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ORIGINAL ARTICLE

The Effect of Skipping, Ground Ladder and Line Drill Trainings on Speed, Agility and Coordination in Basketball Players

AHMET UZUN[1], ATİLLA PULUR[2], ALİ ERKEK[3]
[1]*Ahmet Keleşoğlu Faculty of Education, Necmettin Erbakan University*
[2]*Sport Science Faculty, Gazi University*
[3]*Institute of Educational Science, Necmettin Erbakan University*
Correspondence to: Ahmet Uzun, Email: ahmetuzun@erbakan.edu.tr

ABSTRACT

Aim: The aim of this study is to investigate the effects of intensive skipping, line drill and ground ladder training on speed, agility and coordination in order to increase the performance of athletes during the short camp period.

Methods: The study group was selected from among 3000 athletes determined as a result of the screenings covering 81 provinces for the Turkey men's star national basketball team. 92 athletes who passed the first stage, which consisted of physical characteristics and pre-test evaluations, participated in the study. In addition to general basketball training, young basketball players were given intensive skipping, line drill and ground ladder exercises for 15 days. The average age of the basketball players participating in the study was 15,52±,5 years, height 185,01±5,9 cm, and body weight 75,22±3,6 kg. In the study, 30 meters, illinois agility, hexagonal (coordination) and T Drill tests were used to determine the speed, coordination and agility of basketball players.

Results: While no significant difference was found in the 30 meter Speed Test values of the basketball players in the study, a statistically significant difference was found in the Illinois Agility Test, T Drill Agility Test and Hexagonal Coordination Test values. As a result, it was concluded that the intense skipping, ground ladder and line drill trainings during the short camp period did not improve speed, but the agility and coordination of the athletes significantly improved.

Conclusion: In the light of these results, it can be said that it would be appropriate for the athletes to have skipping, ground ladder and line drill trainings in order to improve agility and coordination during the short camp period.

INTRODUCTION

Basketball is a sport in which skill and coordination are at the forefront[21] and the complex structures of basic and auxiliary motor skills are used by developing them at a high level[19]. Making quick hand and foot movements in coordination is essential for success in basketball[6]. In a 40-minute basketball competition, athletes cover an average of 5 km with movements such as jumping, running and sprinting[24]. In addition, they perform high-intensity activities with approximately 300-400 changes in speed and direction during the match[22]. Therefore, coordination ability is a very important feature in basketball[6]. To develop coordination skills correctly; It enables the athlete to think more quickly, learn different motor skills more easily, and improve skill performance by increasing the harmony between the central nervous system and muscles[7].

Since the basketball game changes very quickly on the field, the player must always be ready and active. The pace of the game has increased even more since 2000, when FIBA introduced new rules to ensure the game is played fast. With the rule changes, the time to move the ball to the scrimmage area has been reduced from 10 seconds to 8 seconds, and the time for the offensive team to hit the basket has been reduced from 30 seconds to 24 seconds[4,15]. It is very important to have balance and coordination in training in order to develop the ability to act efficiently and quickly. In basketball, it is often necessary to move forward, backward and sideways on the court. During the game, direction is changed, acceleration is gained and lost without giving up control. At the same time, unexpected movements are encountered and immediate reaction is required. In order to respond to these unexpected movements, agility ability must be at a high level[9,20].

In order to maximize the performance of their athletes, the trainers aim to implement an intense program during the short camp periods in the annual period. This period is important because it includes an extremely intense loading process. There are very few studies in the literature on the effectiveness of short-term intensive training in camps held during the interim period[13]. The aim of this study is to investigate the effects of intensive skipping, line drill and ground ladder exercises on speed, agility and coordination, based on the aim of increasing the performance of athletes during the short camp period.

MATERİAL AND METHOD

In the research, firstly, the scanning model was used to determine the athletes. The pre-test and post-test were performed by applying the experimental model to the determined athletes. 3000 athletes determined as a result of the screenings covering 81 provinces for the Turkey men's star national basketball team. 92 athletes who passed the first stage, which consisted of physical characteristics and pre-test evaluations, participated in the study. The average age of the basketball players participating in the study was 15,52±,5 years, height 185,01±5,9 cm, and body weight 75,22±3,6 kg.

