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## The effect of skillful physical exercises on developing some biomotor abilities and skills (pump fake one dribble and shoot, pick repack and roll) for young basketball players

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### Abstract

The problem for this research, derived from the field reality during play, focused on the presence of a weakness in the level of performance of complex offensive skills, as most players suffer from a weakness in the ability to link movement between one skill to another despite their good possession of individual basic skills, and the problem can be diagnosed clearly and clearly by watching the pause. And disruptions in the motor path for performing complex skills in play during matches, the researchers believe that the reason for this weakness is the lack of focus by coaches in training their players on combining skills and how to invest these skills in achieving superiority over the competitor and achieving progress by relying on skillful physical exercises to link skills in the training process and according to the level of the age group and the capabilities of the players in basketball, as these are needed. Skills reach a high level of bio-motor capabilities in an integrated manner with the skill performance in the training units, which in turn is reflected in the player's performance while playing in matches. The researchers aimed to prepare physical skill exercises, and to identify the role of these exercises in developing some biomotor abilities (speed of movement of the legs and strength characterized by speed and agility) and skills (pump fake one dribble and shot, pick repack and roll) in basketball for youth. The researchers used the experimental method with two pre- and post-tests for two equal groups (experimental and control), and the research population was determined by the young basketball players of Al-Karkh Sports Club for the sports season (2022-2023), who numbered (12) players. The two groups (experimental and control) were divided randomly with (6) players for each group, and the exercises prepared by the researchers were applied to the experimental group in a repetitive training manner with an intensity of (90%). As for the best conclusions reached by the researchers, they are that the physical skill exercises prepared by the researchers had a significant and effective impact in developing some biomotor abilities (speed of movement of the legs and strength characterized by speed and agility) and skills (pump fake one dribble and shot, pick repack and roll) youth basketball.

**Keywords:** Biomotor abilities, skillful physical exercises, young basketball players

### 1. Introduction

The world is currently witnessing great development in various fields, including the sports field, which is characterized by progress and the diversity of scientific training methods in all various sports. The process of sports training is a constructive, developmental, and integrated process for all physical, motor (bio-kinetic), tactical, and psychological qualities and the attempt to employ them to reach the athlete. To the highest levels of athletic activity in practiced sports activity, the researchers believe that the player cannot learn and master good motor performance of skills unless he possesses the necessary physical and motor abilities, the development of bio-motor abilities reflects positively on mastering the performance of individual and combined basic skills in the game of basketball, and skill-based physical exercises are considered complex exercises through which more than one basic skill or physical characteristic can be trained in conditions similar to actual competition during matches, and these The exercises require a relatively large amount of effort to be distinguished

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by focus and accuracy, with the aim of having a positive impact in developing bio-motor abilities and skills (pump fake one dribble and shot, pick repack and roll) in youth basketball, due to what these skills require, the player must have physical and skill capabilities that enable him to be able to perform with consistency, mastery, speed, and accuracy throughout the match, as it is one of the skills that enables the basketball player to deceive the opponent, get rid of defensive pressure, and find an appropriate opportunity to achieve a successful shot and make progress. Here lies the importance of the research in preparing physical skill exercises, which the researchers believe have a positive role in developing the variables targeted for the research.

**1.1 Research problem**

Through the researchers' experience in the field of training for the game of basketball, and from their field observations of the basketball league matches, they noticed a weakness in the level of performance of the complex offensive skills in basketball, which is represented by the integration of basic skills and the achievement of a movement sentence with a correct movement path, which must be well continuous and free of interference. Fractions, as most players suffer from a weak ability to link movement between one skill to another despite their good possession of individual basic skills, the researchers believe that the reason for this weakness is the lack of focus by coaches in training their players on linking skills and how to invest these skills in achieving superiority over the competitor and achieving progress by relying on skillful physical exercises in the training process and according to the level of the age group and the capabilities of the players in basketball, which requires a high level of skill. Bio-motor abilities are integrated with skill performance during exercises for basketball training units. Therefore, the researchers decided to engage in this study and prepare skill-based physical exercises using modern methods that keep pace with development. They may contribute to the development of some bio-motor abilities (speed of movement of the legs and strength characterized by speed and agility) and my skills (pump fake). One dribble and shot, pick and roll) in youth basketball.

