

# Assessment of First-Aid Knowledge and Decision Making of High School Athletic Coaches

Jack Ransone, PhD, ATC\*; Lisa R. Dunn-Bennett, MA, ATC†

\* School of Applied Health and Educational Psychology, Oklahoma State University, Stillwater, OK; † Department of Athletics, San Jose State University, San Jose, CA

**Objective:** To assess the first-aid knowledge and decision making of interscholastic athletic coaches exposed to athletic injuries.

**Design and Setting:** Survey demographic information, First-Aid Assessment, and Game Situation Data Sheet in 17 metropolitan high schools.

**Subjects:** A total of 17 metropolitan high schools participated in this study, and 104 athletic coaches completed questionnaires. Fifteen different athletic sports were represented in this investigation. Thirty coaches (29%) worked with more than one athletic sport during the year. Male subjects constituted 83% ( $n = 85$ ) of the sample. Years of coaching experience ranged from first-year coaches to those with more than 28 years of experience. Most coaches (61%,  $n = 63$ ) investigated were teachers, and the remaining subjects were walk-on coaches.

**Measurements:** Central tendency scores were determined in the demographic analysis.  $\chi^2$  analyses were performed to determine the interaction between First-Aid Assessment and the Game Situation Data.

**Results:** Thirty-eight (36%) of the 104 athletic coaches tested achieved passing scores of 29 or higher, with the total scores ranging from 19 to 34. For the Game Situation Data

Sheet, 75% ( $n = 78$ ) of the coaches selected the same response to 7 questions. Most coaches in this study chose to return injured players to the game. We analyzed the data to determine whether coaches who passed the First-Aid Assessment responded differently than those who did not. (The scenario presented in one question involved a starting player's sustaining injury when losing a close game.) Coaches who passed the First-Aid Assessment tended to return injured starters to the game, whereas those who failed it kept injured players out of the game.  $\chi^2$  analysis on the second question (the team is winning a close game when a regular player is injured) showed no tendency for passing or failing coaches to respond differently.

**Conclusions:** The athletic coaches did not adequately meet first-aid standards as established for this study in accordance with the American Red Cross. In addition, coaches who passed the First-Aid Assessment tended to return an injured starter to the game, whereas those who failed decided to keep the player out of the game. It is critical that an unbiased, objective professional person provide all medical care on the athletic playing field, preferably one who is certified in athletic training.

**Key Words:** athletic injury, injury outcomes

Injuries are part of athletic participation, and many of these injuries are initially treated by untrained personnel due to a lack of health care providers on the athletic field. Coaches are often faced with the responsibility of caring for these injured players. High school athletic programs are one level of athletics that have undergone scrutiny over the past 2 decades for their medical care. District and high school administrators, coaches, and team physicians are being held liable for injuries sustained by participants. Today's legal system expects a high standard of medical care to be provided by high schools.<sup>1-5</sup>

Numerous studies have investigated the multiple first-aid and athletic-injury treatment job responsibilities assigned to high school athletic coaches.<sup>1,3,4,6-14</sup> Researchers have also

examined coaches' knowledge and ability to handle responsibilities related to providing first aid.<sup>2-5,10-11</sup> When coaches are forced to treat athletic injuries due to a lack of available medical personnel, they may be forced to make medical decisions that exceed their educational training. It is important that coaches have the knowledge and expertise in medical care for which they are being held accountable. However, the educational background of coaches in medical assessment and injury care varies greatly; therefore, we need to ensure that coaches possess a minimum level of knowledge in first aid.<sup>4,6,12</sup> Most states require coaches to maintain current certification in first aid and cardiopulmonary resuscitation (CPR),<sup>3,4</sup> whereas a few states require coaches to have a degree in physical education or completion of specialized courses.<sup>1,3,4,7-14</sup>

However, simply possessing sufficient first-aid knowledge does not ensure that coaches will provide adequate first aid because many coaches have a multitude of roles to fill. Not

