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Analysis of the Offensive Tactics Used by High-Level Basketball Players of Different Age Groups

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Abstract

The rapid and continuous development of basketball has necessitated the long-term training of young basketball players, enabling them to meet the ever-changing demands of the sport. The aim of the present study was to record the offensive competitive behaviour of men and boys by analysing world championship matches in order to determine whether the choice of tactics in them depended on the age category they belonged to. The sample of the research consisted of 2,997 actions performed by basketball national teams in Men's (seniors) and juniors' World Championships. The juniors' category includes athletes 14-15 years old (U16). Offenses were recorded with the Sportsout game observation software. The recorded parameters are the following: age group, types of initiating an offense, offensive tactics, type of offensive, attacking from the perimeter & from inside the paint, screening in offense, pick and roll in offense, offensive inbound plays, inbound position, attack efficiency, shooter, shooting area/position. Summarizing, the juniors' group showed a higher percentage in offenses fast breaks, in motion offense, in the attacks that were starting after a steal and an offensive rebound. In addition men's group had higher percentage in inside game and in pick and roll. According to the above the offensivetactics depended significantly on the age group. This confirms the tendency of coaches to use continuity offences in order to train young athletes in all competitive positions rather than in a single one. Their next step would be to adopt the defensive transition tactic, found to have been adopted by the men's group.

Keywords: performance analysis, match analysis, basketball tactics, senior and juniors athletes

Introduction

The impressive development of tactics in basketball has created the need for continuous update and reflection. Year after year, new trends are emerging, mainly due to changes in regulations. Obradovic (2012) states that the reduction of the attack duration to 24 seconds, the team fouls, the new three-point line, the observed flexibility in terms of fouls, and the tendency not to stop the game for minor reasons are some of the factors that have had a significant impact on the development of the game and led to more powerful offenses and defenses.

The need for well-documented scientific theories by coaches and researchers has made the demand for the recording and analysis of matches imperative (Mavridis, Laios, Taxildaris, & Tsiskaris, 2003). Research related to the analy-

sis of players' technical-tactical behaviour has been carried out for several years (Ribas, Navarro, Tavares, & Gómez, 2011; García, Ibáñez, Gómez, & Sampaio, 2014; Vaquera, García-Tormo, Gómez, Ruano, & Morante, 2016; Zhang et al., 2017; Remmert, 2019). Apart from identifying the talented player and generally selecting the right players, coaching science is also interested in studying the opponent through video analysis. Its ultimate goal is to provide information and help coaches at every competitive level do their job more effectively (Hughes & Franks, 2004). The selection of a game situation and the precise analysis of the corresponding individual actions performed by players are of particular interest in order to evaluate and subsequently improve tactical skills (Clay & Clay, 2014; Ibáñez, McRobert, Toro, & Vélez, 2016; Hojo, Fujii, & Kawahara, 2019).



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In the case of basketball, observational studies have been conducted by a considerable number of researchers through video analysis of matches. While some of them aimed at analysing the technical-tactical characteristics of high-level players (Gómez et al., 2015; Vaquera, et al., 2016; Zhang, et al., 2019), others tried to draw conclusions about the frequency of occurrence and use of various technical-tactical partnerships in defence and attack (Polykratis, Tsamourtzis, Mavridis & Zaggelidis, 2010) while there are also researchers who tried to find the parameters that are related to the outcome of the match through the corresponding statistics (Csataljay, O' Donoghue, Hughes, & Danks, 2009; Zhang et al., 2017).

A review of both older and relatively recent literature showed that there are few studies relating to the analysis of basketball games with players in the developmental stage (juniors/U16). Although there are studies on the competitive behaviour of the specific age group (Ortega, Cardenas, Sainz, & Palao 2006; Lorenzo, Gomez, Ortega, Ibanez, & Sampaio, 2010), none of them compares the competitive behaviour among different age groups (men, under 16, under 18 men and women). Moreover, as there are no previous research studies on the competitive behaviour of U16 male players, following the changes in rules implemented in 2010 (extension of the 3-point line from 6.25m to 6.75 m/in place from 1984, and the change of the trapezoid restricted area/in place since the 1950s to a rectangular one), there are no relevant data on which to base any further analysis, in order to study its evolution in terms of playing and coaching. The resulting research gap prompted the implementation of the present study. Therefore, we started by recording the in-game offensive behaviour of the U16 group in the 2010 World Championship. The primary objective of the study was to gather data that characterized the offensive technical-tactical trends of the specific group at that time. At the same time, the recording and analysis of the same data in games in the men's group and their further comparison with the U16 group outlined the offensive behaviour of men as well as the "distance" that separates the two groups. The aim of the present study was to record the offensive competitive behaviour of seniors (men) and juniors (U16) by analysing world championship matches in order to determine whether the choice of tactics in them depended on the age group they belonged to.

