

## Inside game in Euroleague basketball

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### Abstract

Basketball is a popular team sport, where two teams competing in the field and the main objectives are to score goals and to prevent the opponent from scoring through individual or group actions. On the contrary to individual actions which mostly are based on personal skill, group actions success is based on the amount of collective team work. Offensive play at post is an important aspect of modern basketball, especially in Euroleague where the best European teams participate. The purpose of our study is to identify the most common moves of the players to release from their opponents, before possessing the ball close to the basket ring, considering various in game variables. A total of 580 highlights from 18 matches were analyzed through systematic observation. Sport Scouts STA 3.2 for PC was used for the semantic analysis. The analysis format includes the team's home, the game results, the reception zone, the player movements before possessing the ball, the game period in which the pass took place, the time of the offense that the ball went to a player in the post, the area of the post where the player took the ball and the distance of the pass. The SPSS 25 software package was implemented for data processing and Cross-tabulation Analysis with  $\chi^2$  (Chi-square) was used to compare the variables tested with a significance level set to  $p$ -value < 0.05. Our results showed that there is statistically significant difference in the distance of the pass in terms of the movements of the players before receiving the ball at the post ( $\chi^2 = 25,840 / p = 0.000$ ) as well as in terms of the positions that the players had at the post ( $\chi^2 = 10,253 / p = 0.001$ ). Moreover, marked significant differences were found in the effect of the game's result according to the moves of the players before possessing the ball at the post position ( $\chi^2 = 5,573 / p = 0,006$ ). These findings revealed that teams which choose to play the ball close to the basket most often target the low post (69.7%). This information helped us to better understand the attacking strategies of the basketball clubs, an important step required to plan specific exercises and thus improving training programs.

**Key Words:** Offense, Low post, Tactics, Match analysis, Coaching

### Introduction

Basketball is a sport constantly evolving and gaining popularity. Changes in regulations and the improvement of training programs has led to the fast pace of the game and the spectacular efforts of the basketball players. In modern basketball, teams are focused on offensive tactics and for this reason, researches related to tactical behavior of teams have become very important, in order to better understand the cooperation of players during a match (Glazier et al., 2010; Gréhaigne et al., 2013). Information like this leads to explain "why" players must interact in one way or another to solve a problem posed by their defense, supporting both the training process and the definition of a team's playing style (Maslovat et al., 2008; McGarry et al., 2009).

The performance analysis in team sports is gradually gaining prominence, by being one of the main topics of study in the sports sciences (Hughes et al., 1998; Lames et al., 2007; Vaquera et al., 2016). The role of capable analysts, who aim to provide coaches and athletes with specific guidelines for better decision-making in any situation, is considered necessary (Nunes et al., 2015). The analysis of basketball performance attempts to clarify the factors influencing the progress of a match and constitute the key points (Christoforidis et al., 2000; Tsitskaris et al., 2002; Wang et al., 2009).

Therefore, success is inextricably linked to the coaching process and the decisions of coaches (Gomez et al., 2015; Koutsouridis et al., 2018). In modern basketball, an effective inside game is a major offensive goal, as it increases the shooting percentage, allowing finishing at the rim. It also increases the chances of offensive rebounds and causes defensive misplacement at the opposing team, creating better shooting options (Mavridis et al., 2009; Courel-Ibáñez et al., 2017; Courel-Ibáñez et al., 2018).

The boundaries of the post areas are the lane Line, the free throw line as well as the baseline. The post area is divided into low and high post (Tsitsigkaris et al., 2016). The low post is the area near the racket while the high post is the area near the free throw line. In Euroleague, teams choose to pass the ball to the post quite often. This is due to the high efficiency of the players to score near the basket with a hook shot, nail or tip in (Erculj et al., 2015). It is worth mentioning that Euroleague is the leading basketball championship in Europe and the

second largest in the world in quality and commerciality after NBA. Some recent studies have focused on detecting, describing and understanding the factors of the game to enhance the explanation of the inside pass (i.e., pass received by a player stepping the paint) performance. These reports describe greater efficiency in ball possession when using the pass in the top 16 Euroleague teams (63.3% vs. 49.8%) and the top 8 NBA teams (63.9% vs. 51.8%).

