



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Diagnosics and Biomarkers

Evidence-based Multimodal Neurodiagnostic Imaging of Traumatic Brain Injury (TBI) and Posttraumatic Stress Disorder (PTSD)

Funding from the Psychological Health/Traumatic Brain Injury Research Program (PH/TBIRP) managed by Congressionally Directed Medical Research Programs (CDMRP) was awarded to researchers at Saint Louis University to conduct this study in collaboration with colleagues at the University of Missouri-Saint Louis. The primary objective of this study is to compare three cohorts: (1) healthy brains; (2) brains of civilians with TBI; and (3) brains of Service Members with combat-related TBI; to identify correlations between abnormal imaging parameters with neurorehabilitation potential using advanced neurological imaging. The secondary objectives include comparing combat TBI (blast-induced) to civilian TBI (primarily acceleration/deceleration injuries) to normal brains to precisely estimate the incidence and prevalence of structural and functional abnormalities occurring during deployment in a combat area and elucidating the group differences in combat versus non-combat TBI using multimodal neuroimaging diagnostic tools. In 2015 the research team published results from evaluation of the MRIs that demonstrated cortical thinning in the context of chronic blast-related TBI in Military Veterans with comorbid psychiatric conditions.¹ The research team was invited to submit a manuscript for a special issue of the journal Behavioral Sciences and the Law focused on TBI. Both Veteran and civilian TBI groups exhibited limited neuropsychological impairment, relative to the healthy controls.² The Veteran TBI group exhibited pronounced neuropsychiatric symptomology compared with the other groups. The implications of these findings were discussed for neuropsychological evaluation in the context of disability and litigation. The results may have implications for future clinical evaluation and treatment of Service Members.

1 Michael, A. P., Stout, J., Roskos, P. T., Bolzenius, J., Gfeller, J., Mogul, D., & Bucholz, R. (2015). Evaluation of Cortical Thickness after Traumatic Brain Injury in Military Veterans. *Journal of Neurotrauma*, 32(22), 1751–1758. <https://doi.org/10.1089/neu.2015.3918>

2 Gfeller, J. D., & Roskos, P. T. (2013). A comparison of insufficient effort rates, neuropsychological functioning, and neuropsychiatric symptom reporting in military veterans and civilians with chronic traumatic brain injury. *Behavioral Sciences & the Law*, 31(6), 833–849. <https://doi.org/10.1002/bsl.2084>