Limitations: All the athletes stayed in the same camp area and were fed with the same calories. The training, sleeping, waking and meal times of the athletes were set as the same. Basketball players who did not attend three training sessions in a row during the implementation period or who were injured during the implementation process and could not attend 5 training sessions in total were excluded from the study.

Applied Tests: One day before starting the study, speed and agility tests were applied for the pre-test values of the basketball players. After the coordination studies, the speed and agility tests were applied again for the post-test values. The research was carried out in accordance with the pre-test - post-test model.

Anthropometric Measurements: After the ages of the basketball players were determined according to the information in the identity card, measurements were made to determine the height and body weight.

Height: Height of the participants; Anatomical posture, bare feet, feet together, holding breath, head in the frontal plane, after positioning the overhead plate touching the vertex point, the measurement was recorded in cm. Measured with a wall-mounted stadiometer (HoltainLtd, England).

Body Weight: Body weights of the participants; It was measured in kg with an electronic scale (Tanita TBF-401A USA) integrated into the Bioelectrical impedance analyzer while wearing only shorts and a t-shirt, while barefoot and in anatomical stance.

Performance Tests:

30m Speed Test: Photocells are placed at the beginning and end of the 5 meter track. When the participants are ready by standing in the starting position 50 cm behind the starting line, they start the sprint with the command. Two trials are made, and at the end of the trials, the best grade is recorded[8].

Illionis Agility Test: A test track consisting of three cones lined up on a straight line at intervals of 5 m in width, 10 m in length and 3.3 m in the middle section is set up. The test consists of a 40 m straight and 20 m slalom run between cones with 180º turns every 10 m. Photocell is placed at the start and finish lines. It is done by showing the course to the subjects before the test. At the starting line, he is asked to stand in a way that he feels comfortable and to complete the course when he is ready. With full rest, the test is repeated 2 times, the best value is recorded[14].

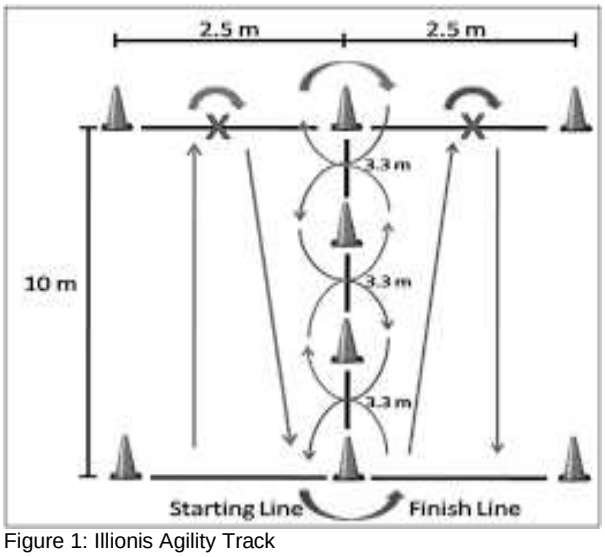

Figure 1: Illionis Agility Track

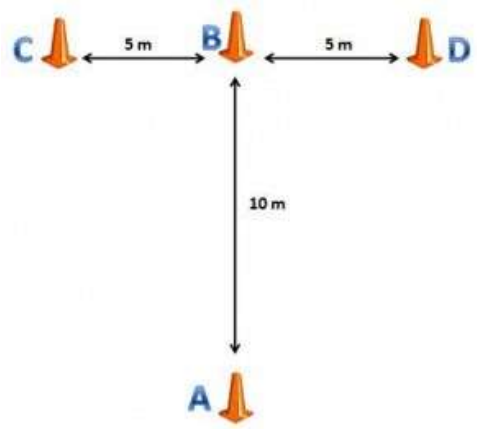

Figure 2: T Drill Agility Track

T Drill Agility Test: To prepare the track, 4 cones are lined up as follows. When the start command is given, the participant starts from cone "A", runs straight to cone "B" and touches the cone with his right hand. Then he runs to the left to the "C" cone with a side step, touches the "C" cone with his left hand, then runs to the right and touches the "D" cone with his right hand. Then he comes back to the "B" cone with a side run and touches it with his left hand, and then runs back to the "A" cone. As soon as he reaches the “A” cone, the stopwatch is stopped. In this study, the participant performs 2 maximum repetitions with complete rest. The best time of the participant is recorded[11].

