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The effect of shooting training on the development of the shot hit rate for basketball players

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Abstract
The aim of this study is to investigate the effect of shooting training for young basketball players and the development of shot percentage of special shot training. 30 male students-athletes participated in this study voluntarily participated in College Teams (age= 14,82 ± 1,0; height= 183,44 ± 6,13; body weight= 68,06 ± 5,38). Subjects were divided into 2 groups, consisting of continuous shooting training (experiment) (n = 15) and general basketball training group (control) (n = 15).Both training groups were subjected to a training program for 10 weeks, 4 days in a week. In this study, 60 minutes of normal basketball training plus shot training and 100-110 minutes of normal basketball training were applied to the control group. During the 10-week period, two-points jump shot (2000 pieces), three-points jump shot (2000 pieces) and in the Zig-Zag run (two-points jump shot-1000 pieces , three-points jump shot-1000 pieces) and totally 6000 shots used as moving. There was no statistically significant difference in the pre-test results between the control and the experimental group in the study, and 2-points, 3-points and zig-zag between the control and the experimental group. However there is a statistically significant difference in all parameters in the final test. In the study, 2-points, 3-points and zig-zag drills 2 and 3-points shots pre-test and post-test results were found to be statistically significant in the experimental group. As a result; general basketball training has shown little improvement in young basketball players' shooting performance, but it has been proven that the long shot training with accurate shot technique training has significantly improved shot performance.
Keywords: Basketball; Shoot Training; Performance; Shoot Technique Teaching.

1. Introduction

The main purpose of basketball is to provide a good shot to score and to take countermeasures against the rival trying to produce numbers with a shot like himself (Karause, 2008). Shoot is the most important determinant in determining the result of a game, winning the game and establishing superiority (Malone, 2002; Csataljay et al 2013; Haris et al., 2018; Savaş et al., 2018). Shoot is the most difficult skill to develop into the physical skills applied in basketball games (Wisse, 2011). It was done in different studies to increase the shot percentage. In some studies to increase the shot percentage, there are investigations as to whether the size of the ball or the size of the backboard is an effect on the shooting percentage (Chiappy, 1960). The development of basketball's shooting skill has created a great deal of pressure on the athletes in the practice of shots and aims to develop

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work that will improve the coach shooting skill. For these purposes, it is seen that sportsmen have been working with thick gloves to improve their fingertip sensitivity and to improve the control of the ball by fingertip (Coppedge, 1967). There is an increase in the number of correct shots per every year. In the NBA, the free-throw hit rate in the 1999-2000 season increased from 74.1% to 75.91% in the 2009-2010 season and the 3-points shot to 35.3% from 34.1% (Uzun and Pulur, 2011). The percentage of shooting in the match is critical in terms of winning a match (Csataljay et al., 2013; Mülazımoğlu, 2009; Savucu, 2004). In the semifinalists (United States, Turkey, Serbia, Lithuania) of 2010 World Basketball Championship shooting average was for free throw 70.33%, for 2-points 54.68% and 3-points. Also in the last 4 teams (Canada, Tunisia, Iran, Ivory) were 39.75% in the championship rankings, the shot average was 68.33% for free throw, 41.78% for 2 points and 28.58% for 3 points (Uzun and Pulur, 2011). Match statistics show that when shooting is vital to a basketball team and basketball player, the player has to bring it to the best level as a needed of basketball.

The aim of this study is to investigate the effect of shots with learning the right shooting training towards young basketball players and the development of shooting rate of special shooting training

Material and Method

30 male students-athletes participating in this study voluntarily participated in the College Teams (age 14,82 ± 1,0- height 183,44 ± 1,1- body weight 68,06 ± 5,38). Subjects were divided into 2 groups, consisting of continuous training (experiment) (n = 15) and general basketball training group (control) (n = 15).

Training Program

Both training groups were trained for 4 days a week for 10 weeks. 60 minutes normal basketball training and additional shooting training was applied to the training group. To the control group 100-110 minutes of normal basketball training was applied. During the 10-week period, two-points jump shot (2000 pieces), three-points jump shot (2000 pieces) and in the Zig-Zag run (two-points jump shot-1000 pieces, three-points jump shot-1000 pieces) and totally 6000 shots used as moving. Before the practice the subjects were shown the correct shot technique for 1 week, and every shot that was missed-nonmissed during all the training was taken. Depends to the hand players used, shooting zones arranged up to 5 from 1.Any shot that cannot be completed within the time given to the subjects is considered a failed shot. During the training of the shots, the athlete who uses the smash ball nourishment was made by 3 athletes waiting under the pot.

