

# STREAMLINING OSD MANAGEMENT

How to optimize diagnosis and treatment.

BY LISA K. FEULNER, MD, PHD

The term *ocular surface disease* (OSD) is often conflated with *dry eye disease* (DED), but it is essential to differentiate the two. DED is a component of OSD, whereas OSD encompasses a broad spectrum of abnormalities affecting the ocular surface, including the conjunctiva and cornea. DED is a chronic, multifactorial condition marked by a loss of tear film homeostasis, inflammation, and damage to the ocular surface. Its symptoms—such as redness, itching, burning, tearing, foreign body sensation, and blurred vision—can significantly decrease patients' quality of life.

The aim of this article is to provide strategies for identifying risk factors for OSD and underlying pathologies that can contribute to the condition. It also explores how to develop efficient algorithms for diagnosing and treating OSD.

## PREVALENCE AND DIAGNOSTIC GAPS

A systematic review and meta-analysis conducted in 2022 estimated that the prevalence of DED in the United States ranges from 5.3% to 14.5%.<sup>1</sup> The 5-year incidence of DED was 3.5% in individuals aged 18 years or older and 7.8% in those aged 68 years or older.

Unfortunately, only a fraction of individuals with DED are diagnosed with and treated for the condition. This gap in care stems from a combination of poor patient education, socioeconomic barriers, and limited physician engagement.

## WHY PRIORITIZE THE OCULAR SURFACE?

Treating OSD, particularly in patients undergoing ocular surgery, is critical for several reasons:

- Untreated OSD can permanently damage the ocular surface;
- OSD is prevalent in most cataract patients,<sup>2</sup> who are often asymptomatic, and it increases the risk of IOL miscalculations and refractive surprises by compromising pre- and postoperative refractive measurements;



## Key Elements of a Comprehensive Approach



### ADOPT A SYSTEMATIC PROTOCOL

Take a consistent approach to every patient encounter.



### EVALUATE RISK FACTORS

Assess systemic and ocular risk factors during initial data collection.



### UTILIZE AVAILABLE DIAGNOSTIC TOOLS

Start with basic exams and expand to advanced testing as necessary.



### HAVE A CLEAR PLAN

Develop a structured diagnostic and treatment algorithm.



### ENGAGE YOUR STAFF

Educate staff to facilitate data collection, patient education, and follow-up.

- Conditions such as blepharitis heighten the risk of postoperative endophthalmitis;
- Any form of ocular surgery can exacerbate OSD; and
- Unaddressed OSD generally reduces postoperative visual performance and patient satisfaction.

### BARRIERS TO PHYSICIAN ENGAGEMENT

Years of surveys of ophthalmic surgeons during national and international lectures have identified several common roadblocks to the diagnosis and treatment of OSD:

- The cost of diagnostic equipment and in-office treatment;
- A potentially overwhelming number of procedural and medical options and uncertainty in creating a treatment algorithm;
- Patient volume and time constraints that make the integration of OSD management into clinical workflows challenging; and
- The chronic nature of OSD that often necessitates multiple touchpoints during the follow-up period for successful management.

### ESTABLISHING AN EFFICIENT STRATEGY FOR DIAGNOSING AND TREATING OSD

Developing a streamlined approach to OSD can feel overwhelming at first. In my practice, we assume every patient has OSD until proven otherwise. A systematic, efficient process that involves the entire team has been crucial to our success (see *Key Elements of a Comprehensive Approach*).

#### The Role of Staff

Technicians and scribes can gather much of the essential data, such as systemic and ocular histories, lifestyle factors (eg, digital device use, environmental conditions), and previous surgeries. This division of labor reduces the physician workload and enhances clinic efficiency (see *Technician-Led Keratometry Workflow*, pg 40).

#### Rapid Risk Assessment

During the exam, key factors, including the following, are evaluated in less than a minute:

- Age and sex (OSD prevalence increases with age and varies by sex);
- Medical and ocular history (conditions such as diabetes, autoimmune diseases, and previous surgeries heighten risk);
- Medications (certain systemic and ocular medications can affect the ocular surface); and
- Environment and occupation (dry air, screen use, and workplace conditions can exacerbate OSD).

### DIAGNOSTIC TOOLS FOR OSD

The effective diagnosis of OSD does not require expensive equipment. Many tools are free or already exist in most practices, including the following:

- Medical history and risk factor assessment;
- Slit-lamp examination;
- Ocular surface staining;
- Schirmer test; and
- Lid position, blink analysis, and tear breakup time.

Advanced diagnostics such as meibography, osmolarity testing, and matrix metalloproteinase-9 assays can provide additional information when needed.

