Journal of Athletic Training 2000;35(2):161–167

www.journalofathletictraining.org

Injuries and Illnesses in the National Basketball Association: A 10-Year Perspective

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Objective: To present an overview of the medical conditions experienced by athletes competing in the National Basketball Association (NBA) from the 1988–1989 through the 1997–1998 seasons.

Design and Setting: Athletic trainers completed profiles that provided demographic information for each player. Injury reports indicated when and where the injury occurred, pathology, onset, activity, and the mechanism of injury. The amount of time lost, injured list status, hospitalization, and surgery were also reported. Reportable injuries were those that resulted in (1) physician referral, (2) a practice or game being missed, or (3) emergency care being rendered.

Subjects: A total of 1094 players appeared in the database 3843 times (mean, 3.3 ± 2.6 seasons). Mean player demographics were age 26.7 (±3.7) years, NBA playing experience 4.1 (±3.7) years, height 200.8 (±9.9) cm, and weight 100.2 (±13.5) kg. Players averaged 52 (±34.7) games and 1263.1 (±1073.8) minutes played.

Measurements: The frequency of injury, time lost, and game exposures were tabulated, and game-related injury rates were then calculated.

Results: Ankle sprains were the most frequently occurring orthopaedic injury (942, 9.4%), followed by patellofemoral inflammation (803, 8.1%), lumbar strains (491, 5.0%), and knee sprains (258, 2.3%). The greatest number of days missed were related to patellofemoral inflammation (7569, 11.5%), knee sprains (5712, 8.6%), ankle sprains (5122, 7.7%), and lumbar strains (3365, 5.1%).

Conclusions: Professional athletes in the NBA experience a rate of game-related injuries that is twice as high as their collegiate counterparts. Patellofemoral inflammation is a significant problem among NBA players.

Key Words: epidemiology, professional sports, ankle sprains, knee sprains

The nature of the game of basketball has changed dramatically over the years, evolving from a game of finesse to a collision sport to its current designation as a high-risk contact sport. The original concept for basketball was to avoid the fast pace of football, and it was based on the premise that "if the offense did not have the opportunity to run with the ball, there would be no necessity for tackling and we would thus eliminate roughness."[1] This premise was reinforced by a rule stating that any form of physical contact would result in the player's being removed from the contest, without a substitute, until the next basket was scored, similar to the penalty box in ice hockey.

The contemporary game of basketball emphasizes the speed and power of its competitors. The strength and quickness necessary to control an opponent's position, "muscle" a rebound, or "power" a shot are all prerequisites for a successful basketball career. Although the changes in the game of basketball can be seen at all levels, the changes are generally acknowledged to have had the greatest impact at the professional level. Athletes in the National Basketball Association, Inc (NBA) participate on a longer court, for a greater number of minutes per game, more times per week, for a longer season, and are older than their collegiate counterparts. Both the frequency and the intensity of the competition expose these athletes to potentially injurious forces across their 9-month season. My purpose is to present a normative overview of the injuries and illnesses seen by athletic trainers and team physicians in the NBA and to compare game-related injury rates with those seen in college basketball.

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METHODS

Subjects

From 1988 through 1997, 86% of the 29 NBA teams complied with the study on an annual basis, with each team averaging 36.7 (±18.2) reports per year. (There were 25 NBA teams during the 1988–1989 seasons. The league added 2 expansion teams at the start of the 1989–1990 seasons and 2 additional teams at the start of the 1995–1996 season.) A total of 1094 individual players were included in this study, representing approximately 85% of the players who were on a regular-season NBA roster during this time (Table 1). Twenty-three players (2.1%) appeared in the database for each of the 10 seasons included in this study, and the average player was recorded in the database for 3.3 (±2.6) seasons, accounting for a total of 3843 player entries in the database. Of the 3843 player entries, 728 (18.9%) players were listed as centers, 1565 (40.7%) as forwards, and 1550 (40.3%) as guards, although the

Table 1. Player Demographic Information

n = 1094	Minimum	Maximum	Mean	SD
Age (years)	18.0	43.0	26.7	3.7
Playing experience (years)	0.0	20.0	4.1	3.7
Height (cm)	160.0	231.1	200.8	9.9
Weight (kg)	60.5	155.9	100.2	13.5
Games played	0.0	938.0	52.0	34.7
Minutes played	0.0	5895.0	1263.1	1073.8

contemporary game of professional basketball tends to blur these distinctions.

