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Analysis of Offensive Patterns After Timeouts in Critical Moments in the EuroLeague 2022/23

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Abstract: Timeouts are a widely supported strategy in the literature, recognized for directly influencing team performance during basketball games. This study aimed to analyze and define the successful patterns of actions after timeouts (ATOs) during critical moments in the 2022/23 EuroLeague season. The sample was drawn from the last two minutes and overtime of 169 games with a final point difference of 10 points or fewer, totaling 365 ATOs. An observational methodology was used, applying the LINCE PLUS software version 2.1.0 and an ad hoc observational instrument. Descriptive analysis and chi-square tests (χ^2) were conducted using SPSS 25.0, and T-pattern analysis was performed with Theme 6 software. Statistical significance was set at $p < 0.05$. Teams in the lead often concluded successful plays through free throws following opponent fouls, while teams trailing behind attempted to close the gap by committing fouls to force free throws in defense and scoring two-point baskets on offense. The findings offer insights into ATOs strategies that can support coaches and technical staff in training and adapting these actions to meet competition demands during critical game moments. These results may assist in enhancing team performance and decision-making under high-stakes conditions.

Keywords: close games; last possessions; basketball; team performance; game analysis

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1. Introduction

In recent years, scientific literature has highlighted the importance of the coach in a team's success through their multifactorial role [1]. Basketball is a non-deterministic sport with multiple technical-tactical solutions [2], making pre-game strategy crucial to the outcome [3]. Coaches can adjust tactics during the game to adapt to its dynamics [4]. In this way, coaches can indirectly influence team performance through interaction with players and directly impact the game itself by making decisions such as tactical adjustments, substitutions, or timeouts [5,6].

Unlike direct methods, player interaction can be provided continuously from the technical area but may be distorted by factors such as bench distance or ambient noise [4]. On the other hand, substitutions and timeouts are subject to regulation in their application, yet they remain some of the most effective ways to influence the team due to their direct effect on gameplay [7,8].

Due to their significant impact, the use of timeouts has been studied in various indoor sports, such as volleyball [5,8,9] or handball [4,7,10,11]. However, most scientific evidence is

found in basketball, with publications addressing their effects [3,6,12–15], the physiological responses of players [16] and coaches [17], the mental rotation process players undergo after receiving instructions [18,19], coach experience and type of speech [20,21], and the phases of the timeout [22].

Coaches often call timeouts to break negative streaks, rest players, or adjust the game plan [3]. Given that timeouts are limited to 60 s and are considered a period of high psychological and physiological demand for coaches, especially those occurring in the final minutes of the game [17,22], it is logical to adopt certain strategies to maximize their effectiveness.

In this regard, recent research [22] divides timeouts into three phases: an initial phase for players to recover and the coach to identify key points; an intermediate phase for calmly addressing strengths and weaknesses with visual aids; and a final phase for players to summarize the coach's instructions. During the timeout, it is essential that information is transmitted clearly, concisely, and simply [21]. For this purpose, visual aids should align with the coach's perspective to reduce cognitive load and prevent misunderstandings [18,19].

Despite these measures, the scientific literature presents conflicting views on their impact on performance. Early research observed that using timeouts effectively interrupted an opponent's scoring streak in both men's and women's basketball [23,24]. Similarly, more recent studies affirmed that offensive and defensive performance improved following a timeout [3], or that the team calling the timeout increased the number of points scored, with this effect lasting up to 10 possessions after [15]. However, recent studies employing complex mathematical models claim that timeouts have no effect on performance. This improvement can be attributed to the natural tendency of the game to return to its baseline state [12], suggesting that teams may not experience significant short-term performance improvements after a timeout compared to if one had not been called [13].

Research on timeouts during the final phases of a game is scarce. Studies have only been reported examining the effect of timeouts on offensive and defensive performance in basketball based on the game period (the first 35 min versus the last 5 min) [3]; the effects of timeouts on free-throw performance in NCAA close games [25]; or coaches' heart rates during the execution of all timeouts, including those taken during the final minutes [17]. However, to the authors' knowledge, no research has analyzed the effectiveness and offensive patterns in plays after timeouts during "crunch time". Research on these phases of the game appears to be highly relevant, as in elite basketball, the final possessions often determine the final score [26], especially when the score difference is equal to or less than 10 points [27]. This context makes timeouts even more important during the last five minutes of the final quarter [3]. Similarly, the study of these actions through observational methodology will allow for the analysis of actions in their natural context [28]. In other studies on timeouts, only game-related statistics have been considered [15]. Conducting research using only the data obtained from the box score will have the limitation of not being able to observe play patterns that help to understand the complexity of the game [29].

Thus, the objectives of the research were: (1) to analyze the effectiveness of baskets after a timeout in relation to the research criteria, (2) to observe the relationship between the location of the game (home or away) and the team's result (winning, losing, or tying) concerning technical-tactical and spatio-temporal aspects, (3) and to identify successful patterns after a timeout based on game location (home or away), team result (winning, losing, or tying), and possession remaining (24–17 s, 16–9 s, and 8–0 s) during the last two minutes and overtimes of close games in the 2022/23 Men's EuroLeague.

2. Methods

2.1. Design

In order to meet the objective of the study we employed an observational methodology [30]. This methodology is acknowledged as a rigorous and validated scientific framework for the analysis of complex sports dynamics, such as those observed in basketball [31]. Numerous studies underscored this phenomenon [31–35]. Game analyses within observational methodology enable diachronic studies to uncover underlying structures in datasets collected over time through intrasessional tracking [36]. The methodology allowed us to analyze basketball in its usual context and with its customary dynamics [37]. The observational design [38] was nomothetic (we studied the offensive actions after timeouts of all participating teams), follow-up (we analyzed 169 men's Euroleague 2022/23 games) and unidimensional (there was only one level of response).

