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Technical and relational analysis of Michael Jordan in the 1995-1996 NBA Finals

Natán Andrés Cook Vaquero . *Pontifical University of Salamanca. Salamanca, Spain.*
Mario Amatria Jiménez. *Pontifical University of Salamanca. Salamanca, Spain.*

ABSTRACT

This article aimed to analyse the technical skills of Michael Jordan by studying his technical actions, shots, and relationship with teammates. The study focused on the six games of the 1995-1996 NBA playoff finals, utilizing an ad hoc instrument with 14 dimensions and 147 categories. The data underwent synchronous analysis to assess the relationship between variables and various success criteria. The results indicated by this data revealed the percentage of Jordan's involvement and his manner of participation. Additionally, a diachronic analysis was conducted using polar coordinate analysis to measure associative consistency among different behaviours. This allowed for the observation and analysis of Jordan's relationship with teammates. The obtained data highlights the significance of dribbling, free throws and fadeaway shot as frequent and effective technical actions used by Jordan. Moreover, they illustrate how Michael was a prominent player in the game, actively contributing to the offensive actions of his team.
Keywords: Sport science, Michael Jordan, Basketball, Dribbling, Free throws, Fadeaway, Polar coordinates.

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Corresponding author. *Pontifical University of Salamanca. Salamanca, Spain.*
E-mail: nacookva@upsa.es
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INTRODUCTION

Basketball is one of the most practiced sports in the world (Quispe, 2023) and research has traditionally focused on aspects such as training, biomechanics, health and injuries, and physiology (Amirnordin et al., 2023; Shah et al., 2023; Shi & Wu, 2024). However, technical-tactical studies, carried out from systematic observation, have not been sufficiently developed (Remmert, 2003) to date. Nevertheless, the emergence of increasingly sophisticated data analysis software, combined with the development of rigorous methodological approaches, provided researchers the tools to prove or disprove numerous theories about basketball that, until then, lacked scientific credibility. A particularly prominent area of the current research in the field of basketball is the relationship between physiological demands and the technical-tactical performance that players develop (Figueira et al, 2022). The depth and sophistication of these interactions, directly related to creativity and intra-team coordination (Furley & Memmert, 2015), confirm that basketball, along with its underlying structures, is a complex system (Klostermann et al., 2018).

This complexity of the game generates complex data when studied, which, if simplified and decomposed into measurable units, becomes easier to analyse (Bakeman & Quera, 1996). In the case of basketball, this "*simplification*" is the only way to validate associations and/or causal relationships that occur during the game and obtain behavioural structures and interactions between them, from a certain distance, that does not affect their development. In this complex game, the whole, which means the team, is more than the sum of its parts, hence the importance of understanding how different players interact and relate to each other. One of the main data analysis techniques to analyse complex interactions in sports is polar coordinate analysis applied to data collected through systematic observation (Anguera & Hernández-Mendo, 2015; Castañer et al., 2016, 2017). Polar coordinate analysis can be used to measure the spontaneous behaviour of players interacting in their natural environment from the perspective of a specific behaviour, known as focal behaviour, having been performed with a high degree of success in other team sports such as soccer (Maneiro & Amatria, 2018) or handball (Navarro et al, 2018).

In this sense, this typology of analysis has proven to be an effective tool to decompose the complexity of the game (Lago & Anguera, 2002; Castellano & Hernández-Mendo, 2003; Perea et al., 2012; Robles et al., 2013). Its application to the study of several of the best athletes in the world from various collective sports disciplines (Castañer et al., 2016; Castañer et al., 2017; Maneiro and Amatria, 2018) has allowed researchers to obtain practical conclusions about what makes these players excellent and, in return, make recommendations to improve the offensive and defensive aspects of the game.

However, polar coordinate analysis has not yet been tested in players with a specific demarcation such as shooting guards. Most of the research on shooting guards is based on different groups of players based on their position in the field between this specific demarcation and point guards, obtaining interconnected results, which in no case can be confirmed as definitive for this type of demarcation, that is, the data analysed is generally outside the specific context of the actions and tactical technical performance developed by these players (Gómez et al, 2007; Sampaio et al., 2008).

On the other hand, the relationships that occur between players are usually viewed through a prism focused on their traditional role according to their position on the field. However, in today's basketball, where greater versatility is increasingly required from players, only three key positions (guard, forward and centre) are identified, according to Sampaio et al. (2006), leaving the shooting guard position diluted and integrated in a non-specific way as such.