Hexagonal Coordination Test: The hexagonal coordination test area is shown. The measurement was made with a digital hand stopwatch. In the starting position, the subject's face is turned towards the A line. The subject must always face the A line. The stopwatch is started when the subject jumps outside of line B. Returns to the center from outside the B line, then continues as C and return to center, D and return to center. When the subject also completes the A line, Round 1 ends and 3 rounds are completed in this way. The degree obtained after 3 rounds is recorded and the test is repeated after resting. The best grade after two attempts is noted as a score[12].

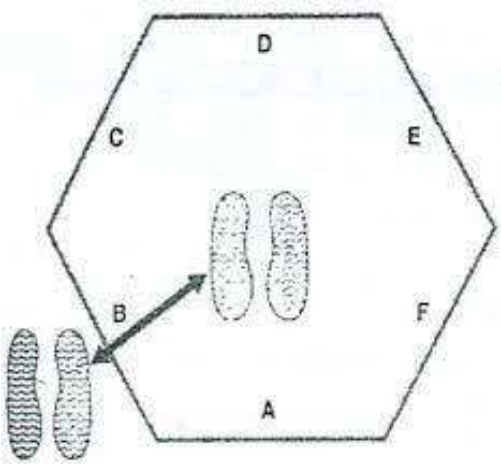

Figure 3: Hexagon Coordination Test

Training Program

1.day	2.day	3.day	4.day	5.day	6.day	7.day	8.day
Pre-Test	Morning Demonstration Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Off

9.day	10.day	11.day	12.day	13.day	14.day	15.day
Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Skipping + Ground Ladder + Ball Evening Line Drills + Ball	Morning Line Drills + Ground Ladder + Ball Evening Skipping + Match	Morning Line Drills + Ground Ladder + Ball Evening Skipping + Match	Morning Line Drills + Ground Ladder + Ball Evening Skipping + Match	Morning Line Drills + Ground Ladder + Ball Evening Skipping + Match	Post-Test

Ground Ladder	Line Drills
Straight Running	Scissors Movement
Jogging with Knees up	Step by Step
Side Run	Stance
Side Run Knees up	Diagonal and Straight Jump
One Foot Jump	Cross Running
2 Right 1 Left Jump	One Leg Forward, Backward and Side Jump
2 Left 1 Right Jump	Double Leg Forward, Backward and Side Jump
Double Foot Bounce in-out	One Cross One Straight Jump Forward
Right Enter Left Pull Ladder Ahead	One Cross One Straight Bounce Back
Right Enter Left Pull Ladder Side	

- Skippings are made for coordination and running mechanics.
- Ground ladder and line drills are made for coordination and quickness.

Data Analysis: Data analysis was done using SPSS 26.0 package program. As descriptive statistics, the arithmetic means and standard deviations of the data are calculated and given. The normality distributions of the variables were analyzed with the Shapiro-Wilk test. It was determined using the t-test for Dependent Samples in the pre-test – post-test comparison. In this study, the error level was accepted as $p<0.05$.

RESULT

When Table 1 is examined, the average age of the basketball players participating in the research is 15,52±,5 years, their average height is 185,01±5,9 cm, their average body weight is 75,22±3,6 kg, and their average body mass index is 21,8±2,31 kg/m².

Table 1: Descriptive Information of Basketball Players Participating in the Research

Variables	N	Minimum	Maximum	Ave±SD
Age (Year)	92	15,00	16,00	15,52±,5
Weight (Cm)	92	166,70	197,00	185,01±5,9
Height (Kg)	92	66,75	84,50	75,22±3,6
VKİ	92	16,02	27,80	21,8±2,31

Table 2: Performance Test Results of Basketball Players Participating in the Research

Variables	Test	N	Ave±SD	t	p
30m Speed Test	Pre-Test	92	4,71±,33	,551	,583
	Post-Test	92	4,70±,34		
İllionis Agility Test	Pre-Test	92	17,17±1,21	2,418	,018*
	Post-Test	92	16,97±1,13		
T Drill Agility Test	Pre-Test	92	11,08±,72	3,385	,001**
	Post-Test	92	10,86±,86		
Hexagon Coordination Test	Pre-Test	92	16,09±3,26	3,362	,001**
	Post-Test	92	15,08±2,47		

*p<0,05

When Table 2 is examined, while there was no significant difference in the 30m Speed Test values of the basketball players participating in the research, a statistically significant difference was found in the values of the Illinois Agility Test, T Drill Agility Test and Hexagonal Coordination Test.

