Journal of Chiropractic Medicine (2016) xx, xxx–xxx

ELSEVIER

JCM Journal of Chiropractic Medicine

www.journalchiromed.com

One-Year Concussion Prevalence in Marion County, Florida High School Athletes

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Received 29 November 2013; received in revised form 5 February 2016; accepted 18 February 2016

Key Indexing Terms:
Brain concussion;
Sports;
Adolescent

Abstract

Objective: The purpose of this study was to evaluate data on concussion prevalence in 1 geographic location and to identify which sports have a higher prevalence of concussion in the Marion County, Florida, school district.

Methods: High school athletic trainers in Marion County, Florida, are required to compile statistics related to number of participants and concussions sustained in the county school district during each season. They provided the data for the 2011-2012 school year to independent analysts with the permission of the athletic director. The study evaluated 3689 student-athletes (2102 male, 1587 female), and 34 concussions (24 male, 10 female) were reported. Concussions were self-reported by the athletes and diagnosed by trainers on field or by follow-up after physician referral. Consent was included in consent to participate in interscholastic athletics, and all athletes enrolling in a sport during the 2011-2012 academic year were included regardless of participation level. Number of participants and concussions sustained was calculated per 100 participants for each sport and in total for 1 year.

Results: The percentages of concussions per sport were as follows: basketball, 1.83%; cheerleading, 0.40%; football, 2.83%; soccer, 1.84%; track and field, 0.44%; and wrestling, 0.70%. Ten additional sports were included in the study but had no reported concussions. Total prevalence for the district was 0.922% (1.14% male, 0.63% female) during a 1-year period.

Conclusion: The concussion prevalence in this district during the 2011-2012 school year was just under 1%. The sport reporting the highest prevalence was football, followed by soccer. Females reported a higher rate of concussions than males in sports played by both male and female participants. This highlights the need to minimize risk for concussion, especially in noncollision contact sports, and in female athletes.
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Introduction

As many as 3.8 million concussions occur in the United States per year during competitive sports and recreational activities. However, up to 50% of the

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http://dx.doi.org/10.1016/j.jcm.2016.04.002
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concussions may go unreported.[1,2] A Joint Commission of the American Academy of Neurology, American Neurology Society, and Child Neurology Society report describes an ethical obligation to protect the athletes' current and future physical and mental health while informing athletes, parents, and medical professionals about the risks of concussion and postconcussive impairments.[3] Although some agreement exists, diagnosis and management of concussion are continually evolving as new data become available.[4] The International Conference on Concussion in Sport and an elevated level of media attention[5] in recent years have spurred sports medicine clinicians to standardize diagnosis, management, and reporting guidelines for athletes sustaining traumatic brain injury during athletic competition.[4,6–8] To date, most attention on concussion has been devoted to collision sports such as football to reduce the risk for serious complications such as second-impact syndrome and potential links to other neurologic disorders.[9,2] This attention has led to updated guidelines for reporting and management of concussion or mild traumatic brain injury in athletic competition.[10] These new expectations open the door to challenge the findings of prior prevalence studies from an era where reporting was often minimized to reduce time out of competition.[2] In Marion County, Florida, the athletic director has established guidelines requiring all trainers to document each concussion reported during practice or competition.

We sought to understand concussion prevalence and examine its impact upon specific sports and sexes in an effort to identify which of these factors present more significant risk at the high school level. Understanding these factors may provide greater insight into the etiologic factors that increase risk for concussion in high school athletes. Several authors have compiled information about how type of sport and/or sex may impact the prevalence of concussion.[6,11,12,1,13,14] The International Conference on Concussion in Sport document also describes the influence of sex differences as less conclusive but still likely a modifying factor.[4] The knowledge of how these risk factors affect concussion prevalence can be used to implement measures to reduce risk while informing sports physicians to allow for more effective resource allocation. Comparison of data from multiple districts will allow involved parties to compare prevention strategies such as rule changes and equipment to determine which are having the most dramatic effect on preventing concussion or minimizing postconcussive complications.

The purpose of this study is to report concussion prevalence in 1 geographic location, to identify which sports have higher prevalence in the region, and to document the sex breakdown in concussion rates. This information will help to build greater understanding of how concussion impacts young athletes while informing decisions related to rule changes and resource allocation that minimize the risk and effects of concussion in high school athletes.

Methods

Subjects and Ethics

A chiropractic physician contracted with the Marion County, Florida, school district collaborated with the district athletic director to obtain concussion prevalence data. This school district consists of 7 high schools. The athletic trainers overseeing sports at all 7 schools within the district provided data for the 2011-2012 academic year at the request of the athletic director. The participants were high school students (age range, 14-18 years) participating in interscholastic athletics during the aforementioned seasons. All athletes were included as "participants" regardless of frequency of competition, and athletes participating in multiple sports were not separated. Consent to use the data is included in the forms signed by each athlete and/or parent prior to beginning their season. The study was approved by the institutional review board of Palmer College of Chiropractic.

Data Collection

The trainers were asked to submit data regarding total number of participants, number of male and female participants, and the number of concussions sustained in each sport during the respective season by sex. The trainers provided these data after removing all personal identifying information. Concussion diagnosis was performed either by the trainer at the event or by report from physician/emergency department based upon self-reporting of symptoms. Diagnosis criteria were not standardized. Multiple concussions sustained by 1 athlete during the season were included separately (each concussion was counted as distinct). This study sought to use blinded data collectors (athletic trainers) in a retrospective format to improve the effectiveness of reporting and data collection but was unable to account for standardization of data collection because of the retrospective nature of the analysis. Each athletic trainer used a different style of data collection including spreadsheet, Word document, or pen and paper.

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