Published in final edited form as:
Clin Pediatr (Phila). 2009 June ; 48(5): 548–550. doi:10.1177/0009922808330777.

Identifying Previous Sports Injury Among High School Athletes

Margaret Alison Brooks, MD, MPH, **Melissa A. Schiff, MD, MPH**, and **Frederick P. Rivara, MD, MPH**
Department of Pediatrics/Orthopedics, University of Wisconsin-Madison, Madison, Wisconsin (MAB); Departments of Epidemiology (MAS) and Pediatrics (FPR), University of Washington; Harborview Injury Prevention and Research Center (MAS, FPR), Seattle, Washington

The number of adolescents participating in high school athletics has doubled over the past 30 years, surpassing 7 million participants in 2007–2008.[1] With increased participation has come heightened focus on the increasing number of adolescent sports injuries. Previous injury has been identified as a risk factor for sustaining a subsequent sports injury.[2–4] We anticipate that many adolescents participating in high school sports have previously sustained a sports-related injury that needs identification prior to future sports participation. Our objectives were to identify previous sports injury among competitive high school athletes entering a new sports season.

Methods

We performed a cross-sectional survey of 451 competitive high school athletes participating in the 2005 spring sports season at 5 large, urban public high schools in Seattle, Washington. Subjects completed a brief self-administered questionnaire. We included adolescents playing boys soccer or boys and girls track. Response rate was 88%. Study procedures were approved by the University of Washington Institutional Review Board and participating school districts. Informed consent was obtained.

We collected self-reported data on gender, age, grade, race/ethnicity, body mass index, spring sport (soccer or track), level of sport (varsity or junior varsity), and fall and/or winter school sport participation. Athletes were asked the number of previous injuries they had while participating in sports activities or team sports between the start of the school year, September 2004, and the start of the spring sports season, March 2005. We defined injury as any injury that prohibited sports participation for at least 1 day. We calculated the number of athletes who reported a previous prohibiting sports injury prior to starting the 2005 spring sports season. Athletes who reported a prohibiting sports injury were queried about their most recent injury, including body part injured, medical attention received, and number of days to recover.

Results

We surveyed 324 track and 127 soccer high school athletes, and 68% were male. The study sample included 67% non-Hispanic white, 8% African American, 8% Asian, 5% Latino, and 12% multiracial or other. The majority had normal body mass index (77%) and were varsity athletes (73%). There was an approximately equal distribution of 9th to 12th graders. The majority of fall sport athletes participated in cross-country, football, soccer, and volleyball;

Address correspondence to: Margaret Alison Brooks, MD, MPH, University of Wisconsin-Madison, 621 Science Drive, Madison, WI 53711; brooks@ortho.wisc.edu.

and the majority of winter sport athletes participated in basketball, swimming, and wrestling. Of the 451 adolescent athletes, 241 (53%) reported at least 1 sports injury during the 2004–2005 school year and prior to starting the spring 2005 sports season. Twenty-nine percent reported that their most recent injury occurred in the month preceding the spring sports season. A higher proportion of varsity athletes (59%) were injured when compared with junior varsity athletes (49%). The lower extremity, specifically knee and ankle, was the most frequently injured body region (Table 1), and there were no differences by gender or sport (data not shown). Of the athletes reporting a previous prohibiting injury, the majority (54%) had only 1 injury, 23% had 2 injuries, and 23% had 3 or more injuries. Almost two thirds of the athletes received medical attention for their injury, most frequently from a physician and/or athletic trainer. Athletes recovered from most injuries in less than 1 week, but almost one quarter of the injuries resulted in more than 3 weeks lost from sports participation (Table 2).

Discussion

Our findings illustrate that many high school adolescents have sustained a sports injury requiring medical attention and time away from sports. More than half of the high school spring athletes in this study reported a previous sports injury during that academic school year. Our overall sports injury prevalence is similar to that reported in Canadian adolescents by Emery et al[5] (49.9%); however, they found that more athletes (70.1%) reported multiple injuries in the previous year. Consistent with the literature, many injuries were to the knee and ankle,[3–6] required less than 1 week for recovery,[3,5] and were more likely in higher level (varsity) athletes.[2]

We acknowledge some limitations in this study. The participating schools were not a random sample, and the results may not be generalizable. We did not measure athlete exposure or differentiate new from recurrent injury, and the definition of injury may be interpreted differently by each adolescent. Although data were self-reported, prior studies have demonstrated good accuracy of self-reported number of injuries, body part injured, and treatment sought for up to a 12-month period.[7,8]

Our finding that many high school athletes have sustained previous sports injury is important due to evidence that prior injury increases the risk of subsequent injury.[2–4] Adolescents playing sports at the junior varsity or varsity level are likely to have experienced a previous sports injury. This may be due to increased injury exposure time, specifically more years of sports participation and hours spent at practices and games, as well as the higher intensity of competition. The athletes in this study were injured during fall and winter sports seasons, and we suspect that additional athletes sustained an injury during the spring sport season.

All states except one require a yearly preparticipation examination (PPE) prior to interscholastic sports participation. One objective of the PPE is to identify musculoskeletal conditions that may predispose an athlete to injury.[9,10] PPEs are frequently performed by primary care providers and represent an opportunity to identify previous sports injuries. We do not know if the athletes in our study will have their previous sports injury identified and addressed at future PPEs. It is important to educate primary care providers, especially pediatricians, about the importance of addressing previous injury as part of the PPE.

