DEMODEX BLEPHARITIS, DIAGNOSIS AND MANAGEMENT

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Vision Source-Pismo Beach, CA

ON MITES by Steven Duck (1736)
Dear Madam, did you never gaze,
Through Optic-glass, on rotten Cheese?
There, Madam, did you ne'er perceive
A Cloud of dwarfish Creatures live?
The vain,
Lords of their pleittle Things, elate with Pride,
Shut in and from, from Side to Side:
In tiny Pomp, and pertly asing Orr, they reign;
And, filled with harden'd Curds and Cream,
Think the whole Dairy made for them.
So Men, conceited Lords of all,
Walk proudly o'er this pendent Ball,
Fond of their little Spot below,
Nor greater Beings care to know;
But think, those Worlds, which deck the Skies,
Were only form'd to please their Eyes.

WHERE IS THE NEAREST MITE?
Most likely on the end of the nose or in the eyelash follicles of the reader.
-T.O. Coston, M.D., 1967

READ THIS!

BLEPHARITIS
Swelling or inflammation of the eyelids, usually where the eyelash hair follicles are located. The most common lid margin disease.

Common Causes of Blepharitis:
- Demodex Infestation
- Excessive oil, MGD
- Excessive bacteria
- Allergies
- Rosacea
Increasing severity, A-H
An Often Overlooked Link to Blepharitis Demodex Infestation

• shorter .2-.3mm
• live in oil glands
• harder to find
• posterior blepharitis, chalazia, rosacea
• solitary

HUMAN DEMODEX TYPES

Brevis
• longer .3-4mm
• live in follicle
• anterior blepharitis, rosacea
• live in clusters

ANATOMY AND LIFE CYCLE

Male folliculorum
sex organs
A rare sighting

CYLINDRICAL DANDRUFF

30 minutes time lapse
Demodex Mites Linked to Lid Margin Diseases through Various Mechanisms

Demodex Mites:
1. Mechanically block hair follicles
2. Secrete digestive enzymes
3. Destroy the epithelial barrier and penetrate into surrounding tissue
4. Trigger reactions of the immune system as a foreign body and as their waste is exposed upon death and decay
5. Transport bacteria around the ocular and skin surface

Results in irritation, inflammation, and unhealthy demis and epidermis

Demodex Mites Linked to Many Lid Margin & Ocular Surface Diseases

- Blepharitis
- Meibomian Gland Dysfunction
- Rosacea
- Chalazia
- Pterygia

Ubiquity and Diversity of Human-Associated Demodex Mites

100% of people over 18 years of age appear to host at least one Demodex species

- N = 29
- Mites found in 70% of 18 yo
- Verified by DNA scrapings

High Age-Dependent Prevalence of Ocular Demodex Infestation

Eyelashes from 435 people with ages from 2 to 96 years were examined under a light microscope. Demodex infestation was classified on the basis of presence of mature and larval forms or after observing chitinous exuviae (cylindrical dandruff) affixed to the subjects eyelashes.

95% in 71 to 96 year-old
87% in 51 to 70 year-old
69% in 31 to 50 year-old
34% in 19 to 25 year-old
13% in 3 to 15 year-old


Demodex mites live in and feed on the oil in the sebaceous glands. Demodex Brevis in particular is most commonly found in the meibomian glands.

Demodex Blepharitis is Frequently Associated with Conjunctival Inflammation

Consider Demodex as a possibility when you see blepharitis with conjunctival inflammation.

Supplies:
- Lash selection is important: crusty, lots of debris and mucus
- Rotate or twist the lash to better express debris and mites
- Use fluorescein on the slide for better mite visibility
- Sample two from each lid
- Examine under 100x magnification

Consider Demodex as a possibility when you see blepharitis with conjunctival inflammation.

<table>
<thead>
<tr>
<th>Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyelash manifestation</td>
</tr>
<tr>
<td>Trichiasis, malalignment, madarosis</td>
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Cylindrical dandruff (CD) is diagnostic for Demodex mites.

Diagnosing Demode

Lash Epilation or Rotation & Microscope Examination Tips

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Diagnosing Demode

Cylindrical dandruff (CD) is diagnostic for Demode mites.

If Demodex is so common, why isn’t everyone symptomatic?

Symptoms and conditions occur when a Demodex population overgrowth or infestation occurs (demodicosis).

What causes an infestation?

- Because the eye is surrounded by the projecting bones of the eyebrow and nose, hygiene in this area can be limited.
- Research suggests that altered fatty acid profiles produce sebum that is favorable for mite development.
- Demodex Infestations are more prone in patients whose immune status is compromised by topical or systemic administration of steroids or other immunosuppressive agents.

