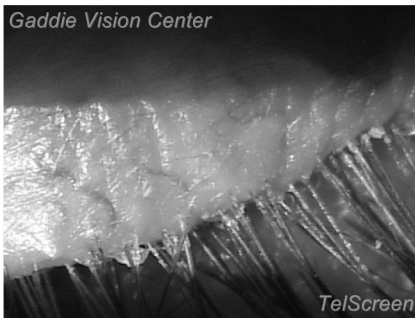


21

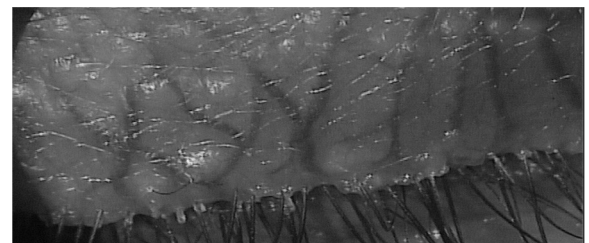


22

Gaddie Vision Center



23



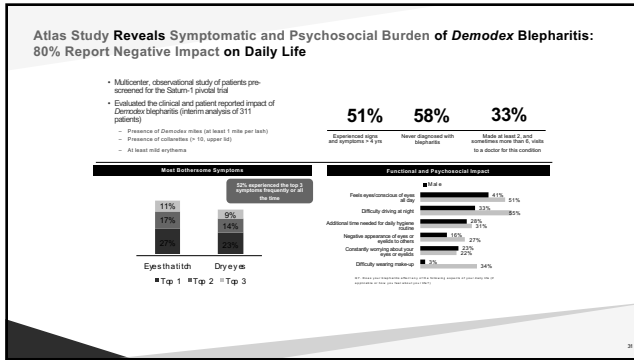
24



28

29

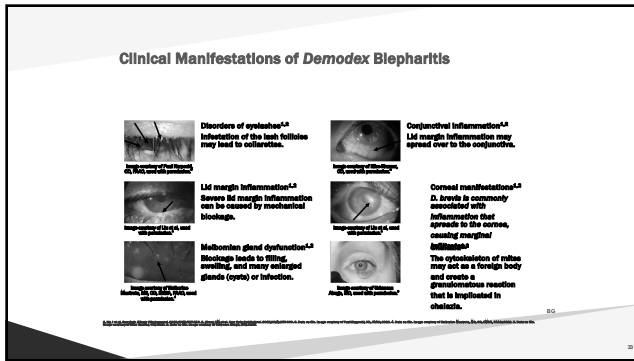
30



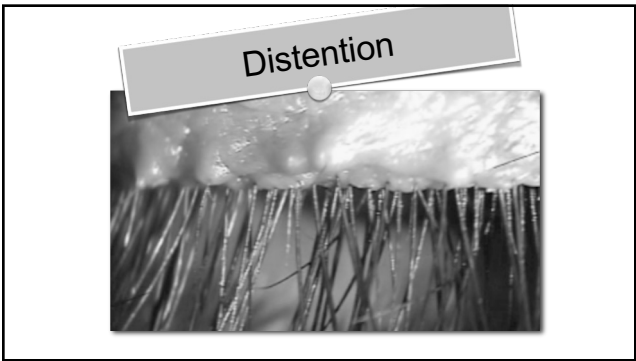
31



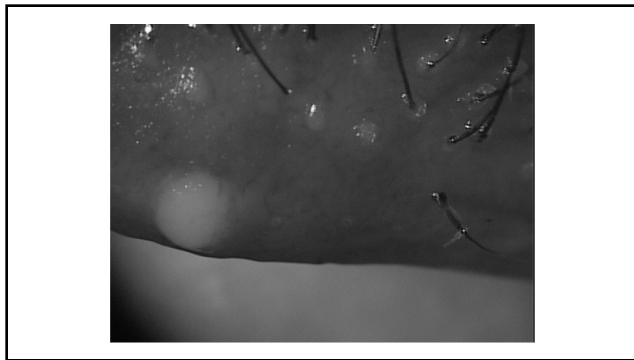
32



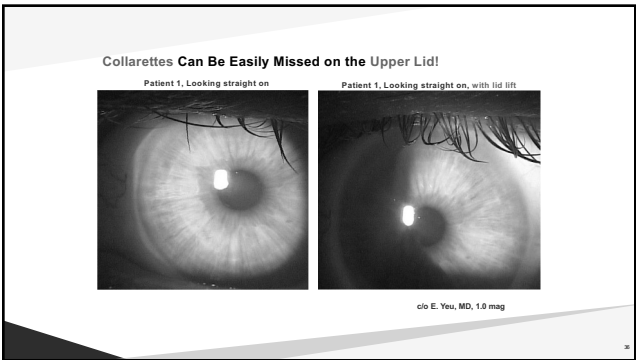
33



34



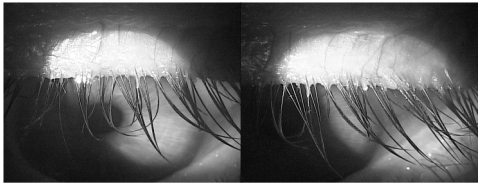
35



36

Collarettes Can Be Easily Seen on the Upper Lid when Patient Looks DOWN

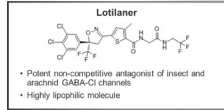
Patient : Diffuse collarettes, misdirected and missing lashes



c/o E. Yeu, MD, 1.0 mag

37

Lotilaner



38

Saturn-1: Pivotal Trial

- **Efficacy:** All pre-specified primary, secondary, and exploratory endpoints were met
  - ☑ Primary Endpoint: Complete Collarette Cure  $p < 0.0001$
  - ☑ Clinically Meaningful Collarette Cure (Grade 0 or 1)  $p < 0.0001$
  - ☑ Secondary Endpoint: Mite Eradication  $p < 0.0001$
  - ☑ Secondary Endpoint: Composite Lid Erythema and Collarette Complete Cure  $p < 0.0001$
  - ☑ Clinically Meaningful Composite Lid Erythema and Collarette Cure  $p < 0.0001$
  - ☑ Erythema Cure  $p = 0.0001$  and Erythema Response  $p = 0.0002$
- **Rapid Cures:** Improvements Seen in 2 Weeks  $p \leq 0.0149$  in Primary and Secondary Endpoints