In addition, it seems that the dynamic interactions of players with or without possessing the ball, such as pick and roll situations or cutting backdoor for an alley-oop can explain these differences, emphasizing the importance of tactical analysis that explores the inside and outside players' coordination (Lamas et al., 2011; Courel-Ibáñez et al., 2016)

Based on the above findings, it is interesting to investigate specific tactics to enhance the performance of teams close to the basket, especially in Euroleague. Therefore, the purpose of this study is to investigate the movements that players use to get open before accepting the ball in the post while these movements were analyzed based on the proposal of Lamas L., Junior D., Santana F., Rostaiser E., Negretti L. and Ugrinowitsch C. The sub-purpose is to analyze and compare specific factors that affect the movement of the ball in the post.

## Material & methods

### Sample

The sample of the research is consisted of eighteen matches (18) from the Euroleague championship in the season 2018-2019. The choice of samples was deliberate due to the importance of Euroleague as mentioned above. A total of 580 inside passes were recorded from these randomly picked matches during the regular season and the playoffs.

### Recording instruments

The instruments used for this study were a laptop ASUS with installed operating system Windows 10, MS Office 2010, SportScout STA Version 3.2 and the software pack IBM SPSS 25.

### Procedure and Variables

Inside pass was considered when the receiver player was stepping the paint (Courel-Ibáñez, et al., 2017). Using SportScout STA 3.2, an analysis table was created in order to record inside pass. The analysis table consists of the variables (receiver action, pass distance, game location, period of the game, shot clock, receiver position, reception zone, game result) (Muñoz, V., Serna, J., Daza, G. e Hileno, R. , 2015) as indicated in Table I. In Table II are described variables such as receiver action, pass distance and shot clock.

**Table I: Variables**

Receiver Action	Pass Distance	Game Location	Period of the Game	Shot Clock	Receiver Position	Reception zone	Game Result
Dive Cut	Interior Pass	Home	1st Period	0-8 seconds	Point Guard	Low Post	Winners
On Ball Screen and Roll	Exterior Pass	Away	2nd Period	9-16 seconds	Shooting Guard	High Post	Losers
Positional			3rd Period	17-24 seconds	Small Forward		
Space Creation Without Ball			4th Period		Power Forward		
Out of Ball Screen and Roll					Center		

### Statistical procedures

The software pack SPSS 25 for windows was used for the data processing and the statistical analysis. Descriptive statistical analysis (average, standard deviations) and frequency analysis were performed to present the data of the variables analyzed. Crosstabulation analysis with  $\chi^2$  (Chi-square) distribution was used to determine if there were differences in the selected variables examined in relation to the outcome of the game, the pass distance and the reception zone, with a significance level of  $p < 0.05$ .

**Table II: Definitions of receiver's actions, pass distance and shot clock**

Receiver Action	Description
Dive Cut	Displacement from the outside towards the basket
On Ball Screen and Roll	The screener moves towards the basket after on ball screen and receives the ball
Positional	Player states with no previous actions
Space Creation Without Ball	Previous movement without the ball to create space and receive it properly
Out of Ball Screen and Roll	The screener moves towards the basket after off ball screen and receives the ball
Pass Distance	Description
Interior Pass	The passer is inside the 3 point line
Exterior Pass	The passer is outside of the 3 point line
Shot Clock	Description
0-8 seconds	The player receive the ball when remains 0-8 seconds on the shot clock
9-16 seconds	The player receive the ball when remains 9-16 seconds on the shot clock
17-24 seconds	The player receive the ball when remains 17-24 seconds on the shot clock

## Results

### Result of each variable

According to table III teams chose to move the ball mainly in the paint between 9-16 seconds of shot clock ( $n = 301$ , 51.9%) to the players in the Center ( $n = 378$ , 65.1%) and Power Forward position ( $n = 88$ , 15.2%). The most common receivers' action was the dive cut ( $n = 190$ , 32.8%), the On ball screen and roll ( $n = 158$ , 27.2%) and positional ( $n = 131$ , 22.6%). The tactic of both teams was to move the ball in the Low post area with consistency ( $n = 404$ , 69.7%).

