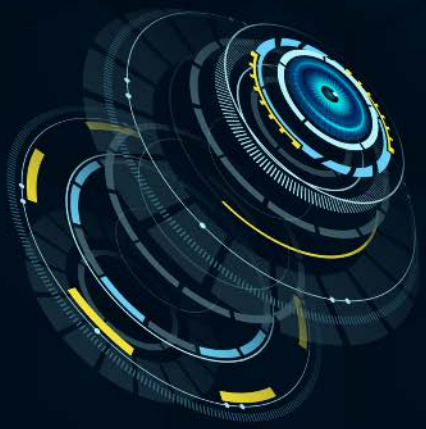
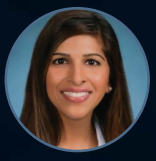


EFFECTIVE PREOPERATIVE ASSESSMENT AND MANAGEMENT OF THE OCULAR SURFACE



Tips for optimizing the ocular surface and therefore surgical success.

BY PRIYA M. MATHEWS, MD, MPH

The precorneal tear film is the most critical refractive surface in the human optical system. When striving to deliver a glasses-free experience, especially with multifocal IOLs, the preoperative management of dry eye disease (DED) is critical (see *The Link Between Dry Eye Severity and Patient Satisfaction*). An unoptimized ocular surface during cataract surgery assessments compromises the accuracy of measurements critical to surgical planning.

Untreated DED can also complicate patients' postoperative recovery. I therefore advise my patients to prioritize DED treatment before undergoing surgery. This approach not only facilitates a smoother, quicker recovery but also optimizes their chances of achieving the desired surgical outcome.

COMPREHENSIVE PREOPERATIVE OCULAR SURFACE ASSESSMENT

Before I enter the exam room, I review the patient's testing outside their room. My biometrist will indicate the quality of the measurements on the Notes section of the IOLMaster 700 (Carl Zeiss Meditec) by grading the distortion from 0 to 4+. Specifically, my biometrist looks at the sharpness of the LED light images reflected off the cornea to gauge the degree of distortion. I read her notes before examining the patient and oftentimes already know whether I want to repeat the measurements.

Multiple imaging modalities. Measurements of critical factors such as astigmatism are compared across different imaging systems, such as the IOLMaster and Pentacam (Oculus Optikgeräte). For instance, if a patient is found to have 2.00 D of astigmatism, I look for consistency in this measurement and its axis across both devices. Discrepancies between these readings often point to untreated DED. A detailed, preemptive review process allows me to tailor my approach to address all underlying issues right from the start.

Once I have reviewed a patient's test results, I personally examine them. My analysis can be divided into two main categories: an evaluation of the eyelids for issues such as meibomian gland dysfunction (MGD) and blepharitis and an examination of the cornea.

Tear film evaluation. Critical insight into the state of the ocular surface is obtained through corneal staining (Figure). At least 2 minutes after the instillation of fluorescein dye, the cornea is evaluated for ocular surface disease (OSD) under cobalt blue light. This process reveals the patterns and distributions of erosions, with findings graded on a scale from 0 to 4 based on the number of punctate epithelial erosions observed. A comprehensive evaluation is crucial for accurately diagnosing OSD severity and tailoring the therapeutic approach. Tear breakup time is also evaluated. Values of less than 10 seconds indicate abnormality, and the presence of vertical streaks may suggest MGD.

PREOPERATIVE OCULAR SURFACE OPTIMIZATION

My preoperative approach to optimizing the ocular surface is not only diagnostic but also educational. I provide patients with a handout that is updated biannually and outlines all possible dry eye treatments. This handout, which lists everything from heating masks to immunomodulatory drops such as cyclosporine (CsA) ophthalmic emulsion 0.05% (Restasis, Allergan/AbbVie), CsA ophthalmic solution 0.09% (Cequa, Sun Ophthalmics), CsA ophthalmic solution 0.1% (Vevye, Harrow), and lifitegrast ophthalmic solution 5% (Xiidra, Novartis Pharmaceuticals), allows me to mark specific recommendations for each patient. Some over-the-counter products, offered in our office for patient convenience rather than profit, are underlined to suggest that patients can easily purchase

them here. For comprehensive OSD management, treatments range from interventions for mild to moderate disease such as preservative-free artificial tears and heat masks to more intensive treatments such as steroids, dissolvable punctal plugs, and device-assisted therapies such as the iLux (Alcon), the LipiFlow Thermal Pulsation System (Johnson & Johnson Vision), and the TearCare system (Sight Sciences).

