

## Care of the Patient with Dry Eye



American Optometric Association

### A. DESCRIPTION AND CLASSIFICATION

Dry eye may result from disruption of the production of any tear film component, alteration of the distribution of tears, or disturbance of the tear film layers. Although each form of dry eye may exist in isolation, frequently there is a mixed presentation depending upon the underlying pathophysiology and its duration.

#### 1. Aqueous Deficient Dry Eye

- Also known as keratoconjunctivitis sicca (KCS), it usually results from a decrease in aqueous production. Generally bilateral, it produces a foreign-body sensation, lacrimation, and is often associated with Sjögren syndrome.

#### 2. Mucin Deficient Dry Eye

- A decrease in mucin production due to a reduction in the number of conjunctival goblet cells, it can be caused by any condition that is damaging to the conjunctiva.

#### 3. Lipid Abnormality Dry Eye

- Typically associated with lid disorders caused by inflammation, trauma, or scarring after eyelid surgery, it is most often caused by chronic blepharitis.

#### 4. Surfacing Abnormalities

- Any structural defect of the lid can interfere with tear film distribution:
  - Impairment of the normal blink action (i.e., incomplete or infrequent blinking) can result in excessive tear evaporation.
  - Lid abnormalities (i.e., ptosis and madarosis) can prevent efficient resurfacing of the tear layer.

#### 5. Epitheliopathies

- An irregular surface of microvilli due to corneal scars, erosions, chemical burns, or contact lens complications that may prevent mucin from adhering to the cornea.

### B. RISK FACTORS

- Rheumatoid arthritis (Sjögren Syndrome)
- Graves' disease
- Use of drugs that decrease aqueous or mucous membrane secretions (e.g., antihistamines; hormone replacement therapy)
- Aging
- Eyelid or blinking abnormalities
- History of trauma to lids

NOTE: This Quick Reference Guide should be used in conjunction with the Optometric Clinical Practice Guideline on Care of the Patient with Ocular Surface Disorders (Revised April 2003). It provides summary information and is not intended to stand alone in assisting the clinician in making patient care decisions.

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## C. COMMON SIGNS, SYMPTOMS, AND COMPLICATIONS

Signs and symptoms of dry eye vary with the nature of the condition (See Table 1). In its earliest stages, an insufficient or unstable tear film may produce symptoms only under conditions of stress. As the condition progresses, symptoms may become more pronounced. Paradoxical epiphora from irritation-induced reflex tearing may be the presenting symptom.

Ocular surface complications (i.e., increased susceptibility to irritation, allergy, and infection and reduced antibacterial function, superficial punctate keratopathy, secondary conjunctivitis/keratitis, and squamous metaplasia of the conjunctiva) may be initiated by instability of the tear film.

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## D. EARLY DETECTION AND PREVENTION

Factors beyond the patient's direct control may cause some forms of dry eye. However, the onset or degree of symptoms may be minimized by use of tear supplements and in some cases, lid hygiene or oral antibiotics. Prompt diagnosis and management can limit the occurrence of other preventable complications.

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## E. EVALUATION

The evaluation of patients with dry or irritated eyes includes the elements of a comprehensive eye and vision examination with particular emphasis on the following areas:

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### 1. Patient History

- Associated conditions that make an individual more likely to develop tear film abnormalities
- Common ocular complaints (i.e., burning or stinging, itching, scratchiness, irritation, tearing, increased mucus, and reduced contact lens tolerance)

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### 2. Ocular Examination

- External evaluation of the eye, noting lid structure, position, symmetry, and blink dynamics
- Biomicroscopic examination of the lid margins, meibomian gland orifices, and their contents

- Biomicroscopic examination of the tear film, noting mucus, debris, interference patterns in the lipid layer, and tear meniscus height
- Biomicroscopic examination of the cornea and conjunctiva, both with and without vital dye staining

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## 3. Supplemental Testing

- No single tear quantity or tear quality test alone is capable of assessing tear film or ocular surface integrity. Diagnosis is more likely to be accurate when it is based on two or more abnormal test results.

