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Shooting strategies and effectiveness after offensive rebound and its impact on game result in Euroleague basketball teams

Estrategias y eficacia de lanzamiento tras rebote ofensivo y su impacto en el resultado de partido en equipos de baloncesto de Euroliga

Estratégias e eficácia do lançamento após rebaixamento ofensivo e seu impacto no resultado da partida em equipes de basquete da Euroliga

Suárez-Cadenas, E.* and Courel-Ibáñez, J.

Faculty of Sport Sciences, University of Granada (Spain)

Abstract: Offensive rebound dominance has been widely shown as a key factor to success in basketball, since provide an extra attack. However, knowledge on how these second-options may results more effective is scarce. Thus, we aimed to discover the influence of shooting after offensive rebound on effectiveness, comparing differences between winners and losers. The sample consisted of 3010 shot attempts from Euroleague-Top-16. Variables pertaining to shooting effectiveness, shooting zone, and game result were registered through systematic observation. Statistical analyses included series of binomial logistic regression analyses. Results showed that shooting effectiveness increases by 67% when shooting after offensive rebound (OR= 1.67; p< 0.01). Additionally, winning teams were more effective after offensive rebound compared to losers (OR= 1.43; p= 0.03). Particularly, winners significantly scored more from the outside than defeated (OR= 3.40; p< 0.01), not finding differences in the inside (p= 0.62). In general, findings point out important advantages of shooting after offensive rebound, showing differences between winners and losers tactics. Thus, it is suggested developing specific tactical behaviours after offensive rebound situations to increase scoring opportunities and winning chances.
Keywords: Match analysis, invasion games, predictive analysis, performance indicator.
Resumen: El dominio del rebote ofensivo ha sido ampliamente considerado como un factor de éxito en baloncesto. Sin embargo, hay un escaso conocimiento sobre cómo esas segundas opciones de lanzamiento pueden ser efectivas. Por ello, el objetivo de este estudio fue determinar cómo influye lanzar después de rebote ofensivo en la eficacia de lanzamiento, comparando entre equipos ganadores y perdedores. La muestra estuvo formada por 3010 lanzamientos procedentes de partidos de Euroliga. Se midieron las siguientes variables mediante observación sistemática: eficacia de lanzamiento, zona de lanzamiento y resultado de partido. Se realizaron distintos análisis de regresión logística. Los resultados muestran que la eficacia de lanzamiento aumenta un 67% después de rebote ofensivo (OR= 1,67; p< 0,01). Además, los equipos ganadores fueron más eficaces tras rebote que los perdedores (OR= 1,43; p= 0,03). En concreto, los equipos ganadores anotaron más que los perdedores desde zonas exteriores tras rebote (OR= 3,40; p< 0,01), no encontrándose diferencias en zonas interiores. Estos resultados muestran las ventajas de lanzar tras rebote ofensivo, señalando diferencias en las tendencias de acierto entre ganadores y perdedores. Por ello, se sugiere analizar acciones tácticas concretas tras rebote ofensivo con la finalidad de aumentar la probabilidad de acierto y de ganar el partido.
Palabras clave: Análisis de juego, deportes de interacción, análisis predictivo, indicador de rendimiento.
Resumo: Dominância rebote ofensivo tem sido amplamente considerada como um fator de sucesso no basquete. No entanto, há pouco conhecimento sobre como essas segunda opções de lançamento podem ser eficazes. Portanto, o objetivo deste estudo foi determinar o lançamento influência rebote ofensivo depois de lançar a eficácia, comparando entre ganhar e perder equipes. A amostra foi composta por 3010 lançamentos de jogos da Euroliga. Lançamento eficácia, área de lançamento e resultado do jogo: As seguintes variáveis foram medidos por meio de observação sistemática. As análises de regressão logística separadas foram realizadas. Os resultados mostram que a eficiência aumenta em liberação de 67% após rebote ofensivo (OR = 1,67; p <0,01). Além disso, as equipas vencedoras foram mais eficazes após recuperação que os perdedores (OR = 1,43; p = 0,03). Especificamente, as equipes vencedoras marcou mais de perdedores de áreas fora após rebote (OR = 3,40; p <0,01), sem diferenças nos territórios do interior. Estes resultados mostram o interesse de lançar após rebote ofensivo, notando diferenças em tendências entre vencedores e perdedores sucesso. Portanto, sugere-se para analisar ações táticas específicas após rebote ofensivo, a fim de aumentar a probabilidade de sucesso e ganhar o jogo.
Palavras chave: Análise do jogo, interação esportes, análise preditiva, indicador de desempenho.

