

Gender Differences in Pediatric Concussion Symptom Severity and Duration

Shayne Fehr, MD; Kyle Scharer, LAT; Elizabeth Pawlak, BS; Kevin Walter, MD; Xue Cheng Liu, MD, PhD

Affiliation: Medical College of Wisconsin, Children's Hospital of Wisconsin

Purpose: Concussion or mild traumatic brain injury is particularly common in the pediatric population. It has been reported that female athletes may be at a greater risk for elevated symptom severity and duration than males. We hypothesized that certain patient factors, including the patient's gender, would be associated with the severity and duration of concussions in the pediatric population.

Methods and Study Design: A review was performed of patients 10-18 years old who started and completed their treatment for a concussion between January 2010 and June 2012 in a pediatric concussion clinic. Each subject completed a post-concussion symptom scale rating symptoms from 0-6. The total symptom score at the first visit was defined as the symptom severity, and the number of days from the injury to being symptom free was the symptom duration. We used ANOVA (SAS program, USA), logistic regression, and a Cox Proportional Hazard Model to analyze the data.

Results: 549 patients, 235 female and 314 male, were included. Mean age was 14.28 years. Sport injuries were the most common, causing 46.5% of all injuries. Football accounted for 22.04% of the sport injuries. A comprehensive neuropsychological evaluation was performed on 83/549 subjects (15.12%). Mean symptom score was 21.92. Median symptom duration was 34 days. Females had increased symptom duration ($p < 0.0001$) and symptom severity ($p < 0.001$). The odds ratio of having a neuropsychological evaluation for females compared to males was 3.16 (95% CI 1.862, 5.386), $p < 0.0001$. Age was not significantly associated with symptom severity ($p = 0.5524$).

Conclusions: Overall, females reported higher total symptom scores at the initial visit and had longer symptom duration than males. Females also were more likely to require neuropsychological testing than males, which might indicate that concussions have a greater impact on female pediatric patients than on their male counterparts.

Significance of Findings: This information illustrates the need to outline the characteristics unique to pediatric concussion patients.

Acknowledgements: Dr. Sergey Tarima; Ms. Heather Zhao; Joshua Veenstra; Ashley Ward; MCW Department of Orthopaedic Surgery