



## THE EFFECT OF SPECIAL MENTAL ROTATION EXERCISES ON THE ACCURACY OF THE SMASH SERVE IN VOLLEYBALL FOR YOUNG PEOPLE

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### Abstract

The space ball game contains many skills that lead to the team winning if it performs it with the required accuracy. After that, you must seek to acquire the decisive knowledge as it can be obtained directly, and as a result of the development in the skill performance in this game, experts and trainers to stimulate a modern skill exercise, and this skill is characterized by excellent and complex difficulty, and requires excellence in skill performance when performing. The crushing serve with the ball.

Since preparing special exercises for mental rotation on the accuracy of the skill of the smashing serve in volleyball, since identifying the effect of the researched exercises on the variables under study in volleyball, where the aim of the research was to prepare special exercises for mental rotation in volleyball. The research hypothesis was that there are statistically significant differences between the results of the pre- and post-tests of the two research groups and in favor of the post-tests in developing in the smashing serve in volleyball.

The research community was represented by the players of the Salikh Sports Club for the 2024/2025 season. The research community was determined by the intentional method of conducting the research on them. As for the research sample, it was chosen by the random lottery method, provided that the research requirements were met in them, such as the inability to reach the required level of accuracy in performing skills well. This was determined by observation and asking the coach. Their number was (12) players under the age of 18 years. Players were chosen for the exploratory experiment from outside the research sample. Among the most important conclusions were: The special exercises for mental rotation prepared by the researchers had an effect on developing the accuracy of the skill performance of the smash serve in volleyball under study, and in favor of the post-test.

The recommendations were: Paying attention to the number of mental rotation exercises in the preparation phase for players, as they are of great importance in achieving the ideal accomplishment and performance of volleyball skills.

### 1-1 Introduction to the research: -

Volleyball contains many offensive skills that lead the team to victory if the team performs them with the required accuracy. The knockout is one of the decisive offensive skills as it can be used to get a direct point. As a result of the development in skill performance in this game, experts and coaches have sought to find modern skill exercises to develop this skill, which is characterized by high difficulty and complexity and requires accuracy in skill performance when performing the skill. Therefore, it requires a lot of continuous training until the player reaches a good level of performance in terms of control and mastery as well as speed of movement. For this reason, training on the knockout has recently become a large part of training units.



Mental rotation is one of the new exercises in the field of determining levels and mental benefit for players, as it is important in performing sports skills in volleyball, as it enables the player performing the skills to reach a mental state that prevents the entry of negative and distracting thoughts during the performance of skills and their accuracy. The importance of exercises based on mental rotation in knowing the details of movement of body parts, especially fast movements, and the relationship of these variables with other elements and variables that affect achievement or performance in volleyball. The smash serve is one of the offensive skills that influence volleyball achievement and through obtaining match points, which require maximum effort from the player with accuracy of performance. Hence the importance of this research lies in the extent of benefiting from special exercises for mental rotation in the smash serve in volleyball. The researchers noticed through training and matches in volleyball that there was not enough use of modernity in the various educational and training methods that lead to developing the accuracy of performance in the training process, as the use of various exercises based on mental rotation leads to the accuracy of performance in addition to excitement and suspense among the players, which leads to achieving the optimal achievement

Therefore, the researchers suggested that it is necessary to study this topic to identify the practical obstacles, especially since studying the topic in this way contributes to finding many solutions to the problems that volleyball players suffer from in all skills, especially the skill of the smash serve in volleyball.

1-2 Research objectives 1- Preparing special exercises for mental rotation in volleyball. 2- Identifying the effect of the prepared exercises on the accuracy of the smash serve in youth volleyball

### **1-3 Research hypothesis:**

- 1- There are statistically significant differences between the results of the pre- and post-tests of the two research groups, in favor of the post-tests, in the accuracy of the smash serve in volleyball .

### **1-4 Research areas:**

1-4-1 Human field: Salikh Sports Club players, youth category for the 2024-2025 sports season.

1-4-2 Spatial field: The closed sports hall of Salikh Sports Club.

1-4-3 Time field: From 8/10/2024 to 10/8/2024

### **2-1 Research Methodology: -**

The researchers used the experimental method for its suitability and the nature of the research problem. 2-2

Research community and sample: - The research community consisted of the youth players of the Salikh Sports Club in volleyball for the 2024/2025 season under (18) years old, numbering (12) players, while the research sample consisted of (6) players, who were selected randomly.

### **2-3 Methods, devices and tools used in the research:**

2-3-1 Methods of collecting information:-

- Observation and analysis
- Personal interviews
- Testing and measurement
- Sources and references

### **2-3-2 Methods and tools used in the research:-**

- A drawing scale with a length of (1) m.
- One laptop type (hb)
- A volleyball court
- Volleyball balls, measuring tape, whistle.