Procedures

The National Basketball [Athletic] Trainers' Association (NBTA) maintains a database of all injuries and illnesses occurring to NBA players that (1) required physician referral or prescription medication, or both; (2) resulted in a practice or game being missed; or (3) caused emergency care to be rendered to the athlete. These records are based on a standardized league-wide injury-reporting instrument that is completed by the team's athletic trainer and cosigned by the team physician. The primary information collected includes the player's identification number, when and where the injury occurred, the specific pathology, and the onset, activity, and mechanism of the injury. Data regarding the number of practices and games missed, ankle support worn, injured reserve list status, hospitalization, surgery, and medication data were also collected.

A "Guide to Reporting" that describes the administrative aspects of this injury surveillance program, a definition of terms, and the reporting time table was distributed to each team's head athletic trainer. Reports were submitted monthly from the start of preseason camp to the end of the postseason.

Before the start of preseason camp, each team returned a Player Profile detailing the position, height, weight, age, number of years of NBA playing experience, and permanent identification number for each member of the team. Updates to this document were made throughout the season as players were added to a team's roster. At the end of the regular and postseasons, exposures for games and playing minutes for the 1988–1989 through the 1996–1997 seasons were acquired from the NBA's official statistical publication, *The NBA News* (New York, NY). At the start of the 1997–1998 season, the NBA's web site (http://www.nba.com) became the League's official source of statistical information. At the end of each season, the Player Profile database was linked to the injury database to provide exposure and demographic information.

Because of the lack of a consistent and reliable method of calculating practice and preseason game exposures, I did not include incidence rates for participation in these activities. Frequency data for these injuries and illnesses were, however, still collected and tabulated.

Data Analysis

I analyzed data reported during the 1988–1989 through the 1997–1998 basketball seasons for league-sanctioned activities from approximately October 1 through June 15. Frequencies, means, standard deviations, and frequency rates were calculated using SPSS-PC, version 9.0 (SPSS, Inc, Chicago, IL). Incidence rates were calculated using Microsoft Excel 97 (Microsoft Corp, Redmond, WA).

Two methods were used to calculate game-related injury rate. To compare these data with research performed by the National Collegiate Athletic Association (NCAA) and other similar studies, injury rates were calculated per 1000 athlete exposures (AEs). This method describes the total number of athletes appearing in regular-season and postseason games whereby 1 athlete appearing in 1 game equals 1 AE (during a single game, the maximum AE would be 24 if all 12 players from each team participate in the contest). Incidence rates for AEs were calculated using the formula: number of injuries (group)/total game exposures (group) × 1000.

Although AE is a common method for determining injury rates, it lacks sensitivity because it does not take into account the length of time the player was actually participating. A player appearing in a game would record 1 AE, whether he played for 1 minute or 48 minutes. Each regulation game represents 480 total minutes of competition (10 players on the court for 48 minutes), and 10000 competition minutes (CMs) would then represent 10 players competing in 20.8 regulation games. Incidence rates for CMs were calculated using the formula: number of injuries (group)/total game minutes played (group) × 10000.

RESULTS

Return Rate and Player Demographics

Of the database's 9991 total entries, 87 (0.9%) were omitted from the study for inaccuracy or not meeting the reporting criteria, thus yielding 9904 usable records. Of this number, 7449 (75.2%) were athletic-related and 2455 (24.8%) were non-athletic-related injuries or general medical conditions.

During the reporting period, 200012 AEs accumulated 4854051 total minutes of playing time. Forwards had the highest game-related injury rate (21.7/1000 AEs), followed by guards (21.3/1000 AEs) and centers (21.0/1000 AEs). Figure 1 presents the game-related injury rates based on the player's age, years of NBA playing experience, height, and weight.

Injuries or illnesses were incurred by 961 (87.8%) individual athletes; 5188 (52.3%) time-lost injuries accounted for a total of 65956 days missed (32118 practices and 33838 games). Athletic-related injuries resulted in 61542 (93.3%) days missed, while non-athletic conditions caused 4414 (6.7%) days lost from practices and games. Also, 1121 (12.3%) incidences resulted in athletes being placed on the injured reserve list.

Of the 7449 athletic-related injuries, 3989 (56.3%) occurred at home, 2347 (31.5%) on the road, while 1113 (14.9%) were chronic or of insidious onset. Game competition accounted for 4277 (43.20%) injuries, with 2357 (55.1%) occurring at home and 1920 (44.9%) during road competition. Game-related injuries occurred at a rate of 21.4/1000 AEs. The rate of game-related injuries increased 12.4% during the 10-year period (Figure 2).