Address correspondence to Jack Ransone, PhD, ATC, Director of Athletic Training, Associate Professor, School of Applied Health and Educational Psychology, Oklahoma State University, Stillwater, OK 74078. E-mail address: ransone@okway.okstate.edu

only are they responsible for developing a winning team and providing first aid for injuries, but they must also care for athletic equipment, maintain practice and event facilities, and schedule travel arrangements.<sup>6,10</sup> As a result of these many duties, a conflict may occur between work responsibilities and the desire to win, reducing the quality of medical care provided by coaches. Coaches must know the duties they are expected to fulfill in relationship to the medical care of their athletes. Therefore, the purpose of our study was to measure the first-aid knowledge of high school coaches and assess their decisions made in hypothetical athletic situations involving competition and injured athletes.

## METHODS

Male and female coaches for boys' and girls' interscholastic athletic teams from 17 California metropolitan high schools were selected for this investigation. High school coaches were categorized according to the work of Hage and Moore<sup>3</sup>:

“teacher-coach,” an individual who is a high school teacher, with or without physical education background, and receives a financial supplement for coaching; or a “walk-on” individual, not necessarily an employee of the school district, who is considered “knowledgeable and competent” and receives financial compensation for coaching.

## Surveys and Questionnaires

Two questionnaires were selected for this study. The First-Aid Assessment (Table 1) was developed to measure first-aid knowledge.<sup>15</sup> Each item on the questionnaire pertained to specific first-aid competencies. Validity and reliability of the First-Aid Assessment were established by expert review to determine the most appropriate questions related to athletic competition. The Game Situation Data Sheet (Table 2) was designed to assess decisions made by coaches in 9 different athletic scenarios a coach may encounter in treating athletic injuries during athletic competition. Validity and reliability of

**Table 1. Examples of Questions Found in First-Aid Assessment**

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1. Water should be
    - a. withheld during practices, available during games.
    - b. withheld during games, available during practices.
    - c. available only during participation on hot days.
    - d. available at all times during practice and games.
  2. Ice should always be used — after an injury occurs, unless otherwise directed by a physician or athletic trainer.
    - a. after the first 48 hours
    - b. during the first 48 hours
    - c. during the first 24 hours only
    - d. during the first 12 hours only
  3. An athlete who is knocked unconscious may return to play if he or she
    - a. regains consciousness within 2 minutes.
    - b. presents no signs and symptoms of a head injury.
    - c. is cleared by a physician.
    - d. feels capable of returning to play.
  4. Standard first aid for a sprained ankle does not include
    - a. ice.
    - b. compression.
    - c. percussion.
    - d. elevation.
  5. Mouth guards protect an athlete against
    - a. tooth fractures and tongue lacerations.
    - b. jaw fractures.
    - c. concussions.
    - d. both a and c.
  6. Which is the first step in caring for bleeding wounds?
    - a. Apply direct pressure on the wound with a clean or sterile dressing.
    - b. Apply pressure at a pressure point.
    - c. Apply bulky dressings to reinforce blood-soaked bandages.
    - d. Elevate the wound above the level of the heart.
  7. An athlete's front teeth are knocked out during practice. The teeth should be
    - a. washed in water and replaced in the sockets.
    - b. stored in saline until dentist can replace.
    - c. stored in milk until dentist can replace.
    - d. any of above are acceptable.
  8. The first action that should be taken when approaching a collapsed, injured athlete is to
    - a. move the athlete off the playing surface.
    - b. determine responsiveness.
    - c. check for breathing.
    - d. check for pulse.
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**Table 2. Examples of Questions Found in the Game Situation Data Sheet**