Method

Sample

The research sample consisted of 20 randomly selected 2010 World Championship matches (10 from each age group). The above number of matches was the limitation of this study, as they were the only ones available on the website platform, www.fibatv.com. However, it was found that the number of actions studied (a total of 2.997 actions / 1391 for seniors and 1606 for juniors) did not have a negative impact on the statistical processing of the data.

Data collection and measuring instruments

The Sportscount game observation software was used in the recording of the attacks and the following observation protocol was created with the participation of a professional basketball coach (a member of the Hellenic Basketball Federation): 1) Age group: Seniors (men), Juniors (U16), 2) Types of initiat-

ing an offense: Defensive rebound, Offensive rebound, Steal, point, Out back, Out front, 3) Offensive tactics: Fast break, Quick attack, Organized attack/Set play, Offensive transition, 4) Type of offensive play: Set-play offense, Continuity offense, Free flowing offence, 5) Attacking from the perimeter & from low post: Inside game, Outside game, 6) Screening in offense: Screen offense, offense without screen, 7) Pick and roll in offense: pick and roll offense, offense without pick and roll, 8) Offensive inbound plays: Out play, pass followed by Set play, 9) Inbound position: Sideline, Baseline, 10) Attack efficiency: Shoot +2, Shoot -2, Shoot +3, Shoot -3, Foul awarded, Turnover, 11) Shooter: Point guard, Shooting guard, Small forward, Power forward, Center, 12) Shooting area/position: Low post, Middle post, High post, Left forward, Right forward, Guard area, long shot from the center of the field, long shot from the opposing field.

Data analysis

Data were processed with the SPSS statistical software suite using the Crosstabs statistical analysis (Kent State University, 2023). The above analysis tested the relationship between the age groups (seniors and juniors) and the corresponding technical-tactical choices during a match. The criterion used to test for homogeneity or independence of variables was Chi-Square with $p < .001$.

Results

Types of offense initiation

According to the results (Table 1a), there was a difference between the two age groups in the initiation of offense after an "offensive rebound" (56% juniors and 44% seniors) as well as in the initiation of offense after a "steal" (60% & 41%). A differentiation was also found in "out back" (55% & 45%). According to the value (Chi-Square₍₅₎ = 30.05, $p < .001$) it was found that the mode of initiation of the attack was significantly dependent on the age group.

Offensive tactics

The main difference in "offensive tactics" was found in the cases of "fast break" (74% & 27%) and "offensive transition" (57% & 43%). The statistical test (Chi-Square₍₃₎ = 102.37, $p < .001$) showed that offensive tactics were significantly dependent on age group.

Type of offensive tactics

Regarding the types of offensive tactics, it was found that they were significantly dependent on the age group (Chi-square₍₂₎ = 90.51, $p < .001$). In particular, juniors performed more "continuity offenses" (65%) than seniors (35%), as well as more "set-play offences" (46% & 35%).

Attack with peripheral play & with play inside the paint:

According to the results, the juniors mainly performed "inside game" offenses (52%) while the seniors preferred "outside game" offenses (52%). Chi-Square₍₁₎ = 7.898, $p < .05$ showed that these types of offense were significantly dependent on the league the games were played in.

Use of offensive screens

Regarding the use of "screen", it was found that the rate of occurrence did not depend on the age group (Chi-Square₍₁₎ = 2.40, $p > .05$).

Use of offensive pick and rolls

In contrast, the occurrence rate of pick and roll was significantly dependent on age group (Chi-Square₍₁₎=26.80, $p < .001$). In particular, “pick and roll” was used more by seniors (55%) and less by juniors (45%).