2-4 Sample homogeneity and equivalence of the two research groups .



In order to achieve homogeneity for the research sample individuals, the researchers performed homogeneity procedures on the research sample individuals, although the sample that was selected was from a close age group, in addition to preventing influences that might affect the results of the experiment in terms of individual differences among the research sample individuals. Therefore, the researchers used statistical methods represented by the arithmetic mean, standard deviation, mode, and skewness coefficient for body measurements to determine the reality of homogeneity or not, as in Table (1)

Table (1)

It shows the homogeneity of the research sample individuals in morphological measurements (age, height, weight)

variables	Arithmetic mean	Standard deviation	The loom	Coefficient of skewness
The age	19.50	0.86	19	0.79 -
height	165.44	0.55	165	0.57
The weight	42.64	0.79	143	0.46 -

Table (1) shows that the values of the skewness coefficient for the body measurements were less than (1), which indicates the homogeneity of the research sample individuals in these measurements.

## 2-5 Equivalence of the two research groups

One of the important things that the researchers should follow is to attribute the differences to the experimental factor. On this basis, the two research groups, the control and the experimental, must be equivalent in the research variables under study. Before the researchers began applying the exercises, the researchers resorted to achieving the principle of equivalence between these two groups. Statistical means were used with the arithmetic mean, standard deviation, and the selection of (t) for independent samples (between the control and experimental groups), as in Table (2)

Table (2)

Equivalence of the research sample for the pre-tests of the skills under study

T	Variables	Control group		Experimental group		Calculated t value	Type of indication
		A	S	A	S		
1	Smash serve	2.09	0.29	3.0	0.76	0.50	Random

Table score = 2.08 at a significance level of (0.05) and under a degree of freedom of (38) Table (2) shows that the calculated (t) values for the technical performance tests of the skills under study are smaller than their table value of (2.024) at a significance level of (0.05) and under a degree of freedom of (4), which indicates the achievement of the principle of equivalence in the skill tests under study.

## 2-6 Field research procedures.

### 2-6-1 Tests used under research.

#### Smashing serve test:-

#### - Purpose of the test:-

Measuring the accuracy of the serve skill of the volleyball player.

#### - Tools:-



Legal volleyball court, legal volleyball, the court prepared as shown in Figure (1)

## - Performance specifications:-

The tester performs the smash serve to the designated areas (A, B, C, D)

## - Conditions:-

-1 Each player has ten consecutive attempts.

-2 In the event that the ball touches the net and reaches the half of the designated court, or goes outside, an attempt is counted for the player (out of the ten attempts) and no point is given for it.

- Scoring:-

-4 points for each attempt inside area (A).

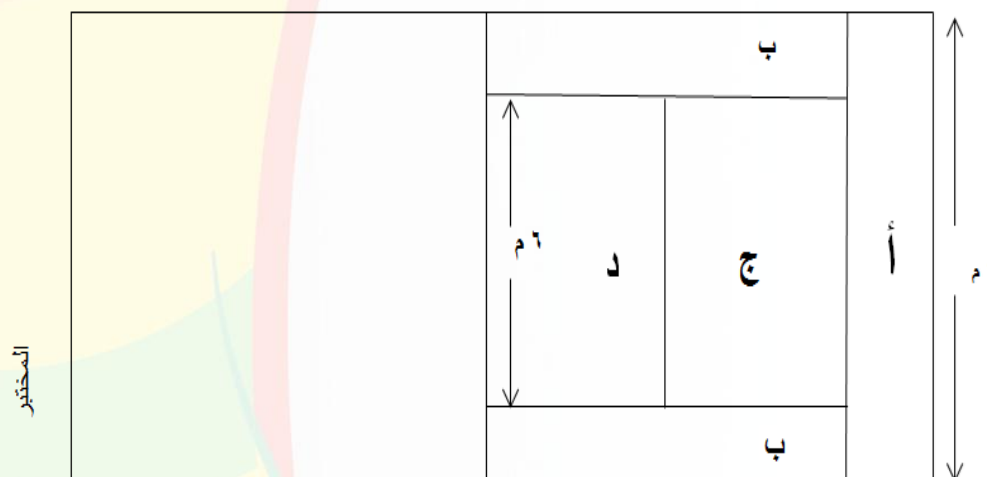
-3 points for each attempt inside area (B).

-2 points for each attempt inside area (C).

-1 point for each attempt inside area (D).

-(Zero) when the ball falls outside these areas. -When the ball falls on a line shared between two areas, the higher area score is given.

