

Timing of Sport-Related Concussions Depend on Type Sport and Competition Situation



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Introduction

- Sports-related concussions (SRC) in the pediatric population have become a topic of unique interest in the last decade as participation in sports has increased drastically.
- SRC are defined as mild traumatic brain injury (TBI) during athletics resulting in the onset of neurological impairments and a constellation of symptoms such as headache, nausea, vomiting, dizziness, confusion, and lethargy.(1)
- Concussions account for approximately 75% of all pediatric TBIs, with SRC accounting for 65% of pediatric concussions.(2)
- Concussions are due to alterations in electrophysiology, hemodynamic response, network connectivity, and glucose metabolism between neurons.(3, 4)
- There is some evidence for post-concussion acute cognitive impairment, psychiatric illness, and poor school performance, but the long-term outcome for the pediatric population is poorly understood.(1)
- The aim of our study is to stratify the incidence of SRC within the New Orleans pediatric population by type of sport, time of year, setting (i.e., practice or in-game), insurance type, and sociodemographic characteristics.
- We hypothesize that there will be significant differences in temporal and situational injury patterns in pediatric patients with SRC.

Methods

- Retrospective chart review of patients less than 18 years old who were diagnosed with SRC at our stand-alone children's hospital from January 2007 to December 2021 was performed.
- Demographics (age, sex, race), sports played, setting (practice or in-game), insurance type (Medicaid, private or uninsured), number of follow ups, date of first HPI, and date of last follow up visit were collected.
- We performed t-test, chi-square vs Fischer's exact to analyze outcomes between sports, demographics, and setting insurance types, and demographics.

Results

	Practice (212)	Game (476)	p-value
Age (years)	13.51±3.0	14.44±2.32	<0.0001
Sex (male)	133	338	0.0311
Race (N, white)	108	208	0.0782
Insurance (Medicaid)	133	303	0.8172
Length of follow up	44.09±116.87	46.24±109.72	0.4104
Number of follow ups	2.22±1.73	2.20±1.69	0.4440

Table 1. Demographics of Practice vs Game SRC

Sport	Practice	Game	P value
Football	84	190	<0.0001
Soccer	9	97	
Basketball	19	62	
Volleyball	8	26	
Cheerleading	33	12	
Baseball/Softball	11	43	
other	33	46	

Table 2. Type of Sport of Practice vs Game SRC

Discussion

- Concussion incident followed a temporal distribution based on sports' seasons (Fig. 1)
- Football was the sport with the most concussions in our cohort. (9-11)
- Children who sustained SRC at practice were more likely to be male and younger than those who sustained SRC during competition. (Table 1) Similar trends were found when comparing high school and collegiate level. (13)
- Most concussions occurred during in-game settings instead of during practice. Studies on while looking at national US high school data from 2008-2012 found similar results. (11)
- In contrast, cheerleading concussions were more prevalent during practice. (Table 2) This could be explained by the repetitive nature of cheerleading practice when compared to competition. (12)

Conclusion

- SRC incidence is situation and temporal dependent.
- Studying the nuances of concussion incidence, presentation, and diagnosis can provide insight into expanding community, school-based, and parent education.

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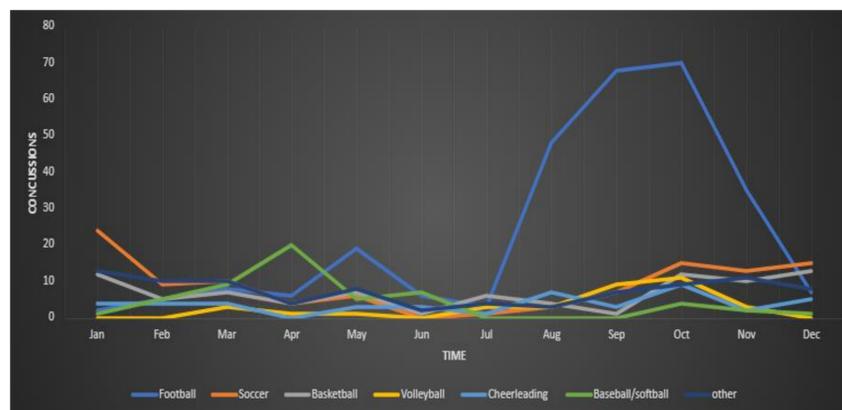


Figure 1. Temporal distribution (by month) of concussions by sport.