

The Effectiveness of Using Proposed Special Exercises in Improving the Level of Serving and Serve Reception Skills in Volleyball Among Middle School Students

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ABSTRACT

The study's objectives were summarized in determining the effectiveness of using proposed special exercises in improving the level of serving and serve reception skills in volleyball among middle school students, and determining which is better in the research variables: the proposed special exercises or the teacher's special exercises. The research hypotheses include the existence of significant differences between the results of the pre-tests and post-tests for the control and experimental groups in improving the level of serving and serve reception skills in volleyball, and the existence of significant differences between the post-test results of the two research groups in improving these skills. The researchers used the experimental approach due to its suitability to the research problem. The sample consisted of third-grade students for the academic year (2024/2025), totaling (40) students, divided into two groups: a control group (A) and an experimental group (B), each consisting of (20) students. The researchers conducted a pre-test for the skills of serving and serve reception. The control group implemented the followed teacher's special exercises, while the experimental group implemented the proposed special exercises. The educational units were implemented over (11) weeks at a rate of one educational class per week. The researchers processed their research results using statistical methods and concluded that both the proposed special exercises and the teacher's special exercises have a positive effectiveness in improving the level of serving and serve reception skills in volleyball, but with varying percentages. Furthermore, the proposed special exercises showed a clear improvement in the research variables. The researchers recommended the use of modern and varied exercises that suit the students' levels, reducing traditional exercises, and conducting research for other team sports.

Keywords: Proposed special exercises, serving skill, serve reception skill, volleyball.

1. Introduction

Learning in humans in general, and motor learning in particular, requires a precise scientific study that demands full knowledge, awareness, and expertise in physiological and psychological aspects. Due to the importance of this science to humans, as the learning process accompanies the individual from birth until death, motor learning has become an identity among the identities of physical education.

The study of motor learning is concerned with learning motor skills, motor control, and motor performance. The subject of motor learning has taken up a broad space in the field of life, capturing the attention of those concerned with kinesiology and motor learning, as well as psychologists. Motor learning is an attempt to understand the psychological factors associated

with learning motor skills and skill performance. Furthermore, the optimization of practice conditions, as outlined by Schmidt and Lee (2020), is essential for consolidating motor memory and facilitating skill acquisition.

Ahmed (1993) indicates that the learning process is considered one of the necessary stages in a student's life, as it is not limited to practical subjects alone but also encompasses the educational and cultural aspects of all life dimensions. All these elements work together to evaluate the student's personality and determine the level of learning motivation. Accordingly, in recent years, a special indicator of the importance of physical education has emerged. This is evident in the advanced athletic levels reached by developed countries, achieved through extensive research and studies based on precise scientific foundations, in which many researchers and specialists in the field of physical education have participated.

Reaching top levels in the sports field, obtaining the best results, and subsequently achieving victory in international forums has become one of the goals that countries strive for today. This is a highly complex issue that requires systematic study and planning from the very first moment an individual steps into life. This makes it imperative for everyone in this field to pay attention to the aspects that are considered causes of progress and development in the sports field. These aspects are numerous and varied, the most important of which are the physical and skill aspects, which can be developed through the early practice of sports activities. The acquisition of these skills relies heavily on structured motor control concepts and well-designed learning environments (Magill & Anderson, 2021).

Special exercises also play a significant role in learning basic skills, as they can contribute greatly and positively to achieving variety in the exercises used and the methods of their implementation. Additionally, they facilitate the learning process and skill retention, taking into account the difficulty or ease of the skill to be learned through progression and following a structured organization during performance. This is achieved through game-like activities that contribute significantly to correct motor performance free of errors. The role of specialized exercises is also critical in optimizing biomechanical variables and promoting motor adaptation in complex athletic movements (Jawad, Nema, & Ismaeel, 2022).

Aboud (2008) indicates that these exercises are the only means to comprehend the elements of play, repeat them, and iterate them until reaching the desired goal and preparation.

The game of volleyball is one of the sports characterized by the diversity of its athletic skills, as well as the close interconnection between them, making the opportunity to achieve progress in skill performance linked to what the previous skill offers. Moreover, some basic skills in this game are decisive skills, as through them, a direct point can be obtained that gives the team the advantage of taking the lead. This comes through performing repetitions, correcting, and relying on feedback to ensure the perception and application of the movement.

