We’ve learned a tremendous amount about dry eye over the past 2 decades, and new diagnostic devices and therapeutic options have given us the ability to visualize, measure, and treat the ocular surface in advanced ways. However, in our efforts to appropriately diagnose and treat patients, we may be overlooking a population of patients that is increasingly at risk of developing the long-term deleterious effects of this condition: children.

CAUSES OF PEDIATRIC DRY EYE

Advanced age is one of the major risk factors for developing dry eye disease, but that doesn’t mean it can’t occur in younger patients. In fact, concurrent conditions such as allergic conjunctivitis, atopic conjunctivitis, and certain medication use can have deleterious effects on the ocular surface in children. Systemic conditions can also contribute to a child’s predisposition to dry eye.

Further, new environmental risk factors, such as the growing use of digital devices, have created an artificial environment in which our eyes have a hard time functioning, and excessive use of digital devices presents a unique risk to pediatric patients. As we stare at screens we tend to blink less, reducing our blink rate. Digital device use also alters the normal dynamic of the blink rate and mechanism of the blink, which starts a cascade of abnormally produced meibomian gland secretions secondary to poor blink rate and incomplete blinks. (For more on the effects of digital device use in children, read “Digital Device Use and Vision in Kids” by Scott E. Schachter, OD, on page 51).

HOW TO SPOT A PEDIATRIC DRY EYE PATIENT

How we diagnose and treat pediatric patients doesn’t differ much from our adult population. Below are some diagnostic strategies for identifying pediatric patients with dry eye disease.

Carefully Inspect the Lid Margin

It’s critical to rule out any signs of collarettes at the base of the lashes that may be adversely affecting the ocular surface. Consider performing a high magnification evaluation of the lash margin, as often this may be missed at lower magnification levels (Figure 1).

Carefully Assess the Lid Margin

Use of vital dyes such as fluorescein, lissamine green, or rose bengal will highlight the line of Marx (LOM; Figure 2), which represents where keratinized epithelium meets the
posterior mucous membrane and is usually located posterior to the meibomian gland orifice. With chronic ocular surface disease, the LOM becomes less regular and migrates anteriorly. It is also important to assess how well the meibomian glands yield secretions. Meibomian gland evaluators are available at a low cost, but it is important when using these tools to be consistent when applying pressure to the lid margin.

Utilize Vital Dyes
Vital dyes enhance the standard slit-lamp evaluation by providing additional information about the ocular surface. Fluorescein allows simple detection of corneal or conjunctival compromise, tear film breakup time measurement, assessment for lid wiper epitheliopathy, and LOM assessment.

Have Patients Fill Out Standardized Questionnaires
Several standardized dry eye questionnaires are available. These instruments provide us with the ability to objectively monitor patients’ symptoms. Commonly utilized questionnaires include the Standardized Patient Evaluation of Dryness, Ocular Surface Disease Index, and the five-item Dry Eye Questionnaire. Have your pediatric patients who spend a significant time in front of a computer screen fill out one of these questionnaires as they’re waiting for their examination to rule out any symptoms that may be a result of extended screen time.

Evaluate the Meibomian Glands
There are several ways to image the meibomian glands. Direct visualization can be had simply by pulling down the lower lid and viewing the structures. An indirect view of the meibomian glands of the lower lid can be gained by performing eyelid transillumination of the lower lid while viewing the palpebral conjunctiva at the slit lamp. It is important to remember that, during this technique, all lights other than the source providing transillumination should be turned off.

Advances in meibomian imaging have also given rise to infrared technologies that allow clinicians the ability to accurately identify the gland length. Meibomian glands produce more heat than the surrounding tissues, and therefore they can be visualized with specialized infrared cameras.

Employ Point-of-Care Tests
Two point-of-care tests that can help identify and quantify dry eye are available. The TearLab Osmolarity System (TearLab) measures the osmolarity of human tears. Abnormality in the tear film results in elevated levels of osmolarity. Abnormal osmolarity is defined as an elevated reading of greater than 300 mOsm/L or an intereye difference of greater than 8 mOsm/L.

InflammaDry (Quidel) is a rapid-result, in-office test that detects the level of matrix metalloproteinase-9 on the surface of the eye from tear samples acquired from the lower palpebral conjunctiva. Levels greater than 40 ng/mL trigger a positive signal and show up as a red line on the test.

PROTECT THE FUTURE
Today’s children are exposed to environmental stressors that can alter normal ocular surface physiology, making it critically important for their eye care providers to appropriately identify ocular surface abnormalities as soon as possible in order to prevent progression and promote ocular surface wellness.

Using the latest technologies to view the ocular surface and measure biomarkers, we can develop a better understanding of pediatric ocular surface physiology and identify abnormalities sooner in this population of patients.


MILE BRUJIC, OD, FAAO
- Partner, Premier Vision Group, Bowling Green, Ohio
- mile.brujic75@gmail.com
- Financial disclosure: Speaker, Writer, Advisory Board, Research, or Meeting Support (ABB Optical, Akorn, Alcon Laboratories, Allergan, Art Optical, Bausch + Lomb Health, BledphEx, Contamac, CooperVision, CSEye, Euclid, Eyevance, Johnson & Johnson Vision Care, Luneau, Novartis, Oculus, Optovue, Sight Sciences, Sun Pharma, Tangible Science, TelScreen, TruForm Optics, Valley Contax, Visionary Optics, VMax Vision, Walman Optical, Weave, Zeiss, Zea Vision)