**Table III: Results of variables**

Variables	Inside pass	
	Frequency (n)	Percent (%)
<b>Receiver Action</b>		
Dive Cut	190	32,80%
On Ball Screen and Roll	158	27,20%
Positional	131	22,60%
Space Creation Without Ball	86	14,80%
Out of Ball Screen and Roll	15	2,60%
<b>Pass Distance</b>		
Interior Pass	312	53,80%
Exterior Pass	268	46,20%
<b>Game Location</b>		
Home	263	45,30%
Away	317	54,70%
<b>Period of the Game</b>		
1st Period	148	25,50%
2nd Period	133	22,90%
3rd Period	146	25,20%
4th Period	153	26,40%
<b>Shot Clock</b>		
0-8 seconds	180	31,00%
9-16 seconds	301	51,90%
17-24 seconds	99	17,10%
<b>Receiver Position</b>		
Point Guard	11	1,90%
Shooting Guard	48	8,30%
Small Forward	55	9,50%
Power Forward	88	15,20%
Center	378	65,10%
<b>Reception zone</b>		
Low Post	404	69,70%
High Post	176	30,30%
<b>Game Result</b>		
Winners	299	51,60%
Losers	281	48,40%

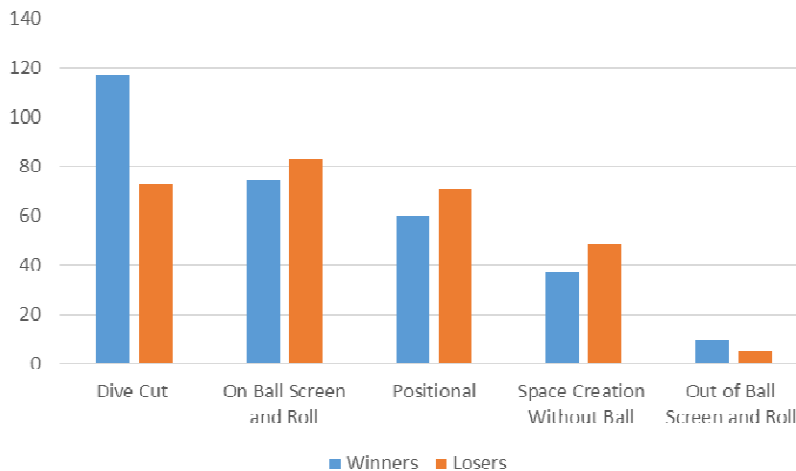
### Comparing variables in relation to the result of the match

Table IV indicates that the result of the match is not depended on the game location ( $\chi^2 = 0.326 / p = 0.568$ ). It was revealed that the result is not affected by the period of the game where the inside pass was made ( $\chi^2 = 3,837 / p = 0,280$ ). Thus, it was observed that in the 3rd period the winning teams ( $n = 85$ , 14.66%) sent the ball to the post with greater consistency than the losers ( $n = 61$ , 10.52%).

In addition, the result of the match is not affected by the shot clock ( $\chi^2 = 1,429 / p = 0,490$ ). Also, it was found that both the winning teams ( $n = 156$ , 26.90%) and the losing teams ( $n = 145$ , 25%) passed the ball to the post area more often between 9 to 16 seconds of the attack. The result of the match is not affected by the receiver's position ( $\chi^2 = 7,928 / p = 0,094$ ), despite the fact that both teams chose to send the ball to post mainly in the Power Forward positions and Center. In addition, it is observed that the result of the match is not affected by the pass distance ( $\chi^2 = 1,300 / p = 0,254$ ). It is worth mentioning that the outcomes were similar for the teams that won the match, while the teams that suffered the defeat preferred the interior passes ( $n = 158$ , 27.24%).

On the contrary, the outcome of the match is influenced by the receivers' action ( $\chi^2 = 5,573 / p = 0,006$ ). As shown in figure I the players of the losing teams receive inside pass more often when rolling after a screen on the ball ( $n = 83$ , 14.31%) and then follow the dive cut movements ( $n = 73$ , 12.59%) and positional ones ( $n = 71$ , 12.24%). However, the most common receivers' action move of the winning teams was the dive cut ( $n = 117$ , 20.17%) followed by on ball screen and roll ( $n = 75$ , 12.93%) and positional ( $n = 60$ , 10.34%). These results indicate that teams with more off ball movement are more likely to win. It is worth noticing that both teams used pick and roll quite often.

**Figure I: Relation of the outcome to the receivers' action**



Finally, the outcome of the match is not affected by the receiver zone ( $\chi^2 = 1,284 / p = 0,257$ ). Both the winners ( $n = 202, 34.83\%$ ) and the losing teams ( $n = 202, 34.83\%$ ) preferred to move the ball more often in the low post.