### TREATMENT STRATEGIES

The therapeutic approach to OSD should be tailored to the patient's clinical presentation. [Editors' note: For a detailed list of therapies available in the United States, see *Comprehensive OSD Treatment Options*.] At my practice, patients are divided into three groups.

#### Group No. 1: Asymptomatic Patients With Signs of OSD

**Initial therapies.** Management begins with foundational treatments, such as hot compresses, preservative-free artificial tears, blinking exercises, and environmental modifications. Nutraceuticals (eg, omega-3 fatty acids) may also be beneficial.

**Patient education.** Visual aids (eg, topography or Placido rings) are used to explain the disease's impact and build patient buy-in.

**Follow-up.** Patients are reassessed in 3 to 4 weeks. Treatment is escalated as needed to include antiinflammatory drops, therapies for conditions such as *Demodex*, and punctal occlusion.

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## COMPREHENSIVE OSD TREATMENT OPTIONS

Treatment should be tailored to the patient's disease severity, symptomatology, and response to prior therapy. The following organized overview of ocular surface disease (OSD) treatment options is designed to guide practitioners in selecting appropriate interventions.

### Over-the-Counter Treatments

Over-the-counter products, including artificial tears, gels, and ointments, are often the first line of defense against mild OSD symptoms.

### Lid Hygiene

Maintaining clean lids is crucial, particularly in patients with blepharitis or meibomian gland dysfunction (MGD). Tea tree oil-based cleansers help to reduce debris and inflammation. In-office procedures can remove biofilm and debris.

### Environmental Modification

Minimizing environmental triggers can significantly reduce OSD symptoms. Suggestions for patients include eliminating airflow from fans or fireplaces and using humidifiers to maintain optimal indoor humidity levels.

### Oral Supplements

Nutritional support may enhance tear film stability. Omega-3 fatty acids and other nutraceuticals with antiinflammatory properties are commonly recommended supplements.

### Prescription Antiinflammatory Agents

Medications targeting ocular inflammation are critical for managing moderate to severe OSD. Options include the following:

- Cyclosporine (eg, Cequa [Sun Pharmaceuticals], Restasis [Allergan], Verkazia and Vevye [both from Harrow]) for long-term control of inflammation;
- Lifitegrast (Xiidra, Bausch + Lomb), a lymphocyte function-associated antigen-1 antagonist; and
- Loteprednol (Eysuvis [Kala Pharmaceuticals], Lotemax [Bausch + Lomb]), a soft corticosteroid that carries a minimal risk of side effects.

### Oral Antibiotics

Systemic antibiotics are useful for managing MGD and ocular rosacea. Doxycycline and azithromycin reduce inflammation and improve gland function.

### Meibomian Gland Therapies

Direct treatment of MGD has become increasingly effective with modern techniques. Thermal pulsation therapy with devices such as iLux (Alcon), LipiFlow (Johnson & Johnson Vision), or TearCare (Sight Sciences) helps liquefy and express meibum. Manual gland expression can clear obstructions. Blepharoexfoliation may serve as an adjunct to other gland therapies.

### In-Office Procedures

For patients with refractory symptoms, advanced in-office procedures may provide significant relief. Intense pulsed light therapy helps reduce inflammation and improve meibomian gland function. Punctal occlusion preserves the tear film by reducing drainage, and meibography-guided therapy can improve the health of the tear film.

### Biologic Therapies

In eyes with severe or complex OSD, biologic therapies can offer regenerative benefits. Autologous or allogeneic serum tears can be used to address severe dryness. Amniotic membranes can help reduce epithelial damage and inflammation. Recombinant human nerve growth factor promotes corneal healing.

### Advanced Therapies

Cutting-edge treatments are emerging to address specific challenges in OSD management. For example, specialized scleral lenses help protect and hydrate the ocular surface. Nasal neurostimulation can increase tear production. Perfluorohexyloctane eye drops (Miebo, Bausch + Lomb) are a novel treatment for evaporative dry eye disease; the product is designed to reduce friction and promote healing.

### How to Choose the Right Treatment

Effective OSD management requires a stepwise approach. Basic therapies such as artificial tears and lid hygiene are foundational. Treatment is escalated based on symptom severity, clinical findings, and response to initial interventions. Considerations such as cost, insurance coverage, and patient preference are integral to optimizing outcomes and improving adherence.