Injury Prevalence

The lower extremity was the most common site of injury and resulted in the greatest number of days being lost (Table

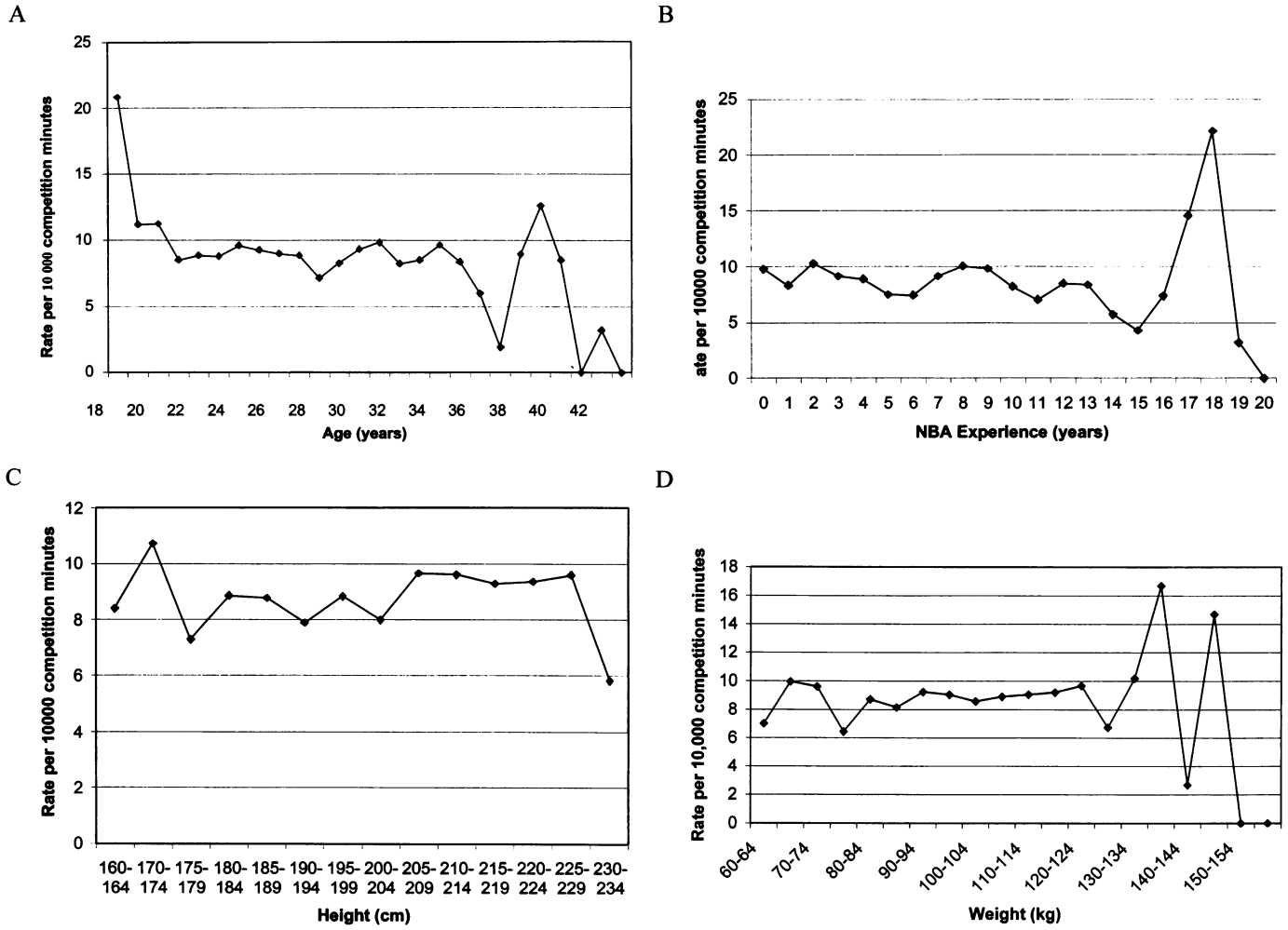

Figure 1. Game-related injury rates by player (A) age, (B) years of NBA playing experience, (C) height, and (D) weight based on 10000 competition minutes (1 regulation game = 480 competition minutes).

