

The Effect of Rondo Training on Motor Coordination and Accuracy of Basic and Compound Skills for Second-Year Female Students

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ORIGINAL STUDY

The Effect of Rondo Training on Motor Coordination and Accuracy of Basic and Compound Skills for Second-Year Female Students

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Abstract

Rondo training is one of the important training methods due to its importance in maintaining the ball on the one hand, and on the other hand, its role in developing motor coordination and its impact on the accuracy of the basic skill represented by the long pass from the shoulder level and the compound skill represented by the dribbling and chest pass. Motor abilities are also a link between physical and skill abilities and play an important role in the accuracy of performing the game's skills, whether offensive or defensive. The objectives of the research were to prepare rondo basketball training for female students, and to know the effect of rondo training on developing motor coordination in basketball for female students, and that developing motor coordination affects the accuracy of basic and compound skills in basketball. For female students, the researchers used the experimental method using the single-group method, where the experiment was conducted on a sample randomly selected by (lottery) from the second-stage female students of the College of Physical Education and Sports Sciences for Girls / University of Baghdad, with a number of (15) students and a percentage of (17%). The exploratory experiment and pre- and post-tests were carried out in addition to the main experiment, which lasted (8) weeks, with one unit per week according to the lessons in the table. It was implemented from 1/27/2025 to 3/17/2025. The researchers concluded that there is an effect of Rondo training in developing motor coordination, as well as the emergence of its effect in all research variables and the emergence of differences between the pre- and post-tests of the variables of the research sample' And this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education).

Keywords: Basketball, Rondo drills, Motor coordination, Basic and complex skills, Women

1. Introduction

Scientific progress in the field of sports is witnessing remarkable development as a result of the reflection of the expertise and experience of those working in this field, and their goal of reaching the highest sporting levels based on solid scientific foundations. The importance of studies lies in the ongoing focus on sporting achievements and their continued development, as well as the importance of using modern and effective methods in all team sports, including basketball. The team works as a single unit in moving the ball. This is due to the precise skillful performance of its players, as it is a game characterized

by motor and skill capabilities, making it a beautiful and engaging game.

As noted by the (Amin and Abdel Adim, 2022, p. 82) "the execution of basketball skills demands a high degree of motor fluidity from players, whether they are in static or dynamic positions. This underscores the importance of developing smooth and coordinated movements throughout various phases of play" (p82).

Motor abilities are the link between physical and skill capabilities and play an important role in the performance of the game's skills, especially among female students. This requires the presence of motor abilities that enable them to perform basketball skills accurately. In view of the above, the importance of

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the research lies in the specificity of the game first, and the motor skills that the students need during practical lessons, second, enabling them when used to influence the accuracy of skills, whether offensive or defensive, and this is done naturally through the Rondo exercises that are prepared to develop these variables, and this is what is used in the research by the two researchers in order to build a good foundation for the students in practical lessons to contribute to influencing the accuracy of performance.

As noted by the [Al-Atrushi \(2022\)](#) "Rondo drills are considered important due to the close proximity between players and the limited space in which the ball is played. This setting compels players to demonstrate their full range of physical and technical abilities required for successful performance on the field"(p22).

1.1. Research problem

Basketball is one of the most exciting and thrilling team games for its players due to its many diverse and changing situations that include different skills. Since it is played on a relatively small court where ten players move as two competing teams, each trying to score a goal, the game requires offensive skills and quick interaction with effective ball distribution among the students. Rondo exercises contribute to improving their performance. Also, motor abilities play an important and effective role in basketball. Since the researchers follow the game and practical lessons in particular, they noticed the absence and lack of Rondo exercises in the lessons, which work to develop motor coordination. From the researchers' point of view, its role is no less than physical abilities, which is negatively reflected in the accuracy of performing basketball skills. From this objective understanding, the researchers put the problem in questions

- Are rondo drills taught in practical basketball lessons for female students?
- Is sufficient time allocated for coordination drills in practical stumping, consistent with the specific skills of basketball?
- Do rondo drills lead to the development of coordination and subsequently impact skill performance?