This happens since the traditional mission of the shooting guard is characterized by their permeability, being a driving force that helps the point guards to organize the game and raise the ball, as well as having mastered shots at all distances (outside, inside and free throws), an aspect that conditions him to be the team's highest scorer and the player with the greatest responsibility attacking. This is why his identification as such is not defined, since he shares the functions of point guard and small forward. In this sense, Fransen et al. (2016), in their study on leadership in sport, determine that the players with main rolls in the game are in a very beneficial spatial position that, in combination with their high tactical responsibilities, positions them as team leaders. Following this line, there are many current examples of great international players that play this position such as Stephen Curry, Luca Doncic or James Hardem, who have as role models players like Kobe Bryant, who had at the same time Michael Jordan as an idol to emulate, latter considered the best shooting guard of all time (Greer, 2023).

Given the above, it is considered appropriate to carry out an in-depth analysis of one of the best shooting guards of all time in his natural environment. This will be carried out through the study of his interactions between teammates and his executed technique, aiming to unequivocally and scientifically establish the elements that must be present in players who play or wish to play in this position that is so relevant in basketball. Applying a robust methodological approach, combined with in-depth multidimensional analysis of rigorously coded data, will help provide objective insights into how Michael Jordan interacts with his environment and makes him unique. The specific objective is to analyse Michael Jordan's technical skills in the NBA playoff final of the 1995-1996 season through his technical actions, his shoots and his relationship with his teammates.

METHOD

To carry out the development of the present research, the Observational Methodology (Anguera, 1979) has been applied. The research design, in accordance with Sánchez-Algarra and Anguera (2013), follows an Idiographic model –given that a single team is the unit of study–, a Tracking model –studying during the games that constitute the finals of the 1995-1996 playoffs–, and a Multidimensional model –due to the categories that form the dimensions constituting the observation instrument. The conducted observation has been guided by scientific criteria with total perceptiveness and as a non-participating observer.

Participants/Sample

The observational sampling conducted has been intentional (Anguera, et al., 2011) with the American professional basketball team Chicago Bulls during the development of the playoff finals for the NBA Champion title in the 1995-1996 season (in this season, the Chicago Bulls won 72 games, breaking the all-time record for most victories in a season, a record that lasted for 20 years). The videos used are publicly available television broadcasts that have been retrieved for the study. All offensive sequences developed by the team during the 6 games that make up the finals of that season –1995-1996– have been coded. The 521 coded offensive sequences consist of 4798 multi-events.

Intersessional consistency has been ensured through the following elements: the same ball size, the same court dimensions, the same game time, the same players on the roster, and the same jersey assignments.

Observation instrument

The present research required the development of an ad hoc observation instrument –see Table 1– which drew from the following sources: the works of Alsasua et al. (2018) and Arroyo et al. (2022). The instrument adapted their contributions and included new dimensions –Player Position, Defensive System, and

Consequence– which will provide a solid foundation for addressing the research objective. The instrument is a combination of nested category systems in field formats –dimensions. These categories adhere to the premise of being exhaustive and mutually exclusive.

Table 1. Observation instrument.