- **Safety:**
  - ☑ All TP-03-related AE's were mild with no treatment related discontinuations
  - 92% of patients reported the drop to be neutral to very comfortable

41

Collarette Grading Scale Used in Saturn-1

Non-linear scale for counting collarettes performed by each site investigator

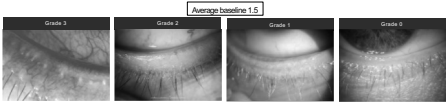


Photos are in eyes taken of patients in Saturn-1 with the corresponding collarette grade.

42

Lid Margin Erythema Scale Used in Saturn-1

Established and validated scale used in blepharitis studies, performed by each investigator



Reproduced with permission from: Jiang et al. Efficacy of intra-maleolar gland injection of the anti-VEGF agent bevacizumab for the treatment of meibomian gland dysfunction with lid-margin vascularity. Drug Design, Development and Therapy 2018:12:1250-1270. © Core Medical Press Limited. Grades 0, 1, and 2 images are from patients in Saturn-1.

43

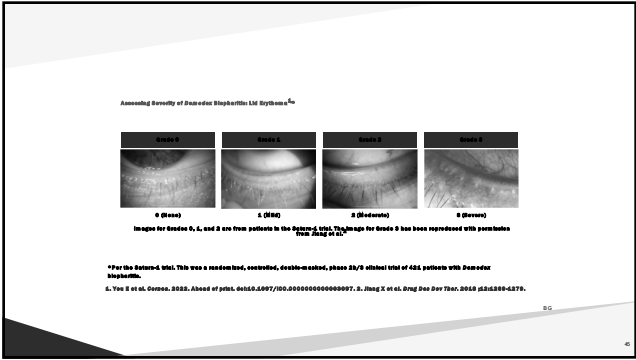
Assessing Severity of Demodex Blepharitis: Collarettes\*

Collarette grade (nonlinear)				
0	1	2	3	4
0 to 2 lashes typical with collarettes	3 to 50 lashes typical with collarettes	>50 to <100+ lashes typical with collarettes	>100 to <200+ lashes typical with collarettes	>200 to <300+ lashes typical with collarettes

