Protective Headgear for Soccer Players: An Overview
ISSN: 1543-9518

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Abstract

Protective headgear has been worn by thousands of American soccer players in youth leagues, high schools, colleges, and even professional leagues. While some current studies indicate that concussions occur among soccer players at a rate similar to that among football players, other studies contradict such results and the issue remains disputed. Moreover, studies disagree on whether heading the ball can cause concussions or long-term brain impairment. This article examines the causes and occurrence of head injuries in soccer and the possible role of protective headgear in preventing those injuries.

Since the International Federation of Association Football, or FIFA, soccer’s Zurich-based world governing body, began to allow the practice, thousands of American soccer players have worn protective headgear in youth league play, high school and college competition, and professional play. Such headgear gained international visibility during the 2003 Women’s World Cup and the 2004 Athens Olympics (Longman, 2004). In the United States itself, the United States Soccer Federation, National Collegiate Athletic Association, and National Federation of State High School Associations all now permit the use of protective headgear in soccer (Delaney, 2008). But these developments did not occur without controversy.

The U.S. Soccer Federation, which permits protective headgear but does not endorse it, fears that wide use of the gear would undermine the assertion that soccer is a safe alternative to football. When soccer officials voice doubts like this, similarities to the failed arguments once made against bicycle helmets, automobile seat belts, and even soccer shin guards may give them a familiar sound (Longman, 2004). According to Jeff Skeen, founder of one soccer headgear company, “Soccer officials are trying to thwart the evolution of headgear in soccer because they think it will scare soccer moms away from the sign-up table” (Longman, 2004, p. 1). “And they also think [headgear use] could be viewed as an admission that heading the ball itself is dangerous,” Skeen added (Longman, 2004, p. 1).

Anson Dorrance, who has coached the women’s team at the University of North Carolina to 19 national championships, has noted that compulsory use of shin guards did not change the nature of soccer, as many feared it would. It is Dorrance’s prediction that headgear will not change soccer’s nature either (Longman, 2004). Steve Ryan, commissioner of the Major Indoor Soccer League (which has approved the use of headgear), agreed. “I remember when baseball players didn’t wear batting helmets,” he said. “You see some resistance in soccer, which is natural. But I expect, over time, you will see [protective headgear use] broadly accepted” (Longman, 2004, p. 1)

Adding to the controversy is the fact that some headgear manufacturers pay professional players the equivalent of $50–$100 per game to endorse their products and furthermore have paid some state soccer associations $4,000–$10,000 for endorsements (Longman, 2004). This arrangement makes company claims of injury reduction suspect, according to the U.S. Soccer Federation (U.S. Soccer Federation, 2005). But several independent studies have shown that head injuries, particularly concussions, have become a significant issue in soccer. The Centers for Disease Control and Prevention has reported that doctors treat more than 200,000 children annually for soccer-related injuries including concussions.
Francois, 2006). A recent independent study by Scott Delaney of Canada’s McGill University, published in the Clinical Journal of Sports Medicine, found that the rate of head injuries among soccer players was similar to the rate among football players (Francois, 2006).

While concussions are significant potential sports injuries that the U.S. Soccer Federation takes seriously (U.S. Soccer Federation Statement on Head Injuries, 2005), there is disagreement about whether heading the ball can cause concussions or long-term brain impairment. Studies have presented contradictory results, and the matter remains disputed as the soccer federation undertakes a long-term examination of head injuries (Longman, 2004). For example, a survey of college-age players (athletes 18 to 22 years old) conducted by Boden et al (cited in Kirkendall & Garrett, 2001). demonstrated that a team can anticipate having one player each season sustain a concussion. However, concussions reported for Boden and colleagues’ survey were largely due to game situations not involving purposeful heading of the ball. Kirkendall and Garrett have stated (2001) that 4%–20% of all injuries in soccer are “head injuries,” under which term they include concussions, nasal fractures, injuries of the eye, lacerations, and contusions.

