
OFFENSIVE TECHNICAL-TACTICAL ANALYSIS ON NBA FINALIST TEAMS: A CASE STUDY

ANÁLISE TÉCNICO-TÁTICA OFENSIVA DE EQUIPES FINALISTAS DA NBA: UM ESTUDO DE CASO

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ABSTRACT

The San Antonio Spurs (SAS) teamwork and the team led by three players of the Miami Heat (MIA) marked the 2014 NBA finals. This study aimed to analyze the offensive actions on those games. Game indicators were obtained through the official NBA box-scores and game analysis took place through an adapted version of the IAD-BB. Field goals made, assists, and total points presented significant association between the teams, in which the SAS presented higher scores in comparison to the MIA. While the SAS presented a significantly higher absolute frequency of offenses with three to five and six to eight passes made, the MIA had a higher number of offenses with zero to two passes made. Significant association was identified for the shooting conditions between the teams, in which the SAS presented a higher number of shots under 'passively guarded' and wide-open conditions, whereas the MIA had a higher number of shots under pressure. However, neither teams' shooting efficacy indicated a significant association. We believe that the higher number of field goals made, assists, total score, and a higher frequency of offenses with a bigger number of passes can be considered the determining factors for the SAS success in the games investigated.

Keywords: Basketball. Game analysis. Athletic performance.

RESUMO

A coletividade do San Antonio Spurs (SAS) e o jogo liderado por três atletas do Miami Heat (MIA) marcaram as finais da NBA de 2014. O objetivo desta investigação foi analisar as ações ofensivas coletivas nestes jogos. Os indicadores de jogo foram obtidos por meio dos *box-scores* oficiais da NBA e a análise das ações de jogo foram coletadas por meio de uma versão adaptada do IAD-BB. Os indicadores de arremessos convertidos, assistências e pontuação total apresentaram associação significativa entre as equipes, onde a equipe do SAS apresentou escores superiores ao MIA. Enquanto que o SAS apresentou frequência absoluta superior de ataques com três a cinco e seis a oito passes, o MIA apresentou maior número de ataques com zero a dois passes. Identificou-se associação significativa das condições de arremesso entre as equipes, sendo superior o número de arremessos em condições facilitadas e livres para o SAS e arremessos em condições pressionadas para o MIA. Não houve associação significativa na eficácia dos arremessos. Acredita-se que o maior número de arremessos convertidos, assistências, pontuação total e a maior frequência de ataques com elevados números de passes podem ser considerados os fatores determinantes para o sucesso do SAS nos jogos investigados.

Palavras-chave: Basquetebol. Análise de jogo. Desempenho atlético.

Introduction

The practice of team sports provides a complex and unpredictable environment to players. In this context, randomness, order and disorder factors, as well as each team constantly attempting to impose their own game style and destabilize the opponent to win the match, stand out^{1,2}. Thus, there is a need for a level of organization and cooperation between players so as to achieve the desired performance³ when facing problem situations frequently imposed by such sports.

In addition to contemplating the complexity present, in general, in collective sports, two characteristics that distinguish basketball from others are the limit of 24 seconds to shoot the ball and a target of only 45 centimeters in diameter⁴. Such situations require high

technical-tactical individual quality and/or constant cooperation between players to overcome the opponent's defense to score. In fact, one of the aspects that James Naismith (basketball creator) considered to be of greatest value in basketball was the development of numerous motor skills during practice, and teamwork⁵.

The consulted literature brings different methods of analyzing performance indicators (popularly known as game statistics) to support interpretations of specific situations and problems encountered in sports practice⁶⁻⁸. By transforming practitioners' actions into numbers that can be interpreted by coaches, these procedures make it possible to guide training sessions and improve fragilities identified in the individual and collective performance of athletes. Traditionally, scoutings contribute to the analysis of game indicators, such as number of field goals attempted, field goals made, defensive rebounds, offensive rebounds, assists, steals, among others^{6,7}. As an example, we mention a study on a tournament playoff⁸, in which winning teams had significantly higher numbers of three-point field goals made, free throws made, defensive rebounds and assists, compared to losing ones.