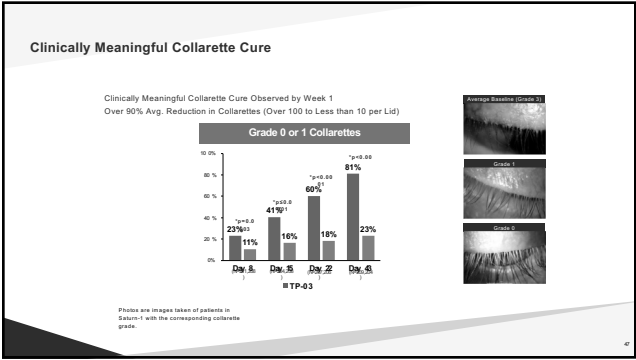
\*See Appendix 1 for detailed description of collarette grading of 485 patients with Demodex blepharitis.

Yeu E et al. Demos. 2025. Ahead of print. doi:10.1093/demos/dnab007

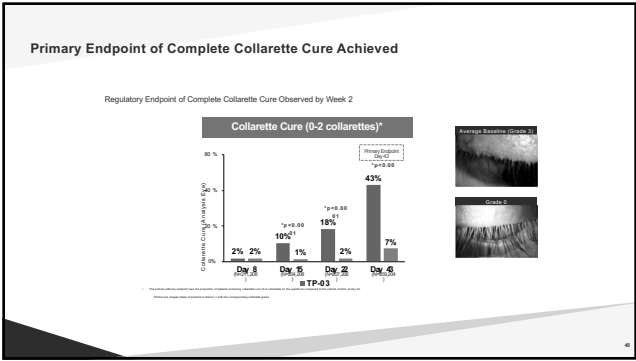
44



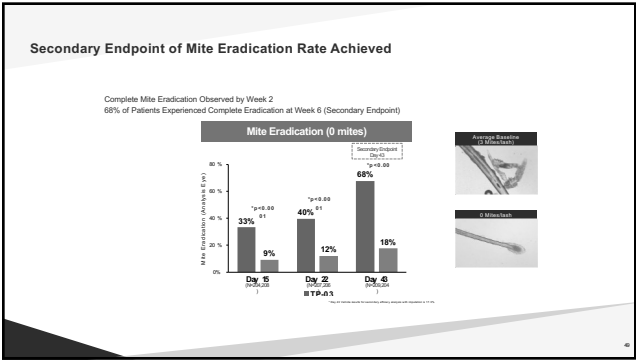
45



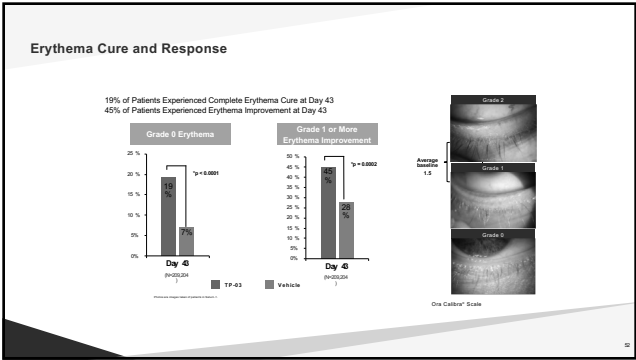
47



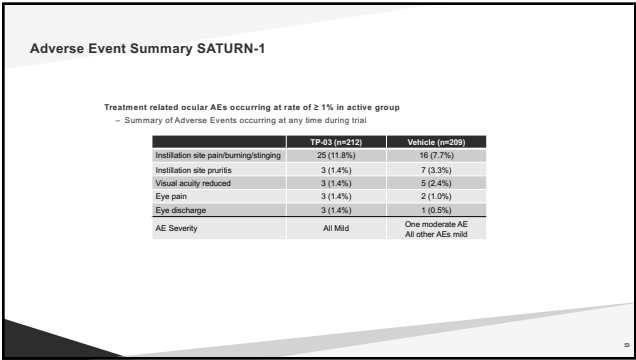
48



49

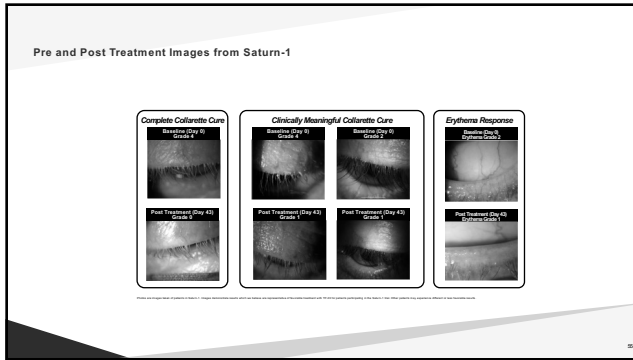


52

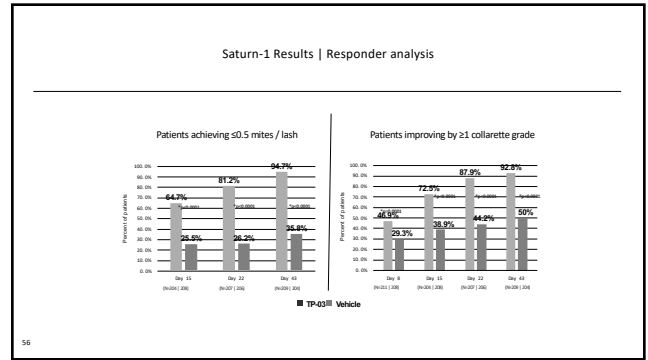


53





55

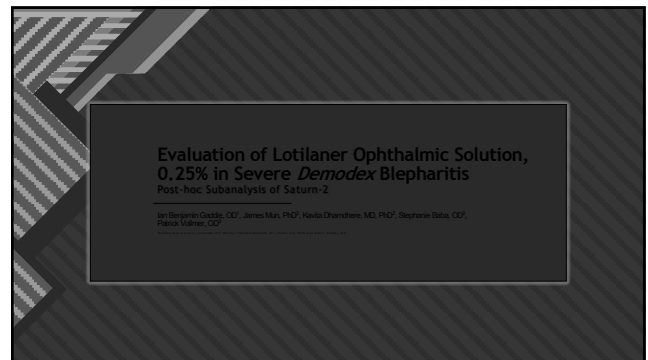


56

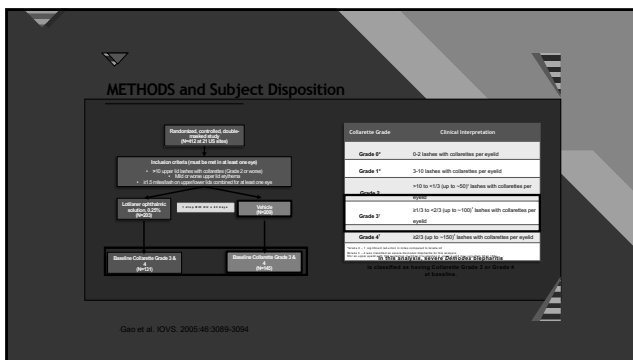
Pooled P3 data

	Saturn-1 (Pivotal Phase 2b/3) (n=102)	Saturn-2 (Pivotal Phase 3) (n=112)	Combined Pivotal Data (n=214)
Primary Endpoint: Complete Collarette Cure	44% vs. 7% (p<0.0001)	56% vs. 13% (p<0.0001)	50% vs. 10%
Clinically Meaningful Collarette Cure (Grade 0 or 1)	81% vs. 23% (p<0.0001)	89% vs. 33% (p<0.0001)	85% vs. 28%
Mite Eradication	68% vs. 18% (p<0.0001)	52% vs. 14% (p<0.0001)	60% vs. 16%
Lid Erythema Cure	19% vs. 7% (p<0.0001)	31% vs. 9% (p<0.0001)	25% vs. 8%
Safety	Generally safe and well tolerated	Generally safe and well tolerated	Generally safe and well tolerated