Powell and Barber-Foss (cited in Kirkendall & Garrett, 2001) reported that mild traumatic brain injuries account for 3.9% of all injuries in boys’ scholastic soccer and 4.3% of all injuries in girls’ scholastic soccer. Powell and Barber-Foss's ongoing survey of high-level youth soccer players (12 to 18 years old) in North Carolina to date shows that about 15% of all injuries were to the head (though these were not solely concussions) and involved player-to-player or player-to-ground contact (Kirkendall & Garrett, 2001). The researchers noted that, "The most frequent mechanism of injury was head-to-head contact, followed by head-to-ground and then head-to-other body part (e.g., foot, knee, and elbow). Importantly, purposeful heading was never a mechanism of injury, but injuries did occur when the player was accidentally struck by the ball (the head and neck were not stabilized)."

According to a study of concussions in soccer players by Dick, Putukian, Agel, Evans, and Marshall (2007), 67.7% of reported concussions were due to player contact, while 18.3% were associated with contacting the ball and 13.4% with contacting the playing surface. Less than 1% were associated with contacting the goal. The study found that concussions represented 6.0% of severe game injuries—those resulting in 10 or more days lost from practice and play (Dick, Putukian, Agel, Evans, & Marshall, 2007).

Delaney’s study of 328 Canadian university football players and 201 university soccer players reporting for training in fall 1999 found that 70.4 % of the football players and 62.7% of the soccer players had experienced symptoms of a concussion in the previous year. Delaney said that concussions are a proven problem, one that, in the lab, protective headgear alleviates. He questioned why players are not being offered the protection (Longman, 2004). “Girls, in general, are more prone to concussions in soccer, and they may be more aware of the possible benefits of wearing headgear,” Delaney, who practices at McGill University’s sports medicine clinic, has noted (Delaney, 2008).

Other studies have yielded contradictory results. For example, 100 male and female athletes were asked to complete neuropsychological tests before and after two training sessions, one session involving heading the ball and one avoiding heading. The tests included the alphabet backwards test, Trail Making Test (Parts A and B), Stroop Color and Word Test, and VIGIL/W. No test yielded significant differences between the control (no-heading) condition and experimental (heading) condition (Kirkendall & Garrett, 2001). Fuller et al. (cited in Dick et al., 2007) investigated 248 cases of head and neck injuries and found only a single incidence of cervical strain that could be attributed to purposeful heading of the ball, while Anderson et al. (cited in Dick et al., 2007) did not identify heading the ball as a mechanism for head injury. These results and others do not show purposeful heading to be a primary cause of concussions. Nor has contact with the ball been consistently identified as a mechanism of head injuries in general, although player-to-player contact has been (Dick et al., 2007).
It appears that definitive evidence for one side or the other in the soccer headgear controversy is not available. But there does seem to be solid evidence that more concussions occur as the level of play and competition advances (Kirkendall & Garrett, 2001). The use of protective headgear has grown most significantly, however, among youth players (age 12 and younger), even though players at this level are least likely to engage in play that would lead to concussions (U.S. Soccer Federation Statement on Head Injuries, 2005). The U.S. Soccer Federation has said marketing of protective headgear is primarily to children, even though the incidence of concussion in players under 12 is low.

A next step in research would be to determine clearly whether protective headgear prevents head injuries in soccer players. An innovative Canadian study examined the issue with 268 adolescents playing club soccer and generated the first results from the field instead of the lab. Just after the 2006 soccer season, the 12- to 17-year-old participants from Oakville Soccer Club, Canada’s biggest, were studied. Although only 52 of them had worn headgear during the season, the study showed a significant decrease in risk of concussion for those players. The unprotected majority of the players in the study was 2.65 times more likely to have been injured: 52.8% of participants who did not use headgear reported being injured, compared to 26.9% of participants who did. According to Delaney, “This study may help convince parents and players that soft protective soccer headgear can be an effective part of a comprehensive plan to reduce the number of head injuries and concussions in soccer” (To Avoid Soccer Head Injuries, 2007).

