

IMPACT OF REGULATION CHANGE ON HALF-COURT OFFENCE IN THE POLISH BASKETBALL LEAGUE

KAROL GRYKO¹, BOGUSŁAW ŚLUPCZYŃSKI¹, ANNA KOPICZKO²

*Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education,
Department of Sports Games¹, Department of Anthropology and Health Promotion²*

Mailing address: Karol Gryko, Józef Piłsudski University of Physical Education, 34 Marymoncka Street,
00-968 Warszawa, tel.: +48 22 8340431, ext. 577, fax: +48 22 8651080, e-mail: k.gryko@awf.edu.pl

Abstract

Introduction. Each change in the rules of a sport affects the way it is performed. Therefore, changes in regulations require that new training models be developed. The aim of the study was to determine whether FIBA's introduction of new regulations in the 2010/2011 season pertaining to the dimensions of certain parts of the playing area, which changed the conditions under which the game was played, impacted the offensive actions of the top three teams in the Polish Basketball League. **Material and methods.** The study analysed qualitative data describing the offences (n = 16,694) performed during 200 matches of the Polish Basketball League, that is the highest-level men's professional basketball league in Poland, during two periods: the 2009/2010 season (110 matches; n = 9,343 offences), before the regulations were modified, and the 2010/2011 season (90 matches; n = 7,351 offences), after they were changed. The research involved the players of three teams who received the gold, silver, and bronze medals in the final standings of the Polish National Championship in the 2009/2010 season. **Results.** The study found a statistically significant (p < 0.001) decrease in the overall number of tactical offensive actions of 3.84% and a significant (p < 0.05) 5% decrease in the mean number of points scored. A significant (p < 0.05) decrease in half-court offences, amounting to almost 2% was also observed. This offensive system was characterised by a minor shift toward individual offences with the back to the basket and pick-and-roll offences; these changes, however, did not cause an increase in the level of effectiveness. **Conclusions.** The direction of the changes observed have been determined, which consisted in a reduction in the overall number of offensive actions and a shift in the place where they were completed, from the three-point area in particular, to the two-point area.

Key words: basketball, tactics, half-court offence, effectiveness, regulation change

Introduction

With the development of basketball, the regulations pertaining to the rules of the game and the way it is played have changed as well. Changes in the regulations have been caused by a continually increasing level of competition and were aimed not only at making the rules uniform, but also at making the game more appealing and more popular, thanks to adjusting it to the requirements of the media.

In the era of the globalisation and professionalization of contemporary sports, it has become necessary to continuously improve and standardise regulations, although over the past 16 years, the dynamics and scope of the changes introduced by the International Basketball Federation (FIBA) have varied [1]. The most recent changes were made to the regulations in the 2010/2011 season. The alterations mostly concerned the part of the playing area where offensive action takes place, and they consisted in changes in the shape and dimensions of the restricted area and the distance of the three-point line, which was moved by another 50 cm (the line is now 6.75 m away from the basket).

Previous research indicates that regulation change seems to stimulate the development of strategy and tactics in team sports [2]. However, it has also been observed that for some time after

new regulations are introduced, teams and their players tend to be maladjusted to the new conditions under which the game is played [3-5]. Other authors have frequently stated that each change in the regulations or in the way the game is officiated causes changes in the way it is played, and this makes it necessary to design new effective methods and forms of training [6, 7].

Sports practice, regardless of the nature and specificity of the discipline, continues to deliver substantial evidence that in order for a team and its players to be successful, apart from undergoing motor, technical, intellectual, and mental training, they need tactical preparation, which plays a particularly important role [8, 9]. During the game, the teams which are competing against each other not only make use of set plays and their variants, but also need to be able to improvise in particular situations. Thus in contemporary sports, a comprehensively trained player should have a wide range of skills which are necessary to implement efficient offensive and defensive strategies in all types of conditions arising in the course of the game [10].

The aim of the current study was to establish whether FIBA's introduction of new regulations regarding the area where offensive actions are carried out in the 2010/2011 season had an influence on the half-court offences performed by the top three teams in the Polish Basketball League.