-The attempt is cancelled if the tester commits a legal error. Figure (1) Shows the smash serve skill test



## 2-6-2 Exploratory experiment:

The researchers conducted the exploratory experiment on two players from the research community of youth volleyball players on Saturday 8/10/2024, during which the technical performance test for the smash skill was applied .

## 2-6-3 Pre-tests:

The pre-test was conducted for the research sample under the supervision of the researchers. The special procedures for the test, the number of attempts, how to calculate and record points, and other test conditions were explained on Tuesday, August 13, 2024.

## 2-6-4 Main experiment (exercise application):

The researchers worked on preparing special exercises for mental rotation within the trainer's training curriculum and in the main section of the training unit in the special preparation phase with (12-13 minutes) and a short rest period (60-75 seconds), and the implementation of the exercises continued within the training program for a period of (8 weeks), at a rate of two units per week, and the total number of units (16 training units). , noting the



following points in the process of developing the exercises: The exercises used should be appropriate for the level of the sample, there should be a gradation in the level of difficulty of the exercises used in the units, and the exercises used should achieve their purpose. The application of the exercises prepared by the researchers began on Saturday, corresponding to (8/17/2024), at a rate of two training units per week on Saturday and Tuesday, and the researchers supervised the application of the special exercises prepared by them only and applied them to the research sample.

## 2-6-5 Post-tests: -

After the researchers completed the application of the prepared exercises on the research sample, over the course of (8) weeks starting from (8/17/2024) until (10/5/2024), the post-tests were conducted for the experimental group on (10/8/2024) corresponding to Tuesday to test the accuracy of the smash serve in volleyball. The researchers were keen to follow the same procedures and similar conditions in the pre- and post-tests and to provide the appropriate tools and the same assistant staff.

## 2-7 Statistical methods: -

In order to achieve the research procedures and reach results, the researcher used the statistical methods extracted from the statistical package Spss.

## 3- Presentation, analysis and discussion of the results:

3-1 Presentation of the results of the arithmetic means, standard deviations, and the calculated (t) value and their statistical significance for the tests and measurements in the pre- and post-test of the research sample individuals and discussion of them.

### Table (1)

Shows the values of the arithmetic means, standard deviations, and the calculated (t) value and its statistical significance for the tests and measurements in the pre- and post-test for the research sample individuals.

### Table (4)

Shows the results of the pre-arithmetic means, standard deviations for the groups, and the (t) value for the research group for the pre- and post-tests

Variable s	Pre-test		Post-test		F	AH	Calculated t value	Moral e level	Significance of differences
	A	S±	A	S±					
Smash serve	24.166	1.471	26.333	1.211	2.166	0.752	7.050	0.001	moral

## 3-2 Discussion of the results of the pre- and post-test of the researched skill tests:

By reviewing Table (3), we notice the existence of significant differences and the calculated (T) value in favor of the post-test for the skills studied, and this indicates the development of the skill level among the players, as the researchers attribute that the axis of the results reached by the researchers lies in the principle of achieving the necessary accuracy for motor performance with the synchronization that combines the player's efforts in terms of strength and motor coordination to achieve the ideal performance accuracy for the skill of the smash, and that this development is due to the application of special exercises prepared for mental rotation that helped effectively in developing the skill of the smash among the players, as the diversification of the exercises prepared by the researchers to encourage the development of performance accuracy and correct it for the players, which



was diagnosed from the results that were extracted, as training the player who performs the skill of the smash on the basis of the exercises prepared by the researchers for mental rotation has an important and major role in increasing his ability and potential to achieve ideal performance accuracy, which in turn leads to achieving the best results for the player alone and for the team as a whole, and thus achieving the required achievement.

The special exercises for mental rotation are an important ability in volleyball, as physical and skill performance in volleyball has become indispensable in one of its parts on this ability, as the player is required to focus the performance in two directions, one of which is the correct performance of the skill and the other is the speed of completing the required skill, and good knowledge of the playing areas is one of the factors of confidence for the player and has great importance in this game, so many specialists agreed that "the player who performs the skill of serving well is the one who is good at knowing the areas and their measurements accurately, as the exercises used had an impact on the level of skill performance among the players, as many players lose their skill accuracy when there is a defect in some abilities, including the accuracy and speed necessary to perform the serve, and the researchers agree with what (Omar Muhammad) sees, "as the fatigue generated by the effort expended, whether in training or competition, makes the player lose his focus and accuracy during skill performance."<sup>(1)</sup>

The researchers also displayed the performance of the trainees on a visual display screen in order to have a positive impact on improving the players' performance and avoiding monotony in the training process, as Mahmoud Daoud states <sup>(2)</sup>

"Getting rid of the traditional restrictions of training, as well as providing high-quality exercises, shortening time and effort, and providing information repeatedly and accurately with the correct model" (et al., 2000). The researchers were also keen to create motivation among players and urge them through the exercises used to develop themselves, as generating motivation among players increases the possibility of the player's rapid progress, as motivation is a condition of training. Nahida Abdul Zaid states that "the training process is every attempt made by the player to develop a specific skill or activity and the steps that follow in which the body's various senses and functional and psychological systems participate. <sup>(1)</sup>".