1.2. Research objectives

To prepare Rondo basketball drills for female students.

To determine the effect of Rondo drills on developing motor coordination in female students' basketball.

To develop motor coordination affects the accuracy of basic and complex skills in female students' basketball.

1.3. Research hypotheses

- Rondo drills have an effect on developing motor coordination in female students' basketball.
- Developing motor coordination affects the accuracy of basic and complex skills in female students' basketball.

1.4. Research areas

1.4.1. Human domain

A sample of second-year female students from the College of Physical Education and Sports Sciences for Girls.

1.4.2. Time domain

January 20, 2025 to March 17, 2025. -Spatial domain: The internal hall of the College of Physical Education and Sports Sciences for Girls.

2. Methods and procedures

The researchers used the experimental method using a single-group design system with pre- and post-tests, as indicated by ([El-Shafei et al., 2009](#), p. 48), as it suited the nature of the problem and the purpose of arriving at the research results.

2.1. Research Community and Sample

The researchers' selection of this community is an important step and stage of the research, As pointed the [Obaid et al. \(2024\)](#) "Because the nature of the research, its hypotheses, and its plan control the steps of its implementation and the selection of tools such as the necessary tests"(344). The research sample must be tested on scientific foundations to reflect a realistic picture of the research problem and accurately diagnose the dimensions to provide reliable results. The research sample was tested from the University of Baghdad / College of Physical Education and Sports Sciences for Girls, second stage, for the academic year 2024–2025. The sample numbered (85) female students, divided into (5) classes. Using a random method (lottery), Class (D) was chosen as a pilot sample, comprising (15) female students, representing (17%) of the community. Data Collection Methods: - Arab and foreign sources, scientific observation, tests and measurements, support team*, exploratory experiment. Tools and equipment used: A stopwatch, a flat surface with eight (8) numbered circles drawn on

it, a basketball court, basketballs, chalk, a whistle, a leather measuring tape, a stopwatch, a nail to mark the common center of the three circles, and a smooth wall.

2.2. Field procedures for the research

Preparing a set of rondo exercises (Appendix 1), determining motor coordination tests, determining basic and complex basketball skill tests, selecting the experimental sample, which consisted of second-year female students for the 2024–2025 academic year, and preparing all necessary supplies for the lesson, preparing the support team, conducting the pilot experiment, conducting pre-tests, implementing the exercises prepared at the beginning of the main section, and conducting post-tests, and statistically processing the results. Tests used in this research: Numbered circles test: Purpose of the test: To measure leg-eye coordination (Hassanein, 1987, p. 183). Ball throwing and receiving test: To measure eye-hand coordination (Hassanein, 1987, p. 184). Dynamic balance test. Accuracy of chest handling after performing the tapping. Purpose of the test: To measure accuracy of chest handling from movement, i.e., the link between tapping and accuracy of chest handling (Hamoudat and Jassim, 1987, pp. 202–203).

Ball handling test with one hand from above towards overlapping circles on the wall. Purpose of the test: To measure accuracy of handling from the long shoulder towards the target (Abdul-Tarfi, 2013, p. 255).

2.3. Exploratory experiment

The support team (Appendix 2), under the supervision of the researchers, conducted the exploratory experiment on Monday, January 20, 2025, on a sample of five female students randomly selected from the second phase. This was a preliminary experiment conducted by the researchers on a small sample before conducting the research (Hassanein, 1995, p. 45).

Pre-tests: The support team, in the presence of the researchers, conducted the pre-tests on Wednesday, January 22, 2025. The researchers worked to prepare, provide, and install everything the research needed to ensure its availability for the post-tests, in terms of time, location, tools, and team.