2.2. Sample

The sample was composed of all the offensive technical-tactical actions obtained after timeouts from the last two minutes of the final quarters and overtime of men's Euroleague 2022/23 (regular season, play-offs, and final four), whose difference in the final score was equal to or less than ten points (n = 365). This specific criterion was chosen to focus on critical moments of the game, where the outcome remains uncertain and the impact of timeouts and strategic decisions are most pronounced. A total of 169 matches were analyzed. Informed consent was not required from participants because the data were not generated by experimentation and the video material was obtained secondarily [39]. The study was approved by the Ethics Committee of the Faculty of Education and Sport Science (University of Vigo, Application 06-280722).

2.3. Instruments

The observational instrument (see Table 1 and Figure 1) was created ad hoc and consisted of 14 criteria and 71 categories drawn from previous research [26,37,40,41]. This instrument is a categories system that meets the conditions of exhaustiveness and mutual exclusivity. The 14 criteria and 71 categories were selected based on a comprehensive review of previous research [26,37,40,41]. The validity of the observational instrument was established through its coherence with the theoretical framework [42] and consultation with two experts in observational methodology and basketball, who assessed the instrument and reached an initial agreement level of 95%. After discussing and resolving discrepancies, a consensus was achieved, resulting in 100% agreement.

Table 1. Observational instrument and descriptive analysis of the research.

Criterion	Code	N = 365	%	χ^2
Game Location. Timeout is called by the home or away team	Home	195	53.4	$\chi^2 = 1.712$ $p = 0.191$
	Away	170	46.6	
Game timing. A timeout is called when there are between. . . remaining to finish the game or during overtime.	0.30′′–0′′	184	50.4	$\chi^2 = 229.205$ $p < 0.001$
	1′–0.30′′	69	18.9	
	1.30′–1′	50	13.7	
	2′–1.30′	44	12.1	
	Overtime	18	4.9	
Team Result. Team's result at the moment of calling the timeout.	Losing	222	60.8	$\chi^2 = 147.227$ $p < 0.001$
	Tying	34	9.3	
	Win	109	29.9	

Table 1. *Cont.*

Criterion	Code	N = 365	%	χ^2
Score difference. There is a difference of 0 to 3 points (1 p), 4 to 6 points (2 p), 7 to 9 points (3 p) or 10 points or more (+3 p) when calling the timeout	1 possession	196	53.7	$\chi^2 = 208.819$ $p < 0.001$
	2 possessions	108	29.6	
	3 possessions	45	12.3	
	+3 possessions	16	4.4	
Start location. The restart after the timeout is in the frontcourt or backcourt	Frontcourt	219	60	$\chi^2 = 14.600$ $p < 0.001$
	Backcourt	146	40	
Type of defense. After the timeout, the opponent's defense is man-to-man or zone defense	Man-to-man	355	97.3	$\chi^2 = 326.096$ $p < 0.001$
	Zone	10	2.7	
Number of passes used after timeout.	0	172	47.1	$\chi^2 = 321.844$ $p < 0.001$
	1	90	24.7	
	2	57	15.6	
	3	25	6.8	
	4	9	2.5	
	+5	12	3.3	
Type of ball screens. After a timeout, the play may involve no screens, an on-ball screen, an off-ball screen, a combination of both on-ball and off-ball screens, or a handoff.	No screen	168	46	$\chi^2 = 183.726$ $p < 0.001$
	On-ball screen	78	21.4	
	Off-ball screen	48	13.2	
	On–Off ball screen	57	15.6	
	Handoff screen	14	3.8	
Possession. Time interval in seconds remaining to finish the possession.	8–0	215	58.9	$\chi^2 = 164.619$ $p < 0.001$
	16–9	134	36.7	
	24–17	16	4.4	
Type of finish	Catch and Shoot shot	65	17.8	$\chi^2 = 125.279$ $p < 0.001$
	Shot after on-ball screen	14	3.8	
	Dribble shot	58	15.9	
	Layup	59	16.2	
	Floater	19	5.2	
	Dunk	6	1.6	
	Not resulting in a finish	59	16.2	
	Foul	85	23.3	
Finish outcome. After the timeout, the play ends with. . .	2-point basket	50	13.7	$\chi^2 = 285.671$ $p < 0.001$
	3-point basket	35	9.6	
	Foul leading to 2 free throws	67	18.4	
	Foul leading to 3 free throws	5	1.4	
	Basket and 1 free throw	7	1.9	
	Basket after an offensive rebound	7	1.9	
	Missed 2-point basket	47	12.9	
	Missed 3-point basket	61	16.7	
	Missed free throws	3	0.8	
	Turnover	21	5.8	
	Steal	18	4.9	
	Block	8	2.2	
	Offensive foul	6	1.6	
	24-s shot clock violation	4	1.1	
	Another reason	26	7.1	
Ending court zone. After the timeout, the play ends in the. . .	Right interior zone	31	8.5	$\chi^2 = 84.945$ $p < 0.001$
	Central interior zone	25	6.8	
	Left interior zone	27	7.4	
	Right mid-range zone	20	5.5	
	Central mid-range zone	49	13.4	
	Left mid-range zone	19	5.2	
	Right perimeter zone	60	16.4	
	Central perimeter zone	64	17.5	
	Left perimeter zone	55	15.1	
	Backcourt	15	4.1	

Table 1. *Cont.*

Criterion	Code	N = 365	%	χ^2
Ending player	Guard Forward Center	210 116 39	57.5 31.8 10.7	$\chi^2 = 120.564$ $p < 0.001$
Basket	Yes No	170 195	46.6 53.4	$\chi^2 = 1.712$ $p = 0.191$