Hence came the importance of the research in developing special exercises to improve the level of serving and serve reception skills in volleyball among middle school students, in order to elevate the level of performance in a short time and with less effort.

1.2 Research Problem The educational process for any game or sports activity requires comprehensive and balanced inclusion of all its educational components, whether skill-based, physical, tactical, psychological, educational, or others. Special exercises are among the topics that have their particularity, as they affect the behaviors of the athletic individual and, consequently, the performance of basic skills, including the serving and serve reception skills in volleyball.

Through the field observation of the two researchers in their capacity as physical education teachers, they noticed that the majority of learning these skills lacks modern exercises and modern learning in educational classes in general. There is a discrepancy in the level of their performance and correct mastery, which prompted the researchers to study this topic and determine the effectiveness of the special exercises they propose in improving the level of serving and serve reception skills, as they are important skills that significantly affect match results. Recent evidence confirms that serve reception accuracy plays a crucial role in shaping a team's overall offensive performance and is heavily dependent on properly adapted biomechanical techniques (Saleem & Al-zuhairi, 2024).

1.3 Research Objectives

- To reveal the effectiveness of using proposed special exercises in improving the level of serving and serve reception skills in volleyball among middle school students.
- To determine which exercises are better: the proposed special exercises or the teacher's special exercises that are followed.

1.4 Research Hypotheses

- There are significant differences between the results of the pre-tests and post-tests for both the control and experimental groups in improving the level of serving and serve reception skills in volleyball.
- There are significant differences between the post-test results of the two research groups in improving the level of serving and serve reception skills in volleyball.

1.5 Research Domains

- **1.5.1 Human Domain:** Third-grade middle school students at (Al-Karma Middle School for Boys) for the academic year (2024-2025), totaling (40) students.
- **1.5.2 Temporal Domain:** For the period from October 6, 2024, to January 8, 2025.
- **1.5.3 Spatial Domain:** The sports field at the school.

2. Research Methodology

2.1 Research Methodology The researchers used the experimental approach because it suits the research problem, employing a two-group design (control and experimental) with pre- and post-tests (Hammood et al., 2024; Mohammed et al., 2025; Omar et al., 2025), as shown in Table (1).



Table (1) Illustrates the Experimental Design of the Research

Pre-tests	Research Groups	Independent Variable	Post-tests	Research Groups
Serving Skill Serve Reception Skill	Control Group	Followed Teacher's Exercises	Serving Skill Serve Reception Skill	Control Group
Serving Skill Serve Reception Skill	Experimental Group	Proposed Special Exercises	Serving Skill Serve Reception Skill	Experimental Group

2.2 Research Population and Sample The researchers determined their study population purposively, which consists of students at (Al-Karma Middle School for Boys) in the Al-Karma district for the academic year (2024/2025). As for the study sample, it was selected via a draw and consisted of third-grade middle school students across three sections, totaling (103) students. The draw resulted in Group (A) being the control group, represented by Section (C), and Group (B) being the experimental group, represented by Section (B), while Section (A) was excluded. Also, (8) students were excluded for the exploratory experiment, and the school's special team students, non-committed students, and absentees were excluded. Thus, their final total became (40) students, with each group consisting of (20) students, representing a percentage of (38.83%) of the main study population, as shown in Table (2).

Table (2) Illustrates the Numbers of the Study Sample and the Percentage According to Research Groups

No.	Groups	Total Study Count	Excluded Students	Study Sample	Percentage
1	Control Group	103	63	20	(38.83%)
2	Experimental Group			20	
Total				40	

The equivalence process between the two groups in the research variables was established, as shown in Table (3).

Table (3) Equivalence of the Two Study Groups in the Serving and Serve Reception Skills in Volleyball

Research Tests	Measuring Unit	Control Group		Experimental Group		Calculated (T) Value	Significance *
		Mean	± SD	Mean	± SD		
Serving Skill	Score	17.6	1.44	17.4	1.45	0.93	Non-significant

Serve Reception Skill	Score	12.66	1.81	12.04	1.52	1.13	Non-significant
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- Tabular (T) Value = (2.02) at a significance level of (0.05) and degrees of freedom ($20 + 20 - 2 = 38$).