Offensive inbound plays

The results showed that the type of offensive inbound plays used did not depend on age group (Chi-Square₍₁₎=0.47, $p > .05$). Thus, regarding the offensive inbound plays, it was observed that most of them were executed with an inbound pass

Table 1a. Relationship between offensive parameters and age groups

CATEGORIES	PAPAMETERS	SENIORS	JUNIORS
Types of offense initiation	Defensive rebound	49%	51%
	Offensive rebound	44%	56%
	Steal	41%	60%
	Point	51%	49%
	Out back	45%	55%
	Out Front	48%	52%
Offensive tactics	Fast break	27%	74%
	Quick attack	52%	48%
	Organized attack/Set play Set play	50%	50%
	Offensive transition	43%	57%
Type of offensive play	Set-play offense	54%	46%
	Continuity offense	35%	65%
	Free flowing offence	50%	50%
Attack with peripheral play & with play inside the paint	Inside game	48%	52%
	Outside game	52%	48%
Screening in offense	Offense with screen	50%	50%
	Offense without screen	52%	48%
Use of offensive pick and rolls	Offense with pick and roll	55%	45%
	Offense without pick and roll	49%	52%

followed by an organised offense (setplay). The above competitive behaviour was similar for seniors (62%) and juniors (64%). Also, both seniors (38%) and juniors (36%) chose out play after an inbound pass (Table 1b).

Offensive Effectiveness

According to the results, the biggest differences in offensive effectiveness, were found in the case of “successful three-point shots”, where seniors had a higher percentage (55%) compared to juniors (46%). In contrast, in the case of turnovers, most of them were made by the juniors (60%). Based on Chi-Square₍₁₎=47.68, $p < .001$, a significant relationship was found between age group and offensive effectiveness.

Shooter

The test showed that the relationship between the parameters “shooter” and age group was significant (Chi-Square₍₄₎=28.06, $p < .001$). More specifically, there were obvious differences in the case of point guard and shooting guard posi-

tions, where the highest percentage of participation in attacks (shooting) appeared in juniors (55% of point guards and 56% of shooting guards). Differentiation was also observed in the small forward position where the highest percentage occurred in seniors (52%) as opposed to juniors who had a lower percentage (48%).

Shooting area/position

Regarding the area from which most shots were taken, it was found that low post shots were taken mainly by seniors (53%), in contrast to the “middle post” and “high post” areas where most shots were taken by juniors (58% from the middlepost and 54 from the highpost). Also, the juniorstook more shots from the “right forward” position (55%), while the seniors took more shots from the guard position (56%).

Moreover, juniors took shots from the “advancing area” with a rate of 58% while the seniors with a rate of 42%. According to the value (Chi-Square₍₇₎=87.87, $p < .001$) the position from which the shots were taken was significantly dependent on the age group.

Table 1b. Relationship between offensive parameters and age groups

CATEGORIES	PAPAMETERS	SENIORS	JUNIORS
Offensive inbound plays	Out play	38%	36%
	Pass followed by set play	62%	64%
$\chi^2_{(1)}=0.47, p=.691$			
Offensive Effectiveness	Shoot+2	50%	50%
	Shoot-2	48%	52%
	Shoot+3	55%	46%
	Foul υπέρ	50%	50%
	Turnover	40%	60%
$\chi^2_{(1)}=47.68, p=000$			
Shooter	Point guard	45%	55%
	Shooting guard	44%	56%
	Small forward	52%	48%
	Power forward	50%	50%
	Center	49%	51%
$\chi^2_{(4)}=28.06, p=000$			
Shooting area/position	Low post	53%	47%
	Middle post	43%	58%
	High post	46%	54%
	Left forward	51%	49%
	Right forward	45%	55%
	Guard area	56%	44%
	Long shot from the center of the field	42%	58%
Long shot from the opposing field	36%	64%	
$\chi^2_{(7)}=87.87, p=000$			

Discussion

The aim of the present study was to correlate the competitive behaviour of seniors and juniors in coaching corresponding high-level matches in order to determine any possible differences in the tactics followed. In this way, it could be documented whether the used tactics depended on the age group, so that researchers and coaches could gain a more thorough insight into the tactics they should probably follow depending on the age category they are coaching.