2.4. Main experiment

Rondo exercises were implemented, with the goal of developing motor coordination and accuracy in the basic and complex basketball skills under study. The time allocated for the exercises ranged between 20–25 minutes, with a total number of (8) exercise units, at a

rate of one unit per week, according to the schedule. The total number of weeks was (8) weeks, with an intensity ranging from 50% to 70% at the beginning of the main section. The exercises were conducted from January 27, 2025, to March 17, 2025.

2.5. For post-tests

The assistant team, in the presence of the researchers, conducted the post-tests on Wednesday, March 19, 2025. They followed all the procedures used in the pre-tests to the greatest extent possible.

2.6. Statistical methods

The researchers used the statistical package system (SPSS) to obtain the research results using the following criteria: percentage, arithmetic mean, standard deviation, and t-test for matched samples.

3. Results

Displaying the results of the pre- and post-means, their deviations, the calculated t-value, and the significance of the research variables, and analyzing them.

Table 1 shows the research variables for the experimental sample. The arithmetic mean for eye-leg coordination in the pre-test was (11.57), while the standard deviation was (1.82). In the post-test, the arithmetic mean was (8.93) with a standard deviation of (0.99). The calculated (t) value was (10.978). As for eye-hand coordination, the arithmetic mean in the pre-test was (6.00) with a standard deviation of (1.41). In the post-test, the arithmetic mean was (8.69) with a standard deviation of (1.40). The calculated (t) value was (11.36). As for dynamic balance, the arithmetic mean for the pre-test was (6.16) with a standard deviation of (0.91). As for the post-test, the arithmetic mean was (5.03) and the standard deviation was (0.36). The calculated (t) value was (11.36). (8.60) As for the chest handling after performing the tapping in the pre-tests (35.53) and a standard deviation (4.480), while in the post-test the arithmetic mean reached (42.73) and a standard deviation (2.344). As for the calculated (t) value, it reached (6.466). This presentation and analysis continues on all other research variables represented by the long handling of the shoulder, where the arithmetic mean in the pre-tests reached (15.07) and a standard deviation (1.981). As for the post-test, the arithmetic mean reached (20.07) and a standard deviation (1.163). As for the calculated (t) value, it reached (9.057). When comparing all the calculated values of these variables, it became clear that they are greater than the tabular (t) value, which is (2.145) under a degree of freedom (14), and this indicates the presence of an effect and statistical

Table 1. shows the variables, the unit of measurement, the pre- and post-means, their deviations, the calculated t-value, and the significance of the research sample variables.

No.	Variables	Unit of measurement	Pre-test		Post-test		calculated t value	Sig	Significance
			S	A	S	A			
1	Eye-foot coordination	S	11.57	1.82	8.93	0.99	10.978	0.000	moral
2	Eye-hand coordination	Score	6.00	1.41	8.69	1.40	11.36	0.000	Moral
	Dynamic balance	S	6.16	0.91	5.03	0.36	8.60	0.000	Moral
3	Patting and chest handling	Score	35.53	4.480	42.73	2.344	6.466	0.000	Moral
4	Accuracy of long shoulder handling	Score	15.07	1.981	20.07	1.163	9.057	0.000	Moral

differences between the two tests. The pre- and post-tests favored the post-test as a result of the physical exercises prepared by the researchers.

