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Provision of Concussion Information From Coaches and the Presence of Athletic Trainers: Findings From the 2021 YouthStyles Survey

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Coaches play an important role in concussion safety, and their views on concussion influence those of their athletes and the athletes' reporting behaviors. In this 2021 survey of youth, we examined how often coaches provide concussion safety information to their athletes and the association between coaches' provision of concussion information to athletes and the presence of athletic trainers (ATs) at a team's games and practices. More than 4 in 10 youth who played sports reported that their coaches did not provide any sort of concussion education or information to them in the past 12 months. Among those youth who *always* or *sometimes* had ATs at practices or games, 76.3% received some type of coach education on concussion in the past 12 months, compared with 31.9% of those who *rarely* or *never* had ATs at practices or games ($P < .0001$). Increasing access to ATs and adapting current concussion training and educational materials for coaches to increase coach-athlete communication may be beneficial.

Key Words: mild traumatic brain injury, concussion education, injury prevention, safety

Sports, in particular contact sports such as tackle football, are a leading activity in which concussions and mild traumatic brain injuries (mTBIs) are sustained by youth.[1] For most youth, concussion symptoms resolve within 2 weeks to 2 months.[2–4] Youth with a prior concussion are more likely to experience a prolonged recovery and more severe symptom presentation after a recurrent injury.[5] Thus, if a concussion is suspected, medical consensus states that the athlete should be immediately removed from practice or competition and should not return to play the same day of the injury.[6] Delaying removal from play after a concussion may result in prolonged recovery, severe symptoms, and a risk for repeat injury to the brain, leading to potentially catastrophic consequences.[7] As such, concussion in sports laws around the country dictate that coaches receive training on concussion identification and response, including the importance of immediately removing an athlete from practice or competition after a possible concussion.

Responsibility for an athlete's removal from practice or competition after a suspected concussion largely falls on the coach due to the absence of on-site health care providers. Adding to the complexity of this responsibility, some concussion signs may be difficult to discern and may not be visible or can have a delayed onset.[6] Therefore, coaches often need to rely on symptom reporting from athletes who, for a variety of reasons (eg, acting "tough," a desire to continue to play, a lack of understanding of the potential seriousness of their injury, and peer or adult pressure to continue to play), may be hesitant to report symptoms.[8] Researchers have showed that, overall, concussion knowledge among coaches who access and complete concussion training is high[9] and coach communication and views on concussion influence those of their athletes.[10] However, less is known about whether and how often coaches discuss concussion safety with their athletes. Furthermore, some schools employ a full- or part-time athletic trainer (AT) to serve as an on-field health care provider. Although the presence of ATs is associated with greater concussion identification among high school football athletes,[11] little is known about whether their presence affects coach-athlete communication on concussion. Thus, in this project, we aimed to answer the following questions: (1) Do coaches provide concussion safety information to their athletes? and (2) What is the association between the provision of concussion safety information and the presence of ATs at practices and games?

METHODS

Self-report data were analyzed from the youth wave (YouthStyles) of Porter Novelli's 2021 ConsumerStyles survey.[12] In June 2021, youth ages 12 to 17 years residing with parents who were members of the Ipsos' KnowledgePanel and completed the 2021 SummerStyles survey were invited to answer the annual YouthStyles web-based survey. Ipsos' KnowledgePanel adult SummerStyles members are randomly recruited using probability-based sampling and include respondents regardless of whether they have landline phones or internet access. Adult SummerStyles panel members participated in a corresponding survey immediately before their child's YouthStyles participation and provided electronic consent for the youth to participate. A total of 833 adolescents (out of 1751 sampled parents) qualified, resulting in a completion rate of 47.6%. Adults who completed the survey received 10 000 cash-equivalent reward points (worth approximately $10), and youth received an additional 5000 points (worth approximately $5). Data were weighted to be nationally representative

based on sex, age, race or ethnicity, education, household income and size, US census region, metropolitan status, and parental status of children ages 12 to 17 years. No personally identifying information was included in the data file provided to the Centers for Disease Control and Prevention (CDC).* Access to SummerStyles data was granted through a data use agreement with Porter Novelli Public Services.

As part of a separate project examining the effect of question wording on mTBI reporting, respondents were randomly assigned to receive 1 of the following 2 questions to assess self-reported lifetime history of a brain injury (full survey is provided in the Appendix):

1. In your lifetime, do you believe that you have ever had a concussion?
2. In your lifetime, do you believe that you have ever had a mild traumatic brain injury?