**1.2 Research objectives**

- Preparing physical basketball skills exercises for youth.
- Identifying the effect of skill-based physical exercises in developing (speed of leg movement and strength characterized by speed and agility) and my skills (pump fake one dribble and shot, pick repack and roll).

**1.3 Research hypothesis**

- There are statistically significant differences between the pre- and post-measurements in (leg movement speed and strength characterized by speed and agility) and my skills (pump fake one dribble and shot, Pick Repack and Roll) for the experimental group and in favor of the post-measurement.
- There are statistically significant differences between the two post-measurements in (leg movement speed and strength characterized by speed and agility) and the two skills (pump fake one dribble and shot, pick repack and roll) for the two groups (experimental and control) and in favor of the experimental group.

**1.4 Research fields**

**The human field**

Al-Karkh Sports Club youth basketball players for the 2022-2023 sports season.

**Time field**

From 28-3-2023 to 4-8-2023.

**Spatial field**

Al-Karkh Sports Club Hall in Baghdad Governorate.

**2. Research methodology and field procedures**

**2.1. Research Methodology**

The researchers used the experimental method to suit the nature of the research and the experimental design with pre- and post-tests for two equal groups (experimental and control).

**2.2 Community and sample research**

The research community was defined by the young basketball players of Al-Karkh Sports Club for the 2022-2023 sports season, who numbered (12) players. The sample was randomly divided into two groups (experimental and control), with (6) players for each group.

**2.3 Homogeneity of the sample and equality of the two groups**

To complete the research requirements with an experimental design, the researchers resorted to using the Levene's Test to verify the homogeneity of the sample and the equality of the control and experimental groups in the variables investigated, as shown in Table (1).

**Table 1:** Shows the homogeneity of the research sample and the equivalence of the two groups (control and experimental), the arithmetic means, the standard deviations, the calculated (t) value, Levene's test, and the significance of the differences in the tests investigated in the pre-test

| Variables                       | Measuring unit | Control group |                | Experimental group |                | Test (Leven) |       | t value | Sig level |
|---------------------------------|----------------|---------------|----------------|--------------------|----------------|--------------|-------|---------|-----------|
|                                 |                | Mean          | Std. deviation | Mean               | Std. deviation | F            | Sig   |         |           |
| Movement speed of the legs      | Number         | 7.250         | 0.524          | 7.083              | 0.584          | 0.27         | 0.873 | 0.520   | 0.614     |
| Strength characterized by speed | Meter          | 5.500         | 0.447          | 5.583              | 0.376          | 0.160        | 0.684 | 0.446   | 0.486     |
| Agility                         | Second         | 10.583        | 0.376          | 10.500             | 0.447          | 0.160        | 0.698 | 0.349   | 0.734     |
| Pump fake one dribble and shot  | Degree         | 5.805         | 0.409          | 6.094              | 0.574          | 0.730        | 0.413 | 1.697   | 0.124     |
| Pick Repack and Roll            | Degree         | 6.071         | 0.379          | 6.018              | 0.245          | 2.452        | 0.148 | 1.850   | 0.099     |

From Table (1), the randomness of the differences between the control and experimental research groups in the variables under study becomes clear at the level of significance (0.05)

and at the degree of freedom (12), as the error levels (Sig) all appeared greater than (0.05), which indicates homogeneity and equality of research group.

## 2.4 Means of collecting information and Devices Tools used in the research

### 2.4.1 Means of collecting information

1. Observation.
2. References and scientific sources.
3. Tests and measurements.
4. A form for registering and transcribing the results of research tests.

### 2.4.2 Devices Tools used in the research

1. Legal basketball court.
2. 6 legal basketballs.
3. FOX whistle number 4.
4. Leather measuring tape 20 meters.
5. 12 bars and cones of different lengths.
6. Ground ladder with adhesive tape on the field, number 1.
7. 2 electronic stopwatches.
8. 1 HP manual electronic computer.

## 2.5 Description of the tests used in the research

### 2.5.1 Test of motor speed of the legs (Allawi, Muhammad Hassan & Radwan, Muhammad Nasr Al-Din, 1994, p. 284)

**Test name:** Side steps.

**Test objective:** Measure the player's speed in lateral leg movement.

Tools used in the test: tape measure and stopwatch.

#### Procedures

A suitable space area and three parallel bars placed in it, 90 cm apart, as in Fig (1).