With the advancement of technologies and the need for an in-depth understanding of the technical-tactical behavior of basketball athletes, game analysis has been highlighted in the scientific community due to its potential contribution to coaches^{9,10}. This method is characterized by an after-match analysis carried out by means of videos, which allows the identification of more detailed aspects of the game such as defensive and offensive movements, athletes' decision-making, quality of technical gestures, and strategies used on the court^{11,12}. Although the game analysis method is used in several basketball practice contexts, it is oftentimes used in high-performance sport, in order to meet the need of constantly improving the performance of professional athletes^{8,10}. It is thus worth mentioning the concern of the international scientific community in investigating the championship organized by the National Basketball Association (NBA) in the United States of America (USA), a competition recognized and consolidated worldwide due to the athletes' performances^{13,14}.

In 2014, the NBA finals counted with the participation of two teams that, overall, had different game models (collective and individual). The San Antonio Spurs (SAS) stood out for the athletes' teamwork to win, while the Miami Heat (MIA) team focused on the technical-tactical skills of three top athletes. At the end of five games, the SAS reached to four wins and became the world champion of 2013/2014 NBA season. MacMullan's text¹⁵, published on ESPN's official website, emphasized the SAS's teamwork as a determining factor for the team's success, making an analogy to "a symphony of cutting and dribbling and passing and scoring". Although the clash of two game models and the importance of teamwork for basketball success have been addressed in the media, there is so far no scientific article that has sought to verify, through a technical-tactical analysis and game indicators, the impact of the Spurs' teamwork and the success achieved in those final games. Thus, the main objective of this investigation was to analyze offensive actions in the NBA Finals during the 2013/2014 season. The objectives were twofold: i) to verify game indicators that determined the success of the champion team; ii) to verify the association between the offensive movement of the teams in the shooting conditions of the athletes, and their efficacy.

The potential contribution of this investigation is to help understand the factors that favored the SAS's wins and the conquest of the 2014 title, despite playing against the MIA, the champion team of the previous season¹⁵. In addition, it is believed that the findings can provide basketball coaches with important reflections and discussions about the consequences of adopting collective and individual game models, allowing new thoughts or new conceptions of sports training for this sport.

Methods

The design of this investigation is descriptive and uses an arbitrary code of observation that develops in a natural environment¹⁶. In this way, it is characterized as observational descriptive, considering the analyses carried out *a posteriori* by means of video-images¹⁷. To meet the proposed objectives, a quantitative data approach was adopted¹⁸.

Sample

For the development of the study, we used the official video recordings of the five games of the 2013/2014 NBA finals, which were acquired by the researchers to conduct this study. The sample consisted of a total of 527 statistical analysis units, selected from a total of 3,737 units.

Instruments for Data Collection

Box-Scores: Box-scores are scoutings that comprise the analysis of various game indicators of each athlete, and according to each quarter and period, as well as total match data. In addition, the “play-by-play” description of the game is presented, which lists all actions performed by the athletes on the court. These numbers are collected by NBA statisticians and made available on the league’s official website.

IAD-BB adaptation: To count the number of passes and analyze shooting conditions and efficacy, as well as for offense types, we adapted the Technical-Tactical Performance Evaluation Tool in Basketball (IAD-BB), proposed by Folle et al.¹². The IAD-BB assesses individual technical and tactical performance of 12 actions taken in the basketball game through adaptation, decision-making, and efficacy components. The classification of actions can vary from 1 to 3 on a likert scale, where 1 is the least adequate action, and 3 is the most adequate action. In the IAD-BB validation process, the instrument obtained 92.4% of consensus between the experts consulted in the content analysis, as well as indexes of 0.84 for intra-rater and 0.96 for inter-rater reliability, receiving the classification of a valid scientific instrument for the individual analysis of the athletes¹².

IAD-BB Adaptation

The adaptation of the original instrument was necessary to assist in the assessment of the offensive collective actions of the investigated teams, specifically as to pass and shooting fundamentals, considering the components of shooting condition and efficacy. In addition to adopting the same classification structure of the actions on a likert scale from 1 to 3, as originally indicated by Folle et al.¹², the IAD-BB adaptation integrated the analysis of three frequent types of offense in basketball: set offense, fast break, and regained offense. The criteria to define offense type and shooting conditions are displayed in Chart 1. The consensus method between basketball experts was used to define the criteria for the offense types and its definitions¹⁹.

