Return to Play After Forearm and Hand Injuries in the National Basketball Association

Kyle W. Morse,* BS, Krystle A. Hearns,* MA, and Michelle Gerwin Carlson,*† MD

Investigation performed at the Division of Hand and Upper Extremity Surgery, Hospital for Special Surgery, New York, New York, USA

Background: Hand injuries can result in significant time away from competition for professional basketball players. Time to return to play after hand injuries in elite athletes has not been well described.

Purpose: To report the return to play from metacarpal fractures, phalangeal fractures, and thumb ligament tears in National Basketball Association (NBA) players over a 5-year period.

Study Design: Descriptive epidemiology study.

Methods: The NBA transaction report was analyzed from January 2009 to May 2014. Players were identified if they were added to the inactive list (IL), missed games due to their injury, or underwent surgery as a result of hand injury. Number of games missed due to injury, days spent on the IL, and age at injury were calculated by injury type and location.

Results: One hundred thirty-seven injuries were identified: 39 injuries to the hand and 98 injuries to the finger. Three major injury patterns were identified and analyzed: metacarpal fractures (n = 26), phalangeal fractures (n = 33), and thumb ligament tears (n = 9). The type of injury sustained affected return to play ($P < .05$). All thumb ligament tears required surgery and had the longest return to play of 67.5 ± 17.7 days ($P < .05$). The return to play for surgically treated metacarpal fractures (56.7 ± 26.3 days) was significantly greater than nonsurgically treated metacarpal fractures (26.3 ± 12.1 days; $P < .01$). Return to play for surgically repaired phalangeal fractures (46.2 ± 10.8 days) trended greater but was not significantly different than phalangeal fractures treated nonsurgically (33.3 ± 28.5 days; $P = .21$).

Conclusion: Hand injuries in professional basketball players can lead to prolonged periods of time away from competition, especially after surgery. This study provides guidelines on expected return to play in the NBA after these common hand injuries.

Keywords: return to play; hand injury; basketball; elite athlete

Basketball is as a contact sport, and players experience a wide variety of injuries.[11] Injury incidence, prevalence, and patterns in the National Basketball Association (NBA) have been reported and documented in the literature.[5,6,8,10]

Injuries to elite athletes create unique challenges as they must balance their organizational responsibility, financial concerns, and future career prospects when considering treatment options. Injuries to the upper extremity, especially the hand, can be particularly devastating to the professional basketball player since hand function and dexterity are crucial to their performance. The varying positions of basketball may also contribute to injury as players have different offensive and defensive roles. Therefore, careful judgment must be used to recommend treatment directed at providing an optimal outcome and return to play while also balancing the professional demands of the athlete.[7]

Return to play after surgery in professional basketball athletes has been examined after Achilles tendon repair,[1] anterior cruciate ligament repair,[3] and microfracture[4]; however, studies that focus on return to play after hand surgery remain scarce in the literature. We previously explored the variability of treatment decisions for professional athletes after hand and wrist injuries by surveying consultant hand surgeons to professional teams.[7] Other studies have reported on return to play after basketball injuries among US high school basketball players[2] as well as total games and days missed,[6,10] but injuries that required surgery were not differentiated.

This study aims to better understand athletes' return to play from hand injuries with or without surgery over a 5-year period in the NBA. This understanding is an integral

†Address correspondence to Michelle Gerwin Carlson, MD, Hospital for Special Surgery, 523 East 72nd Street, 4th Floor, New York, NY 10021, USA (email: carlsonm@hss.edu).

*Hospital for Special Surgery, New York, New York, USA.

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part of clinical decision making when treating professional athletes and can assist in furthering guidelines and recommendations in the treatment of hand injuries for elite athletes.