4. Discussion of the results

From Table 1, the results showed significant differences between the results of the pre- and post-test measurements in the research variables in favor of the post-tests, indicating the effectiveness of the training program in developing motor coordination, which in turn affects the development of the targeted physical skills and abilities of the research sample. The researchers believe that the reason for the significant difference in the research sample is the result of their use of exercises prepared using a scientific method consistent with the Rondo method, which led to an increase in the students' performance level as a result of coordination through various exercises. This was indicated by the (Ghadban, Al-Zuhairi, 2021, p. 24) "Coaches must prepare unconventional and repetitive training using different methods accompanied by equipment and tools to instill a spirit of competition and enjoyment in training"(p24). The researchers sought to diversify these exercises and use different As noted by the (Shareeda, 1990) "diverse training leads to the development of athletes and is what it was designed for" (p.58). In addition, the exercises are suitable for Physical abilities of female students. As pointed the (Ahmed and Majeed, 2022, p. 141) indicated that "this development is due to the process of organizing exercises and repetitions in the curriculum, which has an impact on raising the level of learning, as planning the educational curriculum is one of the basics of achieving the goal of learning"(141). also emphasized the necessity of distinguishing the player with the overall coordination of the body and coordination between the lower limbs and the upper limbs (arms - legs), in addition to coordination of the hand, eye, foot and eye, as the coordination element is considered one of the most important mechanisms that contribute to the success of the player in performing motor duties (Kamal Darwish, 1999,p157). also indicated that coordination means proper motor performance linked to the required speed, accuracy and agility, with economy in

the effort expended and few errors (Abu Al-Ala, 1997, p. 205). This can be observed simply by looking at the motor performance of those with a high level when compared to other novice athletes. Rondo exercises have also had an impact on skill performance represented by long handling from the shoulder level by increasing the number of points and reducing the time in the tapping skill, and this Post-tests demonstrated that physical exercise is a key factor in developing motor performance, leading to improved movement efficiency, making movements more precise and fluid. As noted by the Heuley (1979) "the existence of a link between abilities as motor components and basketball skills"(p124). also indicated (Aziz, AlZuhairi, 2021, p. 15) "diversifying the training process with the help of modern methods stimulates the sample's motivation and encouragement to train, thus improving and developing their skill level" (p. 24). As noted by the (Badri, Dakhel, 2024, p. 15) "the exercises implemented using the Rondo method helped develop some of the basic skills of the research sample members." (15) Furthermore, the complex skill in basketball is one of the essential elements, contributing to improving the player's performance on the court. Therefore, mastering it is essential to achieve rapid transitions and effective attacks (Aziz, Majeed, 2022, p. 15).

As noted by the Al-Hiti (In press) "performing short passes over distances ranging from 2 to 10 meters, accompanied by continuous movement using the rondo exercise, facilitates players' understanding and perception of passing lanes and movement lines. This contributes to creating gaps in the opposing team's formation, enabling the execution of accurate passes at the right time and place, and achieving numerical superiority that allows players to maintain ball control and possession."

5. Conclusions and recommendations

5.1. Conclusions

1. The results showed significant differences between the pre- and post-tests, in favor of the post-test.

2. The impact of Rondo training on developing motor coordination (eye-leg and eye-hand) reflects the effectiveness of the exercises used.
3. The exercises implemented using the Rondo method led to the improvement and development of some basic and complex skills for the research sample.
4. The results show that gradualism, diversity, and repetition in the training program are essential factors for achieving the desired improvement in physical movements and skills.

5.2. Recommendations

1. Continue using Rondo training due to its positive impact on developing motor coordination and basic and complex skills.
2. Emphasize that basketball teachers apply the Rondo method scientifically and systematically to achieve the desired training goals.
3. Design training programs that focus on eye-leg and hand-eye coordination using the Rondo method, especially for age groups that need to enhance these abilities.
4. Emphasize that basketball teachers should pay attention and focus on exercise.

Conflicts of interest

None.

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

Ethical statement

This manuscript approved by Modern Sport journal on (2024 /10 / 27).

Author's contributions

All contributions of this study were done by the researchers Shahad Ali Abd-AL-Hussain and Nada Mohammed Ameen) who get the main idea and work on writing and concluding also with number of experts, Zubaida Salah in Statistics, Liqaa Abdallah in revision, luaay Sami Abd-Al Hameed in translating.

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Data availability

The data that support the findings of this study are available on request from the corresponding author.

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Appendix 1

This shows a sample of the rondo exercises used in the research, which aim to develop motor coordination and accuracy in long over-the-shoulder passes.