Material and methods

Qualitative data was analysed, concerning the tactical offensive actions ($n = 16,694$) performed in 200 matches of the Polish Basketball League National Championship during the two following periods: the season preceding the introduction of the new regulations (2009/2010; 110 matches; $n = 9,343$ actions) and the season following their introduction by FIBA on 1st October, 2010 (2010/2011; 90 matches; $n = 7,351$).

The research involved the players of three teams who received the gold, silver, and bronze medals in the final standings of the Polish National Championship in the 2009/2010 season. These teams were chosen deliberately, as they exhibited similar, high levels of sports performance and had stable groups of players and coaches, which means that before and after the regulations were changed, the teams remained nearly the same, with only minor adjustments, and continued to implement a similar strategy after the rule change.

The method of observation was used, based on predefined categories; DVD recordings were made first and then a qualitative analysis of the 16,694 tactical offensive actions were performed. The instrument used in the research was a data sheet which made it possible to assess the tactical offensive actions qualitatively by recording data regarding the following:

- offensive system (fast-break or half-court);
- organisation of the offence (individual offences facing the basket or with the back to the basket, pick and roll offences – tactical manoeuvres involving one of the players screening the defender, group offences, and team offences);
- part of the playing area where the offence was completed;
- effectiveness of the offence.

The following descriptive statistics for the data was calculated: mean values (X), standard deviations (SD), ranges (min-max), and percentages in the entire data set (%). The data were tested for normality of distribution using the Shapiro-Wilk test. Then the statistical significance was determined of the differences between the values describing the number and characteristics of the offensive actions performed during the seasons preceding and following the introduction of changes in the regulations using a non-parametric Mann-Whitney U test, with statistical significance set at $p < 0.05$.

Finally, the relationships between different types of offensive actions and the numbers of points scored before and after the rule changes were analysed using Spearman's correlation coefficients. All the calculations and analyses were performed using STATISTICA (v.10, StatSoft, USA).

Results

The general characteristics of the tactical offensive actions performed before and after the regulations were changed are shown in table 1. An analysis of the numbers and different types of offences before and after the regulation change showed statistically significant decreases in the numbers of: all offences (of 3.84%, $p < 0.001$), offences leading to throws (of 4.2%; $p < 0.001$), and offences leading to effective throws (of 4.6%; $p < 0.01$). A statistically significant ($p < 0.05$) 5% decrease was also observed in the mean number of points scored in the matches held after the rules were changed. It is worth emphasising that the effectiveness of the throws performed did not change significantly.

As for the two offensive systems (fig. 1), the statistical analysis found that after the rule change, there was a significant

($p < 0.05$) decrease in the number of half-court offences, amounting to nearly 2%.

Table 1. General characteristics of the offences performed before and after the regulation change

Variables	2009/2010 (n = 9343)	2010/2011 (n = 7351)
	X ±SD	
Total offences	84.94 ±7.02	81.68 ±6.07***
Offences leading to throws	71.39 ±6.66	68.39 ±6.18***
Offences leading to effective throws	38.67 ±4.91	36.88 ±4.79**
Offences leading to ineffective throws	32.72 ±5.64	31.51 ±5.07
Offences leading to losing the ball	13.55 ±3.25	13.29 ±3.44
Throw effectiveness [%]	54.17 ±6.00	53.93 ±6.00
Points scored	83.10 ±10.37	78.94 ±10.77*

Statistically significant differences: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

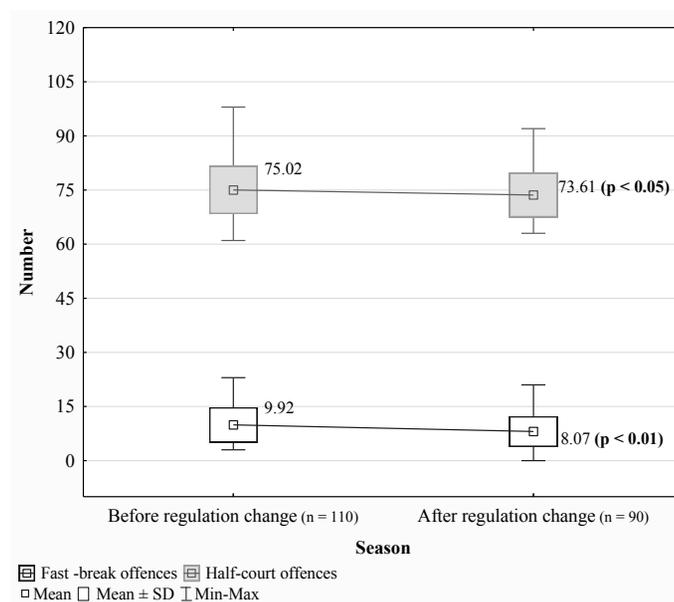


Figure 1. Offences before and after the regulation change depending on the offensive system

Since half-court offences accounted for as much as 88.32% and 90.12% of all offences before and after the rule change, respectively, particular types of these key offences (fig. 2, tab. 2) were examined, and the following was found.