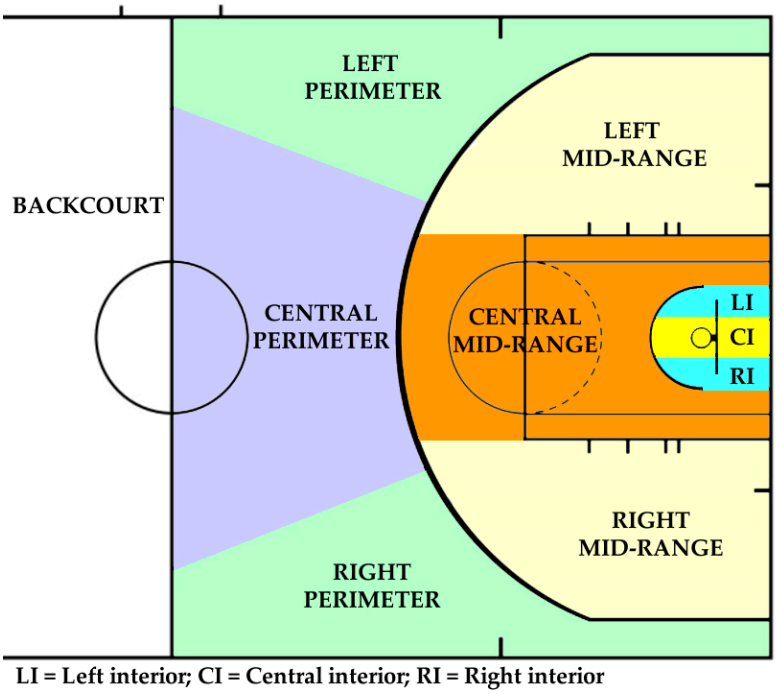

Figure 1. Ending court zone.

For the purposes of data recording, the computer software LINCE PLUS version 2.1.0 was used [43].

2.4. Procedure

The videos analyzed in this study were downloaded from the website of the channel that held the television rights for the championship for that season (DAZN).

After compiling all the matches, the final two minutes of the last quarter and any overtime periods were extracted to create a single file, organizing the games chronologically. The editing and processing of this file were carried out using Filmora software, version 10.1.

Following comprehensive training in the use of analytical tools, two expert observers examined and documented the offensive technical-tactical actions. To maintain accuracy in data collection [44], intra- and inter-observer reliability was assessed using the kappa coefficient [45], computed with LINCE PLUS software. These reliability tests were conducted on a subset of actions not included in the final sample ($n = 75$, approximately 20% of the total). The intra-observer agreement yielded a kappa value of 0.93 for observer 1 and 0.92 for observer 2, while the inter-observer agreement was measured at 0.91. When discrepancies were detected, the observers reached a consensus to enhance the consistency of their evaluations. Once this validation process was completed, the final dataset was recorded through a consensus-based approach between both observers. This type of recording allowed us to optimize the observation.

The kappa values obtained are consistent with those reported in similar observational studies in team sports, where values above 0.80 are typically regarded as excellent [46]. For

instance, prior research in basketball analysis has reported kappa values ranging from 0.80 to 0.93, depending on the complexity of the observational instrument and the expertise of the observers [47,48]. These high values reflect the reliability of the data collection process and the robustness of the instrument. Furthermore, the agreement rates achieved can be attributed to the extensive training provided to the observers, who were experienced in technical-tactical analysis and thoroughly familiarized with the LINCE PLUS software and the instrument's categories. Observer expertise plays a critical role in minimizing variability and ensuring data quality. Additionally, the use of a consensus process to resolve discrepancies further strengthened the reliability of the observations.

Once all actions were recorded, an Excel file was generated containing the sequence of behaviors. The flexibility of this file enabled various modifications to be applied, facilitating the different analyses conducted throughout the study, as demonstrated in previous research [49].

2.5. Data Analysis

All descriptive statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM-SPSS Inc., Chicago, IL, USA). A significance level of $p < 0.05$ was established. A descriptive examination of each variable was conducted, presenting results in terms of frequencies and percentages. To assess differences among the categories within each criterion, a χ^2 goodness-of-fit test was applied.

Furthermore, a χ^2 test of independence was utilized to determine significant associations between the study criteria and the variables "basket," "game location," and "team result."

To identify offensive play patterns following timeouts, Theme 6 Edu software [50] was employed. This specialized tool is widely recognized in disciplines such as psychology, ethology, and sports analysis for its ability to detect temporal patterns in sequential data. Theme is particularly effective in uncovering T-patterns—recurrent sequences that may not be immediately evident—by analyzing large datasets and identifying patterns that do not follow rigid sequences. This capability makes it an essential tool for examining dynamic and complex behaviors in basketball [31].

In this study, Theme 6 was used to extract the most relevant offensive success patterns based on the team's status at the time of possession, the game location, and the timing of the play. The analysis adhered to the following parameters: (a) the presence of a minimum of four T-patterns within the observed sequence set; (b) a 90% reduction in redundancy for recurring T-pattern instances; and (c) a significance threshold of 0.005.

3. Results

3.1. Descriptive Analysis

Table 1 shows a descriptive analysis of all the study variables as well as the results of the χ^2 test to contrast the differences existing between the categories of each criterion (χ^2 goodness-of-fit test). In particular, there were statistically significant differences in all criteria except the in-game location and basket.

The study data showed that just over half of the timeouts were requested by the home team (53.4%), primarily in the last 30 s of the game (50.4%). Most of these requests came from teams that were losing at that moment (60.8%) and had a score difference of between 0 and 3 points (53.7%).

Regarding the actions following the timeout, it was observed that 60% of the plays resumed in the frontcourt, against an individual defense (97.3%), with no passes made during the play (47.1%) and in the last 8 s of the possession (58.9%). In terms of technical-tactical elements, no type of screen was used in 46% of the cases, and the play ended

with a foul in 23.3% of the cases, resulting in two free throws (18.4%). The finishing zone showed a higher concentration in the outer areas (16.4% on the right perimeter, 17.5% in the central perimeter, and 15.1% on the left perimeter), with the point guard being the player responsible for finishing the play in 57.5% of the cases. Finally, 53.4% of the plays did not result in a basket, while in the remaining 46.6%, at least one point was scored.