In view of the important changes in the definitions proposed by Folle et al.¹² regarding shooting conditions, as well as the addition of the identification of offense types, Cohen’s Kappa intra-rater and inter-rater index was obtained for both variables. This index is a valid statistical method that reports the level of agreement between observers for qualitative data (nominal or ordinal), considering random data¹⁸. Thus, two investigators separately collected data from a full quarter of an NBA game (12 minutes), totaling 191 actions. After waiting for a period of 15 days, a new data collection from the same quarter was performed by the researchers.

Offense Types	Set Offense	Characterized by all offensive players present on frontcourt and the opposing team being completely established on their backcourt ²¹ . Were considered set offenses those where the team had 24 seconds of ball possession and started the offense from the backcourt.
	Fast Break	A speed-based offense in which the team in possession of the ball shoots quickly before the opposing team can establish its defense after a defensive transition ²¹ .
	Regained Offense	All other offense situations that did not characterize as set offense nor fast break were considered as regained offense.
Shooting Condition	Pressured	Field goal taken with a close and pressured defense during the jump and landing of the shooter, or field goal taken in which the defender has conditions (or great possibilities) to block it.
	Passively Guarded	Field goal taken when the defender “passively” guarded and offered poor coverage of the shooter; in this situation the defender is less likely to hinder the shooting motion and to block the offensive player.
	Wide Open	Wide open field goal taken by the offensive player without any defensive pressure , which permits him or her to perform a field goal attempt without difficulty during the jump and landing phases.

Figure 1. Assessment criteria for offense type and shooting condition adapted from the IAD-BB

Source: The authors

Offense types analysis presented a Kappa index of 1.00 for intra-rater and inter-rater reliability. On the other hand, the intra-rater and inter-rater analyses for shooting conditions presented, respectively, Kappa indexes of 0.90 and 0.71. According to the agreement parameters suggested by Landis and Koch²², Cohen’s Kappa intra-rater indexes of investigated variables are in the ‘near-perfect’ range, while inter-rater Kappa indexes are in the ‘substantial’ range, which makes the proposed IAD-BB adaptation applicable.

Variables

The NBA box-score analysis comprised 13 game indicators related to basketball offensive actions, namely: field goals made, field goals attempted, field goal percentage, three-point field goals made, three-point field goals attempted, three-point field goals percentage, free throws made, free throws attempted, free throws percentage, offensive rebounds, assists, turnovers, and total score. Field goals made, field goals attempted, and field goals percentage comprise two and three point shots. It should be emphasized that the data referring to game indicators are characterized as discrete quantitative type, considering the counting of frequency of occurrence. Data from game analysis, in their turn, are defined as ordinal qualitative, due to the researchers’ interpretation for game actions based on a likert scale.

Because of the centrality of the investigation on the offensive collective construction of the investigated teams, the analysis included only set offenses carried out by means of a shot and only passes made on the offensive court. Fast breaks, regained offense, and passes made on the defensive court were excluded. In addition, although the term “shooting” suggests the act of throwing the ball into the basket in parabola movement, the game indicators and the shooting actions analyzed through the instrument used included layups, dunks, and alley-oops.

Data Collection Procedures

Game indicators data were transcribed into Microsoft Office Excel spreadsheets (version 2010). The game analysis technique was performed by means of a systematic observation of video recordings of the 2014 NBA Finals, facilitated by the use of an overhead projector. The investigated videos comprise the NBA's official television broadcasts for the aforementioned games.

In order to ensure greater accuracy in the game analysis process, the "play-by-play" description present in the box-scores was used to align the official data provided by the NBA with the data collection of this study. Three investigators performed this procedure in order to help solve the complex situations encountered throughout the process, as well as to reach a consensus when there was disagreement in the assessments.

Data Analysis

The Shapiro Wilk test was used to verify the normality of game indicators data. Student's t test for independent samples or the non-parametric equivalent (Mann-Whitney U test) was used to compare the means found in each game indicator, when the normal distribution of the data was not found. The Chi-Squared test and Fishers's exact test were used to identify the existence of an association between the teams, as well as the pass and shooting fundamentals investigated. Afterwards, the effect size was calculated for all the statistical tests employed, considering the procedures and parameters proposed by Cohen²³. The data were processed on the Statistical Package for Social Sciences (SPSS), version 23.0, adopting a level of significance of 5%.