Introduction

In recent years there has been considerable interest in exploring sports competition requirements to detect most effective behaviours that enhance performance (Drust, 2010; Hughes & Bartlett, 2002; Nevill, Atkinson, & Hughes, 2008). In team sports such as basketball, a better understanding about tactical behaviours and players' interactions is needed to enhance existing knowledge about playing and training according to specific performance indicators (Sampaio, Ibáñez, & Lorenzo, 2013).

Dirección para correspondencia [Correspondence address]: Ernesto Suárez Cadenas. University of Granada, Faculty of Sport Sciences. Carretera de Alfacar. s/n. 18071. Granada (Spain). E-mail: ersuca@gmail.com

Rebound dominance (i.e., successfully gaining the ball possession after a missed field goal or free throw) is a crucial element of the game that characterizes best teams in basketball (Csataljay, O'Donoghue, Hughes, & Dancs, 2009; Gómez, Lorenzo, Sampaio, Ibáñez, & Ortega, 2008; Sampaio, Drinkwater, & Leite, 2010). Offensive rebound (i.e., an attacker recovers the ball after a missed-shot) is particularly important since offers second scoring opportunities against a misplaced defence (Kubatko, Oliver, Pelton, & Rosenbaum, 2007; Oliver, 2004). Concretely, offensive rebounds account for 8-10% of total missed-shot, which provide around 10-15 second shooting options (Csataljay et al., 2009; Gómez et al., 2008; Sporiš, Šango, Vučetić, & Mašina, 2006).

Several investigations have shown game strategies that increase rebounding options according to spatial aspects. Researchers agree that nine out of ten rebounds are obtained at inside zones (i.e., regions close to the ring), and mostly facing the basket (Ribas, Navarro, Tavares, & Gómez, 2011b; Tsamourtzis & Athanasiou, 2004). This may suggest a players' tendency to overcrowd inside zones after a missed-shot to increase offensive rebounding opportunities (Maheswaran, Chang, Henehan, & Danesis, 2012; Mexas, Garefis, Kyriakou, & Tsitskaris, 2005). Besides, getting the ball close to the ring might provide an easy scoring option by shooting from short distances (Courel, Suárez-Cadenas, Ortega, Piñar, & Cárdenas, 2013; Mexas et al., 2005; Tavares & Gomes, 2003). This leads to the idea that two particular shooting situations could emerge after offensive rebound, consequently affecting on players' shooting selection: i) inside shot right after getting the ball, ii) outside shot after an open pass, taking advantage of a possible misplaced defence or an agglomeration of players close to the rim. However, to our knowledge no previous study has explored shooting strategies and effectiveness after offensive rebounding. This information is likely to be useful for basketball coaches and staffs to get the best achievement after a missed-shot.

In sum, best offensive rebounding teams will increase second shooting options, which may enhance winning chances. Moreover, players' shooting strategies after offensive rebound (i.e., inside or outside shots) would affect effectiveness rate. Therefore, this study explores shooting after offensive rebound analysing effectiveness rate, shooting zone and game result. In particular, we examine differences on shooting effectiveness and shooting strategies after offensive rebound between winners and losers.

Methods

Sample and variables

The sample consisted of 3010 shots corresponding to 50 matches from 2012 Basketball Euroleague including the Top-16 teams. All shot attempts performed during set offense situations (i.e., offences against organised defences) with possibility of rebound were included. Shooting fouls, free throws, off time shots, and fast breaks were discarded. Shot attempts were classified whether performed after offensive rebound (n = 335) or not (n = 2675). Three categorical variables were included in analyses: game result (winning and losing team), shot attempts effectiveness (scored and missed attempts), and shooting zone (inside and outside, see Figure 1).