#### Performance specifications

The tester stands at the middle mark, and when he hears the whistle, he takes lateral steps towards the right until he touches the right mark with his right hand, then he returns by taking lateral steps towards the left until he touches with his left hand the line of the other side. Provided that the feet do not cross while moving.

#### Register

The test scores are distributed between the center line and the two lateral marks that are located at an equal distance from this line, which is 90 cm.

One mark is awarded to the laboratory each time it crosses or touches one of the signs while moving to the right and back to the left for a period of 10 seconds. As in Figure (1).



Fig 1: The motor speed test

### 2.5.2 Test of strength distinguished by speed: (Robert Morford, 2008. p.46) [6].

**Purpose of the test:** To measure force and speed for all parts of the body.

**Tools:** Flat area (space), measuring tape, whistle to give the start signal.

**Performance specifications:** The tester stands on the starting line and performs the step process. The tester performs three steps, alternating right, left, right, for the furthest distance.

**Performance conditions:**

1. You must push with your feet from a standing position.
2. Speed and continuity of performance.
3. Measurements are taken to the nearest (cm)
4. Two attempts are given for each laboratory, and the result of the best one is taken.

#### Register

The score is calculated to the nearest (cm) between the starting line and the distance reached by the laboratory.

### 2.5.3 T-test for agility

(<http://www.topendsports.com/tests/-tests.htm>)

**Purpose of the test:** To measure agility.

**Tools:** measuring tape, 4 cones, stopwatch.

#### Test specifications

“Appoint (4) cones as shown in Figure (2). The tester stands at cone A and when he hears the whistle, he quickly runs to cone B and touches it with his right hand, then runs sideways, goes to cone C and touches it with his left hand, then returns by running sideways to Funnel B, touches it with the right hand, then runs sideways, heading to funnel D, touches it with the right hand, then returns by running sideways to funnel B, touches it with the left hand, then returns to funnel A. Note that the distance between funnel A and B is (9.14 m), and B and C are (4.57), and B and D are (4.57).

#### Register

- The attempt will not be counted if the run is incorrect, one foot crosses in front of the other, or if the cone fails to touch.
- The tester is given three attempts.
- The best time in three successful attempts is calculated to the nearest 0.1 seconds, and Figure (2) shows this.

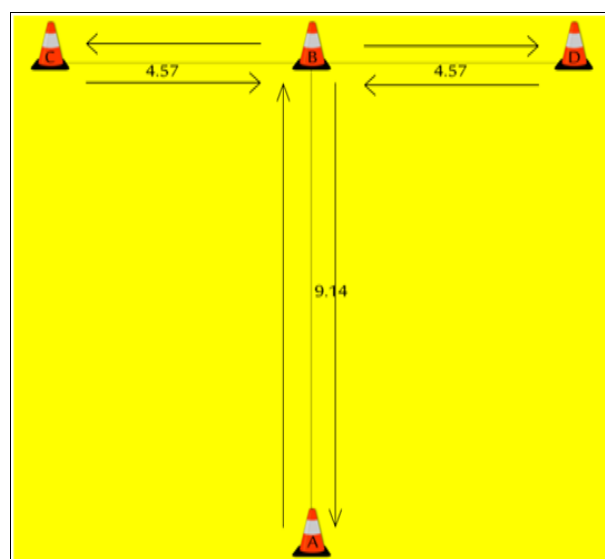


Fig 2: Shows the agility T-test

### 2.5.4 Basketball skill tests

The researchers decided to adopt a method for evaluating motor performance for a one-time test in a way that is

consistent with the goal of this study, which is to measure the performance of complex offensive skills (pump fake one dribble and shot, pick repack and roll) using video recording

of the skill performance and evaluating it by experts after determining the calculation of the score for each. A section of the skills used in this research, as shown in Tables (2) (3).

