

## **Case report: Treatment of mild traumatic brain injury with hyperbaric oxygen**

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### **AbsTrACT**

two United states air Force airmen were injured in a roadside improvised explosive device (ied) blast in iraq in January 2008. both airmen suffered concussive injuries and developed irritability, sleep disturbances, headaches, memory difficulties and cognitive difficulties as symptoms of mild traumatic brain injury (mTBI). Six months after injury, repeat Automated Neuropsychological Assessment Metrics (ANAM) testing showed deterioration, when compared to pre-injury baseline ANAM assessment, in all measured areas (simple reaction time, procedural reaction time, code substitution learning, code substitution delayed, mathematical processing, and matching to sample).

The airmen were treated with hyperbaric oxygen in treatments of 100% oxygen for one hour at 1.5 atmospheres absolute, resulting in rapid improvement of headaches and sleep disturbances, improvement in all symptoms and resolution of most symptoms. Repeat ANAM testing after completion of the hyperbaric treatments — nine months after initial injury — showed improvement in all areas, with most measures improving to pre-injury baseline levels. The airmen received no other treatment besides medical monitoring. Repeat neuropsychologic testing confirmed the improvement. We conclude that the improvement in symptoms and anam performance is most likely attributable to hbo treatment.

### **InTroDuCTIon**

traumatic brain injury has been called one of the signature injuries of Operations Enduring Freedom and iraqi Freedom. the rand report documented a 19% self-reported incidence of probable TBI among returning service members, with 320,000 probable TBI cases. Most of these cases (80%) are considered mild traumatic brain injury, or mtbi (1).

On a per-case basis, one-year costs for mTBI were estimated at \$27,259 to \$32,759 in 2007 (2). The lifetime costs of even mild TBI impairment in young service members can be deemed incalculable (3).

mild tbi is usually characterized by a concussive event that causes a brief period of unconsciousness (lasting less than 30 minutes) or a period of confusion or amnesia lasting less than 24 hours. The Department of Defense has developed criteria for the diagnosis of mTBI, which must include one of the following:

- 1) any period of loss of or a decreased level of consciousness lasting less than 30 minutes;
- 2) any loss of memory for events immediately before or after the injury lasting less than 24 hours after the event;
- 3) any alteration in mental state at the time of the injury such as confusion, disorientation, or slowed thinking lasting less than 24 hours after the event;
- 4) transient neurological deficits (*e.g.*, weakness, loss of balance, change in vision, praxis, paresis or plegia, sensory loss, aphasia); and
- 5) normal intracranial imaging.

Findings may be transitory, and late sequelae that are not explainable by other means may qualify an individual for the diagnosis of mTBI. Patients with more than one of these findings may be assigned a higher level of TBI (4).