

and concussion history is not well understood. Therefore, this study investigated the cross-sectional and longitudinal associations between cumulative concussion history, years of contact sport participation, and health-related/psychological factors with alcohol use in former professional football players across multiple decades.

Participants and Methods: Former professional American football players completed general health questionnaires in 2001 and 2019, including demographic information, football history, concussion/medical history, and health-related/psychological functioning. Alcohol use frequency and amount was reported for three timepoints: during professional career (collected retrospectively in 2001), 2001, and 2019. During professional career and 2001 alcohol use frequency included none, 1-2, 3-4, 5-7 days/week, while amount included none, 1-2, 3-5, 6-7, 8+ drinks/occasion. For 2019, frequency included never, monthly or less, 2-4 times/month, 2-3 times/week, ≥ 4 times/week, while amount included none, 1-2, 3-4, 5-6, 7-9, 10+ drinks/occasion. Scores on a screening measure for Alcohol Use Disorder (CAGE) were also available at during professional career and 2001 timepoints. Concussion history was recorded in 2001 and binned into five groups: 0, 1-2, 3-5, 6-9, 10+. Depression and pain interference were assessed via PROMIS measures at all timepoints. Sleep disturbance was assessed in 2001 via separate instrument and with PROMIS Sleep Disturbance in 2019. Spearman's rho correlations tested associations between concussion history and years of sport participation with alcohol use across timepoints, and whether poor health functioning (depression, pain interference, sleep disturbance) in 2001 and 2019 were associated with alcohol use both within and between timepoints.

Results: Among the 351 participants ($M_{age}=47.86[SD=10.18]$ in 2001), there were no significant associations between concussion history or years of contact sport participation with CAGE scores or alcohol use frequency/amount during professional career, 2001, or 2019 (ρ s=-.072-.067, $ps>.05$). In 2001, greater depressive symptomology and sleep disturbance were related to higher CAGE scores (ρ =.209, $p<.001$; ρ =.176, $p<.001$, respectively), while greater depressive symptomology, pain interference, and sleep disturbance were related to higher alcohol use frequency (ρ =.176, $p=.002$; ρ =.109, $p=.045$;

ρ =.132, $p=.013$, respectively) and amount/occasion (ρ =.215, $p<.001$; ρ =.127, $p=.020$; ρ =.153, $p=.004$, respectively). In 2019, depressive symptomology, pain interference, and sleep disturbance were not related to alcohol use (ρ s=-.047-.087, $ps>.05$). Between timepoints, more sleep disturbance in 2001 was associated with higher alcohol amount/occasion in 2019 (ρ =.115, $p=.036$).

Conclusions: Increased alcohol intake has been theorized to be a consequence of greater concussion history, and as such, thought to confound associations between concussion history and neurobehavioral function later in life. Our findings indicate concussion history and years of contact sport participation were not significantly associated with alcohol use cross-sectionally or longitudinally, regardless of alcohol use characterization. While higher levels of depression, pain interference, and sleep disturbance in 2001 were related to greater alcohol use in 2001, they were not associated cross-sectionally in 2019. Results support the need to concurrently address health-related and psychological factors in the implementation of alcohol use interventions for former NFL players, particularly earlier in the sport discontinuation timeline.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Adult)

Keyword 1: traumatic brain injury

Keyword 2: alcohol

Keyword 3: sports-related neuropsychology

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3 Intensive Clinical Treatment and Rehabilitation for Veterans with Traumatic Brain Injury and Psychological Health Problems

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Objective: Some active-duty military service members and veterans experience combinations of persistent traumatic stress, depression, suicidal ideation, anger, aggressive behavior, substance misuse, sleep disturbance, complicated grief, moral injury, headaches and migraines, chronic bodily pain, and cognitive weakness or deficits. The purpose of this study is to describe the clinical outcomes of active-duty service members and veterans who have completed the traumatic brain injury (TBI) and brain health track of a two-week intensive clinical treatment and rehabilitation program.

Participants and Methods: The sample included 141 participants, with a history of TBI, in the Intensive Clinical Program (ICP). The ICP is a multidisciplinary, two-week treatment and rehabilitation program for active duty service members and veterans with complex psychological, cognitive, and physical health concerns. The program is comprised of daily individual therapy, group psychotherapy, psychoeducation, skills-building groups, and complementary and alternative medicine treatments. Participants in the ICP completed the following measures prior to initiating treatment and immediately following completion of treatment: Neurobehavioral Symptom Inventory (NSI), Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5), Patient Health Questionnaire-9 (PHQ-9), Self-Efficacy for Symptom Management Scale (SE-SMS), and Patient-Reported Outcomes Measurement Information System (PROMIS)-Satisfaction with Participation in Social Roles and Activities-Short Form 8a, version 1.0 (PROMIS-S). Wilcoxon signed ranks tests were used to examine differences in scores on self-report measures from pretreatment to posttreatment for the full sample and within three subgroups stratified by age (in years: 20-34; 35-45; and 46-66). For the NSI, changes in the proportion of participants endorsing moderate or worse levels of individual symptoms from pretreatment to posttreatment were assessed using McNemar's tests. Alpha levels were set at $p < 0.05$ for all analyses.

Results: Participants reported statistically significant improvements across all of the administered measures (NSI, PCL-5, PHQ-9, PROMIS-S, and SE-SMS) upon conclusion of treatment. Effect sizes ranged from medium to large ($d = 0.34 - 1.04$) for the full sample. Effect sizes were largely consistent across age subgroups (20-34: $d = 0.32 - 1.05$; 35-45: $d = 0.55 - 0.96$; 46-66: $d = 0.28 - 1.05$). The magnitude of change on the SE-SMS appeared to be less with

increasing age (20-34: $d = 1.05$; 35-45: $d = 0.69$; 46-66: $d = 0.28$). Individual item analyses for the NSI revealed statistically significant reductions in the proportion of participants endorsing moderate or greater severity from pretreatment to posttreatment for 18 of 22 symptoms.

Conclusions: Active duty service members and veterans participating in the two-week TBI and brain health intensive clinical program reported considerable symptom reduction at the conclusion of the program. Further research is indicated to assess the durability of symptom reduction.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Adult)

Keyword 1: traumatic brain injury

Keyword 2: cognitive rehabilitation

Keyword 3: quality of life

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4 The Role of Cognition and Self-Awareness on Driving Patterns After Moderate-to-Severe Traumatic Brain Injury

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Objective: Return to driving after moderate-to-severe traumatic brain injury (TBI) is often a key step in recovery to regain independence. Survivors are often eager to resume driving and may do so despite having residual cognitive limitations from their injury. A better