**Table 2:** Shows the calculation of each section of the composite skills, the percentage, and (K<sup>2</sup>) for the (pump fake one dribble and shot) skill test

| Compound skill                  | Pump fake | One dribble | Shoot | Agree | Disagree | Percentage | K <sup>2</sup> | Sig type |
|---------------------------------|-----------|-------------|-------|-------|----------|------------|----------------|----------|
| Pump fake one dribble and shoot | 4         | 2           | 4     | 8     | 0        | 8%         | 8              | Sig      |
|                                 | 3         | 3           | 4     | 0     | 0        | 0%         | -              | Non sig  |

**Table 3:** Shows the calculation of each section of the composite offensive skill, the percentage, and (K2) for the (Pick Repack) skill test

| Compound skill       | Pick | Repack | Roll | Agree | Disagree | Percentage | K2 | Sig type |
|----------------------|------|--------|------|-------|----------|------------|----|----------|
| Pick Repack and Roll | 4    | 4      | 2    | 0     | 8        | 100%       | 8  | Non Sig  |
|                      | 4    | 2      | 4    | 8     | 0        | 0%         | -  | Sig      |

**First: Test the pump fake one dribble and shot skill**

**Test name:** Pump fake one dribble and shot skill test.

**Purpose of the test:** To measure the skill of pump fake one dribble and shot.

**Tools needed**

(Legal basketball court, basketballs, video camera, signs, whistle).

**Performance Specifications**

The player stands with the ball at the free throw line, and upon hearing the starting whistle, he begins to perform the pump fake one dribble and shot skill, and then takes one or more steps, performing the tap skill once and performing the shot skill once.

**Register**

The skill performance is videotaped and presented to experts for evaluation of (10) grades according to the grade calculation form prepared by the researchers. The grade is calculated as follows:

- Pump fake performance rating of (4) degrees.
- Evaluate the performance of one dribble out of (2) grades.
- Shot performance evaluation of (4) degrees.

**Second: Pick Repack and Roll skill test**

**Test name:** Pick Repack and Roll test.

**Purpose of the test:** To measure Pick and Roll Repack skill

**Necessary tools:** (Legal basketball court, basketballs, video camera, signs, whistle).

**Performance Specifications**

The player stands at the three-point line and when the starting whistle is heard, he begins to conduct an offensive block for the teammate who has the ball, then re-block after the defender gets rid of the first block and rotates once.

**Register**

The skill performance is videotaped and presented to experts for evaluation of (10) grades according to the grade calculation form prepared by the researchers. The grade is calculated as follows:

- Pick performance rating of (4) degrees.
- Repack performance evaluation of (4) degrees.
- Roll performance evaluation of (2) grades.

**2.6 Reliability and objectivity of tests**

To determine the stability of the tests, the researchers used the test and retest method. The tests were carried out on Tuesday and Wednesday (28-29/3/2023), and after seven days, the tests were re-administered on Tuesday and Wednesday (4-

5/4/2023), and objectivity was calculated. The tests were conducted using the correlation coefficient between the scores of the first and second arbitrators, and after statistical treatment, the reliability and correlation coefficient were highly significant, which indicates the stability and objectivity of the tests, as shown in Table (4).

**Table 4:** Reliability and objectivity of tests:

| Test                            | Reliability | Sig   | Objectivity | Sig   |
|---------------------------------|-------------|-------|-------------|-------|
| Movement speed of the legs      | 0.868       | 0.018 | 0.848       | 0.000 |
| Strength characterized by speed | 0.768       | 0.000 | 0.842       | 0.000 |
| Agility                         | 0.849       | 0.000 | 0.718       | 0.008 |
| Pump fake one dribble and shot  | 0.940       | 0.000 | 0.881       | 0.000 |
| Pick Repack and Roll            | 0.918       | 0.000 | 0.889       | 0.000 |

**2.7 Exploratory experience**

Al-Karkh Sports Club in Baghdad Governorate. The exploratory experience revealed the following points:

1. The validity of the tests used and the time required to conduct them.
2. The validity of the tools used.
3. The validity of the exercises prepared by the researchers, and the diagnosis of the difficulties and obstacles that they may encounter for the experimental group.
4. Determine the time needed for exercises.

**2.8 Pre-tests**

The researchers adopted the results of the exploratory experiment tests after treating them statistically and concluding that they were characterized by scientific foundations, as pre-tests for this research.

**2.9 Main experience (physical skill exercises)**

The researchers began implementing the proposed physical skill exercises on April 9, 2023, and ended on June 31, 2023. The duration of the exercises was (8) weeks, and the total number of training units was (16) training units, with two training units per week, for two days (Sunday - Wednesday). The time for the physical skill exercises prepared by the researchers was (30-35) minutes out of the main section of the training unit, which was (90) minutes, out of the total training unit time (2) hours. The exercises were applied in a repetitive training method with a training intensity (90%).