Tear Quantity Tests:

- Schirmer I tear test
- Fluorescein staining
- Evaluation of tear prism
- Debris in the tear film
- Rose bengal/Lissamine Green staining

Tear Stability Tests:

- Tear film breakup time (BUT)
- Tear thinning time
- Lactoferrin concentration tests
- Lysozyme radial diffusion assay

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## F. MANAGEMENT

Table 2 provides an overview of the evaluation, management, and followup of patients with dry eye.

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### 1. Basis for Treatment

Treatment of dry eye is directed toward five goals:

- Reducing symptoms and inflammation and re-establishing a normal ocular surface
- Re-storing normal tear volume and epithelial integrity
- Removing potential sources of tear film instability (e.g., lid infection)
- Identifying and eliminating contributing environmental factors
- Identifying associated medical conditions for consult with or referral to patient's primary care physician

## 2. Available Treatment Options

Traditional approaches include both tear supplementation and tear conservation:

- Ocular hygiene (daily lid scrubs)
- Topical treatment (tear supplements)
- Punctal occlusion (temporary, removable, or permanent)

Alternative methods include:

- Hydrophilic bandage lenses and collagen corneal shields
- Moisture chamber goggles
- Tarsorrhaphy
- Adjustment of medications that may be contributing to dry eye
- Salivary gland transplantation/limbal grafts

## 3. Patient Education

- Instruct patient as to the rationale for prescribed topical treatment and the specific dosages, frequency, and duration

- Inform patient of expected results and instructions to follow if there are any adverse effects
- Schedule followup discussion with patient to assess effectiveness of treatment

## 4. Prognosis and Followup

- Prognosis is guarded in cases where treatment represents only a maintenance strategy
- Remission is expected if an underlying chronic systemic condition improves
- Multiple evaluations may be necessary to determine the minimum treatment regimen that produces results
- Follow-up care at appropriate intervals is necessary for compliance and to ensure continued effectiveness

**TABLE 1**

**Common Signs, Symptoms, and Complications of Dry Eye**

Condition	Symptoms	Signs	Complications
<b>Mild</b>	Scratchiness, burning, or stinging  Mild blurring of vision	Decreased tear volume, scanty lower lid tear meniscus  Rapid tear film breakup time  Debris in tear film	Reduced contact lens tolerance  Irritation-induced reflex tearing
<b>Moderate</b>	Marked ocular discomfort  Reduced vision	All of the above, and Tear film instability  Subtle corneal superficial punctate staining  Conjunctival staining	Reduced antibacterial function of tear film  Superficial punctate keratopathy
<b>Severe</b>	Severe irritation, burning  Significantly blurred vision	All of the above, and  Mucous strands, filaments, furrows, dellen, staining, or erosion of cornea  Lack of corneal luster  Hyperemia of conjunctiva  Increased viscosity of preocular tear film (POTF)  Thickened lid margins, crusting, madarosis	Superficial punctate keratopathy  Filamentary keratitis  Secondary lid infections

**TABLE 2\*****Frequency and Composition of Evaluation and Management Visits for Dry Eye**

Degree of Involvement	Frequency of Evaluation	Composition of Followup Evaluations			Management Plan
		History	External Evaluation and Slit Lamp Biomicroscopy	Supplemental Testing	
Mild	Annually or as necessary	Yes	Yes	Fluorescein staining, Rose bengal staining, BUT	Preserved or unpreserved tear supplementa p.r.n.; Patient counseling and education
Moderate	Every 6-12 months or as necessary	Yes	Yes	Fluorescein staining, Rose bengal staining, BUT, Schirmer test	Unpreserved tear supplements 4-5 times a day up to p.r.n.; Patient counseling and education
Severe	Every 3-6 months or as necessary	Yes	Yes	Fluorescein staining, Rose bengal staining, BUT, Schirmer test	Unpreserved tear supplements p.r.n., ointment h.s.; Punctual occlusion; Patient counseling and education
Associated with systemic disease	Every 1-6 months or as necessary	Yes	Yes	Fluorescein staining, Rose bengal staining, BUT, Schirmer test	Unpreserved tear supplements p.r.n., ointment h.s.; Punctual occlusion; Refer to primary physician; Patient counseling and education

\* Adapted from Figure 2 in the Optometric Clinical Practice Guideline on Care of the Patient with Ocular Surface Disease.

Legend:

h.s. Bedtime  
 p.r.n. As necessary  
 q.d. Daily