In the analysis of scoring effectiveness following timeouts (Figure 2), home teams showed higher effectiveness compared to the away teams (50.3% vs. 42.4%), although the differences were not statistically significant ($\chi^2 = 2.280$; $p = 0.131$), indicating that game location does not have a strong influence on shooting accuracy in this context. On the other hand, teams that were winning had a 58.7% shooting accuracy after the timeout, compared to 44.1% for teams that were losing and 23.5% for those tied. This difference was statistically significant ($\chi^2 = 14.241$; $p < 0.001$), suggesting that teams in the lead may experience a psychological or tactical advantage that enhances their shooting effectiveness after timeouts. It was also observed that as the point difference increased, the likelihood of scoring also increased, going from 44.4% accuracy with a one-possession lead (0–3 points) to 56.3% when the lead was greater than three possessions (+10 points), although this trend was not statistically significant ($\chi^2 = 1.183$; $p = 0.757$). This indicates that the point difference does not have a consistent impact on scoring effectiveness. Furthermore, the shooting percentage decreased as the possession time ran out, from 56.3% in the first 8 s to 41.9% in the last 8 s. While this trend suggests that shooting becomes less effective as time runs out, the result was not statistically significant ($\chi^2 = 4.735$; $p = 0.094$), likely due to the limited sample size in some categories.

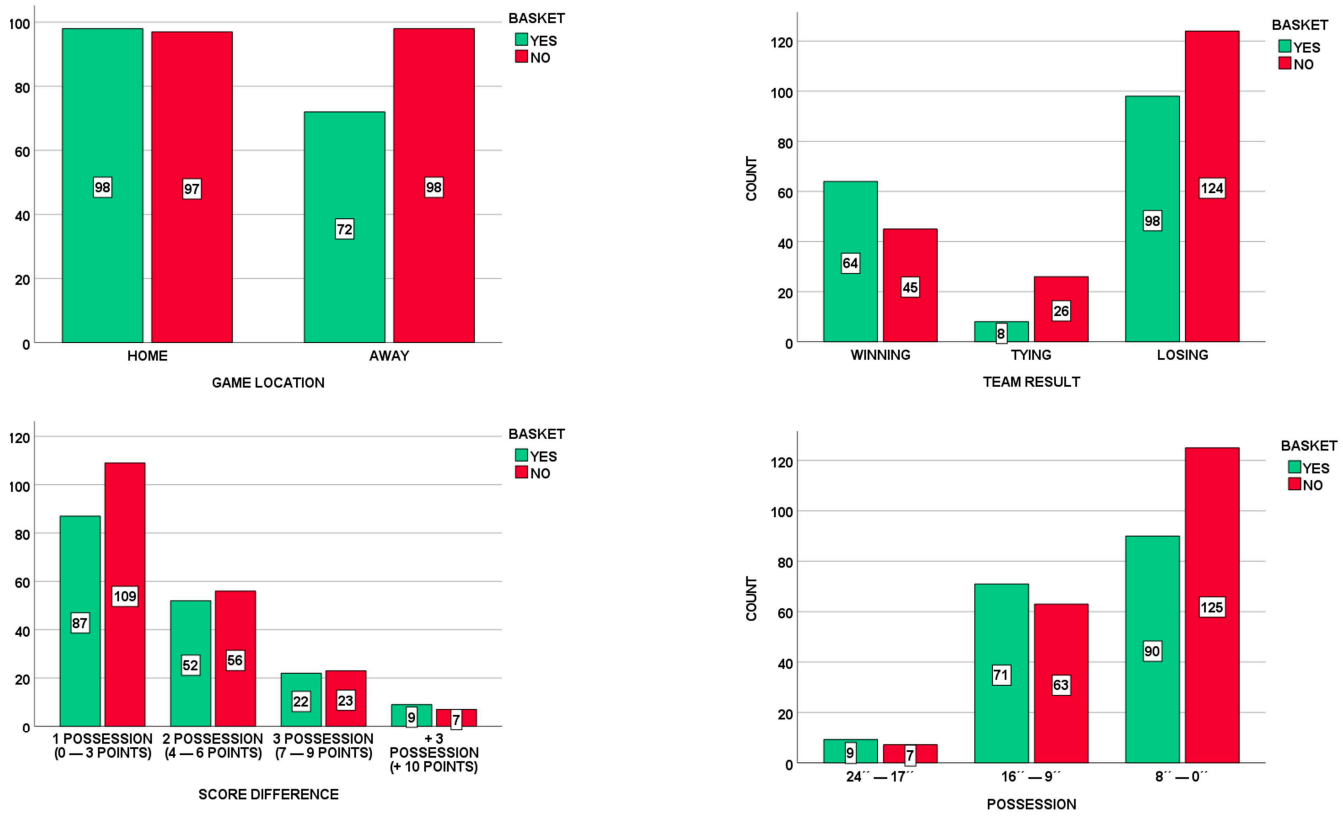

Figure 2. Relationship between the "Basket" criteria and "Game Location", "Team Result", "Score Difference" and "Possession" criteria.

Considering the location of the game (Figure 3), it was observed that in 61.5% of the cases where a team was winning, the team was the home team ($\chi^2 = 6.221$; $p = 0.045$). This statistically significant result underscores the potential influence of playing at home on

maintaining a lead during critical moments of the game. Similarly, 58.9% of the inbound passes from the backcourt were made by home teams ($\chi^2 = 2.936$; $p = 0.087$), reflecting a non-significant trend that could suggest a slight home advantage in possession control. Finally, 53.6% of the plays without screens also corresponded to home teams, indicating a small predominance of this pattern for home teams.