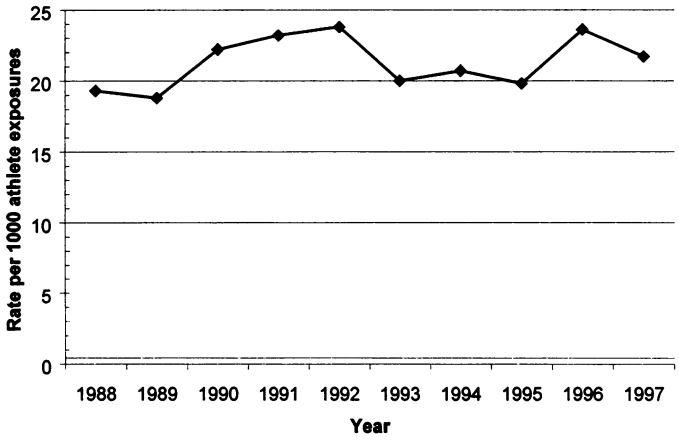

Figure 2. Game-related injury rate for the 10 seasons investigated.

2). Injury to the ankle was the most common site of musculoskeletal trauma (1062, 10.7%), followed by the patellofemoral complex (934, 9.4%), knee (tibiofemoral joint) (433, 4.4%), and lumbar spine (675, 6.8%) (Table 3). Ligamentous sprains accounted for 2074 (20.9%) cases and resulted in 17138 (26.0%) days being lost (Table 4). The number of inflammatory conditions per athlete was significantly correlated with the athlete's age ($r = 0.986$, $P < .001$) (Figure 3).

Ankle sprains were the most frequent orthopaedic condition reported (942, 9.4%), with most involving the lateral ligaments (874, 92.8%) (Table 5). Trauma to the deltoid ligament complex was reported in 60 (6.4%) instances, while the distal ankle syndesmosis was involved in 8 (0.8%) injuries. In all, ankle sprains were the most frequent game-related injury, occurring at a rate of 3.4/1000 AEs.

The patellofemoral complex was the second most frequent site of orthopaedic trauma and is ranked third among the number of days missed from competition. Ranking first in causing the greatest number of days lost, inflammation of the patellofemoral complex resulted in 7569 (11.5%) days missed. When considered as a single unit, the knee (tibiofemoral joint) and patellofemoral complex is the most prevalent site of orthopaedic trauma (1367, 13.8%), accounts for the greatest amount of time lost (17567 days, 26.6%), and follows only the ankle in the percentage of game-related injuries and incidence rate.

A total of 258 (2.6%) knee sprains occurred, with 8 instances involving multiple ligaments. The medial collateral ligament was the most frequently sprained ligament (126, 47.4%), followed by general capsular sprains (76, 28.6%), the anterior cruciate ligament (35, 13.2%), lateral collateral ligament (27, 10.2%), and

Table 2. Injury Frequency Classified by Body Area

	All Injuries (n = 9904)		Game-Related Injuries (n = 4277)			
Body Area	Frequency (percentage)	Days Missed (percentage)	Frequency (percentage of area)	Percentage of All Game Injuries	Rate per 10000 CMs*	Rate per 1000 AEs†
Head	846 (8.5%)	1312 (2.0%)	493 (58.3%)	11.5	1.0	2.5
Neck	145 (1.5%)	797 (1.2%)	87 (60.0%)	2.0	0.2	0.4
Upper extremity	1195 (12.1%)	8580 (13.0%)	818 (68.5%)	19.1	1.7	4.1
Torso	945 (9.5%)	8770 (13.3%)	412 (43.6%)	9.6	0.9	2.1
Genitals	49 (0.5%)	84 (0.1%)	4 (8.2%)	0.1	0.0	0.0
Lower extremity	4593 (46.4%)	43785 (66.4%)	2428 (52.9%)	56.8	5.0	12.1
General medical	2131 (21.5%)	2628 (4.0%)	35 (1.6%)	0.8	0.1	0.2
Total	9904 (100.0%)	65956 (100.0%)	4277 (43.2%)	100.0	8.8	21.4

*CM, competition minute.
†AE, athlete exposure.

