5.73, p = .007). Overall, a linear combination of greater negative (anticorrelated) connectivity between the Right Frontal Pole and the mPFC (seed) (β = -.576, t = -3.53, p = .002) and greater positive connectivity between the Paracingulate Cortex (seed) and the Left Lateral Prefrontal Cortex (β = .368, t = 2.14, p = .039) was also associated with greater impulsivity in individuals with mTBI at 12M.
Conclusions: These findings suggest functional connectivity between the anterior node of the DMN and prefrontal cortex regions involved in behavioral control was predictive of higher impulsivity in individuals with mTBI at 2W and 12M post injury, but not at other time frames. Interestingly, these connections differed at the two time points. Acutely, greater impulsivity was associated with greater connectivity among regions involved in error detection, exploration, and emotion. At one year, the connections involve regions associated with error monitoring and inhibitory processes. This may reflect compensatory strategy development during recovery.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: brain injury
Keyword 2: neuroimaging: functional connectivity
Keyword 3: brain function
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48 Elevated Postconcussive Symptoms are Associated with Increased Anterior Cerebral Blood Flow and Not Cortical Thickness in Veterans with a History of Remote mTBI

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Objective: Veterans with a history of mild traumatic brain injury (mTBI) often endorse enduring postconcussive symptoms (PCS) including cognitive and neuropsychiatric complaints. However, although several studies have shown associations between these complaints and brain structure and cerebrovascular function, few studies have examined relationships between structural and functional brain alterations and PCS in the context of remote mTBI. We therefore examined whether PCS were associated with cortical thickness and cerebral blood flow (CBF) in a well-characterized sample of Veterans with a history of mTBI.
Participants and Methods: 116 Veterans underwent structural neuroimaging and a clinical interview to obtain detailed TBI history and injury-related information. Participants also completed the following self-report measures: the Neurobehavioral Symptom Inventory (NSI) for ratings of cognitive, emotional, somatic-sensory, and vestibular symptoms, and the Posttraumatic Stress Disorder (PTSD) Checklist for PTSD symptom severity. Regional brain thickness was indexed using FreeSurfer-derived cortical parcellations of frontal and temporal regions of interest (ROIs) including the superior frontal gyrus (SFG), middle frontal gyrus (MFG), inferior frontal gyrus (IFG), orbitofrontal cortex (OFC), anterior cingulate cortex (ACC), medial temporal lobe (MTL), and lateral temporal lobe (LTL). A subset of Veterans (n=50) also underwent multi-phase pseudo-continuous arterial spin labeling (MPPCASL) to obtain resting CBF. T1-weighted structural and MPPCASL scans were co-registered and CBF estimates were extracted from the 7 bilateral parcellations of ROIs. To assess the relationship between NSI total and subscale scores and ROI thickness and CBF, multiple regression analyses were conducted adjusting for age, sex, and PTSD symptom severity. False Discovery Rate was used to correct for multiple comparisons.
Results: NSI total and subscale scores were not associated with cortical thickness of any ROI. However, higher NSI scores were associated with increased ROI CBF of the SFG (q=.014) and MFG CBF (q=.014). With respect to symptom subscales, higher affective subscale scores were associated with increased SFG (q=.001), MFG (q=.001), IFG (q=.039), ACC (q=.026), and LTL CBF (q=.026); higher cognitive subscale scores were associated with increased SFG (q=.014) and MFG CBF (q=.032); and higher vestibular subscale scores

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were associated with increased ACC CBF (q=.021). NSI somatic-sensory subscale scores were not associated with ROI CBF.
Conclusions: Results demonstrate that in TBI-susceptible anterior ROIs, alterations in CBF but not cortical thickness are associated with postconcussive symptomatology in Veterans with a history of mTBI. Specifically, postconcussive total symptoms as well as affective, cognitive, and vestibular subscale symptoms were strongly linked primarily to CBF of frontal regions. Remarkably, these results indicate that enduring symptoms in generally younger samples of Veterans with head injury histories may be closely tied to cerebrovascular function rather than brain structure changes. These findings may provide a neurological basis for negative clinical outcomes (e.g., enduring PCS and poor quality of life) that is frequently reported by many individuals following mTBI. Future work is needed to examine unique effects of blast exposure as well as associations with repeated injury on brain-behavior relationships.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: cerebral blood flow
Keyword 2: brain structure
Keyword 3: concussion/ mild traumatic brain injury
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49 Longitudinal White Matter Changes in First Time Mild Traumatic Brain Injury in Relationship with Cognitive Performance: A Diffusion Tensor Imaging Study

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Objective: The objective of the study was to examine longitudinal changes in the white matter tracts with diffusion tensor imaging (DTI), neuropsychological performance, and the associate between the two in adults with a mild traumatic brain injury (mTBI).
Participants and Methods: Sixteen adult patients (age = 38.5(12.8); 75% female) seeking medical care at an emergency department for their first mTBI and 15 healthy adults (age = 30.5(11.3); 33% female) from the community were recruited. DTI and the neuropsychological evaluation were performed at 7 days and 4-months post-injury. The neuropsychological evaluation consisted of the CNS Vital Signs computerized neurocognitive test battery and 2 trials of the Paced Auditory Serial-Addition Test.
Results: Results showed a significant decrease in fractional anisotropy (FA) and an increase in radial diffusivity (RD) of the right uncinate fasciculus as well as a significant decrease in FA and axial diffusivity (AD) of the right inferior fronto-occipital fasciculus over the 4-month follow-up period in the mTBI group compared to the Control group.
The FA of multiple white matter tracts at baseline were positively associated with working memory, sustained attention, and complex attention at baseline in the mTBI group but not the Control group.
The global mean cerebral diffusivity for FA at baseline was positively associated with working memory and sustained attention at 4-months post-injury.
Conclusions: The current findings of abnormal white matter suggest an oxidative stress reaction as a result of mTBI altering the diffusivity of some white matter tracts. Furthermore, the disruption of the white matter tracts at baseline may serve as a biomarker for identifying mTBI and those who may have prolonged cognitive difficulties in working memory and attention as a result of the mTBI.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: concussion/ mild traumatic brain injury
Keyword 2: neuroimaging: structural
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50 Sex differences in psychological features in adolescents after concussion

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