

evaluation as had been reported the previous year. For every year of participation, the number of SRC reported on the baseline exam (Reported) and the number of SRC recorded by athletes and medical staff during the ensuing season (Recorded) were tabulated. In a subsequent year, the expected number of SRC (Expected) was computed as the sum of Reported and Recorded. For participation years in which Expected could be computed, the reporting deviation (RepDev) gives the difference between the number of SRCs which were expected to be reported at a baseline exam based on previous participation year data and the number of SRCs which was actually reported by the athlete or medical record during the baseline exam. The reporting deviation was computed only for those SRC that occurred while the participant was enrolled in the current study (RepDevSO). One-way intraclass correlations (ICC) were computed between the expected and reported numbers of SRC.

**Results:** 341 athletes had a history of at least one SRC and 206 of those (60.4%) had a RepDev of 0. The overall ICC for RepDev was 0.761 (95% CI 0.73-0.79). The presence of depression (ICC 0.87, 95% CI 0.79-0.92) and loss of consciousness (ICC 0.80, 95% CI 0.72-0.86) were associated with higher ICCs compared to athletes without these variables. Female athletes demonstrated higher self-report consistency (ICC 0.82, 95% CI 0.79-0.85) compared to male athletes (ICC 0.72, 95% CI 0.68-0.76). Differences in the classification of RepDev according to sex and sport were found to be significant ( $\chi^2=77.6$ ,  $df=56$ ,  $p=0.03$ ). The sports with the highest consistency were Women's Tennis, Men's Diving, and Men's Tennis with 100% consistency between academic years. Sports with the lowest consistency were Women's Gymnastics (69%), Men's Lacrosse (70%), and Football (72%). 96 athletes had at least one study-only SRC in the previous year and 69 of those (71.9%) had a RepDevSO of 0 (ICC 0.673, 95% CI 0.64-0.71). **Conclusions:** Approximately 40% of athletes do not consistently report their SRC history, potentially further complicating the clinical management of SRC. These findings encourage clinicians to be aware of factors which could influence the reliability of self-reported SRC history.

**Categories:** Concussion/Mild TBI (Adult)

**Keyword 1:** concussion/ mild traumatic brain injury

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## 20 Examining the Recovery Course of Pediatric Concussion Patients with Protracted Recovery Referred to a Specialty Concussion Clinic

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**Objective:** The purpose of this study was to explore overall recovery time and post-concussive symptoms (PCSS) of pediatric concussion patients who were referred to a specialty concussion clinic after enduring a protracted recovery ( $\geq 28$  days). This included patients who self-deferred care or received management from another provider until recovery became complicated. It was hypothesized that protracted recovery patients, who initiated care within a specialty concussion clinic, would have similar recovery outcomes as typical acute injury concussion patients (i.e., within 3 weeks).

**Participants and Methods:** Retrospective data were gathered from electronic medical records of concussion patients aged 6-19 years. Demographic data were examined based on age, gender, race, concussion history, and comorbid psychiatric diagnosis. Concussion injury data included days from injury to initial clinic visit, total visits, PCSS scores, days from injury to recovery, and days from initiating care with a specialty clinic to recovery. All participants were provided standard return-to-learn and return-to-play protocols, aerobic exercise recommendations, behavioral health recommendations, personalized vestibular/ocular motor rehabilitation exercises, and psychoeducation on the expected recovery trajectory of concussion.

**Results:** 52 patients were included in this exploratory analysis (Mean age 14.6, SD  $\pm$ 2.7; 57.7% female; 55.7% White, 21.2% Black or African American, 21.2% Hispanic). Two percent of our sample did not disclose their race or ethnicity. Prior concussion history was present in 36.5% of patients and 23.1% had a comorbid psychiatric diagnosis. The patient referral distribution included emergency departments (36%), local pediatricians (26%), neurologists (10%), other concussion clinics (4%), and self-referrals (24%).

Given the nature of our specialty concussion clinic sample, the data was not normally distributed and more likely to be skewed by outliers. As such, the median value and interquartile range were used to describe the results. Regarding recovery variables, the median days to clinic from initial injury was 50.0 (IQR=33.5-75.5) days, the median PCSS score at initial visit was 26.0 (IQR=10.0-53.0), and the median overall recovery time was 81.0 (IQR=57.0-143.3) days.

After initiating care within our specialty concussion clinic, the median recovery time was 21.0 (IQR=14.0-58.0) additional days, the median total visits were 2.0 (IQR=2.0-3.0), and the median PCSS score at follow-up visit was 7.0 (IQR=1-17.3).

**Conclusions:** Research has shown that early referral to specialty concussion clinics may reduce recovery time and the risk of protracted recovery. Our results extend these findings to suggest that patients with protracted recovery returned to baseline similarly to those with an acute concussion injury after initiating specialty clinic care. This may be due to the vast number of resources within specialty concussion clinics including tailored return-to-learn and return-to-play protocols, rehabilitation recommendations consistent with research, and home exercises that supplement recovery. Future studies should compare outcomes of protracted recovery patients receiving care from a specialty concussion clinic against those who sought other forms of treatment. Further, evaluating the influence of comorbid factors (e.g., psychiatric and/or concussion history) on pediatric concussion recovery trajectories may be useful for future research.

**Categories:** Concussion/Mild TBI (Child)

**Keyword 1:** concussion/ mild traumatic brain injury

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## 21 Associations Between Initial Injury Severity, Cerebral Metabolites, and the Local Connectome in Remote Mild-to-Moderate TBI

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**Objective:** To determine the association between in-vivo spectroscopy metabolite data, the local connectome, and markers of initial injury severity (i.e., history of loss of consciousness; LoC) in traumatic brain injury (TBI), in a heterogeneous sample of Veterans and non-Veterans with a history of remote mild-to-moderate TBI (i.e., >6 months).

**Participants and Methods:** Participants with complete PRESS magnetic resonance spectroscopy (MRS) and diffusion weighted imaging (DWI) data ( $N = 41$ ) were sampled from a larger multisite study of chronic mild-to-moderate TBI ( $N_{mild} = 38$ ;  $N_{moderate} = 3$ ; 54% with LoC; 46% with multiple TBI). The sample was predominantly male (76%) with ages ranging from 23–59 ( $M = 36.9$ ,  $SD = 10.1$ ), with 98% holding at least a high school degree ( $M = 14.5$  years of education,  $SD = 2.4$ ). Fully tissue-and-relaxation-corrected metabolite concentration estimates in the dorsal anterior cingulate (30x30x30mm voxel) were modeled using Osprey 2.4.0. Total creatine (tCr), total choline (tCho), total N-acetylaspartate (tNAA), glutamate/glutamine (Glx), and myo-inositol (ml) were analyzed. Logistic regression was used to measure the association between metabolites and history of TBI with LoC. Correlational connectometry using the normalized spin distribution function was performed for metabolites associated with LoC, to characterize