Table 3. Injury Frequency Classified by Structure*

	All Injuries (n = 9904)		Game-Related Injuries (n = 4277)			
Structure	Frequency (percentage)	Days Missed (percentage)	Frequency (percentage of area)	Percentage of All Game Injuries	Rate per 10000 CMs†	Rate per 1000 AEs‡
Systemic	2144 (21.6%)	2817 (4.3%)	5 (0.2%)	0.1	0.0	0.0
Ankle	1062 (10.7%)	7198 (10.9%)	724 (68.2%)	16.9	1.5	3.6
Patellofemoral	934 (9.4%)	8628 (13.1%)	236 (25.3%)	5.5	0.5	1.2
Lumbar spine	675 (6.8%)	7268 (11.0%)	271 (40.1%)	6.3	0.6	1.4
Femur	541 (5.5%)	3252 (4.9%)	337 (62.3%)	7.9	0.7	1.7
Tibia	471 (4.8%)	4822 (7.3%)	239 (50.7%)	5.6	0.5	1.2
Knee	433 (4.4%)	8939 (13.6%)	308 (71.1%)	7.2	0.6	1.5
Foot	414 (4.2%)	6056 (9.2%)	181 (43.7%)	4.2	0.4	0.9
Shoulder	296 (3.0%)	2386 (3.6%)	184 (62.2%)	4.3	0.4	0.9
Hip	234 (2.4%)	880 (1.3%)	164 (70.1%)	3.8	0.3	0.8
Eye	224 (2.3%)	575 (0.9%)	160 (71.4%)	3.7	0.3	0.8
Groin	220 (2.2%)	1444 (2.2%)	121 (55.0%)	2.8	0.2	0.6
Toes	202 (2.0%)	972 (1.5%)	80 (39.6%)	1.9	0.2	0.4
Wrist	187 (1.9%)	1798 (2.7%)	133 (71.1%)	3.1	0.3	0.7
Fingers	182 (1.8%)	731 (1.1%)	123 (67.6%)	2.9	0.3	0.6
Mouth	178 (1.8%)	80 (0.1%)	98 (55.1%)	2.3	0.2	0.5
Hand	175 (1.8%)	1470 (2.2%)	130 (74.3%)	3.0	0.3	0.7
Thumb	160 (1.6%)	1354 (2.1%)	116 (72.5%)	2.7	0.2	0.6
Nose	150 (1.5%)	285 (0.4%)	51 (34.0%)	1.2	0.1	0.3
Elbow	150 (1.5%)	386 (0.6%)	102 (68.0%)	2.4	0.2	0.5
Cervical spine	120 (1.3%)	781 (1.2%)	70 (58.3%)	1.7	0.1	0.4
Face	103 (1.0%)	77 (0.1%)	79 (76.7%)	1.8	0.2	0.4
Thorax	99 (1.0%)	445 (0.7%)	53 (53.5%)	1.2	0.1	0.3
Skull	85 (0.9%)	128 (0.2%)	49 (57.6%)	1.1	0.1	0.2
Fibula	77 (0.8%)	1401 (2.1%)	35 (45.5%)	0.8	0.1	0.2
Sacrum	60 (0.6%)	309 (0.5%)	33 (55.0%)	0.8	0.1	0.2
Jaw	58 (0.6%)	72 (0.1%)	45 (77.6%)	1.1	0.1	0.2
Abdomen	56 (0.6%)	589 (0.9%)	31 (55.4%)	0.7	0.1	0.2
Thoracic spine	50 (0.5%)	167 (0.3%)	24 (48.0%)	0.6	0.0	0.1

*Structures accounting for less than 0.5% of the total were excluded from this table.
†CM, competition minute.
‡AE, athlete exposure.

posterior cruciate ligament (2, 0.8%). In 9 (3.4%) instances, the ligament sprain occurred concurrently with a meniscal tear.

Trauma to the lumbar spine was the third most prevalent musculoskeletal injury. Lumbar strains and intervertebral disc ruptures (567, 5.7%) accounted for 6418 (9.7%) days missed.

Surgical intervention was required for 368 (3.7%) of the cases reported and accounted for 18761 (28.4%) days missed. The incidence rate for game-related injuries was 1.8/1000 AEs. The body areas most frequently requiring surgery were the knee (120, 32.6%); wrist, hand, and thumb (49, 13.3%); foot (29, 7.9%); and patella (26, 7.1%).

General Medical Conditions

More than one quarter of the conditions reported were not orthopaedic in nature; of these, systemic conditions were the most prevalent, representing 2144 (21.6%) of all cases. Upper respiratory infections were the most common conditions seen by the medical staff (1655, 16.7%), and gastrointestinal problems were ranked fifth in terms of frequently seen conditions (345, 3.5%) (Table 5). Local and systemic infections (94, 0.9%) and dermatologic conditions (86, 0.9%) were also frequently treated conditions.