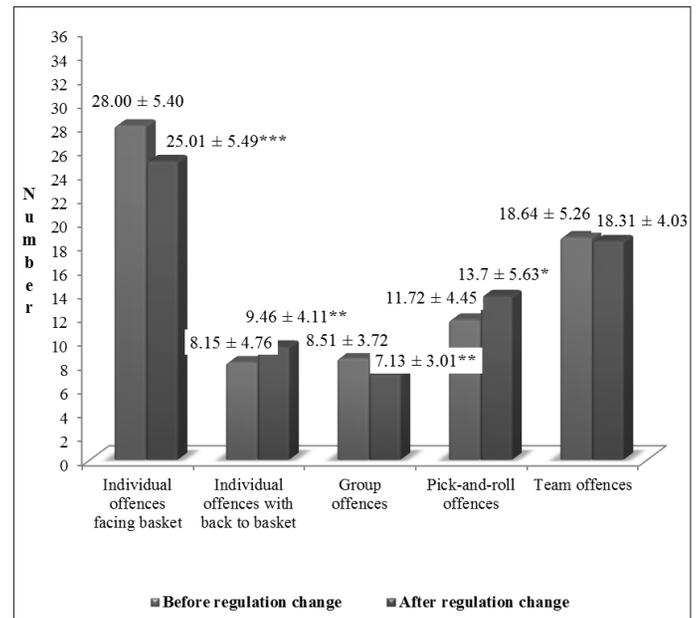
- Individual offences facing basket.

The study revealed a statistically significant ($p < 0.001$) decrease in the number of individual offences performed facing the basket (-2.99 per match), a significant ($p < 0.01$) decrease in the percentage of these offences in the total number of offences (from 37.32% to 33.98%), and decreases in the numbers

of particular types of these offences. a significant ($p < 0.05$) decrease was also observed in the number of points scored (-2.49 per match), and no statistically significant difference in throw effectiveness was found.

- Individual offences with back to basket.
After the regulations were changed, there was a significant ($p < 0.01$) increase in the percentage of back-to-basket offences in the total number of half-court offences (from 10.86% to 12.85%), stemming from a significant ($p < 0.01$) increase in the number of offensive actions ($+1.31$ per match). These actions mainly led to ineffective throws ($p < 0.01$) and losing the ball ($p < 0.05$), which, in turn, caused a minor drop in throw effectiveness, and thus there was no significant difference in the number of points scored.
- Group offences.
The study showed a significant ($p < 0.01$) decrease in the percentage of group offences in the total number of half-court offences (from 11.35% to 9.68%), due to a significant drop in their number (-1.38 per match). Taking into account the fact that the effectiveness of the throws performed was similar, this caused only a minor decrease in the number of points scored (-1.44 per match).
- Pick-and-roll offences.
A significant ($p < 0.01$) increase was observed in the percentage of these offences (from 15.62% to 18.62%) in the total number of offences, caused by a significant ($p < 0.05$) increase in their number ($+1.98$ per match). However, since throw effectiveness dropped significantly (by -1.75% ; $p < 0.05$), this did not result in a significant increase in the number of points scored.
- Team offences.
No statistically significant changes were observed for this group of offences after the new regulations were introduced.

As far the number of half-court offences performed before and after the change in regulations depending on the place where they were completed is concerned (fig. 3), a significant



Statistically significant differences: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 2. Half-court offences (X ± SD) before and after the regulation change depending on their organisation

($p < 0.01$) drop (of 8-9%) was found in actions completed in the restricted and three-point areas. The number of offences completed in the two-point area increased in a statistically significant way ($p < 0.01$) by almost 18%.

