ABSTRACT

The background leading to present need for continued research on the specificity and sensitivity of automated neuropsychological assessments of mTBI in-theater has been clearly defined by the recommendations delineated in the 2008 report from the Traumatic Brain Injury Task Force to the Office of the Surgeon General (2008). It is estimated that almost 50% of Soldiers injured in combat return with some form of TBI (mild, moderate, or severe), however, precise numbers are not available. As of September 30, 2007 the Pentagon listed 4471 TBI diagnoses from OEF and OIF, however, the founder of the Congressional Brain Injury Task force, estimates more than 150,000 TBI instances have occurred among approximately 1.5 million OEF/OIF participants (Zoroya, 2007). The discrepancy may be due to the fact that an estimated 80% of TBIs are mild (mTBI); a condition that is not readily apparent (Heegaard, 2007). Most mTBI patients make a rapid recovery, suffer few post injury complications, and, for these reasons, often bypass acute medical attention or hospitalization. Nevertheless, up to one-third of mTBI patients develop chronic symptoms, and delayed symptom onset is not uncommon Rao, 2000).

The Purpose of this study is to determine the concurrent validity, sensitivity, and specificity of the Automated Neuropsychiatric Assessment Metric [ANAM] to cognitive impairment following acute concussion in an operational combat theater. Concurrent validity will be assessed by comparing ANAM with conventional neuropsychological tests used for assessing neurocognitive function in individuals with acute concussion (mild traumatic brain injury; mTBI)

Case Control study consisting of three arms: 60 cases of acute concussion, who will be given a battery of neuropsychological tests similar to standard of care in CONUS in addition to those tests given in Iraq today (ANAM and MACE). Our primary change from normal standard of care is that all tests will be given to all patients, allowing for a meaningful correlation, rather than a phased approach which adds tests based upon performance on other tests, as is common today. A sample of 100 normal soldiers will also be collected, matched on type of duty and time in theater to the Concussion patients to give a normative sample and to allow comparison for whether the tests given have specificity for concussion. Lastly, a sample of 60 medical patients with outpatient medical conditions, controlled for pain level and medication will also be given the neuropsychologicial test battery. This will allow us to control for non-specific effect of a medical condition in neuropsychological performance.

Management of acute concussion is a significant problem for the military today. As an alternative to traditional neuropsychological testing, which can only be conducted by a licensed clinical neuropsychologist, the automated (computerized) neurocognitive testing has been proposed for the assessment of cognitive impairment in individuals that are suspect of mild traumatic brain injury [mTBI] related to concussion. The present study seeks to establish whether the ANAM is a reasonable substitute for traditional measures of cognitive performance which represent the standard of care for Soldiers in non-deployed environments.

Furthermore, since most military Concussion in Iraq occur during life threatening events (as the result of hostile enemy action), the role of emotional factors in complicating recovery has not yet been fully explored. None of our deployed hospitals have had the manpower, specialty expertise in neuropsychology, nor equipment to do systematic, comprehensive testing on the large numbers of patients seen. The present study proposes to answer several crucial questions relating

to management of acute concussion, while providing high quality care in a deployed environment.

Mild TBI can be found in both the civilian and military environment. Common causes of TBI, both civilian and military, include falls, motor-vehicle accidents, striking or being thrown against an object, or assault. However, as mentioned previously, blast related TBI, most common in OIF and OEF, may be distinctly different from civilian TBI. While extensive literature exists describing recovery from blunt-force trauma due to motor-vehicle accidents or falls (Eden 2006) data and studies describing blast injury are limited (Taber, 2006). Whereas blunt force trauma may be somewhat more focal, blast injury may be more diffuse due to primary over-pressurized waves pervasively affecting the entire brain; secondary and tertiary effects might furthermore create more multifocal effects (DePalma 2005). There may also be an accumulation of effects secondary to repeated blasts. Soldiers may have been exposed to multiple explosions, and while receiving only mild post concussive effects from one blast, a second or third blast of equal force could result in more severe injury (Taber, 2006). Because mTBI may not have obvious outward symptoms, and symptoms may overlap with other conditions, extensive assessment efforts are required to determine tests suitable for administration in the theater of operations that are both sensitive and specific to acute mTBI. Such data can only be collected in theater as close in time and space to the injury event as possible.