Manufacturers of soccer headgear have designed the gear to decrease the forces associated with heading and assume that doing so reduces the risk of head trauma. To date, however, only one study has been conducted to evaluate the gear’s efficacy. The most substantial finding of that study was that application of the headgear was linked to a decrease in the peak force of impact from a soccer ball traveling at 56.4 kph (35 mph). This force was approximately 112.5% lower (nearly 400 N), as compared to the unprotected force platform (Broglio, Ju, Broglio, & Sell, 2003). No differences were seen among the different brands of headgear; the decrease measured in the peak force suggests that a soccer player using any of the tested brands of headgear would be subjected to lower forces. Naunheim et al. (cited in Broglio et al., 2003) reported a similar decrease, when soccer headgear was used, in peak acceleration from a high-pressure soccer ball traveling at 34 mph (54.72 kph).

The founder of a company based in San Diego, California, said he had sold 100,000 pieces of headgear. The gear resembles an enlarged headband and covers the forehead, temples, and occipital bone in back of the head. Made of shock-absorbing foam between an outer layer of Lycra and an inner layer of sweat-absorbing polypropylene, the device weighs less than 2 oz. The company does not claim the gear prevents concussions, but rather that it can reduce by up to 50% the peak impact forces occurring in typical collisions when a player’s head strikes the ground or goal post or another’s head or elbow (Longman, 2004).

Delaney has argued that such headgear could also protect those players who are designated as headers, particularly at the elite level (at that level, such a player may head the ball up to 10 times per game). Delaney has been involved in drafting the Canadian Academy of Sports Medicine’s position paper on the prevention of head injuries in soccer (Robillard, 2004). But Ottawa-based orthopedic surgeon Rudy Gittens, who chairs the Canadian Soccer Association’s sports medicine committee and is furthermore a member of FIFA’s sports-medical committee, said to date no scientific evidence “conclusively” shows that purposefully heading the ball leads to concussions. Gittens, head of the medical commission of one of the six FIFA continental governing bodies, the Confederation of North, Central American and Caribbean Association Football or CONCACAF, said he is unaware of any scientific studies supporting use of soccer protective headgear to prevent concussions (Robillard, 2004).
A clinical professor of sports medicine at UCLA, Gary Green, has pointed out that, while there is “no evidence” headgear helps, there are theoretical grounds for questioning whether headgear use might actually hurt some players. For example, the headgear could produce a false sense of security in players, leading them to rely on a device instead of proper medical evaluation after suffering a possible concussion. Or headgear use could contribute to feelings of being invincible that promote recklessly aggressive play, a phenomenon known as the Superman effect. Green, who serves on the U.S. Soccer Federation’s medical advisory committee, said headgear use should be better studied before players “take a chance” by using it (Longman, 2004).

There is much to learn about headgear. A recent study sponsored by FIFA’s sports medicine committee concluded that headgear has a negligible effect in head-to-ball impacts but does provide “measurable benefit” in subconcussive head-to-head impacts. One still-unanswered question—and the most important—is the extent to which soccer protective headgear diminishes risk of concussion, if indeed it does. The U.S. Soccer Federation’s own sports medicine committee continues to monitor the available literature and encourage further research into, for example, whether decreasing impact force translates into decreasing concussions or whether using headgear gives players a false sense of security or causes them to play unusually aggressively (U.S. Soccer Federation Statement on Use of Padded Headgear, 2005). In the mean time, for those who do use protective headgear, it is important to remind players, coaches, and parents that headgear is not a substitute for proper medical evaluation and treatment of possible concussions. Consultation with a doctor is always a best first step when any sort of head injury occurs (U.S. Soccer Federation Statement on Use of Padded Headgear, 2005).

Around the world, players of all ages and skill levels play soccer. Available data on the efficacy of soccer protective headgear may suggest, in light of the relatively ordinary ball speed employed in the research, that use of headgear decreases the force of an impacting soccer ball and thus offers typical players protection. But before any recommendation or mandate is issued for all players to use soccer protective headgear on the field, further investigation of these products should directly address their clinical utility (Broglio et al., 2003).

References


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