METHODS

An initial search was performed to identify players who were placed on the inactive list (IL), underwent surgery, or missed games due to a hand injury. The search was performed from January 2009 to May 2014 utilizing a single source (http://www.prosportstransactions.com). This included the lockout season during the 2011-2012 season, in which 66 games were played instead of 82. The NBA no longer releases the official injury list data to the public. In this study, the IL was used as a search tool to aid in the identification of injured players. The IL consists of at most 3 players who may be called up the active 12-player roster. Players may move between the active roster and IL based on the coach's decision 1 hour prior to the start of the game. Additionally, a player may remain on the IL for a minimum of 1 game up to an indefinite period. A player does not have to be listed on the IL if he is injured, only if the coach deems it advantageous to call up a fit player to play in the game.

Athletes who were injured during the postseason were not included; however, athletes who were injured during the preseason were included because the return to play could be calculated based on their return during the regular season. During the initial search, the athlete's name, team, IL placement date, IL removal date, surgery date, and injury date were recorded. Players with multiple injuries during a given season were identified and assessed separately.

Demographic information for each player was then incorporated into the database. This information included the athlete's age, position (guard, forward, center), and shooting hand. This information was identified through the use of 2 websites (http://www.espn.com and http://www.basketball-reference.com).

Box scores, game summaries, team press releases, and news reports were used to verify the injury date, injury side, injury location, type of injury, and surgery date. Mechanism of injury and details regarding whether the injury occurred in training, practice, games, or outside basketball activities were not recorded or analyzed. Injury location was specified as injury to either the metacarpal region or the finger. Metacarpal region injuries included any injury to the metacarpals or carpometacarpal joints. Phalangeal injuries included any injury to the proximal, middle, or distal phalanx; collateral ligaments of the metacarpophalangeal joint, proximal interphalangeal joint, or distal interphalangeal joint; or any injury to these joints, respectively. Each athlete's game log by season was used to identify the number of games missed, postseason playoff status, and date returned to play. Return to play was defined as the first game that the athlete played in and had playing minutes recorded. The athlete's age at the date of injury as well as the number of days between injury and return were calculated.

SPSS Statistics version 22 (IBM Corp) was used for data analysis. Injury frequencies, means, standard deviations, and standard error were found by injury location and injury type. Chi-square tests were used to determine associations between position, injury location, and injury modality. When the expected count was less than 5, the Fisher exact test was used. Independent-sample t tests were used to compare return to play between surgically and nonsurgically treated injuries. A Welch robust analysis of variance (ANOVA) with Games-Howell correction was used to compare return-to-play times between positions. Pearson correlations were used to correlate age with return to play. The level of statistical significance was defined with an alpha level of <0.05. Values are reported as mean ± standard error of the mean (SEM) unless otherwise noted.

TABLE 1
Identified Hand Injuries and Their Frequency of Occurrence

Injury	Frequency
Soreness	3
Fracture	59
Sprain	26
Dislocation	12
Ligament tear	12
Partial ligament tear	2
Unspecified ligament injury	2
Tendon tear	2
Bruise	3
Laceration	6
Hyperextension	1
Strain	3
Avulsion fracture	1
Unknown	5
Total	137

RESULTS

One hundred thirty-seven injuries were identified (Table 1). Of these, 39 were injuries to the hand and 98 were injuries to the finger. Three major injury patterns were identified and analyzed: thumb ligament tears (n = 9), metacarpal fractures (n = 26), and phalangeal fractures (n = 33) (Table 2).

Age was not correlated with the number of games missed due to injury or number of days between injury and return ($P > .05$). There was no relationship found between position and whether the player had surgery or not, $\chi^2(4, N = 68) = 3.28$; $P > .05$, or between injury type and position, $\chi^2(2, N = 68) = 0.90$; $P > .05$. There was no statistically significant difference in return to play between positions, $F(2, 49) = 2.46$; $P > .05$. For right-handed players, there was no difference in return to play if the injury occurred to the dominant hand as opposed to the nondominant hand (27.2 ± 27.7 vs 28.8 ± 33.2 days; $P > .05$). However, for left-handed players, return to play was significantly greater for injuries to the nondominant hand (53.3 ± 24.6 vs 19.9 ± 22.3 days; $P < .05$). For teams that made the playoffs, more players returned from injury during the last 3 months of the season (February, 20.0%; March, 20.0%; April, 13.3%)

TABLE 2
Total Number of Injuries, Number of Days Between Injury and Return, Age at Injury, and Number of Games Missed Across Injury Types

		Days Between Injury and Return		Age at Injury, y		No. of Games Missed	
	No. of Injuries	Mean ± SD	Median	Mean ± SD	Median	Mean ± SD	Median
Metacarpal fracture							
Total	26	42 ± 26	35	27 ± 5	26	16 ± 12	15
Surgery	13	57 ± 26	53	27 ± 6	26	19 ± 11	18
No surgery	13	26 ± 12	30	27 ± 5	26	11 ± 6	13
Thumb ligament tear							
Total	9	68 ± 18	62	27 ± 3	27	25 ± 11	28
Surgery	9	68 ± 18	62	27 ± 3	27	25 ± 11	28
No surgery	0	—	—	—	—	—	—
Phalangeal fracture							
Total	33	38 ± 24	38	28 ± 5	28	11 ± 8	10
Surgery	13	46 ± 10	47	27 ± 5	28	14 ± 10	13
No surgery	20	33 ± 29	23	28 ± 5	28	10 ± 7	10

than for those teams that did not make the playoffs (13.0%, 13.0%, and 0.0%, respectively). There was no difference whether the athlete's team made the playoffs for the number of games missed or the number of days between the injury date and return to play ($P > .05$). Return to play was greatest for injuries that occurred in 2009 and 2012 (55.4 and 48.6 days, respectively); however, there was no statistically significant difference between return to play and the year in which the injury occurred ($P > .05$).

Thumb Ligament Tears

Forty-seven injuries to the thumb were identified, 9 of which were thumb ligament tears. All thumb ligament tears were treated surgically and had a longer return to play of 67.5 ± 17.7 days ($P < .05$) compared with metacarpal fractures and phalangeal fractures (Table 2). The mean number of games missed after thumb ligament tears was 24.7 games.

Metacarpal Fractures

Thirteen metacarpal fractures were treated surgically (Table 2). Return to play for surgically treated metacarpal fractures (56.7 ± 26.3 days) was significantly greater than those injuries treated nonsurgically (26.3 ± 12.1 days; $P < .01$). The mean number of games missed for all metacarpal fractures was 16.3 games. Fourth metacarpal fractures were the most common metacarpal fractures (11/26), and no first metacarpal fractures were reported. Additionally, 1 player sustained a simultaneous fracture of 2 different metacarpals. The first injury was treated nonoperatively; the second injury was treated operatively.

Phalangeal Fractures

Of the 33 total phalangeal fractures, 13 required surgery. Return to play for surgically repaired phalangeal fractures (46.2 ± 10.8 days) trended greater but was not significantly different than phalangeal fractures treated nonsurgically (33.3 ± 28.5 days; $P = .21$) (Table 2). There was no relationship between the finger fractured and need for surgery ($P > .05$). The mean number of games missed for all phalangeal fractures was 11.4. The thumb was the most commonly fractured digit (13/33), followed by index finger (7/33). Age was not associated with return to play after thumb ligament tear surgery, surgery to repair metacarpal fractures, or surgery to repair phalangeal fractures ($P > .05$).

DISCUSSION

Few studies have examined return to play after injury in professional athletes after surgical and nonsurgical treatment of hand injuries. In this study, we aimed to quantify return to play for these injuries in the NBA. Players undergoing surgery had longer return-to-play times than those who did not. Obviously, there is selection bias in that patients undergoing surgery likely have more severe injuries than those treated nonoperatively. However, this calls into question the commonly held but unsubstantiated belief that surgery to fix a fracture returns the athlete to play quicker. This retrospective study does not fully answer this question, and a prospective blinded study is needed.

For nondisplaced metacarpal fractures, Dy et al[7] reported that more than half of the surgeons surveyed recommended return to protected play between 3 and 4 weeks, and 73% recommended unprotected play between 4 and 8 weeks after injury, although surgeons treating basketball players recommended longer return to play times. Our data suggest return to unprotected play may be even sooner than 4 weeks; however, we are unable to differentiate between displaced and nondisplaced fractures. Additionally, Kovacic and Bergfeld[9] recommended return to protected play in a playing cast when initial healing had begun or approximately 2 to 3 weeks after an isolated metacarpal shaft fracture that was repaired by fixation or simple immobilization, but protected play is rarely possible in basketball. In the present study, we found that

return to play was twice as long for metacarpal fractures treated surgically (8.1 weeks) than metacarpal fractures treated nonsurgically (3.8 weeks); however, the increased return to play may be the result of more severe injury patterns resulting in an immobilization requirement and limited playing function due to increased swelling requiring a longer rehabilitation time.

We found the mean return to play from surgically repaired thumb ligament tears to be 9.6 weeks. Comparatively, Dy et al[7] found that 55.6% of surgeons recommended return to protected play after 2 weeks, and 63.9% of surgeons recommended return to unprotected play after 12 weeks. Our study suggests that some athletes may return to play in 10 weeks; however, partial thumb ligament tears that were likely treated with immobilization alone are not included.

Over a 17-year period ending with the 2004-2005 season, Drakos et al[6] found that upper extremity injuries accounted for 15.4% of all injuries in the NBA. In their analysis, hand and wrist fractures were grouped together and 100 injuries were reported, which resulted in a total of 1470 games missed or 14.7 games per injury. We found return to play across all metacarpal fractures to be 16.3 games. In addition to hand injuries, Drakos et al[6] reported 52 finger fractures that resulted in 457 missed games (8.8 games per injury) and 40 thumb fractures in 331 missed games (8.3 games per injury). In comparison, we found a mean of 11.6 missed games for all phalangeal fractures. Both Drakos et al[6] and Starkey[10] noted an increase in the injury rate from previous studies due to increased physicality of the sport and increased size and speed of its players. While injury rate cannot be assessed in the current study, the increased number of days missed across these injury types may reflect the increased physical nature of professional basketball or conservative management to protect players from subsequent injuries due to the potentially increased value of player contracts.

Age was not associated with return to play, and this finding was similar to previous studies.[6,10] Injury type was not related to player position; however, centers had the highest ratio of injuries treated surgically to those treated nonsurgically, although this trend was not significant. Henry et al[8] found that forwards sustained more upper extremity injuries than guards and centers. In the present study, however, forwards actually had less hand injuries than guards, with centers having the least overall.

A limitation of this study is that the information was sourced using publicly available data and not from an official NBA source. Detailed information identifying the therapeutic treatment, pathology, injury severity, and how the injury occurred was scarce and may result in the inability of our study to analyze minor injuries. Teams may be reluctant to report some injuries as it could affect future game strategy and contracts. Different physicians may have different surgical indications for hand injuries in athletes. Minutes played per game were also not taken into consideration. For some injuries, players may also elect to forego surgery until the end of the season. We also found an increased trend for players to return toward the end of the season if their team made the playoffs. Therefore, making the playoffs may affect decisions regarding a player's injury. Additionally, there are other factors that affect return to play, such as monetary considerations regarding a player's contract and a coach's decision to use a player tactically. Therefore, our data may represent the most serious injuries, which may overestimate return-to-play times. The injuries that resulted in surgery are likely worse in severity. While this is a limitation of the study, we cannot control for it without official injury reports. Another limitation of this study is that the time period covered included the 2011-2012 lockout season, in which the regular season game schedule was reduced. While this may reduce the number of injuries reported, we are not investigating injury incidence. The reduced season may cause additional pressure to return to play more quickly, but return to play was lower than injuries that occurred in 2009. It remains important to capture a recent time period to analyze the most recent patterns. Given these limitations, a study utilizing an official NBA-sponsored injury database would provide data to more accurately assess injuries and return to play for professional basketball players.

An understanding of return-to-play times is an integral part of clinical decision making when treating professional athletes. This study is a first step toward addressing return-to-play times after hand injuries in the NBA. Based on this study's findings, we offer guidelines on expected return to play in professional basketball players for 3 common hand injuries. These guidelines can assist in improving the treatment of hand injuries in this specialized population.

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