No.	Dimension	Category System
1	Offense	Positional) offense with defenders positioned; Fast Break) offense in a fast-break situation.
2	Player Positions when passing the half-court line	PJ500) 5 outside players; PJ104) 1 outside player, 4 in the paint; PJ410) 4 outside players, 1 inside the three-point line; PJ401) 4 outside players, 1 in the paint. PJ140) 1 outside player, 4 inside the three-point line; PJ320) 3 outside players, 2 inside the three-point line; PJ302) 3 outside players, 2 in the paint; PJ203) 2 outside players, 3 in the paint; PJ230) 3 outside players, 3 inside the three-point line; PJ311) 3 outside players, 1 inside the three-point line, 1 in the paint; PJ131) 1 outside player, 3 inside the three-point line, 1 in the paint; PJ113) 1 outside player, 1 inside the three-point line, 3 in the paint; PJ212) 2 outside players, 1 inside the three-point line, 2 in the paint; PJ221) 2 outside players, 2 inside the three-point line, 1 in the paint; PJ122) 1 outside player, 2 inside the three-point line, 2 in the paint.
3	Defensive System	DI) individual defence; DZ) zone defence; DMX) mixed defence; PT) full-court pressure; P34) three-quarter-court pressure; P12) half-court pressure.
4	Player	J23) Michael Jordan; J33) Scottie Pippen; J91) Dennis Rodman; J13) Luc Longley; J07) Toni Kukoč; J09) Ron Harper; J25) Steve Kerr; J34) Bill Wennington; J08) Dickey Simpkins; J22) John Salley; J30) Jud Buechler; J00) Randy Brown; J53) James Edwards; J35) Jason Caffey.
5	Technical action executed by the player with the ball	RP) receives and shoots; PerRP) loss after receiving and shooting; PerR) loss after receiving; Bot) bounces once; PerBot) loss after bouncing once; Drib) dribbles multiple times; PerDrib) loss after dribbling multiple times; Pas) passes; PerPas) loss after passing; Lan) shoots at the basket.
6	Starting Zone	ZI1, ZI2, ZI3, ZI4, ZI5, ZI6, ZI7, ZI8, ZI9, ZI10, ZI11, ZI12, ZI13, ZI14, ZI15, ZI16, ZI18, ZI19, IN) unobservable.
7	Ending Zone	ZF1, ZF2, ZF3, ZF4, ZF5, ZF6, ZF7, ZF8, ZF9, ZF10, ZF11, ZF12, ZF13, ZF14, ZF15, ZF16, ZF18, ZF19.
8	Off-ball Player Action	Bloq) pick and roll; BloqC) pick and cut; C) cut; Apo) approach support to the ball; Puer) backdoor cut.
9	Interceptions and Interruptions	SF) inbound pass; SB) sideline inbound pass; SBF) sideline inbound pass after the ball has been out of bounds; R) rebound; Ro) steal; Int) ball interception; F) foul; FT) technical foul; FA) unsportsmanlike foul; Fx2) foul by two players; TM) timeout; Sx2) jump ball; TresS) three seconds in the key; Lucha) hustle; 24s) end of shot clock; Defl) illegal defence (three seconds in the key).
10	Outcome	CO1) change of possession; CO2) loss of possession; CO3) regaining possession.
11	Shooting Zones	ZT1, ZT2, ZT3, ZT4, ZT5, ZT6, ZT7, ZT8, ZT9, ZT10, ZT11, ZT12, ZT13, ZT14, ZT15, ZT16, ZT18, ZT19.
12	Type of Shot	TSus) jump shot; TEs) set shot; TAtr) fadeaway shot; TMov) moving shot; En) layup; MEst) static dunk; MMov) moving dunk; G) hook shot; AO) Alley-Oop; StepB) step-back shot; B) bomb; Pal) tip-in.
13	Scoring	P0) missed shot; P1) made free throw; P2) made two-point shot; P3) made three-point shot.
14	Moment	M1) start and end of the first quarter; M2) start and end of the second quarter; M3) start and end of the third quarter; M4) start and end of the fourth quarter; PR1) start and end of the first overtime; PR2) start and end of the second overtime; PR3) start and end of the third overtime.

Recording and coding

The data was recorded (Hernández-Mendo et al., 2014) using Lince software, version 1.2.1 (Gabin et al., 2012), achieving an intra-observer agreement value of .91. The obtained data is of type IV, i.e., concurrent and time-based (Anguera et al., 2011).

Subsequently, two additional programs were employed. The first one was Gseq v5.1 (Bakeman & Quera, 2011), through which sequential analysis of delays was conducted. Later, the program Hoisan, version 1.2 (Hernández-Mendo et al., 2012), was utilized. The data obtained from the previous software was entered and analysed for obtaining polar coordinates. Finally, for the representation of results, the ObserTools application (Rodríguez-Medina et al., 2021) was employed.

Data quality

The data collection was carried out by two graduates in Sports Science with extensive experience in the studied sport and the use of observational methodology. However, the observers received specific training for data collection in this study following the phases recommended by Anguera (2003). The primary observer recorded all sequences comprising the observational sampling, while the second observer recorded 16.7% of the total sample.

