

sleep quality). Logistic regression models were fit to investigate the association of the number of prior concussions with individual sub-components of the PSQI (i.e., quality, latency, duration, efficiency, disturbances, use of sleep medications, and daily dysfunction), which were binarized based on their distribution. Sex and total number of years of exposure to contact sports were included as covariates for all models.

Results: The number of prior concussions was significantly associated with worse overall sleep quality as assessed by the global PSQI score, $F(3,172)=6.92$, $p < 0.001$, unstandardized beta[B](standard error[SE])=0.54(0.14). Investigation of sub-components showed that the number of prior concussions was significantly associated with multiple PSQI sub-components, including: poorer sleep quality, odds ratio [OR]=1.35, 95% CI [1.05, 1.74], $p=0.02$; longer sleep latency, OR=1.35, 95% CI [1.08, 1.68], $p=0.008$; more sleep disturbances, OR=1.56, 95% CI [1.15, 2.12], $p=0.004$; and more sleep-related daily dysfunction, OR=1.46, 95% CI [1.16, 1.83], $p=0.001$. The number of prior concussions was not significantly associated with sleep duration, sleep efficiency, or the use of sleep medication ($ps > 0.05$). There were no years of exposure effects ($ps > 0.05$). Select sex-related effects on sleep quality were observed. Specifically, women reported significantly worse global sleep scores, $F(3,172)=6.92$, $p=0.048$, $B(SE)=-0.99(0.50)$, and women reported significantly more sleep disturbances, $B(SE)=1.47(0.70)$, $p=0.04$, OR=4.34 (95% CI [1.11, 16.98]).

Conclusions: These results suggest a potential dose-effect of concussion history on poorer sleep quality ratings in otherwise healthy athletes. Specific facets of sleep that were adversely associated with prior concussion included sleep quality, latency, disturbances, and daily dysfunction, highlighting potential areas for sleep-related clinical interventions. Given the adverse effects of chronic sleep disturbance on mental health, future studies are needed to determine the role of concussion-related sleep problems in the adverse psychological outcomes observed in some athletes with multiple prior concussions.

Categories: Concussion/Mild TBI (Adult)

Keyword 1: concussion/ mild traumatic brain injury

Keyword 2: sleep

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56 Investigating the Moderating Effect of Family Psychiatric History on the Association Between Concussion History and Elevated Symptom Endorsement

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Objective: Prior research has found that a greater history of concussion is associated with subtle increases in symptom endorsement. Recent work indicates that a family history of psychiatric disorder is a potential risk factor for prolonged recovery following a single injury. While greater symptom endorsement is observed among those with a personal psychiatric history, the potential role of family psychiatric history in elevated symptom endorsement in the context of repeated concussion has not been investigated. Therefore, the objective of this work was to determine whether family psychiatric history moderates the association of concussion history and elevated symptom endorsement in active collegiate athletes.

Participants and Methods: A total of 176 (mean age = 21.19 ± 1.63 ; 116 male) collegiate athletes completed this study at the Medical College of Wisconsin. Participant's family psychiatric history was collected through a modified Family History Screen (FHS) regarding the participant's biological parents, siblings, and children, focusing on questions relating to major depressive disorder (MDD; 3 total questions) and general psychiatric history (5 total questions). Concussion history was assessed through a semi-structured interview using American College of Rehabilitation Medicine criteria for mild traumatic brain injury. Concussion symptoms were measured via the Sport Concussion Assessment Tool (SCAT-5) and psychological distress was assessed using the Brief Symptom Inventory-18 (BSI-18). General linear models tested the association of the number of prior concussions with log-transformed SCAT-5 and BSI-18 scores. Additional general linear models were fit to

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