Game Situations	Return to the Game	
1. During the last 10 minutes in the game with your team clearly losing, your 8th player (usually 3rd into the game) gets a hand in the way of a hard pass and hyperextends an elbow. It is checked and taped. The player is eager to get back on the floor.	Yes	No
2. One of your starters, during a game you are winning easily, suffers a dislocated finger. After reduction (being returned to its normal position) the finger is checked for fractures. It doesn't appear as if there are any fractures present. The finger is given some support and the player asks to return to the game.	Yes	No
3. The game is close and your team is down by 4 points. You have a "bench player" on the floor replacing a tired starter when the bench player begins hyperventilating. After being helped at the bench, the player indicates everything is okay.	Yes	No
4. Your starting guard dives after a loose ball and bruises the right kneecap. The game is far out of your team's reach at this point. The knee is slightly stiff and is showing some signs of a bruise, but the player can move fairly well without too much problem. The player indicates a readiness to return to the game.	Yes	No

the Game Situation Data Sheet were established by Flint and Weiss.<sup>2</sup>

We used the First-Aid Assessment, which was adapted with permission from the American Red Cross Basic First-Aid Competency Examination and from Sports Injury: Emergency First-Aid Care and Prevention Final Examination, to assess first-aid knowledge.<sup>15</sup> The original tests are used by the American Red Cross to determine proficiency after completion of the Basic First-Aid and Sports Injury courses. This 38-item test consists of statements that require an objective response to assess competency in 6 areas identified as responsibilities of individuals who provide first aid. The 6 areas are anatomy, care and treatment, prevention, assessment, equipment, and heat/cold-related factors. A score of 80% or greater was required to pass, in accordance with American Red Cross examination guidelines.<sup>15</sup>

The Game Situation Data Sheet was used, with permission,<sup>2</sup> to examine the decisions coaches make in hypothetical athletic situations. Nine scenarios require the coaches to indicate whether or not they would return the injured player to the game. Injured athletes are classified as starting players, first substitutes, or bench players. Game situations include winning, losing, and close competitive scores.<sup>2</sup>

We used a separate survey to obtain demographic information and identify trends as related to years of coaching experience, sport coached, and questionnaire scores. Factors evaluated were sport(s) and sex(es) of the athletes each coach oversees, teacher-coach or walk-on status, sex of coach, years of coaching experience, educational background, date (month/year) of most recent first-aid and CPR certification, and medical coverage at the high school. Verbal permission from the participating high school athletic league commissioners and school districts was obtained, and written permission was then provided. Test sessions were administered by a certified athletic trainer, who followed standardized procedures during the administration of the questionnaires. A consent form was given to each coach before the test session began. As consent forms were returned to us, we distributed questionnaires with a letter of explanation and instructions. All procedures were approved by a university institutional review board.

### Statistical Analysis

We examined 2 hypotheses: 1) that no difference exists between accredited standards of competency in basic first aid and high school coaches' knowledge of first aid; and 2) that decisions made by coaches are not affected by a conflict of duties. We performed descriptive analysis on the demographic data and First-Aid Assessment and  $\chi^2$  analysis at the 0.05 level of significance on the Game Situation Data Sheet. The  $\chi^2$  analysis was used to determine the interaction between the First-Aid Assessment and the Game Situation Data Sheet. We used the Statistical Package for the Social Sciences (SPSS, version 6.1, Chicago, IL) for all analysis procedures.

### RESULTS

Seventeen metropolitan area high schools participated in this study, and 104 athletic coaches completed questionnaires. Fifteen athletic sports were represented in this investigation. Thirty coaches (29%) worked with more than 1 athletic sport during the year. Male subjects constituted 83% ( $n = 85$ ) of the sample. Years of coaching experience ranged from first-year coaches to those with more than 28 years of experience. Most, 61% ( $n = 63$ ), of the coaches were teachers, and the remaining subjects were walk-on coaches.