Table 4. Injury Frequency by Type*

Injury or Condition	All Injuries (n = 9904)		Game-Related Injuries (n = 4277)			
	Frequency (percentage)	Days Missed (percentage)	Frequency (percentage of area)	Percentage of All Game Injuries	Rate per 10000 CMs†	Rate per 1000 AEs‡
Sprain	2074 (20.9%)	17138 (26.0%)	1489 (71.8%)	34.8	3.1	7.4
Upper respiratory infection	1655 (16.7%)	1568 (2.4%)				
Strain or spasm	1603 (16.2%)	12288 (18.6%)	829 (51.7%)	19.4	1.7	4.1
Inflammatory	1516 (15.3%)	12948 (19.6%)	348 (23.0%)	8.1	0.7	1.7
Contusion	1166 (11.8%)	2931 (4.4%)	899 (77.1%)	21.0	1.9	4.5
Skin wound	360 (3.6%)	412 (0.6%)	273 (75.8%)	6.4	0.6	1.4
Gastrointestinal	348 (3.5%)	353 (0.5%)				
Fracture	302 (3.0%)	8534 (12.9%)	179 (59.3%)	4.2	0.4	0.9
Neurologic	178 (1.8%)	4315 (6.5%)	66 (37.1%)	1.5	0.1	0.3
Other illness	134 (1.4%)	632 (1.0%)	3 (2.2%)	0.1	0.0	0.0
Infection	94 (0.9%)	108 (0.2%)	4 (4.3%)	0.1	0.0	0.0
Dermatologic	86 (0.9%)	111 (0.2%)	8 (9.3%)	0.2	0.0	0.0
Dental	85 (0.9%)	65 (0.1%)	40 (47.1%)	0.9	0.1	0.2
Eye	83 (0.8%)	447 (0.7%)	52 (62.7%)	1.2	0.1	0.3
Meniscal tear	76 (0.7%)	3819 (5.8%)	39 (51.3%)	0.8	0.1	0.2

*Injury and illness types accounting for less than 0.5% of the total were excluded from this table.
†CM, competition minute.
‡AE, athlete exposure.

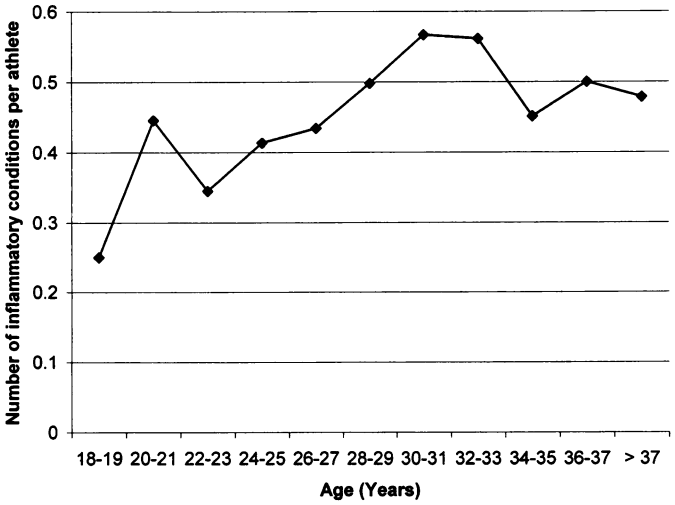

Figure 3. Rate of inflammatory conditions per player by age group (2-year increments).

DISCUSSION

The types of injuries experienced by professional basketball players reflect the physical demands of the game. As many as 4 nights per week, up to 38 weeks per year, athletes may log as many as 48 minutes, and travel the length of a 28.65-m (94-ft) court 200 to 300 times per game (the equivalent of 4.83 to 8.05 km), all while jumping, cutting, and contacting the opponent. These forces, combined with the stresses associated with traveling and time zone changes, all seemingly lead to the onset of acute and repetitive stress injuries.

The changing nature of professional basketball and its increased physical demands may be reflected by the 12.4% increase in game-related injuries during the period investigated. The frequency of inflammatory conditions and the high incidence rate of general medical conditions (eg, upper respiratory infections, influenza) may also serve as evidence that the stresses associated with game participation and travel take their toll on the athletes' physical health.

While a number of researchers[2–6] have examined specific injuries associated with participation in the NBA, this study provides perspective as to the scope, frequency, and relative magnitude of the broad range of conditions that occur to these athletes. Zagelbaum et al[5] investigated eye injuries using data reported to the NBTA during the 1991 and 1992 seasons, finding that 5.4% of the injuries involved the eye and occurred at the rate of 1.4/1000 AEs. Both the magnitude and rate of eye injuries were determined to be somewhat less during the 10 seasons described in this paper, when eye injuries represented 3.0% of all athletic-related injuries with an incidence rate of 1.1/1000 AEs. Krinsky et al[6] examined meniscal tears reported to the NBTA during the 1985 through 1990 seasons and reported that most (58%) involved the lateral meniscus. Similarly, I noted in this study that 59% of meniscal tears involved the lateral meniscus.

