

## Restoring the Surface in Dry Eye Disease – Impact of Preservatives and Novel Formulations in First Line Treatments

- Analyze the history of preservatives in ophthalmic solutions
- Recognize the potential deleterious impact preservatives have on the ocular surface
- Explain the drawbacks of traditional first-line therapies for dry eye disease (DED)
- Summarize novel formulations for the management of DED

Our understanding of dry eye has evolved from a “condition” thought to affect only females over the age 40 to a multifactorial disease rooted in a loss of tear film homeostasis, inflammation, hyperosmolarity, and neurosensory abnormalities. One well-known but often overlooked exacerbating factor in dry eye disease is the use of topical preservatives. While this is sometimes unavoidable, the following discussion highlights the significance of careful consideration when selecting eye drops for patients with both dry eye disease and glaucoma, ensuring that the chosen drops do not worsen the condition of their ocular surface.

- 1) Introduction, Disclosures, and Review of Objectives
  - a) Loss of Homeostasis
    - i) The Cycle of DED
    - ii) Inflammation
    - iii) Dessicating Stress
      - (1) Preservatives
        - (a) BAK
        - (b) Other
- 2) Standard Protocol
  - a) Algorithm Review
    - i) DEWS I and TFOS DEWS II definitions
    - ii) ASCRS
    - iii) CEDARS
  - b) Diagnostics
    - i) Hyperosmolarity
    - ii) Inflammation
    - iii) TBUT
    - iv) TMH
    - v) Vital Dye Lissamine and NaFL or with Wratten filter
    - vi) Questionnaire
      - (1) Validated
        - (a) SPEED, OSDI, DEQ-5, etc

- (i) Walk me through your typical day-How do you use your eyes everyday?
      - (ii) Do your eyes itch, water, burn?
      - (iii) Do you use eyedrops? Which ones?
      - (iv) Do they help?
    - vii) Meibography
  - c) How to diagnose DED? The Quick Easy 3: Ask & Listen, Look, and Push
    - i) Look
      - (1) Start with the Lids and work inward
        - (a) Demodex Blepharitis
          - (i) Look down!
        - (b) Other Anterior Blepharitis
    - ii) Identify
      - (1) Osmolarity
      - (2) Inflammation
      - (3) Vital Dye
- 3) Management of DED
  - a) What's the end goal?
  - b) Will you know success when you get there?
- 4) Treatment modalities
  - a) Where do preservatives fit in?
    - i) Alternative therapies
      - (1) Ocular Sparing
      - (2) Drop Holiday
      - (3) PF formulations
  - b) Treat inflammation
    - i) Cyclosporine
    - ii) Lifitegrast
    - iii) Steroids
    - iv) Omega fatty acids
    - v) PO Azithromycin
    - vi) Autologous serum
    - vii) Amniotic membranes
    - viii) PO Doxycycline
    - ix) IPL
  - c) Treat Evaporation
    - i) Perflourohexyloctane
  - d) Treat Anterior Blepharitis
    - i) Staph
    - ii) Seborrhea
    - iii) Demodex
      - (1) Lotilaner
  - e) Identify and Treat Posterior Blepharitis
    - i) Meibography

- ii) Blink Reflexes-Glands of Reiter
  - iii) Moist Heat
  - iv) Intense Pulsed Light
  - v) Thermal Pulsation
  - vi) Heat and Expression
  - f) Tear Film
    - i) Tears
    - ii) Sleep Mask
    - iii) Decrease fans
    - iv) Punctal Occlusion
    - v) Neurostimulation
      - (1) Review anatomy of the Lacrimal Functional Unit and neural pathways
      - (2) Define the role of intranasal neurostimulation in treating dry eye disease
        - (a) Goblet cells degranulate
        - (b) Aqueous Layer
        - (c) Meibum is released by glands
        - (d) Studies in literature
  - g) Ocular Rosacea
    - i) Telangiectasia
    - ii) Intense Pulsed Light (IPL)
      - (1) Non-invasive and ocular sparing-drug free/drop free
- 5) Preservative Free Decision Tree