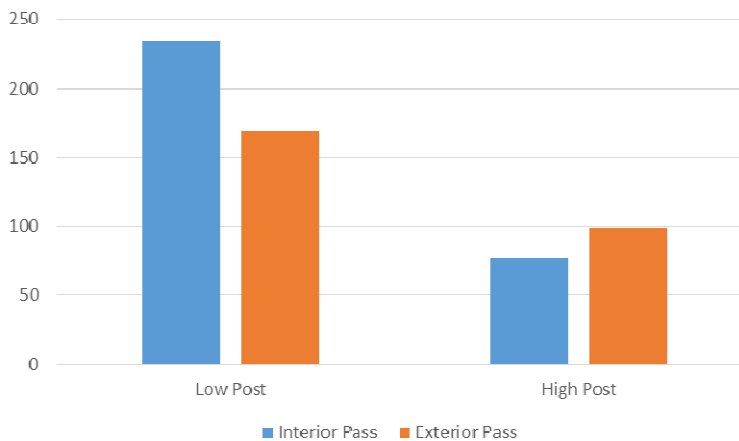
*Comparing variables related to the pass distance*

It is observed that the distance of the pass is not affected by the game location ( $\chi^2 = 1,191 / p = 0,275$ ), as the results were evenly distributed to the home and away teams. The results showed that the pass distance is also not affected by the period of the game ( $\chi^2 = 3,177 / p = 0,365$ ). It was presented that in the first period the teams preferred to make interior passes ( $n = 85, 14.66\%$ ) over the exterior passes ( $n = 63, 10.86\%$ ) while in the other periods the results were divided.

Furthermore, the pass distance is not affected by the shot clock ( $\chi^2 = 4,989 / p = 0.083$ ). The results revealed that the interior pass is preferred between 0 to 8 seconds ( $n = 105, 18.10\%$ ) and between 9 to 16 seconds ( $n = 163, 28.10\%$ ) of the offence. Shared results were found in cases where the teams moved the ball to the post at the beginning of the attack (17 to 24 seconds).

On the other hand, there are significant statistical differences in relation to receiver zone ( $\chi^2 = 10,253 / p = 0,001$ ). It was observed in figure II that the interior pass is preferred when the ball moves to the low post ( $n = 235, 40.52\%$ ) and on the contrary when the ball moves to the high post the results were equally shared.

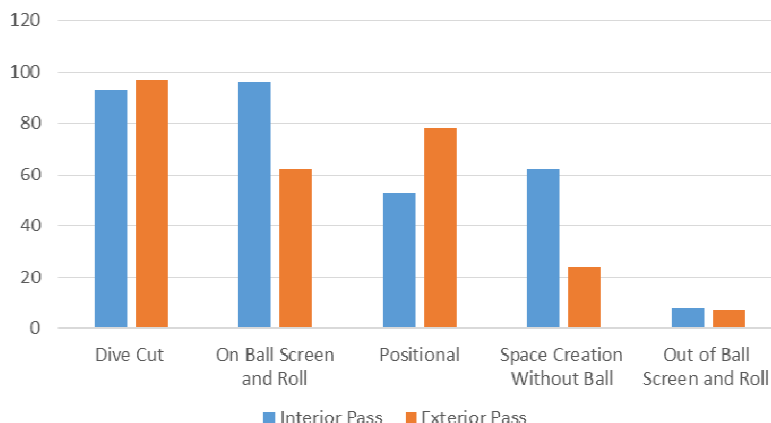
**Figure II: Relation of the pass distance with receivers' zone**



In addition, it is observed that the distance of the pass is not affected by the receivers' position ( $\chi^2 = 5,573 / p = 0,233$ ). The Center players have received mainly interior passes ( $n = 213, 36.72\%$ ) although the results were shared for the players in the other positions. Additionally, there are statistically significant differences in the receivers' action ( $\chi^2 = 25,840 / p = 0.000$ ). As described in figure III after on ball screen and

roll (n = 96, 16.55%) and space creation without ball (n = 62, 10.69%) the players received interior passes. On the contrary, when the receiver action was positional (n = 78, 13.45%) then the exterior pass was preferred.

**Figure III: Relation of the pass distance with receivers' action**



*Comparing variables in relation to the receivers' zone*

As described in table IV, compared to the receivers' zone, it is observed that is not affected by the game location ( $\chi^2 = 0.477 / p = 0.490$ ). Moreover, the results revealed that both teams aimed to move the ball mainly to the low post. The period of the game also does not affect it ( $\chi^2 = 1,484 / p = 0,686$ ). In all periods the teams moved the ball mainly to the low post. Furthermore, it is observed that it is not affected by the shot clock ( $\chi^2 = 0.800 / p = 0.670$ ). The results indicated that the pass in the low post is preferred regardless of the time the pass was made. In addition, the receivers' zone is not affected by the position of the player ( $\chi^2 = 3,624 / p = 0,459$ ). The results were equally shared for players competing in point guard and shooting guard positions. However, the players who play in the small forward (n = 42, 7.24%), power forward (n = 65, 11.21%) and center position (n = 257, 44.31%) received the ball more often in the low post.