Although a higher proportion of respondents reported having sustained a concussion (11.3%) than an mTBI (5.5%) during their lifetime, no differences were seen in the outcome of interest (ie, concussion safety). Therefore, responses to these 2 questions were combined to create a dichotomous "*yes*, concussion or mTBI" or "*no*, no concussion or mTBI" variable. Henceforth, all self-reported brain injuries will be referred to jointly as *mTBIs*. Four respondents were dropped from the analysis due to their failure to complete the mTBI questions, for a total analytic sample of 829 youth.

All respondents, regardless of their mTBI experience, were asked a series of questions regarding their past 12 months of sports participation. Questions included whether their coaches provided them with concussion safety information, how concerned they believed their coaches were about concussion safety, and the frequency of an AT presence at practices or games (see the Appendix for the full survey). We analyzed all data using SAS (version 9.4; SAS Institute Inc) and SPSS (version 29.0; IBM Corp). Frequency distributions were calculated for each question. We conducted χ^2 tests to determine if providing safety information differed by the presence of ATs. The complex survey design was considered in the analysis.[12]

RESULTS

Sample Description

The demographic composition of the respondents is shown in Table 1. One in 12 (8.3%) respondents reported sustaining an mTBI in their lifetime (Table 2). Approximately 19.1% of respondents participated in only a school-based sport in the past 12 months, 13.2% participated in only a nonschool-based sports league, and 6.9% participated in both. Youth who played sports had a higher prevalence of lifetime mTBI (12.9%) than those who did not play any sports (5.0%; $P = .0044$; results not shown). More than 9 in 10 youth (91.5%) who reported participating in sports in the past 12 months played a contact or limited-contact sport, and about 21.2% played a noncontact sport (the categories were not mutually exclusive).

Table 1. Characteristics of Respondents in the 2021 Porter Novelli YouthStyles Sample (N = 829)

Characteristic	Frequency (Weighted %)	95% CI
Sex		
Female	411 (49.3)	45.1, 53.4
Male	418 (50.7)	46.6, 54.9
Total	829 (100.0)	
Age, y		
12	133 (17.6)	14.4, 20.8
13	128 (16.3)	13.1, 19.4
14	131 (17.3)	14.1, 20.6
15	144 (16.7)	13.6, 19.8
16	145 (16.2)	13.2, 19.2
17	148 (15.9)	13.0, 18.9
Total	829 (100.0)	
Race or ethnicity		
Hispanic	137 (25.1)	21.1, 29.1
Non-Hispanic Black	58 (12.8)	9.4, 16.2
Non-Hispanic other	94 (10.7)	8.2, 13.2
Non-Hispanic White	539 (51.4)	47.2, 55.6
Total	828 (100.0)	
US region		
Northeast	138 (16.2)	13.3, 19.2
Midwest	217 (21.3)	18.1, 24.4
South	284 (38.3)	34.1, 42.4
West	190 (24.2)	20.6, 27.8
Total	829 (100.0)	
Household income, $		
<25 000	59 (11.3)	8.1, 14.6
25 000–74 999	231 (32.8)	28.7, 36.9
≥75 000	539 (55.9)	51.6, 60.1
Total	829 (100.0)	

Lifetime Concussion and mTBI Prevalence, Sports Participation, and Concussion Safety Experience and Attitudes

About 47.0% of youth who played sports indicated that their coaches talked to them about concussion, 32.0% indicated that their coaches gave them a printed handout about concussion, and 22.9% indicated that their coaches sent them an email or had them watch a video about concussion in the last 12 months. Overall, 57.5% of youth who played sports reported that their coaches provided any sort of concussion education or information to them in the past 12 months; this percentage was higher among youth who played only school sports (65.0%) than youth who played only nonschool sports (39.1%; data not shown). Two-thirds of respondents (66.0%) *agreed* or *strongly agreed* that their coaches were concerned about concussion safety. About half noted that they *always* or *sometimes* had ATs at practices (54.7%) or games (54.5%) in the past 12 months; overall, 63.4% of youth athletes *always* or *sometimes* had ATs at practices or games in the last 12 months. *Always* or *sometimes* having access to ATs was more common among

*The CDC licensed these data from Porter Novelli Public Services. Although Porter Novelli Public Services and its vendors are not subject to CDC Institutional Review Board review, they do adhere to all professional standards and codes of conduct set forth by the Council of American Survey Research Organizations. Respondents are informed that their answers are being used for market research, and they may refuse to answer any question at any time.