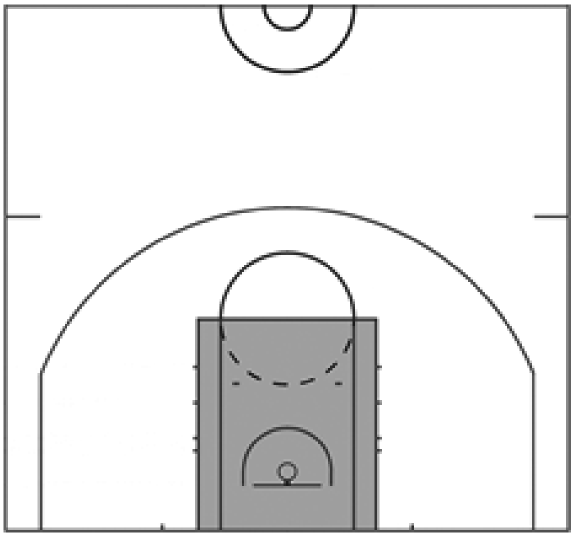

Figure 1. Shooting zone delimited in attempts performed inside the three-second restricted area (in grey) and outside the three-second restricted area, including both two and three-point area (in white).

Procedure

The games were analysed through systematic observation, performed by two expert technicians trained for this task, graduated in Sports Sciences with a minimum of six years' experience as basketball coaches. After a 4-week period, they acquired over 18 hours of experience through nine specific sessions. Inter and intra-observer reliabilities were assessed by Cohen's Kappa calculation, obtaining scores over 0.93 and 0.95 respectively. According to Altman (1991, p.404) values were considered as very good strength of agreement (>0.80). Data were recorded using the LINCE software, a specific digital tool to measure sport behaviour (Gabín, Camerino, Anguera, & Castañer, 2012).

Eight different binomial logistic regression models were used. Firstly, three models were fitted using *Shooting after offensive rebound* (yes/no) as dependent variable to estimate the likelihood of scoring when shooting after offensive rebound (model 1), the likelihood of shooting from the inside zone after offensive rebound (model 2) and the winners' likelihood of shooting after offensive rebound (model 3). Secondly, five models more were developed using *Effectiveness after offensive rebound* (score/not score), *Shooting zone* (inside/outside) and *Scoring zone* (inside/outside) as dependent variables to estimate the winners' likelihood of scoring when shooting after offensive rebound (model 4), the likelihood of scoring from the inside zone after offensive rebound (model 5), the likelihood of shooting from the inside zone after offensive rebound (model 6), the winners' likelihood of scoring from the inside zone when shooting after offensive rebound (model 8) and, similarly, the winners' likelihood of scoring from the outside zone (model 9).

Statistical analysis

Descriptive analysis included percentages of occurrence and effectiveness of shot attempts. Statistical analysis included binary logistic regressions where *b*-values (*B)* and *Odds Ratio* (*OR*) with their 95% confidence intervals (CI) and Nagelkerke's *R2* was used to assess goodness-of-fit of the models. Significations of predictors were assessed by means of Wald's test. The significance threshold for all analyses was $p<.05$. Statistical analyses were conducted in IBM SPSS Statistics, Version 20.0 (2011, Armonk, NY: IBM Corp.).

Results

Results from descriptive analysis are displayed in Table 1. Results from the first three logistic regression models (dependent variable: *Shooting after offensive rebound*) are shown in Table 2. Model 1 (X2(1) =17.865; p<0.001) revealed that scoring odds increased when shooting after offensive rebound compared with shooting before a rebound. Model 2 (X2(1) =70.262; p<0.001) showed a higher probability of shooting from the inside zone than from the outside zone after offensive rebound. Model 3 (X2(1) = 0.440; p=0.51) did not show significant differences between winners and losers in the amount of shots performed after offensive rebound.

Table 1. Distribution of shoots regarding rebound situation and shooting zone, comparing winning and defeated teams.