2.3 Tools, Equipment, and Means for the Study Regulation court, (10) volleyballs, whistle, measuring tape, electronic stopwatch, personal computer, data recording forms, a pole with an iron ring attached, Arabic sources.

2.4 Research Tests Used

2.4.1 First Test: Serving Skill (Saleh & Hamza, 2020)

Test Objective: To measure the underhand frontal serving skill to specified areas.

Test Tools: Regulation volleyball court, (10) balls.

Test Specifications: The court is divided into zones using adhesive tapes, with the granted points specified on the target areas and written on the floor, taking into account the legal net height for women, as shown in Figure (1).

Test Conditions: The subject performs (10) consecutive underhand attempts and tries to direct the ball to the area with the highest point value as written inside it. Points are calculated based on where the ball lands in the designated area on the court, and the subjects receive the points of the location where the ball fell. The subjects receive a (zero) when the ball touches the net or goes outside the court boundaries. When it falls on the line, it is calculated as if it fell in the area bounded by this line, and when it falls on the shared line between two areas, the subject is granted the highest score of the two areas.

Recording Points: The subjects' scores obtained in their ten performed attempts are recorded, and the final test score is (40) points.

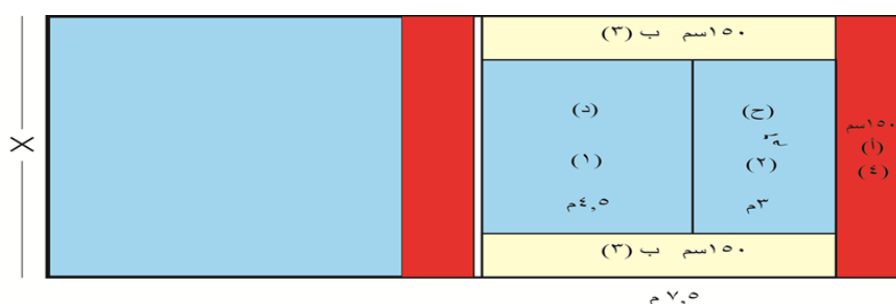


Figure (1) illustrates the serving skill accuracy test

2.4.2 Second Test: Serve Reception Skill (Ghazi & Ismail, 2023)

Test Objective: To measure the two-handed underhand serve reception skill. **Tools Used:** Volleyball court, (5) balls, colored tape to divide the court areas. **Performance Specifications:** Two circles (A and B) are drawn at the corners of the court. The distance between the center of the circle and the sideline is (1.5 m), and the distance between its center and the endline is (3

m). The circle's diameter is (1 m). An (X) mark is placed in the opposite half of the court at a distance of (3 m) from the endline and (4.5 m) from the sideline. The (3 m) area is divided into three equal zones (1, 2, 3) with dimensions of (3x3 m), as shown in Figure (5). The subject stands inside circle (A) facing the net, and the teacher must serve the ball to him while he is in this position. The student is to receive it and direct it into zone (1) for two served balls, and so on, directing two balls to zone (2) and two balls to zone (3). The action is repeated with the same number of attempts for circle (B).

Performance Conditions: (1) Each subject has (6) attempts from inside circle (A) and (6) from inside circle (B). (2) The two-handed underhand reception skill is used in all attempts. (3) The attempt is canceled if the ball is served by the teacher to the subject in an inappropriate manner or outside the circle in which the subject stands. (4) It is necessary to adhere to the sequence of performing the attempts, such that from circle (A), there are two attempts for zone (1), two attempts for zone (2), and two attempts for zone (3); and from circle (B), two attempts for zone (1), two attempts for zone (2), and two attempts for zone (3).

Recording: The subject is recorded for the total points obtained in the (12) given attempts, which consists of (6 attempts from each circle), according to the following:

- When the ball lands inside the specified zone, the subject is awarded (3) points.
- When the ball lands outside the specified zone and inside the adjacent zone, the subject is awarded (2) points.
- When the ball lands outside the specified zone but inside the court, the subject receives (1) point.
- Otherwise, the subject receives zero, making the final test score (18) points.

