rehabilitation included the Rehabilitation Survey of Problems and Coping (R-SOPAC), the Mayo-Portland Adaptability Inventory-4 (MPAI-4), the Depression Anxiety Stress Scales 21 (DASS-21), and the Brief Pain Inventory-Short Form (BPI-SF). Mediation analyses were carried out via PROCESS macro for SPSS, model 4 and 6 (Hayes, 2013).
Results: Mediation analyses indicated a partial indirect link between coping, anxiety, and pain on the level of social participation at the pre-rehabilitation time point. Post-rehabilitation, a significant partial mediating relationship regarding the impact of pain on the link between coping and social participation, was found. In addition, a statistically significant mediation relationship was found, where anxiety mediated the relationship of coping and social participation. These relationships suggest that lower levels of coping appear to be linked to a higher self-reported level of psychological distress and pain, resulting in lower social participation.
Conclusions: This observational rehabilitation cohort study demonstrates how anxiety and pain are associated with coping and social participation outcome following mTBI. These results are quite pertinent for clinical purposes in that paying close attention to the level of anxiety and perceived impact of pain during rehabilitation, and applying targeted interventions at these levels, in particular to increase coping, may prove particularly beneficial to improve social participation outcome.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: concussion/ mild traumatic brain injury
Keyword 2: anxiety
Keyword 3: adaptive functioning
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61 Neurocognitive functioning improves in former athletes with sport-related concussion and repetitive head hits following transcranial photobiomodulation treatment

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Objective: Significant advances in the research of sport-related concussion (SRC) and repetitive head impacts (RHI) over the previous decade have translated to improved injury identification, diagnosis, and management. However, an objective gold standard for SRC/RHI treatment has remained elusive. SRC often result in heterogenous clinical outcomes, and the accumulation of RHI over time is associated with long-term declines in neurocognitive functioning. Medical management typically entails an amalgamation of outpatient medical treatment and psychiatric and/or behavioral interventions for specific symptoms rather than treatment of the underlying functional and/or structural brain injury. Transcranial photobiomodulation (tPBM), a form of light therapy, has been proposed as a non-invasive treatment for individuals with traumatic brain injuries (TBI), possibly including SRC/RHI. With the present proof-of-concept pilot study, we sought to address important gaps in the neurorehabilitation of former athletes with a history of SRC and RHI by examining the effects of tPBM on neurocognitive functioning.
Participants and Methods: The current study included 49 participants (45 male) with a history of SRC and/or RHI. Study inclusion criteria included: age 18-65 years and a self-reported history of SRC and/or RHI. Exclusion criteria included: a history of neurologic disease a history of psychiatric disorder, and MRI contraindication. We utilized a non-randomized proof-of-concept design of active treatment over the course of 8-10 weeks, and neurocognitive functioning was assessed at pre- and post-treatment. A Vielight Neuro Gamma at-home brain tPBM device was distributed to each participant following baseline assessment.

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Participants completed standardized measures of neurocognitive functioning, including the California Verbal Learning Test (CVLT-3), Delis Kaplan Executive Function System (D-KEFS), Continuous Performance Test (CPT-3), and The NIH Toolbox Cognition Battery. Neurocognitive assessments were collected prior to and following tPBM treatment. Paired t-tests and Wilcoxon's signed-rank tests were used to evaluate change in performance on measures of neurocognitive functioning for normal and non-normal variables, respectively, and estimates of effect size were obtained.
Results: Study participants' ability for adapting to novel stimuli and task requirements (i.e., fluid cognition; t=5.96; p<.001; d=.90), verbal learning/encoding (t=3.20; p=.003; d=.48) and delayed recall (z=3.32; p=.002; d=.50), processing speed (t=3.13; p=.003; d=.47), sustained attention (t=-4.39; p<.001; d=-.71), working memory (t=3.61; p=.001; d=.54), and aspects of executive functioning improved significantly following tPBM treatment. No significant improvements in phonemic and semantic verbal fluencies, reading ability, and vocabulary were shown following tPBM treatment.
Conclusions: The results of this pilot study demonstrate that following 8-10 weeks of active tPBM treatment, retired athletes with a history of SRC and/or RHI experienced significant improvements in fluid cognition, learning and memory, processing speed, attention, working memory, and aspects of executive functioning. Importantly, the majority of effect sizes ranged from moderate to large, suggesting that tPBM has clinically meaningful improvements on neurocognitive functioning across various cognitive domains. These results offer support for future research employing more rigorous study designs on the potential neurorehabilitative effects of tPBM in athletes with SRC/RHI.

Categories: Concussion/Mild TBI (Adult)
Keyword 1: cognitive functioning
Keyword 2: sports-related neuropsychology
Keyword 3: treatment outcome
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62 Effect of Blast TBI on Axonal Structure in Networks of Emotional Regulation and Cognitive Control

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Objective: Blast-related traumatic brain injury (bTBI) is one of the most common injuries among Veterans who have served in recent wars in Iraq and Afghanistan. Despite representing a distinct mechanism of injury, long-term clinical and functional outcomes of bTBI are generally comparable with non-blast-related traumatic brain injury (TBI). However, controversy remains over whether bTBI etiology differentially impacts emotional regulation and neurocognition – particularly with respect to post-traumatic stress disorder (PTSD) and verbal and visual memory. Through diffusion tensor imaging (DTI), the present study investigates the microstructural pathophysiology of bTBI, compared to non-blast TBI, in neural pathways involved in emotional regulation and cognitive control.
Participants and Methods: Participants included 36 Veterans (25% female; age M = 36.33, SD = 10.11; years of education M = 15.67, SD = 2.34). Axial diffusivity (AD) in networks of emotional and cognitive control was acquired using magnetic resonance imaging (MRI) with a DTI protocol. Analyses of variance (ANOVA) were used to compare Veterans with self-reported bTBI (n = 23) to those with non-blast-related TBI (n = 13).
Results: In the left hemisphere, Veterans with bTBI exhibited significantly smaller AD in axonal projections from the caudate nucleus (CN) to the orbitofrontal cortex (OFC), as well as in projections from the putamen to the OFC ($p < 0.05$). In the right hemisphere, Veterans with bTBI also exhibited significantly smaller AD in networks connecting the hippocampus to the amygdala ($p < 0.05$).
Conclusions: Compared to Veterans with non-blast-related TBI, Veterans with bTBI exhibited decreased AD in neural pathways from the CN to the OFC, the putamen to the OFC, and the hippocampus to the amygdala – indicative of increased axonal injury in these areas. Our results suggest that, on a microstructural level, emotional and cognitive networks are

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