Results

Although the NBA box-score analysis included 13 game indicators, the data in Table 1 show only those that revealed significant association, as well as all indicators related to two- and three-point field goals. It is worth noting that three game indicators showed a significant difference of means: field goals made ($p=.023$), assists ($p<.001$), and total score ($p=.004$). Besides these indicators, it should be noted that, even though both investigated teams had similar amounts of field goals attempted (two and three-point field goals) and three-point field goals attempted during the analyzed matches, the SAS obtained the highest mean of field goal percentage for both game indicators. The effect size analysis indicates that field goals made and total score are characterized as medium effect, and assists as large effect.

Table 1. Statistical analysis of game indicators of the NBA Finals in the 2013/2014 season

Indicators	SAS			MIA			Sig.	ES
	M	SD	S	M	SD	S		
Field Goals Made	38.2	1.8	191	33.6	3.2	168	.023 ^a	.662
Field Goals Attempted	72.4	7.4	362	71.2	6.5	356	.786 ^a	.088
Field Goals Percentage	53.3	7.1	--	47.4	5.2	--	.171 ^a	.429
Three-Point Field Goals Made	11	1.9	55	9.2	1.9	46	.172 ^a	.428
Three-Point Field Goals Attempted	23.6	2.9	118	23.2	3.9	116	.858 ^a	.052
Three-Point Field Goals Percentage	46.4	3.4	--	40	7.2	--	.110 ^a	.494
Assists	25.4	3.2	127	15.2	1.6	76	<.001 ^a	.894
Total Score	105.6	6.0	528	91.6	5.1	458	.004 ^a	.781

Note: M = Mean, DP = Standard Deviation, S = Sum, ^a = Student's t test, ES = Effect Size

Source: The authors

The total count of set offenses per team in the five matches analyzed were similar, with 263 offenses for the SAS team and 264 for the MIA team. The number of passes made in the 527 offenses of both teams varied from zero pass to eight passes before shooting. As it can be seen in Figure 2, while the SAS team performed more frequently two and four passes in the offenses made, the MIA team concentrated the offense with just one pass.

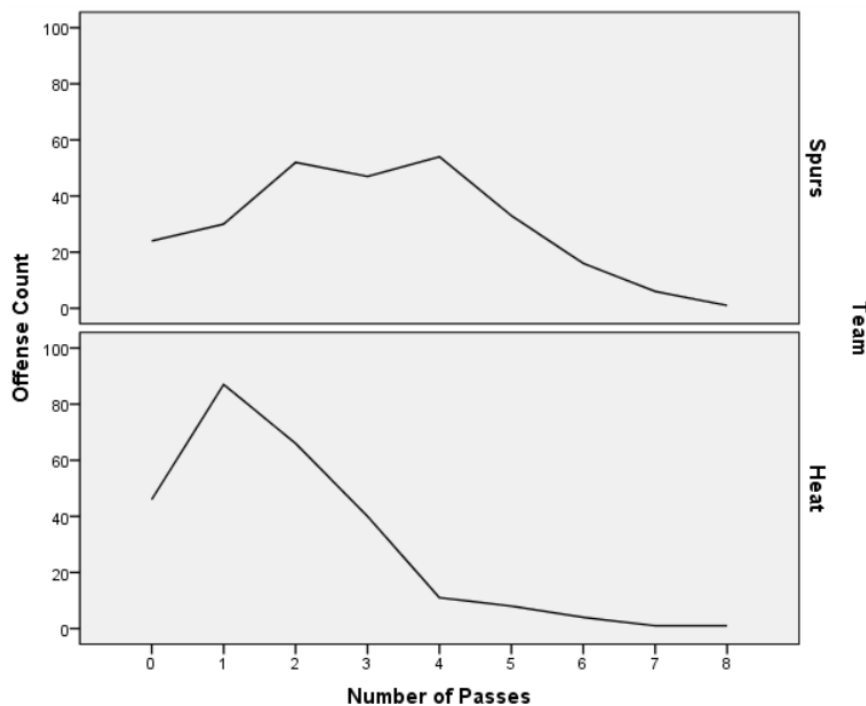


Figure 2. Number of set offenses according to the amount of passes made

Source: The authors

In the overall calculation of offenses made by the investigated teams (Table 2), offenses with zero to two passes (57.9%) stood out, suggesting the concern of the teams in finishing the offense with little use of this fundamental. However, a detailed analysis of the teams revealed significant differences in terms of number of passes made per offense ($p < .001$). While the MIA team performed more frequently (75.4%) offenses with fewer passes (zero to two passes), the SAS team performed more offenses with a larger number of passes: three to five passes (51.0%), and six to eight passes (8.7%). Medium effect size was identified for this analysis.