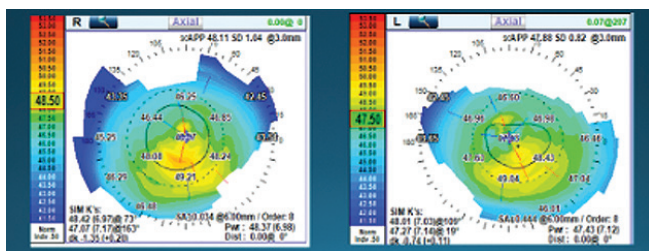


Figure 1. Corneal topography of a 65-year-old woman with Sjögren syndrome.

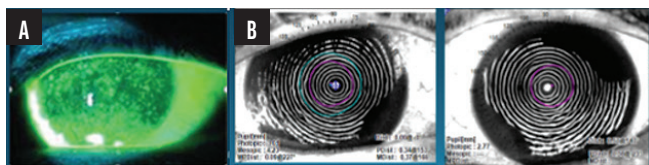


Figure 2. Preoperative evaluation following 54 visits over 5 years showing corneal fluorescein staining indicative of OSD (A) and keratometric images (B) confirming corneal surface stability after extensive optimization treatments.

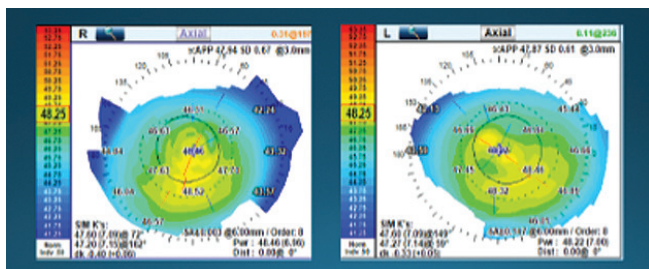


Figure 3. Postoperative corneal topography of the right and left eyes showing improved corneal regularity following cataract surgery.

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### Group No. 2: Symptomatic Patients With Minimal Signs of OSD

**Initial approach.** These patients are motivated by their symptoms, allowing faster escalation to therapies such as prescription antiinflammatory eye drops and punctal occlusion.

**Additional considerations.** Anatomic abnormalities, lid margin disease, and environmental factors are addressed to enhance outcomes.

**Noncovered therapies.** Patients may opt for advanced treatments such as thermal pulsation or intense pulsed light therapy to address persistent evaporative DED.

### Group No. 3: Patients With Both Signs and Symptoms of OSD

**Challenges.** In many of these patients, prior therapy has failed, and they have not been properly educated about the chronic nature of OSD.

**Tailored treatment plan.** Foundational and advanced therapies are combined, the importance of patient adherence is emphasized, and realistic expectations are set with visual aids.

## PREOPERATIVE MANAGEMENT OF OSD

Optimizing the ocular surface before surgery is essential for accurate measurements and successful outcomes in refractive cataract surgery. Preoperative strategies typically include hot compresses and lid scrubs, preservative-free artificial tears, and prescription medications, such as antiinflammatory drops and punctal plugs.

A systematic preoperative workflow ensures accurate measurements. Topography can identify corneal irregularity. Tear film instability is detected through an evaluation of Placido rings. The cornea is examined for signs of inflammation or scarring. The lid margins are inspected for evidence of meibomian gland dysfunction (MGD).

## CASE EXAMPLES

### Case No. 1: Persistence in OSD Management

A 65-year-old woman with Sjögren syndrome presented with a progressive decrease in vision and requested cataract surgery (Figure 1). Her BCVA was 20/40 OU. Nuclear sclerosis grades 2 to 3 was found in each eye. Topographic analysis revealed significant corneal irregularity in both eyes, prompting concern about tear film stability and ocular surface health.

**Treatment strategy.** Several strategies were executed over the course of 54 visits spanning 5 years (2014–2019) to optimize the ocular surface before cataract surgery:

- Supplementation with preservative-free artificial tears and serum tears;
- Antiinflammatory therapies with prescription eye drops and short-term steroid use;
- Mechanical treatments such as thermal pulsation therapy to address MGD;
- Moisture retention strategies such as lid hygiene, moisture goggles, and punctal plugs;
- Nutritional support such as omega-3 supplementation; and
- Advanced options such as amniotic membranes and radiofrequency lid treatments.

**Surgical planning and challenges.** Despite years of therapy, repeated keratometric measurements with multiple devices were required to confirm stability. The preoperative regimen included continued lid hygiene, artificial tears, blinking exercises, and avoidance of contact lenses and environmental irritants. These efforts eventually stabilized the corneal surface sufficiently for cataract surgery to be planned and executed with confidence (Figure 2).

**Postoperative outcome.** Following cataract surgery, the patient's UCVA was 20/20-1 OD and 20/25-1 OS (Figure 3). Despite the excellent visual results, she continued to experience symptoms of OSD.

