

# MILITARY OPTOMETRY

## IN THE CARE OF

### TRAUMATIC BRAIN INJURY PATIENTS

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#### Abstract

*The medical care system for soldiers and Marines who incur traumatic brain injury in Iraq and Afghanistan is presented. After initial immediate care is provided, they are sent to a staging area for further treatment and then to a tertiary care hospital in Germany. Finally, they are assigned to an army or navy medical care facility in the United States. All suspected traumatic brain injured patients are screened to determine the level of severity of injury. They are then assigned to either an Army Hospital, or a Department of Veterans Affairs health care facility for further treatment and rehabilitation. The author notes his impressions that in terms of vision, there are often changes in refraction, impaired accommodation and binocular functioning.*

#### Key Words

*accommodation, Afghanistan, Department of Veterans Affairs, Naval Medical Center, Iraq, medical care system, phoria, refractive changes, traumatic brain injury (TBI), tropia, U.S. Army, U.S. Marines, Veterans Health Administration, Walter Reed Army Hospital*

**T**oday's soldiers have a much better chance of surviving battlefield injuries than did their predecessors. This is attributed in great part to improved body armor that better protects the head and vital organs. Advancements in military medicine have also contributed to increased survival rates on the battlefield. Soldiers are provided more advanced care that is delivered quicker than in previous wars. Hence, with more soldiers surviving their initial trauma, the prevalence of traumatic brain injury (TBI) has increased when compared with past conflicts.

A soldier can arrive at Walter Reed Army Medical Center (WRAMC) in Washington, DC, from either Iraq or Afghanistan in as little as 36 hours after being injured. In contrast, during World War II, it could take up to two weeks to evacuate soldiers from the European theater and return them back to the continental U.S. Today, priority of evacuation is given to those at risk of losing life, limb, and/or eyesight.

When a soldier is injured in Iraq or Afghanistan, he or she is provided immediate medical care. The soldier is rapidly transported to a medical facility where the wounds can be treated and the condition stabilized for subsequent transport to a higher level of care. Most soldiers with frank TBI are sent to a staging area within either Iraq or Afghanistan. They are further stabilized, and then transported to the tertiary care hospital in Landstuhl, Ger-

many. This facility is run jointly by the Army and the Air Force, and additional and more advanced medical treatment is provided. When he or she is further stabilized, the patient is flown to Andrews Air Force Base. Then, Army personnel are typically sent to WRAMC, whereas Marine personnel are typically sent to the Naval Medical Center in Bethesda, Maryland. Some patients, for example, those with severe burns, are transported to other major facilities, such as Brooke Army Medical Center in San Antonio, Texas, where a specialized burn unit is located.

All wounded soldiers returning from Iraq and Afghanistan are screened to determine the severity of the TBI. The most frequent assessments that are used include, but are not limited to, the Glasgow Coma Scale (GCS),<sup>1</sup> Loss of Consciousness (LOC),<sup>2</sup> and Post Traumatic Amnesia (PTA).<sup>2</sup> Table 1 summarizes the scales that are used to assign severity for each of the screenings. An open-head injury by itself is automatically categorized as "severe" TBI.

The most common causes of the TBI for soldiers sent to WRAMC (from the most to least common) are: improvised explosive devices (IEDs), mortars, gun shot wounds to the head or neck, rocket propelled grenades, vehicle born, and motor vehicle accidents.

The TBI team at WRAMC includes physicians, therapists, counselors, and administrative personnel. They provide com-

**Table 1.**  
**Severity of Traumatic Brain Injury (TBI) with respect to Glasgow Coma Scale (GCS), Loss of Consciousness (LOC), and Post-Traumatic Amnesia (PTA).**

Severity of TBI	GCS	LOC	PTA
Mild	13-15	< 1 hour	< 24 hours
Moderate	9-12	1 – 24 hours	> 24 hrs. but < 7 days
Severe	3-8	> 24 hours	> 7 days

prehensive evaluations which are used for treating and educating the patients. The team also provides information to medical boards to determine whether the patient can return to active duty. Furthermore, the TBI team coordinates patient information with the Department of Veterans Affairs, Veterans Health Administration (VA). In those instances where a VA facility is appropriate, the level of rehabilitation therapy that matches the patients' needs is provided.

Examining TBI patients offers many challenges for the optometrist. Many of the soldiers with TBI have additional injuries from which they are recovering. Thus, vision examinations may need to be performed at bedside if the patient is not ambulatory or unable to use a wheelchair. Another consideration is that many of these patients are taking several medications for a multitude of reasons. It is not uncommon for one or more of these medications to have visual side effects.

Optometrists at WRAMC have been involved in TBI care since June, 2006. During this short period, some interesting anecdotal findings have been noted. Patients tend to have an increase in myopia and astigmatism when compared to their previous refractive correction. However, many of these patients are in their early 20's, and thus some of the refractive change may be attributed to natural progression. Near vision symptoms predominate. For example, many patients have reduced accommodation. The near vision symptoms may be due, however, in part to the medications being taken. Finally, if the patient has an increase in his or her phoria, or has a tropia, it tends to be an exo deviation.

When these patients first arrive at WRAMC, they typically report relatively few visual complaints. As they begin to recover and increase their rehabilitative workload, there is a concurrent increased demand on the visual system, especially at near. During this time of increased visual demands, many TBI patients report additional vision symptoms. Presently, the most common treatment plan includes updating the corrective lenses, as well as prescribing spectacles for near if accommodation is reduced. Fusional prisms are commonly prescribed for those with binocular vision dysfunctions, such as convergence insufficiency. In the future, vision therapy and other aspects of vision rehabilitation for binocular vision disorders will be added to the armamentarium.

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## EDITORIAL continued

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