When particular types of half-court offences were examined depending on the place where they were completed (tab. 3), significant decreases were observed in the numbers of offences leading to throws (of 9%; $p < 0.05$) and those leading to effective throws (of 19.4%; $p < 0.001$), which caused as significant drop in throw effectiveness and in the number of points scored (of 7.7% and 19.8%, respectively; $p < 0.001$). Different changes were observed for the two-point area, in that there was a sig-

Table 2. Mean values (X ± SD) describing the half-court offences before and after the regulation change depending on their organisation

Variables		Offences leading to throws	Offences leading to effective throws	Offences leading to ineffective throws	Offences leading to losing the ball	Throw effectiveness [%]	Points scored
Total number of half-court offences	Before	62.89 ± 6.51	32.84 ± 4.38	30.05 ± 5.47	12.13 ± 2.80	52.17 ± 6.00	70.77 ± 9.46
	After	61.61 ± 6.10	32.30 ± 4.54	29.31 ± 5.00	12.00 ± 3.15	53.04 ± 6.00	69.34 ± 9.96
Individual offences facing basket	Before	21.40 ± 4.66	10.72 ± 3.31	10.68 ± 3.26	6.60 ± 1.84	50.09 ± 11.06	23.00 ± 7.33
	After	18.98 ± 4.76***	9.62 ± 3.03*	9.36 ± 3.31**	6.03 ± 1.58*	50.68 ± 11.72	20.51 ± 6.89*
Individual offences with back to basket	Before	6.24 ± 3.66	3.39 ± 2.50	2.85 ± 1.95	1.91 ± 1.48	54.33 ± 24.40	6.55 ± 4.49
	After	7.18 ± 3.42*	3.61 ± 2.14	3.57 ± 2.01**	2.28 ± 1.13*	50.28 ± 20.24	6.99 ± 4.32
Group offences	Before	8.09 ± 3.58	5.83 ± 2.81	2.26 ± 1.74	0.42 ± 0.64	72.06 ± 18.83	10.31 ± 5.11
	After	6.73 ± 2.83	5.08 ± 2.32	1.65 ± 1.32*	0.40 ± 0.61	75.48 ± 20.06	8.87 ± 4.18
Pick-and-roll offences	Before	9.49 ± 3.97	4.97 ± 2.65	4.52 ± 2.18	2.23 ± 1.03	52.37 ± 16.77	11.05 ± 5.97
	After	11.24 ± 5.07*	5.69 ± 2.75	5.55 ± 3.29*	2.46 ± 1.23	50.62 ± 16.84*	12.50 ± 6.19
Team offences	Before	17.67 ± 5.30	7.93 ± 3.09	9.74 ± 3.60	0.97 ± 0.89	44.88 ± 11.68	19.86 ± 7.85
	After	17.48 ± 4.09	8.30 ± 3.00	9.18 ± 2.71	0.83 ± 1.00	47.48 ± 11.59	20.47 ± 7.73

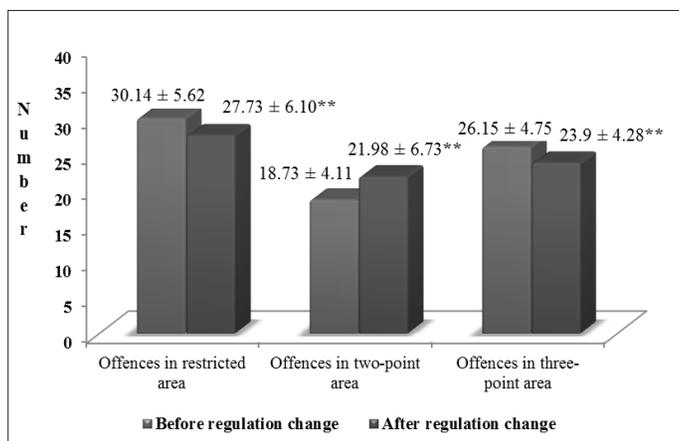
Statistically significant differences: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3. Mean values ($X \pm SD$) describing the half-court offences before and after the regulation change depending on the place where they were completed