Regardless of the specific treatment plan, the use of artificial tears is regularly recommended before surgery. Depending on the severity of their OSD, patients may be brought back for follow-up and retesting within 1 to 3 weeks. This comprehensive, patient-centered approach ensures each patient receives individualized care to optimize their ocular health and surgical outcomes. (For an overview of cutting-edge treatments and novel approaches currently in development or recently approved, see *Therapeutics Under Investigation in DED Management*.)

THE LINK BETWEEN DRY EYE SEVERITY AND PATIENT SATISFACTION

A thorough analysis conducted at Center for Sight in 2019 (unpublished data) involving four surgeons and 113 eyes found a direct correlation between dry eye disease severity and patient dissatisfaction following premium IOL surgery. In the analysis, a preoperative complaint of vision fluctuation was closely linked to dry eye disease severity, highlighting the necessity of addressing ocular surface health preoperatively.

MANAGING PATIENT EXPECTATIONS AND EDUCATION

Patient education is fundamental to DED management. I emphasize to patients that DED is a chronic condition, not something that will disappear. It requires ongoing management. Individuals receiving certain types of IOLs, such as multifocal lenses, may require lifelong DED management. Patients who grasp the permanence of their condition are more likely to have realistic expectations and adhere to prescribed treatment.

At the time of the consultation, I make it a point to inform every patient about the types of lenses for which they are eligible. When patients present with moderate to severe OSD, the conversation takes a different turn. I tell them up front that their candidacy for multifocal lenses might be limited and the decision hinges on how they respond to treatment. Typically, I schedule a follow-up appointment 2 to 3 weeks later to assess their progress.

In my experience, patients who are informed about their DED at the outset are less likely to be frustrated by postoperative vision fluctuations. Proactive communication fosters a more positive attitude toward their condition and its treatment.

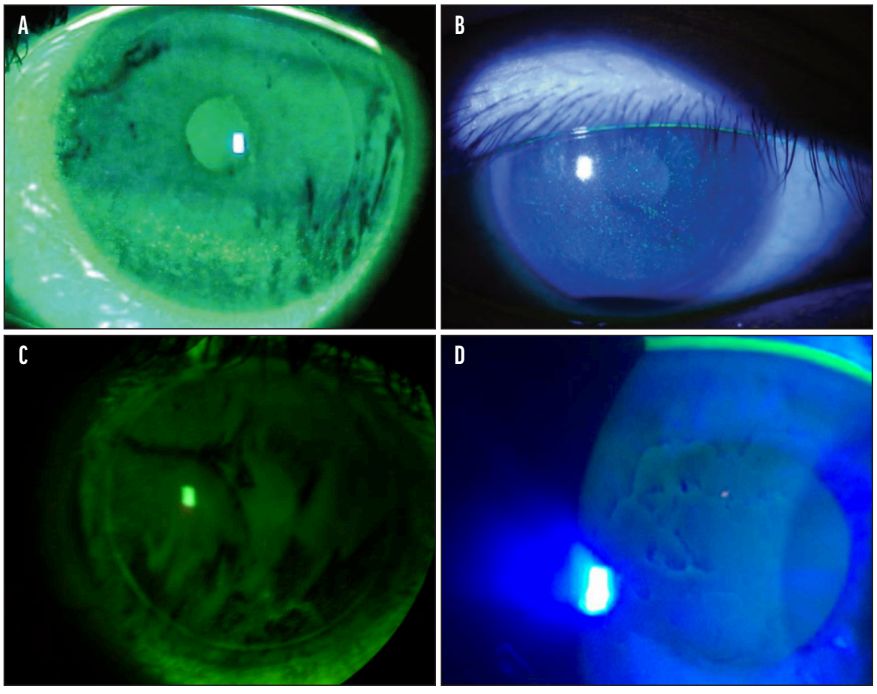


Figure. Corneal staining patterns observed during an assessment of the ocular surface with fluorescein dye. A scattered staining pattern indicates the need for a meticulous preoperative evaluation of the ocular surface (A). A diffuse corneal staining pattern is often seen in eyes with various ocular surface disorders (B). The presence of vertical streaking within the tear film is suggestive of MGD (C). Corneal changes characteristic of anterior basement membrane dystrophy/epithelial basement membrane dystrophy (D).