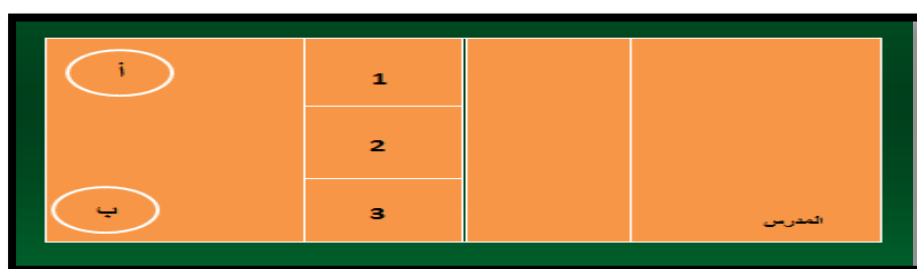


Figure (2) illustrates the two-handed underhand serve reception skill test

2.5 Field Procedures for the Research

2.5.1 Exploratory Experiment This experiment was carried out on Sunday (10/6/2024) on (8) students outside the research sample regarding the serving and serve reception skills in volleyball. The tests were implemented on the school's sports field, and the research achieved its goal from the experiment through its assistant work team and the clarity and ease of the tests used. The scientific foundations for the two tests were established (7) days after the implementation of this experiment, on Sunday (10/13/2024), as shown in Table (4).

Table (4) The Scientific Foundations in the Serving and Serve Reception Skills in Volleyball

Tests Used	Measuring Unit	Validity	Reliability	Objectivity
Serving Skill	Score	90.82	0.89	0.90
Serve Reception Skill	Score	90.87	0.88	0.88

2.5.2 Pre-tests Over two days, the researchers conducted these tests on their two research groups in the serving and serve reception skills in volleyball. On Wednesday (10/16/2024), the serving skill test was conducted, and on Thursday (10/17/2024), the serve reception skill test was conducted, both on the school's sports field.

2.5.3 Main Research Experiment Before the researchers implemented their educational units using the special curriculum, their experimental group was given an educational unit to grasp the idea of applying the proposed special exercises during the lesson on Sunday (10/20/2024). The educational curriculum was implemented on Tuesday (10/22/2024) and its implementation continued for (11) weeks at a rate of one educational lesson per week. The lesson was divided for the two study groups into three parts (preparatory, main, and final). The two groups were similar in their first and third parts, and their difference was only in the second part. The duration of the preparatory part was (10 mins), which included the regular lining up of the students, taking attendance, conducting warm-ups for both groups, and providing them with physical exercises. The main part lasted (25 mins) and included both theoretical and practical aspects (application of the proposed special exercises), which was implemented by the experimental group, while the control group implemented the teacher's special exercises. The final part lasted (5 mins) and included recovery exercises and feedback for both groups. The researchers concluded their educational units on Tuesday (12/31/2024).

2.5.4 Post-tests For two days, the researchers conducted these tests on their two research groups in the serving and serve reception skills in volleyball. On Tuesday (1/7/2025), the serving skill test was conducted, and on the second day (1/8/2025), the serve reception skill test was conducted, following the same pre-testing procedures and using the same conditions and tools.

2.6 Statistical Methods Percentage, arithmetic mean, standard deviation, (T-TEST) for independent samples, (T-TEST) for paired samples (Abdullateef AbdulJabbar et al., 2025; Fayyad et al., 2025, 2026; Khalaf et al., 2025).

3. Results

3.1 Presentation, Analysis, and Discussion of the Results of Pre- and Post-Tests for the Research Groups

3.1.1 Presentation, Analysis, and Discussion of the Pre- and Post-Test Results for the Control Group

Table (5) Values of Arithmetic Means, Standard Deviations, Means of Differences, Calculated (T) Value, and Significance of Differences between Pre- and Post-Test Results in the Serving and Serve Reception Skills Test in Volleyball for the Control Group and Their Analysis

Variables	Measuring Unit	Pre-test		Post-test		Means of Differences	Std. Deviations of Differences	Calculated (T) Value	Significance*
		Mean	± SD	Mean	± SD				
Serving Skill	Score	17.6	1.44	19.29	1.41	2.3	1.2	3.12	Significant
Serve Reception Skill	Score	12.66	1.81	15.12	1.13	4.3	1.4	3.09	Significant

- Tabular (T) Value = (2.09) at a significance level of (0.05) and degrees of freedom (20-1=19).