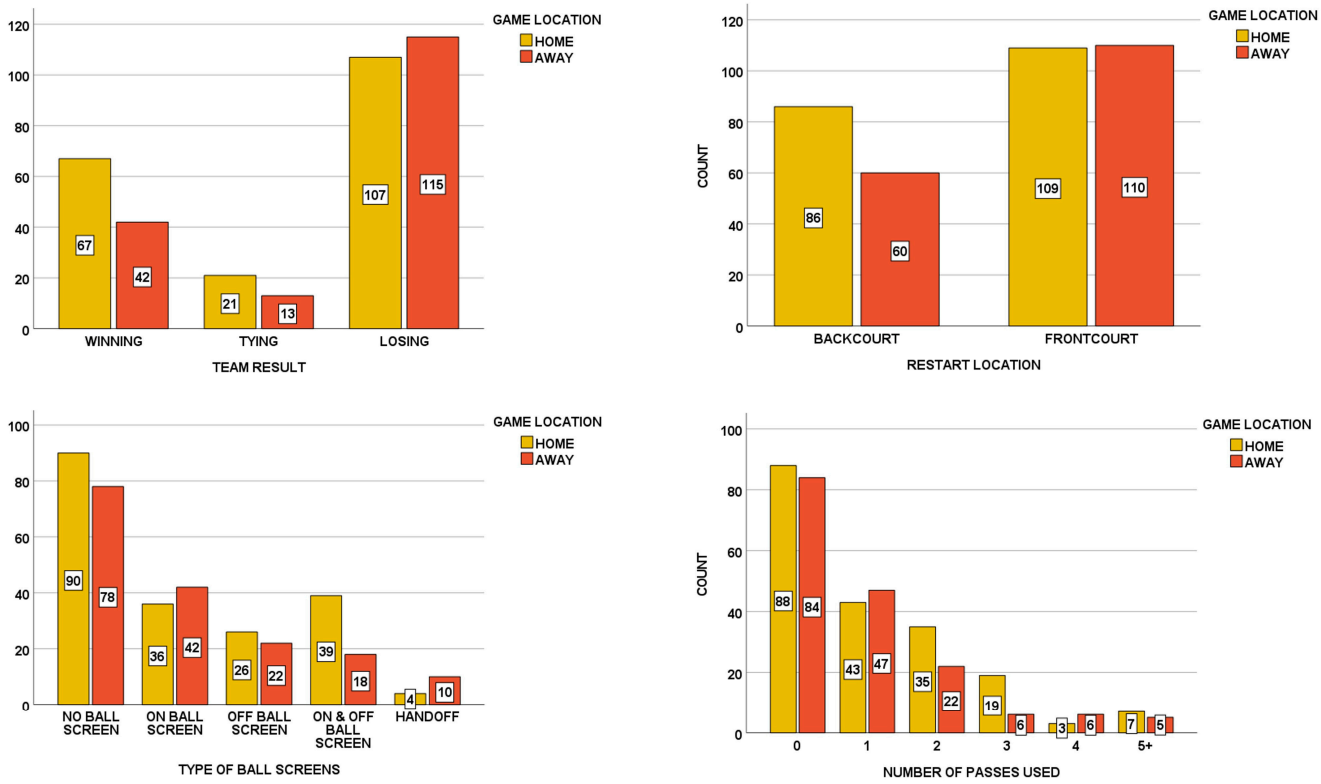

Figure 3. Relationship between the "Game Location" criteria and "Team Result", "Restart Location", "Type of Ball Screens" and "Number of Passes Used" criteria.

Regarding the team result (Figure 4), it was found that 72.1% of the inbound passes by teams that were losing were made from the frontcourt ($\chi^2 = 37.017$; $p < 0.001$), indicating a strategic effort to create quick scoring opportunities and reduce time spent advancing the ball. As for the use of screens, teams that were winning did not use screens in 70.6% of the cases, while teams that were losing used on-ball screens (25.2%), off-ball screens (15.8%), and combinations of both (16.7%) ($\chi^2 = 47.723$; $p < 0.001$). This suggests that losing teams adopt more complex strategies to generate offensive opportunities. Finally, regarding the types of finishing, winning teams were fouled in 48.6% of the cases, highlighting their ability to draw contact and gain free-throw opportunities, while the teams that were trailing finished their plays with catch-and-shoot actions (22.5%) or layups (21.1%) ($\chi^2 = 83.660$; $p < 0.001$). These results emphasize the distinct tactical approaches employed by teams based on their game situation, reflecting their efforts to optimize scoring under varying conditions.