Table 2. Lifetime Concussion or Mild Traumatic Brain Injury Prevalence, Sports Participation, and Concussion Safety Experience and Attitudes

Item	Frequency (Weighted %)	95% CI
Lifetime concussion or mild traumatic brain injury		
Yes	67 (8.5)	6.1, 11.0
No	762 (91.5)	89.0, 93.9
Do you currently or did you participate in the past 12 months in a sport?		
Yes, only in a school-based sport, not including physical education or recess	162 (19.1)	15.9, 22.3
Yes, only in a sports league that is not part of school	104 (13.2)	10.0, 16.1
Yes, both in a school-based and a nonschool-based sport	73 (6.9)	5.1, 8.6
No	487 (60.9)	56.8, 64.9
Which sport(s) did you participate in?[a]		
Contact or limited-contact sports	248 (91.5)	88.0, 95.1
Baseball or softball	64 (17.0)	12.5, 21.6
Basketball	72 (25.9)	19.7, 32.1
Cheerleading	17 (5.8)	2.5, 9.2
Flag or touch football	16 (5.8)	2.7, 8.9
Gymnastics	11 (2.5)	0.9, 4.0
Ice hockey	12 (4.6)	1.4, 7.7
Soccer	82 (25.5)	19.7, 31.4
Tackle football	43 (17.0)	11.5, 22.5
Volleyball	47 (13.1)	9.0, 17.2
Wrestling	14 (4.4)	1.6, 7.2
Noncontact sports	56 (21.2)	15.0, 24.4
Bicycle racing	4 (1.6)	0.0, 3.5
Golf	12 (3.1)	0.9, 5.2
Swimming or diving	27 (6.4)	3.7, 9.1
Tennis	30 (9.2)	5.3, 13.0
Unknown contact level		
Other sport	109 (27.0)	21.6, 32.4
Did your coach(es) talk to you about concussion within the last 12 months?		
Yes	136 (47.0)	39.9, 54.1
No	161 (53.0)	45.9, 60.1
Did your coach(es) give you a printed handout or make you read about concussion within the last 12 months?		
Yes	101 (32.0)	25.6, 38.4
No	200 (68.0)	61.6, 74.4
Did your coach(es) send you an email or have you watch a video about concussion within the last 12 months?		
Yes	65 (22.9)	16.9, 28.9
No	242 (77.1)	71.1, 83.1
Coach provided any concussion education (combined 3 questions above)		
Yes	160 (57.5)	50.4, 64.5
No	129 (42.5)	35.5, 49.6
My coach(es) is(are) concerned about concussion safety		
Strongly agree	88 (26.2)	20.3, 32.1
Agree	140 (39.8)	33.5, 46.2
Neither agree nor disagree	87 (27.4)	21.3, 33.6
Disagree	14 (4.9)	1.9, 7.9
Strongly disagree	9 (1.6)	0.4, 2.9
How often did you have an athletic trainer at practices in the last 12 months?		
Always	67 (23.2)	14.1, 29.4
Sometimes	93 (31.5)	24.9, 38.1
Rarely	45 (14.2)	9.4, 19.0
Never	92 (31.1)	24.5, 37.6
How often did you have an athletic trainer at games in the last 12 months?		
Always	95 (32.7)	26.0, 39.4
Sometimes	60 (21.8)	15.7, 27.9
Rarely	41 (15.0)	9.7, 20.2
Never	93 (30.6)	24.0, 37.1
Frequency of athletic trainer at practice or games[b]		
Always or sometimes	182 (63.4)	56.6, 70.2
Rarely or never	113 (36.6)	29.8, 43.4

[a] Respondents could pick more than 1 sport.
[b] Combined responses of "How often did you have an athletic trainer at practices in the last 12 months?" and "How often did you have an athletic trainer at games in the last 12 months?"