The reliability of the obtained data was calculated using Cohen's (1960) Kappa coefficient. This coefficient measures the agreement between nominal classifications where there is no order of ranking. GSEQ software version 5.1 was used for the calculation of this coefficient following the recommendations established by Bakeman & Quera (2011). The concordance index achieved by the primary observer was .91 (intra-observer agreement). Regarding the result of inter-observer agreement, it was higher than .86 in all games included in the study (game 1 = .93; game 2 = .87; game 3 = .94; game 5 = .88, game 6 = .87). Considering these concordance data, it can be stated that the agreement is almost perfect (Landis & Koch, 1977).

Data analysis

Two types of data analysis have been employed to address the stated objectives: synchronous analysis and diachronic analysis.

Synchronous analysis through inferential statistics has been used to assess the relationship between variables and various success criteria, using the Pearson chi-square statistic (χ^2). This was done by applying the following formula:

$$\chi^2 = \sum_{i,j=1}^{k} [\frac{(F_{ij} - \hat{F}_{ij})^2}{\hat{F}_{ij}}]$$

The computation of this statistic was carried out using SPSS software version 20.0.

Regarding the diachronic analysis, polar coordinates analysis has been employed, which is a very recent typology of analysis in sports science (Anguera and Hernández-Mendo, 2015). Cochran's Zsum (1954) is the foundation and origin of this analysis technique, which applies and is based on the principle that the sum of N independent z scores is normally distributed, with $Z = 0$ and $s = N$. Thus, the statistic $Z\text{sum} = \sum_l^m \frac{z}{\sqrt{n}}$ (where n is the number of delays), according to Sackett (1980), allows measuring the strength or associative consistency between different behaviours.

The polar coordinates technique, developed by Sackett (1980) and later refined by Anguera (1997), is utilized to identify the relationships between behaviours. The technique involves one of these behaviours: the conditioning behaviour or focal behaviour and the remaining behaviours, which constitute the various dimensions of the observation instrument (conditioned behaviours). This analysis is performed both prospectively (+1 to +5) and retrospectively (-1 to -5), resulting in a vector for each behaviour related to the focal behaviour, with a specific angle and radius.

Based on the angle obtained by the vector, it can occupy one of the four quadrants or sectors that make up the polar coordinate. Depending on the quadrant the vector occupies, the activation or inhibition relationship between behaviours varies. In quadrant I, the focal behaviour activates the presence of the mating behaviour both in the prospective and retrospective planes. In quadrant II, the focal behaviour is activated by the mating behaviour in the retrospective plane, while it is not in the prospective plane. In quadrant III, the focal behaviour inhibits the presence of the mating behaviour in both the prospective and retrospective planes. Lastly, in quadrant IV, the focal behaviour is activated by the mating behaviour in the prospective plane, while it is not in the retrospective plane.

RESULTS

During Jordan's participation in the 6 games that make up the sample, he interacts with the ball a total of 536 times out of the team's total of 2996 interventions, accounting for 17.89% of the actions in the offensive play where the ball goes through his hands.

Regarding the technical actions executed by Michael Jordan, the obtained results indicate the presence of significant differences ($\chi^2 = 163006$; $p < .001$). Standout actions include dribbling –Drib– with 35.9%, Free-throw shooting –Lan– (11.9%), and Dribble –Bot– (12.6%), percentages superior in all cases to the results achieved by his teammates. On the other hand, RP –reception and pass– and Pas –pass– actions present lower percentage results compared to the rest of the teammates with 34.0% and 2.7%, respectively (Table 2).

Table 2. Technical action executed by the player with the ball.

	RP	PerRP	PerR	Bot	PerBt	Drib	PerDrib	Pas	PerPas	Lan
Other players	44.1%	0.8%	0.6%	9.4%	0.6%	23.9%	0.3%	16.0%	0.1%	4.2%
Michael Jordan	34.0%	0.7%	0.0%	12.6%	0.9%	35.9%	1.2%	2.7%	0.0%	11.9%

In terms of the type of shot executed, Michael Jordan exhibits shooting percentages that amount to 207 finishing actions, both following a previous technical action and from the free-throw line, resulting in a shooting rate of 38.61%.

Table 3. Type of shot executed.