Additionally, the receivers' zone is not affected by receivers' action ( $\chi^2 = 6,993 / p = 0,136$ ). The results were divided when players chose to get open with out of ball screen and roll action. On the contrary, they received the ball more often in the low post when the receiver action was on ball screen and roll (n = 107, 18.45%), dive cut (n = 124, 21.38%), positional (n = 102, 17.59%) and space creation without ball (n = 59, 10.17%).

Table IV: Variables relation to the outcome of the game, the pass distance and the reception zone

**Discussion**

Variables	Winers		Losers		Interior Pass		Exterior Pass		Low Post		High Post	
	n	%	n	%	n	%	n	%	n	%	n	%
<b>Receiver Action</b>												
Dive Cut	117	20,17%	73	12,59%	93	16,03%	97	16,72%	124	21,38%	66	11,38%
On Ball Screen and Roll	75	12,93%	83	14,31%	96	16,55%	62	10,69%	107	18,45%	51	8,79%
Positional	60	10,34%	71	12,24%	53	9,14%	78	13,45%	102	17,59%	29	5,00%
Space Creation Without Ball	37	6,38%	49	8,45%	62	10,69%	24	4,14%	59	10,17%	27	4,66%
Out of Ball Screen and Roll	10	1,72%	5	0,86%	8	1,38%	7	1,21%	12	2,07%	3	0,52%
<b>Game Location</b>												
Home	139	23,97%	124	21,38%	148	25,52%	115	19,83%	187	32,24%	76	13,10%
Away	160	27,59%	157	27,07%	164	28,28%	153	26,38%	217	37,41%	100	17,24%
<b>Period of the Game</b>												
1st Period	70	12,07%	78	13,45%	85	14,66%	63	10,86%	105	18,10%	43	7,41%
2nd Period	67	11,55%	66	11,38%	63	10,86%	70	12,07%	87	15,00%	46	7,93%
3rd Period	85	14,66%	61	10,52%	81	13,97%	65	11,21%	104	17,93%	42	7,24%
4th Period	77	13,28%	76	13,10%	83	14,31%	70	12,07%	108	18,62%	45	7,76%
<b>24s of the offence</b>												
0-8 seconds	97	16,72%	83	14,31%	105	18,10%	75	12,93%	121	20,86%	59	10,17%
9-16 seconds	156	26,90%	145	25,00%	163	28,10%	138	23,79%	214	36,90%	87	15,00%
17-24 seconds	46	7,93%	53	9,14%	44	7,59%	55	9,48%	69	11,90%	30	5,17%
<b>Receiver Position</b>												
Point Guard	7	1,21%	4	0,69%	8	1,38%	3	0,52%	6	1,03%	5	0,86%
Shooting Guard	31	5,34%	17	2,93%	23	3,97%	25	4,31%	34	5,86%	14	2,41%
Small Forward	34	5,86%	21	3,62%	27	4,66%	28	4,83%	42	7,24%	13	2,24%
Power Forward	41	7,07%	47	8,10%	41	7,07%	47	8,10%	65	11,21%	23	3,97%
Center	186	32,07%	192	33,10%	213	36,72%	165	28,45%	257	44,31%	121	20,86%
<b>Reception zone</b>												
Low Post	202	34,83%	202	34,83%	235	40,52%	169	29,14%				
High Post	97	16,72%	79	13,62%	77	13,28%	99	17,07%				
<b>Pass Distance</b>												
Interior Pass	154	26,55%	158	27,24%								
Exterior Pass	145	25,00%	123	21,21%								

The data procession and analysis led to a several useful conclusions which can be compared with other research.

The analysis indicated that in NBA power forwards and centers are more likely to get inside pass, followed by the players who play in the small forward and shooting guard position with a lower percentage (Mavridis et al., 2009). In the present research the highest percentage to get the ball close to the basket is gathered by the centers, followed by power forwards and small forwards. It is observed that the teams choose to give the ball close to the basket to the players playing in the power forward and center position, with a percentage of 69% in NBA and 80.3% in Euroleague. This is due to the height of the players as well as their ability to score in the paint. Additionally, it is observed that European teams choose to give the ball in the post with a much higher percentage in Centers, compared to NBA. This is probably due to the athleticism of most NBA players and their effectiveness near the basket, unlike Euroleague players where this is mainly part of those in the Center position.