**2.10 Post-tests**

The post-tests were conducted on Tuesday and Wednesday, corresponding to 4-5/7/2023, at four in the afternoon, and the researchers took care to provide all conditions similar to the pre-tests.



## 2.11 Statistical methods used in the research

The researchers used the statistical package (SPSS) to analyze the research results.

## 3. Presentation, analysis and discussion of the results

### 3.1 Presentation and analysis of results

#### 3.1.1 Displaying the results of the pre- and post-tests for the control group for the variables investigated

**Table 5:** Shows the arithmetic means, standard deviations, the (t) value calculated for the correlated samples, the test significance level, and the significance of the difference for the pre- and post-tests for the control group for the investigated variables

| Variables                       | Pre   |                | Post  |                | t value | Sig level | Sig type |
|---------------------------------|-------|----------------|-------|----------------|---------|-----------|----------|
|                                 | Mean  | Std. deviation | Mean  | Std. deviation |         |           |          |
| Movement speed of the legs      | 7.250 | 0.524          | 8.333 | 0.408          | 4.540   | 0.006     | Sig      |
| strength characterized by speed | 5.500 | 0.447          | 6.250 | 0.273          | 3.000   | 0.030     | Sig      |
| Agility                         | 10.50 | 0.408          | 9.333 | 0.408          | 4.719   | 0.005     | Sig      |
| Pump fake one dribble and shot  | 5.805 | 0.409          | 6.921 | 0.210          | 6.148   | 0.001     | Sig      |
| Pick Repack and Roll            | 6.071 | 0.379          | 6.708 | 0.401          | 9.289   | 0.000     | Sig      |

#### 3.1.2 Presentation of the results of the pre- and post-tests of the experimental group for the investigated variables

**Table 6:** Shows the arithmetic means, standard deviations, the (t) value calculated for the correlated samples, the test significance level, and the significance of the difference for the pre- and post-tests of the experimental group for the investigated variables

| Variables                       | Pre    |                | Post   |                | t value | Sig level | Sig type |
|---------------------------------|--------|----------------|--------|----------------|---------|-----------|----------|
|                                 | Mean   | Std. deviation | Mean   | Std. deviation |         |           |          |
| Movement speed of the legs      | 7.083  | 0.584          | 10.583 | 0.491          | 15.652  | 0.000     | Sig      |
| strength characterized by speed | 5.583  | 0.376          | 7.333  | 0.258          | 8.174   | 0.000     | Sig      |
| Agility                         | 10.583 | 0.376          | 7.750  | 0.273          | 13.440  | 0.000     | Sig      |
| Pump fake one dribble and shot  | 6.094  | 0.574          | 7.826  | 0.450          | 16.60   | 0.000     | Sig      |
| Pick Repack and Roll            | 6.018  | 0.245          | 7.711  | 0.240          | 100.4   | 0.000     | Sig      |

#### 3.1.3 Presentation of the results of the tests (post-post) for the control and experimental groups for the variables investigated

**Table 7:** Shows the value of (t) calculated for independent samples, the level of significance of the test, and the significance of the differences between the test results (post-test) for the control and experimental groups for the variables investigated

| Variables                       | Control |                | Experimental |                | t value | Sig level | Sig type |
|---------------------------------|---------|----------------|--------------|----------------|---------|-----------|----------|
|                                 | Mean    | Std. deviation | Mean         | Std. deviation |         |           |          |
| Movement speed of the legs      | 8.333   | 0.408          | 10.583       | 0.491          | 9.000   | 0.000     | Sig      |
| strength characterized by speed | 6.250   | 0.273          | 7.333        | 0.258          | 13.00   | 0.000     | Sig      |
| Agility                         | 9.333   | 0.408          | 7.750        | 0.273          | 5.836   | 0.002     | Sig      |
| Pump fake one dribble and shot  | 6.921   | 0.210          | 7.826        | 0.450          | 3.608   | 0.001     | Sig      |
| Pick Repack and Roll            | 6.708   | 0.401          | 7.711        | 0.240          | 5.453   | 0.000     | Sig      |

