TAKING DRY EYE CARE TO THE NEXT LEVEL

Don't let patients leave the office with undetected ocular surface disease.

BY MILE BRUJIC, OD, FAAO

My appreciation and passion for actively identifying and managing dry eye disease developed more than a decade ago, out of necessity. I saw a new patient, a 42-year-old woman who complained of reduced near vision through her glasses. I examined her and prescribed her first pair of progressive addition glasses. One month after these glasses were dispensed, she appeared on my schedule for a prescription check.

At this follow-up visit she said she felt that something was wrong with the prescription in her new glasses. When I checked her vision through the new glasses, I noted that she was blinking to try to clear her vision. As I saw her doing this, I asked whether she felt like she had to do this frequently to clear her vision, and she responded that she has to do it all the time.

I proceeded to the slit-lamp evaluation after instilling fluorescein, using a cobalt blue light and a Wratten No. 12 filter. The nature of her complaint quickly became evident, as her tear film began breaking up almost immediately after she blinked.

AT A GLANCE

- Creating a protocol to help identify patients with dry eye is crucial to patient satisfaction.
- An appropriate protocol will help to optimize chances of identifying dry eye in the patients in your practice.
- Many strategies can be employed immediately in your office with diagnostics and equipment you already have.

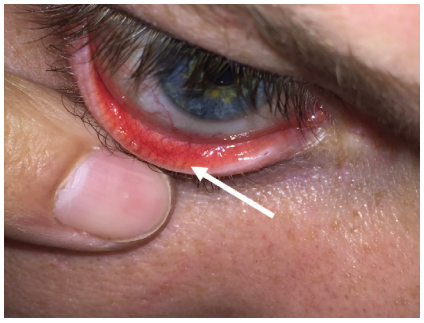

Figure 1. The patient's lower lid is pulled down to view the palpebral conjunctiva. Arrow indicates the meibomian glands.

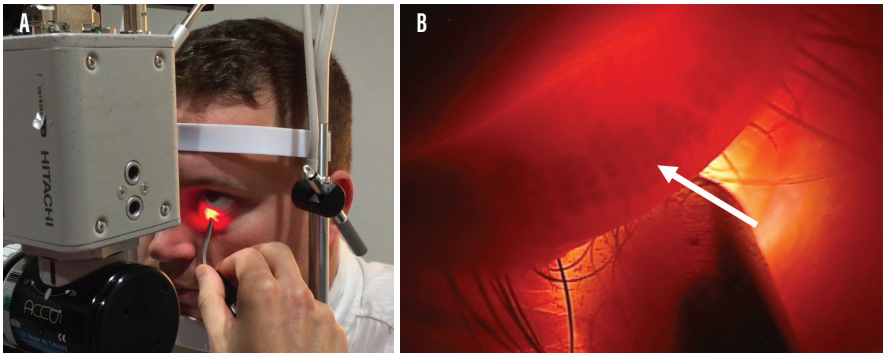

Figure 2. Eyelid transillumination is performed at the slit lamp (A). The view at the slit lamp using this technique; arrow indicates a meibomian gland (B).

RECOGNIZING A NEED

I realized then that I needed to put a process in place to help avoid undiagnosed dry eye affecting my patients' vision with their new glasses. The last thing that I wanted was to have someone walk out of our office not seeing as well as he or she should because of an underlying dry eye problem that was missed.

I immediately implemented a process to actively identify patients with dry eye through application of fluorescein on every patient at every encounter. Since then, the process has evolved in this era of new diagnostic technologies.

I feel that it is crucial to care appropriately for patients with dry eye, and ultimately this involves identifying these individuals. Although processes will vary between offices, I believe practitioners should consider putting together a protocol to help identify these patients. If we simply wait to hear the classic complaint that "my eyes burn," we will miss a number of individuals who need our help.

In this article I review several diagnostic measures (excluding standardized questionnaires) that we use to monitor treatment success (or failure). The goal of these diagnostic tests and of physical examination is to gather information to determine the causes and effects of dry eye in order to put an appropriate, active plan in place. Keep in mind that many of these strategies can be employed immediately in your office with the diagnostics and equipment that you already have.

EXAMINATION AND DIAGNOSTIC OPTIONS

Lash Margins

Early evidence of inflammation can often be seen as a pallor around the base of the lash hair follicles and sometimes an elevation at the base of the lash, known as the *volcano sign*. This is suggestive of excessive inflammation in the hair follicle, and it can be a precursor to dry eye symptoms.

We must also be cognizant of deposits and collarettes at the base of the lashes.[1] Both of these findings are best viewed at the slit lamp under high magnification. Under low magnification they can often be missed. Additionally, be mindful of loss of lashes, which can arise secondary to chronic inflammation.

Lid Margins

The clinician should look for eyelid margin thickening and visible inflammation. Examination of the meibomian orifices is also critical; there can be pouting of the meibomian gland orifices in eyes with long-term meibomian gland dysfunction.