Empirically and anecdotally, ankle sprains are synonymous with the game of basketball. This study confirms that ankle sprains were the most common musculoskeletal injury suffered by professional basketball players, accounting for 9.4% of all injuries and illnesses and 7.7% of all time lost from practices and games. However, the injury rates for ankle sprains identified in this study of 3.4/1000 AEs and 1.4/10000 athlete-minutes are less than those reported for collegiate intramural[7,8] and European professional basketball.[9]

Because of its insidious nature, patellofemoral inflammation may be the "silent endemic" among professional basketball players. This condition is the leading cause of players missing practices and games, but in multiple, small increments rather than the season-ending magnitude of other injuries in the database.

The NCAA maintains a longitudinal database of injuries occurring in 15 sports, including basketball. Similar to the NBTA, the NCAA's reporting criteria were injuries that (a) occurred as a result of participation in an organized intercollegiate practice or game; (b) required medical attention by a team athletic trainer or physician; and (c) resulted in restriction of the student-athlete's participation or performance for 1 or more days beyond the day of injury.[10]

A comparison of the rates and types of game-related injuries that occurred in the NBA and in NCAA Division I, II, and III

Table 5. Specific Injury and Illness Rates*

Injury/Illness	All Injuries (n = 9904)		Game-Related Injuries (n = 4277)			
	Frequency (percentage)	Days missed (percentage)	Frequency (percentage of area)	Percentage of All Game Injuries	Rate per 10000 CMs†	Rate per 1000 AEs‡
Upper respiratory infection	1655 (16.7%)	1568 (2.4%)				
Ankle sprain	942 (9.4%)	5122 (7.7%)	689 (73.1%)	16.1	1.4	3.4
Patellofemoral inflammation	803 (8.1%)	7569 (11.5%)	143 (17.8%)	3.3	0.3	0.7
Lumbar erector muscle group strain	491 (5.0%)	3365 (5.1%)	189 (38.5%)	4.4	0.4	0.9
Gastrointestinal distress	345 (3.5%)	321 (0.5%)				
Knee sprain	258 (2.6%)	5712 (8.6%)	195 (75.6%)	4.6	0.4	1.0
Hamstring strain	249 (2.5%)	1878 (2.8%)	139 (55.8%)	3.2	0.3	0.7
Head and face lacerations	248 (2.5%)	90 (0.1%)	197 (79.4%)	4.6	0.4	1.0
Foot inflammation	219 (2.2%)	2527 (3.8%)	71 (32.4%)	1.7	0.1	0.4
Adductor strain	210 (2.1%)	1352 (2.0%)	117 (55.7%)	2.7	0.2	0.6
Quadriceps contusion	208 (2.0%)	591 (0.8%)	157 (75.5%)	3.7	0.3	0.8
Knee contusion	179 (1.8%)	531 (0.8%)	139 (77.7%)	3.2	0.3	0.7
Triceps surae or Achilles tendon strain	149 (1.5%)	2518 (3.7%)	86 (57.1%)	2.0	0.2	0.4
Finger sprain or dislocation	133 (1.3%)	252 (0.4%)	94 (70.7%)	2.2	0.2	0.5
Lower leg contusion	132 (1.3%)	631 (0.8%)	100 (75.8%)	2.3	0.2	0.5
Hip contusion	127 (1.3%)	291 (0.4%)	109 (85.8%)	2.5	0.2	0.6
Wrist sprain	115 (1.1%)	852 (1.2%)	92 (80.0%)	2.2	0.2	0.5
Thumb sprain	112 (1.1%)	833 (1.2%)	83 (74.1%)	1.9	0.2	0.4
Triceps surae or Achilles tendon inflammation	109 (1.1%)	547 (0.8%)	34 (31.2%)	0.8	0.1	0.2
Foot sprain	102 (0.9%)	718 (1.1%)	65 (63.7%)	1.5	0.1	0.3
Ankle inflammation	86 (0.8%)	948 (1.4%)	20 (23.3%)	0.5	0.0	0.1
Lumbar intervertebral disc rupture or herniation	76 (0.8%)	3053 (4.6%)	16 (21.1%)	0.4	0.0	0.1
Meniscal tear§	76 (0.7%)	3819 (5.8%)	39 (51.3%)	0.9	0.1	0.2
Cervical muscle strain	73 (0.7%)	198 (0.2%)	43 (58.9%)	1.0	0.1	0.2
Rotator cuff inflammation	68 (0.7%)	350 (0.5%)	20 (29.4%)	0.5	0.0	0.1
Hand ligament sprain	66 (0.7%)	168 (0.3%)	48 (72.7%)	1.1	0.1	0.2
Lumbosacral contusion	62 (0.6%)	93 (0.1%)	56 (90.3%)	1.3	0.1	0.3
Foot contusion	59 (0.6%)	305 (0.4%)	39 (66.1%)	0.9	0.1	0.2
Tarsal or metatarsal fracture	58 (0.6%)	2802 (4.2%)	25 (43.1%)	0.6	0.1	0.2
Quadriceps strain	58 (0.6%)	454 (0.7%)	29 (50.0%)	0.7	0.1	0.2
Tooth fracture	57 (0.6%)	28 (0.0%)	40 (70.2%)	0.9	0.1	0.2
Toe sprain	55 (0.6%)	208 (0.3%)	33 (60.0%)	0.8	0.1	0.2
Hip flexor strain	52 (0.5%)	427 (0.7%)	31 (59.6%)	0.7	0.1	0.2
Glenohumeral sprain	50 (0.5%)	1049 (1.6%)	43 (86.0%)	1.0	0.1	0.2
Nasal fracture	50 (0.5%)	165 (0.2%)	36 (72.0%)	0.8	0.1	0.2
Acromioclavicular joint sprain	47 (0.5%)	464 (0.7%)	31 (66.0%)	0.7	0.1	0.2
Elbow contusion	47 (0.5%)	62 (0.1%)	36 (76.6%)	0.8	0.1	0.2