		Not shooting after offensive rebound						Shooting after offensive rebound						Total			
Shooting effectiveness	**Shooting zone**	Winners		Losers		Total		Winners		Losers		Total		Winners		Losers	
		N	%	N	%	n	%	N	%	N	%	n	%	n	%	n	%
Scored attemp	Inside	346	54,2	326	57,4	672	55,7	81	75,0	73	86,9	154	80,2	427	57,2	399	61,2
	Outside	292	45,8	242	42,6	534	44,3	27	25,0	11	13,1	38	19,8	319	42,8	253	38,8
Missed attempt	Inside	268	37,4	287	38,1	555	37,8	42	61,8	39	52,0	81	56,6	310	39,5	326	39,4
	Outside	448	62,6	466	61,9	914	62,2	26	38,2	36	48,0	62	43,4	474	60,5	502	60,6
Total	Inside	614	45,3	613	46,4	1227	45,9	123	69,9	112	70,4	235	70,1	737	48,2	725	49,0
	Outside	740	54,7	708	53,6	1448	54,1	53	30,1	47	29,6	100	29,9	793	51,8	755	51,0

Results from the other regression models (dependent variables: Shooting effectiveness, Shooting zone and Scoring zone after offensive rebound) are shown in Table 3. Model 4 (X2(1) =4.589; p=0.03) revealed that winners' odds to score after offensive rebound increased compared with losers. Model 5 (X2(1) =21.680; p<0.001) showed a higher effectiveness from the inside zone than outside zone after offensive rebound. Model 6 (X2(1) =0.012; p=0.912) showed no differences between winners and losers in amount of shots regarding shooting zone (inside/outside). Model 7 (X2(1) =0.012; p=0.913) did not revealed differences between winners and losers in shooting effectiveness at the inside zone after offensive rebound. Interestingly, Model 8 (X2(1) =8.211; p=0.004) indicated a higher effectiveness by winners from the outside zone than losers after offensive rebound.

Table 2. Results from logistic regression models using as dependent variable Shooting after offensive rebound (yes/no). Odds Ratios (OR) and their 95% confidence intervals (CI), regression coefficients (β) and their standard errors (SE) are shown.

Parameter	***Model***	**Total shooting attempts (n=3010)**			
		B coefficient	**P**	**OR**	**95%-CI**
Shooting (after OR)					
Scoring vs. Not scoring	*model 1*	0.49	**<0.001**	**1.63***	1.30 - 2.06
Inside shot vs. Outside	*model 2*	1.02	**<0.001**	**2.77***	2.17 - 3.55
Winners vs. Losers	*model 3*	0.08	0.510	1.08	0.86 - 1.35

Model 1: X2(1) =17.865; p<0.001; *Model 2*: X2(1) =70.262; p<0.001; *Model 3*: X2(1) =0.440; p=0.507

Table 3. Results from logistic regression models using as dependent variable effectiveness after offensive rebound (score/not score), shooting zone (inside/outside) and Scoring zone (inside/outside). Odds Ratios (OR) and their 95% confidence intervals (CI), regression coefficients (β) and their standard errors (SE) are shown.

Parameter	*Model*	Shooting attempts after Rebound (n=335)			
		B coeficient	*P*	OR	95%-CI
Effectiveness (Score)					
Winners vs. Losers	*model 4*	0.35	**0.035**	**1.43***	1.01 - 2.01
Inside vs. Outside	*model 5*	1.13	**<0.001**	**3.10***	1.91 - 5.04
Zone (inside shot)					
Winners vs. Losers	*model 6*	0.03	0.912	0.97	0.61 - 1.56
Inside Zone (Score)					
Winners vs. Losers	*model 7*	0.03	0.913	1.03	0.60 - 1.77
Outside Zone (Score)					
Winners vs. Losers	*model 8*	1.22	**0.006**	**3.40***	1.34 - 8.06

Model 4: X2(1) =4.589; p=0.032

Model 5: X2(1) =21.680; p<0.001

Model 6: X2(1) =0.012; p=0.912

Model 7: X2(1) =0.012; p=0.913

Model 8: X2(1) =8.211; p=0.004

Discussion

The aim of this study was examine differences on shooting effectiveness and shooting strategies after offensive rebound between winners and losers. In general, results point out general advantages of shooting after offensive rebound on attack effectiveness. As expected, shooting effectiveness increases after offensive rebound compared with effectiveness before a rebound (Model 1). Besides, shooting attempts after offensive rebound are more likely to be made from the inside zone than before a rebound (Model 2). These results might suggest a players' tendency to shoot from short distances where more points are usually scored (Courel et al., 2013; Mexas et al., 2005; Tavares & Gomes, 2003) and most of rebounds are grabbed (Ribas et al., 2011a; Tsamourtzis & Athanasiou, 2004).