	Tsus	Tes	Tart	Tmov	En	Mest	Mmov	G	B	Pal
Other players	47.0%	20.7%	3.8%	4.6%	10.6%	1.3%	2.3%	6.1%	.2%	3.5%
Michael Jordan	34.3%	31.9%	15.9%	4.3%	12.1%	0.0%	1.0%	0.0%	0.0%	.5%

Table 3 presents the results corresponding to the analysis of the type of shot executed when comparing Michael Jordan with the rest of his teammates. The obtained results from this analysis show significant differences ($\chi^2 = 64137$; $p < .001$). Notably, the actions of TEs –Static Shot– (31.9%) and TAtR –Backward Jump Shot– with 15.9% stand out in this regard.

Effectiveness

Regarding shooting effectiveness, i.e., the success of making or missing the shooting action, the results obtained, when comparing the performances of Michael Jordan with the rest of his teammates, show significant differences ($\chi^2 = 1615$, $p < .001$) in favour of Michael Jordan, presenting much higher shooting efficiency percentages than the rest of his teammates –Table 4.

Table 4. Shooting effectiveness.

	Ineffective	Effective
Other players	54.1%	45.9%
Michael Jordan	48.8%	51.2%

There are no significant differences in Jordan's involvement and the moment of the game, nor between the moment and the effectiveness of the shot, nor between the moment and the effectiveness between games.

Finally, the results obtained are presented regarding the associative analysis through the use of polar coordinates technique, where Michael Jordan is related to the rest of the players in the squad who participated in the different games played.

For the development of this analysis, the focal behaviour J23 has been related to the rest of the categories that make up the dimension (J33, J91, J13, J07, J09, J25, J34, J08, J22, J30, J00, J53, and J35), as well as with itself (J23). This analysis aims to verify the relationship established between Michael Jordan and the rest of the teammates throughout the final phase. The results obtained (Table 5 and Figure 1) show the criterion category J23 (Michael Jordan) with a radius of 7.24 and an angle of 45 degrees in quadrant I, where the focal behaviour activates the presence of the mating behaviour both in the prospective and retrospective planes.

Also, the categories J25 (Steve Kerr), J22 (John Salley), J00 (Randy Brown), J34 (Bill Wennington), and J30 (Jud Buechler) are observed with radii of 5.96, 3.69, 3.02, 3.33, and 2.96, and angles of 223.63°, 230.61°, 259.26°, 226.63°, and 238.32° respectively, in quadrant III, where the focal behaviour inhibits the presence of the mating behaviour both in the prospective and retrospective planes.

Table 5. Results of the polar coordinates of analysis for the focal category J23 in relation to his teammates in the 1996 finals matches.

Category	Quadrant	Prospective Zsum	Retrospective Zsum	Radius	Significance–Sig.	Angle
J23	I	5.12	5.12	7.24	**	45
J33	I	0.71	1.41	1.58		63.36
J91	III	-0.2	-0.34	0.39		239.04
J13	IV	0.82	-1.63	1.83		296.63
J07	II	-0.95	0.04	0.95		177.57
J09	II	-0.41	1.74	1.79		103.17
J25	III	-4.31	-4.11	5.96	**	223.63
J34	III	-2.29	-2.42	3.33	**	226.63
J22	III	-2.34	-2.85	3.69	**	230.61
J30	III	-1.56	-2.52	2.96	**	238.32
J00	III	-0.56	-2.97	3.02	**	259.26

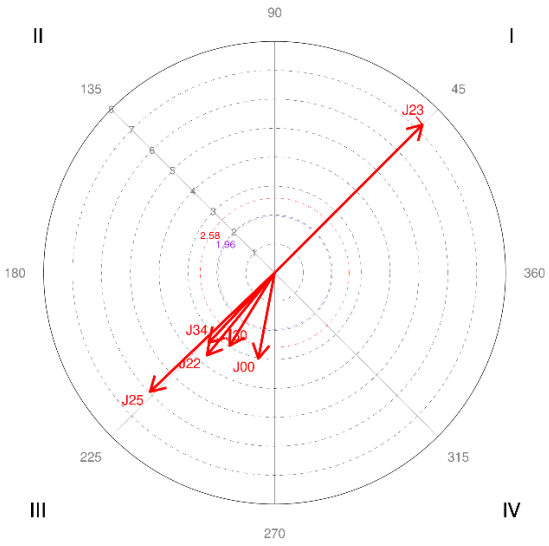

Figure 1. Representation of the behavioural map establishing category J23 as the focal behaviour in relation to his teammates in the 1996 finals matches.