Table 3. Concussion Safety Experience and Attitudes by Access to an Athletic Trainer

Item	Athletic Trainer Access at Practices or Games: *Always or Sometimes* Frequency (Weighted %)	95% CI	*Rarely or Never* Frequency (Weighted %)	95% CI	χ^2 Value	*P* Value
Did your coach(es) talk to you about concussion within the last 12 months?					31.3	<.0001
Yes	96 (63.3)	54, 72.6	29 (23.9)	14.6, 33.2		
No	65 (36.7)	27.4, 46.0	72 (76.1)	66.8, 85.4		
Did your coach(es) give you a printed handout or make you read about concussion within the last 12 months?					10.2	.0014
Yes	68 (41.6)	32.2, 51.0	26 (20.4)	11.8, 28.9		
No	94 (58.4)	49.0, 67.8	79 (79.6)	71.1, 88.2		
Did your coach(es) send you an email or have you watch a video about concussion within the last 12 months?					17.1	<.0001
Yes	49 (33.5)	24.2, 42.7	11 (8.8)	2.7, 14.8		
No	117 (66.5)	57.3, 75.8	93 (91.2)	85.2, 97.3		
Coach provided any concussion education in the last 12 months					45.9	<.0001
Yes	110 (76.2)	68.6, 83.7	37 (31.9)	21.3, 42.5		
No	45 (23.8)	16.3, 31.4	64 (68.1)	57.5, 78.7		

youth who played only school sports than those who played only nonschool sports (71.6% and 49.3%, respectively; data not shown).

Concussion Safety Experience and Attitudes by Access to an AT

Always or *sometimes* having an AT at practices or games was associated with a greater proportion of coaches providing concussion education to their athletes (Table 3). Among those who *always* or *sometimes* had ATs at their practices or games, 63.3% reported that a coach talked to them about concussion compared with 23.9% of those who *rarely* or *never* had ATs at practices or games ($P < .0001$). Similarly, among those who *always* or *sometimes* had ATs at practices or games, 41.6% were given a handout about concussions from coaches, in contrast to the 20.4% given a handout who *rarely* or *never* had ATs at practices or games ($P = .0014$). Also, among the youth who *always* or *sometimes* had ATs at practices or games, 33.5% received an email or watched a video from their coaches about concussion safety, compared with 8.8% of those who *rarely* or *never* had ATs at practices or games ($P < .0001$). Overall, among those youth who *always* or *sometimes* had ATs at practices or games, 76.2% received some type of coach education on concussion in the past 12 months compared with 31.9% of those who *rarely* or *never* had ATs at practices or games ($P < .0001$).

DISCUSSION

Prevalence of mTBI

This study demonstrated that mTBI is common among youth, as 8.5% of adolescents reported a lifetime mTBI. Additionally, those who had played sports in the past year had a higher prevalence of lifetime mTBI than those who had not. Concerns about repeat concussions or mTBIs, as well as the possible long-term effects of concussions and mTBIs on young athletes, have led to several efforts to address concussion prevention and response among youth. Unfortunately, in 1 investigation,[13] more than 50% of high school athletes did not report their concussions, which compromises the ability of coaches, health care professionals, and others to protect them from the potentially harmful consequences of concussions and mTBIs. Common reasons for not reporting concussions or mTBIs include inadequate understanding of the seriousness of the injury, not wanting to be removed from play, and not wanting to let teammates down.[13]

Provision of Concussion Safety Information

Researchers[14] have suggested that coach communication with athletes about concussion increases the likelihood of symptom reporting by helping to set safety-promoting norms regarding reporting and being removed from play when injured. Supporting this effort includes building awareness of concussion among coaches and providing education. High school coaches are required to receive educational materials or training about concussion in nearly all states.[15] Still, despite these widespread efforts, 2 in 5 youth athletes in this study indicated that they did not receive any concussion information from their coaches in the past 12 months. Coaches may not communicate with athletes about concussion due to a lack of objective criteria for diagnosis and recovery of concussion, pressure to win, and the belief that they should defer to the medical staff because it is not their role.[16] Conversely, other efforts to improve coach-athlete communication about concussion include focusing educational materials on improving coaches' attitudes and beliefs about concussion[17] and educational interventions addressing the importance of encouraging coach concussion communication.[18]

Effects of the AT's Presence on the Provision of Concussion Safety Information

Coaches value communication with medical staff about athlete health and often describe a positive relationship.[16] We found that *always* or *sometimes* having access to an AT at practices or games was positively associated with the provision of education to athletes by coaches. Although this result is encouraging and despite the well-documented benefits to athlete safety, expanding access to ATs is an ongoing challenge. Data collected as part of the Athletic