In agreement with previous studies (Csataljay et al., 2009; Ibáñez et al., 2008; Trninic et al., 2002), Model 3 did not show differences between winners and losers in the amount of shots after offensive rebound. These results are controversial considering that offensive rebound, or more specifically, the amount of offensive rebounds grabbed, has been considered an important performance indicator in basketball (e.g., Kubatko et al., 2007). It is well known that getting an offensive rebound has positive implications; it gives the team a second chance to shoot and, maybe, in better conditions than before. Nevertheless, our findings suggest that offensive rebound could be of greater advantage if teams are capable of creating optimal shooting conditions.

More importantly, Model 4 revealed increments on winners' scoring odds after offensive rebound compared with losers. This fact may be explained by differences in shooting selection as a consequence of better decision-making during the offence (Suárez-Cadenas, Courel-Ibañez, Cárdenas, & Perales, 2016). For instance, group-tactical behaviours oriented to disturb the defence and generate spatial advantage enhance shooting options against low defensive pressure, resulting in higher effectiveness (Csataljay et al., 2013). Further, we observed shots are likelier to be scored from the inside after rebounding (Model 5). In elite basketball, players' aims are defined according to specific positions (i.e., inside and outside players). In this sense, inside players are characterized by a physical power, rebounding dominance, and shooting skills from close distances against high defensive pressure (Cárdenas, Ortega, Courel, Sánchez-Delgado, & Piñar, 2015; Gomez et al., 2013). Thus, coaches should emphasize in designing shooting conditions right-after rebounding to improve inside players' anticipation and decision-making in overcrowded regions close to the basket.

The following models are focused on spatial point aspects. Whereas Model 6 and 7 did not find shooting amount differences or scoring differences between winners and losers in the inside zone, Model 8 revealed that winners significantly scored higher in the outside. This interesting result is consistent with research that reveals better shooting percentage of winners from far distance (Gómez et al., 2008; Ibáñez, García, Feu, & Cañadas, 2009; Trninic et al., 2002). Nevertheless, effectiveness is directly related to shooting selection and, in turn, to decisional cues as opposition degree (Csataljay et al., 2013, Ibáñez et al., 2009; Suárez-Cadenas et al., 2016). Therefore, the greater effectiveness after offensive rebound at the outside suggests better shooting selection developed by winners.

This idea could have further implications at the defensive level. At the moment of shooting, offensive teams must try to get a good disposition to grab a possible rebound (crowding the inside zone) and, at the same time, to get ready for a quick defensive reaction to avoid a possible fast-break (placing players around the three-point line) (Suárez-Cadenas, Sánchez-Delgado, Cárdenas, & Perales, 2015). Thus, those players that are ready to avoid a possible fast-break could be perfect support to get open shots in case of offensive rebound. In this sense, future studies could analyse how affect the offensive rebound to the opposition degree at the outside.

Our study has some limitations that must be acknowledged. First of all, rebounds after free throws were not included in the analysis. Secondly, it is important to point out that fouls received after offensive rebound were not included in the analyses, so important information could be lost. It is suggested to include fouls received as variable as well as exploring larger samples in future studies to get higher validity, and to detect further indicators related to effectiveness after offensive rebound.

Practical Applications

The current study has tried to explore game performance after offensive rebound. Evidences reported provide useful information for coaches and basketball professionals, and contribute to develop strategies for teams' performance improvement. Future studies must clarify whether offensive rebound is a real performance indicator itself or, on the contrary, the actions developed after rebounding are the factors that actually determine teams' performance. Also, it might be interesting to go further in the analysis of actions after rebounding to detect specific collective behaviours that could result more effective. It is suggested to develop specific tactical behaviours after grabbing offensive rebound to increase scoring opportunities and winning chances. For instance, a quick reaction of supporting players in the outside might help the rebounder making an open pass.

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