Table 2. Incidence of set offenses by category, considering passes made past mid-court.

Team	Number of Passes						Total	Sig.	ES
	0 – 2 Passes		3 – 5 Passes		6 – 8 Passes				
	n	%	n	%	n	%			
SAS	106	40.3	134	51.0	23	8,7	263		
MIA	199	75.4	59	22.3	6	2,3	264	<.001†	.358
Total	305	57.9	193	36.6	29	5,5	527		

Note: † = Chi-squared test, ES = Effect Size

Source: The authors

As for the teams's shooting conditions over the analyzed games, the data in Table 3 revealed that most of the shots were made under pressured conditions (64.9%), followed by

passively guarded (22.0%) and wide open (13.1%). Analyzing the teams individually, a statistically significant difference in the investigated shooting conditions was identified ($p=.006$). The MIA team made more shots under pressure (71.6%) and the SAS team made more shots in passively guarded (24.7%) and wide open (16.7%) conditions. Despite the significant p -value in the correlation between these variables, the effect size is small.

Table 3. Conditions of the shots made by the teams in set offenses

Team	Shooting Conditions						Total n	Sig.	ES
	Pressured		Passively Guarded		Wide Open				
	n	%	n	%	n	%			
SAS	154	58.6	65	24.7	44	16.7	263		
MIA	189	71.6	51	19.3	24	9.1	264	.004†	.145
Total	343	65.1	116	22.0	68	12.9	527		

Note: † = Chi-Squared Test, ES = Effect Size

Source: The authors

Regarding to shooting efficacy considering the shooting conditions analyzed, the results in Table 4 did not reveal significant association between the two variables ($p>0.05$). Overall, the efficacy of the shots of both teams showed similar numbers, regardless of shooting conditions. It is important to note that, under pressure, the MIA presented higher scores for field goals made (48.1%), while the SAS presented higher values under passively guarded (61.5%) and wide open (59.1%) conditions.

Table 4. Shooting efficacy considering shooting conditions in set offenses

Teams	Shooting Conditions	Efficacy						Total n	Sig.	ES
		Missed		Blocked		Made				
		n	%	n	%	n	%			
SAS	Pressured	80	51.9	6	3.9	68	44.2	154		
	Passively Guarded	23	35.4	2	3.1	40	61.5	65	.087‡	.176
	Wide Open	18	40.9	0	0	26	59.1	44		
	Total	121	46	8	3	134	51	263		
MIA	Pressured	90	47.7	8	4.2	91	48.1	189		
	Passively Guarded	21	41.2	2	3.9	28	54.9	51	.705†	.091
	Wide Open	10	41.7	0	0	14	58.3	24		
	Total	121	45.8	10	3.8	133	50.4	264		

Note: ‡ = Fisher's Exact Test, † = Chi-Squared Test, ES = Effect Size

Source: The authors

Discussion

The results of the analysis on the 13 game indicators revealed that field goals made, assists, and total score were the game indicators in which the SAS presented significantly higher scores, and appear to have contributed to the victories over the MIA and, consequently, to winning the 2013/2014 NBA finals. The superiority of field goals made by the SAS reveals the consolidation of this indicator as a success factor in basketball teams, as already mentioned in other studies^{24,25}. However, it is worth pointing out the importance for future

studies to identify specifically the zones where these shots were made, as well as the shooting types that specifically contributed to the SAS's success in those finals, such as layups, mid-range shots, close-range shots, dunks, among others.

Assists in basketball are characterized as the last pass before a field goal made, provided that the shooter takes immediate action after receiving the pass¹¹. This indicator is not only related to the player's technical ability to execute a pass to a teammate, but involves his or her cognitive decision-making ability, by reading the opposing defense and offensive movement of teammates, to identify the player with the best position for receiving the pass and taking the shot²⁴. In this study, the SAS presented a significantly higher number of assists compared to the MIA, a fact already observed in other winning teams in basketball^{8,24-26}, which is usually reported as an indicator of teamwork^{24,26}.

