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Blurred vision, light sensitivity, reading difficulty: Assessing the visual system after concussion

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A 14-year-old boy comes in with a headache and dizziness after a big tackle in football practice yesterday. He attended school today, and his symptoms worsened as the day progressed. The teen also complains that lights bother him, and he is having trouble reading, with blurry and sometimes double vision.

Concussions are a common injury in childhood and may be associated with organized sports, recreational play or everyday activities. Headaches and dizziness are well-known presenting symptoms in children and adolescents with concussion, but vision problems also are increasingly being recognized as common sequelae (Master CL, et al. *Clin Pediatr*. 2016;55:260-267, <https://bit.ly/3AiVqnl>).

Vision issues after concussion deserve attention due to the substantial negative impact they can have on a child's functioning in school and activities, such as sports.

A new policy and clinical report can help clinicians identify vision problems after concussion and inform the development of targeted accommodations to support timely return to school and activities after injury.

The policy *Vision and Concussions: Symptoms, Signs, Evaluation and Treatment* is available at <https://doi.org/10.1542/peds.2021-056047>, and the clinical report *Evaluation of the Visual System by the Primary Care Provider Following Concussion* is at <https://doi.org/10.1542/peds.2021-056048>. Both documents are from the AAP Section on Ophthalmology, American Academy of Ophthalmology, American

Association for Pediatric Ophthalmology and Strabismus, and American Association of Certified Orthoptists and will be published in the August issue of *Pediatrics*.

History, physical examination

In addition to obtaining a history of the injury that resulted in the concussion and ensuing symptoms, clinicians should ask questions that address visual function. Children may report blurry vision, light sensitivity and difficulty reading. Visual fatigue may contribute to headache and may be associated with dizziness. Specifically asking about visual symptoms may be helpful in younger children who may not recognize that they have vision problems.

When examining the patient for concussion, a targeted assessment of the visual system also is important. This should include not only an assessment of visual acuity, but also an assessment of eye movements, accommodation (monocular visual function) and convergence (binocular visual function). Assessment of smooth pursuit and saccadic function can determine if symptoms are provoked by tracking a moving object (smooth pursuit) or visual jumping from point to point (saccades), as is required for reading (horizontal saccades) or taking notes from a smartboard (vertical saccades). Symptom provocation with vestibulo-ocular reflex testing also can be associated with motion sensitivity or dizziness.

The policy statement details a screening assessment that can be conducted in the primary care outpatient or emergency medicine setting with an accompanying video. The clinical report further details the elements of a visual system evaluation after concussion.

Implications for concussion management

Identification of visual issues after concussion can inform clinical management, especially as it relates to the child's return-to-learning activities. The clinician can recommend adjustments and accommodations in school, such as breaks to alleviate visual fatigue and temporary use of audio or large font printed materials vs. electronic format. Preferential seating in the classroom and preprinted notes also may be useful. All of these elements can be incorporated into a return-to-learn plan.

While many vision problems after concussion may be self-limited, prompt referral to a specialist with experience treating concussions may be helpful if symptoms persist. Visual diagnoses that may need to be addressed include convergence insufficiency (difficulty maintaining focus at near distance) and accommodative infacility (difficulty with monocular focusing).

Clinicians caring for children with concussion can have a positive impact on their return to learning and activities by specifically assessing for visual problems by history and targeted examination, implementing academic accommodations tailored to visual issues, and referring early for further management by a specialist familiar with visual issues following concussion.

Key recommendations

- Screening for visual complaints is an important component of assessing a child with concussion.
- A targeted physical examination of the visual system should include an assessment of oculomotor function and binocular and monocular focusing.
- Findings from the screening exam of the visual system can be used to develop academic accommodations that support the return-to-learn plan for a child with concussion.

Dr. Master is a lead author of the policy statement and clinical report. She co-directs the Minds Matter Concussion Program at Children's Hospital of Philadelphia.

Resource

Table 1 in the policy statement at <https://doi.org/10.1542/peds.2021-056047> outlines the steps in oculomotor assessment after a suspected concussion.

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