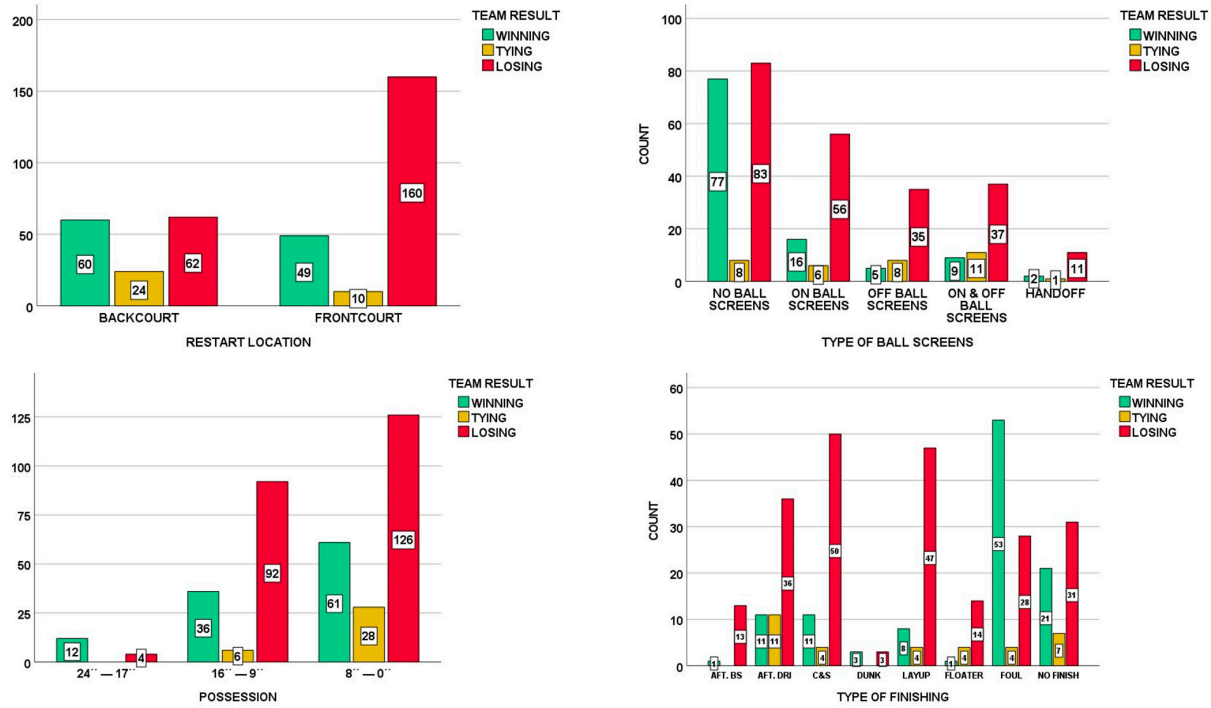

Figure 4. Relationship between the "Team Result" criteria and "Restart Location", "Type of Ball Screens", "Possession" and "Type of Finishing" criteria. Note: AFT.BS: After Ball Screen; AFT.DRI: After Dribbling; C&S: Catch & Shoot.

3.2. Analysis of Successful Patterns on Offense

Table 2 presents a T-Patterns analysis of the 170 successful actions recorded. Regarding game location (home—98 actions or away—72 actions), a higher number of successful actions was observed for home teams (57.6%) compared to visiting teams (42.4%).

Table 2. T-Pattern analysis of the 170 successful plays observed.

Sequence of Patterns			Max	Most Representative T-Pattern	O	%R	%T
HOME			98	(((home (difference of 0 to 3 points 0 passes used))(no ball screens (foul 2 free throws)))(forward yes))	5	5.1	1.4
HOME	WIN		42	((((home winning)(dif. of 0 to 3 points 0 passes used))(no ball screens (foul 2 free throws)))(guard yes))	6	14.3	1.7
HOME	WIN	T17_24	5	((home winning)((no ball screens 24–17 s possession)(foul (2 free throws yes))))	4	80.0	1.1
HOME	WIN	T9_16	16	((((home winning)(0 passes used no ball screens))(16–9 s possession (foul 2 free throws)))(guard yes))	4	25.0	1.1
HOME	WIN	T0_8	21	(((home winning)((difference 0 to 3 points no ball screens)(8–0 s possession foul)))(2 free throws yes))	4	19.0	1.1
HOME	LOS		50	(((home losing)(on/off-ball screens layup))((2-points basket right interior zone)(guard yes)))	4	8.0	1.1
HOME	LOS	T17_24	2	-			
HOME	LOS	T9_16	22	((home ((losing differ. of 4 to 6 points)(0 passes used 16–9 s possession)))(3-points basket (guard yes)))	4	18.2	1.1
				((home ((losing 16–9 s possession)(layup 2-points basket)))(right interior zone yes))	4	18.2	1.1
HOME	LOS	T0_8	26	((home ((losing 8–0 s possession)(layup 2-points basket)))(right interior zone (guard yes)))	4	15.4	1.1

Table 2. *Cont.*

Sequence of Patterns			Max	Most Representative T-Pattern	O	%R	%T
AWAY			72	(((away (difr. of 0 to 3 points 0 passes used))(no ball screens (foul 2 free throws)))(central perimeter zone (guard yes)))	4	5.6	1.1
AWAY	WIN		22	((away ((winning difference of 0 to 3 points)(0 passes used no ball screens)))(foul (guard yes)))	7	31.8	2.0
AWAY	WIN	T17_24	1	-	-		
AWAY	WIN	T9_16	9	(((away winning)((differ. of 0 to 3 points no ball screens)(16–9 s possession foul)))(2 free throws yes))	5	55.6	1.4
AWAY	WIN	T0_8	12	(((away (winning differ. of 0 to 3 points))((0 passes used no ball screens)(8–0 s possession guard))) yes)	6	50.0	1.7
AWAY	LOS		48	(away ((losing difference of 4 to 6 points)(layup 2-points basket)))(guard yes))	4	8.3	1.1
				((away ((losing difference of 0 to 3 points)(2 passes used 8–0 s possession)))(2-points basket yes))	4	8.3	1.1
AWAY	LOS	T17_24	1	-			
AWAY	LOS	T9_16	22	((away ((losing difference of 4 to 6 points)(0 passes used 16–9 s possession)))(2-points basket yes))	5	22.7	1.4
				((away losing)(difference of 4 to 6 points ((16–9 s possession layup)(2-points basket yes))))	4	18.2	1.1
AWAY	LOS	T0_8	25	((away losing)(difference of 0 to 3 points ((8–0 s possession 3-points basket)(guard yes))))	4	16.0	1.1
				((away ((losing difference of 0 to 3 points)(2 passes used 8–0 s possession)))(2-points basket yes))	4	16.0	1.1

Note: Max refers to the maximum possible frequency of actions with this sequence; O = occurrence; %R = percentage relative to the maximum number of actions that occurred with the established search sequence.; %T = percentage relative to the total number of actions observed; LOS = losing; WIN = winning; T0_8 = 8–0 s of possession remaining; T9_16 = 16–9 s of possession remaining; T17_24 = 24–17 s of possession remaining.

Concerning the team's result at the start of the play (winning, losing, or tying), home teams that began losing achieved the highest proportion of successful actions (51%), followed by those that started while winning (42.9%) and those that were tying (6.1%). Conversely, among away teams, those that began the play while losing completed a greater number of successful actions (66.7%) compared to those that were winning (30.6%) or tied (2.7%).

Finally, regarding the phase of possession, regardless of the game location or team result, most successful actions occurred during the final phase of possession (8″–0″).

The most representative patterns of play are presented below stratified according to game location, team result, and possession.

4. Discussion

The objective of this research was to analyze the development and patterns of plays after timeouts (ATO's) in the last two minutes and overtime periods of games with final scores equal to or within 10 points in the 2022/23 EuroLeague. This study is pioneering in examining the development of plays following timeouts during critical moments of the game.

