



Sports-related Testicular Injuries and the Use of Protective Equipment Among Young Male Athletes

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OBJECTIVE	To survey young male athletes to determine the self-reported prevalence of sports-related testicular injuries and use of protective equipment among adolescents and young adults.
METHODS	A self-administered questionnaire was distributed to male students at local high schools and colleges. Respondents were asked about personal and team member usage of athletic cups and history of testicular injuries. Returned surveys were analyzed for descriptive statistics and compared between high school and college respondents.
RESULTS	Approximately 1700 surveys were distributed and 731 returned. The mean age of all respondents was 17.7 years. Across all sports, 18% of athletes experienced a testicular injury during sports and 36.4% observed injuries in team members, whereas only 12.9% of respondents reported wearing athletic cups. The prevalence of testicular injuries for lacrosse, wrestling, baseball, and football was 48.5%, 32.8%, 21%, and 17.8%, respectively. Of athletes reporting a prior injury, 20.1% reported that they wear a cup now. Rates of athletic cup usage were significantly less for college baseball, football, and all respondents compared with their high school counterparts.
CONCLUSION	Previously reported rates of testicular injury with sports participation may underestimate the prevalence of these injuries among adolescent and young adult athletes among whom testicular protective equipment is infrequently used. UROLOGY 84: 1485–1489, 2014. © 2014 Elsevier Inc.

Although sports participation contributes to the social and physical development of children and adolescents, it can also be hazardous with up to 3 million pediatric sports-related injuries occurring annually.^{1,2} Musculoskeletal injuries make up the majority of these injuries, and genitourinary injuries occur uncommonly in pediatric trauma and emergency room registry reviews.³⁻⁵ The incidence of testicular injury specifically is relatively infrequent among the genitourinary organs.

Many cases of testicular trauma may never reach the hospital, however, leading to an underestimation of the incidence of sports-related testicular injuries. Sports trainers, pediatricians, and express clinics can treat pediatric patients with mild genital injuries, which are not accounted for in registry reviews. Other published testicular injury series consist of retrospective cohorts and cannot estimate the true incidence or prevalence of these injuries.⁶⁻⁸ Further causing a paucity of data, adolescent male athletes may be embarrassed by a genital injury and

withhold symptoms from parents, coaches, and medical personnel.

Young male athletes were found to have a gross lack of awareness of genital health with variable use of genital protective equipment across sports in a recent survey.⁵ Athletic cups are designed to protect the genitals from blunt forces such as moving balls, pucks, bats, limbs, or other objects during sports participation. There are no confirmatory studies to date demonstrating effectiveness in reducing testicular injuries with athletic cup usage, but they continue to be encouraged in many contact sports to reduce genital injuries.

Given an increase in serious sports-related testicular injuries seen at our institution, we hypothesized that patient-reported testicular injury prevalence may be higher than that noted in current trauma and emergency room registry reviews. We also believe that the consistent use of protective cups can lead to a decreased incidence of injury. This study was designed to evaluate the prevalence of testicular injuries and the use of protective equipment among male high school and college athletes using an anonymous questionnaire.

METHODS

After institutional review board approval, male students aged 14-24 years at 3 local high schools (Pennsylvania Interscholastic Athletic Association 2-3) and 2 colleges (Division I and II)

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Table 1. Completed surveys from local high school and college male students