Two-Points Jump-Shot Practice

The athlete was allowed to shoot 5 shots in 2 different shots area within the same distance (4,225 m) from the middle points of the circle, consisting of 2 rounds in 5 different regions. 25 shots in the first round and 25 in the second round, totaling 50 shots. The athletes were given 3 minutes to complete two rounds.

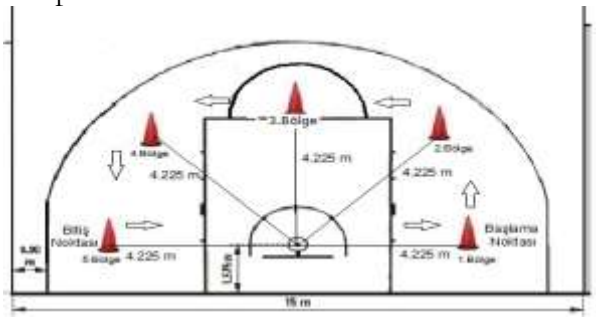

Figure 1. 2-Points-Shot Zones

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Points Shot Practice

The athlete is allowed to shoot 5 shots consisting of 2 rounds in 5 different regions at equal distance (6.75 m) to the middle points of the circle within the 3-points shooting range. 25 shots in the first round and 25 in the second round, totaling 50 shots. Shooting distances were 6.75 m, the free throw line distance, and 3.30 minutes were given for sportsmen to complete two rounds.

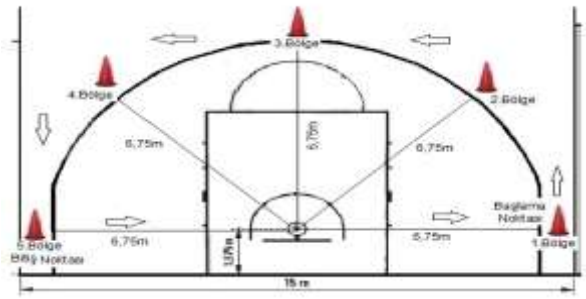

Figure 2. Three-Points-Shot Zones

Zig-Zag Drill Shot Practice

The athlete was allowed to shoot 5 points in 3 and 2 points shooting areas consisting of 5 places in 5 different areas with a distance of 6,75 m and 2 points of 4,225 m equally spaced on the middle points of the circle in a course consisting of 3 points and 2 points shooting points. Tours start with a 3-points shot and ends with a 2-points shot. A total of 50 shots are made, including 10 shots in one round, 25 two-points and 25 three-points in five rounds. Athletes are given 4 minutes to complete 5 rounds.

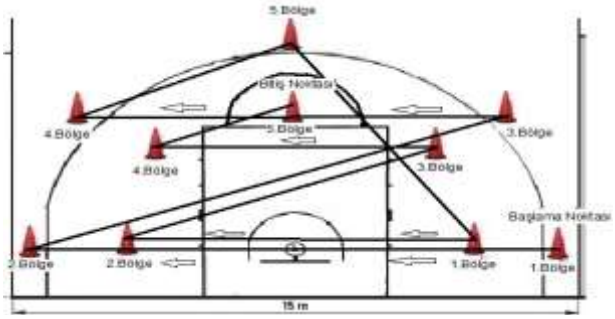

Figure 3. Zig-Zag Practice Shot Zones

Data Collection and Analysis

The statistical difference between the control group and the experimental group participating in the study was analyzed by two trial averages for the pre-test and post-test. In the analysis of the development of 10-week training in the experimental group, averages of 1 week (1, 2, 3 and 4 training) for the pre-test and 10 weeks (37, 38, 39 and 40 training) were taken for the final test. Analysis of the data was made using the SPSS 18.0 package program. Descriptive statistics are given by calculating the arithmetic mean and standard deviations of the data. The Mann-Whitney U test was used for nonparametric tests. As the significance levels $p < 0.01$ and $p < 0.05$ were taken.

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Results

The findings of the measurement results of the groups participating in the survey are summarized in the following tables.