The way offenses are initiated varies, but it seems that in the developmental ages of children, many of them start after a steal or an aggressive rebound, a characteristic that coaches should take into account when focusing on the reduction of mistakes and teaching blockout, which is one of the basic technical-tactical elements of basketball. The considerable number of mistakes made by juniors is probably due to the fact that they have not yet perfected their tactics (Canadas et al., 2013). Winston (2009) states that one of the most important elements in the development of the offense is going for offensive rebounds without making turnovers.

As far as tactics is concerned, it is observed that in the developmental age group, emphasis is placed on fast break in an attempt to impose fast pace and increase the number of ball possessions. According to Ory (2009) the quintessence of the offense is to create an advantage in fast break, while Vargas (2009) believes that the offense should always create conditions for scoring before the opponent’s defense is organised. At

men’s level, there are fewer surprises because teams emphasize the defensive transition, the transition of teams from offense to defense (Messina, 2007).

In the offensive system there was a tendency to use the set-play offense more often. However, it should be noted that there was a great disparity in continuity offense recorded in the case of juniors. At these ages, coaches tend to ask their players to try all positions, taking into account their biological age (Garcia Toledo, 2017).

In modern basketball, perimeter play seems to be used more than play near the hoop. Cardenas (2006) states that from a young age athletes need to train in one-on-one perimeter play in order to be able to perfect it in the future. As far as play near the hoop is concerned, although it appears to be less frequent nowadays, it is the most effective (Romaris-Duran, 2016).

Regarding offensive screens, it seems that they were used by both age groups. This is probably due to the fact that in modern basketball the learning methodology starts with individual offense and continues with the cooperation of several players, either through movement without the ball or through screens. In particular, pick and roll cooperation, which aims to deliver the ball in an advantageous position near the hoop, is less common at the developmental level of children than that of men (Conte et al., 2013).

In the case of offensive tactics, it appeared that the two age group had similar inbound play tactics, either from the side-

line or the baseline. As it was found, most of inbound plays were done with a pass. This was probably aimed primarily at initiating a new offensive cooperation rather than a specific offensive inbound play. It appears that, as their primary goal is to limit the number of turnovers, coaches tend to avoid the use of any particular inbound play. After all, at critical points of the game, where athletes perform under pressure, making the right decisions is very important (Barragan, 2015).

In the men's age group, most of the attacks were executed by players playing in the forward and center positions. Indeed, the goal of the offense is to create an advantage near the hoop. It therefore seems that the accuracy rate of field shots is one of the most important factors associated with winning (Winston 2009; Martinez & Martinez, 2013). On the contrary, most of the offenses in the seniors' group were executed by players playing in guard position and far from the hoop. This is probably due to the fact that at the beginning of the coaching process coaches implement methods that can help their players to better understand their technique and tactics. For this reason, they also take into account other parameters such as the biological age of their players, which seems to be very significant in the case of players under 15 years old (Garcia Toledo, 2017). As mentioned above, this research was the starting point for the study of the U16s in the year that the basketball regulations were changed. So, future studies could study a recent World Championship to check if, after a period of about ten years, the offensive behaviour of these age groups (seniors/juniors), and therefore the priorities of the coaches, have changed. Also, future research could use or improve the observation protocol of this study by studying the other age groups (women's

U16, men's and women's U18), both in 2010 and in the recent World Championship, in order to determine their own offensive profile as well as their differentiation from the offensive profile of seniors. Thus, the younger age groups and their coaches will adjust the content of their training according to the prevailing trends.

Conclusions

To summarise, the conclusions drawn are the following: In the case of juniors, most offenses started after a steal and after an offensive rebound. Most fast breaks occurred in the juniors' age group. Motion offense is more common among juniors. Outside game occurs more with juniors, while inside game with seniors. At both age levels, screen attacks are common. Pick and roll is used more frequently by seniors. Most inbound plays are made with a pass and an organized attack by both seniors and juniors.

By recording and analysing the offensive behaviour of high-level players, the present study is, on the one hand, believed to have filled a research gap that dealt primarily with the identification of differences between individual age groups (seniors and juniors). In this way, the prevailing trends in each category as well as their distinctive characteristics were highlighted. Therefore, it is believed to have provided significant help to coaches in lower divisions in order to prepare their players in accordance with the standards of higher divisions. On the other hand, the created observation protocol can be used by coaches to evaluate the offensive tactics of their teams and adjust their training sessions according to the resulting data.

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Conflict of Interest

The author declares that there is no conflict of interest.

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