This extreme case illustrates the complexity of managing advanced OSD in surgical candidates. Even with prolonged and intensive therapy, the condition's chronic nature requires ongoing care and monitoring.

## TECHNICIAN-LED KERATOMETRY WORKFLOW

Accurate keratometry is critical for refractive cataract surgery, and inconsistencies in measurements can often be traced to an untreated or poorly managed ocular surface. Technicians play an essential role in ensuring the accuracy of these measurements and identifying issues that must be addressed.

### The Patient's Ocular Surface Disease Regimen

The technician confirms whether the patient has adhered to their prescribed preoperative treatment plan (eg, hot compresses, lid scrubs, artificial tears). The patient's chart may be used to document compliance and identify potential gaps. Multiple measurements with various diagnostic devices should be obtained. Data are compared for consistency in average keratometry, total keratometry, and the axis of astigmatism across all methods.

### Flag Discrepancies

If significant discrepancies arise between devices or the measurements fall outside the parameters set by the surgeon, the chart should be flagged for additional review.

### Noncompliance and Cornea Check

When poor measurements may result from noncompliance, the technician can educate the patient on the importance of adhering to the prescribed regimen. The patient is rescheduled for repeat testing after a sufficient interval to determine if adherence has improved and the ocular surface has stabilized.

If the second round of measurements raises concern, the patient should be seen by the doctor for a cornea check. This evaluation may involve more in-depth diagnostic testing and adjustments to the treatment plan.

### Optimizing Measurements

When keratometric inconsistencies persist despite efforts to stabilize the ocular surface, a full range of diagnostic tests and therapeutic options may be deployed. These include advanced diagnostic tools (eg, topography, Placido rings, tear film analysis) and customized therapies for specific conditions (eg, antiinflammatory drops, punctal occlusion, meibomian gland expression, thermal pulsation).

### Case No. 2: Misdiagnosed Keratoconus

A 45-year-old man presented with a gradual, progressive decrease in vision in his left eye and inquired whether cataract surgery might be necessary (Figure 4). He reported no significant past medical or ocular history, did not wear contact lenses, and was not on any contributory medications.

**Initial evaluation.** Based on the patient's symptoms and initial examination, keratoconus was suspected, but a closer inspection of his corneal topography and Placido ring images were inconsistent with that diagnosis. Irregular astigmatism suggested a severely compromised ocular surface as the root cause of his visual decline.

**Treatment approach.** The patient began aggressive OSD therapy, including preservative-free artificial tears, lid hygiene and blinking exercises to address MGD, and environmental modifications to improve tear film stability.

**Outcome.** After several weeks of treatment, the patient's astigmatism decreased from 2.57 to 0.64 D, which not only improved his visual function but also confirmed that he did

not have keratoconus. As a result, CXL and cataract surgery were unnecessary.

### CONCLUSION

The effective evaluation and management of OSD are essential for preserving the long-term health of the ocular surface, enhancing visual quality, and improving overall quality of life. Addressing OSD before refractive or cataract surgery is critical; untreated OSD can lead to inaccurate keratometry readings, resulting in errors in IOL power calculations and incorrect axis or magnitude of correction with toric IOLs or limbal relaxing incisions.

Proactively managing OSD preoperatively helps to minimize postoperative complications and patient dissatisfaction. Patients must be educated on the importance of optimizing the ocular surface to ensure precise measurements and successful outcomes, and staff must be equipped with the knowledge and tools to support pre- and postoperative care. ■

1. McCann P, Abraham AG, Mukhopadhyay A, et al. Prevalence and incidence of dry eye and meibomian gland dysfunction in the United States: a systematic review and meta-analysis. *JAMA Ophthalmol*. 2022;140(12):1181-1192.  
2. Trattler WB, Majumdar PA, Donnenfeld ED, McDonald MB, Stonecipher KG, Goldberg DF. The Prospective Health Assessment of Cataract Patients' Ocular Surface (PHACOS) study: the effect of dry eye. *Clin Ophthalmol*. 2017;11:1423-1430.

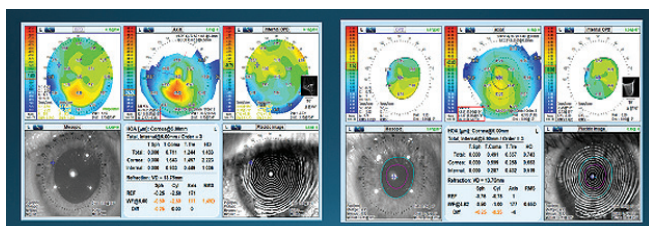


Figure 4. Advanced corneal imaging and topographic analysis assessing a patient for keratoconus versus irregular astigmatism.

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