Table 1. Physical properties and comparison of experimental (1) and control (2) groups participating in the study

Variables	Group	Mean	S.D	X1 - X2	z	p
Age (year)	Exper.	14,78	,377	-1,000	80,000	,415
	Control	14,86	,265			
Sports Age (year)	Exper.	4,73	1,162	-1,123	69,000	,109
	Control	5,85	1,955			
Height (cm)	Exper.	182,30	6,930	-2,27	70,000	,311
	Control	184,57	5,330			
Body Weight (kg)	Exper.	65,36	7,100	-5,383	63,500	,285
	Control	70,75	6,919			

There was no statistically significant difference in age, sport age, height and body weight of the groups participating in the study (P <0.05).

Table 2. Results of Zig Zag Drill, 2 and 3 pre-test and post-test between Experimental and control groups

Variables	Group	Measurement	Shot Numbers	Mean	S.D	X1-X2	z	p
2-Points Shot	Exper.	**Pre-Test**	50	18,533	7,385	-2,180	78,000	,237
	Control		50	20,714	6,533			
	Exper	**Post-Test**	50	30,533	3,356	10,17	23,500	,000**
	Control		50	20,357	6,007			
3-Points Shot	Exper	**Pre-Test**	50	11,333	5,407	-3,452	65,500	,082
	Control		50	14,785	5,726			
	Exper	**Post-Test**	50	21,333	3,221	8,404	19,500	,028*
	Control		50	12,928	5,553			
Zig Zag Drill 2-Points Shot	Exper	**Pre-Test**	25	9,200	3,121	,985	85,500	,389
	Control		25	8,214	2,154			
	Exper	**Post-Test**	25	14,533	2,669	6,247	7,500	,000**
	Control		25	8,285	2,524			
Zig Zag Drill 3-Points Shot	Exper	**Pre-Test**	25	5,266	2,153	-2,090	68,500	,107
	Control		25	7,285	3,383			
	Exper	**Post-Test**	25	11,933	2,120	6,290	17,500	,000**
	Control		25	5,642	3,319			

*p<0,05; **p<0,01

There was no statistically significant difference in the pre-test results between the control and the experimental group in the study, and 2-points, 3-points and zig-zag between the control and the experimental group. However there is a statistically significant difference in all parameters in the post-test. (Table 2)

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Table 3. Pre-test and post-test results of the Zig Zag Drill, 2 and 3 development of the control group at the end of the training.

Variables	Measurement	Shots Number	Mean	S.D	z	p
2-Points Shot	Pre-Test	50	20,71	6,533	-,314	,753
	Post-Test	50	20,35	6,007		
3-Points Shot	Pre-Test	50	14,78	5,726	-2,053	,040*
	Post-Test	50	12,92	5,553		
Zig Zag Drill 2-Points Shot	Pre-Test	25	8,21	2,154	-,036	,972
	Post-Test	25	8,28	2,524		
Zig Zag Drill 3-Points Shot	Pre-Test	25	7,28	3,383	-2,257	,144
	Post-Test	25	5,64	3,319		

It was determined that there was no between the 2-points shots, zig-zag 2-and 3-points, whereas there was a statistically significant difference between pre-test and post-test results in the control group of the study (Table 3).

Table 4. Pre-test and post-test results of the Zig Zag Drill, 2 and 3 development of the experimental group at the end of the training.

Variables	Measurements	Shots Number	Avarage	S.D	Z	p
2-Points Shot	Pre-Test	50	13,9	7,35	-5,845	,000**
	Post-Test	50	31,2	3,46		
3-Points Shot	Pre-Test	50	8,15	4,77	-5,847	,000**
	Post-Test	50	21,3	3,47		
Zig Zag Drill 2-Points Shot	Pre-Test	25	7,00	3,21	-5,855	,000**
	Post-Test	25	15,1	2,38		
Zig Zag Drill 3-Points Shot	Pre-Test	25	4,33	2,57	-5,855	,000**
	Post-Test	25	11,8	2,00		

In the study, 2-points, 3-points and zig-zag drills 2 and 3-points shots pre-test and post-test results were found to be statistically significant in the experimental group (Table 4).