The most common receivers' action in NBA to get open and get the ball in the post was Positional and Dive Cut (Courel-Ibáñez et al., 2018). On the contrary, the largest percentage in the teams that participate in Euroleague have Dive cut, on ball screen and roll and Positional movements. It is observed that in Euroleague the player will receive the inside pass after on ball screen and roll in a fairly large percentage in contrast to NBA where the most common move is to get the ball with no previous action. One interpretation for this is the different dimensions of courts in Europe and United States, as well as the differences in regulations. It is worth noting that in both championships the teams move the ball with a high percentage in the paint after a dive cut move by the receiver.

Compared to the home variable, in NBA the game location it is not affected by the frequency of the inside pass (Courel-Ibáñez et al., 2017). Respectively, in Euroleague the game location variable does not greatly affect the frequency of inside pass, as the teams have similar percentages. Regarding the variable of game's period, the results showed that in Euroleague does not affect the inside pass. In contrast, in NBA the percentage of the inside pass decreases over time (Courel-Ibáñez et al., 2018), as the greatest number of the highlights takes place in the 1<sup>st</sup> period and the lowest in the 4<sup>th</sup> period.

It is noticed that NBA teams prefer to move the ball in the paint with exterior pass (Courel-Ibáñez et al., 2017). Nevertheless, in Euroleague level, it is observed that the teams choose to move the ball in the paint with interior pass. One interpretation is that in the NBA, players try to keep good spacing to create isolation situations for the receiver and this is allowed due to the large dimensions of the courts in United States as well as the ability of the players, to finish effectively isolation situations in the paint.

The conducted research led to the fact that in NBA small forwards and power forwards are more likely to receive the pass in the high post, while the shooting guards are more likely to receive the ball in the low post (Courel-Ibáñez et al., 2017). In Euroleague the results led to the conclusion that the teams choose to move the ball mainly in the low post regardless of the receivers' position. This is because Euroleague players have better shooting percent near the basket, unlike NBA players who have the same high shooting percent in long distances.

The results revealed that the interior pass is preferred when the ball moves to the low post ( $n = 235$ ), on the contrary when the ball goes to the high post the results are equally shared. Most likely this is due to space creation in the high post when the passer is outside of the 3-point line, resulting in better conditions to move the ball there. It is also worth mentioning that regardless of the position of the passer on the field, the teams in Euroleague choose to move the ball to a higher percentage in the low post. One interpretation is the teams' preference to finish close to the basket where the players have high shooting percentage.

Comparing the pass distance with the receivers' action, it is observed that when an interior pass is made in the post then the most common receivers' action is dive cut ( $n = 93$ ) and on ball screen and roll ( $n = 96$ ). This result shows the importance that pick and roll (Koutsouridis, 2017) has acquired in the modern era as well as the tendency of teams to move the ball to screener near the basket after the pick and roll. However, when an exterior pass is made in the post then the most common movements of the players are dive cut ( $n = 97$  passes) and positional ( $n = 78$  passes). This happens due to space creation near the basket when the passer is outside of the 3-point line, which creates isolating situations in the paint. It is noticed that regardless of the pass distance, the players choose to get open most of the times with dive cut. That shows the importance of moving without the ball in modern basketball.

## Conclusions

The detailed information about players and teams is an important tool for coaches, in order to design the coaching process with more validity and success. This allows the performance of the teams to be correlated with the technique of the players and the tactics used by the teams during the game resulting in improved training programs. From the findings of the present research it seems that the un-marked movements of the players can play an important role and determine the result of a match (Suárez-Cadenaset al, 2017). More specifically, when players receive a pass in the post after a dive cut, their teams are more likely to reach a winning result. Therefore, it is very important for coaches to work in training the constant movement away from the ball and especially the dive cut, as this seems to create several problems in the defending teams.

It is observed that the recipients of the pass in the post are mainly the players who play in Power Forward and Center positions, as well as that they accept the ball in a higher percentage in the low post area. Therefore, there is a need for training planning that aims to train these players in the various conditions created when they receive the ball in the low post, as well as the actions they can perform after receiving the ball.

This research has conducted results which are useful for every coach. The conclusions that emerged contribute to a winning design of the training, which will focus on increasing the inside game options and players' decision making in relation to the opponent defense. Therefore, it is important for every coach to learn about it and produce a focused plan.

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