*Injuries representing less than 0.5% of the total were excluded from this table.
†CM, competition minute.
‡AE, athlete exposure.
§Includes meniscal tears associated with ligament sprains: lateral meniscus, 59.2%; medial meniscus 40.8%.

men's basketball from 1988 through 1997 reveals some stark contrasts.[10] The injury rate among NBA players (21.4/1000 AEs) was twice that experienced by collegiate players (10.9/1000 AEs). In collegiate basketball, the ankle (28.8%), knee (12.0%), and hip and pelvis (2.7%) were the most frequent sites of orthopaedic trauma. When only musculoskeletal trauma was considered (ie, eliminating general medical reports), the top 3 injury locations in professional basketball were the ankle (14.3%), patellofemoral complex (12.5%), and lumbar spine (9.1%). Similarly, the most common types of injuries experienced in college basketball were sprains (37.1%), strains (16.4%), and contusions (12.6%). In professional basketball, the most frequent types of injury were sprains (27.8%), strains (21.5%), and inflammatory conditions (20.4%).

The prevalence and types of general medical conditions suffered by NBA athletes dilute the perception that these individuals are otherwise healthy. Although the number of reports of general medical conditions may be inflated because conditions needing prescription medication require an injury report, many diseases would have once disqualified the athlete from competition. Athletes are competing in professional basketball with conditions such as asthma, diabetes, emotional and cognitive disorders, and cardiovascular and cardiopulmonary diseases. To appropriately recognize and refer athletes with these conditions to the appropriate medical professional, the athletic trainer's scope of knowledge must extend beyond orthopaedic conditions. Athletic trainers must be familiar with the unique needs of these athletes and be prepared to respond in the event that athletic competition complicates the athlete's condition.

CONCLUSIONS

Professional basketball players experience game-related injuries at a rate twice that of college basketball players. The

lower extremity is the most commonly injured body area, accounting for more than half of all orthopaedic injuries. Although ankle sprains are the most frequently occurring orthopaedic injury, the scope of conditions that NBA athletic trainers and team physicians must be familiar with is much broader. Patellofemoral inflammation accounted for the greatest number of practices and games missed, potentially reflecting the physical demands of competition in the NBA and the age of its participants. Extra precautions should be taken to reduce the onset of inflammatory conditions in athletes who are entering the league and those over age 30. Approximately one quarter of the conditions reported were nonorthopaedic, general medical conditions.

This paper serves as the foundation for further investigation into the nature and cause of injuries suffered by professional basketball players. Demographic factors, past injuries, and the concurrence of 1 condition to another, as well as the more detailed analysis of injuries suffered by body region, are logical extensions of this descriptive study.

ACKNOWLEDGMENTS

I thank the athletic trainers of the NBA, who, in addition to their other responsibilities, took the time to complete and return the instruments necessary to conduct this study. Joe O'Toole, ATC, former athletic trainer for the Atlanta Hawks, must be recognized for developing and implementing this study and seeing it grow from a simple idea to a league-wide concept. Also, gratitude is extended to Christopher D. Ingersoll, PhD, ATC, for his valuable assistance in the technical development of this paper.

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