Training Locations and Services Project demonstrated that access to AT services varied widely by state; only 1% of secondary schools in Alaska had full-time AT services versus 80% of secondary schools in New Jersey.[19] We determined that as many as a third of athletes *rarely* or *never* had any AT access at practices or games, which closely matches national estimates.[19] Additionally, AT access was more common among youth who played only school sports than those who played only nonschool sports. Earlier authors[11] noted that access to ATs increased concussion identification among athletes. This information is vital, as ATs play a key role in concussion prevention efforts in primary prevention (preventing concussions), secondary prevention (identifying and diagnosing concussions), and tertiary prevention (managing athletes with concussions). Furthermore, ATs help ensure that athletes do not return to play prematurely, thereby decreasing the potential long-term effects of concussion and the risk of sustaining a repeat concussion. High schools with greater AT access had better engagement with coaches and parents, which increased the likelihood that management recommendations (eg, limiting early return to sport and monitoring school performance and physical exercise) were being followed.[20] As the AT's role in concussion safety involves working with various stakeholders (eg, coaches, parents, school professionals, and athletes themselves), the CDC, in partnership with the National Athletic Trainers' Association, created an online training course for ATs that includes best practices for implementing concussion safety and response plans, as well as how to bring stakeholders together to promote a culture of concussion safety.[21]

Limitations

Our study was subject to at least 2 limitations. First, the data only allowed for reporting associations, not causality. It is possible that the types of environments that have a greater AT presence are the same environments that have a more robust safety culture overall and thus are more likely to require that coaches provide concussion information to athletes. Second, data in the survey were based on self-reports and are therefore subject to recall bias. However, the data do provide preliminary findings that can be used to inform larger, more robust studies.

CONCLUSIONS

Several efforts to promote concussion safety among coaches have been implemented over the last decade. Still, 2 in 5 youth athletes in this study indicated that they did not receive any concussion information from their coaches in the past 12 months. Increasing access to ATs and adapting current concussion training and educational materials for coaches to increase their focus on the importance of coach-athlete communication may be beneficial.

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Appendix. Youth Styles 2021 Survey[a]

(Note: Questions 1a and 1b were randomized so that half of respondents were shown each version.)

Question 1a

In your lifetime, do you believe that you have ever had a concussion?
Select one.

1	Yes
2	No

Question 1b

In your lifetime, do you believe that you have ever had a mild traumatic brain injury?
Select one.

1	Yes
2	No

Question 2

Do you currently or did you participate in an individual or team sport during the last 12 months?
Select all that apply.

1	Yes, a school-based sport, not including PE or recess
2	Yes, in a sports league that is not part of school
3	No

Question 3

Which sport(s) did you participate in?
Select all.

1	Baseball or softball
2	Cheerleading
3	Soccer
4	Tackle football
5	Flag or touch football
6	Ice hockey
7	Golf
8	Basketball
9	Wrestling
10	Gymnastics
11	Swimming or diving
12	Tennis
13	Volleyball
14	Bicycle racing
15	Other

Question 4

Did your coach(es) talk to you about concussion within the last 12 months?
Select one.

1	Yes
2	No
3	Not sure

Question 5

Did your coach(es) give you a printed handout or make you read about concussion within the last 12 months?
Select one.

1	Yes
2	No
3	Not sure

Question 6

Did your coach(es) send you an email or have you watch a video about concussion within the last 12 months?
Select one.

1	Yes
2	No
3	Not sure

Question 7

My coach(es) is/are concerned about concussion safety.
Select one.

1	Strongly agree
2	Agree
3	Neither agree or disagree
4	Disagree
5	Strongly disagree

Question 8

How often did you have an athletic trainer at practices in the last 12 months?
Select one.

1	Always
2	Sometimes
3	Rarely
4	Never
5	Not sure

Question 9

How often did you have an athletic trainer at games in the last 12 months?

Select one.

1	Always
2	Sometimes
3	Rarely
4	Never
5	Not sure

Question 10

When is a good age for kids to start playing tackle football?

Select one.

1	Elementary school age (5 to 10 years old)
2	Middle school age (11 to 13 years old)
3	High school age (14 to 17 years old)
4	College age and above (18 years or older)
5	Never

Question 11

Do you think it is safe for kids to play tackle football?

Select one.

1	Yes
2	No
3	Not sure

Abbreviation: PE, physical education.

[a] Instrument is reproduced in its original format.