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Supplies:
- Epilation forceps
- Glass slides and cover slides
- LCD Digital Microscope

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Statistically Significant Correlation between Demodex Infestation and Serum Immunoreactivity to Bacillus Oleronius in Rosacea Patients

- A prospective, masked study of 59 age-matched patients
- The Demodex count was statistically significantly higher in patients with facial rosacea (6.6 ± 9.0 vs. 1.9 ± 2.2, P=0.014).
- A statistically significant correlation between serum immunoreactivity and facial rosacea (P=0.009), lid margin inflammation (P=0.045), and ocular Demodex infestation (P=0.048), but not inferior bulbar conjunctival inflammation (P=0.573).
- A statistically significant correlation of facial rosacea with lid margin inflammation (P=0.016), but not with inferior bulbar conjunctival inflammation (P=0.728).

1 Li, Jianjing et al, Correlation between Ocular Demodex Infestation and Serum Immunoreactivity to Bacillus Proteins in Patients with Facial Rosacea. Ophthalmology, 2010; 117:870-877.

Infestation of Particular D. Brevis Is Significantly More Prevalent In Chalazia Than Control

<table>
<thead>
<tr>
<th>Brevis and Folliculorum Infestation in Chalazia and Control</th>
</tr>
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<tbody>
<tr>
<td><strong>BREVIS</strong></td>
</tr>
<tr>
<td>Entire</td>
</tr>
<tr>
<td>FOLLCULORUM</td>
</tr>
<tr>
<td>Entire</td>
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Study Reports Demodicosis is Significantly More Prevalent in Chalazia than Control

- Study reports that ocular demodicosis is a risk factor for pterygium recurrence.
- Table showing the prevalence of demodicosis in eyes with and without pterygium.
- Statistical significance indicated by *all P<0.001*.


Clinical Evidence on the Role of Eye Hygiene in Managing Lid Margin Diseases

- The Old Way
  - None of these kill mites

- After 1 month of at-home treatment, 22 yo male

The Olde Way (The Janitor)

<table>
<thead>
<tr>
<th>Approach</th>
<th>Targets</th>
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<tbody>
<tr>
<td>Warm compress</td>
<td>Oil glands</td>
</tr>
<tr>
<td>Baby shampoo</td>
<td>Lid margin, lashes</td>
</tr>
<tr>
<td>Lid scrub</td>
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</tr>
<tr>
<td>Topical antibiotics</td>
<td>Microbes</td>
</tr>
<tr>
<td>Omega-3 fatty acids</td>
<td>Inflammation</td>
</tr>
<tr>
<td>Oral Tetracycline/Doxycycline</td>
<td>Microbes</td>
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</table>
Study Shows that Conventional Treatment Methods Are Not Effective in Killing DEMODEX MITES

- Cannot be killed by 10% Providone iodine (surgical scrub)
- Cannot be killed by 75% alcohol
- Cannot be killed by Macrolides such as erythromycin (antibiotic)
- Cannot be killed by Metronidazole (for Rosacea treatment)

Demodex mites killed dose-dependently by Tea Tree Oil (TTO)

Tea Tree Oil is the EXTERMINATOR

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Treatment with TTO

Example 1: Blepharitis

Before

After

Example 2: Conjunctival inflammation

Before

After

RS, 70 yo F

- OD, June 2014 and September 2014.
- Did Cliradex bid, OU x 1 month. Now twice per week.

INNOVATION

OKRA-based Zocukit
- Well-tolerated, no anaesthetic required
- Commercially available
- Low cost of goods
- Takes about 8 minutes
INNOVATION

Intense Pulsed Light

- Likely kills demodex
- Effective against rosacea
- Low/no cost of goods
- Takes about 5 minutes
- Treats chalazion

PRACTICE MANAGEMENT

How to talk to patients:
“Your have a very common condition, affecting about 25% of my patients. It’s caused by a small mite. Most people have SOME of these mites, you have TOO MANY, and we need to reduce the population”.

If you think compliance will be an issue, show anterior segment photos, or epilate and show them the mites.

Take baseline photographs to monitor effectiveness of treatment, and to educate patients.

If mild, treat at home, TTO bid and recheck in one month. Taper.

If moderate to severe, treat in-office 3 times, one week apart. Support with bid use of TTO at home.

Demonstrate the use of TTO so patients knows what to expect.

Fan the face after applying to cool off.

TTO is better tolerated the longer it is used.

Use it as a facial wipe, eyelashes, forehead, cheeks, base of nose, and ears.

Wash all linens on high heat.

Discard makeup.

Evaluate family members.

Use an ABN for in-office treatment.

Look for improvement, not eradication.

Sometimes, you just can’t win.

DEMODEX MYTHS

1. Ocular Demodex infestation is treated the same way as eyelash infestation by Pediculus humanus capitis (head lice).

2. 100% eradication of demodex infestation is the goal.

3. Tea tree oil is safe and non-toxic.

4. The clinician must epilate to detect demodex in a lash/follicle

5. Demodex is only found in the eyelid.

6. One can get demodex infestation from a dog.

7. There is a procedure code to treat demodex in the office.

8. Demodex blepharitis is an isolated condition.

9. Demodex excretion/droplets produce collarettes and greasy eyelashes.

10. Demodex is only seen in elderly patients.