



## **Advanced neuroimaging applied to veterans and service personnel with traumatic brain injury: state of the art and potential benefits**

### **Purpose**

This review surveyed the use of the structural and functional imaging techniques used in military studies.

### **Participants**

Imaging techniques across the spectrum were reviewed to include the utilization of quantitative fluid attenuated inversion recovery (FLAIR), susceptibility weighted imaging (SWI), volumetric analysis, diffusion tensor imaging (DTI), magnetization transfer imaging (MTI), positron emission tomography (PET), magnetoencephalography (MEG), task-based and resting state functional MRI (fMRI), arterial spin labeling (ASL), and magnetic resonance spectroscopy (MRS).

### **How was the study conducted?**

Systematic review of military studies utilizing imaging of TBI of service members and Veterans involved in recent conflicts.

### **Findings**

Advantages and limitations of each imaging technique are discussed, and the importance of rigorous quality assurance measures emphasized. Advanced imaging techniques hold promise, particularly where more conventional detection techniques have been unrevealing.

### **Military Impact**

A more complete understanding of both the structural changes caused by mTBI as well as the development of a clear diagnostic method would greatly improve the care and quality of life for both service members as well as veterans. This is especially important given the frequent lack of documentation regarding specific injuries and the high comorbidity of post-traumatic stress disorder, depression and substance abuse. The more advanced imaging techniques reviewed will require additional testing prior to clinical application with service members and veterans.

*Wilde EA, Bouix S, Tate DF, Lin AP, Newsome MR, Taylor BA, Stone JR, Montier J, Gandy SE, Biekman B, Shenton ME, York G. Advanced neuroimaging applied to veterans and service personnel with traumatic brain injury: state of the art and potential benefits. Brain imaging and behavior. 2015 Sep; 9(3): 367-402. PubMed: 26350144 <https://link.springer.com/article/10.1007/s11682-015-9444-y>*