



MANAGING PATIENTS WITH CONCUSSION



How to assess and treat a patient with a head injury.

BY VITTORIO MENA, OD, MS

The 2015 movie *Concussion* shined a spotlight on the serious and potentially fatal effects of traumatic brain injuries (TBIs). Although many people think of these types of injuries mostly in relation to football, a TBI—whether mild or severe—can occur due to multiple causes, including road accidents.

Older adolescents (ages 15–19) and older adults (ages 65 and older) are the individuals most likely to sustain a TBI. It is estimated that 3.8 million concussions occur in the United States each year, and as many

as 50% of these may go unreported.¹ TBIs are contributing factors to a third (30%) of injury-related deaths in the United States.² A *concussion*, a mild TBI, is the most common type of TBI. Some symptoms, such as fatigue and mood swings, may not directly appear to be correlated with a head injury, whereas other symptoms are much more severe and noticeable (see *Concussion Symptoms*).

ASSESSMENT GUIDELINES

After someone experiences a TBI, it is crucial that he or she has a

CONCUSSION SYMPTOMS

Common symptoms reported by individuals with a concussion.

- Difficulty focusing/ concentrating
- Headaches or feeling dizzy or confused
- Double vision
- Sensitivity to light or noise
- Dry eye
- Bumping into objects
- Losing balance
- Leaning to one side
- Mood swings
- Exhaustion/fatigue

comprehensive eye examination along with follow-up visits. The examination should include VA testing with refraction, evaluation of pupil reactivity and color, IOP measurement, visual field testing, and dilated fundus exam. Ocular motility assessment should be conducted, including pursuits, saccades, vestibulo-ocular reflex, and convergence and divergence. Individuals with TBI may report a decrease in VA and experience foggy

VISUAL PROBLEMS ASSOCIATED WITH TBIS

- Blurred vision
 - Sensitivity to light; glare sensitivity
 - Reading difficulties; words appear to move
 - Double vision
 - Aching eyes
 - Headaches with visual tasks
 - Inability to maintain visual contact or focus
 - Reduction or loss of visual field (visual field loss)
- Difficulties with eye movements, such as:
 - Ocular pursuits
 - Saccadics
 - Accommodative inability
 - Binocular vision (eye alignment, eye teaming, depth perception, 3D vision, stereopsis)

CONTRAST SENSITIVITY TESTS

- Pelli-Robson test (Precision Vision)
- logMAR (Bailey-Lovie) chart
- Vision Contrast Test System (Vistech)
- Cambridge low contrast grating test
- Sports Vision Performance (M&S Technologies)
- Regan low contrast letter charts
- Functional Acuity Contrast Test (FACT) chart

or blurry vision (see *Visual Problems Associated With TBIs*).

Neuroimaging such as a CT scan or MRI is also typically ordered; however, these scans do not always provide useful information regarding cerebral concussions. Neuroimaging should be used whenever a patient loses consciousness, experiences severe amnesia, or has increasing symptoms of headaches or nausea. If damage appears on one of these scans, the injury is more serious than a concussion.

Contrast sensitivity testing is often a better predictor of functional vision than VA (see *Contrast Sensitivity Tests*). In contrast sensitivity testing, unlike in standard 100% contrast black-on-white VA testing, stimuli are presented against backgrounds with varying levels of contrast, giving better insight into the patient's ability to perceive objects in the real world.

For patients with contrast sensitivity deficits, vision can be improved with proper illumination and frequently can be enhanced by using color filters such as tinted spectacles or contact lenses.

Patients with head injuries are often prescribed pain medications, and these medications can have

effects on their refractive error and accommodative effort, heighten light sensitivity, and even produce color-vision defects. Patients should avoid taking medications containing aspirin, which can increase intracranial bleeding.

TREATMENT TACTICS

Treatment for concussion can take many forms. It may be as simple as changing the patient's lens prescription. Any astigmatism should be addressed in the new prescription, as well as any hyperopia of +0.50 D or greater and myopia of -0.25 D or greater. Prescribing a second pair of reading glasses instead of bifocals can also help with accommodative issues. To help patients reduce glare issues and light sensitivity and to alleviate fatigue and daytime sleepiness, a 40% blue tint and an antireflective coating can be added to their spectacle prescription.

Another option is *vision therapy*, which can boost the eyes' ability to communicate, focus, and converge and diverge. This is usually the most appropriate form of care when simple adjustments in prescription or tints are not enough.

The period of recovery after TBI can be as long as 1 to 2 years, but recovery may remain incomplete.³ Symptoms persisting beyond 1 year have been reported in 10% to 15% of those with mild TBI.⁴

Although most patients with mild

AT A GLANCE

- Traumatic brain injuries (TBIs) are a contributing factor in 30% of all injury-related deaths in the United States.
- Some symptoms are noticeable immediately, but other symptoms may be milder yet still serious.
- Optometrists should conduct a thorough eye examination of patients who experience a TBI, including VA testing, ocular motility assessment, and contrast sensitivity testing.



BRAIN INJURY FAST FACTS



Football is the leading cause of high school sports concussions in boys.



Soccer is the leading cause of high school sports concussions in girls.



1.5 million Americans experience TBIs each year.



A TBI occurs every 15 seconds.

Source: What is a concussion? Brain Injury Research Institute. www.protectthebrain.org/Brain-Injury-Research/What-is-a-Concussion-.aspx. Accessed October 22, 2019.

TBI recover to a significant degree, approximately 20% will be unable to return to work, and even more can remain symptomatic. Sensory and neurologic tracking devices can be used to improve a patient's awareness and decision-making abilities,

and these can also help determine whether an athlete can return to participating in his or her sport.

IT TAKES A TEAM

Follow-up is crucial at 1, 3, and 6 months after the injury. Treating

a concussion is truly a team effort because, though some symptoms may resolve as quickly as a week, others may last years. The care team may include a neurologist, ophthalmologist, optometrist, vision therapist, occupational therapist, physical therapist, psychologist, primary care physician, speech language pathologist, and even a social worker. When everyone is included, the patient ultimately benefits. ■

1. Harmon, KG, Clugston JR, Dec K, et al. American Medical Society for Sports Medicine position statement on concussion in sport. *Clin J Sport Med.* 2019;29(2):87-100.
2. Taylor CA, Bell JM, Breiding MJ, et al. Traumatic brain injury-related emergency department visits, hospitalizations, and deaths – United States, 2007 and 2013. *MMWR Surveill Summ.* 2017;66(9):1-16.
3. McHugh T, Laforce R Jr, Gallagher P, Quinn S, Diggle P, Buchanan L. Natural history of the long-term cognitive, affective, and physical sequelae of mild traumatic brain injury. *Brain Cogn.* 2006;60(2):209-211.
4. Rutherford WH, Merrett JD, McDonald JR. Symptoms at one year following concussion from minor head injuries. *Injury.* 1979;10(3):225-230.

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