The results reveal, first and foremost, that home teams request a greater number of timeouts and have a higher scoring success rate on the subsequent play compared to visiting teams. This may relate to the 'home advantage phenomenon' [51], where teams benefit from playing at home. This advantage, widely documented in the literature [52], may be due to the more assertive attitude of home teams, fostered by the arena environment, which drives them to seek more contact and force the visiting team to take worse shots due to defensive pressure [53]. This phenomenon is especially prominent in the Balkans, in indoor sports involving physical contact, and in men's teams [52]. The probability of

winning at home ranges from 52% in countries like Estonia to 70% in Bosnia-Herzegovina or Croatia [54]. However, it is estimated that approximately two-thirds of this advantage accumulate during the first quarter, gradually diminishing as the game progresses [55]. In high-stress situations, such as the final minutes and overtime, this effect diminishes, as visiting teams tend to adapt to the arena environment [56,57]. Our data support this, showing no significant differences in scoring or location, consistent with findings [15] that timeout effects are similar for home and away teams.

When analyzing the timing of timeouts during 'crunch time', it becomes evident that the highest number occurs as the game nears its end, especially in the last 30 s and with a one-possession margin. This pattern highlights the strategic importance of timeouts in these moments, as they allow coaches to design specific plays, disrupt the opponent's momentum, and manage player fatigue and psychological pressure. In elite basketball, such as the NBA, games are often decided in the final minute since a single possession can influence the final outcome [58]. This aligns with a study [3] showing 64.9% of timeouts occur in the last five minutes, especially with a score difference of -2 to 3 points (one possession). In the final minute, timeouts become increasingly critical due to the heightened stochasticity and complexity inherent in late-game scenarios [59]. Another factor that could be associated with this is the significant physical fatigue that might accumulate during the final quarter of the game [60]. Additionally, the psychological pressure players could experience in these critical phases [56] might contribute to a decline in performance [61]. Coaches might choose to use timeouts to give players recovery opportunities and to execute plays under more optimal physical and mental conditions.

Through examining the team's status when requesting a timeout, our analysis revealed that in 60.8% of the cases, the team was losing, which seems consistent, as one of the main reasons for requesting a timeout is to try to reverse a negative trend [3]. After the timeout, teams that were losing scored 44.1% of the time, compared to a 58.7% success rate for teams that were winning. These data are consistent with the findings of another study [3], where it was shown that the offensive performance of losing teams remained similar before and after the timeout, while teams that were winning exhibited an improvement in performance. This difference could be attributed to the psychological advantage held by winning teams, who may approach timeouts with greater confidence and focus, allowing them to execute plays more effectively. Additionally, teams in the lead often play with less urgency and are better positioned to control the game tempo, reducing the likelihood of rushed or pressured decisions [62]. Similarly, other researchers [56] reported that teams in the lead showed higher shooting accuracy during the last five minutes of the game, suggesting that these teams are less affected by pressure in the offensive phase during the final minutes. The combination of tactical adjustments and psychological resilience may contribute to the superior performance of leading teams during crunch time. Another factor could be attributed to the natural tendency of the game to return to its baseline state [12], where teams that are leading might maintain their scoring momentum following a timeout.

As for the defensive strategies following timeouts, it was observed that in almost all instances, the opposing team opted for man-to-man defense. These findings are consistent with the results of another study [63], which also found that man-to-man defense was the most frequent, both for home and away teams. This preference may be explained by the tactical advantages of man-to-man defense in high-pressure situations, such as those following timeouts during the final minutes of close games. Man-to-man defense allows for greater control over individual matchups, making it easier to neutralize key offensive players and disrupt set plays designed during the timeout. The greater the defensive pressure, the higher the difficulty in scoring [64], assuming that high defensive pressure can only be achieved through man-to-man defense. Additionally, this strategy facilitates quick

switches and adjustments, which are critical during unpredictable, high-stakes moments. The situational urgency of 'crunch time' may also discourage the use of zone defenses, which could be more susceptible to breakdowns against well-organized offensive plays. However, other authors [6] identified a higher use of zone defense in the phases before and after the timeout. Nonetheless, their study highlighted the tendency of the requesting teams to switch from zone defense to man-to-man defense after the timeout, which could indicate a strategy to adapt to higher-pressure situations or better game control.

When examining passing patterns during possession, the data indicate that a lower number of passes correlates with a higher shooting success rate, with the best results obtained in plays involving between 0 and 2 passes. This could be attributed to the urgency and time constraints typically present during the final minutes of close games, which may discourage prolonged ball movement. The heightened psychological pressure during crunch time may prompt players to prioritize straightforward scoring opportunities over more complex passing sequences. This finding was reflected in a study that observed how the most effective actions during critical moments of EuroBasket games were those involving simple plays, such as the 1-on-1 plays [48]. Additionally, plays with fewer passes allow teams to quickly exploit defensive mismatches or capitalize on previously planned set plays, reducing the risk of turnovers. These findings align with those of one of the studies consulted [40], where it was observed that in the last five minutes of the game, plays with zero to two passes predominated, highlighting how the absence of passes in this phase of the game increases shooting effectiveness during possessions. Additionally, previous studies have noted an average of two passes in fast-break situations [65], 3.7 passes in offensive systems, and 1.45 passes in transitions [66], or 2.95 passes in the EuroLeague and 2.71 in the NBA [67]. Furthermore, it appears that teams with a lead tend to employ a greater number of passes [68,69], which could be related to a focus on maximizing possession time to reduce the opposing team's opportunities [26,62].

