MEIBOMIAN GLAND DYSFUNCTION & DRY EYE:
WHAT DO THE EXPERTS SAY?

Course description: This course reviews the latest thoughts, theories, and management strategies for meibomian gland dysfunction (MGD), which is now thought to be the most significant cause of evaporative dry eye.

LEARNING OBJECTIVES: At the conclusion of this lecture, the attendee will be able to:

1. Recognize the various clinical manifestations of blepharitis and meibomian gland dysfunction;
2. Understand the impact of the aforementioned conditions on the function and integrity of the ocular surface and tear film;
3. Identify the newest and best treatment modalities for managing chronic lid margin disease and evaporative dry eye.

Dry Eye Defined:

Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.


Aqueous Deficient Dry Eye: implies that dry eye is due to a failure of lacrimal tear secretion.

Evaporative Dry Eye: is due to excessive water loss from the exposed ocular surface in the presence of normal lacrimal secretory function. Its causes have been described as intrinsic.
where they are due to intrinsic disease affecting lid structures or dynamics, or extrinsic, where ocular surface disease occurs due to some extrinsic exposure.

**Causes of Dry Eye**

- **ADDE:**
  - Sjögren Syndrome
  - Non-Sjögren Syndrome, e.g.
    - Age-related lacrimal gland deficiency
    - Congenital Alacrima
    - Lacrimal Gland Infiltration, Ablation or Denervation
    - Obstruction of Lacrimal Gland Ducts
    - Reflex Hyposcretion

- **EDE:**
  - Intrinsic
    - **Meibomian Gland Dysfunction**
    - Disorders of Lid Aperture and Lid/Globe Congruity
    - Low Blink Rate
  - Extrinsic
    - Ocular Surface Disorders
      - Vitamin A Deficiency
      - Topical Drugs & Preservatives (e.g. BAK)
    - Contact Lenses
    - Allergic Eye Disease

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**Meibomian Gland Dysfunction Defined:**

Meibomian gland dysfunction (MGD) is a chronic, diffuse abnormality of the meibomian glands, commonly characterized by terminal duct obstruction and/or qualitative/quantitative changes in the glandular secretion. This may result in alteration of the tear film, symptoms of eye irritation, clinically apparent inflammation, and ocular surface disease.


“Overall, MGD is an extremely important condition, conceivably underestimated, and very likely the most frequent cause of dry eye disease.”

Types of Blepharitis

- Anterior
  - Bacterial / “Staph”
  - Seborrheic
- Posterior
  - Clinically synonymous with **Meibomian Gland Dysfunction (MGD)**
  - Obstruction of meibomian ducts with associated inflammation of the lid margins
  - Secondary effects include compromised tear film

**Meibomian Gland Dysfunction: Pathophysiology**

- Results from hyperkeratinization of ductal epithelium within meibomian glands
- Leads to increased intraductal pressure and stagnation of normal meibum flow
- Obstruction of meibomian ducts causes accumulation and thickening of lipids, bacterial colonization and inflammation of the lid margins
- Secondary effects include compromised tear film & associated dry eye pathology

**Diagnosis:**

- Clinical symptoms
  - Burning, foreign body sensation, itching... consistent with dry eye
  - Unstable or intermittently blurred vision
  - Symptoms often worse after awakening; may improve with heat and/or massage
- Clinical signs:
  - “Foamy” or “frothy” tears
  - Inspissated orifices (“capped glands”)
  - Gland expression → turbid, thickened or “toothpaste-like” secretions
  - Thickened, “bumpy” lid margins & lid margin telangiectasis
Dry Eye Treatment Options

- **ADDE:**
  - Environmental modifications
  - Tear replacement therapy (i.e. artificial tear drops, gels & ointments)
  - Immunomodulatory / anti-inflammatory agents (e.g. cyclosporine, steroids)
  - Secretagogues (?)
  - Nutritional support (e.g. flax-seed / omega-3 supplementation)
  - Punctal occlusion
  - Autologous serum
  - N-Acetylcysteine
  - Moist chamber goggles

- **EDE**
  - Lid hygiene (i.e. “lid scrubs”)
  - Lid hyperthermia (i.e. warm compresses) & digital massage
  - Topical antibiotic (e.g. erythromycin)
  - Topical corticosteroid
  - Nutritional support (e.g. flax-seed / omega-3 supplementation)
  - Oral tetracycline drugs

MDG Treatment

- **Rationale:**
  1. Diminish ocular surface friction
  2. Restore the normal chemistry, consistency and flow of meibum
  3. Reduce ocular surface inflammation

- **Historical / Conventional Therapies:**
  1. Support the (lipid aspect of the) tear film
  2. Lid hygiene (i.e. “lid scrubs”)
  3. Lid hyperthermia (i.e. warm compresses) & massage
  4. Topical corticosteroid – usually in combination with antibiotic (e.g. TobraDex)
  5. Nutritional support (e.g. flax-seed / omega-3 supplementation)
  6. Oral tetracycline drugs (especially low-dose doxycycline)

- **Newer & experimental therapies**
  - Topical cyclosporine-A (Restasis) - off-label use for blepharitis
  - Topical azithromycin 1% (AzaSite®) - off-label use for blepharitis
  - N-acetylcysteine
  - Meibomian gland probing (Maskin technique)
  - Automated thermodynamic manipulation of glands
REFERENCES / RECOMMENDED READING LIST: