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Research Article

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# The Impact of Anterior Cruciate Ligament (ACL) Tears on Game Statistics among National Basketball Association (NBA) Players a Retrospective Cohort Study

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## Abstract

***Introduction***

*Anterior cruciate ligament (ACL) tears are a common injury among athletes, including NBA players. Advances in surgical techniques, rehabilitation protocols, and complementary therapies have greatly improved the outcomes for athletes undergoing ACL reconstruction surgery. Arthroscopic surgery has become the standard approach for ACL reconstruction due to its minimally invasive nature, resulting in less pain, faster recovery, and better outcomes. Accelerated rehabilitation protocols have been shown to improve outcomes by getting athletes back to playing sooner and with better functional outcomes than traditional rehabilitation programs. Physiotherapy has aplayed an important*

*Role in helping athletes return to play by using targeted exercises to improve range of motion, strength, and stability. Complementary therapies, such as phytotherapy, have also shown promise in aiding the healing process. These advancements in ACL tear treatment have the potential to improve outcomes for NBA players who suffer from these injuries and further research can help continue to improve prevention and management of these injuries.*

***Methods***

*The study is a retrospective cohort study that focuses on NBA playerswho suffered from ACL tears and underwent reconstructive surgery between 2012 and 2022. The study excluded players who had not played prior to experiencing an ACL injury, players with a concurrent significant knee injury involving other ligaments, any other major leg injury, or a history of ACL tear in the contralateral knee. The study gathered data on 25 players and recorded game statistics for each player before and after surgery to assess the impact of ACL tears on players' game performance. The recorded data was analyzed using SPSS Statistics.*

***Results***

*The mean age at injury was 26.12 ± 4.3 years, and the majority of injuries occurred on the left side. players experienced significant decreases in minutes per game and points per game, with a reduction of 5.9 and 3.5, respectively, during the season following the injury. Moreover, players exhibited a statistically significant decline in rebounds per game and assists per game, with a decrease of 0.91 and 1.11, respectively. These findings suggest that ACL injuries can have a severe impact on a player's ability to contribute to their team's success. The study did not find a significant difference in shooting percentages for two-pointers, three-pointers, and free throws before and after ACL injury. This suggests that ACL injuries do not significantly affect a player's shooting abilities.*

***Discussion***

*This study focused on the incidence and impact of ACL injuries among NBA players between 2012 and 2022. The study found that ACL injuries had a significant negative impact on a player's performance, including decreases in minutes, points, rebounds, and assists per game. The mean time to return to play after ACL surgery was consistent with previous studies. The study also*

*highlighted the importance of effective prevention, treatment, and rehabilitation strategies, with neuromuscular training programs showing promise in reducing the incidence of ACL injuries. While ACL injuries did not significantly affect shooting percentages, further research is needed to fully understand their impact on shooting performance.*

***Conclusion***
*The study sheds light on the frequency and effects of ACL injuries in NBA players and emphasizes the importance of implementing effective strategies for preventing, diagnosing, and treating such injuries in order to help players recover and return to their previous level of performance.*

**Keywords:** ACL Reconstruction, Basketball, NBA

## Introduction

Anterior cruciate ligament (ACL) tears are a common injury among athletes, including National Basketball Association (NBA) players. The impact of ACL tears on an athlete's performance and game statistics makes it an important area of research. Understanding the effects of ACL tears on NBA players' performance can help in the development of effective treatment and rehabilitation strategies.

Over the last 20 years, there have been significant advancements in the treatment and rehabilitation of ACL tears. In particular, surgical techniques for repairing ACL tears have greatly improved. Arthroscopic surgery, which involves the use of small incisions and a tiny camera to view and repair the ligament, has become the standard approach for ACL reconstruction [1]. This minimally invasive technique has been shown to result in less pain, faster recovery, and better outcomes compared to traditional open surgery [2].

In addition to improvements in surgical techniques, rehabilitation protocols have also advanced in recent years. The use of accelerated rehabilitation protocols, which involve early weight-bearing, range-of-motion exercises, and neuromuscular training, has been shown to improve outcomes for athletes undergoing ACL reconstruction surgery [3]. These protocols aim to get athletes back to playing sooner and with better functional outcomes than traditional rehabilitation programs.

Physiotherapy has also played an important role in the treatment and rehabilitation of ACL tears. The use of targeted exercises to improve range of motion, strength, and stability has been shown to be effective in helping athletes return to play [4]. In addition to traditional medical treatments and physiotherapy, there has been growing interest in the use of complementary therapies, such as phytotherapy, for the treatment of ACL tears. Herbal remedies, such as curcumin, Boswellia serrata, and ginger, have been shown to have anti-inflammatory and analgesic effects, which may aid in the healing process [5].

These advancements in ACL tear treatment have the potential to improve outcomes for NBA players who suffer from these injuries. By improving surgical techniques, rehabilitation protocols, and exploring the potential of complementary therapies, athletes may be able to return to pre-injury levels of performance more quickly and with a reduced risk of long-term effects on game statistics.

In conclusion, the last two decades have seen significant advancements in the treatment and rehabilitation of ACL tears, including improved surgical techniques, physiotherapy, and complementary therapies. These advancements have the potential to improve the outcomes for NBA players who suffer from ACL tears, and further research can help continue to improve the prevention and management of these injuries.

## Methods

We conducted a retrospective cohort study on NBA players who suffered anterior cruciate ligament (ACL) tears and underwent reconstructive surgery between 2012 and 2022. The exclusion criteria for this study comprised of NBA players who had not played prior to experiencing an ACL injury, players with a concurrent significant knee injury involving the posterior cruciate, medial or lateral collateral ligaments, or any other major leg injury, such as an Achilles tendon rupture. Furthermore, players with a history of ACL tear in the contralateral knee were also excluded from the study.

In order to gather the necessary data, publicly available information on NBA teams was utilized using methods similar to previous studies [11-16]. From this source, 33 players were identified, of which 25 met the inclusion criteria established for this study. Data was then recorded for each of these individuals, including their age at the time of injury, height, weight, body mass index, date of injury, date of surgery, date of return to play, number of months between injury and return, and the specific knee affected.

To assess the impact of ACL tears on players' game statistics, we recorded detailed game statistics for each player, including their minutes played, points, offensive and defensive rebounds, assists, steals, blocks, turnovers, personal fouls, and shooting percentages for field goals, 3-pointers, and free throws. These data were collected for the season prior to ACL surgery, as well as the season following the surgery, in order to assess the impact of ACL tears and subsequent surgical reconstruction on NBA players' game performance. This information was obtained from publicly available

sources, including NBA team websites and online databases of player statistics.

The recorded data was analysed using SPSS Statistics, which is a widely used software package for statistical analysis in medical research. Descriptive statistics such as means, standard deviations, and frequencies were calculated for each variable. Inferential statistics such as t-tests and analysis of variance (ANOVA) were used to determine statistical significance and assess the relationship between different variables.

## Results

The study focused on the incidence of ACL injuries among NBA players between the years 2012 and 2022. A total of 33 players required ACL reconstruction surgery during this time period. However, 8 of these patients were excluded from the study due to incomplete medical records or other factors, leaving a sample of 25 players who met the inclusion criteria and were analyzed.

The demographic characteristics of the sample are presented in Table 1. The mean age at injury was 26.12 ± 4.3 years, with a range of 20 to 38 years. The majority of injuries occurred on the left side (60%), with 40% occurring on the right. The mean height and weight of the players were 197 ± 10.01 cm and 95.64 ± 11.7 kg, respectively. The mean body mass index (BMI) was 24.69 ± 1.70, indicating that most players were within the healthy weight range. Finally, the mean time to return to play after ACL surgery was 13.18 ± 4.47 months, with a range of 7 to 28 months.

**Table 1**

| | |
|---|---|
| Age at injury [Years] | 26.12 ± 4.3 (min=20, max=38) |
| Side (Rt/Lf) [%] | 40/60 |
| Height [Cm] | 197 ± 10.01 |
| Weight [kgm] | 95.64 ± 11.7 |
| Bmi | 24.69 ± 1.70 |
| Return to play [Months] | 13.18 ± 4.47 (min=7, max=28) |

It is worth noting that for three out of the 25 players included in our analysis, the ACL tear was a career-ending injury. These players were unable to return to professional play following surgery, and their mean age at injury was 34 years old. Such instances highlight the potential severity of ACL tears and the need for effective prevention and treatment measures.

Table 2 presents a comprehensive summary of the performance effects observed in players after returning from ACL surgery, revealing a statistically significant decline in several crucial performance metrics during the season following the injury. Specifically, players experienced significant decreases in minutes per game and points per game, with a reduction of 5.9 and 3.5, respectively. These findings demonstrate that ACL tears can significantly impair a player's ability to contribute to their team's success. Moreover, players also exhibited a statistically significant decline in rebounds per game and assists per game, with a decrease of 0.91 and 1.11, respectively. These results emphasize the severe impact that ACL injuries can have on a player's performance and highlight the importance of effective prevention, treatment, and rehabilitation strategies to mitigate the negative consequences of these injuries.

Although some of the differences observed, such as steals per game or blocks per game, were not statistically significant, our findings underscore the significant impact of ACL tears on player performance. Therefore, NBA players, coaches, and medical professionals must prioritize the prevention, diagnosis, and treatment of these injuries to minimize their detrimental effects.

**Table 2**

| | pre injury | Season after return from injury | Difference | P- value |
|---|---|---|---|---|
| minutes per game | 28.3 | 22.4 | 5.9 | 0 |
| Points per game | 14.09 | 10.59 | 3.5 | 0 |
| rebounds per game | 4.47 | 3.56 | 0.91 | 0.029 |
| assists per game | 3.97 | 2.86 | 1.11 | 0.018 |
| steals per game | 0.95 | 0.89 | 0.06 | 0.651 |
| blocks per game | 0.573 | 0.409 | 0.164 | 0.122 |

In order to further investigate the impact of ACL injuries on player performance, we also utilized points per 36 minutes as an additional metric, in order to account for variations in playing time. As shown in Table 3, the difference in points per 36 minutes was 1.53, which was found to be statistically significant ($p = 0.039$). This analysis provides further insight into the potential impact of ACL injuries on a player's ability to contribute offensively.

**Table 3**

| | pre injury | Season after return from injury | Difference | P- value |
|---|---|---|---|---|
| Points per 36 minutes | 17.73 | 16.2 | 1.53 | 0.039 |

In addition to measuring changes in players' performance metrics, we also examined changes in shooting percentages before and after ACL injury. Table 4 presents the differences in pre-injury and post-injury shooting percentages for two-pointers, three-pointers, and free throws. Our results show a statistically insignificant difference in shooting percentages for all three metrics, suggesting that ACL injuries do not significantly affect players' shooting abilities. However, further research is needed to fully understand the impact of ACL injuries on shooting performance.

**Table 4**

| | pre injury | Season after return from injury | Difference | P- value |
|---|---|---|---|---|
| 2 pts shooting % | 45.14% | 43.20% | 1.94% | 0.409 |
| 3 pts shooting % | 31.10% | 30.20% | 0.90% | 0.735 |
| free throws shooting % | 76.60% | 75.61% | 0.99% | 0.67 |

## Discussion

The study analyzed the incidence and impact of ACL injuries among NBA players between 2012 and 2022. The results showed that 33 players required ACL reconstruction surgery during this time period, but only 25 players were included in the study. The majority of the injuries occurred on the left side (60%), and the mean age at injury was 26.12 years. The mean time to return to play after ACL surgery was 13.18 months, which is consistent with previous studies [6].

Of the 25 players included in the study, three were unable to return to professional play following surgery, indicating the potential severity of ACL tears and the need for effective prevention and treatment measures. Previous research has also shown that ACL injuries can lead to significant long-term consequences, such as an increased risk of developing knee osteoarthritis [7].

The study found that players experienced a significant decline in several crucial performance metrics during the season following the injury. Specifically, players exhibited statistically significant decreases in minutes per game, points per game, rebounds per game, and assists per game. These findings are consistent with previous studies that have shown a negative impact of ACL injuries on performance [8, 9].

The findings highlight the severe impact that ACL injuries can have on a player's performance and underscore the importance of effective prevention, treatment, and rehabilitation strategies to minimize the negative consequences of these injuries. One promising approach to preventing ACL injuries is neuromuscular training programs, which have been shown to reduce the incidence of ACL injuries by up to 72% in female athletes [10].

Additionally, the study found a statistically significant decline in points per 36 minutes, providing further insight into the potential impact of ACL injuries on a player's ability to contribute offensively. However, the study did not find a statistically significant difference in shooting percentages for two-pointers, three-pointers, and free throws before and after ACL injury. This suggests that ACL injuries do not significantly affect players' shooting abilities. Nevertheless, further research is needed to fully understand the impact of ACL injuries on shooting performance.

## Conclusion

The study provides important insights into the incidence and impact of ACL injuries among NBA players. The results highlight the need for effective prevention, diagnosis, and treatment strategies to minimize the negative consequences of these injuries and help players return to their pre-injury level of performance.


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This research received no external funding.


## Informed Consent Statement

Consent was granted by the NBA and the NBA Players Association as per the guidelines and requirements for “NBA related health research” governed by the NBA Collective Bargaining Agreement

## Conflicts of Interest

The authors declare no conflict of interest.

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