## 4- Discussion of the results

It is evident from the results of the tests presented and shown in Tables (5) (6) (7) of the difference in the values of the arithmetic means between the pre- and post-tests. The results showed the extent of development in some bio-motor abilities (speed of movement of the legs and strength characterized by speed and agility) through comparison. Between the pre-test and the post-test, in addition to the statistical significance of the significant differences through statistical treatment in the post-tests for the control and experimental groups and in favor of the experimental group, the researchers attribute the reason for this development in favor of the experimental group in the post-tests to the effectiveness of the physical and skill exercises prepared by the researchers, which were represented by the combination and overlap between physical and skill exercises, provided that these exercises are similar to the actual performance during the matches, as "exercise is a necessary and helpful factor in interaction." between the learner and the motor skill, controlling his movements, and achieving coordination between the parts that make up the motor skill in correct, sequential performance at an appropriate time"

(Abd Zaid, Nahida & Al-Hadi, Mazen Abd, 2018, p. 99) [5].

The researchers also stressed that these exercises should be

compatible and at different speeds to develop the players' motor speed, and this was confirmed by (schmidt): "The players who practice several variations in the exercise will be strengthened in their idea of generating different values and new and varied principles, and thus the impact of all of this will be positive on the reaction." (Schmidt & wrisbregre, 2004, p. 267) [4].

Also confirms that organizing the exercise in a diverse or variable manner and using stimuli or means is more effective in learning, and the large number of repetitive attempts constitutes a clear development in learning. One of the most important principles that the researchers adopted in preparing the exercises is Diversity and repetition, which generates the player's correct expectation and speed of decision-making, as "the programs resulting from the players' experiences and expertise can serve the athlete in the correct expectation that reduces response time, as well as good skill performance and all special physical abilities (Schmidt, A Richard, 1999. p. 211) [3].

It is also evident from what was presented in Tables (5) (6) (7) of the results of the two skills tests (pump fake one dribble and shot, pick repack and roll), a noticeable development in favor of the posttest, and the researchers attribute this development to physical exercises. Prepared skills, as these

exercises were characterized by a focus on the principle of compatibility and motor interconnection of skill performance between bio-motor abilities as physical and motor characteristics and the performance of basic and complex skills in basketball, including my skills (pump fake one dribble and shot, pick repack and roll), “The focus must be on training motor coordination and coordination and placing it in the training program. Using motor coordination for a long time and with continuous repetition will lead to getting used to the ideal motor and temporal path framework” (Hussein, Qasim Hassan, 1991, p.47) <sup>[1]</sup>, in addition to that these exercises were similar to actual motor skill performance in matches during play, as “The exercises aim to raise the physical ability of the athlete by using skills and movement direction close to the type of specialization and similar to the required sport” (Al-Bashtawi, Muhannad Hassan & Al-Khawaja, Ahmed Ibrahim, 2010, p. 325) <sup>[2]</sup>. Based on the above, skillful physical exercises contributed to developing the variables targeted in this research, and thus the researchers achieved the goal of the research in developing some biomotor capabilities. (Speed of movement of the legs and strength characterized by speed and agility) and my skills (pump fake one dribble and shot, pick repack and roll) for basketball players.

## 5. Conclusions and recommendations

### 5.1 Conclusions

1. The physical skill exercises prepared by the researchers had a significant impact on developing some biomotor abilities (speed of movement of the legs and strength characterized by speed and agility).
2. The physical skill exercises prepared by the researchers had an impact on developing the skills (pump fake one dribble and shot, pick repack and roll) for basketball players.
3. The development of some bio-motor capabilities (speed of movement of the legs and strength characterized by speed and agility) reflected positively on the development of the skills (pump fake one dribble and shot, pick repack and roll) for basketball players.
4. The training period adopted by the researchers in applying physical skill exercises was sufficient and positive in developing the physical, motor, and skill qualities targeted in this research.

### 5.2 Recommendations

1. The need for basketball coaches to focus on physical skill exercises and the interrelationship in training between physical, motor, and skill qualities in the training units.
2. The need for coaches to rely on specialized physical and skill exercises in a design similar to actual performance during matches.
3. The necessity of informing basketball coaches of the results of studies and research in order to improve the training process through holding scientific lectures.
4. The need for researchers to conduct studies and research related to preparing other exercises aimed at linking physical, motor, and skill qualities.

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