Variables		Offences leading to throws	Offences leading to effective throws	Offences leading to ineffective throws	Offences leading to losing the ball	Throw effectiveness [%]	Points scored
Offences in restricted area	Before	24.60 \pm 5.39	16.61 \pm 4.49	7.99 \pm 3.70	5.54 \pm 1.86	67.51 \pm 12.99	33.34 \pm 9.05
	After	22.39 \pm 5.89*	13.39 \pm 4.40***	9.00 \pm 3.27	5.34 \pm 1.76	59.80 \pm 11.53***	26.74 \pm 8.82***
Offences in two-point area	Before	16.31 \pm 4.17	8.64 \pm 2.65	7.67 \pm 2.86	2.42 \pm 1.08	52.85 \pm 12.08	14.82 \pm 5.54
	After	19.03 \pm 6.76	11.82 \pm 4.73***	7.21 \pm 3.91	2.95 \pm 1.19**	62.11 \pm 14.76***	21.40 \pm 8.85***
Offences in three-point area	Before	21.98 \pm 4.66	7.59 \pm 2.59	14.39 \pm 3.37	4.17 \pm 1.21	34.53 \pm 8.55	22.77 \pm 7.77
	After	20.19 \pm 4.34**	7.09 \pm 2.70	13.10 \pm 3.64*	3.71 \pm 1.24**	35.07 \pm 11.96	21.20 \pm 8.00

Statistically significant differences: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

nificant ($p < 0.001$) increase in the number of effective offences (of 36.8%) as well as in throw effectiveness (of 9.3%) and in the number of points scored (of 44.4%). As for the three-point area, a decrease was observed in the numbers of offences leading to throws (of 8.1%; $p < 0.01$), those leading to ineffective throws (of 8.9%; $p < 0.05$), and those leading to losing the ball (of 11%; $p < 0.01$). The effectiveness of throws and number of points remained on a level similar to the one prior to the introduction of new regulations.



Statistically significant differences: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 3. Half-court offences ($X \pm SD$) before and after the regulation change depending on the place where they were completed

The values of Spearman's rank correlation coefficients (tab. 4) changed significantly with regard to the types of half-court offences performed and the places where they were completed. As far as the data collected for the season preceding the change in regulations are concerned, a significant ($p < 0.05$) weak negative correlation was found between the number of points scored and the number of individual offences with the

back to the basket and a significant ($p < 0.05$) weak positive correlation in the case of pick-and-roll offences. The study also revealed a significant ($p < 0.01$) weak negative correlation between the number of offences completed in the two-point area and the number of points scored and a significant ($p < 0.05$) positive correlation for offences completed in the three-point area.

Table 4. Spearman's correlation coefficients characterising the relationships between the half-court offences before and after the regulation change depending on their organisation and the place where they were completed

Correlations	Before rule change n = 9343	After rule change n = 7351
Individual offences facing basket and points scored	$r_s = 0.059$	$r_s = 0.045$
Individual offences with back to basket and points scored	$r_s = -0.213^*$	$r_s = 0.242^*$
Group offences and points scored	$r_s = 0.141$	$r_s = 0.136$
Pick-and-roll offences and points scored	$r_s = 0.228^*$	$r_s = -0.217^*$
Team offences and points scored	$r_s = 0.042$	$r_s = 0.287^{**}$
Offences in restricted area and points scored	$r_s = 0.083$	$r_s = 0.204$
Offences in two-point area and points scored	$r_s = -0.262^{**}$	$r_s = -0.016$
Offences in three-point area and points scored	$r_s = 0.188^*$	$r_s = -0.008$

r_s – Spearman's rank correlation coefficient.

Statistically significant differences: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

When it comes to the season following the changes in the regulations, significant weak positive correlations were observed between the number of points scored and the numbers of individual offences with the back to the basket ($p < 0.05$) and team offences ($p < 0.01$), in addition to a significant ($p < 0.05$) weak negative correlation observed in the case of pick-and-roll offences.

Discussion

The aim of the study was to determine whether the implementation of new regulations, modifying the shape and dimensions of the restricted area and the distance of the three-point line, which changed the conditions under which the game was played, influenced the particular types and effectiveness of half-court offensive actions performed by three teams in the Polish Basketball League who ranked best in the season preceding the introduction of these changes. The three teams as a whole were assessed.

Any clear evidence was found that the teams had adapted to the new regulations. Changes were observed consisting in a reduction in the overall number of offensive actions (fig. 1) and a shift in the place where they were completed from the three-point area in particular to the two-point area (fig. 3).