The first month Today: Monday
 Unit number: First Date: 27-1-2025
 Allotted time 17/3/2025
 D 20-25 Location: The internal hall of the College of Education

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No.	Exercises	Training volume	Rest between repetitions (tha)	Rest between sets	Total exercise time (sec)	Total exercise time (d)
1	Five students stand in a circle holding the ball. When the whistle is blown, the students exchange places diagonally and crosswise, receiving and passing the ball to any student.	$\frac{3 \times 10 m}{3}$	30 m	50 m	360 m	6 s
2	Two students are standing in possession of the ball against one defending student. When the whistle is blown, the two students pass the ball between them without moving, while preventing the ball from being lost.	$\frac{3 \times 10 m}{3}$	20 m	30 m	300 m	5 s
3	The students stand near the sideline in five groups of three students. When the whistle is blown, the first student quickly pats the ball and turns around behind the barrier and returns to perform the passes with the two students after they move to the middle of the field, changing places between them.	$\frac{3 \times 5 m}{2}$	30 m	60 m	330 m	5.5 s
4	Three students stand in a triangle with the ball in their possession against two defending students. When the whistle is blown, they pass the ball between them, either directly or by patting, moving and giving the ball quickly.	$\frac{15 \times 2 m}{2}$	30 m	45 m	210 m	3.5 s

Appendix 2

Assistant Working Group

Name	workplace
Dr. Zubaida Salah	University of Baghdad / College of Physical Education and Sports Sciences for Girls
Assistant Professor Dr. Hana Abbas	University of Baghdad / College of Physical Education and Sports Sciences for Girls

تأثير تدريبات الروندو بالتوافق الحركي ودقة المهارة الأساسية والمركبة لطالبات المرحلة الثانية

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المستخلص

تُعَدُّ تدريبات الروندو إحدى الطرائق التدريبية المهمة، لما لها من دورٍ في المحافظة على السيطرة على الكرة من جهة، ومن جهة أخرى في تنمية التوافق الحركي وتأثيره في دقة الأداء المهاري، سواء كان ذلك في المهارة الأساسية المتمثلة بالمناولة الطويلة من مستوى الكتف، أم في المهارة المركبة المتمثلة بالطبقة والمناولة الصدرية. كما تُعدُّ القدرات الحركية حلقة وصل بين القدرات البدنية والقدرات المهارية، ولها دورٌ أساسي في دقة تنفيذ المهارات الخاصة باللعبة الهجومية منها أو الدفاعية. يهدف البحث إلى إعداد تدريبات روندو بكرة السلة موجهة للطالبات. التَّعرَّف على أثر تدريبات الروندو في تنمية التوافق الحركي بكرة السلة لدى الطالبات، تبين أن تطوير التوافق الحركي ينعكس إيجاباً على دقة أداء المهارات الأساسية والمركبة بكرة السلة لدى الطالبات، اعتمدت الباحثتان المنهج التجريبي بالتصميم ذو المجموعة الواحدة، إذ أُجريت التجربة على عينة اختيرت عشوائياً (بالقرعة) من طالبات المرحلة الثانية في كلية التربية البدنية وعلوم الرياضة للبنات / جامعة بغداد، بلغ عددهن (15) طالبة وبنسبة (17%). وقد نُقِذَت التجربة الاستطلاعية والاختبارات القبليّة والبعدية فضلاً عن التجربة الرئيسية، التي استمرت (8) أسابيع بواقع وحدة واحدة أسبوعياً وفق الجدول الدراسي، وذلك للفترة من 2025/1/27 ولغاية 3/17، الاستنتاجات توصلت الباحثتان إلى أن تدريبات الروندو كان لها أثرٌ واضح في تنمية التوافق الحركي، وظهر تأثيرها في جميع متغيرات البحث، فضلاً عن وجود فروق دالة بين الاختبارات القبليّة والبعدية لمتغيرات عينة البحث.

الكلمات المفتاحية: كرة السلة، تدريبات الروندو، التوافق الحركي، المهارات الأساسية والمركبة، الطالبات