3.1.2 Presentation, Analysis, and Discussion of the Pre- and Post-Test Results for the Experimental Group

Table (6) Values of Arithmetic Means, Standard Deviations, Means of Differences, Calculated (T) Value, and Significance of Differences between Pre- and Post-Test Results in the Serving and Serve Reception Skills Test in Volleyball for the Experimental Group and Their Analysis

Variables	Measuring Unit	Pre-test		Post-test		Means of Differences	Std. Deviations of Differences	Calculated (T) Value	Significance*
		Mean	± SD	Mean	± SD				
Serving Skill	Score	17.4	1.45	22.38	1.42	2.3	1.3	3.49	Significant
Serve Reception Skill	Score	12.04	1.52	19.11	1.16	4.3	1.6	4.03	Significant

- Tabular (T) Value = (2.09) at a significance level of (0.05) and degrees of freedom (20-1=19).

3.2 Presentation, Analysis, and Discussion of the Post-Test Results for the Two Research Groups

Table (7) Values of Arithmetic Means, Standard Deviations, Calculated (T) Values, and Significance of Differences between Post-Test Results in the Serving and Serve Reception Skills Test in Volleyball for the Control and Experimental Research Groups and Their Analysis

Variables	Measuring Unit	Control Group		Experimental Group		Calculated (T) Value	Significance*
		Mean	± SD	Mean	± SD		
Serving Skill	Score	19.29	1.41	22.38	1.42	4.29	Significant

Serve Reception Skill	Score	15.12	1.13	19.11	1.16	4.36	Significant
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- Tabular (T) Value = (2.02) at degrees of freedom (20+20-2=38) and a significance level of (0.05).

4. Discussion

Through the presentation and analysis of the results, Table (5) reveals to us the calculated (T) values for the control group in testing the serving and serve reception skills in volleyball, which were (3.12, 3.09) respectively. It was found that these values are greater than the tabular (T) value of (2.09) at a significance level of (0.05) and degrees of freedom of (19). The researchers attribute this progress, in its varying percentages, to the use of the educational units followed by the teacher, their clarity in the method of performing their exercises, their suitability to the students' capabilities and abilities, their sound execution, and scientific repetition during performance, which contributed to enhancing the learning of the sports skills under study. This is what Mahjoub (2002) refers to, indicating that it is important for individuals to be motivated to learn motor tasks in order to achieve maximum learning. If the learner views the task as meaningless or non-preferred, learning the skill will be limited, and if the motivation is very low, learning may not occur at all.

Table (6) reveals to us the calculated (T) values for the experimental group in testing the serving and serve reception skills in volleyball, which consecutively were (3.49, 4.03). It was found that these values are greater than the tabular (T) value of (2.09) at a significance level of (0.05) and degrees of freedom of (19). The researchers attribute the reason for this development to the use of special exercises, proper progression according to correct scientific methods in seriously performing the required exercises, as well as attention to the motor path for performing the exercises fully. This was indicated by Shehata (1992), who stated that special exercises are used to develop and improve the correct performance of special motor skills, as these exercises contain a quality similar to the basic technical performance of the exercise.

Table (7) reveals to us the calculated (T) values for the two groups, control and experimental, in testing the serving and serve reception skills in volleyball, which consecutively were (4.29, 4.36). It was found that these values are greater than the tabular (T) value of (2.09) at a significance level of (0.05) and degrees of freedom of (38). The researchers attribute the reason for this development to the experimental research group's use of the proposed special exercises, which achieved better improvement than the followed exercises, as well as the progression in learning and mastering them, and organizing the use of exercises that develop special coordinative and physical traits. In this regard, Mukhlif (2009) mentions that special exercises aim to elevate the level of physical and skill preparation in anticipation of teaching specific movements and activities in all aspects of the sport. This aligns with the findings of González-Silva et al. (2020), who emphasized that high reception and serving efficacy are primary determinants of setting success and overall team performance in modern volleyball.

5. Conclusions and Recommendations

Conclusions

- The use of special exercises has a positive impact on improving the level of serving and serve reception skills in volleyball.
- The post-tests for the research variables outperformed in both the control and experimental groups, though by varying percentages.
- The special exercises have achieved the purposes and goals for which they were set, by teaching the correct performance of the skills under study.

Recommendations

- Using the prepared special exercises while considering the progression of ease and difficulty for middle school students.
- The necessity of urging those in charge to conduct tests to determine the level of skill retention.
- The necessity of conducting similar studies and research using different age groups and for both genders.

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