Make sure to assess the lid margins for appropriate meibomian gland secretions. The most common way to perform this assessment is by placing gentle pressure along the anterior surface of the lid margin. This can be done by either gently pressing along the lid margin with a finger or in a controlled way utilizing the Meibomian Gland Evaluator (Johnson & Johnson Vision).

Meibomian Glands

The meibomian glands can be assessed several different ways depending on the technology you have in your practice. The structure of the glands along the lower lid can be viewed by pulling the lower lid down and viewing the palpebral conjunctiva with the naked eye (Figure 1). The meibomian gland structure can also be assessed at the slit lamp with eyelid transillumination. In this technique, the transilluminator is used to pull the lower eyelid down as its light shines through the lid. The palpebral conjunctival surface can then be viewed with the light from the transilluminator as the only light source (Figure 2).

The meibomian glands can also be viewed using infrared technology. This approach leverages the fact that the meibomian glands are more metabolically active than the surrounding tissues, causing them to appear a lighter color. All three of these techniques provide visualization of the meibomian glands to allow determination of whether there is any dropout.

Fluorescein

As noted above, fluorescein instillation is a part of every ocular surface assessment I perform. The reason for this is that it provides a tremendous amount of information. The key to optimally observing fluorescein after it is applied to the ocular surface is to view it with cobalt blue light and a Wratten No. 12 filter.

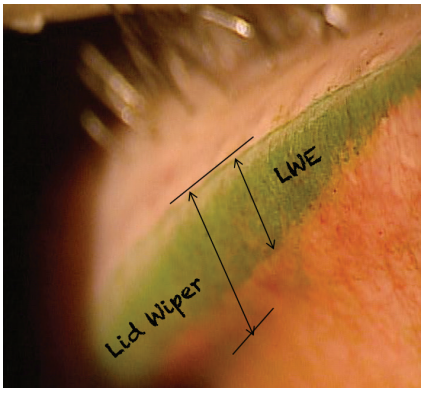

Figure 3. Photo shows the lid wiper area and the presence of lid wiper epitheliopathy.

The first assessment made after instillation is tear breakup time (TBUT). A normal TBUT should be 10 seconds or more. After TBUT is assessed, the presence of corneal and bulbar conjunctival staining can be assessed. In a normal eye, no corneal staining should be evident.

The tear meniscus is also easily viewed when fluorescein is placed on the eye. A healthy tear meniscus is usually approximately 0.3 mm above the lid margin. Additionally, it is easy to see if there are any irregularities in the lid margin.

Another important clinical marker that can be viewed with fluorescein is lid wiper epitheliopathy (LWE). In order to understand LWE, it is important to understand the anatomy of the lid wiper area (LWA). The LWA is the small area on the posterior surface of the upper eyelid that wipes along the ocular surface during the blink. Additional friction along the LWA will result in tissue irritation, leading to fluorescein absorption into the LWA. When staining is present on the LWA, it is referred to as LWE (Figure 3).

Be cognizant of the line of Marx, an anatomic structure that in normal eyes will stain with fluorescein. The line of Marx is where the keratinized epithelium of the anterior eyelid meets the mucous membrane of the palpebral conjunctiva. The anterior margin of the LWA is the line of Marx. The level of LWE is graded based on the horizontal width and the sagittal depth of the stain that absorbs in the LWA. Then these two levels are averaged to arrive at a final LWE severity (Table). LWE can also be evaluated with lissamine green or rose bengal staining.

TABLE. Grading of Horizontal Width and Sagittal Depth of Lid Wiper Epitheliopathy

HORIZONTAL LENGTH OF STAINING	GRADE
<2 mm	0
2–4 mm	1
5–9 mm	2
>10 mm	3
SAGGITAL WIDTH OF STAINING	**GRADE**
<25% of the width of wiper	0
25–<50% of the width of wiper	1
50–<75% of the width of wiper	2
≥75% of the width of wiper	3

Adapted from Korb DR, Herman JP, Greiner JV, et al. Lid wiper epitheliopathy and dry eye symptoms. *Eye Contact Lens*. 2005;31(1):2-8.

Tear Osmolarity

Tear osmolarity is a measure of the concentration of solutes in the tear film. In a patient with dry eye, tear film osmolarity increases. As the quality of the tear film is normalized, osmolarity decreases.

Point-of-Care Testing

In-office testing with the InflammaDry assay (Quidel) measures the level of matrix metalloproteinase 9 (MMP-9) in the tear film. The sensitivity of the test detects levels of MMP-9 at 40 ng/mL and higher. MMP-9 levels lower than 40 ng/mL are considered to be in the normal range. As the level of MMP-9 in the tear film increases, the positive signal strength will increase in intensity.

FOCUS ON THE PROTOCOL

Setting a protocol in place to help identify patients with dry eye is crucial to patient satisfaction. An appropriate protocol will help to optimize your chances of identifying this condition in the patients in your practice. With a protocol in place to actively identify this condition, you will take your dry eye practice to the next level. ■

1. Rynerson JM, Perry HD. DEBS – a unification theory for dry eye and blepharitis. *Clin Ophthalmol*. 2016;10:2455-2467.

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