An explanation for these findings could be that a one-year period was not sufficient for the teams to adapt to the new conditions, which, apart from the slightly modified shape of the restricted area, were characterised by a three-point line that had been moved 50 centimetres further away from the basket. In this new situation, offensive actions which were previously performed by the players in what was considered the three-point area now counted as throws performed in the two-point area, as demonstrated by the increase in the number of two-point offences and that of points scored for them (tab. 3).

It can be assumed that the decrease in the number of throws made in the three-point area was caused by the fact that the habits developed by the players over several years of training, both regarding the places where offences are executed and important spatial and temporal factors, which determined the quality of the throws performed, were incompatible with the new conditions under which the game was played.

Concluding our discussion of the results of the investigation of particular types of offences performed in the two periods examined, it can be stated that during the first season after the regulation change, the half-court offensive system was modified to a small extent, in that the tactics shifted slightly to individual back-to-basket and pick-and-roll offences (fig. 2). However, this shift did not result in an increase in effectiveness, which is evidenced by the drop in throw effectiveness and the nearly identical number of points scored compared to the preceding season (tab. 2). It is worth noting that the weakest point of this altered strategy was the effectiveness of pick-and-roll offences, the correlation between these offences and the number of points scored being $r_s = -0.217$ (tab. 4); bearing in mind that these offences were numerous, their effectiveness needed to be raised significantly. The analysis also showed a clear increase in the importance of individual back-to-basket offences and team offences (tab. 4).

A comparison of the findings of the current study with those obtained by other authors [3] reveals that a similar scope and direction of changes in the way the game was played after the three-point line was moved by 50 cm were found in the ACB League (the highest-level professional men's basketball league

in Spain, which is also considered the best basketball league in Europe). There were significant ($p < 0.001$) decreases in the throws completed in the three-point area, regarding the number of throws performed (from 22.3 to 21.4 per match), number of effective throws (from 8.1 to 7.4 per match), and throw effectiveness (from 36.1% to 34.5%).

Similar effects of regulation change were found in research involving 57 NBA basketball players which investigated seasons 1991/1992 to 1999/2000, when the distance of the three-point line from the basket was changed twice (from 7.24 m to 6.70 m in 1994/1995 and then back to 7.24 m in 1997/1998). The research showed that the number of throws and effective throws as well as the effectiveness of three-point throws increased (from 26.3% to 32.6%) when the line was at a smaller distance from the basket (6.70), and the opposite effect was observed when the line was moved to its previous position [2].

As for the impact of the changes in the regulations introduced by FIBA on all matches in the Euroleague played in 2010/2011, research by other authors found, similarly as the current study, decreases in particular types of offences and the effectiveness of three-point throws, as well as a shift in the primary place where the offences were completed to the two-point area, proven by an increase in the number of offences carried out in that area [4].

To sum up, the scope and directions of the changes presented in the current article are in line with those reported by other researchers who have investigated the effects of changes in regulations on basketball performance [1, 11-15]. Each modification of the regulations seems to have a negative effect on the dynamics of a sport, both in team [16-18] and individual disciplines [5], as evidenced, among others, by the findings of the current study.

Conclusions

1. The results of the current study which compared the offensive actions of three top Polish Basketball League teams after the regulation change introduced in 2010 with those in the preceding season revealed that these modifications had clear effects in terms of the players' response to the new conditions of the game, and these effects were varied in scope and scale.
2. A detailed analysis of the variables describing the offensive play of the teams in the two periods examined led to the conclusion that after the rules were modified, individual offences with the back to the basket and team offences became more important in the offensive tactics.
3. When compared to the data for the season preceding the changes, the offences which were found to be the least effective were pick-and-roll offences (there was a significant increase in their number, but their effectiveness dropped), which may indicate that the technical and tactical potential of the players who played a key role in the half-court offence had not been diagnosed correctly.
4. The modification of particular parts of the playing area where offensive actions take place caused the place where these actions were completed to shift to the two-point area from other parts of the playing area.
5. Based on the research findings in the field, there is a need to investigate the long-term effects of introducing new regulations on the tactics of offensive play in basketball, in order to explore whether the scope and direction of the changes observed in this and other studies remain similar over time.

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