DISCUSSION

Following Anguera and Hernández-Mendo (2015), the effectiveness of observational methodology lies in its ability to conduct a diachronic analysis with type II and type IV data, meaning data that include an order and a time component. However, conventional synchronic statistical analyses are also relevant, seeking associations between dimensions that provide categorical data to meet the objectives established in match analysis (O'Donoghue, 2009).

Regarding the technical actions performed by Michael Jordan, dribbling stands out as the most prominent. This technical action is characteristic of shooting guards, who, unlike point guards, not only have offensive construction responsibilities, but also play a role in breaking the repetitive dynamics of the attack and are players with a high degree of technical proficiency (Okazaki et al., 2004; De Rose et al., 2004; Gómez et al., 2007).

Regarding his shooting performance, Jordan demonstrates a particular expertise in free throw shooting, with a very high success rate. In this regard, this proficiency, coupled with his publicly acknowledged dedication to practicing this technique after daily training sessions, is closely linked to dribbling, as through these one-on-one situations, he manages to draw personal fouls in his favour, and these situations end up leading to free throw attempts, proving to be a decisive performance factor in basketball (Csataljay et al., 2009; Paulauskas et al., 2018).

On the other hand, concerning the type of shot Jordan executes most notable, it is the fadeaway. This shooting style became his signature move, not only due to its repetition as the team's offensive finish but also because of his accuracy in scoring. This shooting technique serves as a counterpoint to the previously mentioned dribbling technique. Jordan uses dribbling as a deceptive move or feint to create optimal space, combined with the slight distance gained from the defender when jumping backward, allowing for a higher likelihood of successful execution (Courel-Ibañez et al., 2017).

In this regard, considering Jordan's shooting efficiency during the finals, especially if we take into account the volume and relevance of his shots, it can be observed the significance of this player in the team's scoring success. The precision in field goals is a crucial factor in achieving success in a game, as these variables represent both individual and collective offensive effectiveness (García et al., 2013; Malarranha et al., 2013).

Undoubtedly, professional basketball has undergone significant development and evolution in the game over the last decade, showcasing players with increasingly versatile profiles (Courel-Ibáñez et al., 2017; Mateus et al., 2015). Therefore, it is essential to update knowledge about performance profiles in young players with professional potential and assess their suitability for today's high-level basketball (Ibáñez et al., 2018). However, it is crucial not to overlook the qualities and capabilities of players who have left their mark on the history of international basketball, particularly in the NBA, where players often exhibit a higher degree of specialization in their game compared to other competitions (Paulauskas et al., 2018).

CONCLUSIONS

The objective set in this research was to analyse the technical skills of Michael Jordan in the NBA 1995-1996 playoff finals through his technical actions, shooting, and his relationship with his teammates. To address this objective, two types of analyses, synchronous and diachronic, have been employed, through which, based on the results obtained, the following conclusions can be reached:

- Regarding his actions, dribbling stands out, as well as the execution of free throws, which are strongly related elements. Here, Jordan demonstrates excellent ball control and 1x1 skills, forcing defences to engage with more than one opponent and causing defensive personal fouls.
- The type of shot he performs that stands out is the fadeaway, a shooting action strongly linked to 1x1 situations. This provides a wide variety of resources and solutions to different 1x1 and even 1x2 scenarios for this player, making defending him a very complex situation due to the unpredictability of his actions.
- Jordan is a completely consistent player with effectiveness indices in his actions and a level of participation that remains constant during all four quarters of each game and throughout the six games that make up the NBA finals.
- The relationship between Jordan and his teammates does not show significant results exclusively with himself. This is interpreted as a player with great adaptability who both includes his teammates and is included by them in the plays, and the results clearly identify the team as rotation or non-participative.

These types of studies allow us to advance and better understand the game of one of the best basketball players in the world. This enables the replication of his actions and a deeper comprehension and appreciation of the evolution of this sport. Similarly, this study serves as guidance for coaches and players in developmental categories, where the specificity of the position is less emphasized, and a more versatile player profile is increasingly valued, capable of effectively participating in the entire development of offensive actions.

AUTHOR CONTRIBUTIONS

Natán Andrés Cook Vaquero: data registration, analysis and interpretation, writing and translating the article. Mario Amatria Jiménez: data verification, analysis and interpretation, methodology approach, and writing the article.

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