As for the control group, there were no differences between the post-tests in the accuracy of the smash serve despite the development that occurred. The researchers attribute this to the ineffectiveness of the exercises followed and not modern by the coach in the training units in the accuracy of skills in volleyball, especially the smash serve skill among the players, and then its reflection on the level of the players in the results of the smash serve accuracy test in volleyball.

## 4-Conclusions and recommendations

### 4-1Conclusions :

1. The special exercises for mental rotation prepared by the researchers have an effect on developing the accuracy of the skill performance of the smash serve in volleyball under study and in favor of the post-test2 .
2. The special exercises for mental rotation have developed the level of skill performance of the smash serve skill in volleyball and in favor of the post-test.

<sup>(1)</sup>Omar Mohammed Majeed: The effect of special weight training exercises to develop strength endurance and performance of some complex offensive skills in basketball for ages (18) years and younger, (Master's Thesis), University of Baghdad, College of Physical Education, 2009, p. 113.

<sup>(2)</sup> Mahmoud Daoud: The Football Coach and Training, (Dar Al Fikr Al Arabi, 2020), p. 65

<sup>(1)</sup>Mustafa Hassan Bahi, Samir Abdel Qader Gad: Psychology of Sports Excellence, Development of Mental Skills: (Cairo, Nahdet Misr Library, 1999.





- The prepared exercises have affected the development of the smash serve skill in volleyball and reduced the percentage of errors during the final performance and in favor of the post-test

## 4-2 Recommendations

- The researchers recommend using special suggested exercises that take into account the accuracy of the areas in terms of angles and correct measurements for skill performance in order to achieve rapid development in mastering the skill of the smash serve in volleyball
- The researchers recommend using modern skill performance accuracy exercises by coaches to identify strengths and weaknesses when performing skills in general and the skill of serving in particular for players who are late in controlling skills
- The researchers recommend conducting similar research and different samples of auxiliary tools
- The researchers recommend conducting future studies soon on the work of the researchers within the recommendations.

## References

- Omar Mohammed Majeed: The effect of special weight training exercises to develop strength endurance and performance of some complex offensive skills in basketball for ages (18) years and younger, (Master's Thesis), University of Baghdad, College of Physical Education, 2009..
- Mahmoud Daoud: The Football Coach and Training, (Dar Al Fikr Al Arabi, 2020), p. 65
- Mustafa Hassan Bahi, Samir Abdel Qader Gad: Psychology of Sports Excellence, Development of Mental Skills: (Cairo, Nahdet Misr Library, 1999.

### Appendix (1) Assistant Team

T	the name	Work place	Specialization
1	DR- Ali Aziz	Ministry of Education	Sports training - volleyball
2	Louay Bassem Delf	Ministry of Youth and Sports	Sports training - basketball
3	Taher Thamer Issa	Ministry of Youth and Sports	Sports training - basketball

### Appendix (2) Models for special exercises for mental rotation

T	Exercise name	the explanation
1	T1	The player carries the ball ready to serve the smash and when ordered to serve it to a specific area in center 5 measuring 2*2m.

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2	T2	The player holds the ball ready to serve the ace and when ordered to serve from a specific area above the net 1 m wide to the 5th position
3	T3	The player stands in front of the service line and after being instructed to send the ball to a circular area with a diameter of 50 cm in center 6.
4	T4	The player stands in front of the service line, then after the command, he carries the ball and performs the smash serve with his eyes closed to position number 5 or 6 by jumping from the highest possible point

## Appendix 3

Sample training modules for the experimental group

First week

First training unit

Place Salikh Sports Club

: Day and date: Saturday 8/17/2024 Total time: 80 min

sections	Time	Exercise	intensity	Perce time	repetitio ns	Groups	Comfort	Workin g time	Rest time	زمن العمل Total	Notes
Main Section	15M										
Main Section	/22.1M	T2	%65	/15S	10	4	/ 60S	/ 60S	/240S	/5M	Transition time from one exercise to another (1) minute
		T1	%65	/20S	10	3	/ 60S	/ 60S	/180S	/4M	
		T3	%75	/25S	10	4	/ 60S	/100S	/240S	/5.6 M	
		T4	%75	/30S	10	3	/60S	/ 90S	/180S	/4.5 M	
Final section	10M										
the total	/80M						/ 4 M	/5.1M	/ 14M	/19.1 M	/ 3M