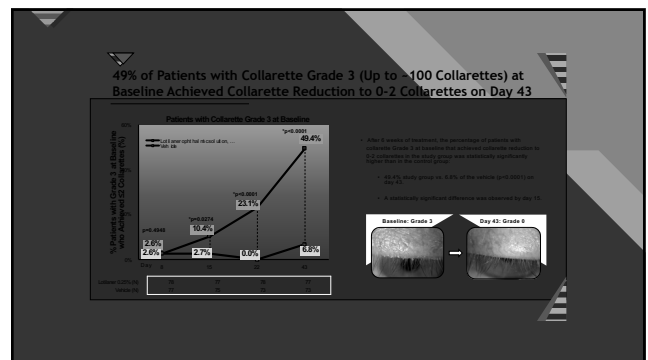
57



58

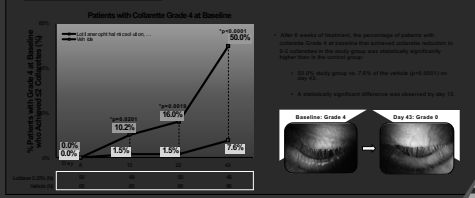


59



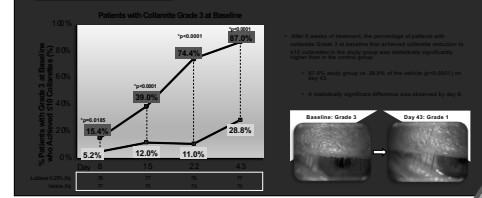
60

### 50% of Patients with Collarette Grade 4 (Up to ~150 Collarettes) at Baseline Achieved Collarette Reduction to 0-2 Collarettes on Day 43



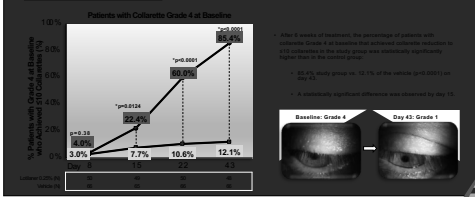
61

### 87% of Patients with Collarette Grade 3 (Up to ~100 Collarettes) at Baseline Achieved Collarette Reduction to ≤10 Collarettes on Day 43



62

### 85% of Patients with Collarette Grade 4 (Up to ~150 Collarettes) at Baseline Achieved Collarette Reduction to ≤10 Collarettes on Day 43



63

### Phase 2b Lotilaner MGD Data

- Two Studies
  - 1 with lotilaner 0.25%
  - 1 with vehicle
- Two Arms
  - TID
  - BIG
- Time points
  - Day 43
  - Day 85

64



65

### Grading Scales and VAS

- Meibum Quality Score Scale
  - Grade 3= Clear Liquid Secretion
  - Grade 2= Cloudy Liquid Secretion
  - Grade 1= Opaque liquid to toothpaste
  - Grade 0= No secretion
    - 15 central lower glands studied
    - Perfect function= 45 (GRADE 3 X 15=45)
- Visual Analog Score (VAS)
  - Patient grades symptoms on a scale of 1 to 100
    - Example: Fluctuating Vision score of 60= 60% of the time patient has fluctuating vision

66

### Meibomian Gland Secretion Scores

- Baseline was a score of 22 in both studies
  - Day 43= 27.8 Lotilaner vs. 23.3 vehicle
  - Day 85= 33.2 Lotilaner vs. 23.1 vehicle

67

### Number of Glands Secreting Any Liquid (grade 2 or 3)

- 15 central glands=15 is perfect score
- Baseline both groups=7.1 glands
- Day 43= 10.7 lotilaner vs. 8.2 vehicle
- Day 85= 12.7 lotilaner vs. 7.6 vehicle

68

### % of Patients Achieving >3 Glands With Improvement to Grade 3

- Day 43=44.7% Lotilaner vs. 17.6% vehicle
- Day 85=78.9% Lotilaner vs. 18.1% vehicle

69

### Fluctuating Visual Acuity

- Visual Analog Score up to 100
- Baseline=46.5 Lotilaner vs. 51.9 vehicle
- Day 43=22.2 Lotilaner vs. 40.1 vehicle
- Day 85=13.1 Lotilaner vs. 30.8 vehicle

70

### Itching

- Visual Analog Score up to 100
- Baseline= 47.0 Lotilaner vs. 52.8 vehicle
- Day 43= 16.9 Lotilaner vs. 42.6 vehicle
- Day 85= 11.4 Lotilaner vs. 40.5 vehicle

71

### Burning

- Visual Analog Scale up to 100
- Baseline= 35.4 Lotilaner vs. 46.0 vehicle
- Day 43= 20.0 Lotilaner vs. 34.1 vehicle
- Day 85= 10.5 Lotilaner vs. 31.6 vehicle

