

# Sleep Quality, Dizziness, and Postural Stability Following Early Post-Concussion Physical Activity



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## Background

Early physical activity (PA) may improve concussion recovery time.

Early PA may also improve sleep quality, dizziness, and postural stability after concussion.

**Purpose:** To assess sleep quality, dizziness, and postural stability among those who did and did not report early post-concussion PA compared to uninjured controls.

## Methods

### Participants:

- Athletes ages 13-18 years assessed within 14 days of concussion (n=34)
- Uninjured controls (n=21)

### Concussion Participant Grouping Variable:

- **Early PA:** self-reported engaging in PA prior to assessment.
- **No PA:** self-reported not engaging in PA prior to assessment.

### Outcome Measures:

- Pittsburgh Sleep Quality Index (PSQI)
- Dizziness Handicap Inventory (DHI)
- Single-task tandem gait (TG) time (sec)
- Dual-task TG time (sec)

### Statistical Analysis:

- We used one way analysis of variance to assess between-group differences on PSQI, DHI, and single- and dual-task TG time.

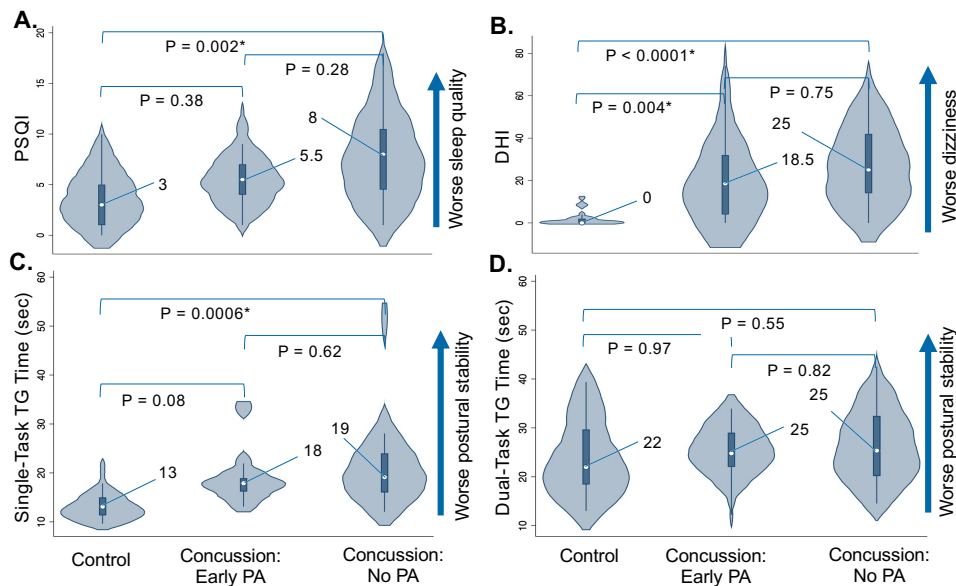
## Results

### Compared to uninjured controls:

- The no PA group reported worse sleep quality (Fig 1A) and performed single-task TG more slowly (Fig 1C).
- Both the early and no PA groups reported more dizziness (Fig 1B).
- There were no between-group differences in dual-task TG time (Fig 1D).

**Table 1:** Comparison of participant characteristics between the control group and concussion groups who did and did not report engaging in PA at the initial assessment.

Variable	Control (n=21)	Concussion: Early PA (n=10)	Concussion: No PA (n=24)	P-value
Sex (female)	10 (48%)	7 (70%)	12 (50%)	0.49
Age (years)	16.0 (1.8)	15.8 (1.6)	16.0 (1.3)	0.91
Days since concussion	-	8.4 (3.6)	8.8 (4.3)	0.78
Post-Concussion Symptom Inventory: initial score	7.0 (8.1)	34.1 (29.8)	45.2 (26.3)	<0.0001
History of prior concussion	3 (14%)	5 (50%)	9 (38%)	0.07



**Figure 1:** Violin plot describing the distribution of outcomes for the control, early PA and no early PA groups: A) Pittsburgh Sleep Quality Index, B) Dizziness Handicap Inventory, C) single-task tandem gait, and D) dual-task tandem gait. The shaded area represents the probability density of data at each outcome measurement, smoothed using a kernel density estimator.

## Conclusions

Early PA was associated with better sleep quality and single-task TG performance.

Early PA may have a beneficial effect on sleep; or those with better sleep quality may be more likely to initiate PA.

Future research investigating optimal PA dosage is recommended to guide concussion treatment strategies.

## Acknowledgement

This study was funded by the MINDSOURCE Brain Injury Network, Tai Foundation, and NIH/NICHD (R01HD108133)