In addition, it was observed that in almost half of the analyzed plays, no type of screen was used, which aligns with the results of other researchers [40], who found that in the last five minutes of the game, screens were used in 44% of the cases. This limited use of screens in late-game situations may be attributed to the urgency of the moment, where teams prioritize faster, less complex plays to minimize the risk of turnovers or miscommunications. On the other hand, the absence of screens can be attributed to the high number of actions that result in a quick foul by the teams trailing on the scoreboard. When screens were employed, the on-ball screen was the most frequent (21.4%). The use of the pick-and-roll in the final minutes appears to be an effective element in these phases of the game [49]. These results are consistent with studies addressing similar contexts in terms of time and score; for example, a 29.1% use of on-ball screens was observed in the last two minutes of NBA games [26] and 15.92% in the EuroLeague during the same period [62].

Observing successful patterns, we noticed that teams in the lead, regardless of location or the phase of possession, most frequently scored through free throws resulting from fouls. Fouls were the most common type of play-ending event, accounting for 23.3%. Within the context of this research—analyzing the final two minutes of games with a final score margin of less than 10 points—and considering that teams trailing in the score accounted for 60.8% of the sample, it seems reasonable to hypothesize that these teams resort to fouling their opponents to stop the game clock and challenge the leading team to score through free throws [25]. However, this "comeback" strategy of fouling may not be the most effective, as the probability of overcoming the deficit and winning increases if the trailing team allows their opponent's attack to proceed without committing a foul [26]

On the other hand, it was observed that teams trailing in the score, regardless of location or possession phase, most commonly scored through a two-point basket, usually

a layup, predominantly executed by a point guard. Other studies [70] highlight that the most efficient way to end possession in the EuroLeague is by scoring a two-point basket. Additionally, some patterns emerged where plays concluded with a three-point shot, consistent with other studies showing that teams trailing on the scoreboard tend to attempt faster scoring opportunities with fewer passes. This strategy aims to minimize the actions required to reduce the scoring gap [71].

4.1. Practical Applications

The knowledge of this data can be highly useful for coaches and technical staff of high-performance basketball teams, helping them adapt training to the competitive demands in these specific situations. According to the results, the preparation of these plays should differ depending on whether the team is winning or losing. On one hand, the team in the lead should prioritize training situations where the ball is in the possession of players with high free throw accuracy, as it is likely that the opposing team will attempt to commit a foul during the play after the timeout. On the other hand, teams that are trailing should focus on plays that result in two-point shots, executed by technically proficient players, such as point guards, and with the shortest possible possession time. Similarly, in both cases, these actions should be practiced in environments that replicate the high physical and psychological demands of real competition conditions. This is supported by the observation that more than half of the timeouts during critical moments occur in the final 30 s of the game. Given the nature of these plays, which always follow a timeout, both the coach's instructions and the actions to be performed during the play can be trained in a more analytical way. This contrasts with other actions that occur during the game, which are more influenced by the flow of the match.

4.2. Limitations of the Research and Future Perspectives

The results of this study should be interpreted with caution, as the sample was limited to games with a final score difference of 10 points or less during a full season of the EuroLeague. This criterion ensured an emphasis on critical game moments, where the outcome remains uncertain, and the impact of timeouts and strategic decisions is most pronounced. However, this narrow focus might have excluded significant patterns observed in games with larger score differences, where tactical and psychological dynamics could differ

Additionally, the exclusive focus on a single season of the EuroLeague games represents a limitation in terms of generalizability. Although the EuroLeague is highly competitive and globally recognized, its playing style, strategies, and cultural context may not reflect other leagues. For instance, leagues such as the NBA or national leagues in Europe might exhibit different tactical tendencies, pacing, or defensive strategies compared to the EuroLeague, which could influence the applicability of the findings. Moreover, cultural and stylistic differences in basketball, including the philosophies of coaches or the emphasis on specific offensive or defensive systems, might lead to variations in how after-timeout plays (ATOs) are executed and their overall effectiveness.

Furthermore, as this study represents a relatively novel area of research, there is a scarcity of direct studies for comparison, often requiring reference to broader analyses that examine entire games rather than close-score moments. The exclusive focus on the men's EuroLeague further limits the generalizability of the findings to other levels of competition, such as youth or amateur leagues, and to women's basketball

Future studies could address these limitations by incorporating games with broader score margins, analyzing a wider range of competitions, and evaluating short-duration tournaments on neutral courts, such as international selection tournaments or cup cham-

pionships. Such approaches could expand the understanding of after-timeout plays in diverse contexts.

While the current study focused on descriptive statistics, chi-square tests, and T-Pattern analysis to identify patterns of behavior after timeouts (ATOs), future research could benefit from integrating regression models to determine which variables have the strongest impact on successful outcomes. For instance, logistic regression could be used to assess the probability of scoring based on factors such as the type of screen employed or the phase of possession. Additionally, comparative analyses between winning and losing teams could extend beyond descriptive statistics. Techniques such as MANOVA or ANOVA could provide a more nuanced exploration of how combinations of variables, including game location, possession time, and type of finish, differ between these groups. These advanced approaches would yield deeper insights into the tactical and psychological dynamics of critical game moments.

Moreover, future research could explore the psychological impact of timeouts on players and coaches across different competitive contexts. Investigating how timeouts affect motivation, concentration, and emotional states could provide valuable insights into their effectiveness. Additionally, analyzing gender differences in timeout strategies and effectiveness, particularly in women's basketball leagues, would be beneficial. Understanding whether variations exist in the utilization and outcomes of timeouts between male and female teams could inform tailored coaching strategies. Furthermore, examining the role of timeout strategies in youth basketball or lower-tier leagues could shed light on their effectiveness in developmental contexts, potentially guiding coaching practices at these levels.

5. Conclusions

In critical moments during EuroLeague games, most timeouts occur with less than 30 s remaining in the game, predominantly called by the losing teams, and primarily when the score difference is within one possession (0–3 points). Teams that are winning seem to have a higher success rate in the action immediately following the timeout compared to those that are losing, and the game's location does not appear to influence this advantage.

Winning teams typically finish the play by scoring at least one point from the free-throw line after a foul is committed by the opposing team, which is attempting to mount a comeback using this strategy. Losing teams tend to score two-point plays but attempt and miss more catch-and-shoot three-pointers than the winning teams.

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