72

### Redness

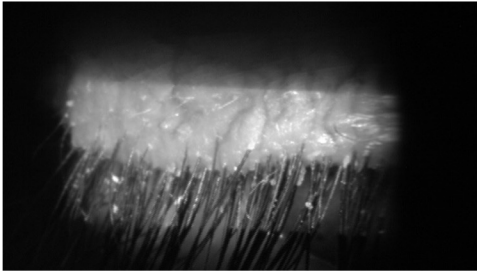
- Visual Analog Scale up to 100
- Baseline= 43.6 Lotilaner vs. 42.5 vehicle
- Day 43= 18.6 Lotilaner vs. 38.9 vehicle
- Day 85= 12.2 Lotilaner vs. 32.6 vehicle

73

### Case

- 56 YOWF presenting for comprehensive exam
  - Red, itchy eyelids and fluctuating vision
  - Stopped wearing her contact lenses due to blurry vision
    - VA BCVA 20/25-1 OD and 20/25-1 OS
    - SPEED Score 21/28
- Current medications:
  - Flaxseed oil, Flonase, Retaine MGD
- Previous/Failed Therapies
  - FreshKote for SPK
  - Loteprednol
  - Cyclosporine
  - Liftegrast
- Previous procedures-Lipiflow, iLux

79



80

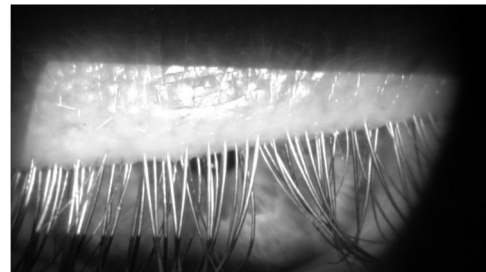


81

### Case

- Diagnosis?
  - Demodex Blepharitis, Grade 4 (over 150 lashes with collarettes)
- Start Lotilaner 0.25% BID OU x 6 weeks
- RTC 6-8 weeks for follow up

82

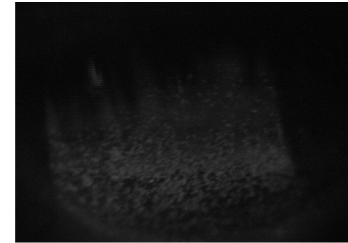


83

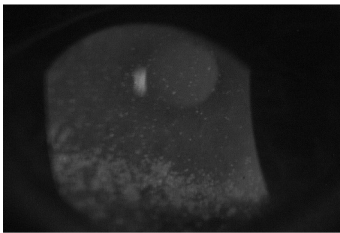
### Case

- Lids look much improved
  - 2 collarettes each lid (grade 0)
  - VA improved to 20/25 OD and OS
  - Speed down to 12
- Significant residual SPK OU
  - Symptoms still persist of DED,
    - SFA (perfluorohexyloctane) due to persistent SPK
      - QID (BID-TID w Contact lens wear)
  - RTC 4-6 weeks

84



85

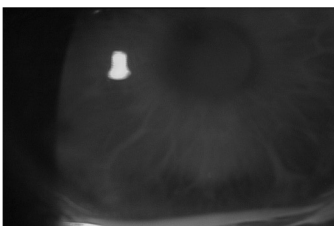


86

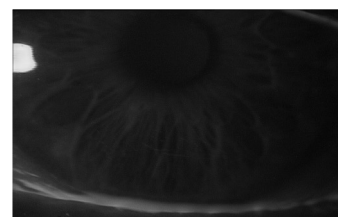
### Case

- 1 month follow up
  - BCVA 20/20 OD and OS
  - Quality of vision is improved
  - Resumed CL wear successfully
- Decreased to BID OU while wearing CL's

87



88



89

### Gaddie Current Protocol

- **Think SPEED!! All 3 of the below work w/in 2 weeks!**
- If I have a work-up and see corneal staining, my immediate go to is perflourohexyloctane TID OU
- If I have a work-up and see cylindrical dandruff, my immediate go to is Lotalin
- If I have aqueous deficient patient, I will reach for Perfluorobutylpentane + Cyclosporine .1%

90

### Last thoughts...

Although their pathogenic potential remains unclear, the ubiquitous pilosebaceous mite *Demodex* (generally considered a saprophyte) overpopulation should be considered as cause in recalcitrant cases of blepharitis/conjunctivitis/corneal pathology. *Demodex brevis* induced pathological changes in the meibomian gland function/lipid layer is implicated in evaporative dry eye/ocular surface disease.



91