

FROM THE GUEST EDITORS

TRAUMATIC BRAIN INJURY & THE NATION

The on-going wars in Iraq and Afghanistan have strained many areas of the military as a result of the prolonged, intense, and complex nature of these conflicts.¹ One specific area of concern has been that of traumatic brain injury (TBI), with its extended and costly health care demands. TBI has become the “signature injury” of these two wars, especially in Iraq. At the time of this writing (December, 2006), it is estimated that 20% of the soldiers injured in Iraq, or 4000 individuals, have sustained a TBI.² Most of these brain injuries have resulted from bomb blasts, in particular improvised explosive devices, or IEDs.³ The medical and related costs for their health care and rehabilitation over the next several decades is estimated to be 35 billion dollars², with the overall cost of these wars estimated at two trillion dollars². Many of these soldiers with TBI will have vision problems, such as oculomotor dysfunctions and visual field defects, occurring as a result of diffuse axonal injury, coup-contrecoup injury, and/or penetrating bullet wounds.³ While the exact number of those individuals manifesting vision dysfunctions remains unknown, it is predicted to be high. For example, in a vision screening of an unselected sample of patients with acquired brain injury in two extended care facilities,⁴ the frequency of vision problems ranged from 2% to 40% depending on the diagnostic category of the dysfunction, with this frequency of occurrence being several times greater than found in a non-selected, non-TBI patient population.⁵ Some of the most common vision problems included oculomotor/accommodative dysfunctions and anterior/posterior segment diseases. These find-

ings have been confirmed and extended in a more recent retrospective study conducted by us in 160 visually-symptomatic individuals with mild TBI who were examined in our clinic.⁵ More specifically related to eye movements, another of our retrospective studies using the same TBI sample revealed that 90% manifested one or more oculomotor disorders, such as convergence insufficiency, with symptoms frequently occurring during reading and near vision tasks.⁶ Fortunately most (90%) could be treated successfully with optometric vision therapy.⁷

At the 2005 meeting of the American Academy of Optometry (AAO), a distinguished group of individuals informally met to discuss the issue of war-related TBI, with emphasis on the Veterans' Administration and more generally to the armed services. This included Drs. Ciuffreda, Gagnon, Garbus, Ikeda, Kirby, McVeigh, Padula, Stelmack, Townsend, Van Roekel, Vicci and Mrs. Ludlam. The AAO's Binocular Vision Section was planning a symposium on the topic for 2007, but the urgency of the situation forced us to press ahead for 2006. With input from a variety of sources, including Colonel Frances McVeigh, an optometrist and administrator at Walter Reed Hospital, and Dr. John Townsend, Director, VA Optometry Service, and others, the symposium was formulated with the notion of presenting a wide range of military, clinical, and academic perspectives. Those who presented at the symposium included Drs. Kirby, Padula, Stelmack, Suter, Townsend, Van Roekel, and Vicci, as well as ourselves. The success of the symposium was considerable, perhaps serving as an impetus for more frequent conferences in the area in the future and

for an ever-increasing role for optometry as the primary vision care provider for those with TBI.

We were fortunate that Dr. Irwin Suchoff, editor of the Journal of Behavioral Optometry, enthusiastically agreed to publish this special issue based on our symposium. We hope the issue will provide a helpful overview of this important area and its complex problems. Furthermore, we trust that it will serve as one of the many recent optometric contributions providing a framework for quality vision care and neuro-optometric rehabilitation to our returning soldiers with TBI. If so, it will allow them to regain full and productive lives despite their brain injury. We dedicate this issue to them.

Note

Several presenters at the symposium agreed to prepare their papers for publication in this issue of the Journal. Space restrictions did not allow all to appear herein. They will be carried over to the next issue.

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COMMENTARY

TRAUMATIC BRAIN INJURY & THE MILITARY

In mid 2005, Dr. John Townsend, Director of the Veterans Administration's (VA) Optometry Services, approached Dr. (COL) Francis L. McVeigh, Chief, Walter Reed Army Medical Centers' (WRAMC) Optometry Service and the President of the Armed Forces Optometric Society. He asked the simple question, "What involvement do the eye care providers at WRAMC have in regarding the care of traumatic brain injury (TBI) patients." Dr. Townsend further stated that some TBI patients currently in the VA hospitals had been identified with vision problems that were previously undetected. Dr. McVeigh's response was, "Our eye surgeons are repairing and or enucleating damaged eyes and the optometrists are performing routine optometric examinations on any TBI patient who happens to show up for a routine appointment." This indicated that there was no specific program in place to ensure that all TBI patients receive a comprehensive eye examination that would address their unique needs.

Realizing the importance of meeting the newly increased demand that arose because of the recent conflicts in Afghanistan and Iraq, Dr. Townsend and McVeigh agreed to work together on developing a plan. Emails began to flow between VA, WRAMC and civilian optometrists in August 2005. Bi-weekly telephone conferences with this group started shortly thereafter and remain in place today. Members of this group met with concerned optometrists at the December 2005 American Academy of Optometry (AAO) Meeting. During this meeting Dr. McVeigh mentioned that he needed guidance and direction from those individuals who

have been working with TBI patients as his staff had very little experience in this area. He also added that he no money to give consultants at this time. The response was overwhelming as the email and teleconferencing groups enlarged, and many articles and books were sent. The AAO, incoming President was approached and asked to allow us to add a TBI symposium to the December 2006 AAO meeting in Denver, which he did.

A joint proposal was written and distributed between November 2005 and February 2006, by the WRAMC and VA optometrists. The proposal took a multi-pronged approach: education/consultation; clinical hands-on training/clinical care delivery; and clinical research. One of the ultimate goals was to develop evidenced-based clinical practice guidelines and scientifically validated visual rehabilitative standards for our Nation. This comprehensive approach is interdisciplinary and should expedite the exchange and sharing of clinical knowledge and medical information between Department of Defense (DoD) and VA providers. The proposal took into consideration that there are different schools of thought on the underlying TBI visual problems' etiologies and attempted to take the all inclusive approach -- not ruling out any theories. The proposal has many supporters. It has received some WRAMC funding for equipment and stands a good chance of being fully funded for some VA and DoD medical facilities.

By June of 2006 the WRAMC optometrist was participating in interdisciplinary TBI meetings discussing all WRAMC TBI patients and examining patients on the in-patient wards and in the optometry clinic.

It is important to note that many of these TBI patients have multiple injuries, are heavily medicated and are not responsive enough to fully participate in a comprehensive eye examination. The WRAMC optometrist attempts to see all of the TBI patients and assesses who is ready to be seen and modifies his clinical approach as needed.

In December 2006 the AAO sponsored a TBI symposium organized and facilitated by Dr. Kenneth Ciuffreda, that was very well presented and attended. The papers in this special TBI issue of the Journal of Behavioral Optometry are based on the presentations at this 2006 AAO meeting.

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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,

Today'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),¹ Loss of Consciousness (LOC),² and Post Traumatic Amnesia (PTA).² 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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