

assess the effects of number of prior concussions, family psychiatric history (MDD family history and general family history, each coded as Yes/No), and the interaction of prior concussion and family psychiatric history on log-transformed SCAT-5 and BSI-18 scores. Sex was included as a covariate in all models.

Results: More prior concussions were significantly associated with greater symptom severity scores on the SCAT-5 ($\chi^2=26.87$, $p<0.001$, unstandardized beta[B](standard error[SE])=0.25(0.05)) and BSI-18 ($\chi^2=20.94$, $p<0.001$, B(SE)=0.19(0.04)). For the models investigating the effects of family psychiatric history, neither the main effect of MDD family history nor the MDD family history by prior concussion interaction were significant for either the SCAT-5 ($ps>0.05$) or BSI-18 ($ps>0.05$). Similarly, for the general history model, neither the main effect of general family psychiatric history nor the interaction of general family psychiatric history and number of prior concussions were significant for either the SCAT-5 ($ps>0.05$) or BSI-18 ($ps>0.05$). For both the MDD family history and general psychiatric family history models, the number of prior concussions remained positively associated with subjective symptoms on both the SCAT-5 ($\chi^2=20.10$, $p<0.001$, and $\chi^2=23.50$, $p<0.001$) and BSI-18 ($\chi^2=16.46$, $p<0.001$, and $\chi^2=20.68$, $p<0.001$).

Conclusions: The results of the current study provide further evidence for a relationship between elevated sub-clinical symptom endorsement and the number of prior concussions in active, collegiate athletes. The results do not, however, support the hypothesis that the association between prior concussion and an athletes' level of symptom endorsement are moderated by the family psychiatric history. Additional research is needed to determine what factors predispose some individuals to the adverse chronic effects of repeated concussion.

Categories: Concussion/Mild TBI (Adult)

Keyword 1: concussion/ mild traumatic brain injury

Keyword 2: sports-related neuropsychology

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57 Olfaction in Veterans with a History of Deployment-Related Mild Traumatic Brain Injury

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Objective: Olfaction is a critical sensory function and changes in the ability to detect smells could affect quality of life by diminishing appreciation of food, drink, and other aroma-based experiences, increase danger of hazardous exposures, and cause a loss of employment. Additionally, decrements in olfaction have been related to onset of some neurodegenerative conditions. Olfactory impairments in military populations are highly prevalent and often attributed to the long-term effects of mild traumatic brain injury (mTBI) and chronic psychiatric disorders. The main goal of this investigation was to examine olfactory function in a cohort of combat veterans using a quantitative smell test.

Participants and Methods: Participants underwent a neurological examination using a revised version of the Neurological Outcome Scale for Traumatic Brain Injury. Olfactory function was examined using a set of essential oil vials with common odors. Based on the number of correctly identified odors, the following grading system was employed: no deficit; mild; moderate; severe deficit; and absence of smell detection. All study assessments were performed prior to March of 2020 (onset of COVID-19 pandemic). In addition, participants completed performance validity testing (PVT) and screening for ongoing substance misuse using the Alcohol Use Disorders Identification Test and Drug Abuse Screening Test-10. Lifetime history of brain injury, combat-related extracranial injuries, and deployment characteristics were assessed using structured interview. All available medical records were reviewed.

Results: Participants were 38 veterans with a deployment-related mTBI who passed the PVT

and did not have ongoing substance misuse issues. Olfactory examination revealed normosmia in 20 participants and various degrees of deficit in 18 (11=mild; 4=moderate; and 3=severe). The groups did not differ in demographics, post-injury interval, or current clinical (non-psychiatric) conditions. Participants with hyposmia frequently reported being exposed to a higher number of blasts and being positioned closer to the nearest primary blast, and more often endorsed a period of loss of consciousness after the most serious mTBI. In addition, they more often reported tympanic membrane perforation, extracranial injuries, and histories of both blast and blunt force mTBI. Comorbid diagnoses of posttraumatic stress disorder (PTSD), depression, chronic headaches, and pain were more common among these participants as well.

Conclusions: Several blast exposure and specific injury-related characteristics increase the likelihood of long-term olfactory impairments, comorbid psychiatric conditions, and chronic pain among veterans with a history of deployment-related mTBI. Notably, none of the participants with hyposmia had a clinical diagnosis of olfactory dysfunction or were receiving service-connected disability for a loss of sense of smell at the time of their assessment. Multidisciplinary rehabilitation care provided to combat veterans with history of mTBI and/or PTSD should include olfactory examination using both quantitative and qualitative smell tests, education regarding the adversities related to loss of smell, management of current psychiatric symptoms, and follow-up assessments. The lack of a comparison group without a history of mTBI and the small sample size were the main limitations of this investigation.

Categories: Concussion/Mild TBI (Adult)

Keyword 1: olfaction

Keyword 2: concussion/ mild traumatic brain injury

Keyword 3: post-traumatic stress disorder

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58 Sex Differences in the Relationship Between Sleep Disruption and Depressive Symptoms During Acute and Chronic Stages of Mild Traumatic Brain Injury (mTBI)

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Objective: mTBI is trauma to the brain due to a blow or other mechanical force affecting the head. Prior research has established that common symptoms of mTBI include decreased sleep quality and onset/worsening of emotional dysregulation. However, there is little published research investigating how sleep disruption and depressive symptoms are experienced at varying stages of mTBI. We hypothesized that sleep disruption would change with differing time since injury, and that depressive symptoms should accordingly. Additionally, since females tend to have higher rates of depression, we predicted that there would be a significant difference between the sexes at different stages post-mTBI.

Participants and Methods: This study included 145 healthy adults, split into six groups, comparing healthy controls consisting of 15 males ($Mage=23.67$, $SD=5.066$) and 17 females ($Mage=25.35$, $SD=7.035$) to individuals who had mTBI, 41 males ($Mage=26.88$, $SD=8.509$) and 72 females ($Mage=23.79$, $SD=6.898$) at five points post-mTBI: 2 weeks and 1, 3, 6, and 12 months. The Pittsburgh Sleep Quality Index (PSQI) global score was used to assess individual sleep quality and disturbances; higher scores indicated poorer sleep quality. The Beck Depression Index (BDI-II) was used to assess characteristics and symptoms of depression. We adjusted the score to exclude item 16, which measures changes in sleep. Higher scores indicate more severe depressive symptoms. We conducted a multivariate analysis of variance and Pearson correlation to examine whether there were significant differences in sleep and depression at different stages of mTBI for each sex.

Results: We discovered that sleep quality was worse at chronic stages of mTBI (i.e., 12M, $p<.001$), than at acute stages (2W, $p=.049$), and compared to healthy controls. There were also significant differences in depression scores