	Overall	High School, n (%)	College, n (%)	P Value
Surveys	731	467 (63.9)	264 (36.1)	<.001
Mean age (y)	17.7	16.4	20.0	<.001
Average no. of sports	1.31	1.45	1.06	<.001
Baseball	138	82 (59)	56 (41)	.03
Basketball	77	56 (73)	21 (27)	<.001
Football	288	143 (50)	145 (50)	.95
Lacrosse	33	33 (100)	0 (0)	<.001
Soccer	83	61 (73)	22 (27)	<.001
Wrestling	67	48 (72)	19 (28)	<.001
Other sports	271	255 (94)	16 (6)	<.001
All sports	957	678 (70.8)	279 (29.2)	<.001

were asked to complete a voluntary survey regarding the prevalence of sports-related testicular injuries and the use of athletic cups. The survey specifically asked about the use of cups during practice and games, whether students had ever experienced a sports-related testicular injury (defined as testicular pain during an injury occurring during sports, whether seen by a physician or not), if they were wearing a cup at the time of injury, whether teammates wear cups, and whether teammates had ever experienced testicular injuries. Students were queried for each sport they played, organized or not, with specific focus on contact sports.

At high schools, the anonymous surveys were distributed to all male students during physical education classes. Because the included colleges did not have physical education classes, sports team coaches were asked to distribute the surveys to their respective team members. Completed surveys were then returned and entered into an aggregate database.

The self-reported data regarding use of protective equipment and prevalence of testicular injuries were analyzed for descriptive statistics. The chi-square tests of independence were performed to determine *P* values for comparisons of cup usage and testicular injury between sports groups and level of education with Stata software (StataCorp, College Station, TX). The reported *P* values compare each group frequency with all others combined. Significance was reported for comparisons with *P* <.05.

RESULTS

Approximately 1700 surveys were distributed to 3 local high schools and 2 colleges to be dispersed to male student athletes. We received 731 completed surveys representing a 43% completion rate (Table 1). Four hundred sixty-seven (63.9%) of the returned surveys were completed by high school students and 264 (36.1%) completed by college athletes. The mean age of all respondents was 17.7 years with mean ages of 16.4 and 20.0 years for high school and college respondents, respectively.

The high school surveys were distributed during physical education classes, and 76 (10.4%) respondents indicated that they did not play any sports and were excluded from analysis; all college respondents reported participation in at least 1 sport. Many students completed the survey questions for multiple sports with 227 (31%) playing at least 2 sports. Analyzing each set of survey responses for each sport reported separately, there were

957 individual sport responses. The greatest number of respondents were observed for baseball, basketball, football, lacrosse, soccer, and wrestling with a total of 28 groups and individual sports reported.

The cumulative questionnaire results are described in Table 2. Eighteen percent of all respondents had experienced a testicular injury at some time during sports games or practices. Sports with the highest injury rates included lacrosse (48.5%), wrestling (32.8%), soccer (25.6%), and baseball (21.0%). The "other sports" category included many alternative limited or noncontact sports for which participants reported an injury rate of only 8.7%.

Only 12.9% of male sports participants reported the use of an athletic cup either all the time or sometimes during practice or games. Baseball and lacrosse players had the highest rates of cup usage at 40.6% and 51.5%, respectively. All other contact or limited contact sports had <10% cup usage rates. For those respondents who had experienced an injury, they were also asked if their behaviors had changed to now include wearing a cup. Baseball (48.3%) and lacrosse players (68.8%) reported the greatest behavior changes with only 20.1% of all athletes indicating that they now use a cup for testicular protection.

During games or practices, 36.4% of respondents indicated that they had seen teammates experiencing similar testicular injuries. Rates of injuries in team members were higher for each sport than individual injury rates and even as high as 84.4% among lacrosse players. Responses for sports play during practices and games were recorded separately. Cup usage was reported more frequently for games than practices among all respondents, 12.4% and 10.4%, respectively (*P* = .17). The prevalence of testicular injuries, conversely, was higher during practices than games, 15.5% and 11.8%, respectively (*P* = .02).

Table 3 compares the prevalence of testicular injuries and reported rates of athletic cup usage between high school and college respondents. The reported prevalence of sports-related testicular injuries was similar between all high school (18.4%) and college (17.2%) athletes (*P* = .67). Rates of injuries in each sport were likewise similar with a significant difference noted for only high school (24.1%) and college (11.7%) football players (*P* = .006). Overall rates of cup usage were higher for high school

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