Thirty-eight coaches (36%) achieved passing scores, with the total scores ranging from 19 to 34. For the Game Situation Data Sheet, 75% ( $n = 78$ ) of the coaches selected the same response to 7 questions. Most coaches chose to return injured athletes to athletic competition. However, on 2 questions (No. 4 and No. 8), coaches were more divided between the 2 choices. On question 4, 63% ( $n = 65$ ) of the coaches made the same choice in returning an injured player to a close, losing game. On question 8, 58% ( $n = 60$ ) of the subjects returned the injured player to a close, winning game. Therefore,  $\chi^2$  analysis was performed on those 2 questions at the 0.05 level of significance (Table 3).

The scenario presented in 1 question stated, "In a game in which you are only down by 5 points, your starting guard goes down with a sprained ankle. It appears to be a mild sprain and

**Table 3.  $\chi^2$  Results of Selected Game Situation Data and Return of Injured Athlete to Play**

	Scenario Results		$\chi^2$ Value
	Yes	No	
Question 4			4.88*
Pass first-aid assessment	29	9	
Fail first-aid assessment	36	30	
Question 8			.73
Pass first-aid assessment	24	14	
Fail first-aid assessment	36	30	

\*  $P < .05$ ,  $df = 1$ .

taping has given it some support. The player assures you everything is fine and [he] can perform cuts and turns with only minor discomfort." The significant  $\chi^2$  value of 4.88 shows that a difference existed such that coaches who passed the First-Aid Assessment tended to return an injured starter to the game, whereas those who failed decided to keep the player out of the game. The second question stated, "With 10 minutes to go in a close game, and your team up by only 3, your starting guard needs a rest. The backup player at that position had earlier gone out with a strained lower back muscle. The backup player has been moving around behind the bench and appears fine. It appears to be only a mild strain and isn't causing the player a great deal of problems. The backup player wants to play again in the game." The nonsignificant  $\chi^2$  value of 0.73 demonstrated no tendency for passing or failing coaches to respond differently.

## DISCUSSION

Athletes in all sports at every level of ability are susceptible to injury during athletic competition<sup>16,17</sup>; therefore, quality medical assistance should be readily available for all athletes.<sup>3,4,6,17-19</sup> In a survey of Chicago high schools in 1980 by Porter et al.<sup>10</sup> approximately 75% of responding coaches indicated that they perform the following duties: coach athletes, administer conditioning programs, educate athletes about diet and nutrition, issue and maintain equipment, provide first aid, and apply protective tape and equipment.

The duties identified by Abraham<sup>6</sup> and Porter et al.<sup>10</sup> are now considered standard<sup>2,5,7,8,20</sup>; however, the growing demand for athletic trainers and sports medicine in the 1970s, as well as increased litigation involving coaches and school districts, served as an impetus for research specifically investigating a coach's duty to provide first aid. Generally, these studies sought to determine whether coaches were still required to perform first aid.<sup>1,3,9,11-14</sup> Wrenn and Ambrose<sup>14</sup> in 1980 conducted a statewide study of health care practices in 128 Maryland public high schools. According to their findings, coaches were the individuals most responsible for first-aid care for 85 percent of the schools. Bell et al.<sup>7</sup> investigated medical coverage in 397 Illinois high school athletic programs in 1984 and found that coaches in 92% were responsible for performing first aid on injured athletes.

Research indicates that most high school coaches are responsible for providing first aid to their athletes.<sup>1,3,7,9,11-14</sup> As the responsibility of coaches to provide higher standards of first-aid care increases, the potential for a duty conflict to occur increases, providing the impetus for research to determine whether a role conflict exists for coaches.<sup>2,3,5</sup> Several studies have alluded to the potential for coaches to experience conflict between their duties. As early as 1970, Abraham<sup>6</sup> perceived that a coach's duty to provide first aid and perform his or her other duties might result in a conflict. Suggested reasons for the role conflict include time constraints, inadequate first-aid education, and actual duty to coach.<sup>2,5,6,9,10</sup> However, role conflicts were not directly investigated until the 1980s.<sup>2,5</sup>

Flint and Weiss<sup>2</sup> developed the Game Situation Data Sheet for their study of Oregon coaches. They used the questionnaire to assess the decisions made by coaches regarding injured athletes in scenarios involving various game situations and players of different abilities. Game situation and player status significantly influenced coaches' injury management decisions, and the authors concluded that a role conflict did exist between the duty to coach and the duty to provide first aid.