DİSCUSSİON

The aim of this study is to investigate the effects of intense skipping, line drill and ground ladder training on speed, agility and coordination, which are done to increase the performance of athletes during the short camp period.

The average age of the basketball players participating in the research is 15,52±,5 years, their average height is 185,01±5,9 cm, their average body weight is 75,22±3,6 kg, and their average body mass index is 21,8±2,31 kg/m². When the literature is examined[5,10,17,25], Uzun and Pulur (2011) stated the average age of Turkish basketball players is 14,82 years. , height 183,43 cm, body weight 68,05 kg, while Parlak (2018) stated that basketball players with an average age of 15,45 are 1,77 cm in height and 67,68 kg in body weight. In studies conducted in different countries, the average height of 15-16 year old male basketball players is 178,14 cm, their body weight is 67,21 kg and their body mass index is 21,11 (kg/m²)[5], Gonzalo-Skok and others (2017) reported that the average height of the U16 athletes was 188,08±7,06 cm, and the average body weight was 76,05±11,1 kg. he literature studies in different countries show parallelism with our study.

As a result of the skipping, line drill and ground ladder exercises of the basketball players participating in the research, no significant difference was found in the speed values. It has been observed that training on the ground ladder and exercise machine does not affect the speed of young basketball players[23]. Similarly, in the study examining the effects of basketball-specific foot control training (Slalom, etc.) on some physical capacities in the U15 age category, it was found that there was no significant difference in speed values[2]. In a study comparing high-intensity interval training and narrow field games in female college basketball players, it was concluded that narrow field games improved speed more[26]. Findings in the literature also support the results of the study. When the literature is examined, it is shown that skipping, line drill or ladder-like exercises do not play an active role in the development of speed. It is thought that the most important reason for this is that short-term speed development such as thirty meters can be achieved with long-term training, but short-term training will not be sufficient for speed development.

It is seen that the basketball players participating in the research have a positive effect on their agility and coordination skills as a result of skipping, line drills and ground ladder exercises. Motor coordination values of 14-15 year old basketball players in Poland were measured with a computer aided program in the laboratory environment. At the end of the study, it was seen that basketball players have higher coordination than individuals who do not do sports. In addition, it has been determined that the spatial orientation, complex reaction and focus of the athletes in the game, as well as the level of coordination in the action and decision phase are an important help[27,28,29]. The effects of basketball on coordination and speed of university students given basketball training were investigated, and at the end of the study, it was shown that ground ladder training was more effective in coordination and speed in tests with and without the ball than general basketball training[23].

When the literature is examined, the number of studies examining the effect of line drill training on agility is also limited. In the study on the offensive abilities of basketball players in the applied agility tests, it was found that ladder training improved agility skills[1]). In another study examining the effect of ladder training and shuttle running on agility in male basketball players, it was concluded that ladder training improves agility[3]. Pratama, Mintarto, Kusnanik, and Pratama (2018) in their study examining the effects of jumping rope and ladder exercises on speed and agility, reported that both jumping rope and ladder exercises improve agility performance, but ladder exercises improve agility more than rope skipping exercises. Studies in the literature support the findings of our study. It can be said that one of the most important reasons for the difference in the findings in our study, especially regarding the effect of ground ladder exercises, is due to ground ladder training. There are few studies that have different results from our study findings. In ladder studies applied to football players in early adolescence, it was stated that although there was improvement in agility values, the development was not at a significant level[16]. It can be said that this difference is due to the fact that early adolescence is a period when strength development is weak. However, in parallel with this study, it is seen that ladder training improves agility in basketball players and is supported by the literature.

CONCLUSİON

As a result, it was concluded that the intense skipping, ground ladder and line drill trainings during the short camp period did not improve speed, but significantly improved the agility of the athletes. In the light of these results, it can be said that it would be appropriate for the athletes to have skipping, ground ladder and line drill trainings in order to improve agility during the short camp period.

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