Discussion

Basketball players are making great efforts to reach the targeted shot percentage. These goals are considered to be successful in the numbers of professional athletes in turnout shots of 99%, free throws of 70%, 2-points shots of 50% and 3-points shots of 33% and above. These results may be considered lower for young basketball players (Waters, 2006). There was no statistically significant difference in age, sport age, height and body weight among the experimental and control groups formed by young basketball players participating in the research (Table 1). These results suggest that the research groups have a homogeneous numbers and that the developmental periods are similar when the age groups are considered. It was determined that there was no statistically significant difference between the groups, although the control group had a better shot number when the pre-test measurement results were compared between the experimental group and the control group in 2-points, 3-points and zig zag drill 2 and 3-points shots. However, in the final test results between the experimental group and the control group after 40 training, it was found that all the categories (2-points, 3-points and zig-zag drill 2 and 3-points) from the control group of the experimental group performing the shot training had a very

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high meaningful (Table 2). In the NBA (male, female, and college), about 65 000 points were recorded from the free throw in the 2005-2006 season, and about 37000 of these numbers were obtained in the second shot (28,000 in the first shot) (Gorski, 2010). In America, the average level of free throws in the last five years (2005-2010) is 65% for High School, 68% for College (18-21 years), and 72% for professional players (Palubinskas, 2009). There is evidence that the correct shooting technique improves performance. In the study of the effect of the right shooting form on 3 female basketball players (guards in 3 sports) playing in the same team in NCAA, 10 free throws were made from the foul line for 7 days to the athletes and every shooting shot was recorded. Video and graphical analysis of accurate and missed shots were made. During the study, no encouraging words were used in the shoots that are right for the athletes, but the correct shot form is explained after every shot that has been missed. As a result of the video and graphical analyzes of the shoots, it was determined that the first and third athletes shot 100% of the correct shot and the second player shot 90% of the correct shot. In the previous season 3 athletes had a free throw average of 40% while team averages were 54.5% below a team percentage, while the athletes' free throws were 60.4% while the average of their teams remained at 59%. According to the study, working athletes with correct shooting technique showed higher performance than working athletes in the form of wrong shots (Kladopoulos, 2001). This results supports our study work and is an important indication that the correct shooting technique improves performance. In the study control group, pre-test post-test results showed a decrease in the 3-points shot accuracy rate, while no other parameters showed any improvement (Table 3). However, as a result of the training performed by teaching the right shooting technique, it is seen that the experimental group achieved a great improvement in all the study types of zig zag drills of 2-points and 3-points, 2-points and 3-points shots according to pre-test post-test results (Table 4). There is an increase in the number of correct shots per year. For big college teams (NBA) it increased from 29.3 percent in 1948 to 43.9 in 1967 (Coppedge, 1967). The NBA's free-throw hit rate in the 1999-2000 season is reported to have risen from 74% to 75.91% in the 2009-2010 season (NBA 2010). In the 2000-2001 NBA team Los Angeles Lakers was the champion, Los Angeles' player Shaquille O'Neal had a free-throw training and his free throw success got to 69.4% from 38.3% (Palubinkas, 2008). In the NBA, the 3-points shooting rate in the 1999-2000 season was 34.1%, it was 35.3% in the 2009-2010 season (NBA, 2011). In November 2006 Toronto changed their shooting coach and Dave Hope came to club as the shooting coach because of the low percentage of the team's shooting and in February 2007 the team's 2-points shooting percentage was 44.2% that increased to 47%, while the percentage of 3-points shots percentage increased from 30% to 40% (Haefner, 2011). Hanes (2006) did a similar study in literature. 12 female basketball players aged 13-14 participated in the study of the effect of the star drill shooting on the development of the shooting performance. Female basketball players were divided into 2 groups and both had a general basketball training session for 6 days in a week for 1 month. The experimental group also had a star shooting practice consisting of 100 shots every day. At the beginning of the training sessions and at the end of the training, three preliminary tests and final tests were conducted and the correct shots of both were calculated. As a result of 1-month training in the study, the control group increased the number of correct shots by only 6 in the average of the last 3 games, while the training group increased the number of shots by 59. The study of Hanes is similar to our study, both in terms of the method of study and the results of the study, and that supports our study results.

Conclusions

As the result; it is seen that general basketball training has slightly improved the shooting performance of young basketball players, but long shot training sessions with accurate shot technique training has significantly increased shooting performance. At the end of this study, it can be said that it is a necessity to regularly perform the shooting training with the right shooting technique before the young basketball players become professional.

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