The National Basketball Association
Eye Injury Study

Bruce M. Zigelbaum, MD; Chad Starkey, PhD; Peter S Hersh, MD;
Eric D Donnenfeld, MD; Henry D. Perry, MD; Jack B Jeffers, MD

Objective: To investigate the epidemiology of eye injuries sustained by professional basketball players in the National Basketball Association (NBA).

Methods: A prospective study involving all NBA athletes who sustained eye injuries between February 1, 1992, and June 20, 1993, was conducted. Twenty-seven NBA team athletic trainers, physicians, and ophthalmologists were provided data forms to complete for any player examined for an eye injury. Practice and game exposures during the preseason, regular season, playoffs, and championships were included.

Results: Of the 1092 injuries sustained by NBA players during the 17-month period, 59 (5.4%) involved the eye and adnexa. Eighteen (30.5%) of the injuries occurred while the player was in the act of rebounding, and 16 (27.1%) while the player was on offense. The most common diagnoses included 30 abrasions or lacerations to the eyelid (50.9%), 17 contusions (edema and/or ecchymosis) to the eyelid or periorbital region (28.8%), and seven corneal abrasions (11.9%). There were three orbital fractures (5.1%). Most injuries were caused by fingers (35.6%) or elbows (28.8%). Nine players (15.3%) missed subsequent games because of their injury. Fifty-seven players (96.6%) were not wearing protective eyewear at the time of injury.

Conclusions: The incidence of eye injuries in NBA players during the 17-month period was 1.44 per 1000 game exposures. Frequent physical contact in professional basketball players leaves them at great risk for sustaining eye injuries. To prevent these injuries, protective eyewear is recommended.


The incidence of sports-related ocular injuries treated in hospital emergency departments continues to increase. In 1992, basketball accounted for the greatest prevalence of sports-related eye injuries in the United States. Although most reported injuries occurred in beginner and amateur athletics, professional athletes also have sustained serious eye injuries. However, no report has been published concerning professional basketball players as a group. We conducted a prospective study of ocular injuries to professional basketball players in the National Basketball Association (NBA) and report our results.

RESULTS

During the 17-month period examined, 1092 athletic-related injuries occurred in the population we studied. Of this number, 59 (5.4%) involved injury to the eye. Fifty-two injuries (88.1%) were reported as occurring during regular and postseason game competition, a rate of 1.44 injuries per 1000 game exposures. The group most at risk of suffering game-related eye trauma were those athletes listed as center, incurring 194 injuries per 1000 game exposures (Table 1). Six injuries (10.2%) were reported during postseason competition, yielding a higher rate of injury than that found during the regular season (2.48 compared with 1.42 injuries per 1000 exposures). Seven injuries (11.9%) occurred during practice sessions.

The mechanism of eye injury is presented in Table 2 and the activity in which the athlete was involved at the time of the injury in Table 3. Eighteen injuries (30.3%) occurred while the athlete was in the act of rebounding, and the injurious force was most often delivered via the opposing player’s finger, elbow, hand, or fore-
MATERIALS AND METHODS

A prospective study of ocular injuries among professional basketball players was conducted from February 1, 1992, through the playoff series ending June 20, 1993. Practice and game exposures incurred during the preseason, regular season, playoffs, and championships were included in our study. During the regular season, each team carried an active 12-player roster and competed in 82 games.

At the onset of the study, all 27 of the NBA's athletic trainers, physicians, and ophthalmologists were provided with instruments and instructions to complete and return them for any player who sustained an ocular injury regardless of the apparent severity of the condition. For the purposes of this study, we defined an eye injury as any condition that affected the globe, orbit, eyelid, eyebrow, or periorbital area. Information collected on this form included the mechanism of injury, activity, athlete's position, diagnosis, and the athlete's chief complaints. Additionally, we collected data regarding any protective and/or corrective eyewear worn by the athlete at the time of injury. Each injury was immediately seen and evaluated by the team's athletic trainer and within 24 hours by the team physician. An ocular/ophthalmologic examination was performed as necessary on each player; the diagnosis, treatment, and disposition were recorded. Injury sufficient to cause missed games was noted.

Each team was contacted and all reporting instruments were collected on a monthly basis. Twenty-six (96.3%) of the 27 teams were compliant with the study. The examinations conducted by the teams' athletic trainers, physicians, and ophthalmologists were reviewed for each injury. We then contacted these personnel for any needed follow-up information or clarification of the reports.

Incidence rates were calculated with game-related eye injuries used as the numerator and the number of athletes appearing in games as the denominator (incidence rate = number of eye injuries/number of athletes appearing in games) × 1000). This method provides an accurate description of injury frequency based on the opportunity for the incidence to occur. Incidence rates for injuries occurring during practice or preseason games could not be calculated because of the lack of a reliable instrument for monitoring athlete exposures.

The chief complaints reported after injury are presented in Table 5. Treatment modalities included sutures in 24 cases (40.7%), topical medications in 15 (25.4%), patching in six (10.2%), oral antibiotics in two (3.4%), and bandages or dressings in two (3.4%). Thirteen players (22.0%) required no treatment.