LENS CONSIDERATIONS

Monofocal IOLs. With patients who have severe DED, I often find it necessary to state that, although their condition may improve, I cannot recommend a multifocal lens. I explain that such lenses are particularly susceptible to the effects of DED, which could significantly impair their

THERAPEUTICS UNDER INVESTIGATION IN DED MANAGEMENT

NOVEL MECHANISMS OF ACTION

AR-15512 (Alcon). This topical transient receptor potential melastatin 8 agonist is a first-in-class product candidate for the treatment of the signs and symptoms of dry eye disease (DED). The primary endpoint was achieved in pivotal efficacy and safety studies (COMET-2 and COMET 3).[1]

AZR-MD-001 (Azura Ophthalmics). This selenium sulfide ophthalmic ointment met the coprimary endpoints of a phase 2 multicenter study, with a statistically significant improvement in the signs and symptoms of meibomian gland dysfunction. The drug was safe and well tolerated.[2] It has the potential to revolutionize the treatment of contact lens–related discomfort by improving meibomian gland function and tear stability.[3] Azura is preparing for phase 3 development discussions with the FDA.[4]

HL-036 (HanAll Biopharma). Tanfanercept targets tumor necrosis factor alpha to mitigate inflammation, a key factor in DED. Its unique formulation allows for oral and ophthalmic administration, offering a potential improvement over existing therapies.[5]

IVW-1001 (iView Therapeutics). This novel transient receptor potential melastatin 8 agonist addresses the signs and symptoms of DED by targeting cold-sensitive thermoreceptors. The drug promotes tear secretion and alleviates ocular discomfort. FDA approval of the Investigational New Drug application clears the way for the initiation of a phase 1/2 clinical trial.[6]

ADVANCED DELIVERY SYSTEMS

OTX-DED (Ocular Therapeutix). This low-dose intracanalicular insert of dexamethasone is designed for the short-term treatment of episodic DED. The preservative-free option could reduce the risk of ocular surface toxicity and is currently undergoing clinical evaluation.[7]

OTX-CSI (Ocular Therapeutix). This preservative-free cyclosporine intracanalicular insert is designed to deliver therapy for up to 12 weeks with a single application. It is because evaluated for the treatment of DED.[8]

UNDER ADDITIONAL EVALUATION

Reproxalap (Aldeyra Therapeutics): Following a Complete Response Letter from the FDA for the New Drug Application for this reactive aldehyde species modulator, additional trials of the investigational drug candidate are underway to demonstrate a positive effect on the ocular symptoms of DED. A New Drug Application resubmission could occur in the first half of this year.[9]

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vision. I advise them that a monofocal lens is their only option.

For patients with moderate disease, the decision is more nuanced and depends greatly on their response to treatment. If, upon reevaluation, the ocular surface shows considerable improvement, and the testing is satisfactory, they may be candidates for a multifocal IOL.

Multifocal IOLs. I emphasize the importance of ongoing ocular surface maintenance to candidates for multifocal lenses. They must be willing to commit to preserving the health of their ocular surface postoperatively. If they are hesitant or unable to make this commitment, I recommend a monofocal IOL as a safer, more suitable choice. This approach ensures that patients are fully informed of their options and the responsibilities associated with each lens and guides them toward the best decision for their vision and lifestyle.

COLLABORATIVE CARE FOR OPTIMAL OUTCOMES

In our high-volume surgical practice, I rely heavily on the expertise of optometrists for the pre- and postoperative care of our patients. Engaging in ongoing education with our comanaging doctors is essential for maintaining the high level of care our patients expect and deserve. For instance, introducing new medications into our treatment protocol requires educating our team about the agents' benefits and applications. ■

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