The most current PPE monograph includes 5 questions about history of previous sports injury and use of braces or other assist devices.[10] The pediatrician conducting the preparticipation exam should carefully review this area. It is important to ask additional questions, such as duration of time away from sport as a measure of injury severity and

potential disability. The musculoskeletal portion of the physical exam should focus on specific areas or joints as guided by injury history. For example, participation in sports such as track and soccer may require more detailed examination of the knee and ankle. Sports such as swimming and volleyball may require examination of different body parts or joints such as the shoulder. Because the knee and ankle are most commonly injured, all pediatricians should be competent and confident performing these joint exams.

A common encounter may be an adolescent athlete with a history of multiple ankle sprains who has not performed any rehabilitation and does not wear ankle braces. External ankle support and balance training reduce the risk of ankle reinjury.[6] This history of previous sports injury ideally will be identified and addressed by the pediatrician performing the PPE at least 6 weeks prior to the next sports season or school year. This allows adequate time to address potential playability issues. Ankle joint examination needs to identify persistent pain and swelling, decreased range of motion, strength deficits, and ligamentous instability. Additionally, the athlete should be able to demonstrate pain-free, sport- specific functional movements. In a soccer athlete, this would include jumping, landing, and side-to-side cutting and pivoting activities. Based on careful history and physical exam, the adolescent athlete may need referral to physical therapy for ankle range of motion and strengthening, balance training, in addition to recommended use of ankle bracing with athletic participation. If the pediatrician is uncomfortable assessing previous injury history or performing detailed joint examination, then referral to a sports medicine or orthopedic specialist should be considered. It is important that athletes who require further management of their previous injury receive appropriate follow-up and reevaluation. The musculoskeletal portion of the PPE can be a valuable screening tool to help identify adolescents with previous sports injury and facilitate an intervention that may decrease their risk of reinjury before they enter the demands of a competitive sports season.

Acknowledgments

This work was supported by the Robert Wood Johnson Foundation and its Clinical Scholars Program (Dr Alison Brooks). The opinions are those of the authors and not of the Robert Wood Johnson Foundation.

References

1. National Federation of State High School Associations (NFHS). 2007–08 NFHS High School Athletics Participation Survey. Indianapolis, IN: NFSHA; 2008. http://www.nfhs.org/ore/contentmanager/uploads/2007-08%20Participation%20Survey.pdf
2. Emery CA. Risk factors for injury in child and adolescent sport: a systematic review of the literature. Clin J Sport Med. 2003; 13:256–268. [PubMed: 12855930]
3. Emery CA, Meeuwisse WH, Hartmann SE. Evaluation of risk factors for injury in adolescent soccer: implementation and validation of an injury surveillance system. Am J Sports Med. 2005; 33:1882–1891. [PubMed: 16157843]
4. Kucera KL, Marshall SW, Kirkendall DT, Marchak PM, Garrett WE Jr. Injury history as a risk factor for incident injury in youth soccer. Br J Sports Med. 2005; 39:462. [PubMed: 15976172]
5. Emery CA, Meeuwisse WH, McAllister JR. Survey of sport participation and sport injury in Calgary and area high schools. Clin J Sport Med. 2006; 16:20–26. [PubMed: 16377971]
6. McKeon PO, Mattacola Cg. Interventions for the prevention of first time and recurrent ankle sprains. Clin Sports Med. 2008; 27:371–382. [PubMed: 18503873]
7. Gabbe BJ, Finch CF, Bennell KL, Wajswelner H. How valid is a self reported 12 month sports injury history? Br J Sports Med. 2003; 37:545–547. [PubMed: 14665599]
8. Valuri G, Stevenson M, Finch C, Hamer P, Elliott B. The validity of a four week self-recall of sports injuries. Inj Prev. 2005; 11:135–137. [PubMed: 15933402]
9. Tucker A, Grady M. Role of the adolescent preparticipation physical examination. Phys Med Rehabil Clin N Am. 2008; 19:217–234. [PubMed: 18395645]

10. American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Medicine, American Medical Society for Sports Medicine, American Orthopedic Society for Sports Medicine, American Osteopathic Academy of Sports Medicine. Preparticipation Physical Evaluation. 3. New York: Mcgraw Hill; 2005.

Table 1

Body Part Previously Injured in Past School Year 2004–2005 Among High School Athletes in 5 Public High Schools in Seattle, Washington

Body Part Injured	N	Percentage[a]
Upper extremity		
Shoulder	15	7
Arm	8	4
Elbow	1	1
Wrist	14	6
Hand	5	2
Finger	10	4
Lower extremity		
Hip	11	5
Thigh	16	7
Knee	55	24
Shin/calf	39	17
Ankle	62	27
Foot	28	12
Toe	14	6
Head/neck/face/chest	20	10
Back	32	14

[a]Percentages do not add to 100% because athletes could name more than one body part injured.

Table 2

Days of Prohibited Activity Because of Previous Sports Injury Among High School Athletes From 5 Public Schools in Seattle, Washington, 2005

Days of Prohibited Activity	N[a]	Percentage
1–3 days	65	31
4–7 days	47	23
8–14 days	31	15
15–21 days	15	7
>21 days	49	24

[a]Numbers do not total to 241 due to missing data.