Of the 59 eye injuries, 18 (30.5%) were referred to the team ophthalmologist. Nine players (15.3%) missed subsequent games because of these injuries, whereas five (8.5%) missed practices only. Five players wore protective eyewear (goggles) after their injuries for a specified period only. Nine players had a history of a basketball-related eye injury, and one player sustained four eye injuries during a 2-month period.

Data were gathered on 219 players, of whom 24 (11.0%) wore contact lenses, two (0.9%) wore glasses, and three (1.4%) wore protective goggles. Two players (3.4%) were wearing protective eyewear at the time of their injuries. Both of these players were rebounding, and both had sustained lid lacerations that required suturing. One athlete was elbowed, and the other was struck by a hand. In each case, the protective goggles were dis-
lodged. One of the players wore protective goggles because of a retinal detachment that occurred during a previous season.

Three players (5.1%) sustained orbital wall fractures, all involving the medial wall. The first was to a player on defense who was struck by the palm of the opponent's hand. This player missed four practices and one game and wore protective goggles on his return to competition. The second was to a player who was struck by an elbow while rebounding. He missed three practices and six games and wore protective goggles for 4 weeks after resuming play. The last orbital fracture was to a defensive player who was struck by an elbow while attempting to block an opponent's shot. This occurred during the playoffs, and the player was unable to play for the duration of the season. To date, the players who sustained fractures have not developed any long-term sequelae.

One player sustained four eye injuries during a 2-month period. This player was a forward whose first injury occurred during a collision while he was going for a loose ball, resulting in a laceration of the right eyelid that required three sutures, as well as traumatic iritis. He missed one game. Four weeks later, this player was on defense and was accidentally struck by the elbow of a referee while the referee was making a call. This resulted in a laceration of the left eyebrow and necessitated four sutures. Eleven days later, while rebounding, the player was elbowed in the left eye, resulting in a corneal abrasion and traumatic iritis. Six days after this injury, the player was on offense and was struck in the right eye by an opponent's forearm, resulting in a subconjunctival hemorrhage. Unfortunately, at no time did this player wear protective goggles.

**COMMENT**

More than 2.4 million ocular injuries occur annually in the United States, of which 100,000 are sports related. Eye injuries are often disabling and create enormous costs to both the victim and society. Ocular trauma is second only to cataracts as the most common cause of visual impairment. The Consumer Product Safety Commission estimates that, in 1992, hospital emergency departments treated 48,190 ocular injuries that were sports or recreation related. Basketball accounted for 8,304 (17.2%) of those injuries, the most for any individual sport. For individual age groups, basketball was third (1,830 injuries [10.2%]) for 5- to 14-year-olds, behind baseball and pool and swimming sports, first (3,862 injuries [28.9%]) for 15- to 24-year-olds, and first (2,612 injuries [19.0%]) for 25- to 64-year-olds.

This study examined the causes and types of ocular injuries among professional basketball players. Most injuries encountered in this study were minor; however, some were more serious. Only one injury was caused by the basketball itself, resulting in a periorbital contusion. This is probably because the large size of an official basketball makes it unlikely to fit into the orbit and directly strike the globe. To date, we have not encountered any long-term sight-threatening complications from the injuries in our study.

Our results indicate that most injuries occur while rebounding (18 [31.1%]) as well as on offense (16 [27.6%]). During rebounding, there is a great deal of physical contact. Most players have their arms and fingers extended while jumping and players are in close proximity; thus, they are at great risk for an injury. A player on offense is usually defended by at least one other player, who has his arms and fingers extended in an attempt to steal the ball or block the shot. Many of the injuries to the guards occurred while they were driving to the basket, only to encounter the defending taller forwards and center with extended arms.

The incidence of ocular injury during the 17-month period was 1.44 per 1000 game exposures. Only 1.4% of professional basketball players wear protective eyewear, and many did so only after an eye injury. Clearly, basketball players of all ages are susceptible to eye injuries. To protect the player, we recommend approved sports goggles that are made of polycarbonate lenses (3 mm thick) and unbreakable frames. For those players who do not need prescription eyewear and those who wear contact lenses, molded polycarbonate sports frames with 3-mm polycarbonate plano lenses are recommended. Players who need corrective eyewear should use sports frames with prescription 3-mm polycarbonate lenses. The impact resistance of polycarbonate is substantially greater than that of glass or aliphatic resin (plastic).

For optimal protection, sports frames should fully cover the orbital region and be properly fit, with contact lenses inserted if necessary.
at the bridge and both temples. In addition, they should contain safety bevels to prevent the lens from dislocating inward (toward the eye). All players with ocular injuries should be referred to the ophthalmologist. The high velocity and blunt nature of these events can cause ocular injuries that are more serious than they initially appear.

Accepted for publication January 30, 1995.

This study was supported in part by the Lions Club International Foundation, Oakbrook, Ill, and Research to Prevent Blindness, New York, NY.


We thank Stephen Lombardo, MD, John Lally, the NBA, the NBA Physician's Association, and the NBA Athletic Trainers' Association for their cooperation and assistance with this study.

Reprint requests to 333 E Shore Rd, Suite 202, Manhat-
set, NY 11030 (Dr Ziegelbaum)

REFERENCES