In addition to conflicts related to duties and time constraints, other factors have been identified that impact first-aid provision by coaches. Those factors most frequently cited are a lack of first-aid knowledge and low confidence level.<sup>1,3,5,6,9,18</sup> Research concerned with emergency medical education and knowledge of coaches has been conducted, both separately and in conjunction with studies investigating how capable coaches feel they are to administer first aid.

Research results suggest that a low level of confidence is directly related to inadequate first-aid knowledge.<sup>1,4,5,11-13</sup> In 1980, Redfean<sup>11</sup> examined the first-aid capabilities of 35 Michigan high school coaches, using a simple questionnaire to survey their education in medical care. Fifty-five percent had American Red Cross first-aid training, 30% had CPR education, and 2.7% had received emergency medical technician training. However, only 44% felt capable of managing an emergency medical situation.

Before this investigation, first-aid knowledge had been investigated in only 2 studies.<sup>4,12</sup> Rowe and Robertson<sup>12</sup> developed a first-aid test for their study investigating Alabama athletic coaches. Of the 127 respondents, only 27% ( $n = 34$ ) passed the First-Aid Assessment. Rowe and Miller<sup>4</sup> gave the same test to Georgia coaches and found that only 38% ( $n = 50$ ) of the 130 coaches achieved passing scores, even though 89% ( $n = 116$ ) had current first-aid certification. Similarly, in our study of 104 coaches, 36% ( $n = 38$ ) passed the first-aid test and 92% ( $n = 96$ ) were certified in first aid.

In our study, coaches' decisions on the Game Situation Data Sheet were consistent with the Flint and Weiss<sup>2</sup> study for the close game scenarios. Coaches who passed the First-Aid Assessment tended to return injured starters to the game, whereas those who failed decided to keep such players out of the game. In many cases, the coaches returned the injured

athlete to play regardless of the game situation. Prior investigations found that medical decisions are based on many factors, such as the player's ability and the game situation.<sup>5,6,9,10</sup> Given this information, it is clear that changes are necessary to ensure that coaches make sound decisions with regard to injured athletes. Coaches need basic first-aid knowledge to establish a foundation for making decisions. Also, they must understand the ramifications of returning an injured athlete to competition. We found that 8% ( $n = 8$ ) of our study sample did not have current first-aid certification, violating present California state interscholastic regulations. Requiring first-aid and CPR certification is not enough to guarantee retention or acquisition of information about athletic injury care, especially since 63% ( $n = 66$ ) of the coaches failed the First-Aid Assessment. Athletic coaches need courses that update first-aid and CPR certification and the care of athletic injuries. Additional knowledge on the treatment and rehabilitation of athletic injuries should enable coaches to make more objective decisions, as well as to provide proper first aid to the injured athlete. Another option is to have someone other than the coach provide first aid and make necessary decisions about how and when an athlete should return to athletic competition. Preferably, this individual would be a qualified medical professional, such as a physician or certified athletic trainer, who could alleviate the conflict for the coach and provide quality medical care for the athlete.

Only 16% ( $n = 16$ ) of our subjects had team physicians available for consultation, and 61% ( $n = 62$ ) had certified athletic trainers available on site for medical support. Having a qualified medical professional at all athletic events is desirable. Recognizing that caution should be observed in generalizing beyond these results, we conclude that coaches did not adequately meet first-aid standards. In the hope that future research will further explore the problem at hand, we recommend use of a broader-based population sample in further studies. Also, future research should look at how sport-specific decision-making scenarios may evoke different responses from coaches and what factors influence the decision to return an injured athlete to competition. Scenarios could be developed to

identify whether the athlete's or the coach's sex, or both, influence decisions made by the coach.

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