Although assists are the result of cooperation between at least two players, it is believed that an analysis focused solely on this indicator may lead to a rushed interpretation of the offensive collective work of a basketball team. In fact, the execution of only one pass followed by a field goal made will be counted as an assist. However, if the player dribbles the ball after receiving the last of a large sequence of passes and makes the field goal, this final pass will not be counted as an assist. Thus, the evidence from this study empirically supports the prior indications of the SAS's collective work in offensive actions¹⁵, in view of the significantly higher average of assists combined with the highest number of set offenses with three to five and six to eight passes before shooting to the basket.

The significant difference in the total score between the teams investigated can be clarified by the balance level of the NBA finals scores in the 2013/2014 season. While the difference was only two points in the MIA's only win, in the four games won by the SAS the differences in the final score were, sequentially, 15, 19, 21, and 17 points. Thus, considering the classification used by Almas⁸ to define the balance level of basketball games in the adult category, the only game won by the MIA and the game won by the SAS by 15 points were balanced games. The other matches won by the SAS were unbalanced ones, reinforcing the premise of the superiority of teamwork to the detriment of the individual technical quality of certain athletes in a basketball team.

Regarding the analysis of shooting conditions considering the number of passes of the teams investigated, results indicate that the highest number of offenses with few passes (zero to two) allowed the MIA's athletes to shoot in the pressured condition in the majority of times. On the other hand, the greater number of offenses with three to five and six to eight passes gave the SAS's athletes more favorable conditions for shots in the passively guarded and wide open conditions. Such results corroborate previous indications that the offensive organization of a basketball team through moving the ball allows finding open spaces in the opponent's defense and more favorable shooting conditions²⁷. Moreover, this finding is also justified by the principle of ball possession maintenance²⁸, in which offense players tend to unbalance the opponent's defense and enable the best shooting means through making passes with teammates, coupled with their offensive movement without possessing the ball.

Despite the differences identified for the shooting conditions of both teams, no association between this variable and its efficacy was identified. These findings can be interpreted from the action rule principle²⁸, which suggests possible forms of response for a player to different problem situations encountered during a game of any team sport, specifically considering his or her decision-making ability. When possessing the ball, the basketball player has four options: shoot it, make a passe, dribble, or maintain possession. It is also important to mention that shooting under pressure may be executed due to the player's mistaken decision or because the shot clock is running down, considering the 24 seconds allowed in basketball⁴. Taking into account the number of similar field goals made between

both teams, the technical quality of the MIA's players is worth highlight, athletes who, even under pressure, managed to score a higher percentage of shots (48.1%) compared to the SAS's athletes (44.2%). Nevertheless, this analysis did not present significant association between the variables and, because the team analysis was conducted collectively, it was not possible to identify the influence of each athlete on the data related to shooting efficacy. Thus, understanding this influence could help in the understanding of future studies about the correlation between shooting condition and efficacy.

Considering that there was no significant association in the efficacies of the field goals made in set offenses (although a significant difference was observed in the means of the field goals made indicator), it is believed that the analysis focused only on set offense has made it impossible to identify a significant association of the teams with shooting efficacy. Furthermore, since the number of field goals made in set offense was similar between the teams (SAS 134; MIA 133), it is suggested that the significantly higher mean in the total score indicator by the SAS comprises the points generated from other types of offense and free throws, aspects not investigated in this study. Thus, there is a need for future analyses to contemplate fast breaks and regained offense to understand game models of basketball teams better, as coaches can encourage the use of certain offense types that require the players' offensive technical-tactical qualities to increase chances of success.

Conclusions

Faced with the results obtained, the evidence points to field goals made, assists, and total score as game indicators associated with the SAS and, possibly, determinants for their success in the 2014 NBA finals. The SAS's offensive teamwork was also evidenced by the higher frequency of assists and offenses with a large number of passes compared to the MIA. These results corroborate the proposal that a greater number of passes with the movement of a basketball team provides better shooting conditions.

Although the SAS team had more favorable shooting conditions compared to the MIA team in set offense, the efficacy of this fundamental was not significantly associated with the condition in which they were performed. It is believed that some factors not herein investigated may contribute to an offensive analysis of basketball teams in further studies, such as individual technical quality of the athletes, game moment, shooting zone, shooting type, and offense type. Therefore, future studies should analyze these factors to allow an understanding of technical and tactical offensive qualities of NBA athletes and how they influence the final result of a basketball game.

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